

QA/QC VMT Data

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Highway Information Seminar

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Objective

- Some data quality improvement examples
- New Vehicle Summary Data Procedure
- Adopt New Procedure
- 2013 Submittal



2012 QA/QC

- 2011: Review calls scheduled with all states
- 2012: Review calls scheduled with states that have issues
- Data quality is significantly improved



QA/QC Items

- 2010 historical trend review only
- 2011 historical trend, regional and national averages, quart-tile graphics
- 2012 Historical trend, quart-tile, VMT by vehicles, VMT% by AADT on Interstate
- 2012 VMT data submittal – **Job well done!**



New Items for 2012 QA/QC

VMT Percentage Changes from 2011 by Vehicle Types

Motorcycle	Car	Light truck	Bus	SU	CT	Total
1.7%	-0.6%	-1.5%	1.6%	-2.2%	-2.1%	-0.9%

INTERSTATE Vehicle Summary Data Compared to VMT% by AADT*Length

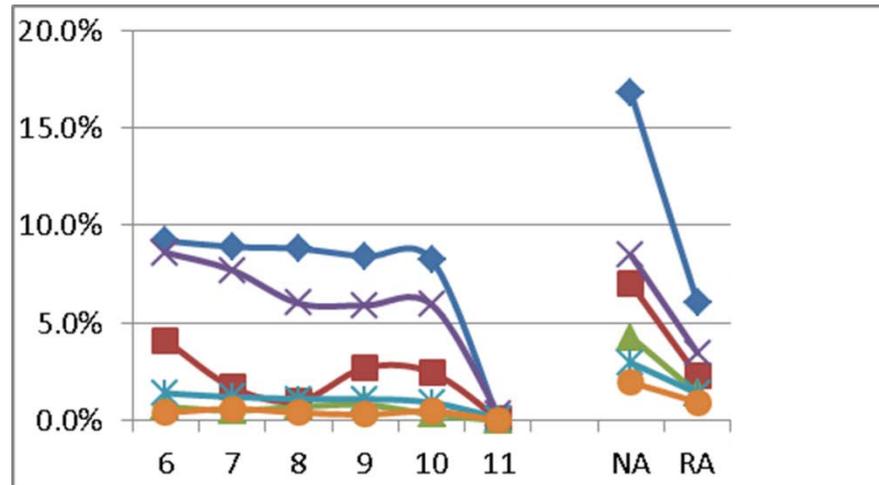
	From vehicle summary data (a)			VMT=aadt*length (b)		% (b-a)/a	
	Bus	Single Unit	Comb Truck	SU+Bus	Comb Truck	SU+Bus	Comb Truck
rural	0.79	2.75	18.12	3.58%	17.64%	1.21%	-2.63%
urban	0.62	2.45	5.9	3.33%	8.48%	8.39%	43.77%

(a) The data come from the vehicle summary data.

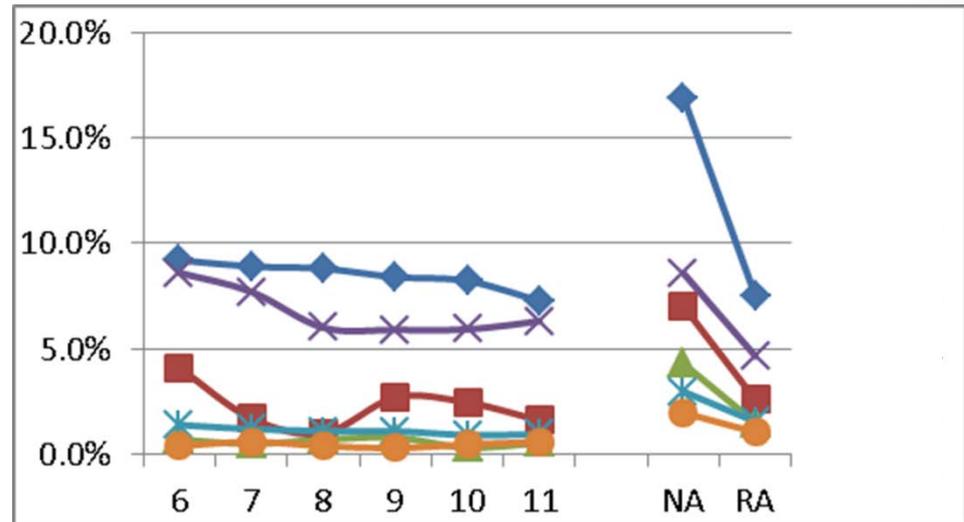
(b) The VMT% was calculated using truck AADT and section length data from HPMS.



