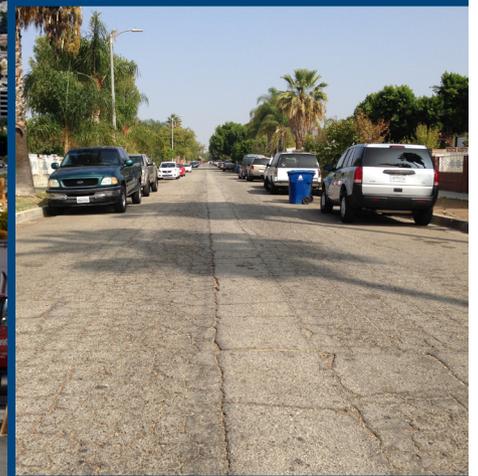


City of Los Angeles



Save Our Streets Los Angeles Program Estimate Report

February 27, 2014



TABLE OF CONTENTS

1	Executive Summary	1
2	Glossary of Terms	8
3	Background	11
4	Data Collection.....	12
5	Estimate Development Methodology.....	15
6	Development of Unit Prices	20
7	Program Delivery	23
8	Estimate	29

Appendices

Appendix A	Estimate Details
------------	------------------

1. EXECUTIVE SUMMARY



The City of Los Angeles has the largest municipal street system in the nation with over 6,500 centerline miles of improved residential and arterial streets. It is estimated that over 35% of the roadway system, approximately 2,400 centerline miles (8,200 lane miles), are currently failing or in near failing (Grade D or F) condition. The program scope estimated in this report also provides for an additional 500 lane miles that may deteriorate during the life of the program, for a total of 8,700 lane miles. The proposed Save Our Streets LA (SOSLA) Program (Program) would provide the funding for implementation, rehabilitation and reconstruction of these streets to improve the City's overall roadway network service level.

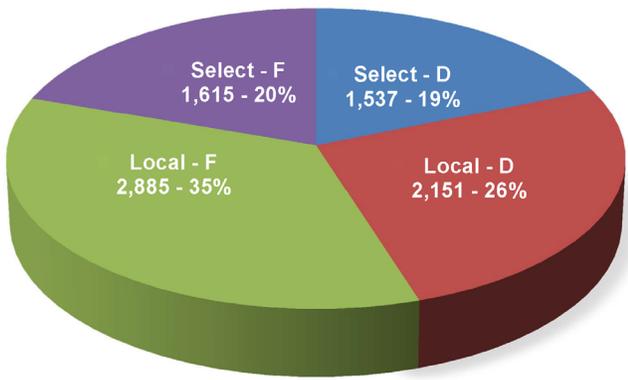
Harris & Associates (Harris) was retained by the City's Bureau of Engineering (BOE) to develop an independent program level cost estimate (Estimate) to confirm and/or refine previous estimates prepared by the City's Bureau of Streets Services (BSS). The focus of the Estimate is to develop a baseline cost for the reconstruction of roadway improvements with pedestrian access ramps. A minimal amount of adjacent concrete improvements are also included in the Estimate, but are limited to those required for the roadway reconstruction. The Estimate is based on utilizing traditional roadway construction methods and materials and does not include other elements such as 'Great Streets', 'Complete Streets', 'Green Streets', alley improvements, traffic signal modifications, water quality elements, sidewalk improvements, utility relocations, or storm drain and sewer improvements. Some of the basic Program elements such as construction duration and program delivery were reviewed to assess their impact on the overall Program cost. The Estimate is further broken down by Arterial (Select) and Residential (Local) street type, and by grade (D and F).

BSS developed and maintains a Pavement Management Program (PMP) that assesses the condition of streets within the City's roadway system. The PMP is considered a network level tool that has information on roadway types and conditions, is primarily used for planning purposes, and is not intended to be used in the development of actual construction quantities or contract documents. The roadway pavement condition is expressed in terms of a Pavement Condition Index (PCI), which is a scale from 0 to 100, 100 being best. The streets considered for the SOSLA Program are based on the PCI condition ratings established by the City's PMP, and are identified as streets being in failed (grade-F, PCI range of 0-40) and near failing (grade-D, PCI range of 41-55) condition.



In October of 2013, BSS provided PMP data for grade D and F streets. This data included a total of approximately 2,400 centerline miles or 8,200 lane miles of pavement. Since fiscal year 2011/12, it has been the City of Los Angeles’ policy to stabilize the condition of the road network at a weighted average PCI of 62, by funding at least 800 lane miles of annual resurfacing and 1,200 lane miles of annual slurry seal. For the purposes of the Estimate, it was assumed that up to 500 lane miles of streets might deteriorate to D or F, conditions during the 18 year program as a result of unforeseen utility trenches, transit bus wear, and other factors. These 500 lane miles were added to the original 8,200 lane miles provided by BSS, by adding approximately 6% to the quantities established for each of the subcategories including: Select streets, grade D and F; and Local streets, grade D and F. This resulted in the 8,700 lane miles established for the Estimate. The 8,700 lanes miles included in the Estimate is proportional to the original 8,200 lane miles and is comprised of 1,717 lane miles of “Select” F Streets, 1,634 lane miles of “Select” D Streets, 2,287 lane miles of “Local” D Streets, and 3,067 lane miles of “Local” F Streets. See Figure 1-1 for the distribution of streets by grade and type for the original 8,200 lane miles provided by BSS. Figure 1-2 shows a similar distribution of streets by grade and type for the projected 8,700 lane miles used for the Estimate.

**Distribution of D and F Rated Street by Type
8200 Lane Miles (Current)
By Lane Miles (LM)**

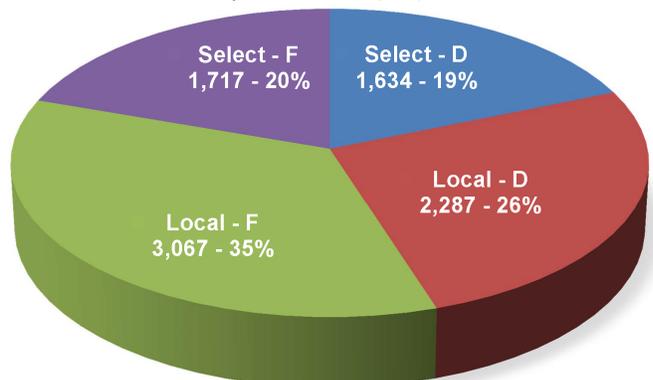


Total Local: 5,036
Total Select: 3,152
Grand Total: 8,188 LM

■ Select - D Streets ■ Local - D Streets
■ Local - F Streets ■ Select - F Streets

FIGURE 1-1

**Distribution of D and F Rated Street by Type
8700 Lane Miles (Projected)
By Lane Miles (LM)**



Total Local: 5,354
Total Select: 3,351
Grand Total: 8,705 LM

■ Select - D Streets ■ Local - D Streets
■ Local - F Streets ■ Select - F Streets

FIGURE 1-2

One of the challenges in developing the Estimate was digesting and interpreting a range of network level information to approximate construction level quantities and costs. The development of the Estimate was performed within a relatively short time frame using existing available data and information. The degree of accuracy of the Estimate is consistent with a Class “C” cost estimate, as identified in the BOE Street Design Manual, Section E 141, which is intended to indicate a preliminary estimate that is subject to revisions based on future design development. The ultimate selection of candidate streets to be included in the Program will require a more detailed investigation during the design and development of the Program.

There are two main types of costs required for the Program:

- **Hard Costs** - These are associated with construction activities, including cost of material, labor and equipment necessary to construct the proposed roadway improvements.
- **Soft Costs** - These are associated with Program delivery and include program management, design, construction management and inspection, and overall program administration.

One of the major elements in developing hard costs was estimating the overall construction quantities, including the percent of pavement areas exhibiting base failure requiring removal and reconstruction. The estimated quantity of roadway removal and reconstruction is one of the most significant items influencing the overall Program cost. The Harris team collaborated with BOE and BSS staff to obtain data and develop the methodology, quantities and costs for pavement areas requiring reconstruction. The methodology used included a visual field survey of a random sampling of streets. This was done to determine a range of pavement removals in terms of a percentage of the total area of all streets. The field survey sample obtained was approximately 3% (773 out of approximately 24,700 street segments). Construction quantities were developed based on the range of removals established from the sampling data and the existing roadway surface areas.

Another cost consideration is the overall duration of the Program. The hard and soft costs associated with the Program increase with time based on the escalation factors applied to materials and labor. A longer overall Program duration will have a higher cost compared to a shorter duration. A Program of this scale is unprecedented and will require a massive coordination effort for its success. Some factors considered in determining the duration of the Program included the capacity of the contracting community, consultant and City staffing required for program implementation, ability of the roadway network to handle traffic restrictions, and the public’s tolerance of traffic delays.



The Harris team collaborated with BOE and BSS staff to develop a methodology, quantities and costs for percent of pavement areas to be reconstructed.

Construction durations of 10, 15 and 20 years were analyzed to determine a realistic time period for the Program delivery. Based on this analysis, it is recommended that a 15-year construction period is most appropriate for use in developing the Estimate. A 10-year construction duration would require constructing approximately 250 centerline miles per year, and would require full production in the first year of the construction phase, and that full production be maintained through the last year. This would be difficult to achieve on both ends. It would be more efficient to ramp up production in the beginning of the program as staff is hired and trained. Also, achieving full production in the last year would be very difficult as well because the odds of all remaining projects in that last year not having any type of challenges would be remote.

If a 10-year construction duration were to accommodate scaling up and down, the remaining full years of production would require approximately 300 centerline miles per year, which is considered too aggressive, especially considering that the BSS resurfacing program will be continuing as well. Overall, the 10-year construction duration is thought to be technically feasible, however, staffing levels for those early full production years would be very difficult to achieve. Proper coordination of work would likely be an extreme challenge and the potential for increased traffic impacts would be high. A 15-year construction duration allows additional time for the construction level to scale up and down in the first and last few year of construction, and therefore would allow for more efficient staffing and for time for Program coordination. It would also offer much more of an opportunity to coordinate with potential grant funding that might be obtained for elements related to things such as ‘Green Streets’ and ‘Great Streets’ by leveraging the basic street work funding. Delivery of the program over a 15-year construction period would still not be easy by any means, as the peak construction years would still require completing about 200 centerline miles per year, but it would be much more manageable. A 20-year construction period would offer further opportunities for coordination and ramp-up of staffing and construction, however, the benefits of a 20-year construction period are not found to outweigh the extra escalation cost that would be incurred. It is estimated that the overall Program delivery period will be approximately 20-years for a 15-year construction period, with approximately 3 years of pre-construction activities required prior to the start of major construction activities in 2017, and approximately 2 years needed after the 15-year construction period to close out projects and the Program’s coordination, financial and administrative elements.

Unit prices for construction costs were developed based on the cost of labor and material for similar types of projects in the greater Los Angeles area in 2012 and 2013. These costs were adjusted to reflect Program economy of scale and complexity of projects for Select and Local streets. In establishing unit costs for year one of the Program, unit prices for 2012 and 2013 were escalated to November of year 2017 (assumed year one for commencement of Program construction). From there the unit prices were escalated to the middle of the 15 year construction period (2024). The unit prices estimated for the middle of the construction period represent the ‘average’ unit price for the entire construction period and were used as the unit prices shown in the Estimate over the 15 year construction period. Escalation factors used in the Estimate were based on historic construction cost indexes developed by Engineering News Record (ENR) in the greater Los Angeles Area over the last 20 years. An average escalation of 3% was used in the Estimate to coincide with the historic average over the last 20 years. Soft costs were based on a percentage of construction costs and from feedback obtained from BOE based on their historic program delivery costs, adjusted downward to account for an expectation of a streamlined design process and economy of scale.



