August 16, 2016

LOS ANGELES FIRE DEPARTMENT

RALPH M. TERRAZAS
FIRE CHIEF

August 1, 2016

BOARD OF FIRE COMMISSIONERS
FILE NO. **16-084**

TO: Board of Fire Commissioners

FROM: Ralph M. Terrazas, Fire Chief

SUBJECT: CONTINUATION OF VEHICLE CONDITION SCORE CARD AND VEHICLE REPLACEMENT GUIDELINES

FINAL ACTION:			
_____ Approved	_____ Approved w/Corrections	_____ Withdrawn	
_____ Denied	_____ Received & Filed	_____ Other	

SUMMARY

The Los Angeles Fire Department (LAFD) Board of Fire Commissioners requested a comprehensive assessment of the automotive fleet with data that guides and justifies the Department's vehicle replacement policy. Using a vehicle condition scoring matrix, the Fleet Maintenance Section assesses various data streams to determine current vehicle condition and will assign a numerical "condition score" to each vehicle in the LAFD fleet. Thereafter, each vehicle will be assessed annually and its condition score updated for as long as the vehicle is maintained by the LAFD. Score "thresholds" for retiring each vehicle type will ensure that relevant vehicles are replaced at the right time and sequence. A description of this plan with partial data is presented in this report. A complete data set however, will take one calendar year to collect for the fleet of emergency apparatus and two years for the fleet of non emergency apparatus.

Utilizing the scoring matrix, the Supply and Maintenance Division, Fleet Maintenance Section has evaluated half of the emergency vehicle fleet through the annual pump test, and ambulance preventative maintenance. The aerial ladder test will begin August 2016. As the Fleet Maintenance Section continues assessing the emergency fleet with the scorecard process, an update is being provided to the Board of Fire Commissioners at the six (6) month point. This Board Report will provide a list of vehicles that have exceeded their life expectancy and are recommended for replacement. Additionally, this report includes reference to the age and mileage threshold which has been established to meet the replacement criteria.

The scoring matrix is designed to guide the Department in fleet replacement decisions, the *Apparatus Asset Assessment* will compel the Department to either replace or not replace vehicles depending on overall vehicle condition. Actual fleet acquisition and disposal, however, is subject to budgetary limitations and operational needs.

Direct cost savings to the Department will be realized by streamlining fleet replacement planning and budget preparation through the use of vehicle condition scores that will guide the Department's fleet replacement strategy and decision making.

RECOMMENDATION
That the Board:
Receive and file.

DISCUSSION
The following data has been extracted from the fleet maintenance database.
The LAFD vehicle fleet consists of 1,257 light and heavy apparatus of various types. Each type of vehicle has an expected life span which, subject to operational needs and budget restrictions, forms the basis for the Department's fleet replacement schedule.

No State or federal rules exists that mandate when fire apparatus must be retired. Nevertheless, National Fire Protection Association (NFPA) recommendation, industry best practices, progressive fire agencies, and LAFD's own Fleet Maintenance Section, all assert that fire department vehicles have a useful life expectancy and sooner or later, they must be replaced.

Following are comments and recommendations from subject matter experts regarding fire apparatus replacement:

- *The Commission of Fire Accreditation International (CFAI) states that apparatus replacement intervals should be based on the effects of variables such as age, use, and maintenance costs on the useful life span of fire apparatus (Commission on Fire Accreditation International, 1997).*

- *NFPA 1912 states "...Apparatus not manufactured to applicable NFPA fire apparatus standards or that are over 25 years old should be replaced."*

- *R. Craven (former president of the California Fire Mechanics Association) identifies three categories of fire apparatus life span: service life, technological life, and economic life.*

- *Various authors suggest that the useful life of fire apparatus varies among fire departments and is affected largely by apparatus utilization, local environment, local operating conditions, routine workload, and scope of preventive maintenance program.*

Currently, the LAFD's fleet replacement policy dictates that heavy apparatus (Triples, Trucks, and Specialty Apparatus) are due for replacement after 10 years in front line service; rescue ambulances are due for replacement after 6 years in front line service,

and light vehicles are due for replacement at 90,000 miles or 6 years in service. These age and mileage criteria are consistent with other best-in-class fleets. However, age and mileage alone do not take into consideration overall vehicle condition which provides information and compelling fleet replacement guidance. A more strategic and compelling vehicle replacement policy is underway to guide and validate fleet replacement actions. To this end, vehicle condition must be considered when making fleet replacement decisions and vehicle condition thresholds must be implemented so the appropriate vehicles are replaced at the appropriate time.