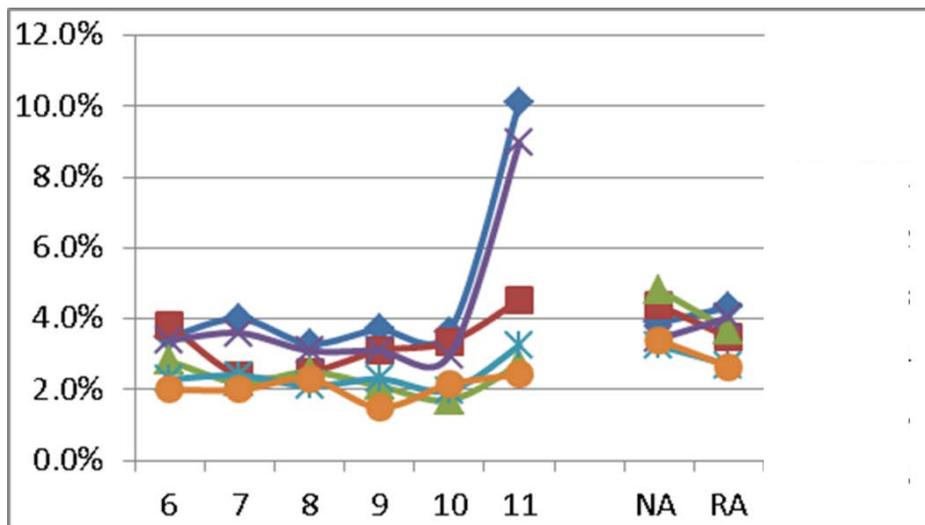
2011 Examples – before & after



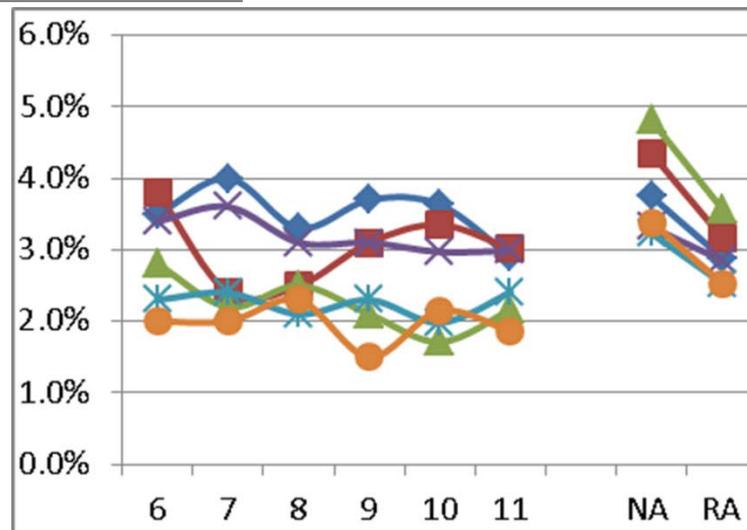
Combination Truck
before & after



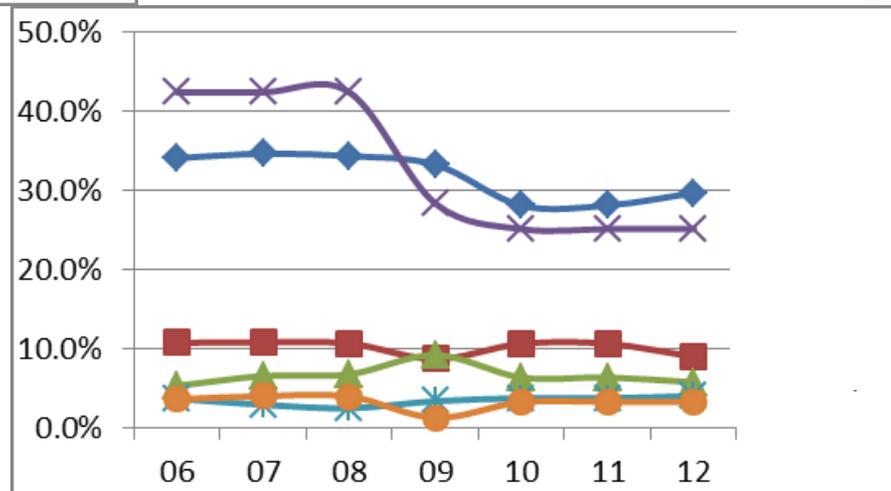
