



NAPA VALLEY VINE TRAIL MAINTENANCE DRAFT WHITE PAPER

**A REPORT ON EXISTING PRACTICES,
NEEDS AND FUTURE COSTS
December 2, 2014**



Prepared for:
Napa Valley Vine Trail Coalition and
Napa County Transportation & Planning Agency's
Technical Advisory Committee.
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1. BACKGROUND

The Napa Valley Vine Trail (Vine Trail) is a proposed 47 mile multi-use paved trail which will extend from the Vallejo Ferry Terminal to the City of Calistoga. The Vine Trail route incorporates several existing paved bike paths in the cities of Vallejo, American Canyon, Napa, Calistoga and the Town of Yountville. The Vine Trail was incorporated into the Napa County Bike Plan (2012). Its route crosses land controlled by twelve separate public agencies.

The Vine trail is being constructed in phases. In 2015 the section between Kennedy Park and Madison Street in Yountville will be complete. It is anticipated that further phases from Calistoga to St Helena and Vallejo to American Canyon will be completed within the next five years depending on funding.

When completed, the Vine Trail will be a recreational and tourist asset to Napa and Solano Counties. It is estimated that the Vine Trail will get 3 million uses/year. 50% of these uses would be residents and 50% tourists and visitors.

The benefits of the Vine Trail from the Project Plan are:

SAFETY: *The Vine Trail will provide a safe trail for people of all ages to enjoy our valley. Napa County is, sadly, in California's top ten counties for bicycle accidents involving motorists—and things are getting worse. Separated trails such as the Vine Trail are by far the safest places to walk, run or bike. More than 70% of American would bike/walk more if they felt safe.*

HEALTH: *A safe, free, easy access biking/walking trail system can significantly improve community health. Napa County has the highest rates of obesity and diabetes in the Bay Area. Studies show even moderate increases in physical activity reduce stress and risk of many serious health issues.*

ENVIRONMENT: *A continuous Vine Trail will connect all Napa Valley communities, providing a safe, car-free alternative for commuting and fun. This will alleviate traffic congestion, taking cars off the road and pollution out of the air, significantly lowering our carbon footprint.*

TOURISM: *This strategic infrastructure improvement will bring a host of benefits to lodging and tourism businesses, including enhancing Napa Valley's attractiveness to the 25-45 year-old travelers who enjoy some physical activity during vacations. The Vine Trail will bring an expected \$165+ Million annual boost to Napa Valley's economy.*

The goal of this White Paper is to provide the Napa County Transportation and Planning Agency and the Napa Valley Vine Trail Coalition with an assessment of bike path maintenance needs based on existing levels of service, best practices and a desire to insure that the Vine Trail, when completed, will be maintained to a high level as befits the Napa Valley. The Napa Valley Vine Trail Coalition also wants to insure that there is a consistency of standards for both design and maintenance along the 47 mile corridor.

The Napa Valley Vine Trail Coalition is actively raising a \$7.5 million endowment which will be available to assist with the maintenance of the Vine Trail. The Napa Valley Vine Trail Coalition is committed to assist local agencies in the long term maintenance needs of Vine Trail either by providing matching funds or contracting for work. The White Paper provides an initial assessment of the likely short term (annual) and long term maintenance costs.

This White Paper goals are:

1. Prepare an inventory of the existing multi-use paths on the Vine Trail alignment.
2. Review existing management and maintenance practices and costs:
 - Existing reports and literature for multi-use path management and maintenance practices
 - Surveys and data from agencies operating similar regional multi use trails
 - Surveys and data from agencies in Napa and Solano counties who are already maintaining existing sections of the future Vine Trail
3. Review Vine Trail management challenges and opportunities
4. Review long term major maintenance needs
5. Explore strategic maintenance and management alternatives

1.1. GEOGRAPHIC LIMITS

The specific study limit of this report is an alignment from the Ferry Terminal in Vallejo to the intersection of the Silverado Trail and Lincoln Avenue (SR-29) in the City of Calistoga. **(Figure 1)**

1.2. INVENTORY

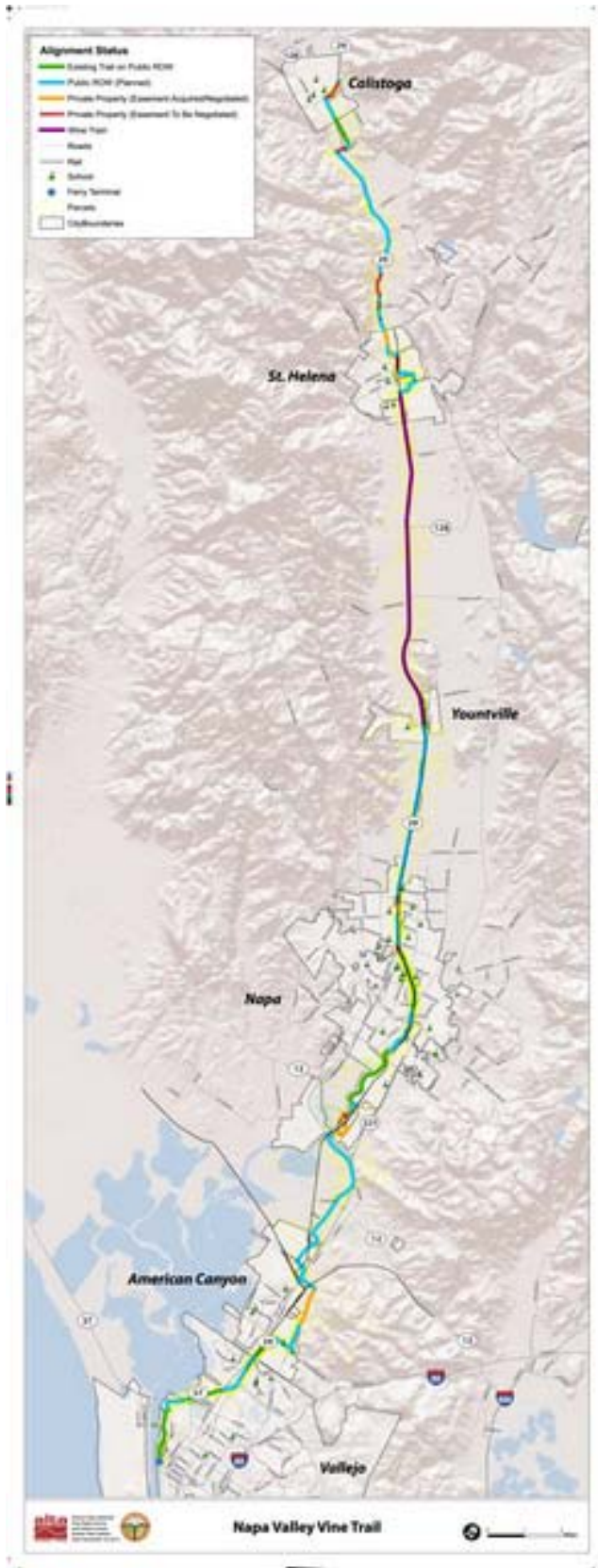
The Vine Trail has been divided into ten sections for planning purposes. These represent either City boundaries or American Viticulture Areas (AVAs). However in each section there may be one or more public agency involved in maintenance and/or ownership.

