

APPENDIX F – COST ESTIMATES

Appendix Outline

- F.0 On-Road Bicycle Facilities
- F.1 Off-Road Bicycle Facilities
- F.2 Intersection Crossings
- F.3 Bicycle Parking Facilities
- F.4 Streetscape Improvements

Preliminary opinion of probable costs for recommended pedestrian projects in this Plan are provided in this appendix. These costs are generic estimates based on the Federal Highway Administrationⁱ, Pedestrian and Bicycle Information Center Bikecost Toolⁱⁱ, and similar projects recently implemented.

The listed cost estimates should be used as a planning guide and do not include extra costs such as land acquisition, utility relocation, roadway size, drainage, final materials used, grading, land clearing and demolition, inspection, surveying and legal administration. Consideration for professional engineering and installation were given for multi-use trail and road shoulder widening projects. Costs are not and should not be considered to be a substitute for professional engineering and surveying regarding actual costs of individual project construction.

In many cases, on-road bicycle facilities can be low costs by restriping a roadway to remove or narrow travel lanes as part of a roadway repaving or reconstruction project. If the Town or NCDOT were undertaking a roadway improvement project as part of its normal maintenance program, it would be advantageous to provide the bicycle facility identified in this Plan during that effort.

F.0 ON-ROAD BICYCLE FACILITIES

The types of on-road improvements include restriping, overlay, full depth, and signed route.

1. **Restriping** includes removing, changing, or adding street striping to an existing roadway to provide space for bicycles. The space may be used exclusively for bicyclists (i.e. bike lane) or shared (i.e. wide outside lane). Roadway paving is typically not required. Travel lanes may be removed, moved or narrowed to provide space for a bicycle lane or wide outside lane.
2. **Overlay** pavement refers to a new layer of bituminous concrete pavement to an existing paved surface. The overlay pavement also may be used to install paved shoulders over an existing grass or gravel shoulder.
3. **Full depth** construction includes either a new road, or complete reconstruction of an existing road. Full depth construction may extend the width or length of an existing road. The cost of

including a bike lane or additional width for bicycles is considered part of the larger full depth construction roadway project.

4. **Signed route** applies directional signs to an existing roadway, identifying a single or series of bicycle routes. A signed route is often located on a street with low traffic volume or route that connects two or more desirable destinations. Route signs and pavement markings may be placed in intervals as needed.

RESTRIPING OR STRIPING

- Lane striping delineated travel lanes, shoulders, and bike lanes cost approximately \$14,000 per mile for a 4-inch white solid line on one side of a lane, or as a trail centerline.
- Restriping a mile of street to include bike lanes or reducing number of traffic lanes to add bike lanes cost approximately \$20,000 - \$48,000 per mile depending upon the number of old lane lines to be removed.

OVERLAY IMPROVEMENT

- Construction of additional lane pavement added during roadway construction or reconstruction cost approximately \$287,000 - \$300,000 per mile.

SIGNED ROUTE

- Regulatory, warning, and informational signs on post cost approximately \$200 per sign and post plus \$100 per each for installation.
- Bicycle Arrow (directional arrow) marking cost approximately \$70 - \$200 per marking. The more expensive tape markings are more durable than the less expensive thermoplastic markings when installed properly.
- Bicycle (symbol) marking cost approximately \$70 - \$200 per marking. The more expensive tape markings are more durable than the less expensive thermoplastic markings when installed properly.
- Sharrow marking cost approximately \$75 - \$100 per marking.

F.1 OFF-ROAD BICYCLE FACILITIES

The types of off-road improvement types include multi-use trails consisting of stone, asphalt, or concrete.

1. **Stone trail** is a crushed stone surface, which is a lower cost method of surfacing for trails with low use, in rural areas, in environmentally sensitive areas to minimize run-off, or other reasons as locally specified.
2. **Asphalt trail** is the most common surface for both roadways and trails.
3. **Concrete trail** is preferred application over asphalt for roadway and trail surfaces in several regions of the country due to maintenance and durability.

STONE TRAILS/PATHS

- A 10 foot wide stone trail or path with 6 inches of CABC cost approximately \$12 - \$ 15 per linear foot (2009)

ASPHALT TRAILS/PATHS

- Town of Winterville, NC spent \$11.90 per linear feet for the pavement structure for a 5-foot wide asphalt multi-use trail with 6-inches of CABC (2009); therefore, a 10-foot wide trail with 6-inches of CABC would be \$30.00 per linear foot.
- Warren County, NC spent \$ 14.11 per linear feet for the pavement structure for a 5-foot wide asphalt multi-use trail with 6-inches of CABC (2006); therefore, a 10-foot wide trail with 6-inches of CABC would cost \$28.22 per linear foot.