Establishing replacement cycles for different vehicle types is both an art and a science. It involves judgment, predictions, forecasts, and assumptions on one hand and analysis of available data on the other. Therefore, the following three approaches will be utilized to identify, prioritize, select, justify, and replace vehicles that have exceeded their useful and economic life span:

1. The Supply and Maintenance Division will conduct an economic lifecycle cost analysis (LCA) on all vehicles to determine the optimum replacement point that results in the lowest total overall cost to the Department. This approach is based on an economic truism which states that as a vehicle ages, the cost of capital diminishes and its operating costs increase. The combination of these two cost factors produce a cost curve that shows the optimum time to replace vehicles is when the operating costs begin to exceed the capital costs. The LCA will show that deferring replacement of vehicles beyond this optimum financial threshold results in increased fleet costs that are essentially transferred from capital budgets to operating budgets. This approach is especially useful in determining when to replace light vehicles.

2. The Supply and Maintenance Division will establish predetermined condition thresholds based on age, mileage, and other condition criteria. A criteria-based replacement strategy dictates the timing of replacement discussions, provides guidance on specific vehicle replacement considerations, and establishes fact-based justification for specific vehicle replacement decisions. Fundamental to this type of vehicle replacement plan is the intent and objective to produce a condition score that only indicates which vehicle(s) of a particular type are due for replacement and which ones should be replaced first. This approach is especially useful in determining when to replace custom vehicles such as fire apparatus. Please note, however, vehicle condition scores are *not* used to indicate fitness for duty or vehicle safety because the overriding criterion for all apparatus in the LAFD fleet is that every vehicle is safe, reliable, and fully functional.

3. A third approach will be to replace vehicles when the cost to maintain and repair them exceeds a preset threshold dollar amount. This threshold dollar amount is generally the wholesale value of the vehicle at the time the vehicle is being assessed. Whereas the first approach focuses on costs already

sustained up to the time of the condition assessment, this last approach takes into consideration expected future operating and maintenance costs that will be incurred in the year or years following the condition assessment. The intent of knowing when a vehicle's operating costs exceed this threshold amount is to replace the vehicle *before* a major breakdown occurs. Analysis of historical repair trends and costs can reveal the point at which vehicle repairs start to increase significantly. This is an effective replacement strategy for any vehicle for which a "blue book" value can be established and for which future repair costs can be estimated. Under this schema, fleets can avoid performing repairs that cost more than a vehicle is worth.

Custom fire apparatus – like all vehicles – have a useful life expectancy. Vehicles that are kept beyond their optimum replacement timeline subject the Department to higher vehicle operating costs, reduced vehicle salvage revenue, and longer vehicle out-of-service times due to reduced parts availability, more extensive repairs, expired warranties, and reduced overall suitability to the Department due to obsolescence and new technology and standards. Vehicle condition scores will enable the Maintenance Section to identify, validate, communicate, and justify which, when, and by how much, vehicles have exceeded their expected life cycle. After vehicle condition results are obtained, appropriate acquisition and disposal action will be taken.

The following is a sample of vehicles in the Fire Department's fleet. The data was pulled from the Vehicle Maintenance System. The vehicles referenced are mission critical and are subjected to extreme duty. Although a large percentage of the fleet has aged and has exceeded the recommended replacement cycle, the quantity and age of the aerial ladder trucks and triples/pumpers should be noted. The Municipal Improvement Corporation of Los Angeles (MICLA) funding has not kept up with the replacement cycle of ten (10) years.

Aerial Ladder Trucks		Year	Quantity	Age
(10 yrs front line)	LTI	1993	4	*23
*Vehicle Exceeds Replacement Cycle	LTI	1995	10	*21
	LTI	1996	4	*20
	American La France	2000	10	*16
	American La France	2001	7	*15
	American La France	2003	4	*13
	American La France	2006	14	10
	American La France	2010	4	6
	Pierce	2015	10	1

Triples / Pumpers		Year	Quantity	Age
(10 yrs front line)	Seagrave	1996	36	*20
*Vehicle Exceeds Replacement Cycle	Pierce	1999	27	*17
	Seagrave	2003	17	*13
	Pierce	2003	17	*13
	Pierce	2005	7	*11
	Pierce	2005	7	*11
	Pierce	2006	16	10
	Pierce	2006	13	10
	Seagrave	2006	13	10
	KME	2010	23	6
	KME	2014	11	2
	KME	2015	15	1
	HME	2015	5	1