The Vine Trail is a Class I multi use path consisting of a 10-foot wide asphalt pathway with two 2-foot shoulders separated from the streets. It is acknowledged that in certain situations concrete or compacted fill with a binder might be used instead of asphalt and that the width might be less than 10-foot wide where right of way is not available.

There will be eleven bridge spans carrying the Vine Trail over creeks and drainages. The longest span will be a 120 feet span over the Napa River on Dunaweal Lane south of Calistoga. The Vine Trail will also intersect with over fifty street intersections.

In addition to the 10-foot wide paved trail, there will also be other amenities including, shade trees to lower ambient air temperature for trail users, Vine Trail “signature” shelters in each of the sections with bike maintenance stations, interpretive signs celebrating the natural history, geology, social history, transportation and agriculture, bike racks, benches, trash cans and dog waste disposal facilities. In addition the Vine Trail is preparing an Art Plan which will add additional art features such as symbolic “gates” at the AVA/City boundaries between the ten sections. All of these features and facilities will require maintenance.

Figure 1: Vine Trail Route



1.3. JURISDICTIONAL/AGENCY RESPONSIBILITIES

The Vine Trail is located in two counties and five cities and one town. However the physical location of the Vine Trail will mean that it is also on lands controlled by Special Districts and State Agencies. In some cases more than one department of either a County or City government is involved in the management and maintenance of the Vine Trail. **Table 1** shows the Agencies and Departments in each of the ten segments.

Table 1- Agencies and Department Jurisdictions

Vine Trail Segment	Agencies	Departments	Locations
Vallejo Section	City of Vallejo	Parks	Embarcadero
		Public Works	Wilson Avenue Sacramento Street Lewis Brown Drive Broadway
	Greater Vallejo Recreation District		River Park
	State of California		Wilson Ave off ramp Sacramento Street SR 29
American Canyon Section	City of American Canyon	Parks	Veterans Park
		Public Works	Broadway American Canyon Road Flood Control Area Newell Drive Watson Lane Paoli Loop Green Island Road Devlin Road
	State of California	Caltrans	Paoli Loop on ramps
Vista Carneros AVA Section	Napa County	Public Works	Devlin Road Soscol Ferry Road
		Napa County Parks and Open Space Dept.	Trail under Butler Bridge
City of Napa Section	City of Napa	Parks and Recreation	Kennedy Park
		Public Works	City Streets Cross Town Commuter Bike Path
	Napa County Water Conservation and Flood Control District		Kennedy Park wetland areas Tulocay Creek to Third Street Solano Ave Vine Trail creek channels

Table 1- Agencies and Department Jurisdictions (cont.)

Vine Trail Segment	Agencies involved	Departments	Locations
Oak Knoll District Section	City of Napa	Parks and Recreation	Solano Ave Vine Trail from Redwood Road to Locust St.
	Napa County	Public Works	Solano Ave Vine Trail from Locust St. to Vineyard View Drive
	Napa County Water Conservation and Flood Control District		Solano Ave Vine Trail creek channels
Yountville AVA Section	Town of Yountville	Public Works	Vineyard View Drive to Madison Street
Oakville AVA Section	Napa County	Public Works	Madison Street to Bella Oaks
Rutherford AVA Section	Napa County	Public Works	Bella Oaks to Zinfandel Lane
St Helena AVA Section	Napa County	Public Works	Zinfandel Lane to Chaix Lane Deer Park Road to Big Tree Lane
	City of St Helena	Public Works	Chaix Lane to Deer Park Road
Calistoga AVA Section	State of California	California Department of Forestry and Fire Protection	Big Tree Lane to entry to CDF station
		California Department of Parks and Recreation	Buckeye Reserve Bothe-Napa State Park
		Caltrans	Crossing of SR 29 at CDF station Crossing of SR 29 north of Larkmead Ave.
	Napa County	Public Works	Deer Park Road to Buckeye Reserve Buckeye Reserve to Big Tree Lane Larkmead to Dunaweal Lane
	City of Calistoga	Public Works	Dunaweal Lane to Silverado Trail

Note: Section designations are not always coterminous with urban boundaries.

Table 2 is a summary of the mileage of the existing and proposed Vine Trail by jurisdiction/agency.

