

## MOVES Transportation Inputs

1) Vehicle Population

MOVES input needed: Vehicle population in 6 vehicle types

Available: Vehicle population in Mobile 6.2 28 vehicle types

Conversion method: Use equivalency tables found in MOVES convertor to convert Mobile 6.2 vehicle population to MOVES population

Attachments: Tables 1A through 1E

Recommendation: Adopt staff proposed method.

2) Vehicle Age Distribution

MOVES input needed: Vehicle age distribution for 0 through 30 years (total of 31 years) in 13 MOVES vehicle types

Available: Vehicle age distribution for 1 through 25 years (total of 25 years) in 16 Mobile 6.2 vehicle types.

Conversion method: EPA provided convertor program which require Mobile 6.2 age distribution in 16 vehicle types as input

Attachments: charts 2A through 2D

Recommendation: Adopt EPA provided convertor program

3) Annual Vehicle Miles of Travel (annual VMT)

MOVES input needed: Annual VMT in the 6 MOVES vehicle types, monthly factors, daily (weekday, weekend) factors, and hourly factors (weekday, weekend).

Available: Annual VMT or daily VMT in 3 vehicle types for the various milestone years, monthly factors, daily (weekday, weekend) factors, and hourly factors (weekday, weekend).

Conversion method: Two options

a) Option 1: Start with aggregate annual VMT

Distribute it into Mobile 6.2 28 vehicle types using local VMT mix percentages

Convert the 28 vehicle types in to the MOVES 13 vehicle types and aggregate to MOVES 6 vehicle types VMT.

b) Option 2: Start with aggregate daily VMT and follow the same method to arrive at the daily MOVES 6 vehicle types VMT.

Use EPA supplied convertor program to convert the daily MOVES 6 vehicle types VMT into MOVES 6 vehicle type annual VMT.

Attachments: Tables 3A through 3D

Recommendation: none.

#### 4) Vehicle VMT Percentage by Facility Type

MOVES input needed: VehicleVMT percentages for 13 MOVES vehicle types distributed by MOVES facility types for urban and rural areas where needed.

Available: Vehicle VMT percentages by restricted and unrestricted facilities for passenger cars, light commercial trucks, heavy duty vehicles, school bus and transit bus.

Conversion method: Use the above percentages in combination with EPA default percentages for motor homes, refuse trucks, and inter city buses.

Attachments: charts 4A through 4D

Recommendation: Adopt staff proposal

Table 1-A MOBILE6 Vehicle Types

MOBILE6 V.Class	Abbreviation	Description
1	LDGV	Light-Duty Gasoline Vehicles (Passenger Cars)
2	LDGT1	Light-Duty Gasoline Trucks 1 (0 - 6,000 lbs. GVWR, 0 - 3,750 lbs. LVW)
3	LDGT2	Light-Duty Gasoline Trucks 2 (0 - 6,000 lbs. GVWR, 3,751 - 5,750 lbs. LVW)
4	LDGT3	Light-Duty Gasoline Trucks 3 (6,001 - 8,500 lbs. GVWR, 0 - 5,750 lbs. ALVW)
5	LDGT4	Light-Duty Gasoline Trucks 4 (6,001 - 8,500 lbs. GVWR, greater than 5,751 lbs. ALVW)
6	HDBGV2b	Class 2b Heavy-Duty Gasoline Vehicles (8,501 - 10,000 lbs. GVWR)
7	HDBGV3	Class 3 Heavy-Duty Gasoline Vehicles (10,001 - 14,000 lbs. GVWR)
8	HDBGV4	Class 4 Heavy-Duty Gasoline Vehicles (14,001 - 16,000 lbs. GVWR)
9	HDBGV5	Class 5 Heavy-Duty Gasoline Vehicles (16,001 - 19,500 lbs. GVWR)
10	HDBGV6	Class 6 Heavy-Duty Gasoline Vehicles (19,501 - 26,000 lbs. GVWR)
11	HDBGV7	Class 7 Heavy-Duty Gasoline Vehicles (26,001 - 33,000 lbs. GVWR)
12	HDBGV8a	Class 8a Heavy-Duty Gasoline Vehicles (33,001 - 60,000 lbs. GVWR)
13	HDBGV8b	Class 8b Heavy-Duty Gasoline Vehicles (>60,000 lbs. GVWR)
14	LDDV	Light-Duty Diesel Vehicles (Passenger Cars)
15	LDDT12	Light-Duty Diesel Trucks 1 and 2 (0 - 6,000 lbs. GVWR)
16	HDDV2b	Class 2b Heavy-Duty Diesel Vehicles (8,501 - 10,000 lbs. GVWR)
17	HDDV3	Class 3 Heavy-Duty Diesel Vehicles (10,001 - 14,000 lbs. GVWR)
18	HDDV4	Class 4 Heavy-Duty Diesel Vehicles (14,001 - 16,000 lbs. GVWR)
19	HDDV5	Class 5 Heavy-Duty Diesel Vehicles (16,001 - 19,500 lbs. GVWR)
20	HDDV6	Class 6 Heavy-Duty Diesel Vehicles (19,501 - 26,000 lbs. GVWR)
21	HDDV7	Class 7 Heavy-Duty Diesel Vehicles (26,001 - 33,000 lbs. GVWR)
22	HDDV8a	Class 8a Heavy-Duty Diesel Vehicles (33,001 - 60,000 lbs. GVWR)
23	HDDV8b	Class 8b Heavy-Duty Diesel Vehicles (>60,000 lbs. GVWR)
24	MC	Motorcycles (All)
25	HDGB	Gasoline Buses (School, Transit, and Urban)
26	HDDBT	Diesel Transit and Urban Buses
27	HDDBS	Diesel School Buses
28	LDDT34	Light-Duty Diesel Trucks 3 and 4 (6,001 - 8,500 lbs. GVWR)

