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Memorandum

TO: Air Quality Conformity Task Force DATE: January 9, 2014

FR: Harold Brazil W.I.:

RE: Proposed Draft Approach to Allocate Truck Count Data

Background – Projects that must undergo interagency consultation include those that use Federal funds and/or require Federal approval, and are not automatically exempt from $PM_{2.5}$ hot-spot analysis requirements. Project sponsors are required to download and complete the project assessment form for $PM_{2.5}$ Interagency Consultation in its entirety (from MTC's online Fund Management System or FMS). Data project sponsors need in the project assessment form includes level of service (LOS) values and diesel truck count information. The purpose of the assessment form is for the project sponsor to provide sufficient information to allow the Air Quality Conformity Task Force to determine if a project is considered a project of air quality concern (POAQC) and if the project requires undergoing a project-level $PM_{2.5}$ hot-spot analysis.

Need and Purpose –Many project sponsors do not have available diesel truck count data and information. In response to this issue, MTC (with assistance from the Bay Area Air Quality Management District or BAAQMD) has proposed a methodology to convert truck counts to estimate diesel truck volumes and percentages in the project area.

This methodology involves using a combination of data from:

- Project sponsor's traffic flow ADT and truck route map
- Caltrans' Annual Average Daily Truck Traffic on the California State Highway System
- Data from a goods movement study in Southern California [VRPA Technologies, 2002] containing the distribution of trucks by number of axles
- Truck fuel type data classification (by truck vehicle weight) contained in the California Air Resources Board's EMFAC2011 emission factor model

This proposed draft approach to allocate truck count data involves the following four steps:

1. Obtain AADT value at example project location
2. estimate truck AADT and truck AADT percentage by number of axles (from Caltrans' Truck Traffic data or if project sponsors collect observed truck counts by truck axle number)
3. apply data from a goods movement study to EMFAC2011 fuel percentage allocations by vehicle type weight category to derive diesel truck share by number of axles
4. apply the diesel percentages (by number of axles) to the corresponding number of axles Truck AADT to get the Diesel Truck counts at the project location

2011

Annual Average Daily Truck Traffic on the California State Highway System

Compiled by
Traffic and Vehicle Data Systems

State of California
Business, Transportation and Housing Agency
Department of Transportation

Prepared in cooperation with the
U.S. Department of Transportation
Federal Highway Administration

PREFACE

The annual average daily truck traffic is shown for selected locations on the State Highway System. Truck traffic is classified by number of axles. The two-axle class includes 11/2-ton trucks with dual rear tires and excludes pickups and vans with only four tires. Total vehicle AADT for the same year is taken from the Traffic Volumes on California State Highways booklet also published by the California Department of Transportation.

Annual average daily truck traffic is the total truck traffic volume divided by 365 days. Truck counting is done throughout the state in a program of continuous truck count sampling. The sampling includes a partial day, 24-hour, 7-day and continuous vehicle classification counts. The partial day and 24-hour counts are usually made on high volume, urban highways. The 7-day counts are made on low volume, rural highways. The counts are usually taken only once in the year. About one-sixth of the locations are counted annually. The resulting counts are adjusted to an estimate of annual average daily truck traffic by compensating for seasonal influence, weekly variation, and other variables that may be present. Annual average daily truck traffic is necessary for presenting a statewide picture of truck flow, evaluating truck trends, planning and designing highways and for other purposes.

The column entitled "Year Ver/Est" indicates the year the truck percents were either verified (V) or estimated (E). It represents the year the truck percentages were verified (counted continuously or quarterly) or estimated. Selected points on a route will be counted and the ones in between will be estimated. At some locations, truck volumes are static and no new counts are made until there is a change in traffic on the route. All truck AADT's listed are for 2011.

California State Highways are listed in legislative route number order. The legislative route number is the same as the signed route number in most cases.

Each count location is identified by the post mile value corresponding to that point on the highway. The post mile values increase from the beginning of a route within a county to the next county line. The post mile values start over again at each county line. Post mile values increase usually from south to north or west to east depending on the general direction the route follows within the state.

