Memorandum

MIAMI-DADE COUNTY

Date: July 15, 2016

Agenda Item No. 2B1
September 7, 2016

To: Honorable Chairman Jean Monestime
and Members, Board of County Commissioners

From: Carlos A. Gimenez
Mayor

Subject: Report on the Impact on Traffic Patterns and County Road Surfaces Caused by Multi-Axle Vehicles and Trailers - Directive 151461

This report was prepared by the Department of Transportation and Public Works (DTPW) in response to Board of County Commissioners' Resolution No. R-608-15, adopted on June 30, 2015, which directed the County Mayor or the County Mayor's designee to prepare and submit a report identifying: (1) the number of multi-axle vehicles and trailers registered in Miami-Dade County (County); (2) the impact on traffic patterns and County road surfaces caused by such vehicles, including information regarding the wear and tear to roads that these heavier vehicles cause; and (3) the amount of taxes paid, if any, by registered multi-axle vehicle owners.

Background

DTPW is responsible for the design, construction, maintenance and repair of the County maintained roadway, and right-of-way infrastructure which includes approximately 3,198 paved (asphalt) centerline miles of roadway, and 209 bridges.

Impact to Roadway Surfaces

The Florida Department of Transportation (FDOT) uses a pavement design based on wear and use that takes into account the amount of vehicles on the roadway, including truck traffic. The FDOT method, similar to the American Association of State Highway and Transportation Officials (AASHTO) method, uses an 18-Kip equivalent single axle load, which takes into account the number of vehicle trips, the percentage of trucks, and the projected life of the pavement.

The County uses a standard pavement cross section for design of arterial and collector roadways, taking into account the aforementioned design methodology, to produce an average 20-year design life of the pavement surface for all roadways. With the implementation of projects funded through the American Recovery and Reinvestment Act in 2009, DTPW began using the Superior Performing Asphalt Pavement System (Superpave). Superpave is used by FDOT and is superior in quality to previous asphalt mixes, since it takes into account traffic and climate conditions.

Studies regarding bridges have shown that the gross weight, axle weight, and axle configuration of heavy multi-axle vehicles directly affect the service life of highway bridge superstructures. With the growth of highway transportation, the increased frequency of heavy trucks contributes to fatigue damage. Damage typically occurs on the bridge deck and in the main superstructure elements, including floor beams and girders, diaphragms, joints, and bearings. Therefore, bridge maintenance becomes more frequent, and, as a result, more difficult and costly.

Additionally, drainage grates and concrete inlet structures and curbing, specifically those located within the turning radius of an intersection or on a curved roadway, are more susceptible to damage. This occurs when the vehicles mount the curb and roll over said structures resulting in damage to the infrastructure.

Impact to Traffic Patterns

In regards to the impact of traffic patterns, it has been determined that heavy multi-axle vehicle traffic impacts the speed of the corridor and occupies more space in the travel lane. Additionally, sight obstructions are created, which lead to lower speeds within a corridor.

It has also been noted that the heavier multi-axle vehicle traffic leads to congestion at a signalized intersections. When a roadway network is operating close to capacity, this heavy traffic can cause bottlenecking and gridlock. As a result less passenger vehicles cross an intersection since multi-axle vehicles are larger and move at a slower speed.

Number of Multi-Axle Vehicles and Fees Paid

The estimated number of multi-axle vehicles registered in Miami-Dade County with the State of Florida Department of Highway Safety and Motor Vehicles (DMV) is 90,413, as denoted under the Heavy Truck category on the attached DMV table (Appendix A). There are no taxes paid to Miami-Dade County for multi-axle vehicles; however, the DMV charges vehicle registration fees based on the weight of the vehicle (Appendix B).

Conclusion

Multi-axle vehicles affect traffic patterns and flow due to their size, speed and maneuverability. While they affect the life of pavement surfaces, pavement design takes into account heavy vehicles to determine the appropriate design for a 20-year life.

Pursuant to Ordinance 14-65, this memorandum will be placed on the next available Board meeting. If additional information is needed, please contact Alice N. Bravo, P.E., Director, DTPW at (786) 469-5406.

C: Alina T. Hudak, Deputy Mayor, Office of the Mayor
Alice N. Bravo P.E., Department of Transportation and Public Works
Eugene Love, Agenda Coordinator

APPENDIX A:

Current Vehicles Registered

Update Frequency: Monthly

Report Date: 1/6/2016

County #	Residence County	Autos & Pickups	Motor-cycles	Mobile Homes	Heavy Trucks	Travel Trailers	Vessels	Vehicle Trailers	Buses	Tools	Totals
1	MIAMI-DADE	1,666,043	48,671	11,436	90,413	3,471	50,484	107,167	8,278	854	1,986,817

APPENDIX B: MOTOR VEHICLE REGISTRATION FEES

The fees listed below represent the base vehicle tax only. Other statutory fees apply. Registration use, license plate type and class code are used to determine registration fees. The class code is determined by the vehicle weight, body type, vehicle type and registration use.

