May 16, 2019
NVTA Agenda Item 9.4
Continued From: New
Action Requested: APPROVE

NAPA VALLEY TRANSPORTATION AUTHORITY
Board Agenda Letter

TO: Board of Directors

FROM: Kate Miller, Executive Director

REPORT BY: Diana Meehan, Associate Planner
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SUBJECT: Transportation Fund for Clean Air (TFCA) Three-year Program Manager Projects List for Fiscal Year End (FYE) 2019 through 2021

RECOMMENDATION

That the Napa Valley Transportation Authority (NVTA) Board approve the Transportation Fund for Clean Air (TFCA) Program Manager Three-year Project List for Fiscal Year End (FYE) 2019 through 2021 allocating $594,227

COMMITTEE RECOMMENDATION

At its May 3, 2018 meeting, the Technical Advisory Committee (TAC) recommended the Napa Valley Transportation Authority (NVTA) Board approve the Transportation Fund for Clean Air (TFCA) Program Manager Three-Year Projects List for Fiscal Years Ending (FYE) in 2019 through 2021 allocating $594,227.

EXECUTIVE SUMMARY

On February 21, 2018 the NVTA Board approved the expenditure plan and opened a call for projects for the TFCA Program Manager Funds which closed on March 23, 2018. Two projects were submitted by NVTA, no projects were received from other jurisdictions. The proposed final list of projects for FYE 2019 through FYE 2021 is shown in Table 1 below. All projects have undergone a cost effectiveness analysis and are eligible to receive funds. Approved projects must be submitted to the Bay Area Air Quality Management District (BAAQMD) by November 2, 2018 to meet the programming deadline.

Table 1: Proposed Three-Year Cycle FYE 2019-2021 TFCA Program Manager Projects

FYE 2019-2021 TFCA Expenditures	**Amount**
Administration Costs for FYE 2019	$12,931
Imola Park and Ride Express Bus Improvements (FYE 2019 & 2020*)	$381,296
Napa Valley Vine Trail Calistoga to St. Helena (FYE 2021*)	$200,000
TOTAL	**$ 594,227**

*FYE 2020 and 2021 Estimates are $380,000 and will be updated when annual fund estimate is received

PROCEDURAL REQUIREMENTS

1. Staff Report
2. Public Comment
3. Motion, Second, Discussion and Vote

FISCAL IMPACT

Is there a Fiscal Impact? Yes, TFCA eligible projects totaling $594,227(including administrative costs) will be funded with FYE 2019 through 2021 revenues.

Is it currently budgeted? Yes

Where is it budgeted? FYE 2019-2021 TFCA Program Manager funds.

Future fiscal impact? No

Consequences if not approved? TFCA FYE 2019-2021 Projects will not be funded.

BACKGROUND AND DISCUSSION

The Transportation Fund for Clean Air (TFCA) is a grant program, funded by a $4 surcharge on motor vehicles registered in the Bay Area. This generates approximately $22 million per year in revenues. The purpose of the TFCA program is to provide grants to implement the most cost-effective projects in the Bay Area that will decrease motor vehicle emissions, and thereby improve air quality. Forty percent of the DMV funds generated in Napa (approximately $190,000 annually) are returned to the NVTA for distribution to local projects. The remaining sixty percent is allocated by the BAAQMD under the Regional Program. Projects must have an air quality benefit and be cost effective. BAAQMD rules and statutes only allow funds to be retained for two years unless an extension is requested. Bicycle projects are not allowed an extension and funds programmed to bicycle projects must be expended in 2 years.

NVTA adopts a list of projects annually to be funded by the TFCA Program Manager funds. Historically, the call for projects has been extended and program funds have been rolled over due to lack of eligible project submissions from jurisdictions. Unused TFCA program manager funds can be allocated to other counties, although this has not yet occurred. At the February TAC meeting, staff proposed programming TFCA funds for a three-year cycle similar to the State Transportation Improvement Program (STIP) in order to aid in local planning processes. NVTA receives approximately $190,000 annually.

The TFCA program can fund a wide range of project types, including the construction of new bicycle lanes; shuttle and feeder bus services to train stations; ridesharing programs to encourage carpool and transit use; bicycle facility improvements such as bicycle racks and lockers; electric vehicles and electric vehicle infrastructure; and arterial management projects that reduce traffic congestion such as signal interconnect projects.

Napa County has approximately $594,227 in Program Manager Funds for FYE 2019 through FYE 2021. This amount includes $12,931 set aside for Administration costs for NVTA in the FYE 2019 Expenditure Plan, plus an additional estimated $380,000 for FYE 2020 and 2021.

The NVTA Board authorized staff to commit a minimum of $200,000 non-federal matching funds for the Imola Park and Ride Express Bus Improvement Project in November 2017. The total cost for the project is $3,950,100 and will be funded with a various sources. $381,296 from TFCA for FY2019-20 will be committed to the project. The funding source composition is shown in Table 1:

Table 1:

Funding Source Composition	**Amount**	**Percentage**
TPI	$ 507,094	12.8
TFCA	$ 381,296	9.7
Other Funds	$ 450,000	11.4
TDA	$ 2,611,710	66.1
Total	**$ 3,950,100**	**100**

$200,000 in TFCA funds were previously committed as local match for the Vine Trail Calistoga to St. Helena when the project was initiated in 2015 and will be programmed in the outer year of the three-year program cycle.

SUPPORTING DOCUMENTS

Attachment: (1) TFCA FYE 2019-2021 Applications

PROJECT INFORMATION

A. Project Number: 19NAP01

B. Project Title: Imola Park & Ride-Phase 1 Express Bus Platform Improvements
Bicycle and Pedestrian access improvements

C. TFCA County Program Manager Funds Allocated: $ 359,296

D. TFCA Regional Funds Awarded (if applicable):$_____

E. Total TFCA Funds Allocated (sum of C and D):$ 359,296

F. Total Project Cost: $2,700,000

Indicate the TFCA dollars allocated (C, D and E) and total project cost (D). Data from Line E (Total TFCA Funds) should be used to calculate C-E.

G. Project Description:

Grantee will use TFCA funds to relocate existing bus stop to Imola Avenue and improve the Imola Park and Ride facility. Two new bus stop platforms will be constructed on the northbound and southbound SR29 ramps. The project includes construction of sidewalk, curb and gutter on the south side of Imola Ave. from the Imola Park & Ride lot to the southbound bus platform . Additional pedestrian crossing improvements will be made for access to the northbound platform. (Attachment A)Long term bicycle parking in the Park and Ride lot will be included to encourage first/last mile connections by bicycle.

These improvements are designed to improve frequency and reduce running time and improve accessibility for the Route 29 Express to the Vallejo Ferry Terminal and El Cerrito Del Norte BART station. Currently, the Route departs from the Soscol Gateway Transit Center in the center of Napa off of the SR29 Corridor. Relocating the stop to the Imola Avenue ramps will significantly reduce running time for the route.

Based on the NVTA Express Bus Study, it is anticipated that increased frequency and reduced running times will result in a 10-15% increase in ridership on the Route 29. This equates to approximately 160 one-way trips per day, up from 144 currently at the Soscol Gateway Transit Center.

H. Final Report Content: Final Report form and final Cost Effectiveness Worksheet

A Final Report Form 1 for Smart Growth Projects/Transit Information will be provided upon completion of the project

I. Completed Cost Effectiveness Worksheet attached

RIDESHARING, BICYCLE, SHUTTLE, AND SMART GROWTH PROJECTS
FYE 2019 TFCA Progam Manager Fund Worksheet

Version 2019.1, updated 1/23/2018

General Information Tab: Complete areas shaded in yellow.

Project Number (19XXXYY)	19NAP01
Project Title	Imola Park and Ride Facility &Transit Improvements
Project Type Code (e.g., 7a)	8c
County (2-3 character abbreviation)	NAP
Worksheet Calculated By	Diana Meehan
Date of Submission	
Project Sponsor	
Project Sponsor Organization	Napa Valley Transportation Authority
Public Agency? (Y or N)	Y
Contact Name	Diana Meehan
Email Address	dmeehan@nvta.ca.gov
Phone Number	707-259-8327
Mailing Address	625 Burnell Street
City	Napa
State	CA
Zip	94559
Project Schedule	
Project Start Date	9/1/2019
Project Completion Date	12/30/2021
Final Report to CMA	

RIDESHARING, BICYCLE, SHUTTLE, AND SMART GROWTH PROJECTS

FYE 2019 TFCA Program Manager Fund Worksheet

Version 2019.1, Updated 1/23/2018

Regional Fund Proj. #:	N/A
Route Name:	

Calculations Tab: Complete areas shaded in yellow only.

SAMPLE ENTRIES ARE SHOWN IN LIGHT BLUE

Cost Effectiveness Inputs	
# Years Effectiveness:	3
Total Cost for route:	$2,700,000
TFCA Cost for route 40%:	$359,296
TFCA Cost for route 60%:	N/A
Total TFCA Cost for route:	$359,296

Program Manager Proj. #

Emission Reduction Calculations

Step 1 - Emissions for Eliminated Trips

A	B	C	D	E	F	G	H	I
# Trips/Day (1-way)	Days/Yr	Trip Length (1-way)	VMT	ROG Emissions (gr/yr)	NOx Emissions (gr/yr)	Exhaust &Trip End PM10 Emissions (gr/yr) *	Other PM10 Emissions (gr/yr) *	CO2 Emissions (gr/yr)
100	250	16	400,000	71,900	62,950	989	98,798	154,024,624
160	240	33.1	1,271,040	207,621	193,217	2,937	313,941	433,805,952
			0	0	0	0	0	0
		Total	1,271,040	207,621	193,217	2,937	313,941	433,805,952

Step 2 - Emissions for New Trips to Access Transit/Ridesharing

50	250	3	37,500	11,900	7,588	144	9,262	14,439,808
			0	0	0	0	0	0
			0	0	0	0	0	0
		Total	0	0	0	0	0	0

Step 3A - Emissions for Shuttle/Vanpool Vehicles up to GVW of 14,000 lbs.

