

CITY OF LOS ANGELES
INTER-DEPARTMENTAL MEMORANDUM

Date: October 21, 2014

To: Budget and Finance Committee
c/o City Clerk, Room 395, City Hall
Attention: Honorable Paul Krekorian, Chair

From: Seleta J. Reynolds, General Manager
Department of Transportation

Subject: **STREET RE-STRIPING AND TRAFFIC LOOP INSTALLATIONS RELATED TO PAVEMENT PRESERVATION PROJECTS (COUNCIL FILE NOS. 13-0886, 14-0600-S208, 14-0600-S220, 14-0813)**

SUMMARY

The Los Angeles Department of Transportation (LADOT) was instructed to report back in 30 days with a comprehensive assessment of resources needed to consistently re-stripe streets within 10 days after the completion of resurfacing and slurry seals. The attached report is among a series of written responses to Council inquiries on the subject of pavement preservation projects coordinated with the Department of Public Works, Bureau of Street Services (BSS).

Council File references include:

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|--------------|---|
| 13-0886 | Report on coordination of lane striping and resurfacing coordination. |
| 14-0600-S208 | Instruct LADOT to report regarding a metric for the average number of days to restripe following street preservation. The time frame for this metric to be developed and include a goal of restriping within 10 days. |
| 14-0600-S220 | Rate of restriping achieved with budgeted resources. Respond to questions of average days to restripe. How LADOT will keep up with BSS, and disclosure of full process from slurry to completion, how do Departments coordinate and communicate, what can be done to improve situation. |
| 14-0813 | LADOT/BSS coordination of connecting and replacing traffic detectors post resurfacing. |

RECOMMENDATION

That the Council:

1. **DIRECT** the Department of Transportation, Bureau of Street Services and General Services Department to submit a joint budget proposal for the Fiscal Year 2015-16 Pavement

Preservation Program that identifies the resources needed to enhance inter-departmental coordination and efficiencies.

2. DIRECT the City Administrative Officer to identify potential funding sources available in the current fiscal year to initiate the purchase of additional vehicles and equipment needed to support street re-striping and traffic loop replacements as described in the attached LADOT Report on Street Re-Striping and Traffic Loop Replacement (September 2014).

SUMMARY

LADOT is committed to ensuring that all streets are re-striped and traffic loop detectors are replaced after streets are resurfaced and slurried. The goal is to re-stripe every street within 10 days, but turnaround times have been inconsistent and delayed due to limited resources. Over the past 5 years, staffing levels have declined substantially while the amount of pavement preservation work has increased to historical levels. The attached report proposes increases to staffing and equipment that will enable the Department to mark out every street within 24 hours of resurfacing, completely re-stripe streets in ten day or less, and significantly reduce the backlog of traffic loop detector replacements. Additional resources will also help to stabilize overtime costs and contractor expenses. These efforts will enhance public safety, improve traffic signal operations and better meet customer service expectations throughout the City.

FINANCIAL IMPACTS

LADOT requires additional resources to meet the goal of re-striping streets within 10 days after resurfacing or slurry seal is completed by BSS. The Department proposes consideration of one-time funding of \$8.9 million to purchase equipment, \$3.5 million in additional salary appropriations for new position authorities and a \$2 million increase to its annual contractual services appropriation.

SJR:SH:sh

Attachment

- c: Doane Liu, Office of the Mayor
Miguel A. Santana, City Administrative Officer
Nazario Saucedo, Bureau of Street Services
Tony Royster, General Services Department
Selwyn Hollins, Los Angeles Department of Transportation

**LOS ANGELES DEPARTMENT OF TRANSPORTATION
REPORT ON STREET RE-STRIPING AND TRAFFIC LOOP REPLACEMENT
SEPTEMBER 2014**

Background

The City of Los Angeles has the largest municipal street system in the nation with approximately 6,500 centerline miles of streets and 800 miles of alleys. The Department of Public Works, Bureau of Street Services (BSS) performs maintenance functions that ensure street conditions meet desirable standards of safety, appearance and convenience. The Los Angeles Department of Transportation (LADOT) is responsible for the installation and maintenance of the lane striping and pavement markings in streets to guide motorists, bicyclists and pedestrians. The primary intent of this report is to provide an assessment of roadway striping activities and the adequacy of resources affecting operational performance. This report also addresses the impacts of street resurfacing on traffic loop detectors embedded in the streets. Loop detectors are the sensory devices that facilitate the timing of traffic signal progression and transmit data to LADOT's Automated Traffic Surveillance and Control (ATSAC) Center.

LADOT performs a wide range of traffic safety improvements and design enhancements that involve lane striping. Additionally, the Department performs striping work for projects associated with the City's Pavement Preservation Program administered by BSS. The Pavement Preservation Program is an annual work plan to resurface and slurry seal streets throughout the City. LADOT's goal is to re-stripe every street within 10 days after it has been resurfaced or slurried by BSS.