Table 2 : Existing and Proposed Trails by Agency/Jurisdiction

Public Agency	California State Parks	CalFire	Napa County Public Works	City of Calistoga	City of St Helena	Town of Yountville	NCWC&FCD*	Napa County Regional Parks and Open Space District	City of Napa	City of American Canyon	Greater Vallejo Recreation District	City of Vallejo	Totals Miles
Vallejo Section													
Existing											0.4	2	2.4
Proposed											0	2.1	2.1
American Canyon Section													
Existing										0.54			0.54
Proposed										3.77			3.77
Carneros Vista Section													
Existing			0.25							0			0.25
Proposed			3.08							1			4.08
City of Napa Section													
Existing							0.4	0	3.41				3.81
Proposed							1	0.13	1.85				2.98
Oak Knoll District Section													
Existing			0						0				0
Proposed			3.2						2.3				5.5
Yountville Section													
Existing						0.88							0.88
Proposed						2							2
Oakville Section													
Existing			0										0
Proposed			2.53										2.53
Rutherford Section													
Existing			0										0
Proposed			3.4										3.4
St Helena Section													
Existing			0		0								0
Proposed**		0.1	3.2		3.7								7
Calistoga Section													
Existing	1.09		0	0.85									1.94
Proposed	0.15		2.4	1.17									3.72
TOTALS	1.24	0.1	18.06	2.02	3.7	2.88	1.4	0.13	7.56	5.31	0.4	4.1	46.9

* The Napa County Water Conservation & Flood Control District enters into agreements with other agencies for trail maintenance but reserves vegetation management on its properties and easements for its own staff.

** City of St Helena includes 3.7 miles of Class II bikeways on City Streets

1.4 CONDITIONS OF EXISTING BIKE PATHS

The Vine Trail will be incorporating into its alignment existing segments of bike paths located in six of the jurisdictions. Because of the different periods of construction, the condition of the bikeway varies considerably. Erosion, use and even sporadic inundations by adjacent creeks can contribute to a slow deterioration. **Table 3** is a summary of existing bike paths with lengths, year(s) they were constructed and general condition.

Table 3: Vine Trail: Existing Bike Paths in the Vine Trail Alignment

Location/Jurisdiction	Mileage	Year Constructed	Condition
City of Vallejo			
Embarcadero Bike Path from Vallejo Ferry Terminal to Mare Island Causeway	1 miles	1967-1970	Poor to Fair (Sections in asphalt are poor, Sections in concrete are Fair)
Mare Island Causeway to Wilson Ave (Greater Vallejo Rec District)	0.4 miles	Unknown	Asphalt and some natural dirt path
White Slough	1 mile	2005	Fair Needs to be slurry sealed
City of American Canyon			
Veterans Memorial Park from city limits to American Canyon Creek	0.54 miles	2013	Good Concrete surface
Napa County			
Devlin Road	0.25 miles	2013 and 2014	Good Concrete and asphalt
City of Napa			
Kennedy Park River Trail from Asylum Slough to Tulocay Creek	2.11 mile	Unknown	Fair to Good
Cross Town Commuter Bike Path from Vallejo Street to Redwood Road	1.7 miles	2004-2010 (phased)	Fair to Good
Town of Yountville			
Vine Trail from California Drive to Madison Street	0.88 miles	2010	Good Slurry seal applied 2014
California State Parks			
Park Road	1 mile	1980s?	Fair to Good
City of Calistoga			
Calistoga Bike Path Dunaweal Lane to Washington Street	0.85 miles	2006	Good Scheduled for minor repairs and slurry seal



Examples of conditions (left) old trail section in Vallejo and (above) newest section American Canyon

2. EXISTING MANAGEMENT AND MAINTENANCE COSTS

The following sources of information on paved trail management and maintenance costs were consulted:

- A national search of existing literature of Best Management Practices for paved multi use paths was conducted. Information was obtained from the Rails to Trails Conservancy and other sources.
- Current data obtained from Bay Area agencies who have experience in managing regional trail systems. This included a study conducted for Transportation Authority of Marin in 2007 for the maintenance needs of the Marin County North-South Bikeway between Sausalito and Larkspur. Other information was obtained from; East Bay Regional Parks (Iron Horse Trail) and Sonoma County Regional Parks (Joe Rodota and West County Trails).
- Local experience. The City of Napa and the Town of Yountville provided detailed information of their costs for managing and maintain their sections of trails. A questionnaire was sent to the other cities Calistoga, American Canyon and Vallejo. (**Appendix 1**)

2.1 DEFINITIONS

Maintenance activities for bike paths fall into three basic categories.

- **Routine maintenance.**

This includes activities such as trash collection, weeding, trimming of bushes and shrubs that grow into the bike path, debris removal such as leaves in the fall, sweeping, and graffiti removal. It may also include visiting the site periodically for other related activities such as visitor use counts and inspections.

- **“As needed” maintenance.**

This includes maintenance activities beyond those described in “routine.” These include filling minor potholes, minor repairs of cracks in the asphalt surface, repair and repacking of the pathway shoulders, replacing damaged signs, re-stripping and stenciling the surface of the pathway when warning signs such as “STOP” bars become worn, and minor repairs of amenities such as drinking fountains and benches.

- **Major maintenance.**

This includes one-time high-cost items. These may include slurry sealing asphalt, extensive repaving of worn or hazardous segments of the bike path, repairs of landslides and replacement of decking on bridges. Funding for these more costly items requires agencies request funds through their annual capital improvement budget. Many of these tasks require a licensed contractor and a formal bidding process.

2.2 TYPICAL MANAGEMENT AND MAINTENANCE TASKS

Table 4 shows typical tasks undertaken in maintain a paved trail.