A	B	C	D	E	F	G	H	I	J	K	L	M	N
			See Emission Factor Tab, ARB Table 2 or 7										
# Vehicles, Model Year	Emission Std.	Vehicle GVW	ROG Factor (gr/mi)	NOx Factor (g/mi)	Exhaust PM10 Factor (g/mi)	**Total** PM10 Factor (g/mi)	CO2 Factor (g/mi) (See CO2 Table for LD and LHD)	Total Annual VMT (sum all vehicles)	ROG Emissions (gr/yr)	NOx Emissions (gr/yr)	Exhaust PM10 Emissions (gr/yr)	Other PM10 Emissions (gr/yr)	CO2 Emissions (gr/yr)
2, 2005	LEV	10,001-14,000	0.23	0.40	0.12	0.32	860	8000	1,840	3,200	960	1,600	6,880,000
									0	0	0	0	0
									0	0	0	0	0
							Total	0	0	0	0	0	0

Step 3B - Emissions for Buses

A	B	C	D	E	F	G	H	I	J	K	L	M	N
			See Emission Factors Tab, Emissions for Buses Table										
# Vehicles	Engine Year, Make, & Model	Retrofit Device Name	ROG Factor (gr/mi)	NOx Factor (g/mi)	Exhaust PM10 Factor (g/mi)	**Other** PM10 Factor (g/mi)	CO2 Factor (g/mi)	Total Annual VMT (sum all vehicles)	ROG Emissions (gr/yr)	NOx Emissions (gr/yr)	Exhaust PM10 Emissions (gr/yr)	Other PM10 Emissions (gr/yr)	CO2 Emissions (gr/yr)
									0	0	0	0	0
									0	0	0	0	0
							Total	0	0	0	0	0	0

Cost Effectiveness Results

	Annual	Lifetime	
1. VMT Reduced	1,271,040	3,813,120	Miles
2. Trips Reduced	38,400	115,200	Trips
3. ROG Emissions Reduced	0.23	0.69	Tons
4. NOx Emissions Reduced	0.21	0.64	Tons
5. PM Emissions Reduced	0.35	1.05	Tons
6. PM Weighted Emissions Reduced	0.41	1.23	Tons
7. CO2 Emissions Reduced	478.2	1434.5	Tons
8. Emission Reductions (ROG, NOx & PM)	0.79	2.37	Tons
9. TFCA Project Cost - Cost Effectiveness (ROG, Nox & PM)		$151,384	/Ton
10. TFCA Project Cost - Cost Effectiveness (ROG, NOx & Weighted PM). THIS VALUE MUST MEET POLICY REQUIREMENTS.		**$140,462**	**/Ton**

Notes & Assumptions

Provide all assumptions, rationales, and references for figures used in calculations.

Project sponsor will use TFCA funds to construct new express bus platforms and update the Imola Park and Ride facility including
Bicycle and Pedestrian infrastructure improvements. These improvements are identified in the NVTA 2017 Express Bus Study.

6 month average on/off for Route 29 Express Bus Service to El Cerrito Del Norte BART Station at Soscol Gateway Transit Center were 144/day
Based on the NVTA Express Bus Study (2017) NVTA anticipates that increased frequency and reduced running times will result in a 10-15% increase in ridership on Rt. 29
This equates to 158-165 one-way trips per day, up from 144 trips once the stop is relocated to the Imola Park and Ride

Trip distance (one-way) to El Cerrito Del Norte BART from Imola P & R	33 miles
Projected trips per day per NVTA Travel Behavior Study with Imola P&R improvements	160 avg.
Days/Year based on 20 days/mo. Weekday commute trips	240

RIDESHARING, BICYCLE, SHUTTLE, AND SMART GROWTH PROJECTS

FYE 2019 Worksheet, Version 2019.1, updated 1/23/2018

Average Auto Emission Factors

Yrs Eff	Trip Fac.	Run Emis. (VMT)	Trip Fac.	Run Emis. (VMT)	Exhaust	Tire,Brakes,Road PM	PM Commute Trip End
1	0.508	0.148	0.166	0.147	0.00216	0.24700	0.00500
2	0.508	0.148	0.166	0.147	0.00216	0.24700	0.00500
3	0.508	0.148	0.166	0.147	0.00216	0.24700	0.00500
4	0.508	0.148	0.166	0.147	0.00216	0.24700	0.00500
5	0.508	0.148	0.166	0.147	0.00216	0.24700	0.00500
6	0.397	0.121	0.125	0.114	0.00216	0.24700	0.00500
7	0.397	0.121	0.125	0.114	0.00216	0.24700	0.00500
8	0.397	0.121	0.125	0.114	0.00216	0.24700	0.00500
9	0.397	0.121	0.125	0.114	0.00216	0.24700	0.00500
10	0.397	0.121	0.125	0.114	0.00216	0.24700	0.00500
11	0.316	0.101	0.096	0.091	0.00216	0.24700	0.00400
12	0.316	0.101	0.096	0.091	0.00216	0.24700	0.00400
13	0.316	0.101	0.096	0.091	0.00216	0.24700	0.00400
14	0.316	0.101	0.096	0.091	0.00216	0.24700	0.00400
15	0.316	0.101	0.096	0.091	0.00216	0.24700	0.00400
16	0.276	0.095	0.081	0.081	0.00216	0.24700	0.00400
17	0.276	0.095	0.081	0.081	0.00216	0.24700	0.00400
18	0.276	0.095	0.081	0.081	0.00216	0.24700	0.00400
19	0.276	0.095	0.081	0.081	0.00216	0.24700	0.00400
20	0.276	0.095	0.081	0.081	0.00216	0.24700	0.00400

Sources:

CARB Methods to Find the Cost-Effectiveness of Funding Air Quality Projects, Table 3 Average Auto Emission Factors, Update from Dennis Wade email, Using columns covering years of project implementation; methodology per Yvette DiCarlo (ARB), Feb. 2010.

CO2 Emission Factors

Gasoline	18.6	lbs/gal	343.9	g/mile
Diesel	22.2	lbs/gal	301.1	g/mile
CNG (from gasoline)		lbs/gal		
CNG(from diesel)		lbs/gal		
Electric	0.00	lbs/gal	0	g/mile
Propane/LPG				
Hybrid				
Approx. Fleet Avg	18.64	lbs/gal	341.3	g/mile

CO2 factors from EMFAC 2014 - cal yr 2017, LDA, LDT1, LDT2, and MCY

Fuel Consumption				**VMT %**	**Weighted**
Lt. Duty Cars & Trucks		21.93	mpg	85.8%	18.82
Md. Duty	1	13.93	mpg	13.7%	1.91
Diesel Bus	2	4.64	mpg	0.5%	0.02
				Weighted Avg	20.75

ARB Table 2:

Baseline Vehicle

Based ob LEV II standards with 120,000 mile durability

Weight (lbs.)[1]	ROG	NOx	PM10		CO_2[4]
			Exhaust	Total[3]	
Up to 8500	0.09	0.07	0.01	0.21	546
8501-10,000	0.195	0.2	0.12	0.32	735
10,001-14,000	0.23	0.4	0.12	0.32	824

Source: Based on LEV II standards, ARB LEV II Final Regulation Order

Cleaner Vehicles (2004+)

Ultra low-emission light-duty and medium-duty vehicle (ULEV) emission factors in grams per mile with 120,000 mile durability

Weight (lbs.)[1]	ROG	NOx	PM10		CO_2
			Exhaust	Total[3]	
Up to 8500	0.06	0.06	0.010	0.053	546
8501-10,000	0.143	0.2	0.058	0.121	735
10,001-14,000	0.167	0.4	0.058	0.126	824

Super ultra low-emission vehicle (SULEV) factors in grams per mile with 120,000 mile durability

Weight (lbs.)[1]	ROG	NOx	PM10		CO_2
			Exhaust	Total[3]	
Up to 8500	0.01	0.02	0.010	0.053	546
8501-10,000	0.1	0.1	0.058	0.121	735
10,001-14,000	0.117	0.2	0.058	0.126	824

Zero-emission light-duty and medium-duty vehicle (ZEV) emission factors in grams per mile

Weight (lbs.)[1]	ROG	NOx	PM10		CO_2
			Exhaust	Total[3]	
Up to 8500	0	0	0	0.0432	92
8501-10,000	0	0	0	0.0432	92
10,001-14,000	0	0	0	0.0432	144

Source: California Air Resources Board - Methods to Find the Cost-Effectiveness of Funding Air Quality Projects, Table 2. Document updated May 2013.

[1] Gross vehicle weights can be associated with passenger capacity as follows: 5751-8500,

[3] Total PM10 factors include exhaust, brake wear, and entrained road dust.

CO2 Table for Light- and Light Heavy-Duty Shuttles

CO2 Emission Factors for Shuttle/Vanpool Vehicles up to 14,000 lbs.

	CO2 (gr/mi)		
GVWR	Up to 8500	8501-10,000	10,001-14,000
	1	2	3
LEV	546	735	824
ULEV	546	735	824
SULEV*	546	735	824
ZEV	92	92	144

* Also PZEV and AT-PZEV

Sources:

CO2 factors from Amir Fanai (BAAQMD) - updated from EMFAC 2011 Version 1.1

ARB Table 5-C:

Diesel[b] **Medium Heavy-Duty** Vehicles (g/mile)[a]**:** 14,001-33,000 lbs

Model Year	ROG[c]	NOx	Exhaust PM2.5	Exhaust PM10	Other PM	CO2[e]
Pre-1987	0.75	14.52	0.64	0.69	0.289	1321.2

1987-1990	0.59	14.31	0.69	0.75	0.289	1307.3
1991-1993	0.26	10.7	0.38	0.41	0.289	1266.3
1994-1997	0.2	10.51	0.21	0.23	0.289	1171.0
1998-2002	0.2	10.33	0.23	0.25	0.289	1201.0
2003-2006	0.13	6.84	0.14	0.16	0.289	1215.4
2007-2009	0.11	4.01	0.02	0.02	0.289	1241.9
2007-2009 (0.5 g/bhp-hr NOx or Cleaner)[d]	0.1	1.73	0.02	0.02	0.289	1241.9
2010+	0.09	0.74	0.02	0.02	0.289	1246.0

Source for ROG, NOx, and PM2.5: Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 5-C

See "Other PM10, Diesel Fleet" for Other PM calculations

Source for PM10: Carl Moyer Guidelines, July 11, 2014, Table D-3
Source for CO2 Values calculated by Amir Fanai (BAAQMD) using EMFAC 2007 V2.3
a - EMFAC 2011 Zero-Mile Based Emission Factors.
b - Emission factors incorporate the ultra low-sulfur diesel fuel correction factors listed in Table D-26 of the Moyer guidelines.
c - ROG - HC * 1.26639.
d - These values are interpolated between 1.2 g/bhp-hr Nox standard for 2007-2009 model years and 0.2 g/bhp-hr Nox standard for 2010+ model years.
CO2 from EMFAC 2014, includes both RUNEX, other CO2 emissions averaged over VMT for a total per mile figure. Ken Mak, updated Dec 12, 2016