Over the past 5 years, LADOT staffing levels have declined substantially while the amount of pavement preservation work has increased to historic levels. The total number of streets resurfaced and slurried has risen from linear 550 miles in Fiscal Year 2009-10 to 700 miles in Fiscal Year 2013-14. During that same period, the field workforce has decreased more than 30% due to the City's Early Retirement Incentive Program, budget reductions and attrition.

LADOT's ability to re-stripe streets in a timely manner has been inconsistent and delayed due to limited resources. The Department has relied on a substantial amount of staff overtime and contractor support to keep pace with workload demands. In the last three fiscal years, overtime costs have increased from \$741,436 to \$2.7 million (270%) and contractor expenses rose from \$2 million to \$7 million (251%). Last fiscal year, the expenditures for overtime and contractors greatly exceeded budget appropriations. Fund transfers from other accounts were needed to compensate for deficits and enable the continuity of operations. The Department has made repeated attempts to obtain additional resources through the budget process, but requests have not been approved.

LADOT is committed to ensuring that all streets are re-striped in association with the Pavement Preservation Program. However, street resurfacing and slurry seal projects now have an annual target of 2,400 lane miles, which is the highest workload volume ever imposed on the Department. Current staffing and equipment resources are insufficient to meet the goal of re-striping streets within 10 days on a consistent basis. Continued delays in re-striping streets result in street surfaces remaining black ("dark") for extended periods of time, thereby contributing to vulnerabilities in traffic control and safety. If the pavement preservation workload remains at existing volumes, financial investments in resources

are necessary to achieve the desired turnaround goals for re-striping within 10 days and to ensure quality work output.

Resurfacing and Slurry Coordination

LADOT and BSS have a long-standing partnership with mutual interests in the safety and maintenance of public streets. For decades, the departments have communicated daily to coordinate pavement preservation work activities and routinely engaged in constructive exchanges of information. The following chart summarizes the current process for inter-departmental coordination from the perspective of LADOT:

RESURFACING	SLURRY SEAL
<p><u>Preface:</u></p> <p>Resurfacing occurs on major arterials and local residential streets. BSS has 8 crews dedicated to resurfacing Monday through Friday, but one or two crews may also perform work on many weekends.</p> <p>LADOT crews work Monday through Friday. Only 1 mark-out crew exists citywide. The crew interprets traffic design plans and places temporary markers and painted lines on the resurfaced street. This serves as detailed guides for permanent striping and pavement marking installations.</p> <p>Two long line striping crews operate heavy duty specialized equipment to install permanent lane lines. One crew installs yellow lines and the other installs white lines.</p> <p>Finally, there is one crew at each of 3 area yards that installs permanent pavement markings, including crosswalks, roadway messages, turn arrows, and parking stalls. These crews are also responsible for citywide maintenance of pavement markings.</p>	<p><u>Preface:</u></p> <p>Slurry mostly occurs on local and collector streets. BSS has 4 crews dedicated to slurry Monday through Friday and the capability to increase up to as many as 7 crews.</p> <p>LADOT crews work Monday through Friday. The mark-out crew and long line striping crews are not required for the majority of slurry projects. The pavement marking crew at each of the 3 area yards installs permanent markings.</p>
<p>1) LADOT receives 30-day advance notice via email of confirmed resurfacing work, followed by daily and weekly updates. LADOT and BSS communicate daily to coordinate work activities.</p>	<p>1) BSS typically provides email notification of slurry projects in advance of the actual work. Notifications include weekly maps identifying work crew schedules and locations.</p>

