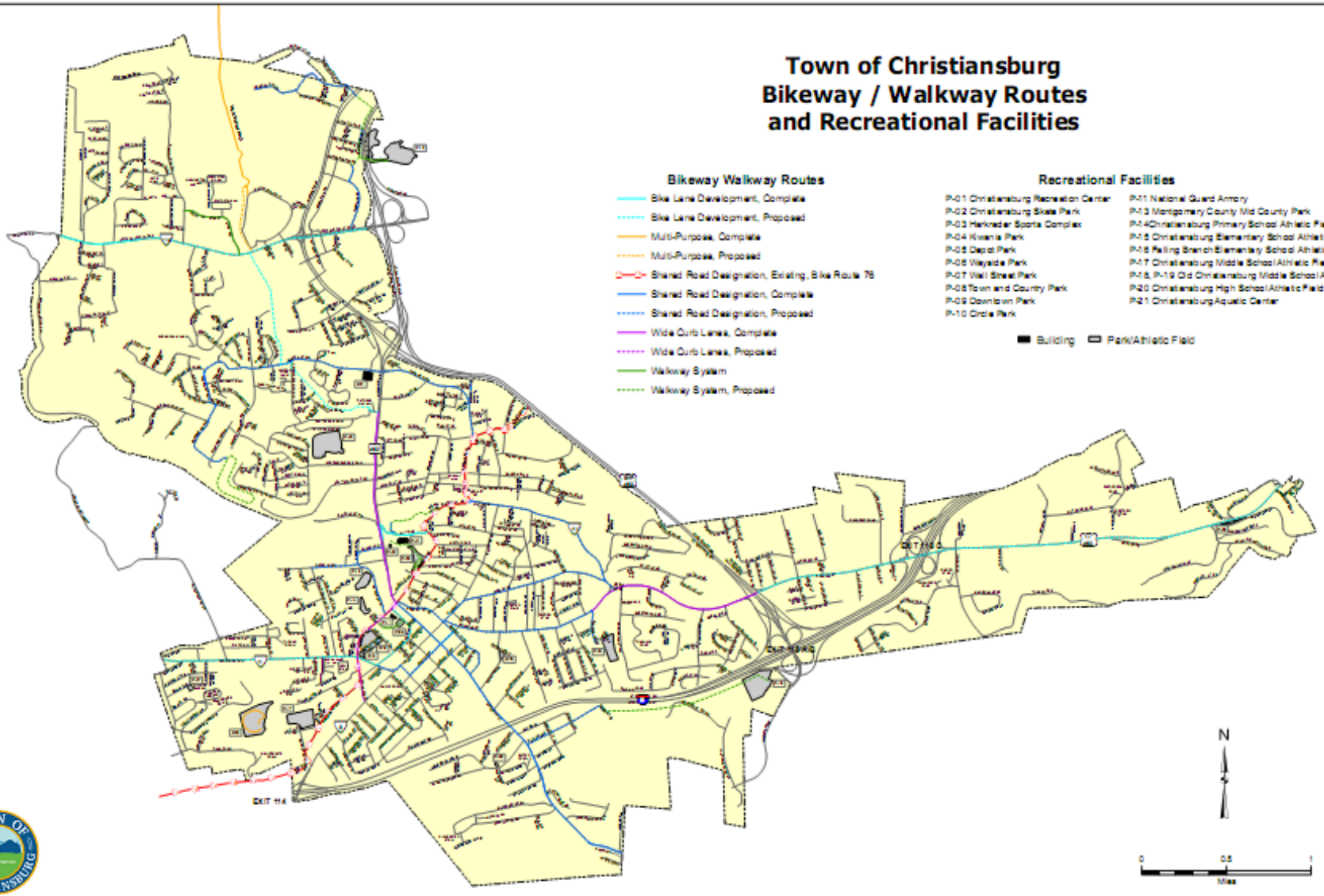
Street Sections and Sidewalks

Prepared by Town of Christiansburg
Planning and Engineering Departments
March 2010

