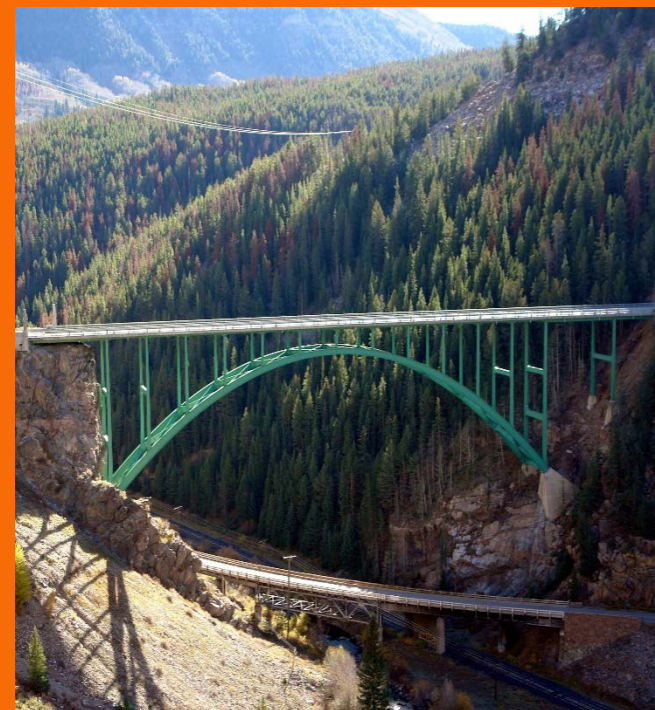




DYE MANAGEMENT GROUP, INC.



## Performance-Based Communication Tools for Maintenance Budgets

11th National Conference on Transportation Asset Management

July 12th, 2016

Rob Zilay



# Presentation Outline

- Performance-based maintenance tools overview
- Communicating needs
  - Know your decision makers
  - Establish credibility
  - Maintain trust
  - Accountability



