

# Addendum 2B: Trucks and Road Maintenance Costs

## 1.1 Introduction

The study team calculated the annual estimated costs of truck traffic on interstate and non-interstate roadways within the COMPASS Region. Absent a documented methodology in place among Idaho transportation agencies, the 1997 Federal Highway Cost Allocation Study was used. These estimated costs, summarized in Figure 1-1, illustrate that trucks have a considerably larger impact on road maintenance costs than would be suggested by their share of traffic. To increase the accuracy of these calculations, further detailed analysis will be required.

Figure 1-1: Estimated Allocated Annual Highway Costs and Traffic Ratios

	Interstate		Non-Interstate	
	Cost (rounded)	Percent of Regional Traffic	Cost (rounded)	Percent of Regional Traffic
Car	\$13,419,800	89.9%	\$28,394,100	95.5%
Single-Unit Trucks	\$1,492,900	2.45%	\$2,550,500	1.90%
Combination-Unit Trucks	\$8,909,200	6.80%	\$4,159,800	1.45%
<b>All Trucks</b>	<b>\$10,402,100</b>	<b>9.25%</b>	<b>\$6,710,300</b>	<b>3.36%</b>

Source: Parametrix analysis of COMPASS data using FHWA Highway Cost Allocation Study 1997 (costs inflated to 2017)

## 1.2 Methodology

Our estimated costs are rooted in the 2000 Addendum to the 1997 Federal Highway Cost Allocation Study produced by the Federal Highway Administration (FHWA).<sup>1</sup> Cents per mile values were used, broken out by vehicle type, from the FHWA Addendum Table 4, “2000 Highway Cost Responsibility by Vehicle Class under TEA-21 Program Structure.” These values have likely changed in the intervening

<sup>1</sup> <https://www.fhwa.dot.gov/policy/otps/costallocation.cfm>

funding bills. However, no update to the FHWA Highway Cost Allocation Study has been done and therefore these values are the most recent available.

These values were then converted from cents per mile to dollars per mile and adjusted for inflation by multiplying these values by 1.46. The inflation adjustment factor was based on the United States Bureau of Labor Statistics’ Consumer Price Index Inflation Calculator.<sup>2</sup> Figure 1-2 below displays the per-mile cost that was utilized in subsequent steps in our calculations.

Figure 1-2: Adjust Values Adapted from 2000 Highway Cost Responsibility by Vehicle Class

Vehicle Class	Dollars Per Mile (adjusted to 2017 dollars)
Autos	\$0.012
Pickups/Vans	\$0.011
Buses	\$0.047
<b>Single-Unit Trucks</b>	
<25,000 pounds	\$0.032
25,001 - 50,000 pounds	\$0.080
>50,000 pounds	\$0.265
<b>Combination-Unit Trucks</b>	
<50,000 pounds	\$0.050
50,001 - 70,000 pounds	\$0.076
70,001 - 75,000 pounds	\$0.111
75,001 - 80,000 pounds	\$0.126
80,001 - 100,000 pounds	\$0.224
>100,001 pounds	\$0.296

Source: Parametrix analysis of FHWA Highway Cost Study 1997

### 1.3 Annual Vehicle Miles Traveled

ATRI GPS data and COMPASS traffic classification counts were used to estimate total truck vehicle miles traveled (VMT) per year below in Figure 1-3: Annual Vehicle Miles TraveledFigure 1-3, as explained in Working Paper 2B. Assuming the non-truck (car) VMT is proportional to the percent of non-trucks in the COMPASS count data, estimates were calculated for non-truck VMT and total VMT.

<sup>2</sup> January 2000 (\$1) – December 2017 (\$1.46).

Figure 1-3: Annual Vehicle Miles Traveled

	Interstate	Non-Interstate	Total
Estimated Car VMT (per year)	1,148,959,318	2,430,999,756	3,579,959,074
<b>Total Truck VMT (per year)</b>	<b>118,249,150</b>	<b>85,417,274</b>	<b>203,666,423</b>
Estimated Total VMT (per year)	1,278,495,955	2,544,431,923	3,822,927,878

Source: CPCS Analysis (Working Paper 2B)

## 1.4 Calculating Allocation of Cost

The FHWA cost allocation truck values were reported by weight class for single or combination-unit trucks while the COMPASS counts were broken out by vehicle classification. Despite the differing schemes, there were equal numbers of sub-types of trucks within each data source. Thus, our methodology assumes correlation between weight of a vehicle and the number of axles and thus joins FHWA cost allocations categories to the vehicle classifications in a one-to-one relationship. For example, a “05-Single Unit Truck, 2 axle, 6 tire” vehicle is similar enough to a single-unit truck weighing <25,000 pounds to adopt its per mile maintenance costs. To generate our final cost allocation costs, the allocated cost per mile was multiplied by the corresponding vehicle type VMT. Figure 1-4 summarizes the results of these calculations.

