2006
ANNUAL TRAFFIC REPORT

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Jim Gibbons,Governor
Susan Martinovich,P.E.,Director

The Annual Traffic Report

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INTRODUCTION

The administration of approximately 5,400 miles of roads in the State of Nevada Highway System involves the expenditure of hundreds of millions of dollars annually for construction, reconstruction and maintenance. Also, it imposes the responsibility of selecting and designing new roads, and the planning of future construction and development.

It is necessary to keep current data on motor vehicle trends for numerous reasons including: Design of new construction to service the volume and type of traffic a roadway will carry. Selection of new routes to serve the greatest area and maximum number of motorists while maintaining cost efficiency. Design of future projects to coincide with expected development. And to schedule maintenance when and where it is most needed.

Perhaps the single most reliable statistics available to guide the highway engineer and the planner are the type and volume of traffic on each section of highway under consideration for future improvement. Responsibility for the collection, tabulation and analysis of these trends is vested in the Traffic Information Division of the Nevada Department of Transportation.

During 2006, hourly traffic volumes were monitored continuously at 95 locations statewide. These sites commonly referred to as Automatic Traffic Recorders (ATR's) are presented in summary form beginning on page 14 of this report. In addition, traffic volumes were collected in short periods (7days) and factored to Annual Average Daily Traffic (AADT's). These summary statistics including a ten-year history (if available) are presented by county in the Annual Average Daily Traffic Count Stations portion of this report, which begins on page 109.

STATISTICS

The methods used to derive the "Annual Average Daily Traffic" (AADT) for the Automatic Traffic Recorder (ATR) sites in this book are:

1. Each day of the week is averaged for the month.

2. The seven average days (Sunday through Saturday) are averaged which provides "Monthly Average Daily Traffic" (MADT).

3. The twelve MADT's (January through December) are averaged, which then yields the AADT.

The methods used to derive the "Annual Average Daily Traffic" for Annul Average Daily Traffic Count Station section in this report are:

1. The total raw count from a five to seven day short period count is divided by the number of hours sampled and the quotient is then multiplied by 24 (24 hours in a day).

2. The above product is then factored using summary statistics from ATR's to derive a Monthly Average Daily Traffic (MADT).

3. The MADT is once again factored for seasonality using summary statistics from ATR's which produces Annual Average Daily Traffic (AADT). The AADT summary statistics in this report represent a composite of both directions.

4. Those locations sampled with an axle sensor are then factored once more using factors developed from vehicle classification statistics. This procedure factors out inflated counts due to extra axle vehicles.

Data is collected in an hourly increment at all count locations statewide. This data is available upon request from the Traffic Information Division staff by calling at (775) 888-7445.

ANNUAL AVERAGE DAILY TRAFFIC AT PORTABLE COUNT STATIONS NUMBERING SYSTEM

The Annual Average Daily Traffic Count Station section of this report contains a ten-year history of Annual Average Daily Traffic at portable (short-term) count locations. This data is divided into counties including maps depicting individual count locations. Short-term count locations are represented on the maps in red and consist of the four- digit identification number with all leading zeros removed. All short-term count locations are listed with the county three digit code and the four-digit station identifier in a table located directly adjunct to the individual county map.

		Depicted on map	Depicted in Table 3
Example of table three:	Clark county station number	1	0030001
	Mineral county station number	33	0210033
	Washoe county station number	114	0310114

*Please note count stations in Clark County in the 2000 series numbers are counts provided by the Regional Transportation Commission and count stations in the 6000 series numbers are counts provided by the City of North Las Vegas.
Below is a listing of the counties and their prefix numbers. County code numbers are in bold print and located in the upper right hand corner on all county maps.

County	Prefix Number
Carson City	025
Churchill	001
Clark	003
Douglas	005
Elko	007
Esmeralda	009
Eureka	011
Humboldt	013
Lander	015
Lincoln	017
Lyon	019
Mineral	021
Nye	023
Pershing	027
Storey	029
Washoe	031
White Pine	033

AUTOMATIC TRAFFIC RECORDERS
(ATR)

In addition to the short-term locations, Automatic Traffic Recorder (ATR) locations are indicated on the maps in red with seven-digit identification number.

Summary data for ATR sites can be found in the Automatic Traffic Recorder section of this report. The ATR section provides the user with Monthly Average Daily Traffic (MADT) and a 10-year history of the AADT with the percent of change from the previous year. This section also provides Average Daily Traffic (ADT), Average Weekday Traffic and Average Weekend Traffic. (Please note Friday ADT is not used to calculate Average Weekday or Weekend Traffic). A 10-year AADT history for all ATR's can also be located in the Annual Average Daily Traffic Count Stations section for each County.