The post mile at a given location will remain the same year after year except in a few cases when the route was relocated/redesignated. When a section of road is relocated, new post miles (usually noted by an alphabetical prefix such as "R" or "M") are established for it. If relocation results in a change in length, "post mile equations" are introduced so that post miles on the remainder of the route within the county will remain unchanged. Post mile equations are not shown on this listing.

A leg is given for each count location and is denoted by an A, B or O. For traffic volumes purposes, a highway intersection or interchange has two legs. According to ascending post miles (route direction) and a post mile reference at the center of the intersection or interchange, B = back leg, A = ahead leg, and O = traffic volume is equal for the back and ahead legs.

Truck AADT's are shown as two-way traffic. Equivalent axle loading (EAL) are calculated to represent two-way travel.

Data compiled by:

Division of Traffic Operations, Office of System Planning Management
Traffic Data Branch
(916) 654-6939

Price: $15.00

RTE	DIST	CNTY	POST MILE	LEG	DESCRIPTION	VEHICLE AADT TOTAL	TRUCK AADT TOTAL	TRUCK % TOT VEH	TRUCK AADT TOTAL By Axle 2	3	4	5+	% TRUCK AADT By Axle 2	3	4	5+	EAL 2-WAY (1000)	YEAR VER/ EST
680	04	SCL	M0	A	SAN JOSE, JCT. RTES. 101/280	156000	2964	1.9	1206	376	116	1266	40.7	12.7	3.9	42.7	531	94E
680	04	SCL	M.385	B	SAN JOSE, KING ROAD	156000	4368	2.8	1904	432	367	1664	43.6	9.9	8.4	38.1	734	94E
680	04	SCL	M.385	A	SAN JOSE, KING ROAD	216000	9504	4.4	3364	1169	532	4438	35.4	12.3	5.6	46.7	1835	94V
680	04	SCL	M1.74	B	SAN JOSE, JCT. RTE. 130	165000	7260	4.4	2686	682	312	3579	37	9.4	4.3	49.3	1437	94V
680	04	SCL	M1.74	A	SAN JOSE, JCT. RTE. 130	182000	8190	4.5	2924	811	303	4152	35.7	9.9	3.7	50.7	1654	94V
680	04	SCL	M5.068	B	SAN JOSE, CAPITOL AVENUE	144000	7776	5.4	2636	855	490	3795	33.9	11	6.3	48.8	1552	94V
680	04	SCL	M5.068	A	SAN JOSE, CAPITOL AVENUE	146000	7884	5.4	2562	938	489	3895	32.5	11.9	6.2	49.4	1592	94V
680	04	SCL	M7.647	B	MILPITAS, JCT. RTE. 237 WEST	136000	6256	4.6	2158	457	213	3428	34.5	7.3	3.4	54.8	1332	94V
680	04	SCL	M7.647	A	MILPITAS, JCT. RTE. 237 WEST	127000	5207	4.1	1692	307	255	2952	32.5	5.9	4.9	56.7	1143	94V
680	04	ALA	M2.382	B	FREMONT, JCT. RTE. 262 WEST	119000	8449	7.1	2231	575	161	5483	26.4	6.8	1.9	64.9	2046	94V
680	04	ALA	M2.382	A	FREMONT, JCT. RTE. 262 WEST	136000	12240	9	3207	967	428	7638	26.2	7.9	3.5	62.4	2899	94V
680	04	ALA	R6.396	B	**FREMONT, JCT. RTE. 238 NORTH**	138000	10212	**7.4**	2676	745	184	6607	**26.2**	**7.3**	**1.8**	**64.7**	2469	94V
680	04	ALA	R6.396	A	**FREMONT, JCT. RTE. 238 NORTH**	138000	8101	**5.87**	2389	480	267	4965	**29.49**	**5.92**	**3.3**	**61.29**	1880	00V
680	04	ALA	R11.042	B	JCT. RTE. 84 WEST	137000	10412	7.6	3019	895	510	5987	29	8.6	4.9	57.5	2328	94V
680	04	ALA	R11.042	A	JCT. RTE. 84 WEST	139000	11120	8	3203	1079	945	5894	28.8	9.7	8.5	53	2384	94V
680	04	ALA	R11.845	A	JCT. RTE. 84 EAST	115000	10580	9.2	3047	1026	899	5607	28.8	9.7	8.5	53	2268	94V

In this example for consulation with the task force, the project located on Warm Springs Blvd in Fremont.