ARB Table 5-D:

Diesel[b] Heavy Heavy-Duty Vehicles (g/mile)[a]**:** 33,001-60,000 lbs

Model Year	ROG[c]	NOx	Exhaust PM2.5	Exhaust PM10	Other PM	CO2[e]
Pre-1987	1.09	21.37	1.15	1.25	0.289	2202.4
1987-1990	0.86	21.07	1.25	1.35	0.289	2571.8
1991-1993	0.56	18.24	0.52	0.56	0.289	2788.6
1994-1997	0.42	17.92	0.34	0.37	0.289	1909.8
1998-2002	0.43	17.61	0.37	0.40	0.289	2817.7
2003-2006	0.27	11.64	0.23	0.25	0.289	2065.3
2007-2009	0.23	6.62	0.03	0.03	0.289	1995.2
2007-2009 (0.5 g/bhp-hr NOx or Cleaner)[d]	0.2	2.88	0.03	0.03	0.289	1995.2
2010+	0.19	1.27	0.03	0.03	0.289	2113.3

Source for ROG, NOx, and PM2.5: Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 5-D

See "Other PM10, Diesel Fleet" for Other PM calculations

Source for PM10: Carl Moyer Guidelines, July 11, 2014, Table D-4
a - EMFAC 2011 Zero-Mile Based Emission Factors.
b - Emission factors incorporate the ultra low-sulfur diesel fuel correction factors listed in Table D-26 of the Moyer guidelines.
c - ROG - HC * 1.26639.
d - These values are interpolated between 1.2 g/bhp-hr Nox standard for 2007-2009 model years and 0.2 g/bhp-hr Nox standard for 2010+ model years.
CO2 from EMFAC 2014, includes both RUNEX, other CO2 emissions averaged over VMT for a total per mile figure. Ken Mak, updated Dec 12, 2016

ARB Table 5-E:

Diesel Urban Buses (g/mile)[b]. 33,000+ lbs

EO Certification Standards[f] (g/bhp-hr)		ROG[a]	NOx	Exhaust PM2.5	Exhaust PM10	Other PM	CO2
6.0 NOX	0.6 PM10	1.15	22.32	1.59	1.73	0.996	2,987.98
5.0 NOX	0.1 PM10	0.96	18.60	0.26	0.29	0.996	2,716.99
5.0 NOX	0.07 PM10	0.96	18.60	0.19	0.20	0.996	2,524.99
4.0 NOX	0.05 PM10	0.77	14.88	0.13	0.14	0.996	2,416.99
2.5 NOX + NMHC	0.05 PM10	0.46	8.84	0.13	0.14	0.996	2,003.00
1.20 NOX	0.01 PM10	0.23	4.46	0.03	0.03	0.996	2,416.99
0.20 NOX	0.01 PM10	0.04	0.74	0.03	0.03	0.996	2,239.81

Source for ROG, NOx, and PM2.5: Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 5-E. Source for PM10: Carl Moyer Guidelines, 7/11/14, Table D-5

Source for "Other PM": Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 1. Average for Tire Wear, Brake Wear, and Road Dust values. PM2.5 converted to PM10.

Source for CO2 Values calculated by Amir Fanai (BAAQMD) using EMFAC 2007 V2.3

a - ROG = HC * 1.26639

b - Mileage based emissions factors were calculated using conversion factors from Table D-28 of the Moyer guidelines.

f - No diesel buses have been certified to the 0.5 g/bhp/hr for the 2004-2006 model year emission standard.

CO2 from EMFAC 2014, includes both RUNEX, other CO2 emissions averaged over VMT for a total per mile figure. Ken Mak, updated Dec 12, 2016

ARB Table 5-F:

Natural Gas Urban Buses (g/mile)[b] 33,000+ lbs

EO Certification Standards (g/bhp-hr)		ROG[a]	NOx	Exhaust PM2.5	Exhaust PM10	Other PM	CO2
5.0 NOX	0.10 PM10	6.33	20.00	0.37	0.40	0.996	2,535.04
5.0 NOX	0.07 PM10	6.33	20.00	0.26	0.28	0.996	2,535.04
4.0 NOX	0.05 PM10	5.07	16.00	0.18	0.20	0.996	2,535.04
2.5 NOX + NMHC	0.05 PM10	2.53	8.00	0.18	0.20	0.996	2,535.04
1.8 NOX + NMHC[fg]	0.02 PM10	1.82	5.76	0.07	0.08	0.996	2,535.04
1.2 NOX	0.01 PM10	1.52	4.80	0.04	0.04	0.996	2,535.04
0.2 NOX	0.01 PM10	0.25	0.80	0.04	0.04	0.996	2,535.04

Source for ROG, NOx, and PM2.5: Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 5-F

Source for "Other PM": Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 1. Average for Tire Wear, Brake Wear, and Road Dust values. PM2.5 converted to PM10.

Source for PM10: Carl Moyer Guidelines, July 11, 2014, Table D-6

Source for CO2 Value: EMFAC 2007 for Diesel Urban Bus, aggregate value for CO2_RUNEX(Pavley I+LCFS) for all model years. Methodology suggested by Dennis Wade from ARB; natural gas vehicles are certified to deisel standards. - Avra Goldman

a - ROG = HC * 1.26639

b - Mileage based emissions factors were calculated using conversion factors from Table D-28 of the Moyer guidelines.

f - A majority of the natural gas urban buses have been certified to the optional standards. Therefore, these values are based on the optional standards.

g - many natural gas urban buses have been certified to optional standards below this level.

Alternative Fuel Medium Heavy-Duty Vehicles (g/mile)[a]: 14,001-33,000 lbs

Model Year	ROG	NOx	Exhaust PM10	Other PM	CO2
Pre 1990, 6.0 NOX	3.61	11.40	1.140	0.244	2202.4
1990, 6.0 NOX	3.42	10.80	0.450	0.244	2571.8
1991-1993, 5.0 NOX	2.85	9.00	0.180	0.244	2788.6
1994-1997, 5.0 NOX	2.85	9.00	0.180	0.244	1909.8
1998-2001, 4.0 NOX	2.28	7.20	0.180	0.244	2817.7
2002-2006, 2.5 NOX	1.14	3.60	0.020	0.244	2065.3
2007-2009, 1.8 NOX	0.82	2.59	0.020	0.244	1995.2
2007-2009, 1.5 NOX	0.68	2.16	0.020	0.244	1995.2
2007-2009, 1.2 NOX	0.55	1.73	0.020	0.244	1995.2
2007-2009, 0.84 NOX	0.38	1.21	0.020	0.244	1995.2
2007-2009, 0.5 NOX	0.29	0.90	0.020	0.244	1995.2
2010+, 0.2 NOX	0.11	0.36	0.020	0.244	2113.3

Source for ROG, Nox: Method to Find the Cost-Effectiveness of Funding Air Quality Projects (May 2013), table 5-B, Source for PM10: Carl Moyer Guidelines (July 2014), table D-2

See "Other PM10, Diesel Fleet" for Other PM calculations

Source for CO2 Values: used values for medium heavy-duty deisel vehicles, per Dennis Wade's suggestion (ARB), as Alt. fuel vehicles are certified to deisel standard and alt. fuel is not available on EMFAC. - Avra Goldman

a - Mileage based emissions factors were calculated using conversion factors from Carl Moyer Guidelines, Table D-28 & D-24

Alternative Fuel Heavy Heavy-Duty Vehicles (g/mile)[a]: 33,001-60,000 lbs

Model Year	ROG	NOx	Exhaust PM10	Other PM	CO2
Pre 1990, 6.0 NOX	5.89	18.60	1.860	0.289	2202.4
1990, 6.0 NOX	5.70	18.00	0.750	0.289	2571.8
1991-1993, 5.0 NOX	4.75	15.00	0.300	0.289	2788.6
1994-1997, 5.0 NOX	4.59	14.50	0.290	0.289	1909.8
1998-2001, 4.0 NOX	3.67	11.60	0.290	0.289	2817.7
2002-2006, 2.5 NOX	1.84	5.80	0.030	0.289	2065.3
2007-2009, 1.8 NOX	1.32	4.18	0.030	0.289	1995.2
2007-2009, 1.5 NOX	1.10	3.48	0.030	0.289	1995.2
2007-2009, 1.2 NOX	0.88	2.78	0.030	0.289	1995.2
2007-2009, 0.84 NOX	0.62	1.95	0.030	0.289	1995.2
2007-2009, 0.5 NOX	0.46	1.45	0.030	0.289	1995.2
2010+, 0.2 NOX	0.18	0.58	0.030	0.289	2113.3