The percent design hour volume (DHV) is of the AADT is provided in the ATR summaries and is a tool used in the design process. It is the hour used to design a highway as it represents the highest volume the highway will have to accommodate. To a greater extent, the design hour volume determines pavement widths and other geometric features.

VEHICLE CLASSIFICATION
&
18 KIP, Equivalent Single Axle Loading (ESAL)
TEMPLATES

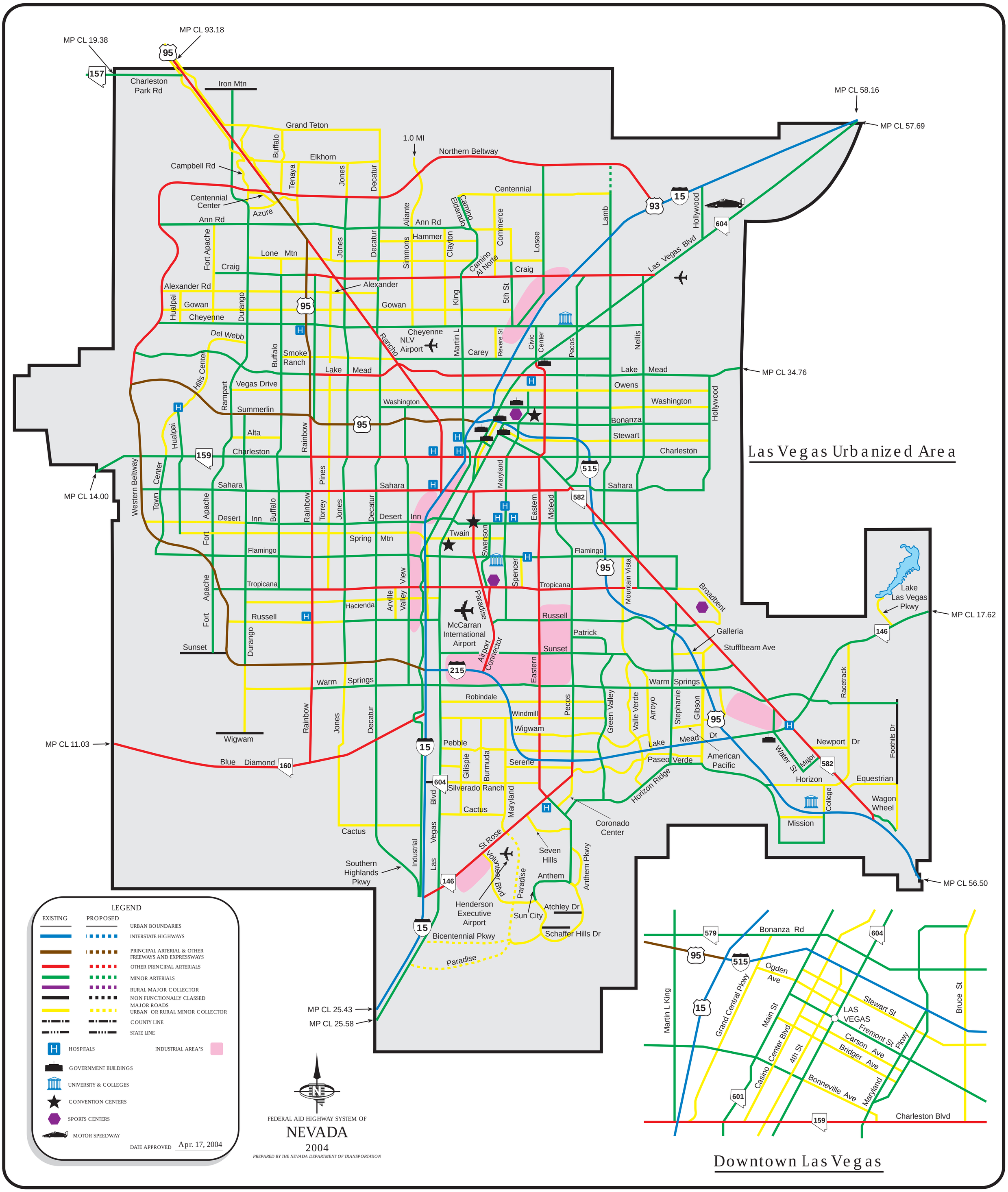
The NDOT Traffic Information, Vehicle Size and Weight section administers the collection of Vehicle Classification and Weigh-In-Motion (WIM) data statewide as outlined in the US Department of Transportation (USDOT) Federal Highway Administration (FHWA) Traffic Monitoring Guide (TMG). Statistics presented are compiled from the most recent three years of data from statewide locations as outlined in the 2001 TMG.