Two estimates were developed for the Program based on a 15-year construction period. The separate Estimates vary based on the percent of the pavement area requiring removal and reconstruction. The percentage of reconstruction area is one of the most significant factors influencing the construction cost. The range of the percentage of reconstruction was established based on a random field sampling of the current D and F streets. The field sampling results were statistically analyzed and a range of removal percentages was established for the high, mean and lower range of reconstruction. The First Estimate for the SOSLA program is \$3.85 Billion. This estimate uses an average escalation of 3% and the mean range of removal percentages.

The Second Estimate was developed using an average escalation of 3% and the lower range of the percentage of reconstruction that may be required. This was done to present a potential lower Program cost option. Using these lower values, the program is estimated to cost approximately \$3.54 Billion. However, it is important to note that during construction, should the actual reconstruction percentage be greater than the lower range, additional funding may be needed to complete the program.

The following pages summarize the two Estimate scenarios developed based on the ranges for the percent of roadway reconstruction.

This report was in response to a request from the Los Angeles City Council (CF 13-1300-S1). Under the leadership of Councilmember Mitchell Englander and Councilmember Joe Buscaino, the Bureau of Engineering was asked to take the lead in developing program costs. We would like to thank Deborah Weintraub and her staff Ted Allen, Mati Laan, Shaun Yepremian and others from Engineering for their leadership and close collaboration on this report. In addition, the assistance from Nazario Saucedo and his staff from the Bureau of Street Services was important. Input from John Reamer and his staff from the Bureau of Contract Administration was also invaluable. Feedback and input from Miguel Santana and his staff from the City Administrative Office, and from Gerry Miller and his staff from the Chief Legislative Analyst's Office has also been significant.



Estimate - SOSLA Cost Estimate
CONSTRUCTION COST ESTIMATE (Level 'C')

REVISED 2-18-14

15 Year Construction Period
 20 Year Program Devility
 2550 Centerline Miles/ 8700 Lane Miles
 Average 170 Miles (Ranging from 64 to 230 Miles per Year)
 Mean Range of Pavement Removals
 Unit Costs Includes 3% Annual Escalation

Item No.	Item Description	Unit Cost	Units	Probable Quantity	Item Total	% of Total Cost	Basis/ Assumption
Hard Construction Costs							
1	Construct 2-inch Asphalt Concrete (AC) Surface Course	\$1.50	SF	501,045,390	\$751,568,085	19.48%	Total Area
2	Remove & Replace Failed Roadway - Select (12" Removal, Replace 6"AC/ 6"AB)	\$9.30	SF	45,437,730	\$422,570,889	10.95%	23% to Total Area Based Field Reviews (Appendix)
3	Remove & Replace Failed Roadway - Local (8" Removal, Replace 2"AC/ 6"AB)	\$4.80	SF	59,982,770	\$287,917,296	7.46%	20% to Total Area Based Field Reviews (Appendix)
4	Removal of failing APC and PCC (12-inch Depth) and Construct 6"AC/6" AB - Select	\$13.75	SF	5,105,360	\$70,198,700	1.82%	6% of APC and PCC Areas Outside HPOZ (Appendix)
5	Removal of failing APC and PCC (8-inch Depth) and Construct 2"AC/6" AB - Local	\$7.30	SF	6,499,970	\$47,449,783	1.23%	8% of APC and PCC Areas Outside HPOZ (Appendix)
6	Remove and Replace PCC Roadway in HPOZ (8" Thick) - Local	\$14.90	SF	814,370	\$12,134,113	0.31%	20% of PCC Area in HPOZ
7	Remove and Replace PCC Roadway (10" Thick, HPOZ) - Select	\$21.10	SF	89,570	\$1,889,927	0.05%	20% of PCC Area in HPOZ
8	Access Ramps - Local (includes removals)	\$3,595.00	Each	48,570	\$174,609,150	4.53%	2.5 Ramps Per Segment (Appendix)
9	Access Ramps - Select (includes removals)	\$3,970.00	Each	20,650	\$81,980,500	2.12%	3 Ramps Per Segment
10	Grinding/ Coldmilling	\$0.45	SF	312,340,810	\$140,553,365	3.64%	Locals - 6' wedge grind along gutter (AC & PCC) Select - Total Area
11	Adjust Surface Utility to Grade	\$620.00	Each	60,240	\$37,348,800	0.97%	Length/ 250' (local), Length/ 175' (Select)
12	PCC Curb and Gutter R&R - Local (6-inch)	\$34.75	LF	490,440	\$17,042,790	0.44%	5% of Centerline Length
13	PCC Curb and Gutter R&R - Select (8-inch)	\$42.00	LF	183,740	\$7,717,080	0.20%	5% of Centerline Length
14	Bus Pads - Select Streets only	\$22.45	SF	591,570	\$13,280,747	0.34%	1 Bus Pad per Mile, Includes removal of existing
15	PCC Cross Gutter R&R 6-inches - Local	\$17.45	SF	349,660	\$6,101,567	0.16%	15% of Existing to be Reconstructed (0.60 per Segment)
16	PCC Cross Gutter R&R 8-inches - Select	\$24.85	SF	72,280	\$1,796,158	0.05%	15% of Existing to be Reconstructed (0.20 per Segment)
17	Striping Replacement - Local	\$1.20	LF	9,808,910	\$11,770,692	0.31%	Lineal foot of striping (1 x Centerline Length)
18	Striping Replacement - Select	\$1.20	LF	22,048,420	\$26,458,104	0.69%	Lineal foot of striping (6 x Centerline Length)
19	Traffic Loops - Select	\$440.00	Each	58,790	\$25,867,600	0.67%	20 Loops per Signalized Intersections (Assume intersection at every 1250')
Sub-Total =					\$2,138,255,345		
Misc Construction Costs							
20	Mobilization	2.00	%	Hard Cost	\$42,765,107	1.11%	Assumed based on Past Construction Projects
21	Traffic Control	1% to 3%	%	Hard Cost	\$42,255,436	1.10%	1% Local streets, 3% for Select streets
22	SWPPP Implementation	0.75	%	Hard Cost	\$16,036,915	0.42%	Assumed based on Past Construction Projects
23	Construction Staking and Monument Preservation	1.50	%	Hard Cost	\$32,073,830	0.83%	Assumed based on Past Construction Projects
Misc Construction Cost Sub-Total =					\$133,131,288		
Construction Cost Sub-Total =					\$2,271,386,633		
15% Construction Contingency =					\$340,707,995	8.83%	
Construction Cost =					\$2,612,094,628	67.70%	
Program Delivery Costs							
24	Material Testing for Construction (Batch Plant inspections & in-place testing)	2.00	%	Construction Cost	\$52,241,893	1.35%	Assumed based on Past Construction Projects
25	Program Management & Public Outreach	6.05	%	Construction Cost	\$158,031,725	4.10%	Performed By City & Consultant Staff
26	Design - Local (includes, Survey, Geotechnical, Deflection Testing, PS&E)	8.50	%	Local Streets Construction Cost	\$112,615,655	2.92%	Performed By City & Consultant Staff
27	Design - Select (includes, Survey, Geotechnical, Deflection Testing, PS&E)	10.00	%	Select Streets Construction Cost	\$128,720,457	3.34%	Performed By City & Consultant Staff
28	Construction Management	8.50	%	Construction Cost	\$222,028,043	5.75%	Performed By City & Consultant Staff
29	Inspection	8.50	%	Construction Cost	\$222,028,043	5.75%	Performed By City & Consultant Staff
Project Delivery Cost Sub-Total =					\$895,665,816	23.21%	
Sub-Total =					\$3,507,760,445		
10% Program Contingency =					\$350,776,044	9.09%	
Total Cost =					\$3,858,536,489		

Alternative Estimate - SOSLA Cost Estimate
CONSTRUCTION COST ESTIMATE (Level 'C')

REVISED 2-18-14

15 Year Construction Period
20 Year Program Devility
2550 Centerline Miles/ 8700 Lane Miles
Average 170 Miles (Ranging from 64 to 230 Miles per Year)
Lower Range of Pavement Removals
Unit Costs Includes 3% Annual Escalation

Item No.	Item Description	Unit Cost	Units	Probable Quantity	Item Total	% of Total Cost	Basis/ Assumption
Hard Construction Costs							
1	Construct 2-inch Asphalt Concrete (AC) Surface Course	\$1.50	SF	501,045,390	\$751,568,085	21.20%	Total Area
2	Remove & Replace Failed Roadway - Select (12" Removal, Replace 6"AC/ 6"AB)	\$9.30	SF	37,323,850	\$347,111,805	9.79%	23% to Total Area Based Field Reviews (Appendix)
3	Remove & Replace Failed Roadway - Local (8" Removal, Replace 2"AC/ 6"AB)	\$4.80	SF	54,529,790	\$261,742,992	7.38%	20% to Total Area Based Field Reviews (Appendix)
4	Removal of failing APC and PCC (12-inch Depth) and Construct 6"AC/6" AB - Select	\$13.75	SF	1,914,510	\$26,324,513	0.74%	6% of APC and PCC Areas Outside HPOZ (Appendix)
5	Removal of failing APC and PCC (8-inch Depth) and Construct 2"AC/6" AB - Local	\$7.30	SF	2,736,825	\$19,978,825	0.56%	8% of APC and PCC Areas Outside HPOZ (Appendix)
6	Remove and Replace PCC Roadway in HPOZ (8" Thick) - Local	\$14.90	SF	814,370	\$12,134,113	0.34%	20% of PCC Area in HPOZ
7	Remove and Replace PCC Roadway (10" Thick, HPOZ) - Select	\$21.10	SF	89,570	\$1,889,927	0.05%	20% of PCC Area in HPOZ
8	Access Ramps - Local (includes removals)	\$3,595.00	Each	48,570	\$174,609,150	4.93%	2.5 Ramps Per Segment (Appendix)
9	Access Ramps - Select (includes removals)	\$3,970.00	Each	20,650	\$81,980,500	2.31%	3 Ramps Per Segment
10	Grinding/ Coldmilling	\$0.45	SF	312,340,810	\$140,553,365	3.97%	Locals - 6' wedge grind along gutter (AC & PCC) Select - Total Area
11	Adjust Surface Utility to Grade	\$620.00	Each	60,240	\$37,348,800	1.05%	Length/ 250' (local), Length/ 175' (Select)
12	PCC Curb and Gutter R&R - Local (6-inch)	\$34.75	LF	490,440	\$17,042,790	0.48%	5% of Centerline Length
13	PCC Curb and Gutter R&R - Select (8-inch)	\$42.00	LF	183,740	\$7,717,080	0.22%	5% of Centerline Length
14	Bus Pads - Select Streets only	\$22.45	SF	591,570	\$13,280,747	0.37%	1 Bus Pad per Mile, Includes removal of existing
15	PCC Cross Gutter R&R 6-inches - Local	\$17.45	SF	349,660	\$6,101,567	0.17%	15% of Existing to be Reconstructed (0.60 per Segment)
16	PCC Cross Gutter R&R 8-inches - Select	\$24.85	SF	72,280	\$1,796,158	0.05%	15% of Existing to be Reconstructed (0.20 per Segment)
17	Striping Replacement - Local	\$1.20	LF	9,808,910	\$11,770,692	0.33%	Lineal foot of striping (1 x Centerline Length)
18	Striping Replacement - Select	\$1.20	LF	22,048,420	\$26,458,104	0.75%	Lineal foot of striping (6 x Centerline Length)
19	Traffic Loops - Select	\$440.00	Each	58,790	\$25,867,600	0.73%	20 Loops per Signalized Intersections (Assume intersection at every 1250')
Sub-Total =					\$1,965,276,812		
Misc Construction Costs							
20	Mobilization	2.00	%	Hard Cost	\$39,305,536	1.11%	Assumed based on Past Construction Projects
21	Traffic Control	1% to 3%	%	Hard Cost	\$38,138,985	1.08%	1% Local streets, 3% for Select streets
22	SWPPP Implementation	0.75	%	Hard Cost	\$14,739,576	0.42%	Assumed based on Past Construction Projects
23	Construction Staking and Monument Preservation	1.50	%	Hard Cost	\$29,479,152	0.83%	Assumed based on Past Construction Projects
Misc Construction Cost Sub-Total =					\$121,663,250		
Construction Cost Sub-Total =					\$2,086,940,062		
15% Construction Contingency =					\$313,041,009	8.83%	
Construction Cost =					\$2,399,981,071	67.71%	
Program Delivery Costs							
24	Material Testing for Construction (Batch Plant inspections & in-place testing)	2.00	%	Construction Cost	\$47,999,621	1.35%	Assumed based on Past Construction Projects
25	Program Management & Public Outreach	6.05	%	Construction Cost	\$145,198,955	4.10%	Performed By City & Consultant Staff
26	Design - Local (includes, Survey, Geotechnical, Deflection Testing, PS&E)	8.50	%	Local Streets Construction Cost	\$107,096,530	3.02%	Performed By City & Consultant Staff
27	Design - Select (includes, Survey, Geotechnical, Deflection Testing, PS&E)	10.00	%	Select Streets Construction Cost	\$114,002,190	3.22%	Performed By City & Consultant Staff
28	Construction Management	8.50	%	Construction Cost	\$203,998,391	5.76%	Performed By City & Consultant Staff
29	Inspection	8.50	%	Construction Cost	\$203,998,391	5.76%	Performed By City & Consultant Staff
Project Delivery Cost Sub-Total =					\$822,293,978	23.20%	
Sub-Total=					\$3,222,275,048		
10% Program Contingency =					\$322,227,505	9.09%	
Total Cost =					\$3,544,502,553		