Table 1-B MOVES Vehicle Types

MOVES SourceUseType Vehicle Categories		
MOVES V.Class	Abbreviation	SourceTypeName
11	MC	Motorcycle
21	PC	Passenger Car
31	PT	Passenger Truck
32	LCT	Light Commercial Truck
41	IB	Intercity Bus
42	TB	Transit Bus
43	SB	School Bus
51	RT	Refuse Truck
52	SUST	Single Unit Short-Haul Truck
53	SULT	Single Unit Long-Haul Truck
54	MH	Motorhome
61	CST	Combination Short-Haul Truck
62	CLT	Combination Long-Haul Truck

Table 1-C. MOBILE 6.2 to MOVES EQUIVALENCY TABLE

Mobile 6 Vehicle Type	MOVES Vehicle Type														TOTAL
	11 MC	21 PC	31 PT	32 LCT	41 IB	42 TB	43 SB	51 RT	52 SUST	53 SULT	54 MH	61 CST	62 CLT		
1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1.00
2	0	0	0.78	0.22	0	0	0	0	0	0	0	0	0	0	1.00
3	0	0	0.78	0.22	0	0	0	0	0	0	0	0	0	0	1.00
4	0	0	0.78	0.22	0	0	0	0	0	0	0	0	0	0	1.00
5	0	0	0.78	0.22	0	0	0	0	0	0	0	0	0	0	1.00
6	0	0	0.63	0.37	0	0	0	0	0	0	0	0	0	0	1.00
7	0	0	0.63	0.37	0	0	0	0	0	0	0	0	0	0	1.00
8	0	0	0.06	0.94	0	0	0	0	0	0	0	0	0	0	1.00
9	0	0	0.06	0.94	0	0	0	0	0	0	0	0	0	0	1.00
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00
11	0	0	0	0	0	0	0.04	0	0.69	0.03	0.23	0.01	0	0	1.00
12	0	0	0	0	0	0.04	0	0.69	0.03	0.03	0.23	0.01	0	0	1.00
13	0	0	0	0	0	0	0	0.9	0.08	0.08	0	0.02	0	0	1.00
14	0	0	0	0	0	0	0	0.9	0.08	0.08	0	0.02	0	0	1.00
15	0	0	0.42	0.58	0	0	0	0	0	0	0	0	0	0	1.00
16	0	0	0.43	0.57	0	0	0	0	0	0	0	0	0	0	1.00
17	0	0	0.43	0.57	0	0	0	0	0	0	0	0	0	0	1.00
18	0	0	0.1	0.9	0	0	0	0	0	0	0	0	0	0	1.00
19	0	0	0.1	0.9	0	0	0	0	0	0	0	0	0	0	1.00
20	0	0	0	0	0	0	0	0.01	0.72	0.06	0.07	0.11	0.03	0	1.00
21	0	0	0	0	0	0	0	0.01	0.72	0.06	0.07	0.11	0.03	0	1.00
22	0	0	0	0	0	0	0	0.02	0.3	0.02	0	0.35	0.31	0	1.00
23	0	0	0	0	0	0	0	0.02	0.3	0.02	0	0.35	0.31	0	1.00
24	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00
25	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1.00
26	0	0	0	0	0.25	0.75	0	0	0	0	0	0	0	0	1.00
27	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1.00
28	0	0	0.42	0.58	0	0	0	0	0	0	0	0	0	0	1.00