Table 4: Typical Trail Maintenance Activities

Maintenance Item	Daily	Weekly	Monthly	As Needed
a) Inspections/Patrolling	X			
b) Sweeping/blowing		X (blow)	X (sweep)	
c) Litter pick up and trash disposal		X		
d) Trimming/pruning			X (shrubs)	X (trees)
e) Sign replacement/repair				X
f) Graffiti removal				X
g) Cleaning (i.e. benches, drinking fountains, signs, shelters, gates)				X
h) Painting re-striping and re-stenciling (i.e. STOP signs)				X
i) Mowing/weed abatement				2 times/year
j) Pavement sealing/potholes				As needed
k) Crack repair				As needed
l) Lighting replacement (if applicable)				As needed
m) Traffic signals (if applicable)				As needed
n) Bridges and culverts				As needed

2.3 CONSIDERATIONS WHEN REVIEWING COST DATA

In reviewing agencies costs for maintenance of paved trails there are several variables that can affect the annual cost per mile:

Climate differences: The agencies maintaining trails in areas subject to snowfall generally would incur higher costs. Similarly trails subject to the occasional inundation by rivers and creeks also have higher maintenance costs.

Regional cost of living differences: Costs of living vary from region to region, state to state and even within states.

Scale of trail: Trails of longer lengths generally have lower operating costs per mile.

City vs Rural: City and urban dwellers tend to expect higher levels of service from park and public works maintenance staff. There is also a higher rate of vandalism in urban areas.

Types of amenities: Trails with trailhead facilities such as parking areas, restrooms and mini parks cost more to maintain. Since it is difficult to break out these other facilities from the actual trail, these costs can affect the per mile maintenance costs.

Use of contracted labor: Some agencies contract out basic maintenance such as sweeping, blowing debris and weeding. These costs can be lower than using in house staff because of lower benefits and overhead costs.

Use of alternative labor: Some agencies use alternative labor to supplement existing staff. This may include inmate crews, conservation corps members and volunteers such as service clubs and “Adopt-a-Trail” programs. These costs generally do not show up on the agencies annual cost data.

Overhead: The ways in which public agencies calculate overhead can vary widely. Labor makes up the most cost of trail maintenance. Most public agencies calculate costs using salaries plus benefits but will then add overhead into their final calculations. Overhead is based on costs of public agencies which are normally not “cost recoverable”. These overhead rates generally include two components. A department overhead component calculated on the administrative costs of the department conducting the work (e.g. secretarial staff, supplies and inter department charges) and a general government component calculated on other costs (e.g. insurance, legal, IT support and other general government activities). These are allocated and spread over tasks for which government agencies can charge. The percentage of the overhead can vary substantially among agencies. Most Federal and State grants contain wording which does not allow agencies to bill for overhead costs when conducting “force account” work using their own crews.

Policing: Some agencies have their own law enforcement staff who bill their time for patrolling paved bike paths. Other agencies rely on calling the Sheriff or Police dispatch when incidents occur. If an agency has its own law enforcement staff the costs per mile will be generally higher.

2.4 NATIONAL LITERATURE SEARCH

The Rails to Trails Conservancy (RTC) provided three documents regarding Trail Management and Maintenance costs from around the country.

- “Rail Trail Maintenance and Operations” (2003) produced for the RTC Northeast office provides a detailed look at 100 rail-trails 60 managed by government entities and 40 by volunteers in the Northeast USA. It was higher for government agency managed trails \$2,000/mile and lower for volunteer/non-profit managed trails \$700/mile. The average was of \$1,500/mile.
- “Monterey Bay Sanctuary Scenic Trail-Operations and Management Plan” (2008) prepared for the Santa Cruz County Regional Transportation Agency estimates annual operating costs to vary between \$6,000/mile to \$10,000/mile. The average was \$8,000/mile.
- “Trail Assessment Management Plan for Billings Montana” (2011) assessed the City of Billings trail network. The survey identified two types of trails soft surface and hard surface and three trail categories by locations (1) Within park lands, (2) Within subdivisions and (3) Along roadways. Annual costs per mile range from \$2,596/mile to \$5,870/mile annually. The average cost was \$4,100/mile.
- Other literature reviewed included:
 - “Statewide Greenways Maintenance Inventory and Case Studies” for the Michigan Trails and Greenways Alliance (2007). This document examined a number of trails in Michigan operated by public agencies. ¹ From the list the Pere Marquette Trail, a 21 miles long with an annual cost (2006 dollars) of \$4,238/mile.
 - US National Library of Medicine National Institutes of Health “Cost Analysis of the Built Environment: The Case of Bike and Pedestrian Trails in Lincoln, Nebraska”². (2004). The study references costs for five trails ranging from 1.6 miles to 4.6 miles in length. Annual costs per mile ranged from \$2,885/mile to \$5,818/mile. The average cost was \$4,352/mile.

¹ <http://www.michigantrails.org/sites/default/files/statewide-trails-maintenance-inventory-and-case-studies.pdf>

² <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1448293/>

2.5 SURVEY OF BAY AREA AGENCIES

The closest study geographically to Napa Valley Vine Trail is the “Marin County Bike Paths Maintenance Report” (2007) prepared for the Transportation Authority of Marin³. This report assessed existing management and maintenance costs of the Marin County North-South Bikeway, a 5 mile bike path between Sausalito and Larkspur Ferry Terminal. The bikeway is jointly managed by three separate agencies; City of Larkspur, Town of Corte Madera and County of Marin Parks and Open Space. It determined that the annual average cost of the bike path maintenance was between \$8,333/mile and \$12,500/mile. (2007 dollars). These costs did not include overhead. The variation was explained by the fact that the County in the unincorporated area provided less amenities and City residents expect higher levels of maintenance and tended to call in problems such as vandalism more regularly. The average was \$10,417/mile.