2. GLOSSARY OF TERMS

Term	Definition
AB	Aggregate Base is a mixed gradation of rock and sand that is placed and compacted in place to create the underlying layer of the roadway section.
AC	Asphalt Concrete is a mixed gradation of rock and sand bound together by a bituminous/asphalt. Asphalt concrete is mixed and placed hot and compacted in place to create the upper layers of the roadway section.
Access Ramp	Access ramps at street corners as required by the Americans with Disabilities Act (ADA) when performing roadway reconstruction and resurfacing.
APC	An existing Portland Cement Concrete (PCC) roadway covered with a layer of Asphalt Concrete (AC).
Appendix	See the appendix of the report for supporting data and documentation of assumptions.
Asphalt Overlays	This technique involves adding one or more Asphalt Concrete layers to an existing asphalt or concrete pavement.
Base Failure	Base failures occur when the layer beneath the binding layer and driving surface can no longer adequately support the weight of vehicular traffic. Base failures can occur for a number of reasons, including: ground water, excessive load counts (too much weight), and inadequate design.
Base Repair	Localized reconstruction of full section of failed pavement area.
Batch Plant	Outdoor plant/facility where asphalt concrete (AC) is created from a stockpile of materials. Process includes using large industrial equipment and machinery to create hot AC that is carried to the job site by trucks.
BMP	Best Management Practices (related to control of storm water runoff).
BOE	City of Los Angeles Department of Public Works Bureau of Engineering
BSS	City of Los Angeles Department of Public Works Bureau of Street Services
CAO	City Administrative Officer
Centerline Mile	Length of street measured along the center of the roadway.
CEQA	California Environmental Quality Act
CIPR Technology	A process in which the asphalt pavement is recycled in-place (cold in-place recycling (CIPR) process), where the Recycled Asphalt Pavement is combined without heat and with new emulsified or foamed asphalt and/or a recycling or rejuvenating agent, possibly also with virgin aggregate, and mixed at the pavement site, at either partial depth or full depth, to produce a new cold mix end product.
Collector Streets	The collector street system provides both land access service and traffic circulation within residential neighborhoods, commercial and industrial areas. It differs from the arterial system in that facilities on the collector system may penetrate residential neighborhoods, distributing trips from the arterials through the area to the ultimate destination.



Term	Definition
Construction Contingency	Contingency added to over all construction cost to account for unforeseen conditions or changes during construction. Unforeseen items could include: damage due to tree roots, poor underlying soil that is difficult to compact and will require additional excavation and reconstruction, utility conflicts and repairs, and unstable roadways in hilly areas.
Crack Sealing	A specially prepared mixture of asphalt emulsion, well graded fine aggregate, and water and mineral filler used to fill and seal surface cracks on a pavement.
Dig-Out	Localized reconstruction of full section of failed pavement area.
Distress	External (visible) indications of pavement defects or deterioration.
Distress Quantity	Amount of external (visible) indications of pavement defects or deterioration typically measured as length or area.
Distress Severity	Level of external (visible) indications of pavement defects or deterioration. Typically expressed as low, medium and high.
Distress Type	Identification and categorization of external (visible) indications of pavement defects or deterioration.
LADOT	City of Los Angeles Department of Transportation
ENR	Engineering News-Record is a weekly magazine that provides news, analysis, data and opinion for the construction industry worldwide. It is owned by The McGraw-Hill Companies. Cost indexes published by ENR are widely-used benchmarks used by the industry.
Escalation	The annual change in construction material and labor costs based on historic records, such as those from Engineering News Record (ENR) magazine.
ft	Feet
GIS	Geographic Information System
Grinding/ Coldmill	The removal of damaged pavement with specially designed equipment.
Harris	Harris and Associates, Inc.
HPOZ	Historic Preservation Overlay Zone. PCC Streets in HPOZ's are replaced in kind to maintain historic materials.
Improved Streets	Developed street complying with city standards, typically, paved with an asphalt or concrete surface from curb to curb.
Lane Mile	A lane mile is equal to an 11 foot wide lane that is one mile long. Area = 11' x 5,280' = 58,080 sf. Example: A roadway that is 64' wide and 1000' long, (64'x1000')/11'/5280' = 1.1 lane miles.
LF	Lineal Foot
Local/ LO	Local or Residential Streets
MicroPAVER™	A pavement management system developed by the US Army Corps Of Engineers. MicroPAVER™ provides pavement management capabilities to: develop and organize pavement inventory; assess the current condition of pavement; develop models to predict future conditions; report on past and future pavement performance; develop scenarios for maintenance and rehabilitation based on budget or condition requirements; and plan projects.
NPDES	National Pollutant Discharge Elimination System
PCC	Portland Cement Concrete



Term	Definition
PCI	Pavement Condition Index. Standardized rating system on a scale of 0 to 100. 100 being a new roadway and 0 being a completely failed roadway at the end of its life cycle. PCI's for this estimate are established by the BSS.
PMP	Pavement Management Program
Primary Arterials	The principal arterial system serves the major centers of activity of a metropolitan area, the highest traffic volume corridors, and the longest trip desires; and carry a high proportion of the total urban area travel on a minimum of mileage. The system should be integrated, both internally and between major urban connections.
Program	Includes all program elements such as Management, Design, Construction and Administration.
R&R	Remove and replace, includes removal of existing and replacement of existing improvements with new construction.
Reconstruction	This technique involves the removal and replacement of the entire existing pavement structure.
Residential Streets	The local street system comprises all facilities not on one of the higher systems. It serves primarily to provide direct access to abutting land and access to the higher order systems. It offers the lowest level of mobility and usually contains no bus routes. Service to through traffic movement usually is deliberately discouraged.
Resurfacing	This technique involves the removal and replacement of one or more layers of an existing asphalt or concrete pavement without replacing the base material.
Secondary Arterials	The minor arterial street system interconnects with and augments the urban principal arterial system and provide service to trips of moderate length at a somewhat lower level of travel mobility than principal arterials. This system also distributes travel to geographic areas smaller than those identified with the Primary Arterial system.
Segment	Equal to one street segment as defined by the PMP, typically from block to block.
Select/ SE	Collector and arterial streets
SF	Square foot
Slurry Sealing	A specially prepared mixture of asphalt emulsion, well graded fine aggregate, water and mineral filler used to provide a surface seal to a structurally sound pavement.
Structural condition	The design integrity of the pavement, capable of supporting vehicle traffic loads.
Surface operational condition	The operability of the pavement ensuring a safe and smooth ride for the commuter.
Surface utilities	Utility covers that are visible in the roadway surface such as maintenance holes and water valve frames and covers.
SWPPP	Storm Water Pollution Prevention Plan, consists of best management practices related to controlling storm water run off during construction.
Traffic Loop	A cable imbedded in the roadway surface that detects vehicles or bicycles at signalized intersections.

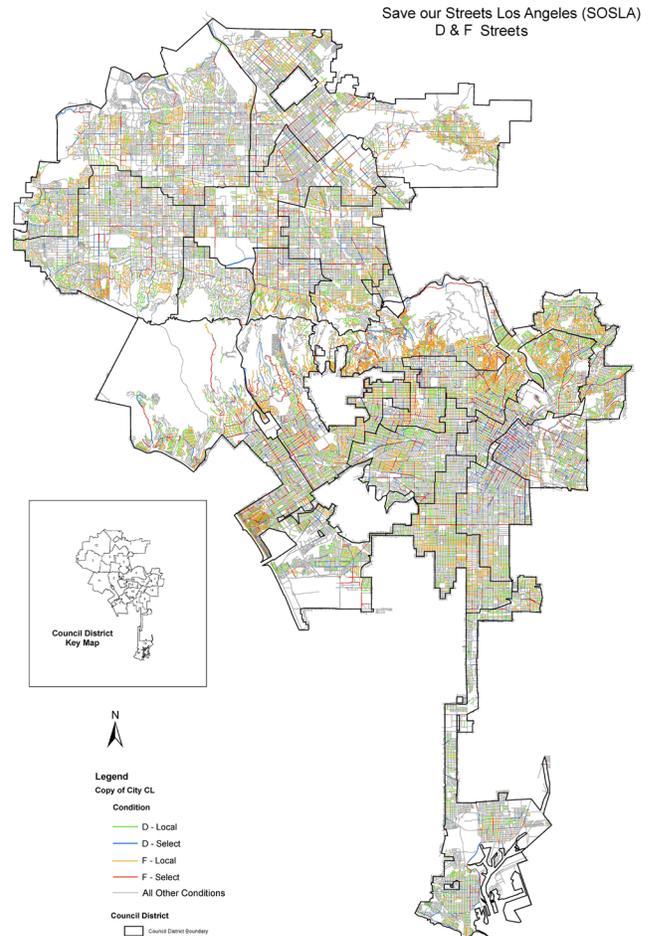


3. BACKGROUND

The City of Los Angeles has the largest municipal street system in the nation with over 6,500 centerline miles (28,000 lane miles) of residential and arterial streets. The roadway network represents one of the City’s largest and most visible assets. Many of the streets in the roadway system are nearing, or beyond, the end of their intended life cycle and showing signs of distress and deterioration. An estimated one third of the system, over 500 million square feet of pavement, equating to 2,550 centerline miles (8,700 lane miles) will require major rehabilitation beyond the City’s existing maintenance efforts and funded expenditures. The proposed Save Our Streets LA (SOSLA) Program would provide needed funding to deliver a program focused on the reconstruction and rehabilitation of the network’s failing streets.