\* Based on EPA's MOVES Vehicle Type Fraction Table

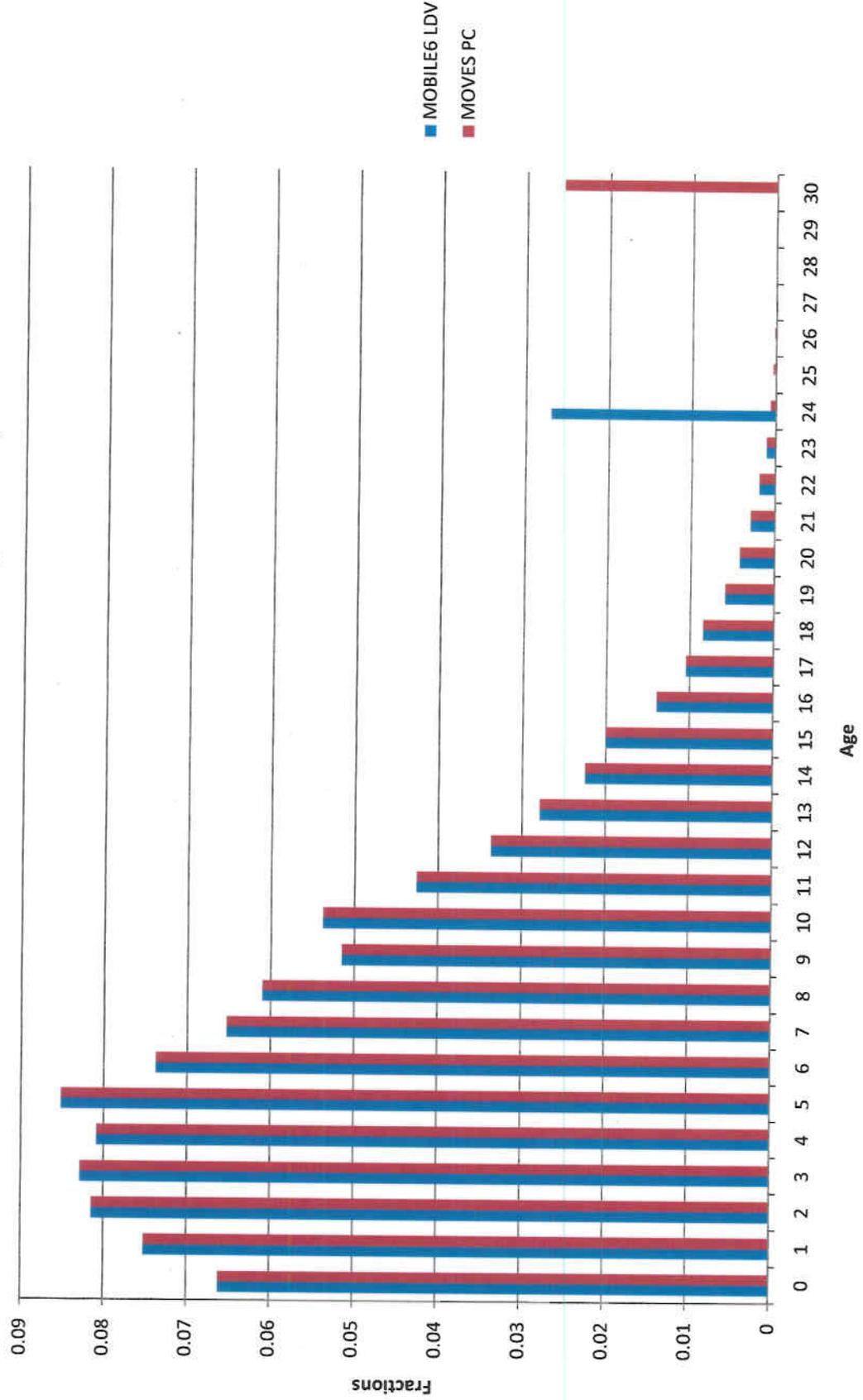
**Table 1-D. 2005 MTG VEHICLE POPULATION FROM MOBILE6 TO MOVES**