Vehicle Classification data is collected using various axle sensor technologies which group vehicles by number of axles in order to stratify the traffic into the FHWA thirteen categories.

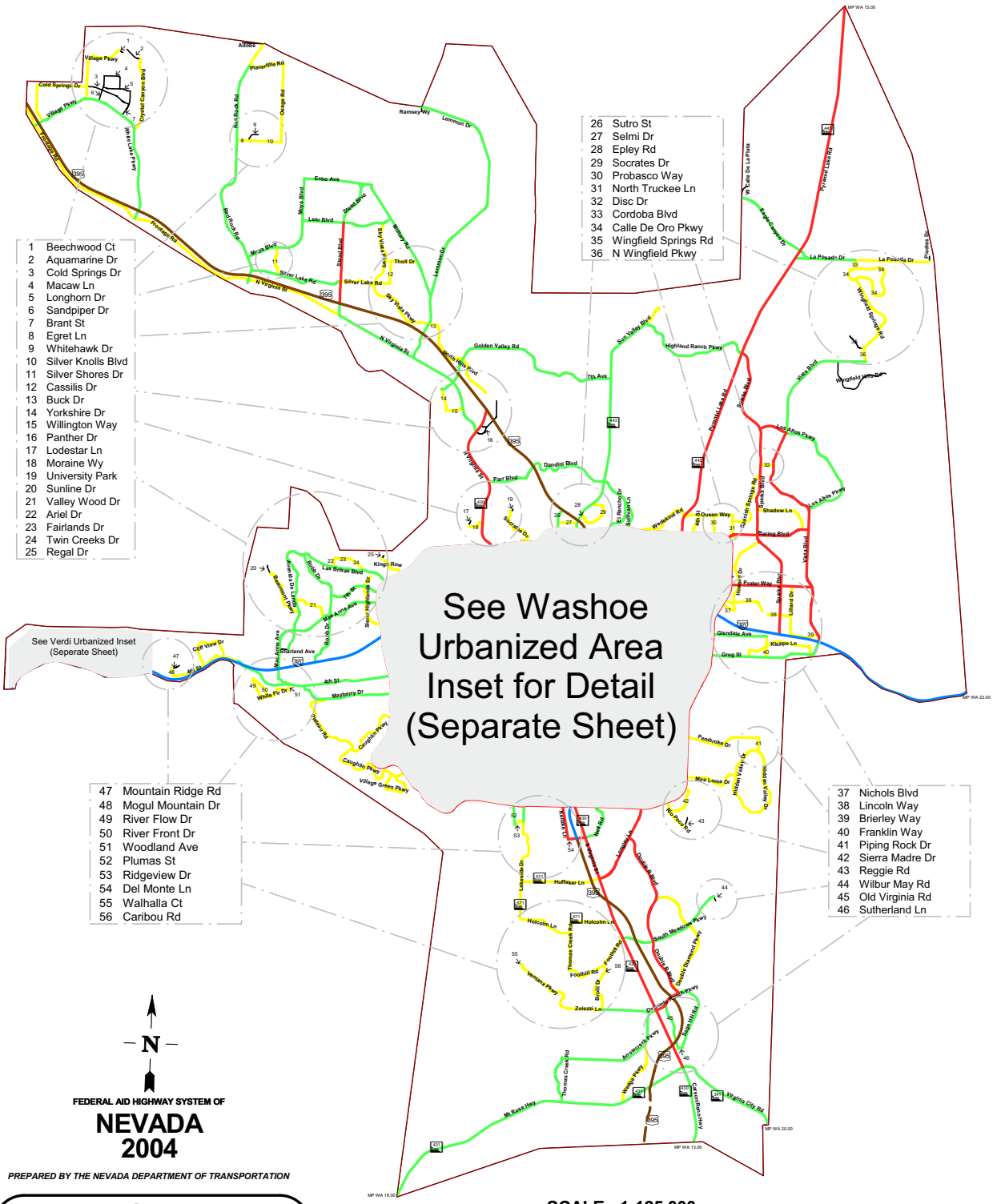
WIM data is collected using portable Capacitive Mat, permanent Bending Plate and Piezoelectric sensor technologies. The equipment collects individual and grouped axle weights, classifies each vehicle according to axle spacing and axle grouping into the FHWA thirteen categories and is used to stratify vehicular traffic. The ESAL data derived from these sessions are used by State and Local entities as well as consulting firms to determine structural numbers which are a primary component for the design of flexible and rigid pavements. Most flexible pavement designs are based on 20-year traffic projections and rigid pavement designs are generally based on 35 years. ESAL values are produced for both site-specific projects (projects with a WIM location on or nearby) and by roadway functional class (Urban or Rural: Interstate, Primary and Arterial roads).