In August of 2013, a motion initiated by Councilmembers Joe Buscaino and Mitchell Englander was adopted (Council File No. 13-1300-S1) directing city staff to develop a joint report based on 24 separate items requested in the Council File. The joint report was requested to gain additional information regarding the SOSLA initiative. The singular form of the word ‘Estimate’ used in this report is intended to include the two separate estimates, collectively, that are presented in the report.

The focus of the Estimate is to develop a baseline cost for the reconstruction of roadway improvements with pedestrian access ramps. A minimal amount of adjacent concrete improvements, such as the repair damaged curbs and gutters and construction of access ramps, are also included in the Estimate, but are limited to those required for the roadway construction. The Estimate is based on utilizing traditional roadway construction methods and materials and does not include other elements such as ‘Great Streets’, ‘Complete Streets’, ‘Green Streets’, alley improvements, traffic signal modifications, water quality elements, sidewalk improvements, utility relocations or storm drain and sewer improvements. Some of the basic program elements such as construction duration and program delivery were reviewed to assess their impact on the overall Program cost.



4. DATA COLLECTION

The Bureau of Streets Services (BSS) developed and maintains a Pavement Management Program (PMP) and performs roadway maintenance throughout the City. BSS utilizes specialized automated vehicles to capture data on existing pavement distresses. This data is analyzed using MicroPAVER software to assess the condition of the streets within the City's roadway network. The PMP is a network level analysis that uses basic roadway information such as work history, street types and current condition for forecasting, budgeting and maintenance planning. The overall roadway condition in the PMP is expressed in terms of a Pavement Condition Index (PCI). The PCI ranges between "0" and "100". A PCI of "0" would correspond to a severely deteriorated pavement with virtually no remaining life, while a PCI of "100" would correspond to a properly engineered and constructed roadway at the beginning of its life cycle.

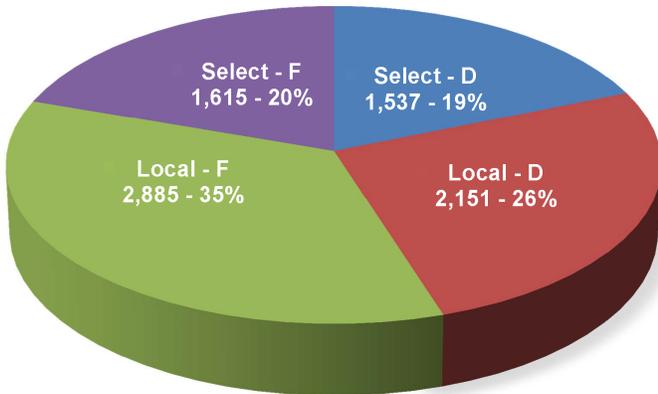
Streets are constantly in a state of deterioration, and for this reason the pavement condition changes with time. Re-inspections, utilizing the automated vehicles, are performed approximately every three years to obtain current condition data and update the PCI ratings. Streets that have been Slurry Sealed since the last inspection are typically excluded from re-inspections in the following cycle. MicroPAVER establishes the PCI for streets based on distress inspection data, recent work histories and life cycle curves that simulate the deterioration of the roadway.

The MicroPAVER data used to determine the streets to be included in the Estimate was provided by BSS in October of 2013 and included 8,200 lane-miles for streets that had PCI's in the range of 0-55 (D and F). The PCI ranges for this report were separated into two major categories: Grade D (PCI 41-55) and Grade F (PCI 1-40). Streets were further broken down into residential streets (Local) and arterial and collector streets (Select).

Since fiscal year 2011/12, it has been the City of Los Angeles' policy to stabilize the condition of the road network at a weighted average PCI of 62. For the purposes of the Estimate it was assumed that up to 500 lane miles of streets might deteriorate to D or F conditions during the 18 year span required to complete the construction of the Program as a result of unforeseen utility trenches, transit bus wear, and other factors. These 500 lane miles were added to the original 8,200 lane miles provided by BSS, by adding approximately 6% to the quantities established for each of the subcategories including: Select streets, grade D and F; and Local streets, grade D and F. This resulted in the 8,700 lane miles established for the Estimate. The 8,700 lanes miles included in the Estimate is proportional to the original 8,200 lane miles and is comprised of 1,717 lane miles of "Select" F Streets, 1,634 lane miles of "Select" D Streets, 2,287 lane miles of "Local" D Streets, and 3,067 lane miles of "Local" F Streets.



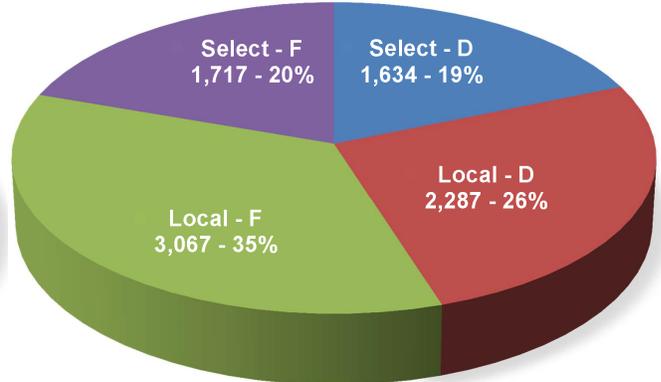
**Distribution of D and F Rated Street by Type
8200 Lane Miles (Current)
By Lane Miles (LM)**



Total Local: 5,036
Total Select: 3,152
Grand Total: 8,188 LM

■ Select - D Streets ■ Local - D Streets
■ Local - F Streets ■ Select - F Streets

**Distribution of D and F Rated Street by Type
8700 Lane Miles (Projected)
By Lane Miles (LM)**



Total Local: 5,354
Total Select: 3,351
Grand Total: 8,705 LM

■ Select - D Streets ■ Local - D Streets
■ Local - F Streets ■ Select - F Streets

Review of the BSS PMP data indicates that the City’s street network information is reasonably current, with nearly 90% of the streets having been inspected or received maintenance treatments within the last three years. Figure 4-1 shows the distribution of recent work or re-inspection of the base 8,200 line miles included in the existing BSS data.

Latest Inspection or Work Completed on D and F Streets		
Year of Last Inspection or Work	Number of Street Segments	Percentage of D & F Streets
2000 - 2007	272	1.10%
2008	444	1.79%
2009	409	1.65%
2010	1635	6.61%
2011	8896	35.94%
2012	6504	26.28%
2013	6590	26.63%
	24750	100.00%

FIGURE 4-1



Additional Data Assessments

The accuracy of the Estimate is dependent on the amount of information available and assumptions used to determine the type of construction and material quantities. Consideration was given to potentially collecting additional data to improve the accuracy of the Estimate. Additional methods considered for developing more data on the existing pavement condition included use of the automated data collection vehicles driving each and every lane of the existing 8,200 lane-miles. Additional data collected from this process would include crack detection and severity, rutting, pot holes, patching, raveling, and joints in concrete. 3D imaging, asset inventory, ground penetrating radar and deflection testing were also considered. Although additional data would be useful in developing the Estimate, these additional assessments were considered to be too costly and time prohibitive to be used in the Estimate. It is recommended that these data collection methods be considered during the design and development phase within the ramp up years of the Program.



5. ESTIMATE DEVELOPMENT METHODOLOGY

5.1 COST ESTIMATE CLASSIFICATION

Typically PMP data is not used in the development of actual construction quantities or contract documents. One of the challenges in developing the Estimate was digesting and interpreting a range of network level information to determine estimated construction level quantities and costs. The development of this Estimate was performed within a relatively short time frame using existing available data and information supplemented by visual and statistical analysis. The degree of accuracy of the Estimate is consistent with a Class “C” cost estimate, as identified in the BOE Street Design Manual Section E 141, which is intended to indicate a preliminary estimate and is subject to revisions and refinements based on the design development phase. The ultimate selection of candidate streets to be included in the Program will require a more detailed investigation during the design development phase of the Program.



5.2 HARD AND SOFT COSTS

There are two main types of costs associated with the Program:

- **Hard Costs** - These are associated with construction activities, including cost of material, labor and equipment necessary to construct the proposed roadway improvements.
- **Soft Costs** - These are associated with Program delivery and include program management, design, construction management and inspection, and overall program administration.

5.2.1 PAVEMENT REHABILITATION

Developing quantity and cost estimates for rehabilitation of pavement sections required the following data:

- Street length
- Street width
- Street classification
- Thickness of treatments
- Type of resurfacing treatment (i.e. AC reconstruction, AC overlay or PCC reconstruction)
- Square foot area of pavement requiring localized or total reconstruction



MicroPAVER data information obtained from BSS provided adequate information to determine the length and width, and square foot area of street segments.

Developing a quantity for the percentage of pavement area requiring reconstruction could not be determined from the information available in the PMP data, so it was necessary to develop a methodology for estimating the removal quantities. The methodology used for the developing the reconstruction quantities in the Estimate consisted of a visual survey of a random sampling of the current grade D and F streets.

The field survey sample obtained was approximately 3% of the candidate streets (775 out of 24,700 segments or 257 out of 8,200 lane-miles). This was a random sample representing all 15 Council Districts. A breakdown of the sampling is as follows:

- Local – AC Sample % by area=4.32%
- Local – PCC Sample % by area=2.02%
- Select – AC Sample % by area=3.55%
- Select – PCC Sample % by area=3.79%

Estimated quantities for reconstruction areas are based on standard pavement sections as indicated in Section E 422.116, Recommended Standard Practices of BOE Street Design Manual and on input from BOE.

The quantity for Portland Cement Concrete (PCC) roadways designated as D and F streets was also determined utilizing the PMP data. The rehabilitation method primarily used for PCC streets includes applying an asphalt concrete surface over the existing PCC. The final Estimate accounts for PCC streets and streets within Historic Preservation Overlay Zones (HPOZ). Candidate PCC Streets within HPOZ's require special consideration for rehabilitation to retain their historic character. Consequently PCC streets within these historic areas will be reconstructed in kind using PCC instead of resurfacing with asphalt concrete.

Since the reliability of estimating the percent of pavement areas requiring reconstruction is so critical to the confidence level of the overall Estimate, Harris retained True North Research, Inc., a firm specializing in statistical analysis. True North estimated the reliability of the projected percent reconstruction needed based on the results of the random sampling of streets.

Table 5-2 presents the results of the analysis to estimate the reliability of the percent reconstruction estimates based on the visual sampling. Because, in practice, streets that are determined to have 50% or greater removal will be completely removed and reconstructed to gain better construction production and a uniform structural section, all streets in the database that had a percent removal value of 50% or greater were recoded to have 100% removal. By making this adjustment prior to the analysis, the percent removal estimates shown in Table 5-2 factor in this consideration.