Town of Christiansburg
Bikeway / Walkway Routes and Recreational Facilities



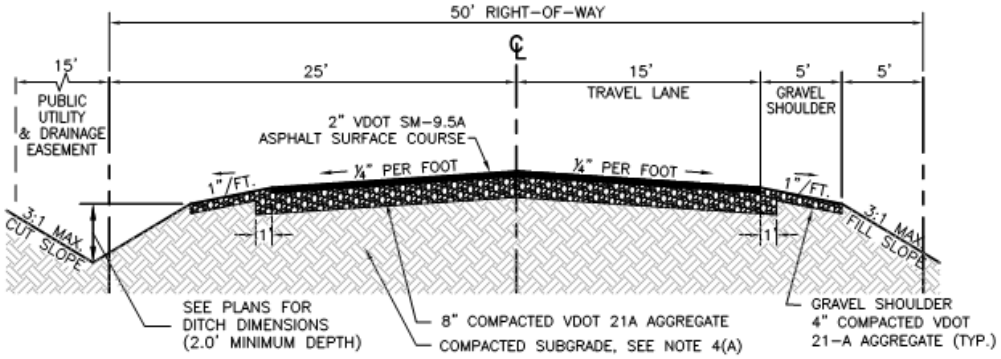
Town of Christiansburg (approximate figures)

- Total Lane Miles (centerline) = 136 miles
- Total Lane Miles (centerline) with sidewalks on one side = 6.4 miles (4.7%)
- Total Lane Miles (centerline) with sidewalks on both sides = 4.7 miles (3.5%)
- Total Lane Miles (centerline) with curb and gutter = 24.8 miles (18.2%)

Note: Pros and cons in this presentation are subjective and may not be a complete list. Allowance of on-street parking is particularly subjective as to whether it is a pro or con; it is included as a pro as it has been the Town's policy to allow on-street parking.

Town standard 30’ of pavement

Pros	Cons
• Accommodates on-street parking	• More pavement costs than VDOT standard section
• Works well within 50’ right-of-way	• More stormwater run-off than VDOT standard section
• Cost savings of not requiring curb and gutter	• Road shoulder degradation results from parked cars and increases maintenance
• Cost savings if sidewalks are not required	
• Ditch section streets results in water quality benefit (compared to storm sewer/piping)	
• Promotes easier snow removal operations	
• Accommodates easier street sweeping operations vs. roll top curb and gutter	



SHOULDER AND DITCH ROADWAY SECTION

NO SCALE

NOTES:

1. ALL PUBLIC IMPROVEMENTS SHALL BE WARRANTEED AND BONDED FOR ONE YEAR FROM THE DATE OF ACCEPTANCE BY THE TOWN OF CHRISTIANSBURG IN ACCORDANCE WITH THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE. A REDUCED BOND AMOUNT SHALL BE MAINTAINED BY THE TOWN OF CHRISTIANSBURG FOR THE DURATION OF THE WARRANTY PERIOD.

2. SHOULD THE DEVELOPER, AT HIS OR HER OPTION, DIRECT PLACEMENT OF THE ASPHALT SURFACE COURSE DURING CONSTRUCTION, THE DEVELOPER IS HEREBY ADVISED THAT SURFACE ASPHALT DETERIORATION SUCH AS SETTLING, RUTTING, CRACKING OR BREAKING MAY OCCUR DURING THE CONSTRUCTION AND WARRANTY PERIOD. SHOULD SURFACE ASPHALT DETERIORATE, AT THE TOWN'S DIRECTION, SOME OR ALL OF THE ROAD SHALL BE REPAIRED, MILLED IF NECESSARY, AND RESURFACED.

3. THE DEVELOPER SHALL HAVE THE OPTION TO UTILIZE A STREET SECTION AS DESCRIBED BELOW IN ORDER TO MINIMIZE THE POTENTIAL FOR RESURFACING. THE APPLICATION OF THE SURFACE COURSE SHALL BE DELAYED UNTIL THE END OF THE CONSTRUCTION PERIOD. CONTRACTOR SHALL REPAIR AREAS AS DIRECTED BY THE TOWN, THOROUGHLY CLEAN BASE ASPHALT COURSE, AND OBTAIN TOWN APPROVAL PRIOR TO PLACEMENT OF TACK COAT AND SURFACE COURSE. STREET SECTION SHALL CONSIST OF THE FOLLOWING:
   - 1½" VDOT SM-9.5A ASPHALT SURFACE COURSE
   - 3" VDOT BM-25.0 ASPHALT BASE COURSE
   - 6" COMPACTED VDOT 21-A SUBBASE AGGREGATE ON A COMPACTED SUBGRADE