The East Bay Regional Parks District (EBRPD) manages the Iron Horse Trail a paved trail which stretches across Alameda and Contra Costa counties. It eventually will be 40 miles in length. The first section of the trail was open to the public in 1986. Jim Townsend, Manager of the Trails Development Division, stated in an email that EBRPD uses a “rule of thumb” of \$25,000 per mile per year. He stated that it is “an all-inclusive number, and includes a reserve for crack sealing, overlays, police patrol, as well as trash pickup and mowing”.

Sonoma County Regional Parks Department manages the 12.5 mile Joe Rodota and West County Trail between Santa Rosa to the Russian River. The annual cost was \$9,206/mile. This does not include overhead.

2.6 EXISTING PRACTICES NAPA COUNTY AGENCIES

The City of Napa and Town of Yountville have provided information on their existing costs for maintain trails (**Appendix 2**). Surveys were also emailed to City Of Vallejo, City of American Canyon and City of Calistoga.

City of Napa provided A Maintenance Work Program for trail maintenance. They estimate that it takes approximately 416 man hours/year to manage and maintain a mile of trail. This includes labor and equipment. It is based on hours. They estimate that the cost of maintenance of a mile of trail for one year to be \$21,433.98. This cost includes overhead costs Maintenance Laborer is billed at \$50/hour and the Park Maintenance Worker II is billed at a rate \$65.24. The actual salary plus benefits rates for these two positions are less than half those rates, so there is 50%+ in overhead.

The Town of Yountville also conducted a study of its costs. They estimated that the maintenance of the existing Vine Trail section between California Drive and Madison Street (0.88 mile) took 358 man hours/year. The tasks were divided into:

- Routine Maintenance which included blowing and debris removal and safety inspections which accounted for between 10 and 20 hours/month varying by season and totaled 180 hours/year.
- Other maintenance activities such as washing, tree trimming, brushing, addressing tripping hazards (minor asphalt repairs) weed abatement and routine collection of trash and recycling accounted for 178 hours/year.

³ Marin County Bike Paths Maintenance Report” (2007) Alta Planning+Design

The Town used a rate of \$75/hour for their calculations and arrived a total of \$26,850 for slightly less than a mile. This is approximately twice the salary plus benefits of a Park Maintenance Worker I so there is 50%+ in overhead.

Table 5: Summary of Average Annual Maintenance Costs per mile of trail

Author of data	Source/study	Average cost per mile	Year of study data	Adjusted average cost/mile in October 2014 dollars using CPI index	Notes/Comments
National Studies					
Rails to Trail Conservancy North East	Rail Trail Maintenance and Operations (survey of 100 trails)	\$1,500	2003	\$1,936	Wide range of bike path types some maintained by volunteers
Santa Cruz County Regional Transportation Agency	Monterey Bay Sanctuary Scenic Trail-Operations and Management Plan	\$8,000	2008	\$8,822	Projections not actuals
City of Billings	Trail Assessment Management Plan for Billings Montana	\$4,100	2011	\$4,328	
Michigan Trails and Greenways Alliance Pere Marquette Trail	Statewide Greenways Maintenance Inventory and Case Studies	\$4,238	2006	\$4,991	Pere Marquette Trail is a 21 miles long asphalt bike path.
National Institute of Health	Cost Analysis of the Built Environment: The Case of Bike and Pedestrian Trails in Lincoln, Nebraska	\$4,381	2004	\$5,508	Study of five bike paths Trail lengths ranging from 1.6 to 4.6 miles.
Bay Area Agencies					
Transportation Authority of Marin	Marin County Bike Paths Maintenance Report (2007)	\$10,417	2007	\$11,928	9 mile bike path. Does not include overhead
East Bay Regional Parks	Iron Horse Trail (personal communication)	\$25,000	2014	\$25,000	40 mile bike path. Includes policing and a reserve for trail overlays and repairs
Sonoma County Regional Parks	Joe Rodota and West County Trails (personal communication)	\$6,424	2013	\$6,642	12.5 mile bike paths. Does not include overhead. Includes some repairs (appx. \$15k)
Napa County Agencies					
Town of Yountville	Existing Vine Trail	\$26,850	2013	\$27,316	0.88 bike path. Includes overhead (50%+)
City of Napa Parks Dept.	Bike paths within City of Napa	\$21,434	2013	\$21,830	Includes overhead (50%+)

3 TRAIL MANAGEMENT CHALLENGES AND OPPORTUNITIES

The Vine Trail crosses through properties under the management of twelve agencies (**Table 4**). Each of these agencies have differing design standards, rules and ordinances. This can be a problem for users and for uniform enforcement in the 47 mile trail. The Vine Trail has a goal to become a national premier trail, which will be an attraction to visitors in Napa Valley providing them a safe non-motorized way of enjoying the beauty of the valley. Despite travelling through parts of the trail managed or controlled by twelve public agencies, the visitor experience should be seamless.

3.1 TRAIL SIGNAGE

Interpretive Sign: The Vine Trail is developing an Interpretive Signage Plan with assistance from local historians, geologists and wine industry experts. A series of fifty two interpretive panels will be located along the route celebrating the social history, geology, natural history, transportation and agriculture heritage. There will be a common design theme and feel to the panels.

Way finding signs. Often signage can be confusing, redundant and not legible to trail users (e.g. in font sizes too small or in poor locations to be read by trail users riding bikes). A well-designed bike path signage system can accomplish several goals:

- Create a sense of unity for the project creating an identity.
- Use of specific colors similar to highway traffic signs to communicate distinctions between cautionary signs, regulation signs and educational signs.
- Use international graphic symbols that can be understood by non- English speakers.
- Use signs to encourage a sense of “ownership” for the public.
- Use maps and entry kiosks at strategic locations to introduce visitors to the bike path and how to use it.