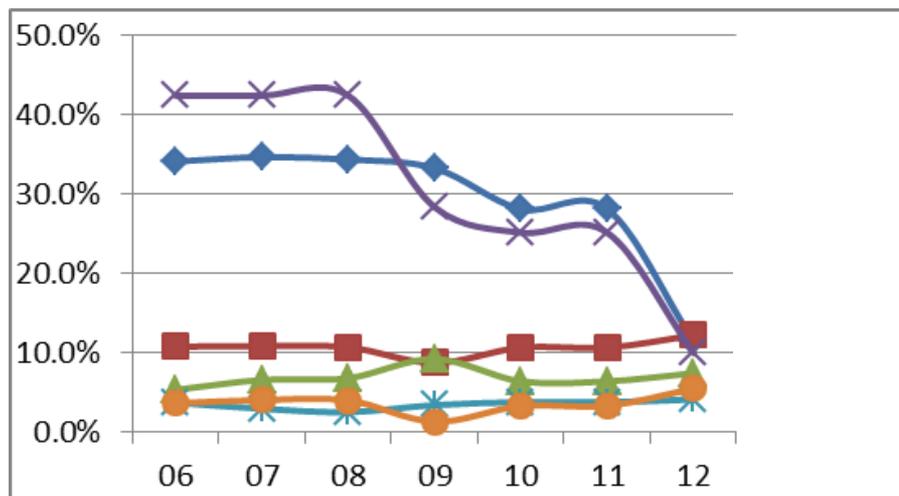
2011 Examples before & after



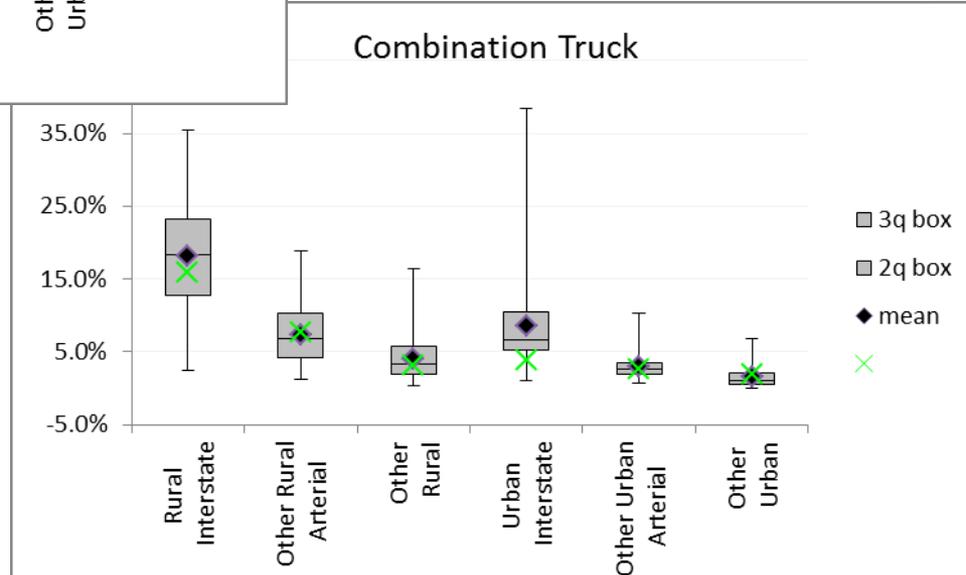
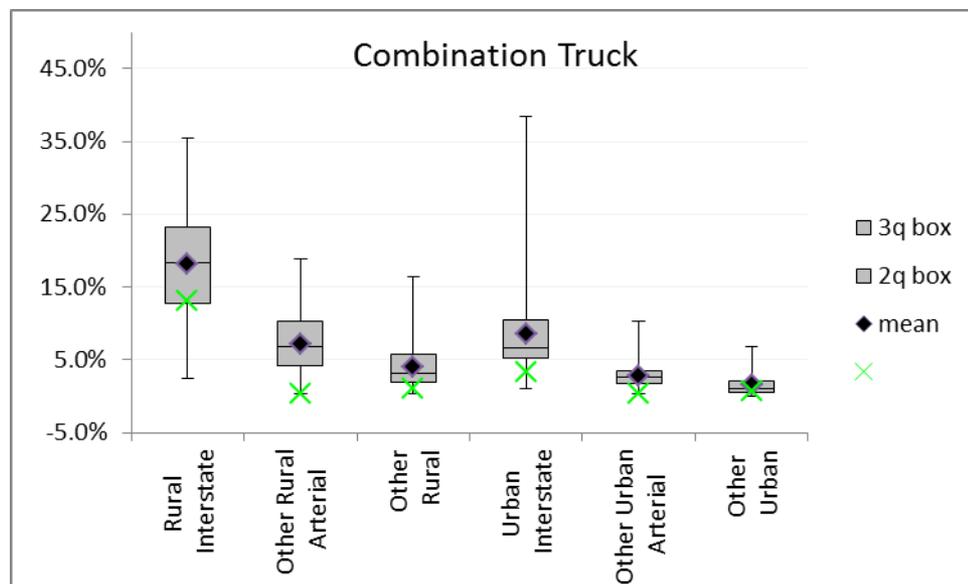
Single Unit Truck
before & after