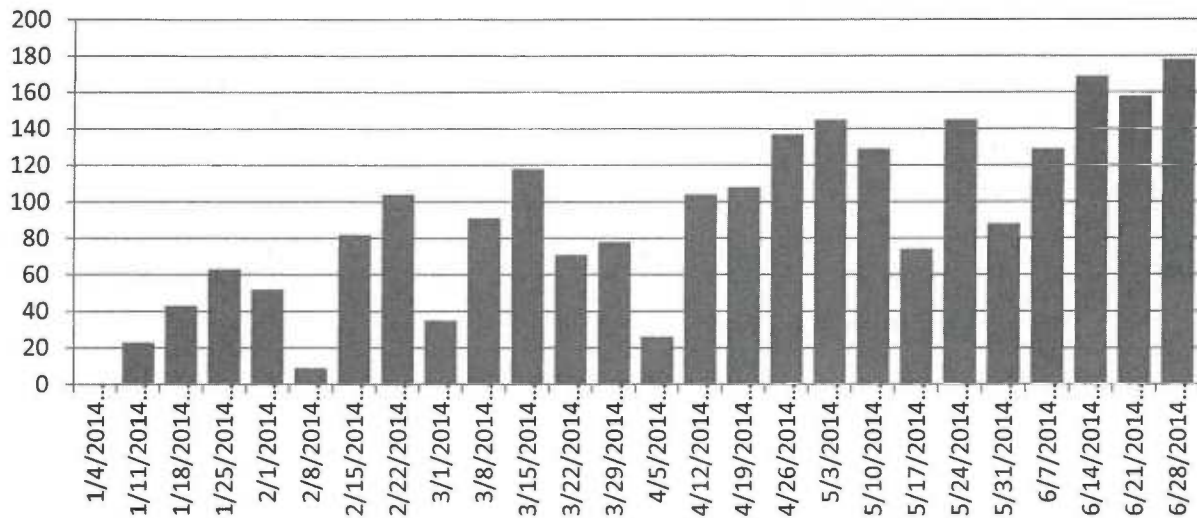
RESURFACING	SLURRY SEAL
<p>2) LADOT engineers re-evaluate every major street scheduled for resurfacing to confirm that the existing geometric striping design is up-to-date per the California Manual of Uniform Traffic Control Devices (MUTCD), departmental standards, and current traffic volumes. A new design plan is prepared to comply with regulatory standards. Additionally, LADOT may need to redesign the striping configuration to include improvements identified in the City's Bicycle Plan or other directives from the Mayor and Council.</p> <p>Depending on the complexity of the design and whether or not an electronic base map exists, actual design time may range from a few days to weeks.</p>	<p>2) BSS applies the slurry seal to the street.</p> <p>Slurry seal involves an overlay of emulsified asphalt over the existing pavement. This procedure covers all existing striping and markings. The number of street blocks slurry sealed per week can vary from zero to 178. Slurry is typically applied along local and collector streets, which generally do not require engineering plans. In Fiscal Year 2012-13, there was a substantial increase in slurry applied on long segments of major arterial and secondary streets in conjunction with resurfacing projects. In such cases, engineering designs were required. Slurry on long segments of major arterials was discontinued in Fiscal Year 2013-14 and is not planned for the current fiscal year.</p>
<p>3) Design plans are forwarded to LADOT's District Research and Support Division to prepare detailed work orders for field crews. This division also field checks local residential streets that do not require design plans and prepares work orders for field crews as appropriate. The work orders clarify the design specifications, stock numbers of materials, spatial and directional information, linear and height measurements, and special installation instructions.</p>	<p>3) A list of completed locations in block segments is emailed after slurry is actually installed. Lists are typically provided every week.</p>
<p>4) BSS paves the street with a new surface.</p> <p>Resurfacing involves surface grinding that damages traffic loop detectors embedded in the street. This causes a disruption in communications between the traffic signals and the ATSAC Center. The signals remain fully functional and default to preset timing sequences, maintaining the safe and orderly movement of vehicles. However, ATSAC may lose its ability to receive data on traffic speeds and volumes and to remotely adjust signal timing if needed.</p>	<p>4) LADOT's District Research and Support Division prepares detailed work orders, which are sent to field crews.</p>

RESURFACING	SLURRY SEAL
<p>5) LADOT mark-out crew installs temporary surface markings on the street to delineate the exact location of traffic lanes, bike lanes, crosswalks, pavement markings, and road markings according to the design plan. However, the Department has only one crew to perform this function citywide and occasional delays occur when there are unusually high volumes of striping projects.</p>	<p>5) LADOT field crews install permanent centerlines, lane lines, limit lines, crosswalks, pavement messages, and road markings on the street if a local or collector street. If a major arterial or secondary street, mark-out is performed first.</p>
<p>6) LADOT mark-out crew forwards work orders to striping crews and the appropriate area yard to complete permanent installations. The Department has 2 striping crews: one yellow striping and one white striping. Crosswalks and pavement markings are performed by staff at 3 area yards: Central, Western and Valley. Each yard has a single crew to perform pavement installations.</p>	<p>6) If a major arterial or secondary street, LADOT mark-out crew forwards work orders to striping crews and the appropriate area yard to complete permanent installations.</p>
<p>7) LADOT signal crews replace traffic detector loops and connect loops to traffic control boxes as required. The loops must be installed after lane lines and pavement markings in order to ensure proper placement on the street.</p>	

Re-Striping Timelines

LADOT views traffic safety as its core mission and continues to rank the re-striping of streets as our top priority among all striping projects. The Department's goal is to re-stripe a street within 10 days after resurfacing or slurry seal is completed by BSS. In Fiscal Year 2013-14, the re-striping turnaround time for resurfacing projects averaged 22.8 days. Approximately 30% of the projects were re-striped in 10 days or less, whereas as 70% took more than 10 days to complete.

The re-striping turnaround for slurry projects after receiving a confirmed list from BSS has ranged from 3 to 77 days. It should be noted that there were extended delays in re-striping from April through June 2014. These delays were due to the depletion of the annual budget appropriations for materials and contracts, and limited savings in other funding sources to address the deficit. Concurrently, there was a substantial increase in slurry projects toward the end of the fiscal year. The following chart represents the number of street blocks slurried each week from January through June 2014.