Mobile 6 Vehicle Type	Population	MOVES Vehicle Type														TOTAL		
		11 MC	21 PC	31 PT	32 LCT	41 IB	42 TB	43 SB	51 RT	52 SUST	53 SULT	54 MH	61 CST	62 CLT				
1 LDGV	413,398	-	413,398	-	-	-	-	-	-	-	-	-	-	-	-	-	-	413,398
2 LDGT1	4,939	-	3,853	1,087	-	-	-	-	-	-	-	-	-	-	-	-	-	4,939
3 LDGT2	171,177	-	133,518	37,659	-	-	-	-	-	-	-	-	-	-	-	-	-	171,177
4 LDGT3	40,289	-	31,425	8,863	-	-	-	-	-	-	-	-	-	-	-	-	-	40,289
5 LDGT4	12,376	-	9,654	2,723	-	-	-	-	-	-	-	-	-	-	-	-	-	12,376
6 HDGV2B	11,785	-	7,425	4,361	-	-	-	-	-	-	-	-	-	-	-	-	-	11,785
7 HDGV3	1,383	-	871	512	-	-	-	-	-	-	-	-	-	-	-	-	-	1,383
8 HDGV4	1,042	-	63	979	-	-	-	-	-	-	-	-	-	-	-	-	-	1,042
9 HDGV5	97	-	6	91	-	-	-	-	-	-	-	-	-	-	-	-	-	97
10 HDGV6	198	-	-	-	-	-	-	-	-	137	6	46	2	-	-	-	-	198
11 HDGV7	48	-	-	-	-	-	-	-	-	33	1	11	0	-	-	-	-	48
12 HDGV8A	4	-	-	-	-	-	-	-	-	4	0	0	0	-	-	-	-	4
13 HDGV8B	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
14 LDDV	2,053	-	2,053	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,053
15 LDDT12	58	-	24	34	-	-	-	-	-	-	-	-	-	-	-	-	-	58
16 HDDV2B	3,101	-	1,334	1,768	-	-	-	-	-	-	-	-	-	-	-	-	-	3,101
17 HDDV3	1,448	-	623	826	-	-	-	-	-	-	-	-	-	-	-	-	-	1,448
18 HDDV4	1,241	-	124	1,117	-	-	-	-	-	-	-	-	-	-	-	-	-	1,241
19 HDDV5	666	-	67	599	-	-	-	-	-	-	-	-	-	-	-	-	-	666
20 HDDV6	1,274	-	-	-	-	-	-	-	13	917	76	89	140	38	-	-	-	1,274
21 HDDV7	697	-	-	-	-	-	-	-	7	502	42	49	77	21	-	-	-	697
22 HDDV8A	490	-	-	-	-	-	-	-	10	147	10	-	171	152	-	-	-	490
23 HDDV8B	1,237	-	-	-	-	-	-	-	25	371	25	-	433	384	-	-	-	1,237
24 MC	8,902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,902
25 HDGB	1,221	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,221
26 HDDBT	1,067	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,067
27 HDDBS	1,244	-	-	-	-	-	-	-	267	800	-	-	-	-	-	-	-	1,244
28 LDDT34	99	-	42	58	-	-	-	-	-	-	-	-	-	-	-	-	-	99
<b>TOTAL</b>	<b>681,537</b>	<b>8,902</b>	<b>415,452</b>	<b>189,027</b>	<b>60,676</b>	<b>267</b>	<b>800</b>	<b>2,475</b>	<b>54</b>	<b>2,111</b>	<b>161</b>	<b>195</b>	<b>824</b>	<b>595</b>	<b>681,537</b>			