2012 example – before & after



Combination Truck – before & after



2012 Examples – before & after

Before

Motorcycle	CarVM	Light Trucks	BusesVM	SUVM	CTVM	TotalVM
20.40%	0.60%	-1.40%	8.80%	-3.60%	-8.80%	-0.30%

After

Motorcycle	CarVM	Light Trucks	BusesVM	SUVM	CTVM	TotalVM
15.06%	0.68%	-0.65%	6.92%	1.56%	-0.16%	0.66%



Vehicle Summary Data Calculation Procedure

- VMT% has to be county based, VMT weighted
- 4 training webinars have been delivered in May
- We have offered assistance to the states that plan to use the new procedure in 2012



Adopting New Procedure

- The result from new procedure should be compared with the data from the previous year
- Adopting new procedure while the differences of two procedures are small (10%)
- State with significant difference from the previous year should take a 4-year adopting procedure
- Details will be discussed tomorrow



Prepare vehicle class data

- Calculate the 6 Vehicle % for each site
- **QA/QC** Vehicle Class Data, eliminate or investigate the sites with data errors (i.e. Motorcycle 80%, combination truck 50%)
- All class data have to be Annualized or seasonally adjusted
- Add **COUNTY, FUCTION CLASS GROUP (6), AREA TYPE(R or U)** into the data



County ID	A (rural interstate)						B (rural arterial)						C (other rural)						
	mc%	car%	ltruck%	Bus%	SU%	CT%	mc%	car%	ltruck%	Bus%	SU%	CT%	mc%	car%	ltruck%	Bus%	SU%	CT%	
1	0.94%	73.83%	20.82%	0.09%	1.73%	2.60%													
7							1.48%	59.18%	25.80%	0.65%	5.65%	7.23%							
11	0.58%	53.65%	18.71%	0.54%	3.89%	22.64%													
13																			
17							2.15%	70.91%	22.51%	0.14%	2.34%	1.95%							
19							0.79%	59.63%	22.52%	0.77%	6.50%	9.80%							
21	0.51%	50.96%	19.54%	0.21%	6.81%	21.98%													
23							0.92%	63.24%	23.00%	0.58%	6.97%	5.29%							
25	0.32%	63.78%	23.36%	0.21%	3.73%	8.61%	1.30%	56.33%	18.77%	2.04%	9.31%	12.24%							
27							1.29%	52.53%	22.41%	0.75%	6.64%	16.38%							
29	0.49%	55.68%	15.68%	0.77%	4.09%	23.28%	0.94%	50.88%	24.66%	0.88%	9.12%	13.51%	1.11%	55.65%	25.56%	0.53%	9.40%	7.75%	
31	0.47%	56.95%	16.34%	0.73%	4.62%	20.90%	1.16%	53.36%	26.97%	0.52%	7.66%	10.34%							
33																			
35							0.62%	57.07%	28.02%	0.11%	4.38%	9.81%							
37							5.90%	66.14%	20.23%	0.37%	4.60%	2.76%							
39							0.51%	69.62%	20.57%	0.49%	4.89%	3.91%							
41																			
45							1.15%	71.65%	19.46%	0.77%	5.06%	1.92%							
47	0.28%	55.33%	15.46%	0.22%	4.54%	24.18%	0.41%	63.97%	21.71%	0.19%	5.03%	8.69%							
53													0.29%	62.20%	31.35%	0.87%	1.92%	13.35%	