4. CONTRACTOR SHALL CONTACT THE TOWN OF CHRISTIANSBURG FOR INSPECTION OF THE FOLLOWING:
   - A.) SUBGRADE PRIOR TO PLACEMENT OF AGGREGATE BASE OR SUBBASE COURSE. SUBGRADE SHALL BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY OBTAINED IN ACCORDANCE WITH ASTM D-698, STANDARD PROCTOR METHOD.
   - B.) AGGREGATE SUBBASE COURSE PRIOR TO PLACEMENT OF ASPHALT BASE COURSE.
   - C.) AGGREGATE BASE COURSE PRIOR TO PLACEMENT OF ASPHALT SURFACE COURSE.
   - D.) ASPHALT BASE COURSE PRIOR TO PLACEMENT OF TACK COAT AND ASPHALT SURFACE COURSE.

5. CONTRACTOR SHALL APPLY ASPHALT PRIME COAT TO BASE OR SUBBASE AGGREGATE COURSE PRIOR TO PLACEMENT OF ASPHALT SURFACE OR BASE COURSE. TACK COAT SHALL BE APPLIED TO ASPHALT BASE COURSE PRIOR TO PLACEMENT OF ASPHALT SURFACE COURSE. MATERIALS AND PROCEDURES FOR TACK COAT AND PRIME COAT SHALL CONFORM TO SECTIONS 310 AND 311, RESPECTIVELY, OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS.

6. THE METHODS AND MATERIALS USED IN THE CONSTRUCTION OF ALL STREETS SHALL CONFORM TO ALL CURRENT VDOT AND TOWN OF CHRISTIANSBURG STANDARDS AND SPECIFICATIONS.

7. MAXIMUM ALLOWABLE ROADWAY CENTERLINE GRADE SHALL BE 12%.

8. CUT SLOPES MAY BE INCREASED TO 2:1 ONLY WHEN APPROVED BY THE TOWN OF CHRISTIANSBURG ENGINEERING DEPARTMENT.

9. DEVELOPER/CONTRACTOR SHALL INSTALL STANDARD CONSTRUCTION ENTRANCE AS SHOWN IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (STD. AND SPEC. 3.02) AT ALL DRIVEWAY LOCATIONS TO MINIMIZE THE TRANSPORT OF DUST, DIRT, AND MUD ONTO ASPHALT SURFACES.

10. TRACK CONSTRUCTION EQUIPMENT SHALL NOT BE ALLOWED TO OPERATE ON OR ACROSS STREETS WHICH HAVE RECEIVED THE FINAL SURFACE ASPHALT COURSE.

11. A FIELD REVIEW SHALL BE MADE BY THE TOWN OF CHRISTIANSBURG DURING CONSTRUCTION TO DETERMINE THE ADEQUACY OF CHANNELS AND DITCHES AS CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLAN. IN THE EVENT OF SCOUR AND EROSION, THE OWNER SHALL INSTALL ADDITIONAL MEASURES AS DETERMINED AND REQUIRED BY THE TOWN.

TOWN OF CHRISTIANSBURG
ENGINEERING DEPARTMENT
100 EAST MAIN STREET
CHRISTIANSBURG, VA 24073
(540) 382-6120 PHONE
(540) 381-7238 FAX
engineering@christiansburg.org

TYPICAL ROAD SECTION WITH SHOULDER AND DITCH

DATE: 01 NOV 2004
SCALE: N.T.S.
DETAIL NO.
XS-1

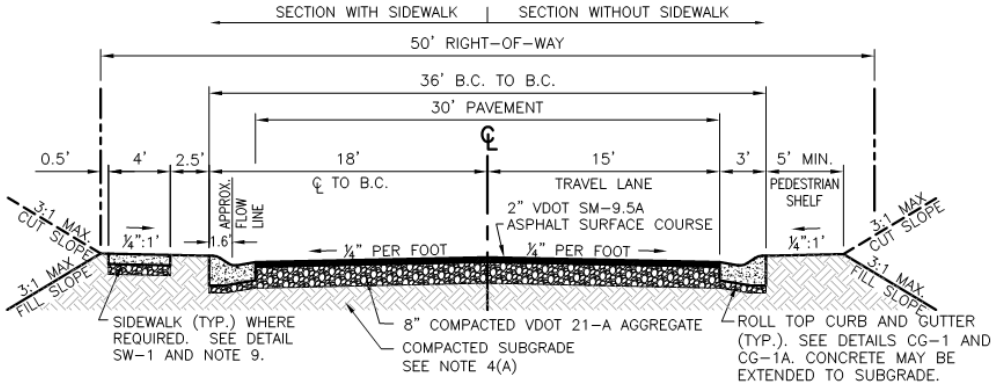
George Edward Via (Vista Via, Phase III)