Vehicle Classification and WIM data is also used for capacity analysis, environmental assessment, pavement management and economic development planning.

The following pages contain color coded Urban and Rural Roadway Functional Classification maps outlining State Maintained roadways and vehicle classification distribution templates with ESAL data which correspond to Urban or Rural conditions.

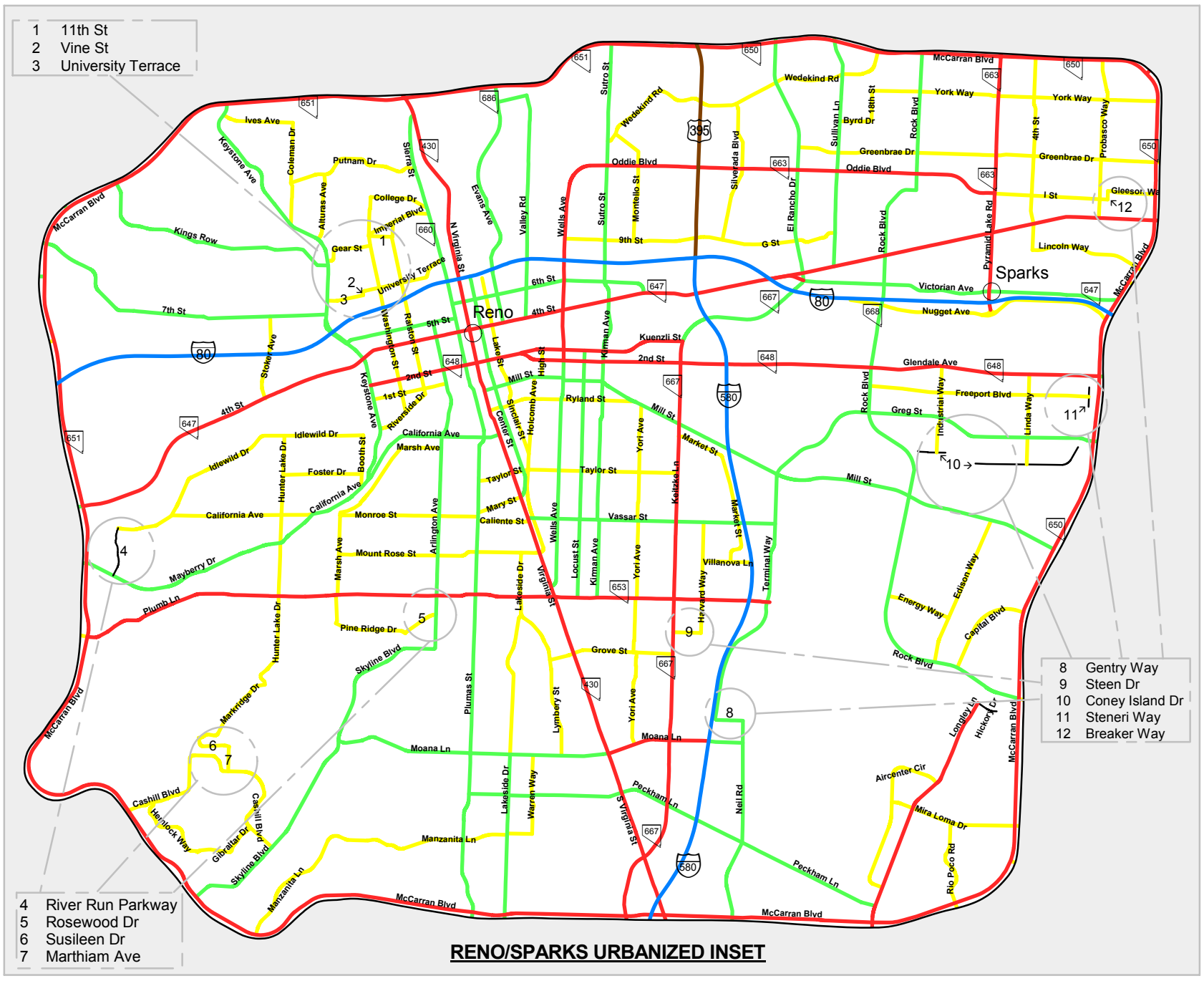


ROADWAY FUNCTIONAL CLASSIFICATION
LAS VEGAS URBANIZED AREA



ROADWAY FUNCTIONAL CLASSIFICATION

WASHOE URBANIZED AREA



RENO/SPARKS URBANIZED INSET

SCALE - 1:50,000

N

FEDERAL AID HIGHWAY SYSTEM OF

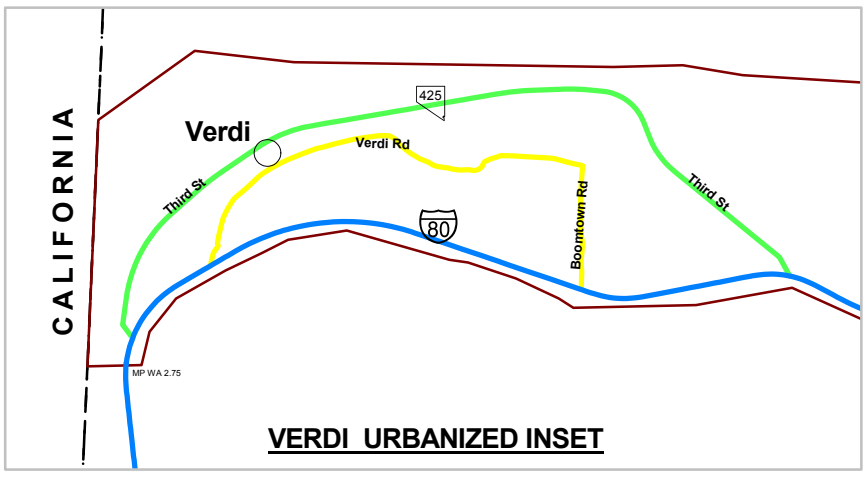
NEVADA 2004

PREPARED BY THE NEVADA DEPARTMENT OF TRANSPORTATION

LEGEND

EXISTING	PROPOSED	
		INTERSTATE HIGHWAY
		PRINCIPAL ARTERIAL & OTHER FREEWAYS OR EXPRESSWAYS
		OTHER PRINCIPAL ARTERIAL
		MINOR ARTERIAL
		RURAL MAJOR COLLECTOR
		URBAN OR RURAL MINOR COLLECTOR
		LOCAL SYSTEM
		URBAN BOUNDARIES
		STATE LINE
		COUNTY LINE