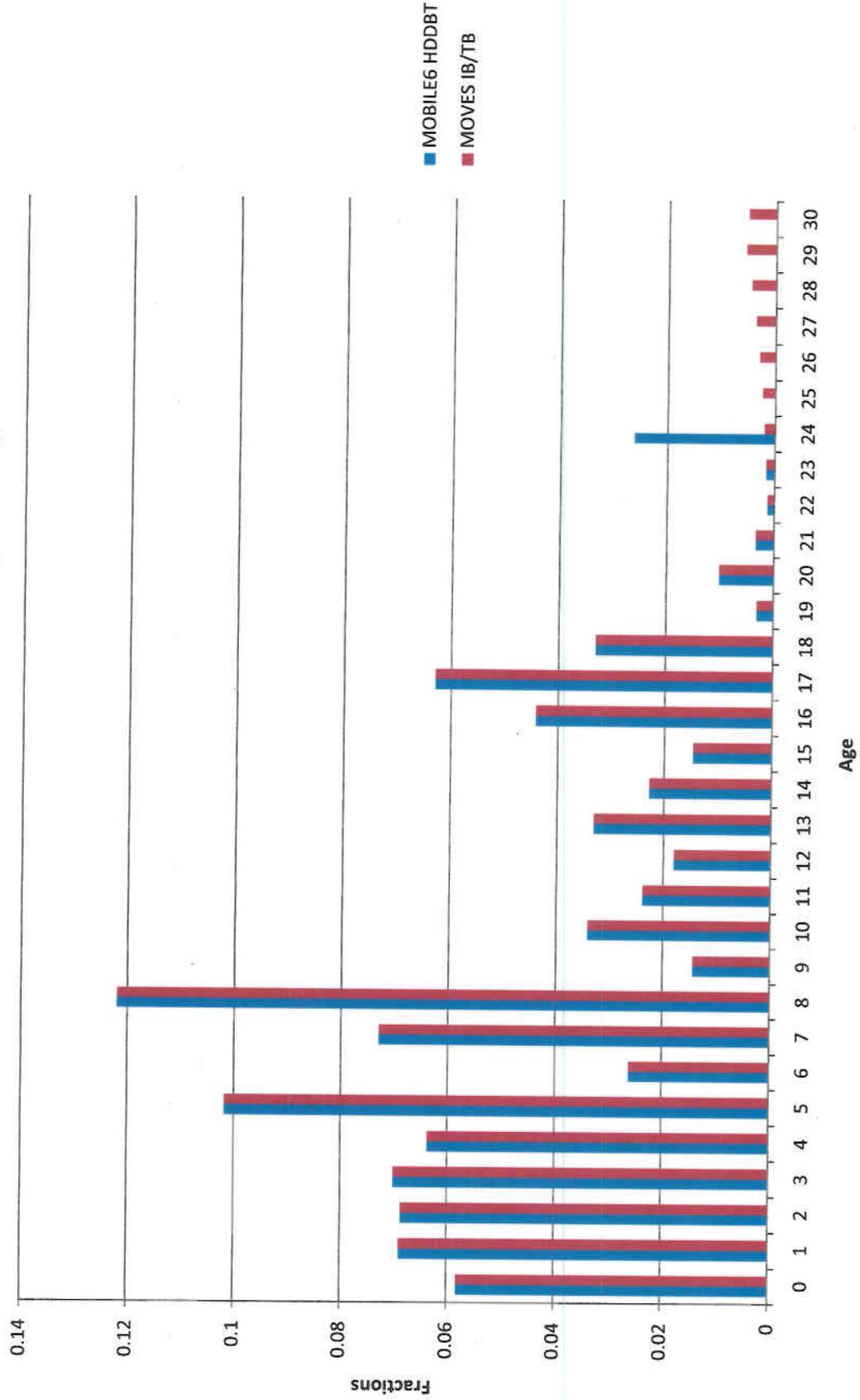
**Table 1-E. 2005 MTG Vehicle Population in HPMS**