Sage Lane (New River Village, Phase VI)

Oak Tree Boulevard (Oak Tree, Ph. 7, 8, & 9

Town standard roll top curb and gutter
(30’ pavement, 36’ back of curb to back of curb)

Pros	Cons
• Accommodates on-street parking	• People often park on the sidewalks defeating the purpose of sidewalks and causing wear and tear on the sidewalks (enforcement issue)
• Works well within 50’ right-of-way	• Extra costs of curb and gutter and sidewalks (if required)
• Allows for flexible location of driveways	• Extra costs of curb inlets and underground storm sewer pipe
• Lower cost versus standard curb and gutter	• Loss of water quality benefit (compared to ditch sections)
	• Extra maintenance costs for the Town
	• Street sweeper operation is not as efficient
	• More stormwater run-off than VDOT standard section
	• Requires transition at inlets



ROLL TOP CURB AND GUTTER ROADWAY SECTION

NO SCALE

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   - 3" VDOT BM-25.0 ASPHALT BASE COURSE
   - 6" COMPACTED VDOT 21-A SUBBASE AGGREGATE ON A COMPACTED SUBGRADE

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7. MAXIMUM ALLOWABLE ROADWAY CENTERLINE GRADE SHALL BE 12%.

8. CUT SLOPES MAY BE INCREASED TO 2:1 ONLY WHEN APPROVED BY THE TOWN OF CHRISTIANSBURG ENGINEERING DEPARTMENT.

9. STANDARD ENTRANCE GUTTERS MAY BE OMITTED WHEN USING ROLL CURB. MINIMUM SIDEWALK THICKNESS SHALL BE 7-INCHES WHERE CROSSED BY DRIVEWAYS.

10. DEVELOPER/CONTRACTOR SHALL INSTALL STANDARD CONSTRUCTION ENTRANCE AS SHOWN IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (STD. AND SPEC. 3.02) AT ALL DRIVEWAY LOCATIONS TO MINIMIZE THE TRANSPORT OF DUST, DIRT, AND MUD ONTO ASPHALT SURFACES.

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TYPICAL ROAD SECTION WITH ROLL TOP CURB AND GUTTER

DATE: 01 NOV 2004
SCALE: N.T.S.
DETAIL NO.
XS-3A

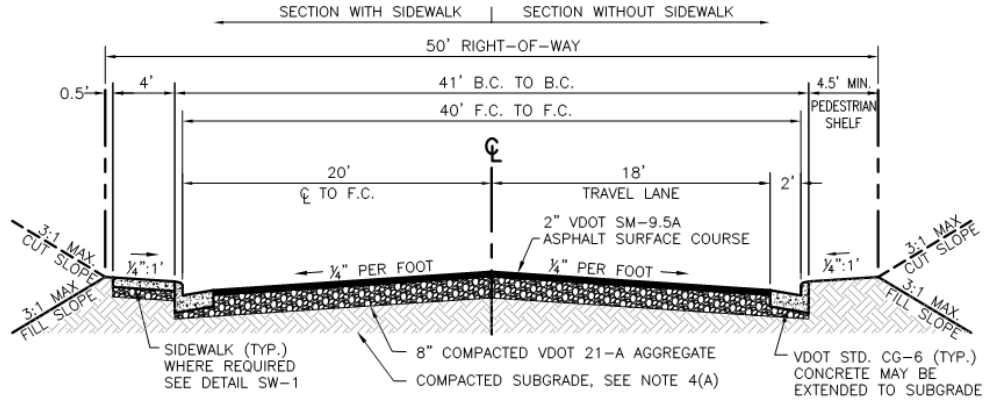
Phoenix Blvd. (Cambria Crossing, Ph. I)