DATE APPROVED November 18, 2004



VERDI URBANIZED INSET

SCALE - 1:50,000

ROADWAY FUNCTIONAL CLASSIFICATION

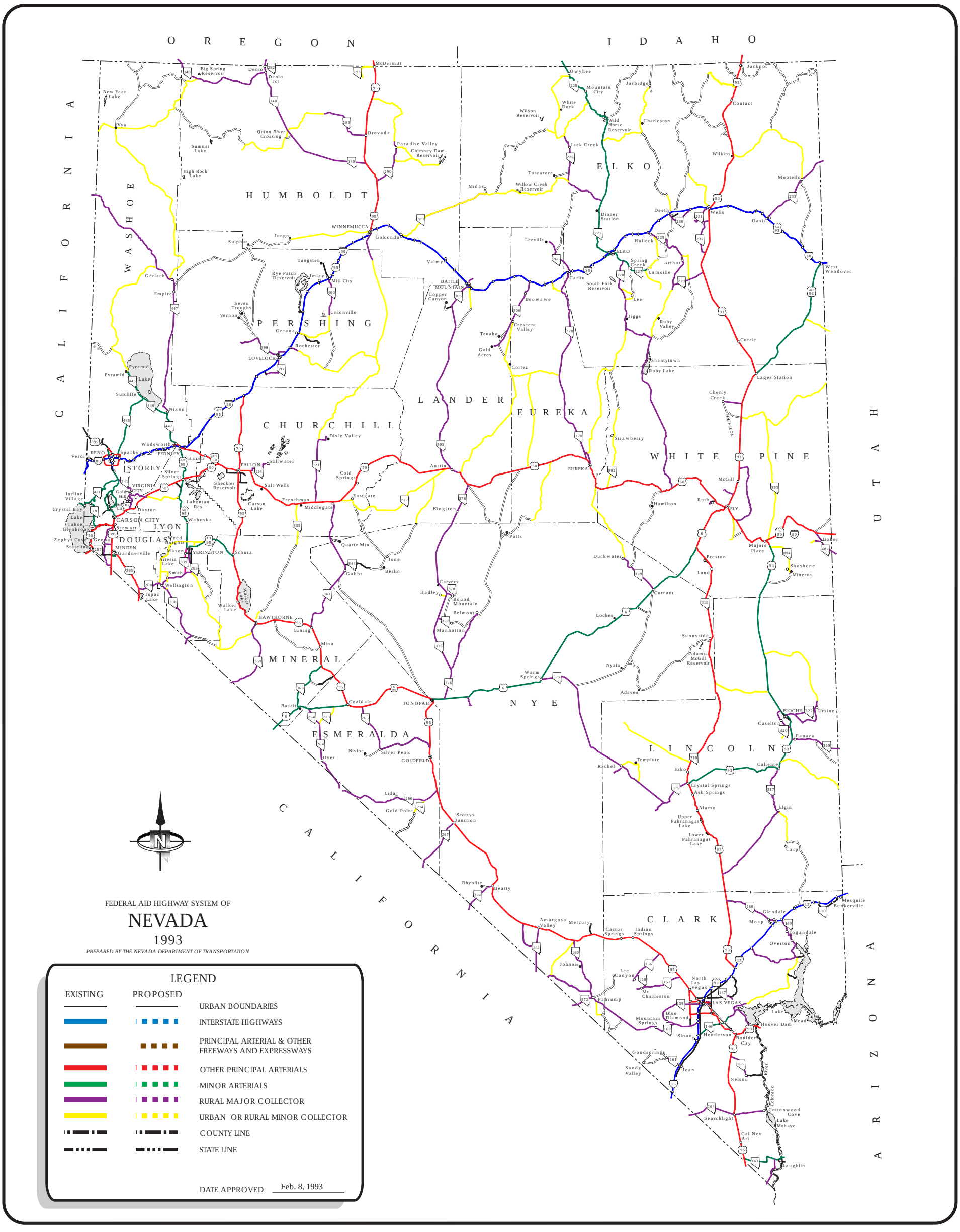
WASHOE URBANIZED AREA INSETS

URBAN
VEHICLE DISTRIBUTION and AVERAGE ESAL's
by ROADWAY FUNCTIONAL CLASSIFICATION

STATE: **NEVADA** STATE FIPS CODE: **32** DATA YEAR: **2006** DATE: **11-Apr-07**

FUNCTIONAL CLASSIFICATION	PERCENT OF TRAVEL												
					SINGLE-UNIT TRUCKS		SINGLE-TRAILER UNITS			MULTI-TRAILER TRUCKS			
	TRUCK PERCENT (T%)	PASS-ENGER CARS [2 AXLE, 4 TIRE]		BUSSES	2 AXLE, 6 TIRE	3 AXLE OR MORE	4 AXLE OR LESS	5AXLE	6 AXLE OR MORE	5 AXLE OR LESS	6 AXLE	7 AXLE OR MORE	AVERAGE ESAL
URBAN													
INTERSTATE	7.62%	92.38%		0.47%	1.09%	0.60%	0.32%	4.30%	0.11%	0.34%	0.06%	0.33%	
FLEXIBLE ESAL by VEHICLE GROUP				0.812	0.259	0.569	0.619	1.221	1.362	1.558	0.961	2.185	1.038
RIGID ESAL by VEHICLE GROUP				0.923	0.228	0.752	0.619	1.837	2.016	1.418	0.866	2.750	1.429