10	20	30	40	50	60
8,902	415,452	249,703	3,542	2,520	1,418

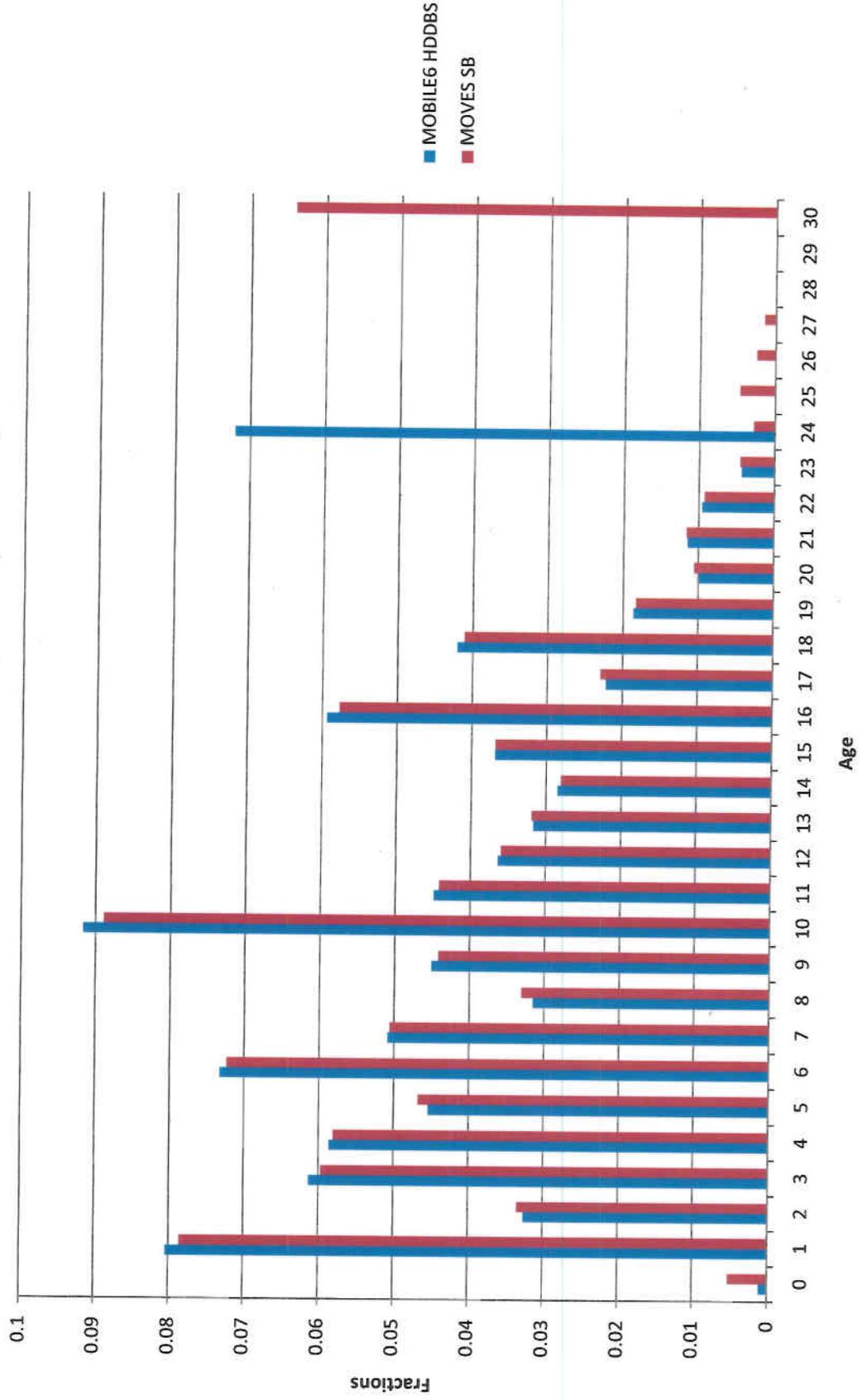
**Chart 2-A 2005 Age Distribution Comparison  
MOBILE6 Light Duty Vehicle vs. MOVES Passenger Car  
Jurisdiction = Montgomery County**