Descriptive Statistics						95% Confidence Interval		
# of streets	Minimum % Removal	Maximum % Removal	Mean % Removal	Standard Error	Standard Deviation	Lower Bound	Mean % Removal Estimate	Upper Bound
All Streets								
773	0	100	23.19	1.209	33.610	20.82	23.19	25.56
Local AC Streets								
514	0	100	22.32	1.477	33.481	19.42	22.32	25.21
Local PCC Streets								
38	0	100	18.45	5.476	33.754	7.72	18.45	29.18
Select AC Streets								
189	0	100	27.80	2.490	34.228	22.92	27.80	32.68
Select PCC Streets								
32	0	100	15.66	5.268	29.799	5.33	15.66	25.98

TABLE 5-2 RESULTS OF PERCENT DIG-OUT ANALYSIS BASED ON RANDOM SAMPLE

For each category of street shown on the left of the table, Table 5-2 represents the number of streets in the sample for that category, the minimum and maximum percent reconstruction among streets in the sample, the mean (average) percent for that category, as well as the standard error and standard deviation for the mean estimate. For example, there were a total of 773 total streets in the all streets categories. Among all streets, the minimum percent reconstruction was 0% and the maximum 100%, with a mean of 23.19% reconstruction. The standard error of the mean estimate is 1.209, with a standard deviation of 33.61.

Shown on the right side of the table is the 95% confidence interval that surrounds the mean estimate for each category. Keeping with the “All Streets” categories as an example, the mean estimated percent reconstruction is 23.19%, with the lower bound of the 95% confidence interval being 20.82% reconstruction and the upper bound being 25.56% reconstruction. In other words, we can be 95% confident that the actual mean percent removal and reconstruction for all streets in the Program from which this sample was drawn will average between 20.82% and 25.56%. This is a percentage of the total surface area and includes localized reconstruction on some streets and complete reconstruction on other streets.

As shown in the Table 5-2, there is substantial variation in the mean percent reconstruction estimates across the subgroups, ranging from a low of 15.66% for Select PCC streets to a high of 27.80% for Select AC streets. The table also makes clear that although streets with a sufficiently large sample size have reasonably tight confidence intervals about the mean estimate (i.e., All Streets, Local AC Streets, and Select AC Streets), categories for which there were few streets sampled (Local PCC Streets and Select PCC Streets) have very large confidence intervals and thus a lower degree of reliability for the mean estimate.



5.2.2 ACCESS RAMPS

A significant amount of concrete improvements directly adjacent to the proposed roadway reconstruction is included in the Estimate. The majority of this adjacent work will be the construction or the reconstruction of access ramps at street intersections. At an escalated cost of approximately \$3,000-\$4,000 per ramp, these costs are a significant percentage of the overall Program cost. The approach to develop the quantity and costs for these ramps was as follows:

- Conduct a random sampling of two areas within each of the 15 Council Districts using maps and desktop visual surveys using publicly available digital street imagery.
- Determine the number of access ramps required per street segment based on this sampling.
- Exclude residential neighborhoods with no sidewalk and/or having rural settings from ramp construction requirements.



Based on the analysis, it was determined that the number of ramps required equates to approximately 2.5 ramps per street segment for Local streets with sidewalks and approximately 3 ramps per street segment for Select streets. The above findings were then broadcast over all street segments to determine the potential total number of access ramps required.

5.2.3 INCIDENTAL IMPROVEMENTS

Incidental improvements include several improvement items that are required for pavement rehabilitation and reconstruction work. Some of these items include:

- Adjustment of surface utilities, i.e. maintenance holes, valves, vaults, etc.
- Replacement of traffic loops
- Replacement of damaged curbs, curb and gutter and cross gutters
- Replacement of affected striping and pavement markers
- Mobilization of contractors' construction forces and equipment
- Traffic control and construction staging
- Construction staking and survey monument preservation
- Material testing during construction
- Construction of concrete bus pads on Select streets
- Storm Water Pollution Prevention Plans (SWPPP) during construction

The methodology for developing the quantities, for the incidental improvements, is listed in the right hand column of the Estimate and is typically a percentage of the hard construction costs or an assumed numerical value.

5.3 SOFT COSTS

Soft costs associated with the Program include the following key items:

1. Program Management

- Program Planning, including identifying overall Program goals and general road map
 - » Set project priority lists
 - » Identify project groupings
 - » Coordinate work assignments among all parties
 - » Reporting and oversight
 - » Resource acquisition (contracts/staffing)
- Design Team Oversight to ensure project objectives, and goals are met consistently
 - » Multiple design team oversight (possibly 4 or more separate teams)
- Program administration and tracking, including scheduling, financing and reporting
- Community outreach
- Procurement of professional services and construction contractors throughout the life of the program

2. Design costs for preparation of construction documents for the Program. Design costs were adjusted for Local and Select streets based on the complexity of the design efforts required.

3. Construction management, construction inspection, material testing for the Program.



6. DEVELOPMENT OF UNIT PRICES

6.1 HARD COSTS

Unit prices for construction costs were developed based on the cost of labor and material for similar types of projects in the greater Los Angeles area in 2012 and 2013. These costs were adjusted to reflect Program economy of scale and the complexity of projects for Select and Local streets. In establishing unit costs used in the Estimate, unit prices for 2012 and 2013 were escalated to year 2017 (assumed year one for commencement of Program construction). Unit prices were then escalated to the middle of the 15 year construction period (2024), based on the escalation factors discussed in the section below. The unit prices estimated for the middle of construction are considered the ‘average’ unit price for the entire construction period and were used as the unit prices shown in the Estimate.

6.2 SOFT COSTS

Soft costs were based on percent of construction costs, and from feedback obtained from BOE based on their historic program delivery costs, adjusted downward to account for an expectation of a streamlined design process and economy of scale. The percentages used for the various soft costs are listed in the Estimate.

6.3 COST ESCALATION

Cost escalation is defined as the probable change in the cost of construction over the life of the Program, and is a standard component of any Construction Program estimate. Escalation is similar in concept to inflation and deflation, except that in this case escalation is specific to construction and not general in nature as is overall inflation. While escalation includes general inflation related to the money supply, it is also driven by changes in supply-demand imbalances that are specific to construction in a given economy. For example, while general inflation may be less than 3% for any given time period, construction prices may increase (escalate) by over 5% because of a supply-demand imbalance. Over a long period of time, as market supply and demand imbalances are corrected, escalation will tend to more-or-less equal inflation, unless there are sustained impacts specific to the construction industry.

In cost engineering, escalation and contingency are both considered risk mitigation factors that should be included in estimates. When projected escalation is minimal, it is sometimes included in the contingency. However, this is not a best practice, particularly when potential escalation is significant.

The starting point for the escalation used in the Estimate is based on historic construction cost indices developed by Engineering News Record (ENR). ENR has been collecting and publishing price data on different construction labor and materials, in 20 major U.S. cities (including the greater Los Angeles area) on a monthly basis for over 50 years. ENR uses data to create two index numbers each month known as the Construction Cost Index (CCI). The CCI is a widely used benchmark for measuring changes in construction



costs over the years. Figure 6-1 shows a table and graph of the historic changes in construction cost in the greater Los Angeles Area. Based on this data the cost of construction has increased an average of 3.90% and 2.7% over the last ten and twenty years, respectively. Based on this data, the escalation of cost used in the Estimate could be as low as 2.7% based on the 20 year average. The average escalation of 3% was used in the Estimate to reflect the approximate average over the last 20 years. What costs a dollar today escalated at 3% would cost approximately \$1.70 at the end of the projected construction period.

6.4 CONTINGENCY

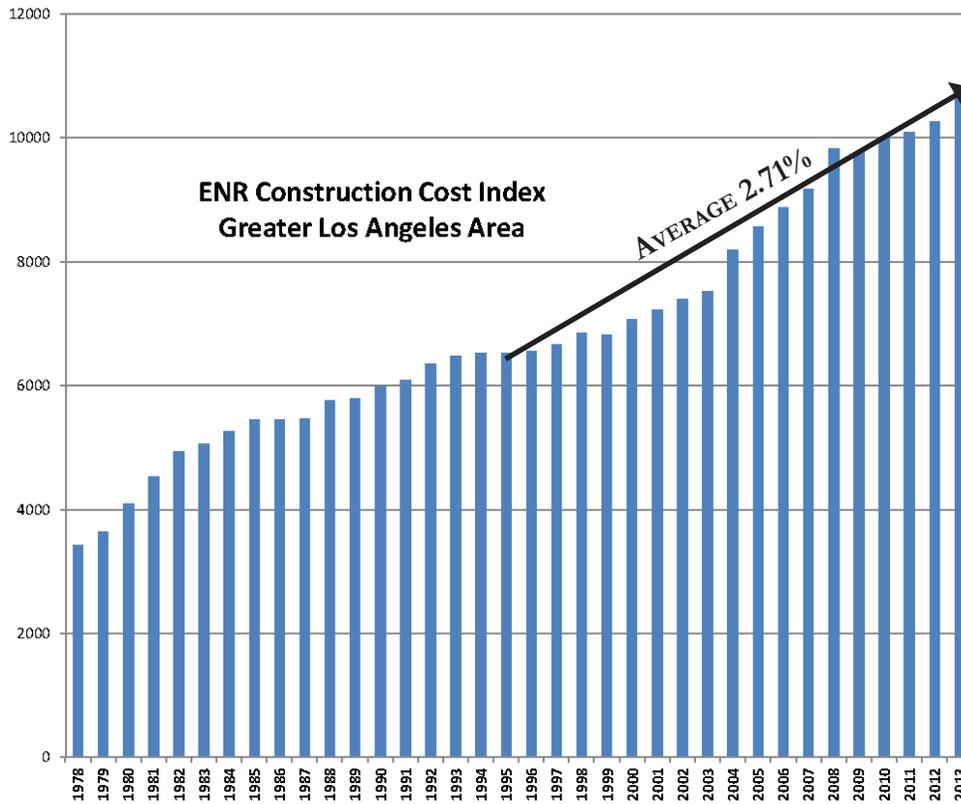
In general, the contingency included in the Estimate is based on a percentage of the estimate's costs and is included to account for unforeseeable risk factors and expenses during construction and delivery of the Program. For the Estimate, a contingency was applied to the construction cost as well as the overall cost of the Program, which includes both construction and program delivery cost.

Construction contingency accounts for risk factors associated with constructing the project and include unforeseen conditions including: increase of pavement reconstruction areas; inclement weather, relocation/reconstruction of existing shallow utilities impacted by construction; increased thickness of assumed pavement structural section on Select streets due to high truck traffic volumes; and other factors that are not accounted for in the Estimate. Due to the aforementioned risk factors, a 15% construction contingency was added to the estimated hard construction costs to account for unforeseen construction conditions.

A 10% Program contingency was applied to the entire Program cost, to account for general risks in delivering the overall Program not directly related to construction field conditions. General risk factors include such items as: an increase in the assumed cost escalation for material, equipment and labor, including the cost of oil - a component of asphalt. Risks also include such items as: future regulatory requirements related to both design and construction that do not currently exist; the availability of professional labor such as engineers, construction managers and program managers needed to staff the Program; and potential additional general and regional cost escalation.