(13.5’ pavement, 16.5’ driving aisle - one way traffic)

Windsor Drive (Windsor Estates, Ph. I)

Town – standard traditional curb and gutter (36’ pavement, 40’ face of curb to face of curb, 41’ back of curb to back of curb)

Pros	Cons
• Accommodates on-street parking	• Extra costs of additional pavement and curb and gutter (and sidewalks if required)
• More accommodating for sidewalk installation than roll top curb and gutter	• Extra costs of curb inlets and underground storm sewer
• Fairly common for commercial development (typically provided in Town Business Districts)	• Loss of water quality benefit (compared to ditch sections)
• Accommodates easier street sweeping operations vs. roll top curb and gutter	• More stormwater run-off than VDOT standard section
	• Extra maintenance costs for the Town
	• May require greater than 50 feet of right-of-way



CURB AND GUTTER ROADWAY SECTION

NO SCALE

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TYPICAL ROAD SECTION
WITH CURB AND GUTTER

DATE: 01 NOV 2004
SCALE: N.T.S.
DETAIL NO.
XS-2

Robert Street (Olde Town Estates)

Alder Lane (Windmill Hills, Section XII)

Lions Gate

(30’ standard curb and gutter – one-way traffic)

Spradlin Farms

VDOT standard (pavement widths vary)

up to 2,000 AADT requires 20’ pavement, 24’ face of curb to face of curb; 2,000-4,000 AADT or ditch section requires 24’ pavement (26’ face of curb to face of curb)

Pros	Cons
• Less cost with narrower pavement width (with developer cost saving hopefully passed onto home buyers)	• Not very accommodating for on-street parking
• Less stormwater run-off than 30’ or greater pavement widths	• Extra costs of sidewalks (trails can be substituted)
• Less maintenance cost (if curb and gutter not required)	
• Ditch sections result in water quality benefit (compared to storm sewer/piping)	

GEOMETRIC DESIGN STANDARDS FOR RESIDENTIAL SUBDIVISION STREETS (GS- SSR)

TABLE 1– CURB AND GUTTER SECTION*

		HORIZONTAL AND VERTICAL CONTROLS MAXIMUM 2:1 CUT OR FILL SLOPE					CURB AND GUTTER ROADWAYS (SEE SPECIAL WIDTH REDUCTION CRITERIA)	
PROJECTED TRAFFIC VOLUME (ADT)	MINIMUM DESIGN SPEED (MPH) (NOT POSTED SPEED)	CURVE DATA		SUGGESTED MAXIMUM % GRADE	MINIMUM SIGHT DISTANCE		MINIMUM WIDTH (MEASURED FROM FACE OF CURB TO FACE OF CURB) (PARKING ASSUMED) (4)	CLEAR ZONE WITHOUT PARKING (MEASURED FROM FACE OF CURB) (6)
		MINIMUM CENTERLINE RADIUS	SUPER-ELEV.		STOPPING	INTERSECTIONS		
UP TO 400	20	110' (5)	NONE	10 (1)	125' (7)	200'	28' (2)	1.5'
401 - 2000	25	200'	NONE	10 (1)	155'	280'	36'	1.5'
2001 - 4000	30	335'	NONE	10 (1)	200'	335'	40' (3)	6'

NOTES:

For streets with volumes over 4000 or serving heavy commercial or Industrial traffic; use the appropriate geometric design standard. (see VDOT's Road Design Manual)

The roadway with the highest volume will govern the sight distance.

Right of Way requirements can be found in Section B-4.1 Right Of Way

1. For mountainous terrain, maximum percent of grade may be 16% for ADT up to 400 and 14% for 401-4000 ADT.
2. 26'allowed for streets< 400 vpd with concurrence of local officials.
3. 36' allowed for streets that are internal to the sub-division, with concurrence of local officials.
4. Pavement widths may be reduced if parking is not allowed. See page 12 of this Guide for roadway width exceptions criteria.
5. 100' minimum radius allowed in mountainous terrain
6. For curb and gutter streets with parking lanes, the clear zone is accommodated within the parking lane. However, VDOT has established a 3' minimum setback requirement behind the curb.
7. Based on 25 MPH Design Speed