A.1 License Taxes-motorcycles	$10.00
A.2 License Taxes-moped	$5.00
A.3 Antique motorcycle	$7.50
A.4 Antique automobile	$7.50
A.5 Automobiles (Net weight up to 2,499 pounds)	$14.50
A.6 Automobiles (2,500 - 3,499 pounds)	$22.50
A.7 Automobiles (3,500 or more pounds)	$32.50
A.8 Trucks (Net weight up to 1,999 pounds)	$14.50
A.9 Trucks -based on weight (2,000 - 3,000 pounds)	$22.50
A.10 Trucks -based on weight (3,001 - 5,000 pounds)	$32.50
A.11 Goat Truck	$7.50
A.12 Antique Truck	$7.50
A.13 Heavy Truck (5,001 - 5,999 pounds)	$60.75
A.14 Heavy Truck (6,000 - 7,999 pounds)	$87.75
A.15 Heavy Truck (8,000 - 9,999 pounds)	$103.00
A.16 Heavy Truck (10,000 - 14,999 pounds)	$118.00
A.17 Heavy Truck (15,000 - 19,999 pounds)	$177.00
A.18 Heavy Truck (20,000 - 26,000 pounds)	$251.00
A.19 Heavy Truck (26,001 - 34,999 pounds)	$324.00
A.20 Heavy Truck (35,000 - 43,999 pounds)	$405.00
A.21 Heavy Truck (44,000 - 54,999 pounds)	$773.00
A.22 Heavy Truck (55,000 - 61,999 pounds)	$916.00
A.23 Heavy Truck (62,000 - 71,999 pounds)	$1,080.00
A.24 Heavy Truck (72,000 or more pounds)	$1,322.00
A.25 Heavy Truck/Tractor 150 mile radius	$324.00
A.26 Heavy Truck/Tractor (Agriculture 150 miles)	$87.75
A.27 Heavy Truck/Tractor	$324.00
A.27 Semitrailers; School Buses; Special Purpose	$13.50

A.29 Semitrailers; School Buses; Special Purpose	$68.00
A.30 Special Purpose Vehicles	$44.00
A.31 School Buses	$41.00
A.32 Wrecker	$41.00
A.33 Other Wreckers (10,000 - 15,000 pounds)	$118.00
A.34 Other Wreckers (15,000 - 20,000 pounds)	$177.00
A.35 Other Wreckers (20,000 - 26,000 pounds)	$251.00
A.36 Other Wreckers (26,000 - 35,000 pounds)	$324.00
A.37 Other Wreckers (35,000 - 44,000 pounds)	$405.00
A.38 Other Wreckers (44,000 - 55,000 pounds)	$772.00
A.39 Other Wreckers (55,000 - 62,000 pounds)	$915.00
A.40 Other Wreckers (62,000 - 72,000 pounds)	$1,080.00
A.41 Other Wreckers (72,000 or more pounds)	$1,322.00
A.42 Hearse or ambulance	$40.50
A.43 Motor vehicles for hire (under 9 passengers)	$17.00
A.44 cwt (weight per hundred pounds)	$1.50
A.45 Motor vehicles for hire (over 9 passengers)	$17.00
A.46 cwt (weight per hundred pounds)	$2.00
A.47 Trailers for private use (under 500 lbs.)	$6.75
A.48 Trailers for private use (over 500 lbs.)	$3.50
A.49 cwt (weight per hundred pounds)	$1.00
A.50 Trailers for hire (under 2000 lbs.)	$3.50
A.51 cwt (weight per hundred pounds)	$1.50
A.52 Trailers for hire (over 2000 lbs.)	$13.50
A.53 cwt (weight per hundred pounds)	$1.50
A.54 Recreational Vehicles (5th wheel)	$27.00
A.55 Recreational Vehicles (camping trailer)	$13.50
A.56 Recreational Vehicles (under 4,500lbs)	$27.00
A.57 Recreational Vehicles (over 4,500 lbs.)	$47.50
A.58 Dealer and Manufacturer License Plate	$17.00

A.59 Exempt/Official License Plates	$4.00
A.60 Locally Operated Motor Vehicles for hire	$17.00
A.70 cwt (weight per hundred pounds)	$2.00
A.71 Transporter	$101.25
A.72 Commercial Motor Vehicle Surcharge on vehicles 10,000 lbs or more	$10.00
A.73 Original/Replacement License Plate Fee	$28.00
A.74 Initial Registration Fee	$225.00