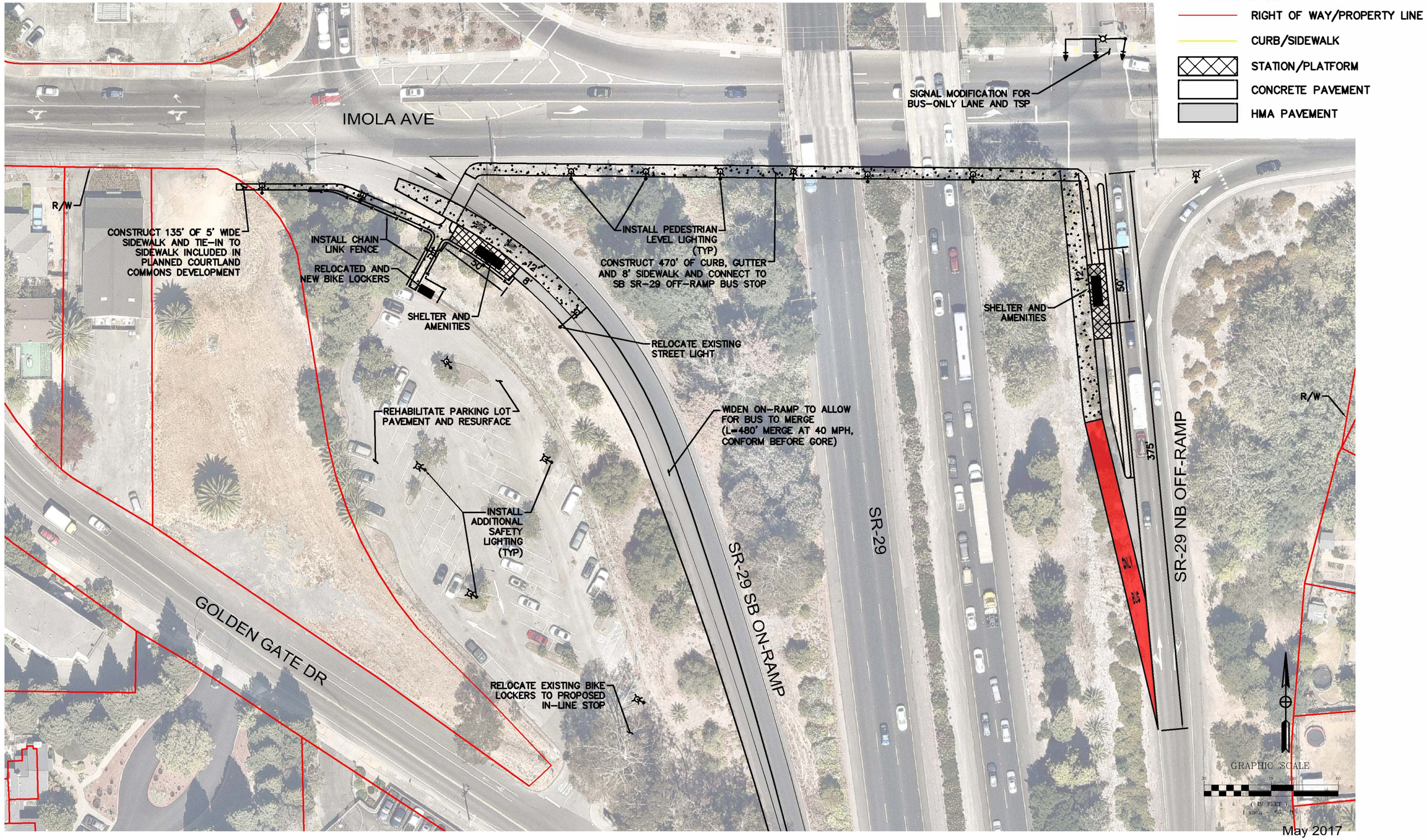
Source for ROG, Nox: Method to Find the Cost-Effectiveness of Funding Air Quality Projects (May 2013), table 5-B, Source for PM10: Carl Moyer Guidelines (July 2014), table D-2

See "Other PM10, Diesel Fleet" for Other PM calculations

Source for CO2 Values: used values for heavy heavy-duty deisel vehicles, per Dennis Wade's (ARB) suggestion, as Alt. fuel vehicles are certified to deisel standard and alt. fuel is not available on EMFAC. - Avra Goldman

a - Mileage based emissions factors were calculated using conversion factors from Carl Moyer Guidelines, Table D-28 & D-24

GASOLINE MEDIUM DUTY VEHICLES (5751-8500 lbs)					
Model year	ROG	NOX	PM10 Exhaust	PM10 TW+BW+RD*	CO2
2000	0.669	0.962	0.004	0.204	619.041
2001	0.563	0.776	0.004	0.204	619.338
2002	0.524	0.768	0.004	0.204	619.106
2003	0.468	0.759	0.004	0.204	618.481
2004	0.254	0.154	0.000	0.200	618.978


LEGEND
RIGHT OF WAY/PROPERTY LINE
CURB/SIDEWALK
STATION/PLATFORM
CONCRETE PAVEMENT
HMA PAVEMENT
IMOLA AVE
SIGNAL MODIFICATION FOR BUS-ONLY LANE AND TSP
R/W
CONSTRUCT 135' OF 5' WIDE SIDEWALK AND TIE-IN TO SIDEWALK INCLUDED IN PLANNED COURTLAND COMMONS DEVELOPMENT
INSTALL CHAIN LINK FENCE
RELOCATED AND NEW BIKE LOCKERS
SHELTER AND AMENITIES
INSTALL PEDESTRIAN LEVEL LIGHTING (TYP)
CONSTRUCT 470' OF CURB, GUTTER AND 8' SIDEWALK AND CONNECT TO SB SR-29 OFF-RAMP BUS STOP
RELOCATE EXISTING STREET LIGHT
REHABILITATE PARKING LOT PAVEMENT AND RESURFACE
WIDEN ON-RAMP TO ALLOW FOR BUS TO MERGE (L=480' MERGE AT 40 MPH, CONFORM BEFORE GORE)
INSTALL ADDITIONAL SAFETY LIGHTING (TYP)
RELOCATE EXISTING BIKE LOCKERS TO PROPOSED IN-LINE STOP
GOLDEN GATE DR
SR-29 SB ON-RAMP
SR-29
SHELTER AND AMENITIES
SR-29 NB OFF-RAMP
375'
50'
12'
8'
30'
GRAPHIC SCALE

May 2017

Vine Transit Express Bus Corridors Study

Conceptual Estimate of Project Costs

Imola Park and Ride (D.2)

Engineer's Opinion of Probable Cost

June 2017

Item	Description	Quantity	Unit	Unit Cost	Total
1	Traffic Control	1	LS	$50,000	$50,000
2	Erosion Control	1	LS	$15,000	$15,000
3	Clearing and Grubbing	1	LS	$10,000	$10,000
4	Roadway Excavation (Includes removal of sidewalk, curb/gutter, etc.)	1	LS	$110,000	$110,000
5	Resurface Pavement (Slurry Seal)	34,200	SF	$1	$34,200
6	Roadway Pavement (HMA/AB) (Includes reconstruction of 50% of Parking Lot Pavement)	28,290	SF	$15	$424,350
7	Roadway Pavement (Concrete/AB)	3,695	SF	$25	$92,375
8	Curb and Gutter	1,175	LF	$35	$41,125
9	Sidewalk/Driveway	4,540	SF	$15	$68,100
10	Chain Link Fence (6')	225	LF	$30	$6,750
11	ADA Curb Ramp	1	EA	$5,000	$5,000
12	Hardscaping	-	SF	$15	$0
13	Landscaping/Clean water features	-	SF	$45	$0
14	Signing and Striping	1	LS	$15,000	$15,000
15	RRFB	-	EA	$15,000	$0
16	Signal Modification/Relocation (NB Ramps - Includes TSP)	1	LS	$200,000	$200,000
17	Signal Modification/Relocation (SB Ramps)	1	LS	$75,000	$75,000
18	Station Platform	1,200	SF	$25	$30,000
19	Relocate Existing Bike Lockers	1	EA	$3,000	$3,000
20	Bike Racks/Lockers	1	EA	$5,000	$5,000
21	Bench	2	EA	$5,000	$10,000
22	Real-Time Arrival Signs	2	EA	$15,000	$30,000
23	Wayfinding Signs	2	EA	$10,000	$20,000
24	Wi-Fi	2	EA	$5,000	$10,000
25	Shelter	2	EA	$75,000	$150,000
26	Utilities (5% of project items)	1	LS	$70,300	$70,300
27	Drainage (7% of project items)	1	LS	$98,400	$98,400
28	Lighting and Electrical (20% of project items)	1	LS	$281,000	$281,000
29	Mobilization (10% of project items)	1	LS	$140,500	$140,500
				Construction Sub-Total	**$1,995,100**
				40% Contingency	$798,040
				Construction Total	**$2,793,200**
	RIGHT OF WAY ACQUISITION	-	SF	$45	$0
	ENGINEERING/DESIGN (18% OF CONSTRUCTION COST)	1	LS	$502,776	$502,776
	ENVIRONMENTAL (10% OF CONSTRUCTION COST)	1	LS	$279,320	$279,320
	CONSTRUCTION MANAGEMENT (15% OF CONSTRUCTION COST)	1	LS	$418,980	$418,980
	PERMITTING (2% OF CONSTRUCTION COST)	1	LS	$55,864	$55,864
				Other Project Costs Total =	**$1,256,900**
				GRAND TOTAL =	**$4,050,100**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known at the time of the opinion.

PROJECT INFORMATION

A. Project Number: 21NAP01

B. Project Title: Napa Valley Vine Trail- Calistoga to St. Helena Segment

C. TFCA County Program Manager Funds Allocated: $ 200,000

D. TFCA Regional Funds Awarded (if applicable):$_____

E. Total TFCA Funds Allocated (sum of C and D):$ 200,000

F. Total Project Cost: $9,100,000

G. Project Description:

Grantee will use TFCA funds to construct a Class I Multi-use facility from the City of Calistoga to the City of St. Helena. This segment is primarily adjacent to the SR29 corridor, a high volume two-lane highway that currently lacks adequate bicycle and pedestrian facilities. The total segment length for this project is 9.1 miles. The total project once complete will be a total of 47 miles, from Calistoga to the Vallejo Ferry Terminal.

The Class I facility will consist of a 10’ wide paved path with 2’ shoulders on either side. Crossing improvements (HAWK Signals and ladder crossings) will be installed to facilitate safe crossings along the route.

H. Final Report Content: Final Report form and final Cost Effectiveness Worksheet

A Final Report Form 3 for Bicycle Projects will be provided upon completion of the project

I. Completed Cost Effectiveness Worksheet attached

RIDESHARING, BICYCLE, SHUTTLE, AND SMART GROWTH PROJECTS
FYE 2019 TFCA Progam Manager Fund Worksheet

Version 2019.1, updated 1/23/2018

General Information Tab: Complete areas shaded in yellow.

Project Number (19XXXYY)	21NAP01
Project Title	Napa Valley Vine Trail-Calistoga to St. Helena Segment
Project Type Code (e.g., 7a)	7a
County (2-3 character abbreviation)	NAP
Worksheet Calculated By	Diana Meehan
Date of Submission	March 20, 2018
Project Sponsor	
Project Sponsor Organization	Napa Valley Transportation Authority
Public Agency? (Y or N)	Y
Contact Name	Herb Fredricksen
Email Address	hfredricksen@nvta.ca.gov
Phone Number	707-259-5951
Mailing Address	625 Burnell St.
City	Napa
State	CA
Zip	94559
Project Schedule	
Project Start Date	12/1/2021
Project Completion Date	6/30/2023
Final Report to CMA	10/31/2023

RIDESHARING, BICYCLE, SHUTTLE, AND SMART GROWTH PROJECTS

FYE 2019 TFCA Program Manager Fund Worksheet

Version 2019.1, Updated 1/23/2018

Regional Fund Proj. #:	N/A
Route Name:	Napa Valley Vine Trail-Calistoga to St. Helena Segment

Cost Effectiveness Inputs			
# Years Effectiveness:	3		
Total Cost for route:	$9,100,000		
TFCA Cost for route 40%:	$200,000	Program Manager Proj. #	21NAP01
TFCA Cost for route 60%:	N/A		
Total TFCA Cost for route:	$200,000		

Calculations Tab: Complete areas shaded in yellow only.