* Rev.1/06

GEOMETRIC DESIGN STANDARDS FOR RESIDENTIAL SUBDIVISION STREETS (GS- SSR)

TABLE 2 – SHOULDER AND DITCH SECTION

		HORIZONTAL AND VERTICAL CONTROLS Maximum 2:1 Cut or Fill Slope					SHOULDER AND DITCH ROADWAYS Minimum ditch width (front slope*) should be 4 feet or greater, based on slopes of 3:1 or flatter (Gentler slopes promote homeowner maintenance of ditches) *Width includes 3' for the G.R. Installation			
PROJECTED TRAFFIC VOLUME (ADT)	MINIMUM DESIGN SPEED (MPH) (NOT POSTED SPEED)	CURVE DATA		SUGGESTED MAXIMUM % GRADE	MINIMUM SIGHT DISTANCE		MINIMUM PAVEMENT WIDTH	MINIMUM GRADED SHOULDER WIDTH		CLEAR ZONE (measured from edge of roadway pavement)
		MINIMUM CENTERLINE RADIUS	SUPER-ELEV.		STOPPING	INTERSECTIONS		FILL W/ G.R.*	CUT OR FILL	
UP TO 400	20	110' (6)	NONE	10 (2)	125'(7)	200'	18'	7'	4' (1)	6' (3)
401 - 2000	25	200'	NONE	10 (2)	155'	280'	22' (4)	9'	6' (5)	7'
2001 - 4000	30	335'	NONE	10 (2)	200'	335'	24'	11'	8'	12'

NOTES:

For streets with volumes over 4000 or serving heavy commercial or industrial traffic; use the appropriate geometric design standard. (see VDOT's Road Design Manual)

The roadway with the highest volume will govern the sight distance.

Right Of Way requirements can be found in Section B-4.1 Right Of Way.

1. When pedestrian facilities are provided behind ditches, the shoulder width may be reduced to a minimum of 2 feet.
2. For mountainous terrain, maximum percent of grade may be 16% for ADT up to 400 and 14% for 401-4000 ADT.
3. Clear zone widths may be reduced with the concurrence of the resident engineer where terrain or social/environmental impact considerations are appropriate.
4. 18' minimum with < 600 ADT in mountainous terrain. For normal conditions 20' minimum with < 1500 ADT.
5. 2' minimum in mountainous terrain with < 600 ADT. For normal conditions 5' minimum with 401-1500 ADT.
6. 100' minimum radius allowed in mountainous terrain.
7. Based on 25 MPH Design Speed.

* Rev. 7/06

GEOMETRIC DESIGN STANDARDS FOR RESIDENTIAL SUBDIVISION STREETS (GS- SSR)
TABLE 3 – ONE-LANE (ONE-WAY) SUBDIVISION STREETS

TRAFFIC	PROJECTED RAFFIC VOLUME (ADT)	DESIGN SPEED (MPH) (NOT POSTED SPEED)	HORIZONTAL AND VERTICAL CONTROLS Maximum 2:1 cut or fill slope				ROADWAY SECTION CRITERIA					
					MINIMUM SIGHT DISTANCE		SHOULDER AND DITCH ROADWAYS Minimum ditch width (front slope*) should be 4 feet or greater, based on slopes of 3:1 (Gentler slopes promote homeowner maintenance of ditches) *Width includes 3' for G.R. installation.				CURB AND GUTTER ROADWAYS	
			MIN. CURVE RADIUS W/O SUPER-ELEV.	SUGGESTED MAXIMUM % GRADE	STOPPING	INTER-SECTION	MINIMUM PAVEMENT WIDTH	FILL W. G.R.*	CUT OR FILL W/O G.R.	CLEAR ZONE (FROM EDGE OF TRAVELWAY)	WIDTH MEASURED FROM FACE OF CURB TO FACE OF CURB WITH OR WITHIOUT PARKING ON ONE SIDE	CLEAR ZONE (FROM FACE OF CURB)
ONE-WAY (1- LANE)	≤ 400	20	110' (5)	10% (2)	125' (6)	200'	16'(4)	7'	4' (1)	6' (3)	22'	1.5'

GENERAL NOTES:

These design standards may also be used for one-way divided pairs, such as subdivision entrances with wide medians.

