

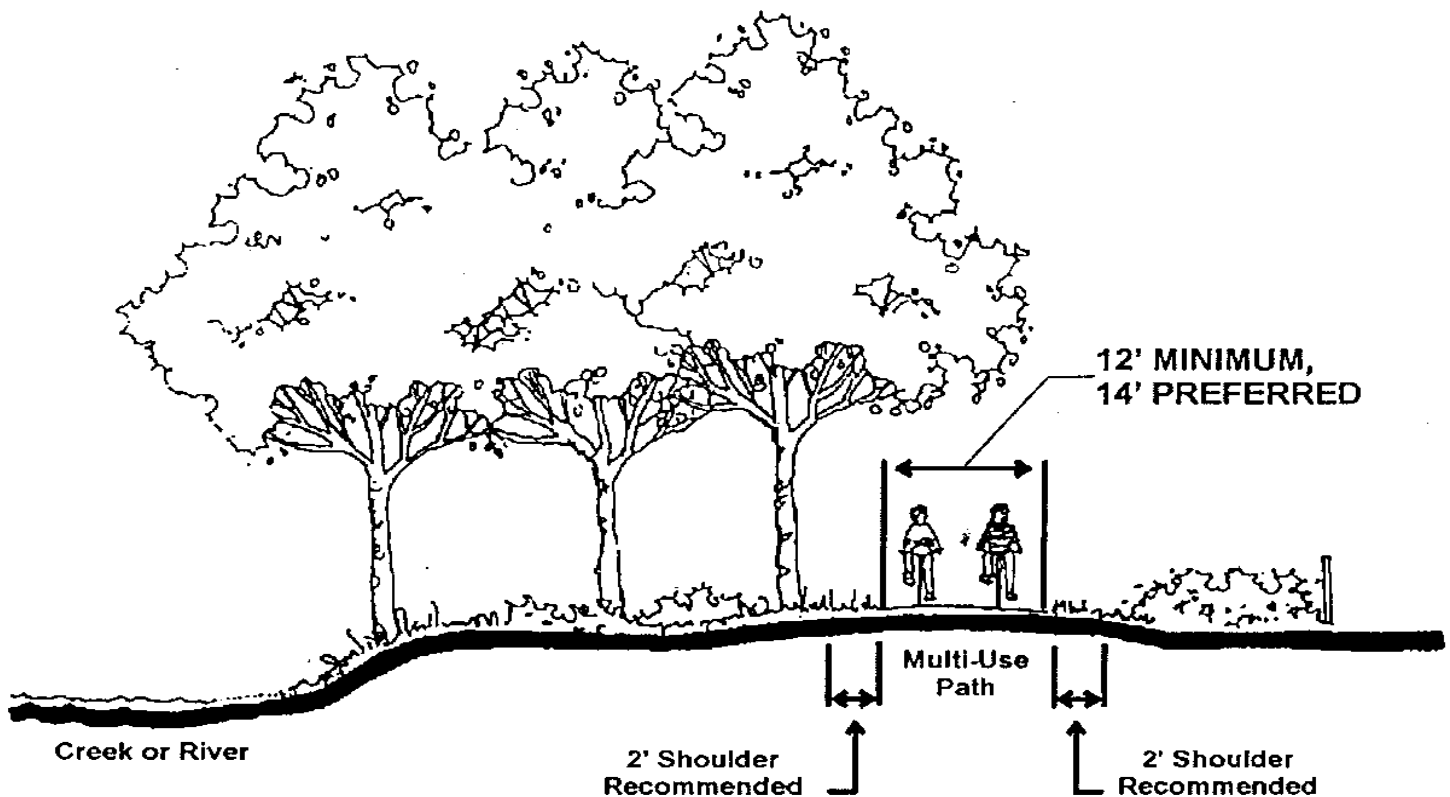
## GENERAL

The subject of "Design Standards" for bicycle and pedestrian facilities has been the focus of several excellent publications that are listed in Appendix E, along with other related publications. Because of the breadth of this topic, this section will focus on summarizing the general design standards, or guidelines, for development of the proposed bicycle and pedestrian network for the City of Hendersonville.

In determining appropriate cross-sections, striping, and signage for specific bicycle paths, routes, and lanes, consideration should be given, as a minimum, to AASHTO's Guide for the Development of Bicycle Facilities and the Manual on Uniform Traffic Control Devices (MUTCD), both referenced in Appendix E.

### BIKE PATH (CLASS I - SHARED-USE PATH OR MULTI-USE PATH)

Bike paths shall be at least 12 feet wide with a 2% cross slope and may include a centerline stripe to separate each direction of travel. A 14' width is preferable, and should be used if conditions permit. A two-foot stabilized shoulder and clear zone (unpaved) should be provided on each side of multi-use paths. Pavement structure for bicycle and pedestrian paths shall be asphaltic concrete or portland cement concrete.