SAMPLE ENTRIES ARE SHOWN IN LIGHT BLUE

Emission Reduction Calculations

Step 1 - Emissions for Eliminated Trips

A	B	C	D	E	F	G	H	I
# Trips/Day (1-way)	Days/Yr	Trip Length (1-way)	VMT	ROG Emissions (gr/yr)	NOx Emissions (gr/yr)	Exhaust &Trip End PM10 Emissions (gr/yr) *	Other PM10 Emissions (gr/yr) *	CO2 Emissions (gr/yr)
100	250	16	400,000	71,900	62,950	989	98,798	154,024,624
240	250	9.4	564,000	113,952	92,868	1,518	139,305	192,493,200
			0	0	0	0	0	0
		Total	564,000	113,952	92,868	1,518	139,305	192,493,200

Step 2 - Emissions for New Trips to Access Transit/Ridesharing

50	250	3	37,500	11,900	7,588	144	9,262	14,439,808
			0	0	0	0	0	0
			0	0	0	0	0	0
		Total	0	0	0	0	0	0

Step 3A - Emissions for Shuttle/Vanpool Vehicles up to GVW of 14,000 lbs.

A	B	C	D	E	F	G	H	I	J	K	L	M	N
			See Emission Factor Tab, ARB Table 2 or 7										
# Vehicles, Model Year	Emission Std.	Vehicle GVW	ROG Factor (gr/mi)	NOx Factor (g/mi)	Exhaust PM10 Factor (g/mi)	**Total** PM10 Factor (g/mi)	CO2 Factor (g/mi) (See CO2 Table for LD and LHD)	Total Annual VMT (sum all vehicles)	ROG Emissions (gr/yr)	NOx Emissions (gr/yr)	Exhaust PM10 Emissions (gr/yr)	Other PM10 Emissions (gr/yr)	CO2 Emissions (gr/yr)
2, 2005	LEV	10,001-14,000	0.23	0.40	0.12	0.32	860	8000	1,840	3,200	960	1,600	6,880,000
									0	0	0	0	0
									0	0	0	0	0
							Total	0	0	0	0	0	0

Step 3B - Emissions for Buses

A	B	C	D	E	F	G	H	I	J	K	L	M	N
			See Emission Factors Tab, Emissions for Buses Table										
# Vehicles	Engine Year, Make, & Model	Retrofit Device Name	ROG Factor (gr/mi)	NOx Factor (g/mi)	Exhaust PM10 Factor (g/mi)	**Other** PM10 Factor (g/mi)	CO2 Factor (g/mi)	Total Annual VMT (sum all vehicles)	ROG Emissions (gr/yr)	NOx Emissions (gr/yr)	Exhaust PM10 Emissions (gr/yr)	Other PM10 Emissions (gr/yr)	CO2 Emissions (gr/yr)
									0	0	0	0	0
									0	0	0	0	0
							Total	0	0	0	0	0	0

Cost Effectiveness Results	Annual	Lifetime	
1. VMT Reduced	564,000	1,692,000	Miles
2. Trips Reduced	60,000	180,000	Trips
3. ROG Emissions Reduced	0.13	0.38	Tons
4. NOx Emissions Reduced	0.10	0.31	Tons
5. PM Emissions Reduced	0.16	0.47	Tons
6. PM Weighted Emissions Reduced	0.19	0.56	Tons
7. CO2 Emissions Reduced	212.2	636.6	Tons
8. Emission Reductions (ROG, NOx & PM)	0.38	1.15	Tons
9. TFCA Project Cost - Cost Effectiveness (ROG, Nox & PM)		$173,971	/Ton
10. TFCA Project Cost - Cost Effectiveness (ROG, NOx & Weighted PM). THIS VALUE MUST MEET POLICY REQUIREMENTS.		**$160,642**	**/Ton**

Notes & Assumptions

Provide all assumptions, rationales, and references for figures used in calculations.

TFCA funds will be used to construct a 9.4 mile Class I section of the Napa Valley Vine Trail from Calistoga to St. Helena
The project is adjacent to the SR29 Corridor and will serve multiple schools, residences, commuters and visitor destinations.

The ADT on SR29 adjacent to the project is approximately 30,000

Project length	9.4mi		
ADT	30,000	0.8	**240 one way trips reduced**

RIDESHARING, BICYCLE, SHUTTLE, AND SMART GROWTH PROJECTS

FYE 2019 Worksheet, Version 2019.1, updated 1/23/2018

Average Auto Emission Factors

Yrs Eff	Trip Fac.	Run Emis. (VMT)	Trip Fac.	Run Emis. (VMT)	Exhaust	Tire,Brakes,Road PM	PM Commute Trip End
1	0.508	0.148	0.166	0.147	0.00216	0.24700	0.00500
2	0.508	0.148	0.166	0.147	0.00216	0.24700	0.00500
3	0.508	0.148	0.166	0.147	0.00216	0.24700	0.00500
4	0.508	0.148	0.166	0.147	0.00216	0.24700	0.00500
5	0.508	0.148	0.166	0.147	0.00216	0.24700	0.00500
6	0.397	0.121	0.125	0.114	0.00216	0.24700	0.00500
7	0.397	0.121	0.125	0.114	0.00216	0.24700	0.00500
8	0.397	0.121	0.125	0.114	0.00216	0.24700	0.00500
9	0.397	0.121	0.125	0.114	0.00216	0.24700	0.00500
10	0.397	0.121	0.125	0.114	0.00216	0.24700	0.00500
11	0.316	0.101	0.096	0.091	0.00216	0.24700	0.00400
12	0.316	0.101	0.096	0.091	0.00216	0.24700	0.00400
13	0.316	0.101	0.096	0.091	0.00216	0.24700	0.00400
14	0.316	0.101	0.096	0.091	0.00216	0.24700	0.00400
15	0.316	0.101	0.096	0.091	0.00216	0.24700	0.00400
16	0.276	0.095	0.081	0.081	0.00216	0.24700	0.00400
17	0.276	0.095	0.081	0.081	0.00216	0.24700	0.00400
18	0.276	0.095	0.081	0.081	0.00216	0.24700	0.00400
19	0.276	0.095	0.081	0.081	0.00216	0.24700	0.00400
20	0.276	0.095	0.081	0.081	0.00216	0.24700	0.00400

Sources:

CARB Methods to Find the Cost-Effectiveness of Funding Air Quality Projects, Table 3 Average Auto Emission Factors, Update from Dennis Wade email, Using columns covering years of project implementation; methodology per Yvette DiCarlo (ARB), Feb. 2010.

CO2 Emission Factors

Gasoline	18.6	lbs/gal	343.9	g/mile
Diesel	22.2	lbs/gal	301.1	g/mile
CNG (from gasoline)		lbs/gal		
CNG(from diesel)		lbs/gal		
Electric	0.00	lbs/gal	0	g/mile
Propane/LPG				
Hybrid				
Approx. Fleet Avg	18.64	lbs/gal	341.3	g/mile

CO2 factors from EMFAC 2014 - cal yr 2017, LDA, LDT1, LDT2, and MCY

Fuel Consumption				**VMT %**	**Weighted**
Lt. Duty Cars & Trucks		21.93	mpg	85.8%	18.82
Md. Duty	1	13.93	mpg	13.7%	1.91
Diesel Bus	2	4.64	mpg	0.5%	0.02
				Weighted Avg	20.75

ARB Table 2:

Baseline Vehicle

Based ob LEV II standards with 120,000 mile durability

Weight (lbs.)[1]	ROG	NOx	PM10		CO_2[4]
			Exhaust	Total[3]	
Up to 8500	0.09	0.07	0.01	0.21	546
8501-10,000	0.195	0.2	0.12	0.32	735
10,001-14,000	0.23	0.4	0.12	0.32	824

Source: Based on LEV II standards, ARB LEV II Final Regulation Order

Cleaner Vehicles (2004+)

Ultra low-emission light-duty and medium-duty vehicle (ULEV) emission factors in grams per mile with 120,000 mile durability

Weight (lbs.)[1]	ROG	NOx	PM10		CO_2
			Exhaust	Total[3]	
Up to 8500	0.06	0.06	0.010	0.053	546
8501-10,000	0.143	0.2	0.058	0.121	735
10,001-14,000	0.167	0.4	0.058	0.126	824

Super ultra low-emission vehicle (SULEV) factors in grams per mile with 120,000 mile durability

Weight (lbs.)[1]	ROG	NOx	PM10		CO_2
			Exhaust	Total[3]	
Up to 8500	0.01	0.02	0.010	0.053	546
8501-10,000	0.1	0.1	0.058	0.121	735
10,001-14,000	0.117	0.2	0.058	0.126	824

Zero-emission light-duty and medium-duty vehicle (ZEV) emission factors in grams per mile

Weight (lbs.)[1]	ROG	NOx	PM10		CO_2
			Exhaust	Total[3]	
Up to 8500	0	0	0	0.0432	92
8501-10,000	0	0	0	0.0432	92
10,001-14,000	0	0	0	0.0432	144

Source: California Air Resources Board - Methods to Find the Cost-Effectiveness of Funding Air Quality Projects, Table 2. Document updated May 2013.

[1] Gross vehicle weights can be associated with passenger capacity as follows: 5751-8500,

[3] Total PM10 factors include exhaust, brake wear, and entrained road dust.

CO2 Table for Light- and Light Heavy-Duty Shuttles

CO2 Emission Factors for Shuttle/Vanpool Vehicles up to 14,000 lbs.