For streets anticipated to serve mixed residential-commercial, commercial, or industrial traffic, use the appropriate urban standard in the road design manual. In such settings, where

- On-street parking is anticipated; a parking lane width not less than 7 feet should be used.
- Normal minimum shoulder widths and construction practices make parking along rural typical roadway sections inappropriate if not illegal.

Right Of Way requirements can be found in Section B-4.1 Right of Way

FOOTNOTES:

1. When pedestrian facilities are provided behind ditches, the shoulder width may be reduced to a minimum of 2 feet.
2. The maximum percent of grade suggested may be adjusted to 16% in mountainous terrain.
3. Clear zone widths may be reduced with the concurrence of the resident engineer where terrain or social/environmental impact considerations are appropriate
4. For traffic volumes > 400 ADT, pavement widths will be established by the resident engineer
5. 100' minimum radius allowed in mountainous terrain.
6. Based on 25 MPH Design Speed.

* Rev. 7/07

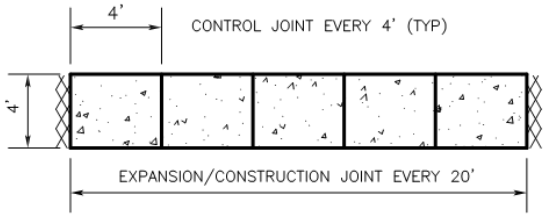
Green Ridge Road (Walnut Creek in County) (18’ pavement)

Green Ridge Road (Walnut Creek in County)

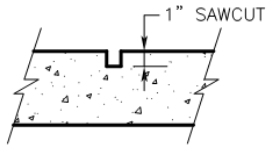
(18’ pavement)

Sidewalk requirement (4’ standard)

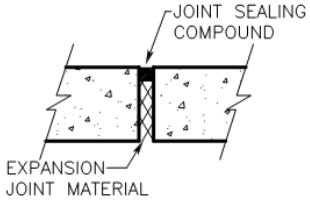
Pros	Cons
• Increased accessibility, walkability, connectivity	• Extra costs of sidewalks (and curb and gutter and underground storm sewer) will be passed on with home sales prices
• Increased property values	• Extra maintenance to the Town (the Town currently has four people for concrete work and sidewalks covering approximately 8.2% of the Town – though not all concrete work is sidewalk or curb and gutter)
• Increased pedestrian safety	• Trails may be a suitable, lower cost alternative
• Provides alternative transportation	• Ditch sections result in water quality benefit (compared to storm sewer/piping)
• Increased opportunity for recreational and health benefits	• Increased repair cost where utility open cuts are required
	• More stormwater run-off
	• May require greater than 50’ right-of-way depending on street section used
	• May result in “sidewalks to nowhere” (particularly for smaller projects or in-fill projects)



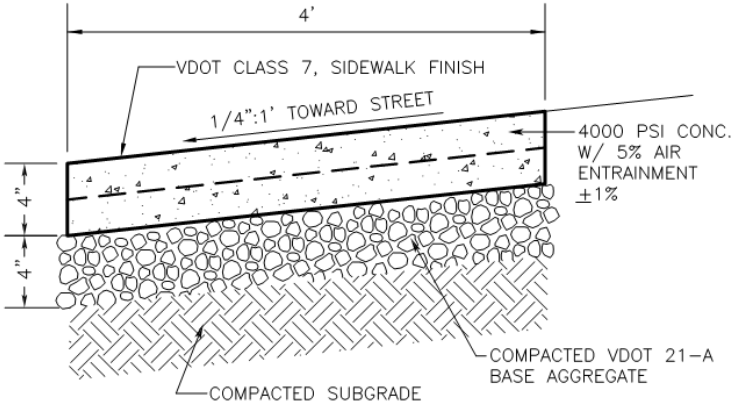
PLAN



CONTROL JOINT DETAIL



EXPANSION/CONSTRUCTION JOINT DETAIL



SECTION

NOTE:

ALL CONSTRUCTION MATERIALS AND METHODS SHALL CONFORM TO VDOT STANDARDS AND SPECIFICATIONS.

TOWN OF CHRISTIANSBURG VA

ENGINEERING DEPARTMENT
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TYPICAL SIDEWALK WITHIN TOWN RIGHT-OF-WAY

DATE: 01 NOV 2004
SCALE: N.T.S.
DETAIL NO.
SW-1