**FIGURE V-1**  
**BIKE PATH - GENERAL CROSS-SECTION**

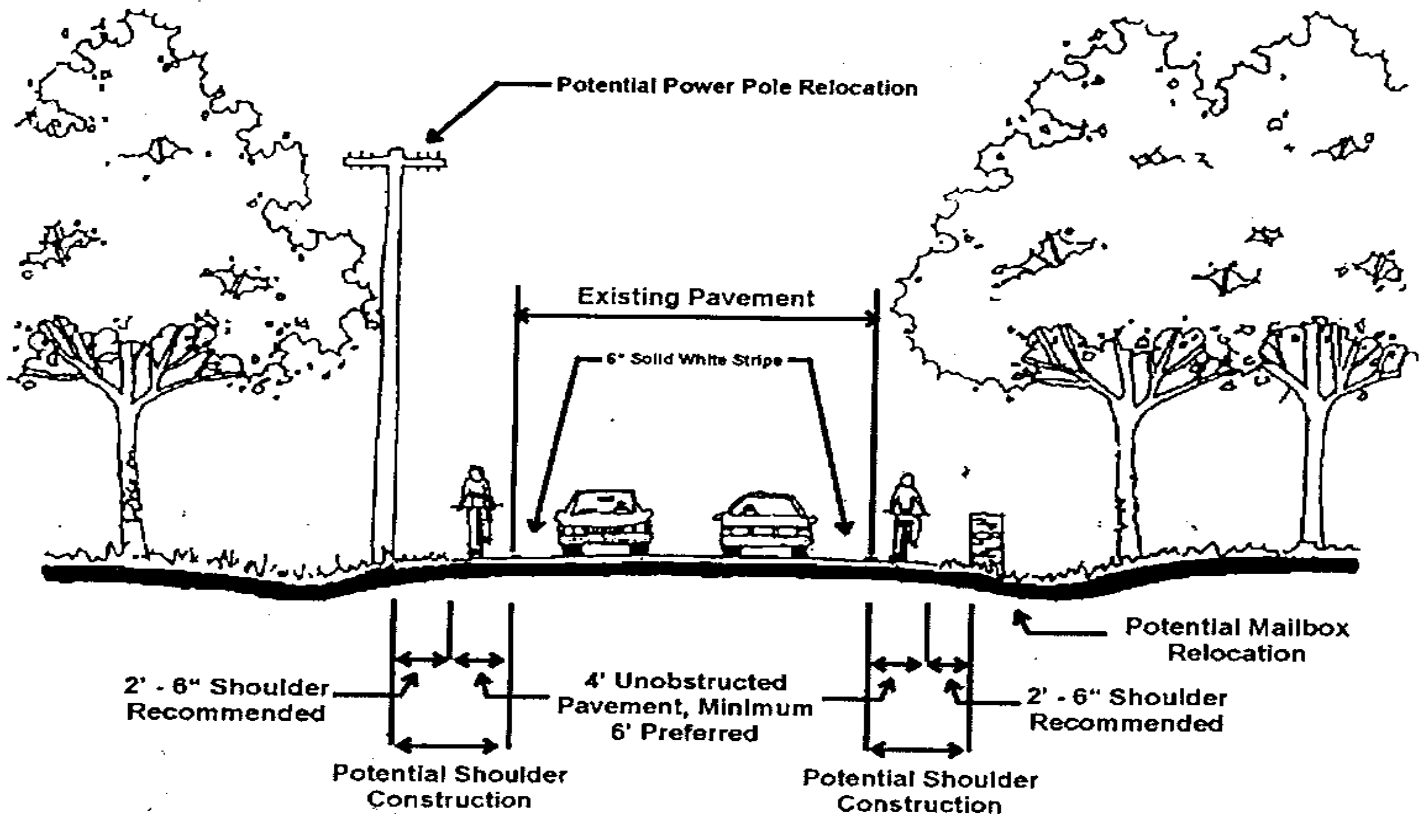
Asphaltic concrete paving is generally preferred to portland cement concrete paving because of the ease of installation, lesser expense cost and a smoother riding/walking surface. However, Roller Compacted Concrete (RCC) provides for an excellent finished surface and may have the same advantages as asphaltic concrete paving with regard to ease of installation, cost and smooth surface.

A typical asphaltic concrete paving section would consist of a stabilized base, 4" of compacted aggregate and 2" of asphaltic concrete surface. In some cases, a stabilized subgrade with 3" to 6" of asphaltic concrete surface may be suitable, depending on existing conditions.

A typical portland cement section would consist of stabilized base and 4" of concrete (3500 psi at 28 days) with a welded wire fabric for reinforcement. Expansion joints (premolded joint filler) should be used at no more than 25 feet on center and contraction joints (scored joints) at no more than 5 feet on center.

### **BIKE LANE (CLASS II - BICYCLES ONLY)**

Bike lanes shall be 4' unobstructed width, minimum, and 6' width shall be used where conditions permit. Typically, these facilities require that additional pavement be provided on the roadway system in order to separate bicycle lanes from the vehicular travel lanes.