Prepare AADT data

- Download the AADT data from HPMS using Spatial Intersector Tool
- Computing VMT of **Total, SU** and **CT** with **COUNTY, FUCTION CLASS GROUP, AREA TYPE(R or U)**
- Build a pivot table to produce the **VMT** by **COUNTY, FUCTION CLASS GROUP, AREA TYPE(R or U)** , compute the truck **VMT%**



Spatial Intersector Report

OBJECTID	YEAR_RECOI	STATE_CODE	COUNTY_COD	F_SYSTEM	Area_Type	VMT	SUVMT	CUVMT	NHS
10296	2011	37	37	3	R	360.00	18.00	18.00	
10378	2011	37	37	3	R	1800.00	91.00	95.00	
10416	2011	37	37	3	R	2000.00	100.00	100.00	
10542	2011	37	37	3	R	1799.00	91.00	95.00	
10584	2011	37	37	3	R	2000.00	100.00	100.00	
10601	2011	37	37	3	R	1799.00	91.00	95.00	
10641	2011	37	37	3	R	2000.00	100.00	100.00	
10765	2011	37	37	3	R	1799.00	91.00	95.00	
10809	2011	37	37	3	R	60.00	3.00	3.00	
10962	2011	37	37	3	R	1899.00	95.00	99.00	
11004	2011	37	37	3	R	1800.00	91.00	95.00	
11052	2011	37	37	3	R	1340.00	67.00	67.00	
11133	2011	37	37	3	R	37.00	1.90	1.98	
11173	2011	37	37	3	R	1457.00	73.71	76.95	
11194	2011	37	37	3	R	1899.00	95.00	99.00	
11236	2011	37	37	3	R	1800.00	91.00	95.00	
11283	2011	37	37	3	R	2100.00	110.00	110.00	
11359	2011	37	37	3	R	306.00	15.47	16.15	
11397	2011	37	37	3	R	1980.00	99.00	99.00	
11597	2011	37	37	3	R	1728.00	87.36	91.20	
11636	2011	37	37	3	R	1999.00	100.00	100.00	
11760	2011	37	37	3	R	1800.00	91.00	95.00	
11825	2011	37	37	3	R	1800.00	91.00	95.00	
11867	2011	37	37	3	R	1999.00	100.00	100.00	
11950	2011	37	37	3	R	1899.00	95.00	99.00	
11992	2011	37	37	3	R	1800.00	91.00	95.00	
12040	2011	37	37	3	R	1999.00	100.00	100.00	



Urban Daily VMT by county by road class for all Sample Panel Data (SU and CT AADT <= 0)