At the regional level, there are several other large agencies in the Los Angeles area that have plans for major construction programs over the next ten years. These agencies include: the Los Angeles County Metropolitan Transportation Authority (Metro); the Ports of Los Angeles and Long Beach; and the Los Angeles International Airport. These proposed regional programs will increase the demand for construction material and labor in the region. The magnitude of the cost escalation, attributed to these general and regional risk factors, is difficult to determine given the limited time frame available to perform the Estimate.





Year	Construction Cost Index	% Change	Year	Construction Cost Index	% Change
1978	3421.25	8.20%	1996	6558.44	-4.90%
1979	3638.81	6.36%	1997	6863.55	1.60%
1980	4102.37	12.74%	1998	6851.95	2.83%
1981	4530.96	10.45%	1999	6825.97	-0.38%
1982	4934.14	8.90%	2000	7068.04	3.55%
1983	5063.89	2.63%	2001	7226.92	2.25%
1984	5259.93	3.87%	2002	7402.75	2.43%
1985	5446.69	3.55%	2003	7531.77	1.74%
1986	5452.2	0.10%	2004	8192.14	8.77%
1987	5474.14	0.40%	2005	8587.42	4.58%
1988	5770.84	5.42%	2006	8878.97	3.64%
1989	5789.77	0.33%	2007	9181.67	3.41%
1990	5994.55	3.54%	2008	9823.19	6.99%
1991	6090.12	1.59%	2009	9763.69	-0.61%
1992	6348.55	4.24%	2010	10004.3	2.46%
1993	6477.84	2.04%	2011	10088.8	3.33%
1994	6532.95	0.85%	2012	10270.93	1.81%
1995	6526.22	-0.10%	2013	10740.93	4.58%
Average - 2010-2013 = +3.04%					
Average - Last 10 Year = +3.90%					
Average - Last 20 Year = +2.71%					

FIGURE 6-1

7. PROGRAM DELIVERY

7.1 PROGRAM DURATION

Another consideration affecting the Estimate is the overall duration and schedule of Program delivery. The hard and soft costs associated with the Program will increase with time based on the escalation factors applied to materials and labor. A longer overall Program duration will have a higher cost relative to a shorter Program. A Program of this scale is unprecedented and will require a massive coordination effort for its success. Construction durations of 10, 15 and 20 years were considered to determine a realistic time period for the Program delivery. Consideration was given to the factors that would affect the Program duration and overall coordination. BOE and Harris interviewed representatives from the construction industry and investigated other citywide street programs in the cities of San Francisco and Santa Ana. This section includes an analysis of the factors and concerns that could affect the Program duration and provides a preliminary concept of how the Program would be structured.

A primary question was to consider how many years would be required for the construction of approximately 8,700 lane miles of roadway improvements? This is a complex question with many factors to consider, including the capacity of the contracting community, consultant and City staffing required, ability of the roadway network to handle traffic restrictions and the public’s tolerance of traffic delays. There are multiple factors that could cause delays to individual projects or streets or to the Program as a whole. Table 7-1 shows a list of considerations for a 10, 15 or 20 year construction period.

TABLE 7-1

No.	Subcategory	Consideration	Comments
Category: Program Management			
1	Scope	Prioritization and Annual Selection of Streets & Traffic Impacts	The approach to how the streets will be packaged each year could have a significant influence on cost and traffic impacts. One approach would be to objectively analyze every street segment, package projects to maximize contractor efficiency and minimize traffic impacts. Another would be to annually package those streets that are most desired to be completed. A blended approach would start with a small number of the highest priority streets and then build efficient packages around those.
2	Scope & Public Expectations	Definition of Eligible Streets	The pavement condition shown in the database of D & F streets will change over time as streets age and complete assessments are conducted. The SOSLA program should not limit the eligible streets to those currently mapped in order to ensure that the streets most in need in the future can be repaired.
3	Scope & Public Expectations	Great/Green/Complete Street Elements Not Included in Estimate, Schedule	The current program schedule and cost estimate does not include construction beyond fundamental needs for paving, access ramps, and curb and gutter repair. However the funding of these elements will increase the likelihood of leveraging them to obtain grant or other funding for other elements such as Great/Green/Complete/Cool Street concepts. Including of these items will be more feasible with a longer construction period.
4	Scope & Public Expectations	Sidewalks/Stormdrains/Alleys/Griffith Park Not Included in Estimate, Schedule	Very similar to Great/Green/Complete street elements; sidewalks, stormdrains and alleys are not included in the cost estimate or schedule. A limited level of sidewalk and storm drain reconstruction will likely be necessary whether officially part of the program or not, just to be able to reconstruct failed curb and gutter locations and install new access ramps. However, a longer construction duration would provide a greater ability to coordinate effectively with a sidewalk or other related program should one be funded separately.
5	Cost/Time	Cost Escalation	Cost estimates for all schedule options are heavily influenced by the assumed escalation rate and thus the actual future escalation compared to the assumed rate will have a greater influence on whether the full program can be delivered within the estimated cost. A shorter construction schedule results in less cost due to escalation, however a schedule that is too short may also result in increased costs due to potential delivery inefficiencies and saturation of the construction marketplace.

TABLE 7-1

No.	Subcategory	Consideration	Comments
6	Cost/Time	Schedule Delays and Overlaps	There are many items that could cause construction delays such as unforeseen field conditions or contractor insolvency. Shorter program timelines have less tolerance for recovering from project schedule issues.
7	Staffing	Staffing Implementation	The magnitude of this construction program will be immense. Even though a large portion of staffing would be provided by consultants a significant number of City staff will also be required. It will still take a great deal of time and effort to put the full team together. It will require many rounds of interviews and hiring of City and consultant staff, as well as the solicitation and execution of consultant contracts and the definition and issuance of work tasks. Selected consultants will also need to hire new staff and train them for a program of this size. Longer program schedules will allow for smoother and more efficient staffing and will actually reduce the overall number of people that would need to be hired by spreading the work such that less would need to be delivered each year.
8	Staffing	Necessary Staffing Level	We can estimate the staffing needs, but because a program of this type and magnitude in LA is unprecedented it will not fully be known until we are underway and have delivered some projects. Longer timelines allow for some early learning at a lower delivery level before needing to fully staff and therefore allow for an optimized staffing plan avoiding potential excess costs of overstaffing.
9	Coordination	Coordination with Other Programs (Metro, Gas, Sewer, Storm Drain, DWP, BSS)	Ideally this program will be well coordinated with planned work and system upgrades with City projects as well as other entities with projects in the streets such that construction work among the various agencies would be coordinated to coincide or be back to back when possible but at the very least would avoid situations where new streets would be cut. Longer programs offer more time for coordination of work.
10	Cost/Time	Ramping Up - Building Public Trust and Incorporating Lessons Learned	The early years of the program will be under great public scrutiny. A longer program duration offers the ability to start on a smaller scale with well thought out projects to build public trust and incorporate lessons learned before rolling out a massive scale of projects.
11	Cost/Time	Definition of Eligible Time Period	It is almost certain that there will be some projects that encounter delays for a variety of reasons, or that should be put on hold for a reasonable time period to coordinate with other outside work or new grants. If the target time frame for construction is worded in the funding eligibility as a hard requirement, it could result in not being able to complete some of the projects in the program or not being able to coordinate effectively in the latter years of the program.
12	Staffing	Trees – Need for Arborists to Address Root Pruning	Although the early program description and cost estimates do not provide for sidewalk repair, there will be some cases where sidewalk repair will be required or where curb/gutter repairs will require tree root pruning which will require the services of specialized arborists. Some of these may also require coordination with private property owners.
13	Staffing	Monument Preservation	The City is required, per Business and Professional Code 8771, to maintain a network of survey monuments which are used by public and private surveyors. The preservation of survey monuments is very important because every lost monument will require more than double the cost to replace as compared to the cost to preserve the monument in coordination with construction. Shorter programs with less ramp-up times will be more of a challenge to monument preservation.
14	Coordination	Caltrans and Railroad Permits	Permits such as these take a lot of lead time, sometimes years, and some of the subject streets will require them.
15	Maintenance	Future Maintenance by BSS	With a greater inventory of streets with ratings from A-C, Bureau of Street Services will need to do more annual maintenance. Longer program timelines allow for a more gradual adjustment.
Category: Design and Construction			
16	Utilities	Utility Coordination - Street Cuts	The City will issue an estimated 55,000 utility and sewer permits for the candidate streets during a 15 year construction program. The SOSLA program will be coordinated with utility companies to minimize new streets from being damaged, however due to the sheer volume of work, street cuts are unavoidable. Longer Programs offer opportunity to better coordinate projects and for Utilities to get their work done prior to construction.
17	Unforeseen Conditions	Variations in Existing Street Thickness	Due to the age of the street system, the thickness of existing streets is often not well known and thus assumptions have been made to develop a cost estimate. Variations from the assumed thicknesses could result in significant cost impacts.
18	Construction Contracting	Project Construction Contract Procurement Process (and the Impact on the Marketplace)	The shorter the timeline, the greater the risk that the marketplace for contractors and materials will be saturated and thus drive up the price due to material cost escalations or a reduction in competitiveness
19	Construction Contracting	Trucking Availability	Trucking costs for the size of the construction program will be influenced by the length and design of the program.
20	Traffic Coordination	Reducing Traffic Impact	The program could gridlock traffic in certain areas if not carefully planned and implemented. It will be critical to package and phase projects to minimize traffic impacts. Longer program schedules will reduce the annual impact and allow for more effective coordination.
21	Transit Coordination	Coordination with Transit	A street program of this magnitude will require extensive coordination with transit agencies for transit route adjustments.
22	Unforeseen Conditions	Inclement Weather	Inclement weather is a significant uncertainty. Some years have little rain while others have rain on and off for months. Streets are not reconstructed during rainy weather because the exposed subgrade becomes saturated and muddy resulting in delays and extra costs. The shorter the timeline to complete the program, the more significant it would be to make up time lost to rain delays.
23	Traffic Mitigation	Construction During Peak Hours	Currently work is not allowed on City streets during peak traffic hours. But, in some cases, full or partial exemptions are approved because it may make sense to get the street back in service quicker. Longer program timelines allow for more planning and less concurrent construction.
24	Utilities	Street Cut Moratorium	A One Year Street Cut Moratorium exists currently. Extension to a longer moratorium for streets would preserve pavement.
25	Unforeseen Conditions	Changes in Oil Prices	Asphalt is a large portion of the cost of the program and asphalt prices are tied to oil prices. Increases in oil prices could result in additional cost escalation.
26	Unforeseen Conditions	Need for Soil Stabilization	The cost estimate assumes that reconstructions will require base and paving reconstruction, but in some areas subgrades may require improvements that are not included in the cost estimate.
27	Nonstandard Areas	Hilly Areas - Drainage Patterns Could Increase Liability	Extra care must be taken in hilly areas that may not have regular curbs/gutters with subsurface storm drain systems because errant runoff can result in slope damage and liability. Even maintaining existing geometry may increase liability because it could be argued that the street should have been improved via the project.
28	Nonstandard Areas	Hilly Areas - Road Stabilization	Hilly areas often contain unique challenges including the absence of curbs and thus the need for special edge confinement and/or support that will require extra design and will cost more, but early estimates have not had the time/resources to estimate the full impact.
29	Utilities	Utility Impacts	Project delays due to unforeseen utilities, accidental utility damage and/or utilities with prior rights. These will likely consist of vaults, cabinets (in curb ramps), meters, etc., as opposed to utility pipelines.