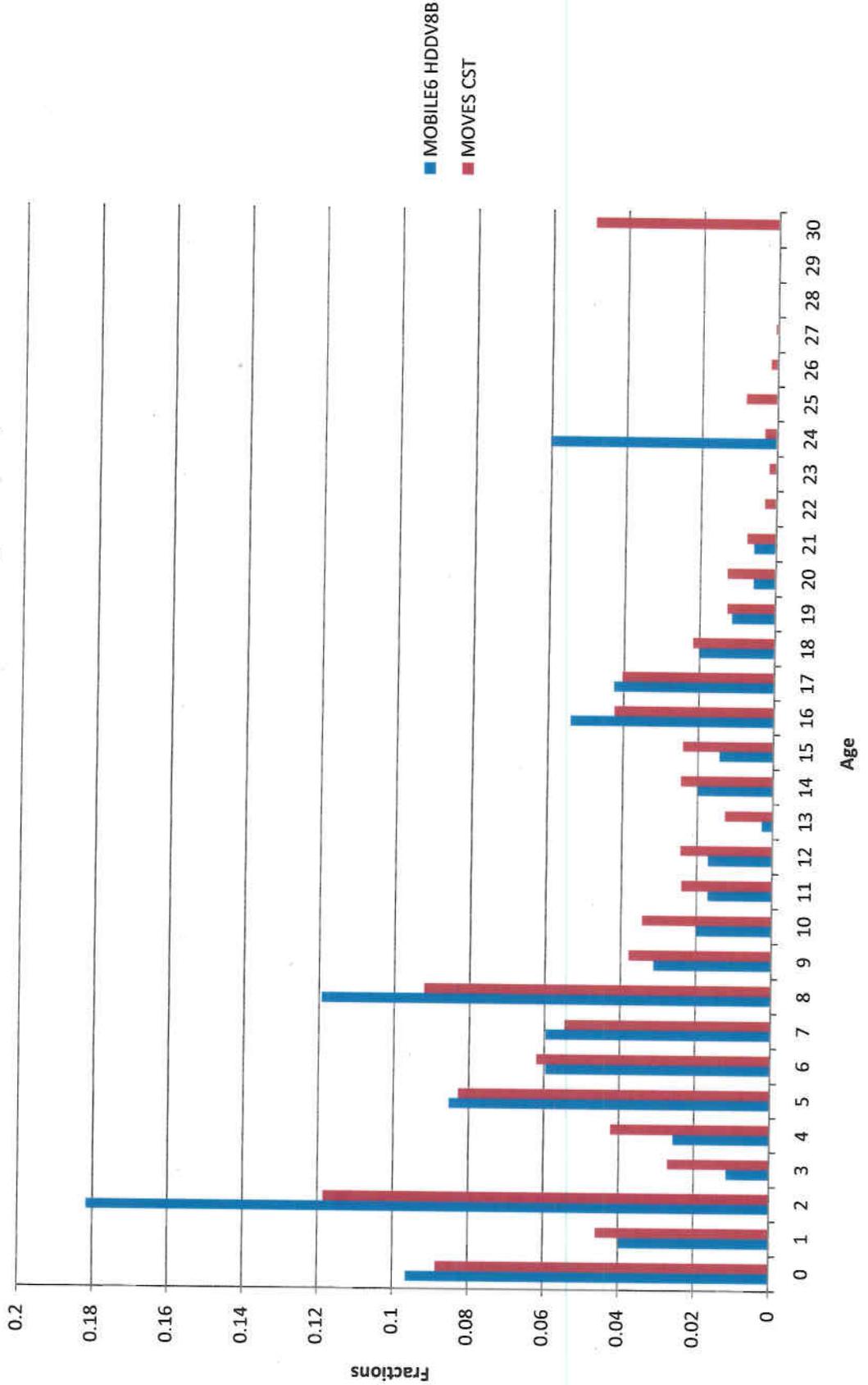
**Chart 2-B 2005 Age Distribution Comparison**  
**MOBILE6 Heavy Duty Diesel Transit Bus vs. MOVES Intercity/Transit Bus**  
**Jurisdiction = Montgomery County**



**Chart 2-C 2005 Age Distribution Comparison**  
**MOBILE6 Heavy Duty Diesel School Bus vs. MOVES School Bus**  
**Jurisdiction = Montgomery County**



**Chart 2-D 2005 Age Distribution Comparison**  
**MOBILE6 Class 8B Heavy Duty Diesel Vehicle vs. MOVES Combination Short-Haul Truck**  
**Jurisdiction = Montgomery County**





Attachment 3-B Daily VMT by 13 MOVES Vehicle Types and 6 HPMS Vehicle Types

Actual Daily VMT by MOVES Vehicle Type(000's)

Facility	Ty% VMT	VMT	11 MC	21 PC	31 PT	32 LCT	41 IB	42 TB	43 SB	51 RT	52 SUSH	53 SULH	54 MH	61 CS	62 CL
	Rural														
Restricted	0.04	823	4		336	334	105	1	2	3	1	16	1	1	11
Unrestricted	0.06	1,392	7		569	565	177	1	3	6	1	26	2	2	19
	Urban														
Restricted	0.33	7,411	35		3,028	3,006	944	5	16	31	6	140	10	9	99
Unrestricted	0.57	12,527	60		5,118	5,081	1,596	9	27	52	10	236	17	15	140
Total	1.00	22,154	106		9,051	8,986	2,822	16	47	92	18	418	30	26	248

