Appendix U
BPMP UNIT COST ASSUMPTIONS

Construction costs for bicycle and pedestrian infrastructure are presented in Tables T.1 and T.2 below. Costs were developed by researching the latest unit costs experienced by the City of Santa Rosa and other local jurisdictions in Sonoma County and the North Bay, and were cross referenced by reviewing the National Cooperative Highway Research Program's Guidelines for Analysis of Investments in Bicycle Facilities[1]. In recent years, actual costs have risen significantly as the cost of construction materials has climbed.

It is important to note that the costs below are intended to be planning level estimates. They are unit costs for construction and do not include design, contingency, construction management costs (which typically add 50% to the total cost); right-of-way acquisition or inflation factors. Furthermore, unit costs may vary considerably depending on the size of the job and the location. For example, the unit cost of striping only 1,000 linear feet can easily be two to three times that of a 15,000 foot project. The same 'economy of scale' can be applied to sign installation and signal modification projects. Pavement widening costs also vary considerably depending on the terrain and other variables, such as presence of utility poles, monuments, and drainage issues. The unit cost estimates provided in this table reflect 2008 dollars and have been applied to the priority projects identified in Chapter 5 of this Plan.

1 Transportation Research Board, National Cooperative Highway Research Program's *Guidelines for Analysis of Investments in Bicycle Facilities,* 2006

Table U.1 Construction Cost Assumptions for Bikeway Improvements

Capital Project	*Unit*	*Cost*
Class I: Multi Use Trail		
Construct Multi-Use Pathway	Mile	$550,000
Rehabilitation	Mile	$125,000
Trail Entry Improvements (may include bollards, signs, minor paving, & concrete driveway apron)	Each	$2,000 - $6,000
At Grade Roadway Crossing (Type 1 – VII as defined in the Citywide Creek Master Plan)	Each	$10,000 - $90,000
Grade Separated Crossing (under/over crossing)	Each	**
Trail Bridge (Prefabricated steel bridge 10 – 12 feet wide by 100 feet long)	Each	$200,000
Class II: Bike Lanes		
Install Signs, Striping, & Stencils	Mile	$30,000
Reconfigure Roadway Striping, add Bike Lanes	Mile	$75,000 - $90,000
Install Loop Detectors	Each Intersection	$2,500 - $5,000
Intersection Striping (bike lane pockets, combined turn lanes, advanced stop bar/ pocket)	Each Intersection	$2,000 - $6,000
Class III: Bike Route		
Install Signing (Up to 10 signs per mile)	Mile	$2,500
Bicycle Boulevard (Signing and Stencils Only)	Mile	$4,500
Bicycle Boulevard (Traffic Calming Treatments)	Each	$2,000 - $60,000
Shoulder/Roadway Widening (One side, 6-foot width)	Mile	$325,000
Shared Roadway Lane Markings / Pavement Legends	Each	$175 - $300
Bicycle Parking		
Inverted "U" Rack (I rack parks 2 bikes)	Each	$250
Post and Ring Rack (1 rack parks 2 bikes)	Each	$200
Bicycle Locker (1 to 2 bikes per unit depending upon locker type)	Each	$1,500

Note: The above unit costs are for construction. These planning level estimates do not include contingencies, design, administrative, right-of-way acquisition costs, or inflation factors.

*** Costs are highly variable depending upon conditions.*

Table U.2 Construction Cost Assumptions for Pedestrian Improvements

Capital Project	*Unit*	*Cost*
Pedestrian Infrastructure		
Concrete Sidewalk	Square Foot	$10
Curb and Gutter	Linear Foot	$37
Pedestrian Ramp	Each	$4,000 - $7,000
12" White Thermoplastic Striping	Linear Foot	$4.50
In Street Pedestrian Crossing Signs	Each	$375
LED Pedestrian Countdown Signal Heads	Each	$250 – retrofit $650 – new
5-foot A/C Pedestrian Pathway	Linear Foot	$50
Street Lights	Each	$2,000
Traffic Signal	Each	$250,000
Pedestrian Flasher (overhead)	Each	$50,000
In-Pavement Flashers (light system, activation bollards, signage, installation, and ADA upgrades to adjacent curb ramps—*assumes two travel lanes only*)	Each	$44,000 - $50,000
Radar Speed Feedback Sign	Each	$16,000
Traffic Calming Devices	Each	$2,000 - $60,000

Note: The above unit costs are for construction. These planning level estimates do not include contingencies, design, administrative, right-of-way acquisition costs, or inflation factors.