Key factors that have impacted turnaround times include:

- BSS deploys 8 crews dedicated to resurfacing up to 7 days a week, plus 4 crews dedicated to slurry 5 days a week. BSS has the capability to increase from 4 slurry crews up to 7 slurry crews. In comparison, LADOT crews work Monday through Friday with only 1 mark-out crew and 2 long line striping crews to service the entire City. One striping crew installs yellow lines and the other installs white lines. The Department is also limited to one crew at each of its 3 area yards to install permanent pavement markings, such crosswalks, roadway messages, turn arrows, and parking stalls. These same yard crews perform citywide maintenance of pavement markings.
- Increase in the total number of street resurfacing/slurry linear miles as reflected in budget documents, rising from linear 550 miles in Fiscal Year 2009-10 (150 resurfacing, 400 slurry) to 700 miles in Fiscal Year 2013-14 (245 resurfacing, 455 slurry).
- Further increase in street resurfacing/slurry for Fiscal Year 2014-15. The measurement has been converted from linear to lane line miles and the goal is now 2,400 lane miles. Approximately 200 more lane miles than last fiscal year.
- Fluctuations in the weekly quantities of slurry projects, which have ranged from zero to 178 blocks per week.
- Specialized striping trucks and equipment have frequent mechanical breakdowns and are sometimes out of service for several weeks.
- Staffing reductions among field personnel who perform striping functions.
- Expanded workloads from new bicycle and pedestrian safety initiatives, primarily the City's Bicycle Plan and expansion of continental crosswalks.
- Increase in paint and sign maintenance orders generated from the MyLADOT online service request system, which currently exceeds 6,600 requests citywide.

Additionally, LADOT is responsible for a broad variety of striping work that does not involve BSS. These activities are performed by the same engineering and field staff that support street resurfacing and slurry projects. Work activities include:

- Adding bicycle lanes and shared-lane markings (“sharrows”) to existing street designs.
- Upgrading intersections with continental crosswalks.
- New crosswalks associated with the installation of traffic signals.
- Limit lines and pavement markings for new stop signs.
- Adding new left turn pockets or increasing the length of existing left turn pockets.
- Adding new striping for parking stalls and diagonal parking.
- Striping redesign to improve safety, efficiency and/or response to tort liability.
- Striping redesign related to projects for light rail, bus rapid transit and exclusive bus lanes.
- Special projects, such as streetscape enhancements.
- Maintenance and repair of existing striping and pavement markings.

Traffic Loop Replacements

Traffic loop detectors are embedded approximately 3 to 4 inches under the surface of the street. The loops facilitate data communications to measure traffic flow, allowing the adjustment of signal timing and actuation of traffic signals. Currently, 64,500 traffic loops exist throughout the City.

Traffic loops are robust and secure within the streets, but can become damaged due to cuts from trenching during construction projects, street resurfacing, and exposure from degraded pavement. Last fiscal year, 5,035 were replaced (3,364 by LADOT and 1,671 by contractor). The Department’s current replacement backlog is more than 3,000 loops.

LADOT has two dedicated crews to perform loop replacements citywide. Each crew consists of 3 employees, but prior to staffing reductions there were three 4-person crews. The crews use specialized equipment to saw into the pavement, insert and connect loops, apply hotmelt sealant, and vacuum the surface area. Labor is occasionally supplemented by a contractor, but is limited due to budgetary constraints.

Resurfacing involves surface grinding that damages traffic loop detectors. This results in the destruction of the data sensory inputs that transmit vehicle presence, counts and occupancy to the ATSAC Center. The signals remain fully functional and default to preset timing sequences, maintaining the safe and orderly movement of vehicles. However, ATSAC may lose its ability to collect data on traffic speeds and volumes and to remotely adjust signal timing if needed.

The Department considers side street phasing as a priority for loop replacements. Along most arterial streets, the traffic signal will remain green unless the light is triggered to change when a vehicle is waiting to enter the intersection from a side street. If the side street loop is damaged, the traffic signals at the intersection will default to preset timing and periodically alternate green lights between the arterial street and side street. This alternating sequence will continue regardless of whether or not there are vehicles present on the side street, which may unnecessarily stop arterial traffic.

Loop damage caused by street resurfacing represents a significant amount of the loop replacement backlog. The loops must be replaced after lane lines and pavement markings are installed because there are often modifications to the street design configuration. Replacing loops after re-striping ensures the proper placement of loops in the street to perform at optimal levels. Based on the overall volume of loop replacements needed and limited resources, there are times when loops are not immediately installed on resurfaced streets, particularly in areas where signal timing is not impacted by damage to loops on side streets.

Resource Allocations

LADOT will ensure that re-striping is performed as necessary to support the Pavement Preservation Program. However, timeliness is a critical measure of performance because of safety risks posed by unmarked streets. The workload demands have expanded in the current fiscal year, yet additional labor and equipment resources have not increased to meet the operational goal of re-striping the street within 10 days after resurfacing or slurry seal is completed.

Staffing Levels

In August 2014, the City's Managed Hiring Committee (MHC) granted approval for the Department to fill all of its vacant field positions that support the Pavement Preservation Program. The MHC also provided blanket approval for positions to be filled as needed when attrition causes new vacancies to occur throughout the current fiscal year. The Department is actively engaged in the hiring process to select candidates for numerous positions. It is anticipated that the majority appointments will become effective by the end of October 2014.