Daily VMT by HPMS Vehicle Type (000's)

10	20	30	40	50	60
106	9,051	11,808	155	491	544

Month	Monthly Adjustment Factor
January	1.0078
February	1.0352
March	1.0551
April	1.0824
May	1.0908
June	1.1138
July	1.1093
August	1.1099
September	1.0777
October	1.0670
November	1.0322
December	0.8165

**Table 3-D. Weekday and Weekend Hourly VMT Fractions**

hourID	Weekday Hourly VMT Fraction	Weekend Hourly VMTFraction
1	0.0095	0.0198
2	0.0063	0.0133
3	0.0053	0.0106
4	0.0060	0.0078
5	0.0116	0.0078
6	0.0325	0.0122
7	0.0552	0.0202
8	0.0688	0.0293
9	0.0657	0.0389
10	0.0554	0.0492
11	0.0491	0.0579
12	0.0490	0.0632
13	0.0510	0.0676
14	0.0529	0.0692
15	0.0615	0.0701
16	0.0673	0.0697
17	0.0695	0.0690
18	0.0695	0.0663
19	0.0598	0.0612
20	0.0458	0.0529
21	0.0358	0.0455
22	0.0313	0.0394
23	0.0244	0.0337
24	0.0167	0.0252

**Table 4-A. MOVES Default VMT Fractions Value**

Vehicle Type	Road Type	VMT Fraction
Refuse Truck	Off-Network	0.0000
Refuse Truck	Rural Restricted Access	0.1149
Refuse Truck	Rural Unrestricted Access	0.3972
Refuse Truck	Urban Restricted Access	0.1715
Refuse Truck	Urban Unrestricted Access	0.3165
MotorHome	Off-Network	0.0000
MotorHome	Rural Restricted Access	0.1149
MotorHome	Rural Unrestricted Access	0.3972
MotorHome	Urban Restricted Access	0.1715
MotorHome	Urban Unrestricted Access	0.3165

**Table 4-B. 2005 Montgomery County MD Annual VMT by Facility Type and Vehicle Type in 2009 CLRP with Purple Line Amendment**

	Commercial Vehicles		Med/Hvy Trucks		Cars		Total
	VMT	VMT%	VMT	VMT%	VMT	VMT%	
Freeway+Exp.Way	91,146,698	3.37%	245,169,673	9.07%	2,366,713,098	87.56%	2,703,029,469
Arterial	248,869,034	5.39%	167,550,952	3.63%	4,202,876,866	90.99%	4,619,296,852
Total	340,015,732	4.64%	412,720,625	5.64%	6,569,589,964	89.72%	7,322,326,321

**Table 4-C. PEI Annual VMT by Facility Type for Montgomery County**

Facility Type	
Rural	HDDBT HDDBS
Interstate	
Other Principal Arterial	0 0
Minor Arterial	0 0
Major Collector	0 1041
Minor Collector	0 1041
Local	0 1388
Urban	
Interstate	383 0
Other Frwy & Expwy	191 0
Other Principal Arterial	4859 7576
Minor Arterial	4859 4282
Collector	9568 4282
Local	1340 16799
Total	21,199 36,410

Table 4-D. 2005 Montgomery County MOVES VMT Fractions by Vehicle and Road Type

	11 MC	21 PC	31 PT	32 LCT	41 IB	42 TB	43 SB	51 RT	52 SUSH	53 SULH	54 MH	61 CS	62 CL
Off-Network	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Rural Restricted	0.0360	0.0360	0.0360	0.0268	0.1268	0.0000	0.0000	0.1149	0.0594	0.0594	0.1149	0.0594	0.0594
Rural Unrestricted	0.0640	0.0640	0.0640	0.0732	0.4821	0.0000	0.0953	0.3971	0.0406	0.0406	0.3971	0.0406	0.0406
Urban Restricted	0.3242	0.3242	0.3242	0.2413	0.1385	0.0271	0.0000	0.1715	0.5346	0.5346	0.1715	0.5346	0.5346
Urban Unrestricted	0.5758	0.5758	0.5758	0.6587	0.2526	0.9729	0.9047	0.3165	0.3654	0.3654	0.3165	0.3654	0.3654
Total	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