1. Start with AADT value at example project location:

Warm Springs Blvd AADT	17,788

between Grimmer and Mission
Source: City of Fremont 2010 Traffic Flow Map [file "City of Fremont Yr 2010 Counts.pdf"]

2. Then estimate truck AADT and truck AADT percentage by number of axles:
[files "City of Fremont Truck Route Map.pdf" and "2011 Caltrans Annual Average Daily Truck Traffic.pdf"]

	Truck %age ADT by # of axles	# of axles	% Truck AADT 2	3	4	5 and 5+	
I-680 at 238 [seg B]	7.4		26.2	7.3	1.8	64.7	<< from Caltrans Truck Data
I-680 at 238 [seg A]	5.87		29.49	5.92	3.3	61.29	
Average	6.64	Weighted Average	27.66	6.69	2.46	63.19	100.00

	Truck AADT 2	3	4	5 and 5+	Total
# of axles					
Truck AADT *	326	79	29	746	1,180

3. Next, data from a goods movement study in Southern California [VRPA Technologies, 2002] containing the distribution of trucks by number of axles and vehicle type weight category [contained in the California Air Resources Board's EMFAC2011 emission factor model] is applied to EMFAC2011 fuel percentage allocations by vehicle type weight category to derive the Overall Diesel truck share by number of axles. The example below [shown with the blue arrows] performs the calculation for two axle trucks. The percenages **0.01%** for light-duty trucks, **0.01%** for medium-duty trucks, **3.97%** for light-heavy-duty I trucks, **8.22%** for light-heavy-duty II trucks, **28.50%** for medium-heavy-duty trucks and **12.65%** for heavy-heavy-duty trucks are summed to **53.37%** for two axle trucks [only]. Repeat this calculation for each of the other [3-axle, 4-axle and 5 and 5+] number of axle groups.

EMFAC2011SG V1.1 Trucks by Gross Vehicle Weight (GVW) in pounds

# of axles	Light-Duty To 5,750	Medium-Duty 5,751-8,500	Light-Heavy-Duty I 8,501-10,000	Light-Heavy-Duty II 10,001-14,000	Medium-Heavy-Duty 14,001-33,000	Heavy-Heavy-Duty 33,001-60,000	
2	11.80%	13.20%	13.20%	14.40%	34.50%	12.90%	
3	0.00%	0.70%	0.70%	1.40%	11.70%	85.50%	
4	0.00%	0.00%	0.00%	0.00%	2.80%	97.20%	
5 and 5+	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	
Diesel Share allocation							
Gas %age	99.90%	99.90%	69.90%	42.90%	17.40%	1.90%	
Diesel %age	0.10%	0.10%	30.10%	57.10%	82.60%	98.10%	
# of axles							** Overall Diesel % age
2	0.01%	0.01%	3.97%	8.22%	28.50%	12.65%	53.37%
3	0.00%	0.00%	0.21%	0.80%	9.66%	83.88%	94.55%
4	0.00%	0.00%	0.00%	0.00%	2.31%	95.35%	97.67%
5 and 5+	0.00%	0.00%	0.00%	0.00%	0.00%	98.10%	98.10%

4. Apply the Overall Diesel percentages [by # of axles] to the corresponding # of axles Truck AADT to get the Diesel Truck counts at the project location.