TABLE 7-1

No.	Subcategory	Consideration	Comments
Category: Public Relations			
30	Business Impacts	Business Coordination and Impact	Coordination with businesses is often significant even with small street projects. A program of the SOSLA magnitude will require extensive coordination effort. Longer timelines reduce the annual coordination effort and also provide more flexibility in scheduling. Longer durations allow for more notice for businesses to prepare for the disruption.
31	Community	Coordination with Schools and Community Events	Shorter program timelines make community coordination more challenging due to the magnitude of the annual workload and the short ramp-up period.
32	Community	Public Relations (Neighborhood meetings, Media, Website)	Shorter program timelines make public relations more challenging due to the magnitude of the annual workload and the short ramp-up period.
33	Environment	Public Works Green Street Policy	The Board of Public Works adopted a green street policy on July 11, 2011, which, among other things, calls for the incorporation of green street elements and BMP's whenever funding is available. With a program of this size, it would be desirable to have at least some green street elements in suitable projects. Longer program timelines give more time to study and implement such features.
34	Traffic Impacts	Unique Impacts to Hillside Neighborhoods	Hillside areas are often more challenging for mitigation of construction impacts. For example, detours can be more challenging due to the irregularity of the road network.
35	Traffic Impacts	Impacts to Traffic and Parking on Local and Select Streets	Longer Programs offer opportunity to spread work out and reduce traffic impacts
36	Community	Planning Mobility Element	Planning has initiated a mobility element in the new City General Plan, and the feedback from this should be captured in the paving effort.
37	Community	2010 Bicycle Plan Not Incorporated	The 2010 bicycle plan adopted by City Council March 1, 2011 (C.F. 102385-S2) and also implemented under Executive Directive 20 (AV Series July 1, 2011) is not currently incorporated into the work plan or the cost estimates. While some elements such as striping could likely be incorporated into the projects, there would still be some complications because many streets only have patchwork segments rated as D or F which would be problematic unless there is a plan to carry the striping through the other segments as well.
38	Community	Trucking Haul Routes	Truck haul routes could have significant community impacts and thus would require careful review and coordination.

It is recommended that a 15-year construction period be used for the Program Estimate because it offers a balance between constructing the work in a relatively short time to minimize costs, and allowing for adequate time to plan and coordinate the work. All references in this document to construction periods are intended as “scheduled construction periods” and are not intended to be interpreted as a proposed funding eligibility window.

A 10-year construction duration would require constructing approximately 250 centerline miles per year, and would require full production in the first year of the construction phase, and that full production be maintained through the last year. This would be difficult to achieve on both ends. It would be more efficient to ramp up production in the beginning of the program as staff is hired and trained. Also, achieving full production in the last year would be very difficult as well because the odds of all remaining projects in that last year not having any type of challenges would be remote.

If a 10 year construction duration were to accommodate scaling up and down, the remaining full years of production would require approximately 300 centerline miles per year, which is considered too aggressive, especially considering that the BSS resurfacing program will be continuing as well. Overall, the 10 year construction duration is thought to be technically feasible, but staffing for those early full production years would be very difficult. Proper coordination of work would be an extreme challenge and the potential for increased traffic impacts would be high. A 15-year construction duration allows additional time for the construction operations to scale up and down in the first and last few year of construction, and therefore would allow for more efficient staffing and for time for Program coordination. It would also offer much more of an opportunity to coordinate with potential grant funding that might be obtained for elements related to things such as ‘Green Streets’ and ‘Great Streets’ by leveraging the basic street work funding. Delivery of the program over a 15-year construction period would still not be easy by any means, as the

peak construction years would still be completing about 200 centerline miles per year, but it would be much more manageable. A 20-year construction period would offer further opportunities for coordination and ramp-up of staffing and construction, however, the benefits of a 20-year construction period were not found to outweigh the extra escalation cost that would be incurred. It is estimated that the overall Program delivery period will require approximately 20 years for a 15-year construction period, with approximately 3 years of pre-construction activities required prior to the start of major construction in 2017, and approximately 2 years needed after the 15 year construction period to close out projects and the Program’s coordination, financial and administrative elements. A cash flow diagram of a 15-year construction program for each estimate is diagrammed in Figures 7-2 and 7-3.

7.2 PRIORITIZATION OF STREETS

As stated previously, PMP data is limited and not typically used in the development of actual construction quantities or contract documents. The ultimate selection of streets to be included in the Program should not be based solely on the PCI rating developed from the PMP. The 8,700 lane miles, used for this estimate, is representative of the anticipated scale and scope of the Program based on the information that is presently available. The actual streets and number of lane miles to be constructed under the proposed Program is difficult to predict at this time. Selection of streets to be included in the Program is subject to refinement as streets are prioritized and more details are obtained during the design and development phase of the Program. A preliminary method for prioritizing streets was considered and is outlined below.

It is recommended that a Geographic Information System (GIS) be developed in the early years of the program to apply objective criteria to each street segment for use in prioritizing them and packaging them into projects.

The system would assign a weighted score to each street segment based on specific criteria, such as:

- PCI rating
- Street type
- Traffic density
- Street or drainage complaints
- Readiness for construction
- Clearance of conflict with utilities and other programs
- Public Transit Use
- Bike Plan route type
- Proximity to police and fire stations, hospitals and schools.

Street segments are recommended to be grouped into projects by geographic location such that the segments in an individual project would be in a similar area, and that the projects as a whole would be distributed throughout the City to minimize the impact to individual areas and to provide all areas and Council Districts of the City with some benefit each year.



8. ESTIMATE

Two estimates were developed for the Program based on a 15-year construction period. The separate Estimates vary based on the percent of the pavement area requiring removal and reconstruction. The percentage of reconstruction is one of the most significant factors influencing the construction cost. The range of the percentage of reconstruction was established based on a random field sampling of the current D and F streets and as described in Section 5 of this report. The First Estimate for the SOSLA program is \$3.85 Billion. This estimate uses an average escalation of 3% and the mean range of removal percentages.

A Second Estimate was also developed using an average escalation of 3% and the lower range of the percentage of reconstruction that may be required. This was done to present a lower Program cost option. Using these lower values, the Program is estimated to cost approximately \$3.54 Billion. However, it is important to note that during construction, should the actual reconstruction percentage be greater than the Lower range, additional funding may be needed to complete the Program.

The following pages summarize the two Estimate scenarios developed, based on the ranges for the percent of roadway reconstruction.



Estimate - SOSLA Cost Estimate
CONSTRUCTION COST ESTIMATE (Level 'C')

REVISED 2-18-14

15 Year Construction Period
 20 Year Program Devility
 2550 Centerline Miles/ 8700 Lane Miles
 Average 170 Miles (Ranging from 64 to 230 Miles per Year)
 Mean Range of Pavement Removals
 Unit Costs Includes 3% Annual Escalation

Item No.	Item Description	Unit Cost	Units	Probable Quantity	Item Total	% of Total Cost	Basis/ Assumption
Hard Construction Costs							
1	Construct 2-inch Asphalt Concrete (AC) Surface Course	\$1.50	SF	501,045,390	\$751,568,085	19.48%	Total Area
2	Remove & Replace Failed Roadway - Select (12" Removal, Replace 6"AC/ 6"AB)	\$9.30	SF	45,437,730	\$422,570,889	10.95%	23% to Total Area Based Field Reviews (Appendix)
3	Remove & Replace Failed Roadway - Local (8" Removal, Replace 2"AC/ 6"AB)	\$4.80	SF	59,982,770	\$287,917,296	7.46%	20% to Total Area Based Field Reviews (Appendix)
4	Removal of failing APC and PCC (12-inch Depth) and Construct 6"AC/6" AB - Select	\$13.75	SF	5,105,360	\$70,198,700	1.82%	6% of APC and PCC Areas Outside HPOZ (Appendix)
5	Removal of failing APC and PCC (8-inch Depth) and Construct 2"AC/6" AB - Local	\$7.30	SF	6,499,970	\$47,449,783	1.23%	8% of APC and PCC Areas Outside HPOZ (Appendix)
6	Remove and Replace PCC Roadway in HPOZ (8" Thick) - Local	\$14.90	SF	814,370	\$12,134,113	0.31%	20% of PCC Area in HPOZ
7	Remove and Replace PCC Roadway (10" Thick, HPOZ) - Select	\$21.10	SF	89,570	\$1,889,927	0.05%	20% of PCC Area in HPOZ
8	Access Ramps - Local (includes removals)	\$3,595.00	Each	48,570	\$174,609,150	4.53%	2.5 Ramps Per Segment (Appendix)
9	Access Ramps - Select (includes removals)	\$3,970.00	Each	20,650	\$81,980,500	2.12%	3 Ramps Per Segment
10	Grinding/ Coldmilling	\$0.45	SF	312,340,810	\$140,553,365	3.64%	Locals - 6' wedge grind along gutter (AC & PCC) Select - Total Area
11	Adjust Surface Utility to Grade	\$620.00	Each	60,240	\$37,348,800	0.97%	Length/ 250' (local), Length/ 175' (Select)
12	PCC Curb and Gutter R&R - Local (6-inch)	\$34.75	LF	490,440	\$17,042,790	0.44%	5% of Centerline Length
13	PCC Curb and Gutter R&R - Select (8-inch)	\$42.00	LF	183,740	\$7,717,080	0.20%	5% of Centerline Length
14	Bus Pads - Select Streets only	\$22.45	SF	591,570	\$13,280,747	0.34%	1 Bus Pad per Mile, Includes removal of existing
15	PCC Cross Gutter R&R 6-inches - Local	\$17.45	SF	349,660	\$6,101,567	0.16%	15% of Existing to be Reconstructed (0.60 per Segment)
16	PCC Cross Gutter R&R 8-inches - Select	\$24.85	SF	72,280	\$1,796,158	0.05%	15% of Existing to be Reconstructed (0.20 per Segment)
17	Striping Replacement - Local	\$1.20	LF	9,808,910	\$11,770,692	0.31%	Lineal foot of striping (1 x Centerline Length)
18	Striping Replacement - Select	\$1.20	LF	22,048,420	\$26,458,104	0.69%	Lineal foot of striping (6 x Centerline Length)
19	Traffic Loops - Select	\$440.00	Each	58,790	\$25,867,600	0.67%	20 Loops per Signalized Intersections (Assume intersection at every 1250')
Sub-Total =					\$2,138,255,345		
Misc Construction Costs							
20	Mobilization	2.00	%	Hard Cost	\$42,765,107	1.11%	Assumed based on Past Construction Projects
21	Traffic Control	1% to 3%	%	Hard Cost	\$42,255,436	1.10%	1% Local streets, 3% for Select streets
22	SWPPP Implementation	0.75	%	Hard Cost	\$16,036,915	0.42%	Assumed based on Past Construction Projects
23	Construction Staking and Monument Preservation	1.50	%	Hard Cost	\$32,073,830	0.83%	Assumed based on Past Construction Projects
Misc Construction Cost Sub-Total =					\$133,131,288		
Construction Cost Sub-Total =					\$2,271,386,633		
15% Construction Contingency =					\$340,707,995	8.83%	
Construction Cost =					\$2,612,094,628	67.70%	
Program Delivery Costs							
24	Material Testing for Construction (Batch Plant inspections & in-place testing)	2.00	%	Construction Cost	\$52,241,893	1.35%	Assumed based on Past Construction Projects
25	Program Management & Public Outreach	6.05	%	Construction Cost	\$158,031,725	4.10%	Performed By City & Consultant Staff
26	Design - Local (includes, Survey, Geotechnical, Deflection Testing, PS&E)	8.50	%	Local Streets Construction Cost	\$112,615,655	2.92%	Performed By City & Consultant Staff
27	Design - Select (includes, Survey, Geotechnical, Deflection Testing, PS&E)	10.00	%	Select Streets Construction Cost	\$128,720,457	3.34%	Performed By City & Consultant Staff
28	Construction Management	8.50	%	Construction Cost	\$222,028,043	5.75%	Performed By City & Consultant Staff
29	Inspection	8.50	%	Construction Cost	\$222,028,043	5.75%	Performed By City & Consultant Staff
Project Delivery Cost Sub-Total =					\$895,665,816	23.21%	
Sub-Total =					\$3,507,760,445		
10% Program Contingency =					\$350,776,044	9.09%	
Total Cost =					\$3,858,536,489		