	CO2 (gr/mi)		
GVWR	Up to 8500	8501-10,000	10,001-14,000
	1	2	3
LEV	546	735	824
ULEV	546	735	824
SULEV*	546	735	824
ZEV	92	92	144

* Also PZEV and AT-PZEV

Sources:

CO2 factors from Amir Fanai (BAAQMD) - updated from EMFAC 2011 Version 1.1

ARB Table 5-C:

Diesel[b] **Medium Heavy-Duty** Vehicles (g/mile)[a]**:** 14,001-33,000 lbs

Model Year	ROG[c]	NOx	Exhaust PM2.5	Exhaust PM10	Other PM	CO2[e]
Pre-1987	0.75	14.52	0.64	0.69	0.289	1321.2

1987-1990	0.59	14.31	0.69	0.75	0.289	1307.3
1991-1993	0.26	10.7	0.38	0.41	0.289	1266.3
1994-1997	0.2	10.51	0.21	0.23	0.289	1171.0
1998-2002	0.2	10.33	0.23	0.25	0.289	1201.0
2003-2006	0.13	6.84	0.14	0.16	0.289	1215.4
2007-2009	0.11	4.01	0.02	0.02	0.289	1241.9
2007-2009 (0.5 g/bhp-hr NOx or Cleaner)[d]	0.1	1.73	0.02	0.02	0.289	1241.9
2010+	0.09	0.74	0.02	0.02	0.289	1246.0

Source for ROG, NOx, and PM2.5: Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 5-C

See "Other PM10, Diesel Fleet" for Other PM calculations

Source for PM10: Carl Moyer Guidelines, July 11, 2014, Table D-3

Source for CO2 Values calculated by Amir Fanai (BAAQMD) using EMFAC 2007 V2.3

a - EMFAC 2011 Zero-Mile Based Emission Factors.

b - Emission factors incorporate the ultra low-sulfur diesel fuel correction factors listed in Table D-26 of the Moyer guidelines.

c - ROG - HC * 1.26639.

d - These values are interpolated between 1.2 g/bhp-hr Nox standard for 2007-2009 model years and 0.2 g/bhp-hr Nox standard for 2010+ model years.

CO2 from EMFAC 2014, includes both RUNEX, other CO2 emissions averaged over VMT for a total per mile figure. Ken Mak, updated Dec 12, 2016

ARB Table 5-D:

Diesel[b] Heavy Heavy-Duty Vehicles (g/mile)[a]**:** 33,001-60,000 lbs

Model Year	ROG[c]	NOx	Exhaust PM2.5	Exhaust PM10	Other PM	CO2[e]
Pre-1987	1.09	21.37	1.15	1.25	0.289	2202.4
1987-1990	0.86	21.07	1.25	1.35	0.289	2571.8
1991-1993	0.56	18.24	0.52	0.56	0.289	2788.6
1994-1997	0.42	17.92	0.34	0.37	0.289	1909.8
1998-2002	0.43	17.61	0.37	0.40	0.289	2817.7
2003-2006	0.27	11.64	0.23	0.25	0.289	2065.3
2007-2009	0.23	6.62	0.03	0.03	0.289	1995.2
2007-2009 (0.5 g/bhp-hr NOx or Cleaner)[d]	0.2	2.88	0.03	0.03	0.289	1995.2
2010+	0.19	1.27	0.03	0.03	0.289	2113.3

Source for ROG, NOx, and PM2.5: Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 5-D

See "Other PM10, Diesel Fleet" for Other PM calculations

Source for PM10: Carl Moyer Guidelines, July 11, 2014, Table D-4

a - EMFAC 2011 Zero-Mile Based Emission Factors.

b - Emission factors incorporate the ultra low-sulfur diesel fuel correction factors listed in Table D-26 of the Moyer guidelines.

c - ROG - HC * 1.26639.

d - These values are interpolated between 1.2 g/bhp-hr Nox standard for 2007-2009 model years and 0.2 g/bhp-hr Nox standard for 2010+ model years.

CO2 from EMFAC 2014, includes both RUNEX, other CO2 emissions averaged over VMT for a total per mile figure. Ken Mak, updated Dec 12, 2016

ARB Table 5-E:

Diesel Urban Buses (g/mile)[b]. 33,000+ lbs

EO Certification Standards[f] (g/bhp-hr)		ROG[a]	NOx	Exhaust PM2.5	Exhaust PM10	Other PM	CO2
6.0 NOX	0.6 PM10	1.15	22.32	1.59	1.73	0.996	2,987.98
5.0 NOX	0.1 PM10	0.96	18.60	0.26	0.29	0.996	2,716.99
5.0 NOX	0.07 PM10	0.96	18.60	0.19	0.20	0.996	2,524.99
4.0 NOX	0.05 PM10	0.77	14.88	0.13	0.14	0.996	2,416.99
2.5 NOX + NMHC	0.05 PM10	0.46	8.84	0.13	0.14	0.996	2,003.00
1.20 NOX	0.01 PM10	0.23	4.46	0.03	0.03	0.996	2,416.99
0.20 NOX	0.01 PM10	0.04	0.74	0.03	0.03	0.996	2,239.81

Source for ROG, NOx, and PM2.5: Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 5-E. Source for PM10: Carl Moyer Guidelines, 7/11/14, Table D-5

Source for "Other PM": Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 1. Average for Tire Wear, Brake Wear, and Road Dust values. PM2.5 converted to PM10.

Source for CO2 Values calculated by Amir Fanai (BAAQMD) using EMFAC 2007 V2.3

a - ROG = HC * 1.26639

b - Mileage based emissions factors were calculated using conversion factors from Table D-28 of the Moyer guidelines.

f - No diesel buses have been certified to the 0.5 g/bhp/hr for the 2004-2006 model year emission standard.

CO2 from EMFAC 2014, includes both RUNEX, other CO2 emissions averaged over VMT for a total per mile figure. Ken Mak, updated Dec 12, 2016

ARB Table 5-F:

Natural Gas Urban Buses (g/mile)[b] 33,000+ lbs

EO Certification Standards (g/bhp-hr)		ROG[a]	NOx	Exhaust PM2.5	Exhaust PM10	Other PM	CO2
5.0 NOX	0.10 PM10	6.33	20.00	0.37	0.40	0.996	2,535.04
5.0 NOX	0.07 PM10	6.33	20.00	0.26	0.28	0.996	2,535.04
4.0 NOX	0.05 PM10	5.07	16.00	0.18	0.20	0.996	2,535.04
2.5 NOX + NMHC	0.05 PM10	2.53	8.00	0.18	0.20	0.996	2,535.04
1.8 NOX + NMHC[fg]	0.02 PM10	1.82	5.76	0.07	0.08	0.996	2,535.04
1.2 NOX	0.01 PM10	1.52	4.80	0.04	0.04	0.996	2,535.04
0.2 NOX	0.01 PM10	0.25	0.80	0.04	0.04	0.996	2,535.04

Source for ROG, NOx, and PM2.5: Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 5-F

Source for "Other PM": Methods to Find the Cost-Effectiveness of Funding Air Quality Projects Table 1. Average for Tire Wear, Brake Wear, and Road Dust values. PM2.5 converted to PM10.

Source for PM10: Carl Moyer Guidelines, July 11, 2014, Table D-6

Source for CO2 Value: EMFAC 2007 for Diesel Urban Bus, aggregate value for CO2_RUNEX(Pavley I+LCFS) for all model years. Methodology suggested by Dennis Wade from ARB; natural gas vehicles are certified to deisel standards. - Avra Goldman

a - ROG = HC * 1.26639

b - Mileage based emissions factors were calculated using conversion factors from Table D-28 of the Moyer guidelines.

f - A majority of the natural gas urban buses have been certified to the optional standards. Therefore, these values are based on the optional standards.

g - many natural gas urban buses have been certified to optional standards below this level.

Alternative Fuel Medium Heavy-Duty Vehicles (g/mile)[a]: 14,001-33,000 lbs

Model Year	ROG	NOx	Exhaust PM10	Other PM	CO2
Pre 1990, 6.0 NOX	3.61	11.40	1.140	0.244	2202.4
1990, 6.0 NOX	3.42	10.80	0.450	0.244	2571.8
1991-1993, 5.0 NOX	2.85	9.00	0.180	0.244	2788.6
1994-1997, 5.0 NOX	2.85	9.00	0.180	0.244	1909.8
1998-2001, 4.0 NOX	2.28	7.20	0.180	0.244	2817.7
2002-2006, 2.5 NOX	1.14	3.60	0.020	0.244	2065.3
2007-2009, 1.8 NOX	0.82	2.59	0.020	0.244	1995.2
2007-2009, 1.5 NOX	0.68	2.16	0.020	0.244	1995.2
2007-2009, 1.2 NOX	0.55	1.73	0.020	0.244	1995.2
2007-2009, 0.84 NOX	0.38	1.21	0.020	0.244	1995.2
2007-2009, 0.5 NOX	0.29	0.90	0.020	0.244	1995.2
2010+, 0.2 NOX	0.11	0.36	0.020	0.244	2113.3

Source for ROG, Nox: Method to Find the Cost-Effectiveness of Funding Air Quality Projects (May 2013), table 5-B, Source for PM10: Carl Moyer Guidelines (July 2014), table D-2

See "Other PM10, Diesel Fleet" for Other PM calculations

Source for CO2 Values: used values for medium heavy-duty deisel vehicles, per Dennis Wade's suggestion (ARB), as Alt. fuel vehicles are certified to deisel standard and alt. fuel is not available on EMFAC. - Avra Goldman

a - Mileage based emissions factors were calculated using conversion factors from Carl Moyer Guidelines, Table D-28 & D-24

Alternative Fuel Heavy Heavy-Duty Vehicles (g/mile)[a]: 33,001-60,000 lbs

Model Year	ROG	NOx	Exhaust PM10	Other PM	CO2
Pre 1990, 6.0 NOX	5.89	18.60	1.860	0.289	2202.4
1990, 6.0 NOX	5.70	18.00	0.750	0.289	2571.8
1991-1993, 5.0 NOX	4.75	15.00	0.300	0.289	2788.6
1994-1997, 5.0 NOX	4.59	14.50	0.290	0.289	1909.8
1998-2001, 4.0 NOX	3.67	11.60	0.290	0.289	2817.7
2002-2006, 2.5 NOX	1.84	5.80	0.030	0.289	2065.3
2007-2009, 1.8 NOX	1.32	4.18	0.030	0.289	1995.2
2007-2009, 1.5 NOX	1.10	3.48	0.030	0.289	1995.2
2007-2009, 1.2 NOX	0.88	2.78	0.030	0.289	1995.2
2007-2009, 0.84 NOX	0.62	1.95	0.030	0.289	1995.2
2007-2009, 0.5 NOX	0.46	1.45	0.030	0.289	1995.2
2010+, 0.2 NOX	0.18	0.58	0.030	0.289	2113.3