	Diesel Truck AADT 2	3	4	5 and 5+	
# of axles					
Truck AADT	326	79	29	746	* from above
Overall Diesel % age	53.37%	94.55%	97.67%	98.10%	** from above
Diesel Truck Count at project location	**174**	**75**	**28**	**732**	**1,009**

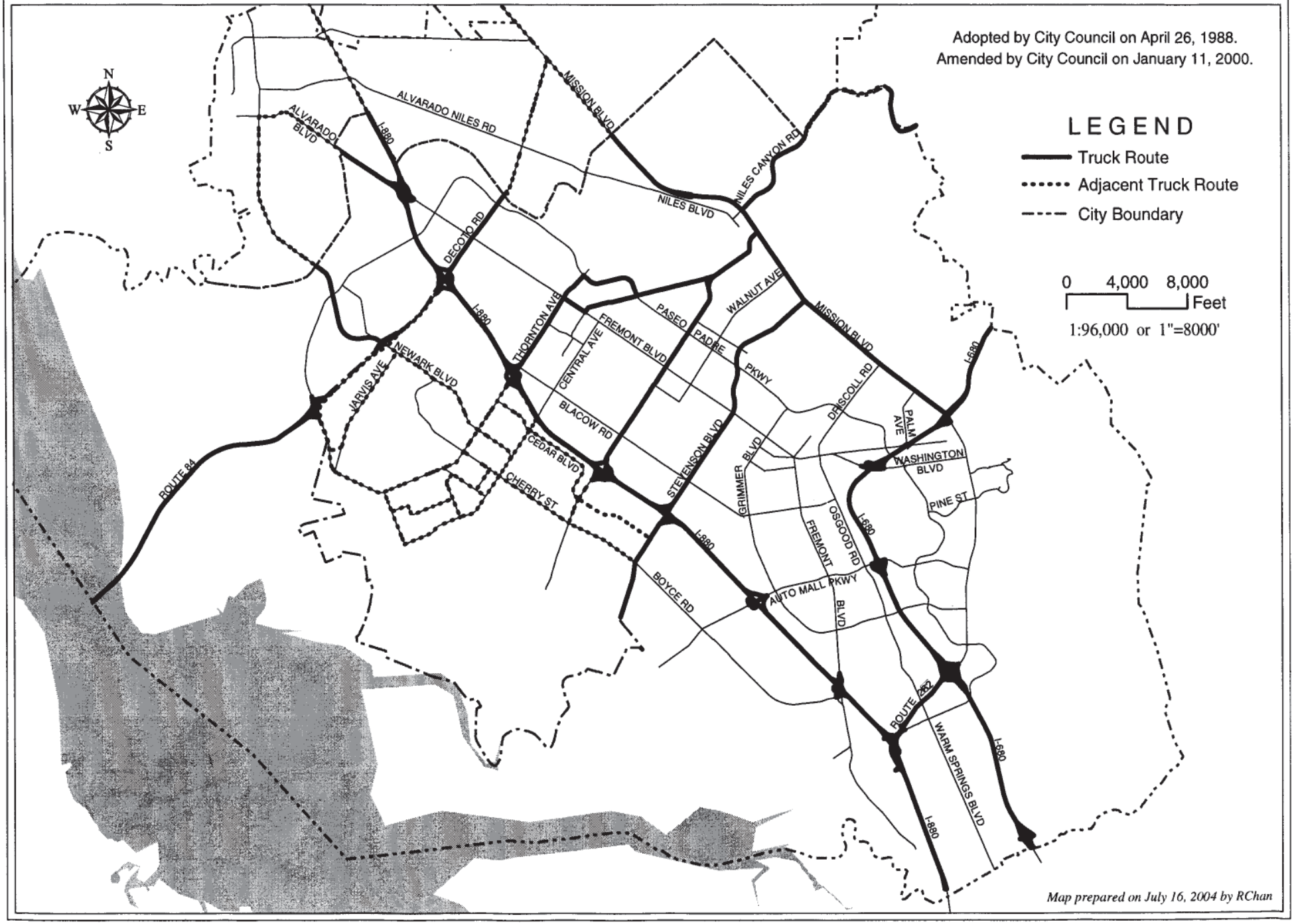
Total Diesel Truck Count at project location

FREMONT 2010 TRAFFIC FLOW MAP

24 Hour Volumes On Major Street System

City of Fremont G.I.S. DIVISION
Office of Information Systems
39550 Liberty Street, P.O. Box 5006
Fremont, California 94537-5006

CITY OF FREMONT TRUCK ROUTES



Map prepared on July 16, 2004 by RChan