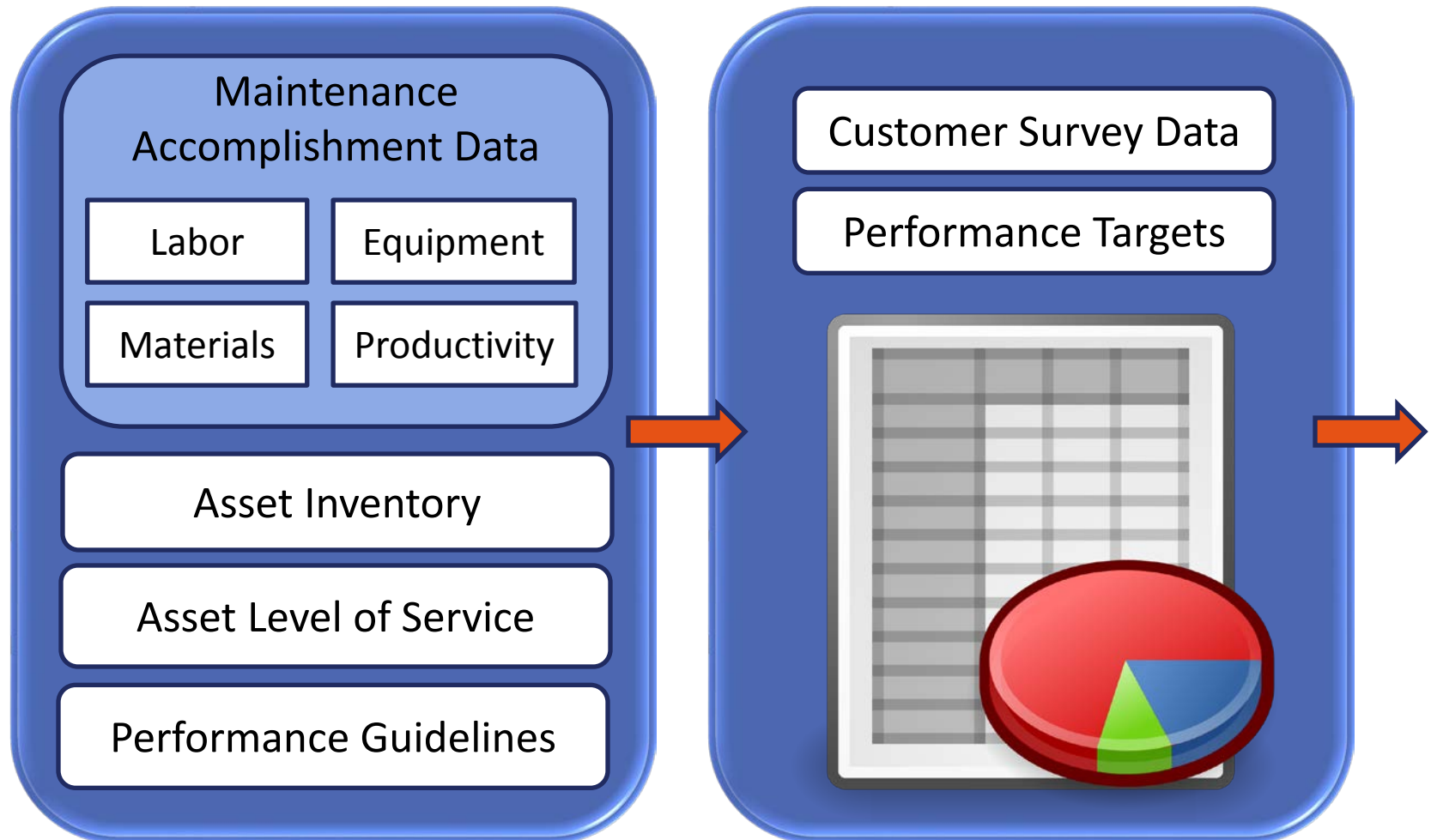
# Overview

- Performance-based budgeting
  - A systematic way to allocate funds
  - Addresses gap between available resources and maintenance needs
  - Quantifies and prioritizes work backlog
  - Provides compelling budget information
  - Effectively communicates impact of doing nothing
  - An approach for achieving near- and long-term asset performance goals