It is important that other way making signage along the trail will provide the visitor with a positive experience.

3.2 TRAIL CROSSINGS

Users will need reminders that they are following a trail. This is not limited to trail signage but also the treatment of crossings of roads. Treatments may include high visibility crossings using paint or elastomeric applied markings or asphalt bonded coloring such as “Streetprint”.

The Town of Yountville has already used “Streetprint” at several locations in its downtown. The City of Sebastopol has one installation which has been in place for eight years.

Paint and elastomeric material will need to be periodically reapplied. An integrated color in the asphalt may provide better longevity.

“Streetprint” asphalt crossing in Sebastopol on Highway 16. It has been in use for since 2006.



3.3 TRAIL HOURS

Funding for the Vine Trail has been from grants from transportation sources with the goal of increasing non- motorized modes of transportation. Many park agencies who manage lands where the Vine Trail will be located have traditionally closed parks at sunset to reduce anti-social activity. Local ordinances vary and create possible conflicts for trail users and trail managers. Examples include trail hours which vary widely and may not account for early morning and evening commuters using the trail.



Existing trail regulation signs. Clockwise from top left Greater Vallejo Recreation District, City of Napa at Kennedy Park, City of Napa at Cross Town Commuter Trail, Town of Yountville, City of Calistoga and Napa River Trail on Napa County Water Conservation and Flood Control District

Trail hours vary from Sunrise to Sunset, to 6:00 AM to Sunset, and 7:00 AM to one hour after Sunset.

3.4 TRAILS IN ACTIVE AGRICULTURAL AREAS

The Vine Trail Coalition and the Bike Coalition, the Napa Farm Bureau and Napa Valley Grape Growers spent several months developing a campaign called “Agricultural Respect”.

RESPECT is an acronym for:

- **R**espect our working farms and vineyards
- **E**xpect Agricultural activities and keep clear
- **S**tay within boundaries (pets too)
- **P**revent the spread of non-native species
- **E**liminate all trace and trash (from pets too)
- **C**heck your noise levels
- **T**ake responsibility and report problems



This campaign aims to educate trail users by positive reinforcement that agricultural activities are occurring adjacent to the Vine Trail and that the Vine Trail is also a unique opportunity to see the process of viticulture and winemaking. Over fifty-five wineries are located along the route of the Vine Trail. The Vine Trail will pass adjacent to vineyards. In some cases the Vine Trail will be obtaining easements from adjacent property owners in many cases only a few feet to construct the trail. In some cases Agricultural equipment may periodically use the trail to turn around equipment.

This is a proactive approach to dealing with anticipated trail management issues in Agricultural areas. Trail managers working in areas where the trail will pass by should make a point to make contact with adjacent grape growers and farmers to develop relationships to become good neighbors. The County through the Napa Valley Bicycle Coalition and NCTPA has produced Bike maps with all the information about Agricultural Respect included in the brochure. In addition the Sherriff, the Farm Bureau and Grape Growers have postcards with information on Agricultural Respect for distribution to bike stores and tourist serving businesses. Agricultural Respect information will be on posts and signs along the Vine Trail.

3.5 DOGS

In national surveys of trails, two of the top concerns/complaints of neighbors of trails are dogs off leash and dog waste. In the past two decades most park and trail agencies have installed dog waste stations and encouraged responsible do owners to pick up after their pets.

Most jurisdictions allow dogs on leash but State Parks does not permit dogs on all their properties. State Parks does permit dogs but only in developed areas within Bothe-Napa State Park such as the campground and picnic areas. Dogs off leash are less simple to deal with. Often the dog off leash and owner is long gone by the time law enforcement can arrive to deal with the issue. Vigilance of trail users and education can help. Dogs of leash tend to be less of a problem on well-travelled trails where there is more peer group pressure on dog owners.

3.6 VEGETATION MANAGEMENT

Trees with developed canopies can reduce the ambient air temperature and improve comfort of trail users. It has been calculated depending on species of tree that air temperatures under canopies can be as much as 5 degrees Fahrenheit lower.

There are potential downsides of unmanaged vegetation along trails. These include areas where homeless can camp or gather, areas where people may feel unsafe walking or cycling and locations where law enforcement cannot monitor activities because of dense vegetation.

Lower branches growing into the trail creating hazards for trail users and should be trimmed back.

Trails are often located in areas where there are natural areas being restored. Restoration planting relies on planting a number of small trees in an area as insurance for survival. If left unmanaged these trees compete with each other for nutrients and light often creating poor specimens.

It is recommended that some clear proactive management protocols for managing vegetation be developed regarding thinning, trimming and pruning vegetation to create both the desired canopies and promote enhanced natural areas.

3.7 TRAIL HEAD SHELTERS

The Vine Trail has designed an iconic shelter drawing on the imagery of winemaking. There will be at least ten of these shelters on the Vine Trail Route, one for each section. The shelters have a bicycle repair station, bike racks, maps, trash cans, a bench and where potable water is available a drinking fountain. These will have to be cleaned periodically.



3.8 ART INSTALLATIONS

The Vine Trail also wants to include art on the trail. The Vine Trail's Arts Cultural and Education Committee (ACE) is developing a plan for the installation of art pieces on the trail. These may take the form of "stand alone" art such as a single sculpture or linear art. It is envisioned that there will be a theme for each section of the trail. These pieces will be curated. Details of how this aspect of the trail are still in progress.



Bacchus sculpture being considered near Vine Trail in Yountville.

4 LONG TERM MAJOR MAINTENANCE NEEDS

The costs of extending the life of existing asphalt by crack repair and slurry sealing are relatively small compared with reconstruction or overlay. It would be prudent to develop an asphalt paving management plan to extend the life of the trail. It is recommended that slurry sealing and crack repairs every seven years can substantially extend the useful life of asphalt paving. Slurry sealing and crack repair costs average between \$0.28 and \$0.46/sf in 2014 dollars depending on the condition of the asphalt.