OTHER FREEWAY & EXPRESSWAY	3.84%	96.16%		0.25%	0.87%	0.40%	0.25%	1.56%	0.07%	0.12%	0.03%	0.29%	
FLEXIBLE ESAL by VEHICLE GROUP				0.714	0.198	1.026	0.598	1.191	1.376	1.426	0.761	1.539	0.912
RIGID ESAL by VEHICLE GROUP				0.746	0.175	1.481	0.586	1.780	2.089	1.305	0.656	2.302	1.261
OTHER PRINCIPAL ARTERIALS	4.19%	95.81%		0.57%	1.31%	0.35%	0.31%	1.26%	0.05%	0.11%	0.04%	0.19%	
FLEXIBLE ESAL by VEHICLE GROUP				1.012	0.269	0.906	1.090	1.223	1.432	2.253	0.952	1.920	0.918
MINOR ARTERIALS	3.56%	96.44%		0.56%	0.87%	0.46%	0.36%	0.64%	0.11%	0.17%	0.12%	0.27%	
FLEXIBLE ESAL by VEHICLE GROUP				0.839	0.239	0.938	0.682	1.285	1.237	2.099	0.593	1.843	0.908
MINOR COLLECTORS	3.23%	96.77%		0.54%	2.05%	0.16%	0.18%	0.14%	0.01%	0.07%	0.05%	0.03%	
FLEXIBLE ESAL by VEHICLE GROUP				*	*	*	*	*	*	*	*	*	*
LOCAL ROADS	4.51%	95.49%		0.38%	2.93%	0.55%	0.04%	0.46%	0.03%	0.01%	0.01%	0.10%	
FLEXIBLE ESAL by VEHICLE GROUP				*	*	*	*	*	*	*	*	*	*