The opportunity to fill vacancies is the first significant hiring effort over the past 5 years. The Department's ability to hire and train staff will help to achieve productivity gains, yet it is important to note that the overall staffing levels have declined substantially during the same 5 year period. As the workforce decreased, the amount of pavement preservation work continuously increased to historic levels. In Fiscal Year 2009-10, BSS achieved 550 centerline miles of street resurfacing and slurry seals. The target for the current fiscal year target is 2,400 lane miles, which represents more than 700 centerline miles.

LADOT experienced large-scale staffing losses due to the Early Retirement Incentive Program, budget reductions and attrition. Since Fiscal Year 2009-10, full-time engineers and management analysts assigned to coordinate pavement preservation work decreased from 5 employees to 2 engineers. Additionally, the Paint and Sign Division workforce was reduced by 31.3% and Signal Operations was reduced by 35.8%:

POSITION AUTHORITIES							
PAINT AND SIGN DIVISION	Fiscal Year 2009-10	Fiscal Year 2014-15	5-year Change	Vacancies as of Aug.	Filled Positions	Overall Staffing Losses	Overall Change
Traffic Marking and Sign Supt. III	1	1	0	0	1	0	0.0%
Traffic Marking and Sign Supt. II	4	3	-1	0	1	-3	-25.0%
Traffic Marking and Sign Supt. I	8	6	-2	0	5	-3	-25.5%
Sign Shop Supervisor	1	1	0	1	0	-1	-100.0%
Traffic Painter and Sign Poster III	14	12	-2	1	11	-3	-21.4%
Traffic Painter and Sign Poster II	28	19	-9	1	17	-11	-35.7%
Traffic Painter and Sign Poster I	33	30	-3	5	25	-8	-24.2%
Sign Painter	2	2	0	0	2	0	0.0%
Painter	1	1	0	0	1	0	0.0%
Maintenance Laborer	23	16	-7	4	13	-10	-47.8%
TOTALS	115	91	-24	12	79	-36	-31.3%

POSITION AUTHORITIES							
SIGNAL OPERATIONS	Fiscal Year 2009-10	Fiscal Year 2014-15	5-year Change	Vacancies as of Aug.	Filled Positions	Overall Staffing Losses	Overall Change
Signal Systems Superintendent	1	1	0	0	1	0	0.0%
Signal Systems Supervisor II	4	3	-1	0	3	-1	-25.0%
Signal Systems Supervisor I	11	9	-2	0	9	-2	-18.2%
Asst. Signal Systems Electrician	22	12	-10	4	8	-14	-63.6%
Signal Systems Electrician	100	81	-19	7	74	-26	-26.0%
Electrical Craft Helper	16	8	-8	2	6	-10	62.5%
Cement Finisher	4	1	-3	0	1	-3	-75.0%
Mechanical Repairer II	4	2	-2	0	2	-2	-50.0%
Maintenance Laborer	3	2	-1	0	2	-1	-33.3%
TOTALS	165	119	4	13	106	-59	-35.8%

The massive decrease in staffing resources combined with repeated equipment failures has resulted in thousands of lost labor hours and measurable declines in productivity. The Department has attempted to compensate for resource shortages by utilizing staff overtime and contractor support.

Overtime

Over the last three fiscal years, overtime work among field staff increased substantially in support of the Pavement Preservation Program. Overtime hours are calculated at the rate of 1.5 hours due to labor agreements, thus the actual work hours are approximately 33% less than the amount shown.

	<u>FY 2011-12</u>	<u>FY 2012-13</u>	<u>FY 2013-14</u>	<u>3-Year Change</u>
Overtime Hours	15,354	33,701	53,974	252%
Salary Costs	\$741,436	\$1,631,767	\$2,742,990	270%

The annual rate of basic pay for a regular full-time employee is 2,087 hours, as defined by the Federal Government. Assuming that an employee takes off 10 vacation days and 13 paid holidays each year, the available work hours per individual is reduced by 184 hours. Thus, the availability of an employee is about 1,903 hours per year (2,087 – 184 = 1,903).

In Fiscal Year 2013-14, the overtime hours peaked at 53,974 (or 35,983 actual labor hours). A comparison of overtime usage to normal labor indicates that 35,983 hours would be equivalent to approximately 19 full-time employees working 1,903 hours per year.

Contractor Support

A private contractor has been used to supplement field staff in completing striping and pavement marking projects. Over the last 3 fiscal years, payments to the contractor have more than doubled:

	<u>FY 2011-12</u>	<u>FY 2012-13</u>	<u>FY 2013-14</u>	<u>3-Year Change</u>
Service Costs	\$2,048,569	\$4,010,388	\$7,181,501	251%

Striping Equipment

LADOT faces challenges with the specialized trucks used for striping streets. The Department has a limited number of vehicles available and frequent breakdowns impact productivity. GSD provides fleet management services that include engine maintenance and vehicle repairs, whereas LADOT is responsible for the maintenance and repairs of any specialized apparatuses and on board equipment.