PROGRAM COSTS

Programmatic improvements are an important complement to the infrastructure improvements proposed in this Plan.

Table U.3: Cost Assumptions for Programmatic Improvements

Program	*Unit*	*Cost*	*Notes*
Special Enforcement Activities	4 times per year	$20,000	Assumes 4 officers running a 2-day operation four times per year
System Maps	25,000	$15,000 - $20,000	Assumes design and printing costs for up to 25,000 user maps
Website Development / Maintenance	Per year	$2,500	Will be accommodated within existing staff positions
Bicycle Loaner Program for City Staff	10 bikes	$4,500	Assumes 10 bikes at $450 a piece. Bikes to be distributed among various City departments.
Bike to Work Month Events	1 week in May	*Varies****	Develop local promotional events conducted over a week including elected officials ride, bicycle safety demonstration, etc.

*** Costs are highly variable depending upon scale and length of event.*

MAINTENANCE

Bicycle and pedestrian system maintenance needs include cleaning, asphalt resurfacing, striping maintenance, sign replacement, pavement repairs, drainage work, refuse removal, graffiti removal, and landscape maintenance. While some maintenance needs such as re-striping or re-surfacing can be placed on a schedule of every one to five years, other needs such as fixing potholes, addressing signal detection sensitivity, and trimming overgrown vegetation require immediate attention.

Table T.4 below provides a recommended timetable for regular maintenance activities associated with the Santa Rosa bicycle and pedestrian networks.

Table T.5 provides estimated maintenance cost per mile by bicycle facility type. However, because costs are highly variable depending upon frequency and degree of maintenance needed and location, they should be adjusted every two to three years as needed. In addition, maintenance is an operating cost, usually covered only by the City's overall general funds, which are subject to fluctuation.

Table U.4: Bicycle and Pedestrian Systems Maintenance – RECOMMENDED FREQUENCY

Maintenance Item	*Schedule / Frequency*
Pavement / pathway sweeping	Monthly – annually as needed
Signal detection sensitivity	Bi-annually – or as needed on a request basis
Trash disposal	Weekly – as needed
Graffiti removal	Weekly - monthly as needed
Potholes	As needed – on a request basis
Sign replacement/repair	1 to 3 years – as needed
Pavement marking replacement	1 to 3 years – as needed
Pavement sealing	Every 5 years – as needed
Lighting (replacement/repair)	Annually – or as needed on a request basis
Clean drainage system	Annually – or as needed on a request basis
Maintain furniture, bus stops, railings	Annually – or as needed on a request basis
Fountain/restroom cleaning/repair	Weekly - monthly as needed
Bridge/ Underpass inspection	Annually
Maintain emergency telephones, CCTV	1 year
Replenish shoulder material	Annually
Landscape Maintenance	
Tree, Shrub, & grass trimming/fertilization	5 months- 1 year
Maintain irrigation lines/replace sprinklers	1 year
Irrigate/water plants	Weekly - monthly as needed
Shoulder and grass mowing	Seasonally as needed
Vegetation maintenance	Annually – or as needed on a request basis
Weed control	Monthly - as needed

MAINTENANCE COSTS

Table U.5: Maintenance Cost Assumptions

Facility Classification	*Estimated Annual Cost Per Mile*	*Notes*
Class I	$10,000	Assumes maintenance associated with Class I trails, trail amenities, and landscaping
Class II	$2,000	Assumes regular/periodic lane sweeping, sign and stripe/stencil maintenance, signal detection, and minor surface repairs
Class III	$1,000	Assumes sign, sweeping and minor surface repairs
Sidewalks	$2,500	Assumes landscape/vegetation maintenance and surface repairs