* Data not available for these Roadway Functional Classifications



ROADWAY FUNCTIONAL CLASSIFICATION

NEVADA

RURAL
VEHICLE DISTRIBUTION and AVERAGE ESAL's
by ROADWAY FUNCTIONAL CLASSIFICATION

STATE: **NEVADA** STATE FIPS CODE: **32** DATA YEAR: **2006** DATE: **11-Apr-07**

FUNCTIONAL CLASSIFICATION	PERCENT OF TRAVEL												
					SINGLE-UNIT TRUCKS		SINGLE-TRAILER UNITS			MULTI-TRAILER TRUCKS			
	TRUCK PERCENT (T%)	PASS-ENGER CARS [2 AXLE, 4 TIRE]		BUSSES	2 AXLE, 6 TIRE	3 AXLE OR MORE	4 AXLE OR LESS	5AXLE	6 AXLE OR MORE	5 AXLE OR LESS	6 AXLE	7 AXLE OR MORE	AVERAGE ESAL
RURAL													
INTERSTATE	23.45%	76.55%		0.65%	1.78%	0.66%	0.60%	16.59%	0.27%	1.21%	0.32%	1.37%	
FLEXIBLE ESAL by VEHICLE GROUP				0.748	0.158	0.460	0.548	1.198	1.110	1.759	0.921	1.609	1.117
RIGID ESAL by VEHICLE GROUP				0.817	0.135	0.598	0.551	1.719	1.476	1.618	0.810	1.930	1.504
OTHER PRINCIPAL ARTERIAL	13.34%	86.66%		0.47%	2.14%	0.45%	1.00%	7.58%	0.18%	0.70%	0.19%	0.63%	
FLEXIBLE ESAL by VEHICLE GROUP				0.651	0.187	0.614	0.689	1.244	1.218	1.290	0.941	1.540	1.003
MINOR ARTERIAL	11.21%	88.79%		0.52%	1.89%	1.58%	0.55%	5.28%	0.16%	0.23%	0.04%	0.96%	
FLEXIBLE ESAL by VEHICLE GROUP				0.669	0.203	0.679	0.482	1.094	1.200	3.308	1.449	2.450	1.001
MAJOR COLECTOR	8.47%	91.53%		0.48%	1.34%	0.51%	0.86%	3.92%	0.13%	0.32%	0.09%	0.82%	
FLEXIBLE ESAL by VEHICLE GROUP				0.682	0.377	0.923	0.807	1.158	0.795	1.663	0.000	1.426	0.984
MINOR COLLECTOR	2.39%	97.61%		0.05%	1.07%	0.13%	0.19%	0.61%	0.02%	0.06%	0.04%	0.22%	
FLEXIBLE ESAL by VEHICLE GROUP				*	*	*	*	*	*	*	*	*	*
LOCAL ROADS	6.47%	93.53%		0.77%	3.45%	0.16%	0.11%	1.42%	0.00%	0.08%	0.03%	0.45%	
FLEXIBLE ESAL by VEHICLE GROUP				*	*	*	*	*	*	*	*	*	*

* Data not available for these Roadway Functional Classifications

Daily directional ESALs requested for design specific locations are derived using the following method:

Weights for individual axles and axle groups derived from each vehicle, weighed at a specific location relevant to the design site, are stored in a database along with an axle equivalency factor. This equivalency factor is derived from tables produced by the American Association of State Highway Transportation Officials (AASHTO) (see attached tables). Factors are derived from this table using a structural number of 3.0 and a serviceability index of 2.5 for flexible pavements and a structural number of 2.0 and a slab thickness of 12 inches for rigid pavements.

The following example uses weights from a 3-axle single unit vehicle and values from the flexible pavement tables for both single and tandem axles:

Steering axle (single)	Table Equivalency	Rear axle group (Tandem)	Table Equivalency	Total
Weight = 10,000 lbs.	.118	Weight =32,000 lbs.	.889	1.007

Once the equivalency factors for each axle and axle group for a specific vehicle configuration are totaled, the totals are averaged for all vehicles of a specific type (such as the 3 axle single unit above) to produce an average ESAL (18 kip/truck) value for each vehicle type.