The following chart identifies the vehicles dedicated to re-striping work and the number of days they were out of service for maintenance last fiscal year.

Vehicle Type	Days Out of Service
Mark-Out Truck #1	31
Mark-Out Truck #2	43
Mark-Out Truck #3	20
Mark-Out Truck #4	8
Thermoplastic Pre-Melt Truck #1	3
Thermoplastic Pre-Melt Truck #2	20
Thermoplastic Long Line Striping Truck #1 - Yellow	99
Thermoplastic Long Line Striping Truck #2 - Yellow	10
Thermoplastic Long Line Striping Truck #3 - Yellow	30
Thermoplastic Long Line Striping Truck #1 - White	131
Thermoplastic Long Line Striping Truck #2 - White	>365

Equipment Purchases

General Services Department (GSD) administers the procurement of vehicles and equipment through a competitive bidding process and manages the awarded contracts. In Fiscal Year 2013-14, LADOT received a \$1.08 million appropriation for the purchase of new equipment to expand its fleet. The selected equipment included 1 Thermoplastic Long Line Striping Truck (White), 1 Thermoplastic Pre-Melt Truck and 1 Paint Striping Truck. The total cost for all three vehicles amounted to \$1,453,428, which exceeded the budget appropriation. Consequently, the Department was compelled to transfer funds from other accounts to make up the difference. The equipment was ordered and delivery is expected by March 2015.

A contract currently exists for the purchase of thermoplastic and paint trucks. This equipment is special ordered and takes approximately 8 months for delivery. According to GSD, additional vehicles can be purchased under the existing contract until its expiration in February 2016. The vendor does not offer pre-owned or leased equipment that meets the City's requirement of being powered by Compressed Natural Gas (CNG) or gasoline.

It should be noted that LADOT and GSD management have been meeting monthly over the past year to specifically discuss vehicle equipment needs. The meetings address a full range of vehicle maintenance and replacement issues, and have resulted in improved communications in determining operational impacts, service priorities and planning strategies. These meetings have led to a mutual commitment for greater preventive maintenance care and repair turnarounds.

Additional Resources Needed

In order to achieve the 10 day turnaround goal for street re-striping and expedite traffic loop replacements, the Department requires additional staffing and equipment dedicated to pavement preservation projects. Resource needs were determined based on a review of BSS crew deployment, workload demands, staffing levels, available labor hours, overtime hours, equipment inventory, and performance statistics. Cost estimates are shown on Appendix A.

Mark-Out

The Department has one mark-out crew to service the entire City. This crew is responsible for interpreting traffic design plans and applying temporary paint/markers on street surfaces to outline patterns for traffic lanes, bike lanes, turn pockets, and crosswalks. The mark-out of a street is an essential pre-requisite to the installation of permanent striping. Recently, the Department completed a statistical analysis of mark-out timelines over the past year. The findings indicated that on average it took 12 days for mark-out to be completed after street resurfacing. When mark-outs are delayed, surface streets remain black ("dark") for extended periods of time. Dark arterial streets are a significant concern for traffic control and safety. The Department proposes to increase staffing levels to 5 crews and add 16 work vehicles, which will facilitate the mark-out of streets within 24 hours.

Yellow Striping

The Department has only one yellow striping crew to service the entire City. This crew is responsible for using thermoplastic material to install permanent yellow traffic control lines and centerlines on street

surfaces. The majority of yellow striping is installed on major arterial streets and secondary arterials. After street resurfacing, re-striping generally occurs within 2 to 3 weeks following mark-out. The Department proposes to increase staffing levels to 3 crews and add 6 specialized work vehicles. This will improve re-striping to 10 days or less after a resurfaced street has been marked-out.

White Striping

The Department has a single white striping crew to service the entire City. This crew is responsible for using thermoplastic material to install permanent white traffic control lines on street surfaces. The volume of white striping is much higher than yellow striping because most roadway configurations consist of multiple traffic lane lines and bike lanes, which are typically white. After street resurfacing, re-striping generally occurs within 2 to 3 weeks following mark-out and as many as 1.5 months after slurry seals. The Department proposes to increase staffing levels to 4 crews and add 10 specialized work vehicles. This will improve re-striping to 10 days or less after a resurfaced street has been marked-out or slurry sealed.

Equipment Repair Shop

GSD provides fleet management services that include engine maintenance and vehicle repairs of striping trucks. However, LADOT is responsible for the maintenance and repairs of any specialized apparatuses and equipment on board the trucks. The Department performs this work at its Equipment Repair Shop, which is currently staffed by 1 Traffic Marking and Sign Superintendent I and 1 Traffic Paint and Sign Poster II. It is proposed that staffing levels be increased by 1 Equipment Repair Supervisor and 2 Equipment Repairer II. The additional staff will be tasked with new functions that significantly enhance service capabilities to minimize vehicle down times, such as expediting repairs at the shop, responding to trouble calls in the field, and conducting routine safety inspections and preventative maintenance.