# Performance-Based Budget Model

## Budgeting Process





# Performance-Based Budget Model

## Budget Model Output

2015		Statewide		LOS-BASED WORK PROGRAM AND BUDGET - MAINTENANCE										Annual Budget (For LOS-Rated Assets Only)				
Group	Feature	Current LOS	Target LOS	Target FY	Yrs to Target	Activity	Description	LOE Qty	Units	% Distrib.	Factor	Annual Work Quantity	Units	Labor	Equipment	Materials	Expenditure	Total
Roadside	Fence	B+	B+	2016	1	1505	ROUTINE FENCE MAINTENANCE	1,697,986	LIN FT	79.33	1.00	1,375,084	LIN FT	\$ 1,652,159	\$ 472,779	\$ 292,821	\$ 2,688	\$ 2,420,448
						1510	ACCIDENT-CHAIN LINK FENCE REPAIR	1,697,986	LIN FT	2.58	1.00	31,610	LIN FT	\$ 118,999	\$ 48,185	\$ 57,775	\$ 477	\$ 225,436
						1511	ACCIDENT BARBED WIRE FENCE REPAIR	1,697,986	LIN FT	4.37	1.00	53,557	LIN FT	\$ 90,520	\$ 26,482	\$ 14,373	\$ 75	\$ 131,450
						9154	CONTRACT FENCE INSPECTION & MINOR REP	1,697,986	LIN FT	0.13	1.00	2,324	LIN FT	\$ -	\$ -	\$ -	\$ 23,237	\$ 23,237
						9156	CONTRACT NEW FENCE INSTALLATION	1,697,986	LIN FT	13.58	1.00	235,412	LIN FT	\$ 2,878	\$ 446	\$ -	\$ 975,297	\$ 978,621
											<b>100.00</b>			<b>\$ 1,864,556</b>	<b>\$ 547,892</b>	<b>\$ 364,969</b>	<b>\$ 1,001,774</b>	<b>\$ 3,779,191</b>
	Guardrail	B-	A	2016	1	1503	ACCIDENT GUARDRAIL REPAIR	1,130,026	LIN FT	10.90	1.00	58,504	LIN FT	\$ 701,987	\$ 340,740	\$ 729,172	\$ 1,532	\$ 1,773,431
						1512	ROUTINE GUARDRAIL REPAIR	1,130,026	LIN FT	85.33	1.00	1,026,129	LIN FT	\$ 354,242	\$ 100,945	\$ 128,903	\$ 161	\$ 584,251
						9153	CONTR GR INSTAL & REPAIR-ADOT FURN MAT	1,130,026	LIN FT	2.59	1.00	31,172	LIN FT	\$ -	\$ -	\$ 336,198	\$ 682,493	\$ 1,018,691
						9155	CONTR GR INSTAL/RPR-CONTRACT FURN MAT	1,130,026	LIN FT	1.18	1.00	14,221	LIN FT	\$ 253	\$ 112	\$ -	\$ 1,273,714	\$ 1,274,079
											<b>100.00</b>			<b>\$ 1,056,482</b>	<b>\$ 441,797</b>	<b>\$ 1,194,273</b>	<b>\$ 1,957,900</b>	<b>\$ 4,650,452</b>
	Impact Attenuators	A+	A	2016	1	1520	CRASH ATTENR. (GUARDR.) REPAIR-ACCIDEN	8,842	LIN FT	96.82	1.00	8,719	LIN FT	\$ 64,475	\$ 23,007	\$ 548,972	\$ 7,651	\$ 644,105
						1590	OTHER ROADSIDE MAINTENANCE	8,842	LIN FT	3.18	2.00	247	LBR HRS	\$ 4,124	\$ 2,290	\$ 317	\$ 1,621	\$ 8,352
											<b>100.00</b>			<b>\$ 68,599</b>	<b>\$ 25,297</b>	<b>\$ 549,289</b>	<b>\$ 9,272</b>	<b>\$ 652,457</b>
	Sweeping	C+	A	2016	1	1507	MECHANICAL SWEEPING	11,145	12-FT LM	48.84	1.00	5,444	12-FT LM	\$ 325,994	\$ 380,458	\$ 1,933	\$ 817	\$ 709,203
						9157	CONTRACT MECHANICAL SWEEPING	11,145	12-FT LM	51.16	1.00	5,701	12-FT LM	\$ -	\$ -	\$ -	\$ 190,790	\$ 190,790
											<b>100.00</b>			<b>\$ 325,994</b>	<b>\$ 380,458</b>	<b>\$ 1,933</b>	<b>\$ 191,607</b>	<b>\$ 899,992</b>
	Litter	B-	A	2016	1	1501	FULL-WIDTH LITTER PICK-UP	40,895	ACRES	16.01	1.00	6,548	ACRES	\$ 86,295	\$ 22,335	\$ 10,836	\$ 754	\$ 120,220
						1502	SPOT LITTER & DEBRIS PICK-UP	40,895	ACRES	71.77	3.00	88,045	LBR HRS	\$ 2,073,061	\$ 670,001	\$ 9,754	\$ 51,166	\$ 2,803,982
						1535	REMOVAL OF DEAD ANIMALS FROM RDWY(N)	40,895	ACRES	12.22	1.00	4,998	LBR HRS	\$ 137,766	\$ 35,716	\$ 1,284	\$ 11,412	\$ 186,178
											<b>100.00</b>			<b>\$ 2,297,122</b>	<b>\$ 728,052</b>	<b>\$ 21,874</b>	<b>\$ 63,332</b>	<b>\$ 3,110,380</b>
	Shoulders	B	B+	2016	1	131	BLADE UNPAVED SHOULDERS	17,101	12-FT LM	93.67	1.45	23,299	-	\$ 77,356	\$ 92,029	\$ 7,432	\$ -	\$ 176,818
						132	REPAIR / REMOVE SHOULDERS	17,101	12-FT LM	6.33	49.00	53,056	-	\$ 468,873	\$ 604,934	\$ 113,317	\$ -	\$ 1,187,123
											<b>100.00</b>			<b>\$ 546,229</b>	<b>\$ 696,963</b>	<b>\$ 120,749</b>	<b>\$ -</b>	<b>\$ 1,363,941</b>
Drainage	Unpaved Ditches	C+	B+	2016	1	1603	CLEAN CUTS/CHANNELS/DIKES/EMBANK CUR	2,473,952	LIN FT	84.32	1.00	2,085,997	LIN FT	\$ 837,056	\$ 928,530	\$ 120,221	\$ 6	\$ 1,885,813
						1604	MINOR SLIDE REMOVAL	2,473,952	LIN FT	3.79	20.00	1,876,362	SQ FT	\$ 2,839,478	\$ 2,412,901	\$ -	\$ -	\$ 5,252,379
						1690	OTHER DRAINAGE MAINTENANCE & REPAIR	2,473,952	LIN FT	11.89	0.02	5,883	LBR HRS	\$ 147,770	\$ 163,346	\$ 31,488	\$ 648	\$ 343,251
											<b>100.00</b>			<b>\$ 3,824,303</b>	<b>\$ 3,504,777</b>	<b>\$ 151,709</b>	<b>\$ 654</b>	<b>\$ 7,481,443</b>
	Channels	C+	B+	2016	1	1603	CLEAN CUTS/CHANNELS/DIKES/EMBANK CUR	1,972,667	LIN FT	100.00	1	1,972,667	LIN FT	\$ 791,579	\$ 878,084	\$ 113,690	\$ 5	\$ 1,783,358
																<b>100.00</b>		
	Pipes & Culverts	B-	B-	2020	1	1601	ROUTINE DRAINAGE MAINTENANCE	96,181	EACH	18.22	1	17,522	EACH	\$ 556,619	\$ 432,233	\$ 55,496	\$ 2,609	\$ 1,046,957
						1602	EMERGENCY DRAINAGE MAINTENANCE	96,181	EACH	1.43	1	1,368	EACH	\$ 105,068	\$ 113,332	\$ 9,300	\$ -	\$ 227,700
						1690	OTHER DRAINAGE MAINTENANCE & REPAIR	96,181	EACH	0.28	2	535	LBR HRS	\$ 13,433	\$ 14,849	\$ 2,862	\$ 59	\$ 31,204
9114						CONTRACT HYDRO VACUUM-ST PROV TRF CN	96,181	EACH	80.08	1	77,024	EACH	\$ 14,551	\$ 21,734	\$ 13	\$ 117,749	\$ 154,047	
										<b>100.00</b>			<b>\$ 689,671</b>	<b>\$ 582,148</b>	<b>\$ 67,671</b>	<b>\$ 120,417</b>	<b>\$ 1,459,908</b>	