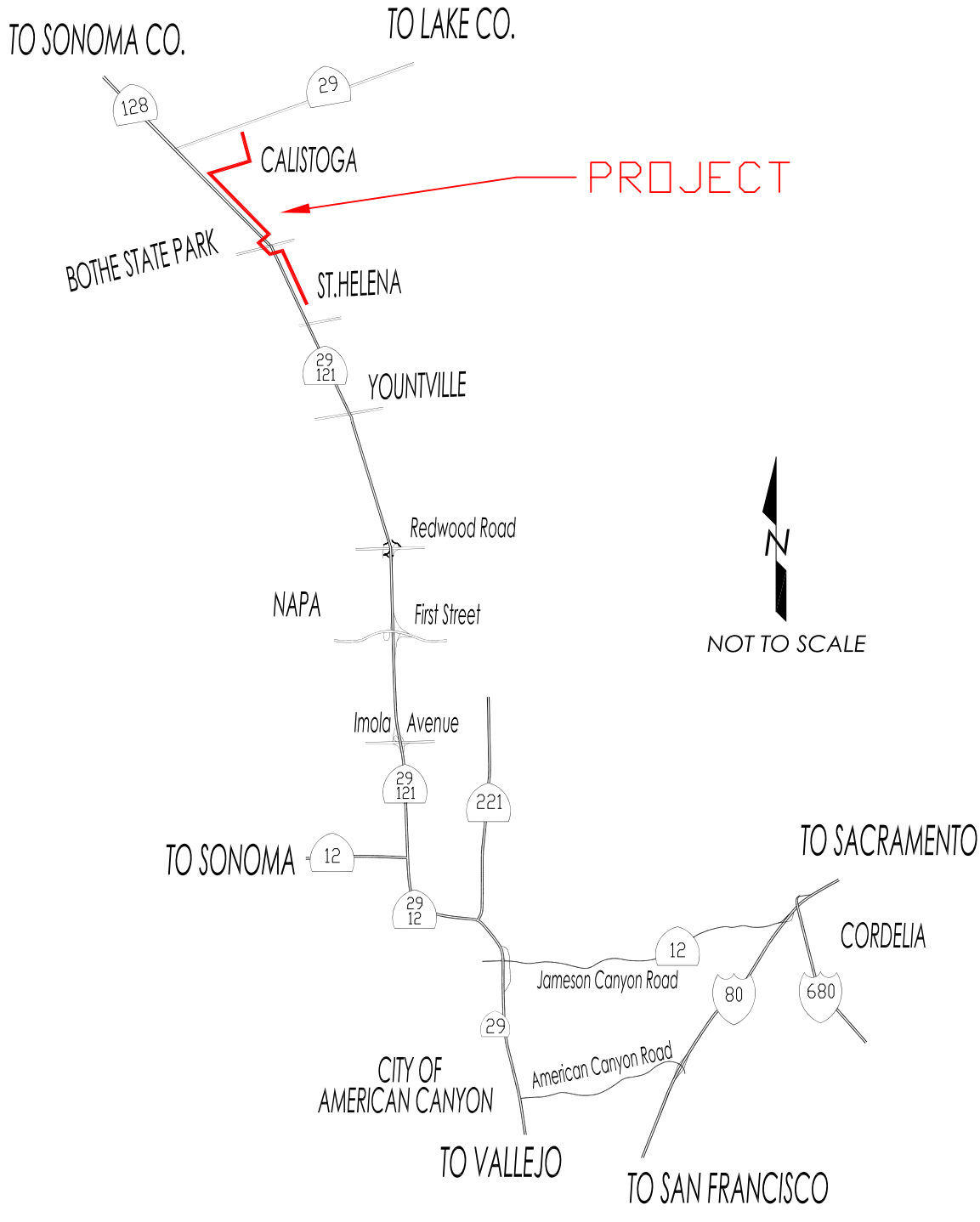
Source for ROG, Nox: Method to Find the Cost-Effectiveness of Funding Air Quality Projects (May 2013), table 5-B, Source for PM10: Carl Moyer Guidelines (July 2014), table D-2

See "Other PM10, Diesel Fleet" for Other PM calculations

Source for CO2 Values: used values for heavy heavy-duty deisel vehicles, per Dennis Wade's (ARB) suggestion, as Alt. fuel vehicles are certified to deisel standard and alt. fuel is not available on EMFAC. - Avra Goldman

a - Mileage based emissions factors were calculated using conversion factors from Carl Moyer Guidelines, Table D-28 & D-24

GASOLINE MEDIUM DUTY VEHICLES (5751-8500 lbs)					
Model year	ROG	NOX	PM10 Exhaust	PM10 TW+BW+RD*	CO2
2000	0.669	0.962	0.004	0.204	619.041
2001	0.563	0.776	0.004	0.204	619.338
2002	0.524	0.768	0.004	0.204	619.106
2003	0.468	0.759	0.004	0.204	618.481
2004	0.254	0.154	0.000	0.200	618.978



LOCATION MAP

NOT TO SCALE

Attachment D

Detailed Engineer's Estimate and Total Project Cost

Important: Read the Instructions in the other sheet (tab) before entering data. Do not enter in shaded fields (with formulas).

Project Information:

Agency:	Napa County Transportation and Planning Agency				
Application ID:	04-Napa County Transp. Planning Agency - 1	**Prepared by:**	RSA/HF	**Date:**	**5/26/2015**
Project Description:	Construction of Class 1 Facility between Pratt Avenue in St. Helena and Lincoln Avenue in Calistoga				
Project Location:	Between Calistoga and St Helena, Napa County CA				

Engineer's Estimate and Cost Breakdown:

Engineer's Estimate (for Construction Items Only)

Cost Breakdown

Note: Cost can apply to more than one category. Therefore may be over 100%.

Item No.	Item	Quantity	Units	Unit Cost	Total Item Cost	ATP Eligible Items %	ATP Eligible Items $	Landscaping %	Landscaping $	Non-Participating Items %	Non-Participating Items $	To be Constructed by Corps/CCC %	To be Constructed by Corps/CCC $
1	Mobilization, Traffic Control, Dust Control, Water Pollution Program	1	LS	$ 200,000	$ 200,000	100%	$200,000						
2	Clearing, Grubbing Tree removal	1	LS	$ 80,000	$ 80,000	100%	$80,000						
3	Demolition	1	LS	$ 80,000	$ 80,000	100%	$80,000						
4	Utility Relocation	1	l.s.	$ 54,260	$ 54,260					100%	$54,260		
5	Earthwork	6,000	c.y.	$ 10	$ 60,000	100%	$60,000						
6	Soil Export	5,700	c.y.	$ 20	$ 114,000	100%	$114,000						
7	Asphalt Concrete	2,766	ton	$ 200	$ 553,210	100%	$553,210						
8	Type II Base 6' deep	4,321	c.y.	$ 75	$ 324,056	100%	$324,056						
9	Thermoplastic paving striping	1	l.s.	$ 5,000	$ 5,000	100%	$5,000						
10	Dunaweal bike/red bridge (135 lf)	1	s.f.	$ 300,000	$ 300,000	100%	$300,000						
11	Mill Creek bike/ped bridge	1	s.f.	$ 55,550	$ 55,550	100%	$55,550						
12	Retaining Walls - CMU or Block	6,000	s.f.	$ 45	$ 270,000	100%	$270,000						
13	Park Tread paving	208,820	s.f.	$ 16	$ 3,341,120	100%	$3,341,120						
14	Box Culverts	2	ea	$ 100,000	$ 200,000	100%	$200,000						
15	Culverts	3	ea	$ 5,000	$ 15,000	100%	$15,000						
16	Stormwater	1	l.s.	$ 314,633	$ 314,633	100%	$314,633						
17	Sidewalk	2,000	s.f.	$ 12	$ 24,000	100%	$24,000						
18	Curb and Gutter	300	l.f.	$ 18	$ 5,400	100%	$5,400						
19	Concrete Headwalls	3	ea	$ 10,000	$ 30,000	100%	$30,000						
20	PCC Curb Ramp	10	ea	$ 4,000	$ 40,000	100%	$40,000						
21	HAWK Signals	2	ea	$ 150,000	$ 300,000	100%	$300,000						
22	Landscaping	1	ea	$ 40,400	$ 40,400			100%	$40,400				
23	Site Amenities	1	ea	$ 328,600	$ 328,600	10%	$32,860			90%	$295,740	5%	$17,163
	Subtotal of Construction Items:				**$6,735,229**		**$6,344,829**		**$40,400**		**$350,000**		**$17,163**
	Construction Item Contingencies (% of Construction Items)**: Enter in the cell to the right**			**15.00%**	**$1,010,284**								
	Total (Construction Items & Contingencies) cost:				**$7,745,513**								

Project Cost Estimate:

Type of Project Delivery Cost	Cost $		
Preliminary Engineering (PE)			
Environmental Studies and Permits(PA&ED):	$ 260,000		
Plans, Specifications and Estimates (PS&E):	$ 700,000		
Total PE:	**$ 960,000**	**12.39%**	25% Max
Right of Way (RW)			
Right of Way Engineering:	$ 50,000		
Acquisitions and Utilities:	$ 50,000		
Total RW:	**$ 100,000**		
Construction (CON)			
Construction Engineering (CE):	$ 400,000	**4.91%**	15% Max
Total Construction Items & Contingencies:	$7,745,513		
Total CON:	**$ 8,145,513**		
Total Project Cost Estimate:	**$ 9,205,513**		

NAPA VALLEY VINE TRAIL: ST. HELENA to CALISTOGA

Trail Demand/Usage Estimate

Est. Population Within .5 mile of project*	5,840
Est. Population Within 3 miles of project**	11,679
Est. Number of Annual Visitors in 3 miles of project***	1,595,000

Recreational Use by Local Residents		
Bicyclists (existing)	23,358	annual trips
Bicyclists (future)	58,395	annual trips
Net increased bicycle trips	35,037	annual trips
Pedestrian (existing)	44,380	annual trips
Pedestrians (future)	88,760	annual trips
Net increased pedestrian trips	44,380	annual trips
TOTAL increased trips	79,417	annual trips
School/Work Commuting Use by Local Residents		
Bicyclists (existing)	5,606	annual trips
Bicyclists (future)	33,636	annual trips
Net increased bicycle trips	28,030	annual trips
Pedestrian (existing)	33,636	annual trips
Pedestrians (future)	70,074	annual trips
Net increased pedestrian trips	36,438	annual trips
TOTAL increased trips	64,468	annual trips
Recreational Use by Visitors		
Total Annual Napa Valley visitors	2,900,000	
Visitors visiting the St Helena to Calistoga area	1,595,000	55.1% of total
Visitors choosing to bike on trail in St.Helena and Calistoga corridor	255,200	
Visitors choosing to walk on trail in St.Helena and Calistoga corridor	63,800	
TOTAL increased trips	319,000	