By comparison, the cost of reconstructing an asphalt trail if the condition has become so deteriorated that the base rock needs to be pulverized, lime treated and re-compacted and new asphalt laid could cost as much as \$6.14/sf in 2014 dollars.

There are a few locations on the Vine Trail alignment where some immediate repairs are needed. The reconstruction of a three quarter mile section in Vallejo and the slurry sealing of older sections of existing bike paths in Vallejo, City of Napa and Calistoga would be recommended to bring the paths up to a level where they can be put on a regular asphalt paving management plan.

Projections for proposed sections of the Vine Trail are shown in **Table 6**. These have been adjusted to reflect a 3.5% annual inflation increase in construction costs on the years beyond 2014. This annual increase is based on data from the Engineering News Record Cost of Construction Index (CCI) 2006-14.

Table 6: Estimate of Vine Trail Surfacing Needs

Segment	Existing (miles)	Proposed new trail (miles)	Projected Year for new trail construction	Repairs needed to existing trail in near future	Slurry seal and crack repair 7 year schedule Total	Year for slurry seal and crack repair
1 Vallejo	2.4	2.1	2018	\$295,040	\$151,514	2022 and 2025
2 American Canyon	0.54*	3.77	2018		\$133,940	2025
3 Vista Carneros	0.25	4.08	2020		\$150,027	2027
4 City of Napa	3.81	2.98	2015	\$95,960	\$217,579	2022
5 Oak Knoll District	0	5.5	2015		\$176,242	2022
6 Yountville	0.88	2	2015		\$92,287	2022
7 Oakville	0	2.53	2021		\$96,287	2028
8 Rutherford	0	3.4	2021		\$129,398	2028
9 St Helena	0	3.2**	2017		\$109,844	2024
10 Calistoga	1.94***	3.72	2017	\$21,408	\$127,694	2024
Total	9.82	33.28		\$412,408	\$1,384,812	

*Concrete does not require slurry seal

** St Helena Vine Trail has an additional 3.7 miles of bike routes through the City on existing City streets

*** Includes 1 mile of State Park maintenance road

Table 7 Shows proposed costs on a seven year resealing and repair schedule, based on estimated years for Vine Trail Section construction using high end 0.46c/sf in 2014 dollars adjusted for inflation.

Table 7 : Future Resurfacing and Slurry Sealing

		Repairs needed		Projected Miles/ Years for Construction					Years for slurry seal and crack repair				
Section	Existing Miles	Overlay needed for existing trail	Resurfacing and Repairs needed to ex sections of trail	2015	2017	2018	2019	2020	2022	2024	2025	2026	2027
Vallejo Section													
Existing	2.4	\$269,854	\$25,186						\$76,906				
Proposed						2.1					\$74,608		
American Canyon Section													
Existing*	0.54												
Proposed						3.77					\$133,940		
Carneros Vista Section													
Existing	0.25												
Proposed							4.08					\$150,027	
City of Napa Section													
Existing	3.81		\$95,960						\$122,088				
Proposed				2.98					\$95,491				
Oak Knoll District Section													
Existing	0												
Proposed				5.5					\$176,242				
Yountville Section													
Existing	0.88								\$28,199				
Proposed				2					\$64,088				
Oakville Section													
Existing	0												
Proposed								2.53					\$96,287
Rutherford Section													
Existing	0												
Proposed								3.4					\$129,398
St Helena Section													
Existing	0												
Proposed**					3.2					\$109,844			
Calistoga Section													
Existing***	1.94		\$21,408										
Proposed					3.72					\$127,694			
TOTALS	9.82	\$269,854	\$142,555	10.48	6.92	5.87	4.08	5.93	\$563,014	\$237,539	\$208,548	\$150,027	\$225,686

Notes

*Concrete does not require slurry seal, ** St Helena Vine Trail has an additional 3.7 miles on existing City streets, *** Includes 1 mile of State Park maintenance road

5 STRATEGIC MAINTENANCE PLAN

5.1 ROUTINE MAINTENANCE-ALTERNATIVES

Some alternatives might be further explored to assist the trail managers with routine maintenance. In addition to using volunteers for “Clean-up Days” on trails, some jurisdictions have developed “Adopt a Trail” or “Adopt a Path” programs. Agencies solicit civic groups such as the Rotary Club or Lions Club to adopt a segment of the trail and let them develop a maintenance schedule using their volunteer organizations. These might include groups such as Boy Scouts, Girl Scouts, High School students and any group that might be looking for Community Service opportunities.

5.2 ECONOMIES OF SCALE

An alternative to hiring more agency employees might be to contract out basic services such as sweeping and blowing off the path, weeding and pruning. There may also be some benefits of scale where several jurisdictions enter into an MOU and contract out services. For instance there is a point in the development of the Vine Trail where a single entity might purchase a sweeping machine. The City of Portland purchased such a machine because its existing fleet of street sweepers are too large to maneuver on the narrow bike paths.



The RAVO sweeper is 105-inches tall, 89-inches wide (7.4 feet), and 178-inches long.

5.3 VINE TRAIL AS PARTNER

Many successful trail organizations are run by or rely on nonprofits, such as the Tahoe Rim Trail. The Vine Trail as a nonprofit partner can provide many long-term advantages. A nonprofit can help harness the trail users who regularly use the trail and have some stake in its future. The nonprofit can become an emissary who can help “tell the story” of the trail or bikeway. Members are likely to identify potential private donors and create opportunities for private funding. The sale or use of trail-related items for promotion by the nonprofit can help “spread the word” and develop a sense of local attachment to the trail. These may include maps, brochures and clothing items.