Traffic Loop Replacement

The Department has two dedicated crews to perform loop replacements citywide. These crews use specialized equipment to saw into the pavement, insert and connect loops, apply hotmelt sealant, and vacuum the surface area. The Department proposes to increase staffing levels to 4 crews and add 6 work vehicles along with several specialized equipment items. This will significantly improve response times and minimize backlogs.

Work Order Administration

All pavement preservation projects require the preparation of work orders for field crews. A work order consists of various job specifications and instructions to ensure the correct installation, modification or removal of traffic control devices. A typical work order includes a detailed description of the project location, measurements, type and quantity of materials, stock numbers, cardinal and ordinal points, and a wide range of special instructions. In regards to street striping and pavement markings, proper work order preparation involves field investigations, research of design plans and coordination with the appropriate LADOT District Office and Council Office. Work order staff must also coordinate efforts with BSS on a daily basis to update and maintain project databases that facilitate the scheduling of work activities for field crews. Currently, there are 2 Transportation Engineering Associates to perform all of these functions. The Department proposes to increase staffing levels with 2 Transportation Engineering Aides. This will significantly enhance the overall quality and timeliness of work order production.

Contractual Services

The Department relies on private contractors with special equipment to remove striping and pavement markings for a variety of projects, and to supplement staff labor during periods of high workload demand in re-striping and traffic loop replacements. It is proposed that \$2 million in additional funding be appropriated to contractual services for as-needed work to help maintain optimal performance goals.

Other Municipalities

LADOT contacted several municipalities to research their street striping operations. The County of Los Angeles was of particular interest because of the large size of its land mass and roadway network. Staff research found that the County mostly uses contractors to perform resurfacing projects including striping. General maintenance striping is done by County work crews. The striping operations rely on a fleet of 3 thermoplastic trucks and 4 paint trucks. The useful life expectancy of the vehicles is 10 years or 9,000 service hours. After reaching life expectancy, the vehicles are usually auctioned for sale. Cities within the County can request striping services from the County through a "City Service Request" system. The County provides a cost estimate and work is scheduled upon approval. Typically, work is performed on weekends and backlogs usually depend on weather conditions.

The following chart provides a summary of the labor resources used by various municipalities to perform street resurfacing projects:

No.	Municipality	Square Miles	Street Resurfacing	Striping Work
1	Alhambra	8	Contractor	Contractor
2	Anaheim	51	Contractor + City Crews/maint.	Contractor + City Crews/maint.
3	Burbank	17	Contractor	Contractor
4	Carson	19	Contractor	Contractor
5	Compton	10	Contractor	Contractor
6	Downey	13	Contractor	Contractor
7	Glendale	31	Contractor	Contractor
8	Inglewood	9	Contractor	Contractor
9	Long Beach	51	Contractor	Contractor
10	Los Angeles City	503	City Crews	City Crews + Contractor
11	Los Angeles County	2,654	Contractor	Contractor + County Crews/maint.
12	Norwalk	10	Contractor	Contractor
13	Palmdale	106	Contractor + City Crews/maint.	Contractor + City Crews/maint.
14	Pasadena	23	Contractor	Contractor
15	Pomona	23	Contractor	Contractor

No.	Municipality	Square Miles	Street Resurfacing	Striping Work
16	San Diego	372	Contractor	Contractor
17	San Francisco	232	Contractor	City Crews
18	Santa Ana	28	Contractor	Contractor
19	Santa Clarita	62	Contractor	Contractor
20	Santa Monica	8	Contractor	Contractor
21	South Gate	7	Contractor	Contractor
22	Torrance	21	Contractor + City Crews/maint.	Contractor + City Crews/maint.

Conclusion

LADOT is committed to ensuring that all streets are re-striped and traffic loop detectors are replaced after streets are resurfaced and slurried. The goal is to re-stripe every street within 10 days, but turnaround times have been inconsistent and delayed due to limited resources. Over the past 5 years, staffing levels have declined substantially while the amount of pavement preservation work has increased to historical levels. This report proposes increases to staffing and equipment that will enable the Department to mark out every street within 24 hours of resurfacing, completely re-stripe streets in ten day or less, and significantly reduce the backlog of traffic loop detector replacements. Additional resources will also help to stabilize overtime costs and contractor expenses. LADOT believes these efforts are essential to enhance public safety, improve traffic signal operations and meet customer service expectations throughout Los Angeles.