STONE TRAILS/PATHS

- Concrete trails can cost around \$60 per linear foot for installation and engineering. Removing existing concrete sidewalks can cost around \$15 per linear foot.

BOLLARDS

- Bollards cost approximately \$180-\$250 depending on size and type.

TRAIL GATE

- Purchase and installation of a trail gate for placement at entrance into a trail (to prevent access by motorized vehicles except for public safety, security, and maintenance vehicles) cost approximately \$2,000 - \$5,000 depending on size and type.

F.2 INTERSECTION CROSSINGS

Intersection improvement types include color pavement markings, signals, signs, and bicycle detector loops.

COLORED PAVEMENT MARKINGS

- Installation of colored markings (thermoplastic application) to increase bicycle visibility at intersections or to create a bike box cost approximately \$12.00 per square foot.

SIGNALS

- Pedestrian/Bicycle Signal Activation -4 Way activated signal (a 4-corner walk/don't walk signal system with a signal head and activator – with eight of each unit) cost approximately \$15,000 - \$20,000.
- Pedestrian/Bicycle Signal Activation – 2 Way activated signal (a 2-corner walk/don't walk signal system with a signal head and activator) cost approximately \$2,500 - \$5,000. Additional costs may be required if a full signal system is installed.

SIGNS

- NO TURN ON RED Signs cost approximately \$50 - \$200 per each depending if a post is needed plus installation at \$100 per each
- Regulatory, warning, and informational signs on post cost approximately \$200 per sign and post plus \$100 per each for installation.
- Warning signs with solar rapid flash beacons can cost approximately \$10-15,000 for purchase and installation of two unitsⁱⁱⁱ

BICYCLE DETECTOR LOOPS

- Loop detector in the pavement cost approximately \$2,000 - \$2,500 per loop detector.

F.3 BICYCLE PARKING FACILITIES

Bicycle parking facilities include either a bicycle rack or locker.

BICYCLE RACK

- An inverted U rack that holds two bicycles cost approximately \$240 each installed. Unique designs may have a higher cost associated with them.

- A bike rack designed to hold multiple bicycles (coathanger or similar) cost approximately \$440 - \$900 depending on style, length, and quantity order will affect cost.

BICYCLE LOCKER

- A bicycle locker that typically holds two bicycles each cost approximately \$1,300 - \$2,000 per locker installed. Special designs would increase the cost.

F.4 STREETScape IMPROVEMENTS

Streetscape improvement types include street lighting and landscaping.

LIGHTING

- Varies depending upon type of light, location, and utility provider; however, costs usually start at \$3,600 per fixture. If a light pole is needed, additional costs will be added based on style and height of pole.

LANDSCAPING

- Street trees (depending on foliage, type, and size) range from \$350 - \$500 per street tree.
- Shrubs (depending on type) cost approximately \$50 - \$75 per each installed by a contractor.

F.5 ROAD DIET TREATMENTS

Traffic Calming Devices include the following:

SPEED BUMPS

- Standard speed bump is approximately \$500 / each

CURB EXTENSIONS

- Concrete curb extension vary from \$2,000 to \$20,000 / corner, depending upon design and site conditions

RAISED MEDIAN

- Raised median cost approximately \$15,000 - \$30,000 / 100 feet

CROSSING ISLAND/ PEDESTRIAN REFUGE ISLAND

- Crossing island cost approximately \$6,000 - \$9,000 per island
- Raised concrete pedestrian refuge island with landscaping cost approximately \$10,000 - \$30,000 / each

CHICANES

- Landscaped chicanes cost approximately \$10,000 for a set of three on an asphalt street and \$15,000 - \$30,000 on a concrete street

MINI-CIRCLE

- Landscaped traffic mini-circle on an asphalt street cost approximately \$6,000 and can cost approximately \$8,000 - \$12,000 on a concrete street

ROUNDBABOUT

- Landscaped roundabout for neighborhood intersections range from \$45,000 - \$150,000
- Landscaped roundabout for arterial streets can cost approximately \$250,000

RAISED MEDIAN

- Raised median cost approximately \$15,000 - \$30,000 per 100 feet

ⁱ Federal Highway Administration (FHWA) Pedestrian Safety, *Safer Journey Library*, October 2007, <http://safety.fhwa.dot.gov/saferjourney/library/matrix.htm>

ⁱⁱ Pedestrian and Bicycle Information Center, Active Communities/Transportation Research Group, *Bikecost Tool: Benefit-Cost Analysis of Bicycle Facilities*, March 2009, <http://www.bicyclinginfo.org/bikecost/>

ⁱⁱⁱ Federal Highway Administration (FHWA) Intersection Safety Technologies <http://safety.fhwa.dot.gov/intersection/resources/techsum/fhwasa09009/>