In addition the Vine Trail's \$7.5 million endowment will assist agencies in the maintenance of the trail through their jurisdictions. It is the intent to generate enough interest from the investments and profits from the fund to provide a level of funding to assist local agencies. The Vine Trail anticipates that funds from the endowment would:

1. Support for routine maintenance. This will be based on a cost per mile to be negotiated. The Vine Trail might consider contributing for salaries plus benefits but not overhead charged by agencies.
2. Alternatively the Vine Trail could contract for routine trail maintenance services under an MOU with multiple agencies and get some level of reimbursement from those agencies.
3. Support a "repair and resealing" fund will provide matching funds to agencies on a seven year schedule.
4. Provide one time capital outlay. An example might be the purchase of a bike path sweeping machine.
5. Provide funding for replacement of maps and displays.
6. Provide funding for repairs to shelters and other Vine Trail amenities.

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Appendices

City of Napa Parks & Recreation Services Department
MAINTENANCE WORK PROGRAM

Recreational Trail/Maintenance Roads - Basic trail

ACTIVITY (TASK) Description	Season	Task Frequency	No. Times Per Year	Hours to Complete Task Once	<i>1 Mile</i> Projected Hours per Year
Litter cleanup	All	2 per week	104.0	1	104.0
Garbage pickup	All	2 per week	104.0	1	104.0
Blow pavement	All	1 per week	52.0	1	52.0
Sweep pavement	All	1 per month	12.0	2.0	24.0
Debris removal	Spring-Fall	as needed	2.0	1.0	2.0
Debris removal	Winter	as needed	6.0	1.0	6.0
Mow wild grass	Spring	2 per year	2.0	8.0	16.0
Chem. weed control	All	as needed	4.0	3.0	12.0
Garbage can maint.	All	1 per month	12.0	0.5	6.0
Graffiti removal	All	1 per week	52.0	0.5	26.0
Sign maintenance	All	as needed	6.0	2.0	12.0
Bench maintenance	All	as needed	12.0	1.0	12.0
Gate/fence maint.	All	as needed	2.0	2.0	4.0
Drainage maintenance	Winter	as needed	4.0	2.0	8.0
Bridge maintenance	All	as needed	1.0	2.0	2.0
Pavement repairs	All	as needed	1.0	8.0	8.0
Equipment maintenance					
Grounds Equipment	All	1 per year	6.0	1.0	6.0
Vehicles	All	1 per year	6.0	1.0	6.0
Tools	All	1 per year	6.0	1.0	6.0

Total staff Hours **416.0**
1 Mile

Maint Laborer	374	\$	50.00	\$ 18,720.00
Park Maintenance WK II	42	\$	65.24	\$ 2,713.98

Total Per Mile
annually **\$21,433.98**

Town of Yountville
Bike Path
Maintenance Hours

	Estimate					Hours	Rate	Total	
Jan (5hrs/week)	Extra Routine Maintenance, blowing, debris removal, and safety inspections					20			
Feb	Extra Routine Maintenance, blowing, debris removal, and safety inspections					20			
Mar (2.5hrs/week)	Routine path maintenance, blowing, debris removal, safety inspections					10			
Apr	Routine path maintenance, blowing, debris removal, safety inspections					10			
May	Routine path maintenance, blowing, debris removal, safety inspections					10			
Jun	Routine path maintenance, blowing, debris removal, safety inspections					10			
Jul	Routine path maintenance, blowing, debris removal, safety inspections					10			
Aug	Routine path maintenance, blowing, debris removal, safety inspections					10			
Sept	Extra Routine Maintenance, blowing, debris removal, and safety inspections					20			
Oct	Extra Routine Maintenance, blowing, debris removal, and safety inspections					20			
Nov	Extra Routine Maintenance, blowing, debris removal, and safety inspections					20			
Dec	Extra Routine Maintenance, blowing, debris removal, and safety inspections					20			
					Total	180			
Washing	Stains, Spills, Mud and Oil runoff, tree sap, and insect droppings					12			
Tree Trimming	Keep canopy raised to safe height and limbing for periodic damage					40			
Brushing	Keep path open and free from brush overgrowth					60			
Tripping Hazards	Fill in low spots, or grind down high spots and minor Asphalt repairs					10			
Weed Spraying/Trimming	Routine weed abatement activities, but can include large weed trimming jobs					30			
Trash receptacles	Routine collecting of recycle and trash receptacles and some minor cleaning					26			
					Annual total	178			
					Highway 29 Path Total	Annual hours	358	\$75.00	\$26,850.00
						Monthly average	30		
Ratio for Solano Avenue Path is 2,200 to 4,155					Solano Ave. Path Total	Annual hours	190	\$75.00	\$14,216.61
Notes:									
1	This does not included some miscellaneous hours for closures and special event signage.								
2	I do not know what if any maintenance issues could arise from the new paths close proximity to the Wine Train and Railroad tracks. (Structural, vibration, noise, etc.)								
3	Depending on the new alignment the speed of traffic on Solano could pose some safety issue for the crew and/or equipment access problems.								
4	Although the new alignment has less trees than the existing alignment, its close proximity to both Hwy. 29 and Solano cold be offset by a heavier litter removal load instead of leave removal so I would leave those hours that way and not reduce the new path hours need.								
5	The new Alignment looks tight to me along the stretch of Solano, and is sharing the edge of Solano, a drainage ditch and the railroad tracks, so we would want to look closely at the alignment, and make sure we clearly define boundaries of maintenance responsibilities.								
6	Hinman creek floods every year and will affect the new path alignment.								
7	These numbers a rough, but it's about the best we have right now.								
	Prepared by Kevin Gaither on 10/9/13								
	Revised by Graham Wadsworth on 11/13/13								