After calculating the Equivalency factors for each individual vehicle type, the percentage that each vehicle type is of the total vehicles (truck and bus) is calculated and multiplied by 1000 to derive a current year distribution percentage, (1000 trucks are used to increase sample size for low volume sites). The resulting distribution percentage for each vehicle type is then multiplied by the average ESAL (18 kip/truck) value for that vehicle type to get a current ESAL value or flexible load by vehicle type. The Current ESAL value by Vehicle type is totaled for all vehicles types and divided by 1000 to produce a one directional 18 kip per truck factor. This factor is applied to one directional current year, mean year and future year AADT and number of trucks projected for the highway segment being analyzed. The projected AADT * Truck percent divided by 2 will yield the number of daily one directional trucks.

The following example is based on data from a rural minor arterial, and depicts how an 18 KIP per truck factor is derived.

VEHICLE TYPE		TRUCK COUNT DISTRIBUTION PERCENT	CURRENT YEAR DISTRIBUTION	18 KIP PER TRUCK	CURRENT FLEXIBLE LOAD
AUTOS	5,500	93.00%			
SINGLE UNITS					
Bus	28	6.8% (*1000)	68	0.489	33
2 Axle	123	29.9%	299	0.566	169
3 Axle	14	3.42%	34	1.388	47
SEMI TRAILERS					
3 Axle	6	1.46%	15	0.571	9
4 Axle	3	0.73%	7	1.084	8
5 Axle	116	28.22%	282	1.660	468
FULL TRAILERS					
5 Axle	10	2.43%	24	1.928	46
6 Axle	4	0.97%	10	0.718	7
MULTI TRAILERS					
5 Axle	6	1.46%	15	1.562	23
6 Axle	1	0.24%	2	1.170	2
7 Axle	64	15.57%	156	3.535	551
8 Axle	36	8.76%	88	1.551	136
COLUMN TOTALS	411	100.00% (truck & bus)	1000		1499

KIP per Truck Average [Current Flexible Load/1000]---------- (1,499/1000) = 1.50
Truck percent -- Total [Trucks/Total Vehicles]----------411/5,911 = 7%

Please note! For site specific design requests NDOT generally provides the truck percentages and projected current, mean and future AADT's to which the ESAL factors are applied.

The Vehicle Distribution and Average ESAL's tables that are depicted in the Annual Traffic Report are based on truck weight and classification data collected by roadway functional classification (IE: Urban and Rural -Interstate, Principal Arterial, Minor Arterial and Major and Minor Collector) **Please Note!** The table in the Annual Traffic Report is designed to produce an average ESAL value based on a specific type of roadway and is not dependent upon AADT.

The following example uses an Urban Principal Arterial roadway to demonstrate how to use the Vehicle Distribution and average ESAL tables, included on page 7 in this year's report. This example includes a standard ESAL value for automobiles, which is not listed in the Annual Report table. To determine an ESAL based solely on trucks, this table assumes a sample of 1000 trucks as in the example below.

Urban Principal Arterial	**T %**	**Autos**	**Bus**	**Single Unit Trucks**		**Single Unit Trailers**			**Multi-Unit Trailers**		
				2 axle	**3 axle +**	**4 axle**	**5 axle**	**6 axle +**	**5 axle**	**6 axle**	**7axle +**
Percent of Distribution	4.36	95.65%	0.56%	1.53%	0.36%	0.30%	1.27%	0.06%	0.14%	0.04%	0.09%
Flexible ESAL		.0004	.6390	.2591	.7866	.5315	1.2655	1.6611	2.0304	1.1113	1.7020
Distribution. of Vehicles			128	350	83	68	291	14	32	9	21
New Current Load			82	91	65	36	368	23	65	10	36

* Example from table is based on sample of 1000 trucks.

To determine an average ESAL value by roadway functional type:

1. Divide the vehicle class percentage by the truck percentage and multiply that number by 1000. This will yield a distribution of vehicles by truck type.
   Example (Bus percentage/T%) .0056/.0436 *1000 = 128

2. Multiply each individual distribution by the flexible ESAL value for that vehicle class, to derive a new current load value.

3. Total all the values for the New Current Load and divide by 1000. This will produce an average 18 kip per truck factor based on roadway functional classification.
   Example: New Current Load total = 776/1000 Average 18 kip/truck factor = .776