Alternative Estimate - SOSLA Cost Estimate
CONSTRUCTION COST ESTIMATE (Level 'C')

REVISED 2-18-14

15 Year Construction Period
20 Year Program Devility
2550 Centerline Miles/ 8700 Lane Miles
Average 170 Miles (Ranging from 64 to 230 Miles per Year)
Lower Range of Pavement Removals
Unit Costs Includes 3% Annual Escalation

Item No.	Item Description	Unit Cost	Units	Probable Quantity	Item Total	% of Total Cost	Basis/ Assumption
Hard Construction Costs							
1	Construct 2-inch Asphalt Concrete (AC) Surface Course	\$1.50	SF	501,045,390	\$751,568,085	21.20%	Total Area
2	Remove & Replace Failed Roadway - Select (12" Removal, Replace 6"AC/ 6"AB)	\$9.30	SF	37,323,850	\$347,111,805	9.79%	23% to Total Area Based Field Reviews (Appendix)
3	Remove & Replace Failed Roadway - Local (8" Removal, Replace 2"AC/ 6"AB)	\$4.80	SF	54,529,790	\$261,742,992	7.38%	20% to Total Area Based Field Reviews (Appendix)
4	Removal of failing APC and PCC (12-inch Depth) and Construct 6"AC/6" AB - Select	\$13.75	SF	1,914,510	\$26,324,513	0.74%	6% of APC and PCC Areas Outside HPOZ (Appendix)
5	Removal of failing APC and PCC (8-inch Depth) and Construct 2"AC/6" AB - Local	\$7.30	SF	2,736,825	\$19,978,825	0.56%	8% of APC and PCC Areas Outside HPOZ (Appendix)
6	Remove and Replace PCC Roadway in HPOZ (8" Thick) - Local	\$14.90	SF	814,370	\$12,134,113	0.34%	20% of PCC Area in HPOZ
7	Remove and Replace PCC Roadway (10" Thick, HPOZ) - Select	\$21.10	SF	89,570	\$1,889,927	0.05%	20% of PCC Area in HPOZ
8	Access Ramps - Local (includes removals)	\$3,595.00	Each	48,570	\$174,609,150	4.93%	2.5 Ramps Per Segment (Appendix)
9	Access Ramps - Select (includes removals)	\$3,970.00	Each	20,650	\$81,980,500	2.31%	3 Ramps Per Segment
10	Grinding/ Coldmilling	\$0.45	SF	312,340,810	\$140,553,365	3.97%	Locals - 6' wedge grind along gutter (AC & PCC) Select - Total Area
11	Adjust Surface Utility to Grade	\$620.00	Each	60,240	\$37,348,800	1.05%	Length/ 250' (local), Length/ 175' (Select)
12	PCC Curb and Gutter R&R - Local (6-inch)	\$34.75	LF	490,440	\$17,042,790	0.48%	5% of Centerline Length
13	PCC Curb and Gutter R&R - Select (8-inch)	\$42.00	LF	183,740	\$7,717,080	0.22%	5% of Centerline Length
14	Bus Pads - Select Streets only	\$22.45	SF	591,570	\$13,280,747	0.37%	1 Bus Pad per Mile, Includes removal of existing
15	PCC Cross Gutter R&R 6-inches - Local	\$17.45	SF	349,660	\$6,101,567	0.17%	15% of Existing to be Reconstructed (0.60 per Segment)
16	PCC Cross Gutter R&R 8-inches - Select	\$24.85	SF	72,280	\$1,796,158	0.05%	15% of Existing to be Reconstructed (0.20 per Segment)
17	Striping Replacement - Local	\$1.20	LF	9,808,910	\$11,770,692	0.33%	Lineal foot of striping (1 x Centerline Length)
18	Striping Replacement - Select	\$1.20	LF	22,048,420	\$26,458,104	0.75%	Lineal foot of striping (6 x Centerline Length)
19	Traffic Loops - Select	\$440.00	Each	58,790	\$25,867,600	0.73%	20 Loops per Signalized Intersections (Assume intersection at every 1250')
Sub-Total =					\$1,965,276,812		
Misc Construction Costs							
20	Mobilization	2.00	%	Hard Cost	\$39,305,536	1.11%	Assumed based on Past Construction Projects
21	Traffic Control	1% to 3%	%	Hard Cost	\$38,138,985	1.08%	1% Local streets, 3% for Select streets
22	SWPPP Implementation	0.75	%	Hard Cost	\$14,739,576	0.42%	Assumed based on Past Construction Projects
23	Construction Staking and Monument Preservation	1.50	%	Hard Cost	\$29,479,152	0.83%	Assumed based on Past Construction Projects
Misc Construction Cost Sub-Total =					\$121,663,250		
Construction Cost Sub-Total =					\$2,086,940,062		
15% Construction Contingency =					\$313,041,009	8.83%	
Construction Cost =					\$2,399,981,071	67.71%	
Program Delivery Costs							
24	Material Testing for Construction (Batch Plant inspections & in-place testing)	2.00	%	Construction Cost	\$47,999,621	1.35%	Assumed based on Past Construction Projects
25	Program Management & Public Outreach	6.05	%	Construction Cost	\$145,198,955	4.10%	Performed By City & Consultant Staff
26	Design - Local (includes, Survey, Geotechnical, Deflection Testing, PS&E)	8.50	%	Local Streets Construction Cost	\$107,096,530	3.02%	Performed By City & Consultant Staff
27	Design - Select (includes, Survey, Geotechnical, Deflection Testing, PS&E)	10.00	%	Select Streets Construction Cost	\$114,002,190	3.22%	Performed By City & Consultant Staff
28	Construction Management	8.50	%	Construction Cost	\$203,998,391	5.76%	Performed By City & Consultant Staff
29	Inspection	8.50	%	Construction Cost	\$203,998,391	5.76%	Performed By City & Consultant Staff
Project Delivery Cost Sub-Total =					\$822,293,978	23.20%	
Sub-Total=					\$3,222,275,048		
10% Program Contingency =					\$322,227,505	9.09%	
Total Cost =					\$3,544,502,553		



APPENDIX A: ESTIMATE DETAILS

SOSLA - Cost Estimate - Summary

REVISED 2-18-14

Local 'D' - Draft Cost Estimate	Mean Range of Removals	Low Range of Removals	2,287 Lane-miles
Hard Construction Costs	\$458,300,077	\$439,157,268	56% of Total
Misc Construction Costs	\$24,060,754	\$23,055,757	3% of Total
Construction Cost Sub-Total	\$482,360,831	\$462,213,025	
15% Contingency on Construction	\$72,354,125	\$69,331,954	9% of Total
Local 'D' Construction Cost	\$554,714,956	\$531,544,978	
Project Delivery Costs	\$186,106,868	\$178,333,340	23% of Total
10% Program Contingency	\$74,082,182	\$70,987,832	9%
Local 'D' Total Cost	\$814,904,006	\$780,866,150	
	\$356,372	\$341,486	Cost Per Lane-mile

Local 'F' - Draft Cost Estimate	Mean Range of Removals	Low Range of Removals	3,067 Lane-miles
Hard Construction Costs	\$636,311,145	\$601,808,692	56% of Total
Misc Construction Costs	\$33,406,335	\$31,594,956	3% of Total
Construction Cost Sub-Total	\$669,717,480	\$633,403,649	
15% Contingency on Construction	\$100,457,622	\$95,010,547	9% of Total
Local 'F' Construction Cost	\$770,175,103	\$728,414,196	
Project Delivery Costs	\$258,393,747	\$244,382,963	23% of Total
10% Program Contingency	\$102,856,885	\$97,279,716	9%
Local 'F' Total Cost	\$1,131,425,734	\$1,070,076,875	
	\$368,924	\$348,920	Cost Per Lane-mile

Select 'D' - Draft Cost Estimate	Mean Range of Removals	Low Range of Removals	1,634 Lane-miles
Hard Construction Costs	\$506,927,296	\$448,191,192	55% of Total
Misc Construction Costs	\$36,752,229	\$32,493,861	4% of Total
Construction Cost Sub-Total	\$543,679,524	\$480,685,053	
15% Contingency on Construction	\$81,551,929	\$72,102,758	9% of Total
Select 'D' Construction Cost	\$625,231,453	\$552,787,811	
Project Delivery Costs	\$219,143,624	\$193,752,128	24% of Total
10% Program Contingency	\$84,437,508	\$74,653,994	9%
Select 'D' Total Cost	\$928,812,585	\$821,193,932	
	\$568,351	\$502,498	Cost Per Lane-mile

Select 'F' - Draft Cost Estimate	Mean Range of Removals	Low Range of Removals	1,717 Lane-miles
Hard Construction Costs	\$536,716,828	\$476,119,660	55% of Total
Misc Construction Costs	\$38,911,970	\$34,518,675	4% of Total
Construction Cost Sub-Total	\$575,628,797	\$510,638,335	
15% Contingency on Construction	\$86,344,320	\$76,595,750	9% of Total
Select 'F' Construction Cost	\$661,973,117	\$587,234,086	
Project Delivery Costs	\$232,021,578	\$205,825,547	24% of Total
10% Program Contingency	\$89,399,469	\$79,305,963	9%
Select 'F' Total Cost	\$983,394,164	\$872,365,596	
	\$572,769	\$508,101	Cost Per Lane-mile

All Street' - Draft Cost Estimate	Mean Range of Removals	Low Range of Removals	8,705 Lane-miles
Hard Construction Costs	\$2,138,255,345	\$1,965,276,812	55% of Total
Misc Construction Costs	\$133,131,288	\$121,663,250	3% of Total
Construction Cost Sub-Total	\$2,271,386,633	\$2,086,940,062	
15% Contingency on Construction	\$340,707,995	\$313,041,009	9% of Total
Total Construction Cost	\$2,612,094,628	\$2,399,981,071	
Project Delivery Costs	\$895,665,816	\$822,293,978	23% of Total
10% Program Contingency	\$350,776,044	\$322,227,505	9%
All Streets Total Cost	\$3,858,536,489	\$3,544,502,553	
	\$443,274	\$407,197	Ave Per Lane-mile