## 1.5 Conclusions

The largest expense overall is due to automobiles comprising such a large percentage of the overall annual VMT estimate. Automobile VMT is higher on non-interstate roadways than interstates because the majority of private vehicular travel occurs off interstates. Similarly, single unit trucks, such as delivery vehicles, are utilized more on non-interstate roads while combination-unit trucks are more commonly used for interstate long-distance travel. The cost allocation difference between automobiles and overall trucks is much smaller on interstate facilities. It is worth noting that heavier vehicles, such as single and multi-unit trucks, are responsible for a large share of the overall cost relative to their relatively small VMT.

Figure 1-4: Summary of Process Values and Estimated Allocated Annual Highway Costs by Vehicle Classification

Allocation Study Vehicle Class <sup>1</sup>	Dollars per Mile <sup>2</sup>	FHWA Vehicle Classification <sup>3</sup>	Interstate		Non-Interstate	
			Annual VMT <sup>4</sup>	Annual Maintenance Cost <sup>5</sup>	Annual VMT <sup>4</sup>	Annual Maintenance Cost <sup>5</sup>
Autos	\$0.012	02-Passenger Car	<b>1,148,959,318</b>	<b>\$13,419,800</b>	<b>2,430,999,756</b>	<b>\$28,394,100</b>
<b>Single-Unit Trucks</b>						
<25,000 pounds	\$0.032	05-Single Unit Truck, 2 axle, 6 tire	24,173,036	\$776,400	35,304,116	\$1,134,000
25,001 - 50,000 pounds	\$0.080	06-Single Unit Truck, 3 axle	6,364,182	\$507,300	11,163,432	\$889,900
>50,000 pounds	\$0.265	07-Single Unit Truck, 4 or more axle	790,611	\$209,200	1,990,511	\$526,600
<b>Total</b>			<b>31,327,829</b>	<b>\$1,492,900</b>	<b>48,458,059</b>	<b>\$2,550,500</b>
<b>Combination-Unit Trucks</b>						
<50,000 pounds	\$0.050	08-Single Trailer Truck, 4 or fewer axle	2,805,030	\$140,500	4,006,976	\$200,700
50,001 - 70,000 pounds	\$0.076	09-Single Trailer Truck, 5 axle	62,968,159	\$4,789,700	20,342,342	\$1,547,400
70,001 - 75,000 pounds	\$0.111	10-Single Trailer Truck, 6 or more axle	11,443,738	\$1,273,100	6,891,919	\$766,700
75,001 - 80,000 pounds	\$0.126	11-Multi Trailer Truck, 5 or fewer axle	20,584	\$2,600	152,732	\$19,300
80,001 - 100,000 pounds	\$0.224	12-Multi Trailer Truck, 6 axle	2,264,234	\$506,400	304,466	\$68,100
>100,001 pounds	\$0.296	13-Multi Trailer Truck, 7 or more axle	7,419,577	\$2,196,800	5,260,779	\$1,557,700
<b>Total</b>			<b>86,921,321</b>	<b>\$8,909,200</b>	<b>36,959,215</b>	<b>\$4,159,800</b>
<p><sup>1</sup> From the 2000 Addendum to the 1997 Federal Highway Cost Allocation Study.</p> <p><sup>2</sup> December 2017 adjusted dollars, initial values from 2000 Addendum to the 1997 Federal Highway Cost Allocation Study.</p> <p><sup>3</sup> Classification used by ATRI data and COMPASS traffic counts.</p> <p><sup>4</sup> Applying COMPASS vehicle type ratios to Truck VMT estimates.</p> <p><sup>5</sup> Estimated dollars per mile multiplied by VMT and rounded.</p>						