**LOS ANGELES DEPARTMENT OF TRANSPORTATION
COST ESTIMATES FOR ADDITIONAL RESOURCES TO ENHANCE OPERATIONAL PERFORMANCE
IN SUPPORT OF THE CITY'S PAVEMENT PRESERVATION PROGRAM**

Job Classification	Annual Salary*	Current Staffing Level		Proposed Increases		Targeted Staffing Level (Current + Proposed)	
		Positions	Salaries	Positions	Salaries	Positions	Salaries
Mark-Out Crew							
Traffic Paint and Sign Poster III	\$65,125	2	\$130,250	3	\$195,375	5	\$325,625
Traffic Paint and Sign Poster II	\$61,680	2	\$123,360	8	\$493,440	10	\$616,800
Maintenance Laborer	\$48,128	2	\$96,256	8	\$385,024	10	\$481,280
		6	\$349,866	19	\$1,073,839	25	\$1,423,705
Yellow Striping Crew							
Traffic Paint and Sign Poster III	\$65,125	1	\$65,125	2	\$130,250	3	\$195,375
Traffic Paint and Sign Poster II	\$61,680	2	\$123,360	1	\$61,680	3	\$185,040
Maintenance Laborer	\$48,128	0	\$0	9	\$433,152	9	\$433,152
		3	\$188,485	12	\$625,082	15	\$813,567
White Striping Crew							
Traffic Paint and Sign Poster III	\$65,125	2	\$130,250	2	\$130,250	4	\$260,500
Traffic Paint and Sign Poster II	\$61,680	2	\$123,360	2	\$123,360	4	\$246,720
Maintenance Laborer	\$48,128	0	\$0	12	\$577,536	12	\$577,536
		4	\$253,610	16	\$831,146	20	\$1,084,756
Equipment Repair Shop							
Traffic Marking and Sign Supt. I	\$74,166	1	\$74,166	0	\$0	1	\$74,166
Traffic Paint and Sign Poster II	\$61,680	1	\$61,680	0	\$0	1	\$61,680
Equipment Repair Supervisor	\$87,132	0	\$0	1	\$87,132	1	\$87,132
Equipment Mechanic	\$69,196	0	\$0	2	\$138,392	2	\$138,392
		2	\$135,846	3	\$225,524	5	\$361,370
Traffic Loop Replacement Crew							
Signal Systems Electrician	\$79,720	2	\$159,440	2	\$159,440	4	\$318,880
Asst. Signal Systems Electrician	\$64,624	4	\$258,496	4	\$258,496	8	\$516,992
Electrical Craft Helper	\$55,958	2	\$111,916	2	\$111,916	4	\$223,832
		8	\$529,852	8	\$529,852	16	\$1,059,704
Work Order Administration							
Transp. Engr. Associate III	\$106,050	1	\$106,050	0	\$0	1	\$106,050
Transp. Engr. Associate II	\$95,213	1	\$95,213	0	\$0	1	\$95,213
Transp. Engr. Aide I	\$72,036	0	\$0	2	\$144,072	2	\$144,072
		2	\$201,263	2	\$144,072	4	\$345,335
TOTALS		25	\$1,658,922	60	\$3,429,515	85	\$5,088,437

* Excludes benefits.

Job Classification	List Price	Current Equipment		Proposed Investments		Targeted Equipment Level (Current + Proposed)	
		Vehicles	Costs	Vehicles	Costs	Vehicles	One-Time Added Costs
Mark-Out Vehicles							
Mark-Out Truck	\$58,500	4	---	6	\$351,000	10	\$351,000
Paint Profiler Truck	\$85,000	0	---	5	\$425,000	5	\$425,000
Traffic Paint Striper	\$525,000	1	---	4	\$2,100,000	5	\$2,100,000
Epoxy Truck	\$73,500	1	---	1	\$73,500	2	\$73,500
		6	---	16	\$2,949,500	22	\$2,949,500
Yellow Striping Vehicles							
Thermoplastic Long-Line Striper	\$720,000	1	---	2	\$1,440,000	3	\$1,440,000
Thermoplastic Pre-Melt Truck	\$215,000	2	---	1	\$215,000	3	\$215,000
Pick Up Truck w/Arrow Board	\$26,250	0	---	3	\$78,750	3	\$78,750
		3	---	6	\$1,733,750	9	\$1,733,750
White Striping Vehicles							
Thermoplastic Long-Line Striper	\$720,000	2	---	4	\$2,880,000	6	\$2,880,000
Thermoplastic Pre-Melt Truck	\$215,000	0	---	3	\$645,000	3	\$645,000
Pick Up Truck w/Arrow Board	\$26,250	0	---	3	\$78,750	3	\$78,750
		2	---	10	\$3,603,750	12	\$3,603,750
Traffic Loop Vehicles							
Pick Up Truck w/Arrow Board	\$26,250	4	---	6	\$157,500	10	\$157,500
Large Pick Up Trucks	\$31,000	2	---	0	\$0	2	\$0
Hot Melt Sealant Machine	\$51,000	2	---	2	\$102,000	4	\$102,000
High-Powered Pavement Saw	\$30,000	4	---	4	\$120,000	8	\$120,000
Trailer Mounted Slurry Vacuum	\$60,000	2	---	2	\$120,000	4	\$120,000
Towable Trailer for Saws	\$16,000	2	---	2	\$32,000	4	\$32,000
		16	---	16	\$531,500	32	\$531,500
TOTALS		27	---	48	\$8,818,500	75	\$8,818,500