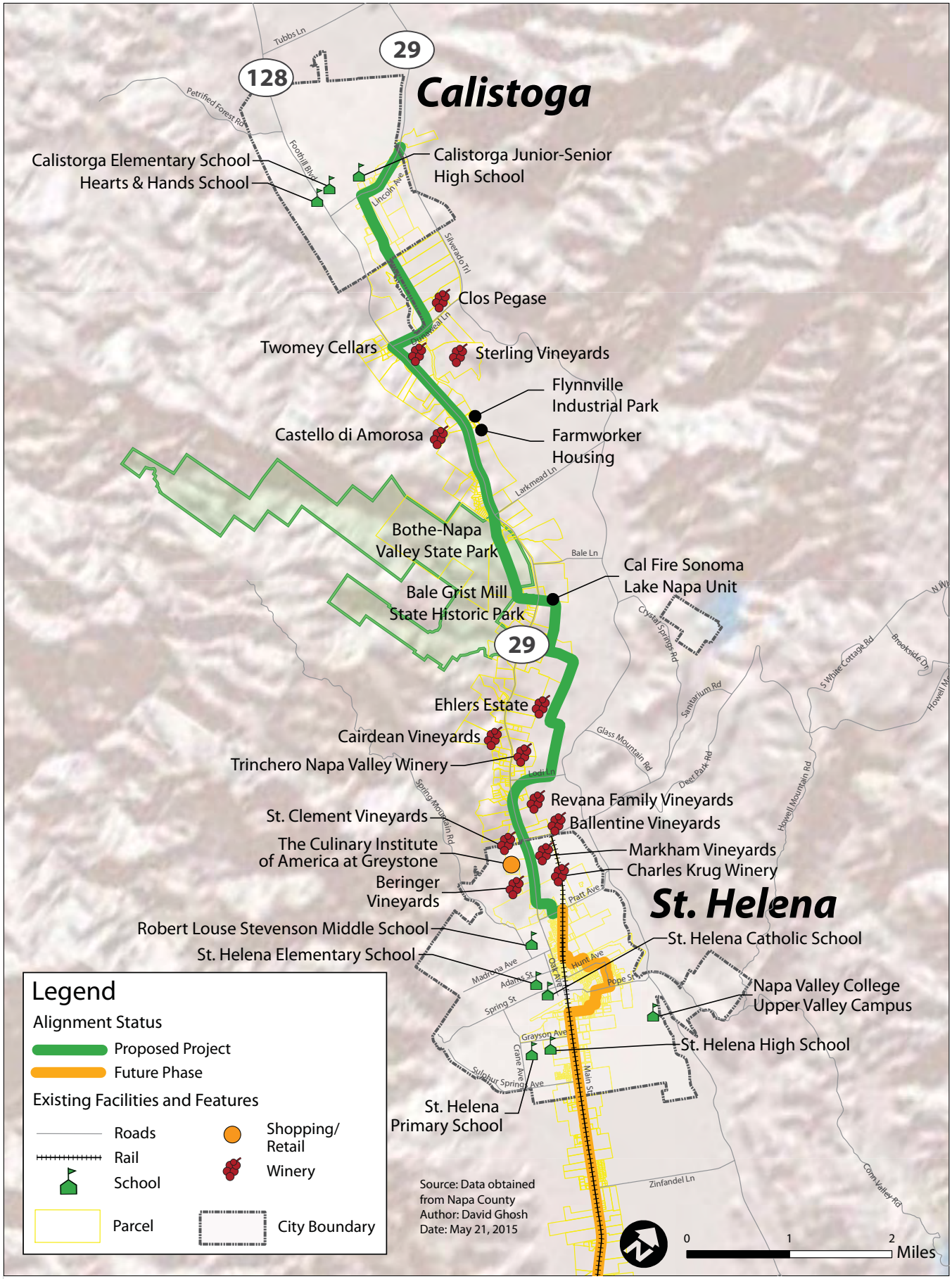
* Includes 50% of population of Calistoga, St. Helena

**Includes 100% population of Calistoga, St. Helena, Deer Park

*** Estimate of 55.1%. Based on Survey Napa Valley Visitor Industry Economic Impact Report

Trips by mode and type				
	Annual uses	Recreation	Commuting	Daily Uses
Bicyclists (existing)	28,964	23,358	5,606	79
Bicyclists (future)	347,231	313,595	33,636	951
Pedestrian (existing)	78,016	44,380	33,636	214
Pedestrians (future)	222,634	152,560	70,074	610
Combined Bicyclists and Pedestrians (existing)	106,980	67,738	39,241	293
Combined Bicyclists and Pedestrians (future)	569,865	466,155	103,710	1,561

I-1.A



Major Facilities Served by the Napa Valley Vine Trail - St. Helena to Calistoga

I-1.B.a

NAPA VALLEY VINE TRAIL: ST. HELENA to CALISTOGA

Schools: Location from project & Attendance

School	Address	Distance from proposed project.	Enrollment 2014/15	# of students living on route proposed for improvement
St Helena High	1401 Grayson Ave, St Helena CA 94574	1.4 miles	507	75
Robert Louis Stevenson M	1316 Hillview Pl, St Helena, CA 94574	0.6 miles	288	43
St Helena Elementary	1325 Adams St, St Helena, CA 94574	0.7 miles	236	35
St Helena Primary	1701 Grayson Ave, St Helena, CA 94574	1.5 miles	238	3
Calistoga Junior-Senior H	1608 Lake St, Calistoga, CA 94515	0.4 miles	360	54
Calistoga Elementary	1327 Berry St, Calistoga, CA 94515	0.3 miles	490	74
Napa College North Valley Campus	1088 College Av, St Helena, CA 94574	1.5 miles	750	250
		Totals	**2869**	**534**

I-1.B.a

Dist	Route	County		Postmile	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak Month	Ahead AADT
04	029	NAP	R	10.389	NAPA, JCT. RTE. 121 NORTH	4500	55000	51000	4900	63000	60000
04	029	NAP		11.548	FIRST STREET	4900	63000	60000	5900	75000	71000
04	029	NAP		12.039	NAPA, LINCOLN AVENUE	5900	75000	71000	5200	66000	63000
04	029	NAP		13.058	TRANCAS/REDWOOD ROADS	5200	66000	63000	3950	51000	48000
04	029	NAP		15.581	OAK KNOLL AVENUE	2950	38000	36000	2850	37000	35000
04	029	NAP		19.031	CALIFORNIA DRIVE	2650	33500	32000	2900	27500	26000
04	029	NAP		22.52	OAKVILLE GRADE ROAD	2900	27500	26000	2800	26500	25500
04	029	NAP		24.595	RUTHERFORD, JCT. RTE. 128 EAST	2800	26500	25500	2500	26500	22900
04	029	NAP		26.57	ZINFANDEL LANE	2750	26500	25000	2850	27000	25500
04	029	NAP		28.75	ST. HELENA, ADAMS STREET	2200	21400	20100	2000	19000	17800
04	029	NAP		29.25	ST. HELENA, PRATT AVENUE	2050	20500	18200	2000	20100	18000
04	029	NAP		30.66	LODI LANE	1650	16700	15300	1650	16400	15000
04	029	NAP		33.47	LARKMEAD LANE	1550	15500	14200	1550	15300	14100
04	029	NAP		36.893	CALISTOGA, JCT. RTE. 128 NORTHWEST	1550	15300	14000	1150	11100	10200
04	029	NAP		37.902	CALISTOGA, SILVERADO TRAIL	570	5200	4800	570	5200	4800
04	029	NAP		39.5	TUBBS LANE	570	5200	4850	1000	9000	8400
04	029	NAP		48.582	NAPA/LAKE COUNTY LINE	1000	9200	8500			
01	029	LAK		0	NAPA/LAKE COUNTY LINE				970	8800	8200
01	029	LAK		4.15	RANCHERIA ROAD	870	9700	9300	870	10300	9900
01	029	LAK		4.54	DRY CREEK CUTOFF	870	10300	9900	1150	12000	11200
01	029	LAK		5.811	MIDDLETOWN, JCT. RTE. 175	1250	12600	11900	1250	13200	12000
01	029	LAK		6.36	MIDDLETOWN, BUTTS CANYON ROAD	1250	13200	12000	1250	13400	12200
01	029	LAK		11.124	HIDDEN VALLEY/SPRUCE ROAD	1150	11700	11100	960	10500	9900
01	029	LAK		11.93	SPRUCE GROVE ROAD	960	10500	9900	960	10500	9900
01	029	LAK		20.31	JCT. RTE. 53 NORTH	1200	12500	11600	1150	12600	11600
01	029	LAK		21.65	SEIGLER CANYON ROAD	1150	12600	11600	1050	11600	10600
01	029	LAK		22.19	POINT LAKEVIEW DRIVE	1050	11600	10600	930	10300	9500
01	029	LAK		27.89	JCT. RTE. 281	930	10300	9500	970	10600	9200
01	029	LAK		31.05	JCT. RTE. 175	1000	10400	9800	1000	10800	10300
01	029	LAK		32.35	BOTTLE ROCK ROAD	1000	10800	10300	1200	12200	11300
01	029	LAK	R	34.58	MAIN STREET	1200	12700	11400	1200	12100	11200
01	029	LAK	R	34.747	KELSEYVILLE, LIVE OAK DRIVE	1200	12100	11200	1100	12300	11500
01	029	LAK	R	35.32	KELSEYVILLE, BELL HILL ROAD	1050	11800	11000	1050	11800	11000
01	029	LAK	R	36.289	RENFRO DRIVE	1050	11800	11000	1300	14100	13000
01	029	LAK	R	37.669	ARGONAUT ROAD	1300	14400	13200	1300	14100	13100
01	029	LAK	R	38.592	HIGHLAND SPRINGS ROAD	1300	14100	13100	1400	15000	13900
01	029	LAK	R	40.14	JCT. RTE. 175	1500	15100	14500	1300	13700	13000