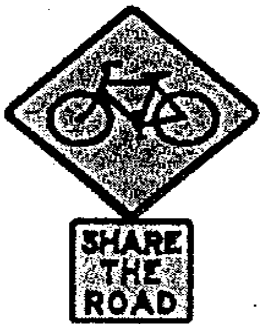


**FIGURE V-2  
BIKE LANE - GENERAL CROSS-SECTION**

Bicycle lanes work best on roadways where turning traffic volumes are low. For bicycle lanes on roadways without parking, it is recommended that four to six feet of pavement be provided on each side of the roadway, excluding the gutter on a curbed street. Bicycle lanes are to be separated by markings from the vehicle travel lanes. On roadways with parking, the bike lane should be six feet wide and located between the parking lane and the outside travel lane.

The pavement markings for bike lanes at intersections are especially critical. There are many potential conflict points at intersections, and special consideration must be given to proper pavement markings for bicycles. The Manual on Uniform Traffic Control Devices (MUTCD) and the AASHTO Guide for the Development of Bicycle Facilities include standard pavement marking details for bicycle lanes at intersections.

### **BIKE ROUTE (CLASS III - SHARED ROADWAY)**



It is preferred that roadways designated as bike routes have wider than normal lanes and/or low traffic volumes, although this is not mandatory. Bike routes shall be designated by means of signage with little or no use of striping to indicate that the corridor is designated as a bicycle route. Also, unlike a bike lane, a bicycle route is not separated from the vehicular traffic by pavement markings.

Additional pavement, or pavement markings, do not have to be provided on bicycle route segments of the network. However, it is very desirable for wide outside lanes to be provided for roadways designated as bicycle routes. Preferably, bicycle routes should have outside lanes with widths of 14 to 15 feet, excluding the gutter. All roadways within the City that are designated as bike routes, and are recommended to be widened in the future, should include wide outside lanes.

### **SIDEWALKS**

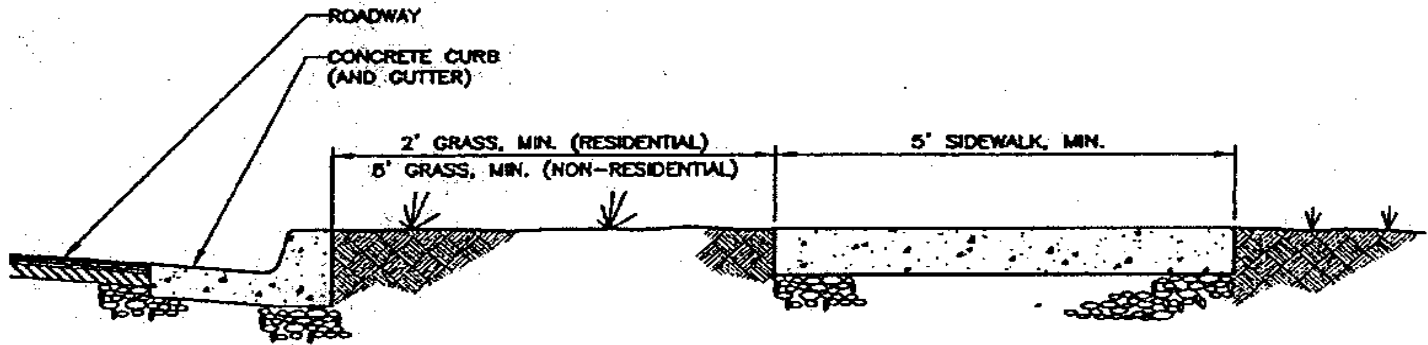
Sidewalks shall be at least 5 feet wide with a 2% cross slope (1/4" per foot). More than 5 feet should be used if conditions permit (if so, this should be reviewed by Planning and Public Works). A grass strip shall be provided between the back of curb and edge of sidewalk as shown in Figure V-3. Also, a two foot stabilized shoulder and clear zone (unpaved) is desirable on the side away from the roadway.

Typical pavement structure for sidewalks is stabilized base and 4" of portland cement concrete (3500 psi at 28 days) with a welded wire fabric for reinforcement. Expansion joints (premolded joint filler) should be used at no more than 25 feet on center and contraction joints (scored joints) at no more than 5 feet on center. Standard finish shall be broom finish according to City standards.

Sidewalks should be located on public property, or in access and utility easements, adjacent to the street right-of-way line, with maintenance responsibility assigned to the

City. Handicapped ramps should be provided at the intersections of all public roadways, and at other locations as directed by the Public Works Director.

Sidewalks should have no obstructions such as mailboxes, streetlights, utility poles, guy wires and fire hydrants. Provisions for offsets around such obstructions should be included in the City's sidewalk regulations.



**FIGURE V-3  
SIDEWALK - GENERAL CROSS-SECTION**

## **DRAINAGE**

Proper drainage shall be provided for all proposed multi-use paths and sidewalks and included as a part of the development of each component of the bicycle and pedestrian plan. As a general guide, a 5-year storm should be used, as a minimum, to size culverts beneath multi-use paths and sidewalks. Professional judgment shall be used to increase the size of culverts as appropriate.