Rescue Ambulances		Year	Quantity	Age
(6 yrs front line)	Ford	2003	29	*13
*Vehicle Exceeds Replacement Cycle	Ford	2005	5	*11
	Ford	2006	24	*10
	Ford	2008	20	*8
	Dodge	2011	49	5
	Dodge	2012	33	4
	Dodge	2014	40	2
	Dodge	2015	23	1
	Dodge	2016	18	0

Suburbans (Assistant Chiefs, Battalion Chiefs, Emergency Medical Services Captains)		Year	Quantity	Age
(6 yrs or 90,000 miles)	GMC	1993	2	*23
*Vehicle Exceeds Replacement Cycle	GMC	1995	10	*21
	GMC	1998	6	*18
	Chevrolet	2003	13	*13
	Chevrolet	2005	4	*11
	Chevrolet	2007	13	*9
	Chevrolet	2010	8	6
	Chevrolet	2011	2	5
	Chevrolet	2014	1	2

Emergency Sedans		Year	Quantity	Age
(6 yrs or 90,000 miles)	Ford Crown Vic	2000	12	*16
*Vehicle Exceeds Replacement Cycle	Ford Crown Vic	2001	1	*15
	Ford Crown Vic	2002	2	*14
	Ford Crown Vic	2003	30	*13
	Ford Crown Vic	2005	19	*11
	Ford Crown Vic	2006	5	*10
	Ford Crown Vic	2007	8	*9
	Ford Crown Vic	2008	22	*8
	Ford Crown Vic	2010	5	*6
	Ford Crown Vic	2004	0	12
	Ford Crown Vic	2005	2	11
	Chevy Caprice	2014	4	2
	Ford Explorer	2014	12	2
	Chevy Caprice	2015	4	1

Non-Emergency Sedans		Year	Quantity	Age
(6 yrs or 90,000 miles)	Chevrolet	1996	4	*20
*Vehicle Exceeds Replacement Cycle	Chevrolet	1998	7	*18
	Chevrolet	1999	2	*17
	Chevrolet	2000	50	*16
	Chevrolet	2001	8	*15
	Toyota	2002	8	*14
	Chevrolet	2003	42	*13
	Honda	2003	7	*13
	Toyota	2005	1	*11
	Toyota	2005	2	*11
	Honda	2005	10	*11
	Dodge	2005	27	*11
	Chevrolet	2007	4	*9
	Honda	2007	16	*9
	Chevrolet	2008	33	*8
	Chevrolet	2015	6	1
	Chevrolet	2016	19	0

Pick Up Trucks ("Plug Buggies")		Year	Quantity	Age
(6 yrs or 90,000 miles)	GMC	1992	1	*24
*Vehicle Exceeds Replacement Cycle	GMC	1995	15	*21
	GMC	1997	5	*19
	Ford	1997	10	*19
	Ford	2003	15	*13
	Ford	2005	7	*11
	Ford	2006	5	*10
	Ford	2006	3	*10
	Chevrolet	2008	1	*8
	Ford	2008	14	*8
	Ford	2008	1	*8
	Chevrolet	2010	1	6
	Dodge	2014	1	2
	Dodge	2016	5	0

CONCLUSION

Current vehicle age and mileage limits are appropriately stated in LAFD's current replacement policy and the Department endeavors to replace a sufficient number of vehicles each fiscal year so that no vehicles in the fleet exceed these limits. Due to budget constraints, however, this has not been possible and as of the date of this report, the majority of the vehicles in the LAFD fleet have reached or passed their expected life span.

Although age and mileage criteria are relevant factors in the vehicle replacement equation, conclusive and compelling arguments to replace or not replace a vehicle cannot be attained without more information. Consequently, justification to support new vehicle acquisition is not as compelling as it will be when purchase decisions are based on total vehicle condition and life cycle analysis.

New apparatus replacement guidelines based on age, mileage, condition, maintenance cost, and obsolescence should be utilized. The budget will also be a part of the decision-making process, but will not be specifically addressed by the guidelines. The intent is that vehicle replacement guidelines will impact the fleet replacement budget, rather than the budget impacting vehicle replacement guidelines.

Board report prepared by Wade White, Assistant Chief, Supply and Maintenance Division and Mark Clark, Equipment Superintendent, Fleet Maintenance Section.