urban County	1			2			3			4			5			6			7			CT_VMT	
	daily vmt	SU_VMT	CT_VMT	vmt	SU_VMT	CT_VMT	vmt	SU_VMT	CT_VMT	vmt	SU_VMT	CT_VMT	vmt	SU_VMT	CT_VMT	vmt	SU_VMT	CT_VMT	vmt	SU_VMT	CT_VMT		
1	16,992,911	435,534	608,793	1,615,855	35,842	18,819	4,179,839	95,212	28,339	694,429	14,200	4,897	262,469	6,747	2,807				12,750		76	2	
5							12,698	460	335	47,452	2,184	1,781											
7				408,317	22,098	11,623	470,740	23,525	15,242	245,261	14,592	9,012	49,261	3,742	1,475								
11				43,851	1,447	1,475				6,182	355	194											
13	7,177,046	176,691	162,974	4,209,109	98,632	80,147	3,402,369	97,546	53,511	561,371	20,944	9,071	130,836	5,727	967								
15							39,959	2,283	1,274				1,510	136	15								
17				727,236	27,583	21,688	499,584	19,114	10,306	176,320	4,601	3,033	17,664	176	353								
19				3,063,962	140,573	250,069	1,074,985	42,463	28,558	734,049	45,089	19,222	204,013	10,939	6,392								
21	100,595	6,793	20,967				44,372	1,493	1,641	25,944	683	341											
23				729,541	29,772	20,156	31,188	935	688	79,299	5,108	2,787	5,434	245	63								
25	146,129	4,549	9,497	68,535	2,966	1,520	368,420	16,672	15,005	250,401	11,819	8,154	85,265	2,972	1,770								
27				2,774	69	342	34,822	1,042	1,231				3,872	79	19								
29				2,793,336	183,503	347,244	2,527,099	187,364	142,058	543,044	42,988	13,042	134,863	10,970	3,076								
31	53,625	3,444	13,146	201,325	16,332	11,932	140,900	7,334	7,098	164,847	7,025	5,050	11,914	529	262								
33							159,344	6,378	2,425	48,116	2,096	2,339											
35							26,501	203	773	8,656	156	80	720	50	14								
37	61,906,645	1,846,955	2,031,006	#####	1,014,338	813,600	17,014,486	615,913	265,237	2,018,301	62,408	35,125	246,180	7,102	5,700					438	38	22	
39				668,800	39,920	82,929	70,056	2,280	3,140	29,481	843	539	6,810	275	742								
41	291,245	11,587	11,066	3,325,852	76,584	32,892	398,065	4,695	1,056	35,367	520	144	18,079	523	371								
45				204,214	12,572	9,382	187,701	11,325	8,278	160,272	7,406	2,978	16,196	472	162								
47				714,718	38,609	109,453	927,495	43,249	98,357	253,359	10,457	8,524	66,636	3,523	2,068					43	2	1	
51										45,148	3,578	971											
53				1,760,116	103,979	65,244	1,860,053	72,078	28,635	303,646	12,007	5,355	206,031	3,556	1,783								
55	476	9	14	430,583	13,937	9,683	339,630	8,779	4,920	120,176	2,825	1,181	47,693	317	65								
57	291,355	14,281	38,651	343,477	11,796	6,061	14,157	358	254	92,886	2,763	1,386											
59	18,623,982	504,488	375,740	#####	582,105	372,484	11,752,286	355,209	210,539	1,675,065	62,925	34,462	349,515	8,648	3,086					16,318	332	136	
61	1,865,840	41,491	80,291	444,076	14,369	27,372	716,069	101,748	24,376	694,446	20,413	20,768	110,682	1,792	1,308								
63										6,361	95	187											
65	11,950,996	556,624	806,509	7,145,445	351,208	273,703	3,004,835	161,163	78,154	3,853,101	118,057	78,056	1,304,100	33,672	14,345					10,593	54	14	
67	5,564,242	144,358	275,927	6,940,789	208,303	197,494	1,969,228	101,672	40,869	1,208,057	59,048	23,409	154,109	5,144	3,220								
69				3,546	412	178	50,829	271	104	2,166	68	26											
71	14,543,591	640,455	1,085,440	4,690,799	155,858	243,984	4,346,745	269,497	165,653	1,663,260	106,425	33,513	436,293	20,976	5,744					41,625	647	1,858	
73	25,584,476	809,177	505,357	8,968,008	255,003	104,013	4,686,368	205,400	135,008	1,187,737	49,842	35,598	269,212	7,508	3,458					517	5	5	
75	1,386,604	23,886	10,106	1,703,417	31,562	14,599	2,317,801	58,896	10,355	30,616	834	147	29,116	807	62								
77	2,686,742	124,625	500,133	2,564,513	123,647	205,974	1,026,667	39,001	43,509	540,519	22,963	18,226	169,890	7,568	4,367								
79				1,581,756	61,274	70,511	924,086	33,163	27,856	407,393	13,679	4,743	21,833	751	245								
81	3,324,106	40,371	14,470	7,076,351	210,188	98,495	1,805,700	38,944	8,928	171,407	3,449	641	16,209	954	309								
83				2,809,697	93,696	101,855	902,141	23,801	12,812	857,290	21,005	8,223	338,941	4,572	1,369								
85	6,466,147	140,113	97,397	#####	308,011	252,465	8,610,505	202,601	88,016	648,212	11,892	8,945	169,552	4,832	878								
87				1,351,095	33,707	12,039	698,756	15,692	6,103	335,793	13,095	5,484	79,106	1,877	540								
89	883,968	18,533	105,450	391,160	4,967	4,734	97,150	1,403	1,585	335,024	14,142	7,292	80,177	2,807	1,543								
93	158,765	5,043	35,487	1,809	97	185	37,909	818	1,003	12,655	249	346	4,507	90	45								
95	5,620,306	114,749	187,604	430,395	10,328	12,538	921,212	18,155	13,501	540,897	10,451	2,882	98,116	2,018	277								
97				3,097,186	101,304	80,983	915,940	20,689	8,155	759,798	15,345	4,389	180,048	2,703	1,049								
99				2,211,809	95,182	205,446	1,076,124	36,799	37,933	972,165	40,109	28,304	82,019	4,023	2,806								
101				187,764	8,458	7,468	99,044	3,453	2,398	165,570	6,285	3,915	8,047	198	175								
103	348,208	7,688	61,821	18,193	567	966	42,137	748	1,132	65,742	1,690	1,330	30,045	1,200	704								
107				1,463,374	89,868	136,163	515,268	25,875	14,796	188,572	11,939	5,743	81,291	3,614	1,476								
109										223,432	4,557	6,546											
111				6,931,535	168,192	129,316	2,779,291	99,889	87,963	773,987	25,583	17,352	227,334	6,903	2,263					888	91	23	
113	1,123,972	39,539	64,365	113,198	3,883	5,083	272,839	8,437	11,200	329,015	13,145	6,660	82,837	3,049	1,496					928	19	46	
115				332,288	24,045	22,172	101,365	5,033	3,996	94,576	2,110	4,043	71,947	3,073	2,160								
Total	187,091,971	5,710,982	7,102,210	#####	4,806,785	4,474,477	84,510,860	3,129,116	1,771,668	24,600,248	934,202	500,824	5,988,331	188,091	81,573					84,100	1,264	2,107	
Grand Total				#####	#####	4,806,785	4,474,477	126,229,656	5,481,975	5,541,066	45,365,346	2,301,420	1,514,046	10,247,256	413,278	260,711				62,265	2,475	1,273	
Grand Total																					84,192	1,267	2,108

Produce the vehicle summary data

RURAL INTERSTATE									
County	Note	MC	Car	Lt	Bus	SU_VMT	SU_VM1	CT_VI	vmt
1		0.94%	71.15%	20.82%	0.09%	1.8%	1.7%	5.3%	100.0%
3									
5									
7		From Class Data				From VMT (AADT)			
9									
11		0.58%	54.98%	18.71%	0.54%	6.1%	5.6%	19.6%	100.0%
13		Calculated: =1-mc-lt-bus-su-ct				Calculated: =SU_VMT - Bus			
15									
17									
19	use 31	0.47%	52.16%	16.34%	0.73%	6.5%	5.8%	24.5%	100.0%
21		0.51%	52.17%	19.54%	0.21%	6.6%	6.4%	21.2%	100.0%
23									
25		0.33%	58.67%	23.27%	0.19%	5.9%	5.7%	11.8%	100.0%
27									
29		0.70%	57.64%	15.61%	0.84%	6.2%	5.4%	19.8%	100.0%
31		0.47%	52.26%	16.34%	0.73%	6.4%	5.6%	24.6%	100.0%
33									
35									

If a county does not have class data, then use neighbor county class data

2013 Submittal

- Adopt the new procedure
- Remain the stability of VMT by vehicle types
- Adequate data? Quality data?
- **QA/QC** is recommended before calculation
- Have a great 2013 submittal!!!