# Overview

- Level of service (LOS) scorecard format is easily understood
  - Provides measured asset performance
  - Used as input for developing performance targets

Average Condition Ratings - 2014						
Asset		A	B	C	D	F
Roadside	Fence			C+		
Roadside	Guardrail		B			
Roadside	Impact Attenuators		B			
Roadside	Length Requiring Sweeping (CL Miles)			C+		
Roadside	Length Requiring Litter Patrol (CL Miles)			C-		
Drainage	Ditch	A				
Drainage	Lined Channels (Miles)		B-			
Drainage	Pipes & Culverts (Each)		B-			
Paved Surfaces	Alligator Cracks (Maintenance Lane Miles)		B-			
Paved Surfaces	Bleeding (Maintenance Lane Miles)	A				
Paved Surfaces	Cracks > 1/4" (Maintenance Lane Miles)		B			
Paved Surfaces	Potholes (Count)			C-		
Paved Surfaces	Raveling (Maintenance Lane Miles)	A-				



# Overview

- Year-over-year LOS trends effectively communicate the impact of funding decisions

Statewide - All Routes - 2010 Condition Ratings						
Asset		A	B	C	D	F
Asphalt	Potholes		B			
	Stripping (Raveling)		B+			
	Shoving				D+	
Concrete	Spalling			C-		
	Faulting			C-		
	Joint Sealing	A+				
	Punchouts				D	
	Pumping		B-			
Paved Shoulder	Potholes		B			
	Edge Raveling		B			
	Sweeping					F
Unpaved Shoulder	Dropoff					F
	High Shoulder				D-	

Statewide - All Routes - 2011 Condition Ratings						
Asset		A	B	C	D	F
Asphalt	Potholes		B+			
	Stripping (Raveling)		B			
	Shoving				D+	
Concrete	Spalling				D-	
	Faulting					F
	Joint Sealing			C-		
	Punchouts					F
	Pumping				D+	
Paved Shoulder	Potholes			C+		
	Edge Raveling		B-			
	Sweeping				D	
Unpaved Shoulder	Dropoff				D+	
	High Shoulder			C-		



# Communicating Needs

- Know your audience
  - Senior DOT management
  - Transportation commission
  - Budget director and staff
  - Strategic planning and staff
  - Governor's office and staff
  - Budget committees
  - Legislature





# Communicating Needs

- Speak their language
  - It's not what it is, it's what it means to them!
  - Early buy-in
  - Focus on hot buttons
    - Business-minded: ROI
    - Attorneys: Risk
    - Legislators: Customer satisfaction
    - Key issues unique to districts/divisions/regions



# Communicating Needs

- Establish credibility
  - Good data
  - Transparent, formula-driven process
  - More analysis, less reliance on judgment
- Maintain trust
  - Data
  - Graphics
  - Simulations



# Communicating Needs

## Data

Maintenance Feature Name:		Guardrail										
UOM	LOS	A		B		C		D		F	Conv. Factor	
% Deficient	Range:	0	1.9	1.9	7.8	7.8	14.2	14.2	19.0	>19	1.000	
	Midpoint:	0.95		4.85		11.00		16.60		19	Units	
Converted UOM	Range:	0.00	1.90	1.90	7.80	7.80	14.20	14.20	19.00	>19		
% Deficient	Midpoint:	0.95		4.85		11.00		16.60		19.00		
Average Annual Work Quantity:												
Activity	UOM	Avg. Quantity	% Applicable	Applic. Quantity	Conv. Factor	Conv. Quantity	Conv. Units	Distr.(%)				
1503	LIN FT	61	100	61	1.0000	61	LIN FT	0.8				
1512	LIN FT	7,615	100	7,615	1.0000	7,615	LIN FT	99.2				
9153	LIN FT	0	100	0	1.0000	0	LIN FT	0.0				
9155	LIN FT	0	100	0	1.0000	0	LIN FT	0.0				
					<b>Total =</b>	7,676	LIN FT	100.0				
<b>Inventory:</b>	Guardrail Miles	187				5,280	987,360	LIN FT				
		LOS	Converted									
<b>Current LOS =</b>		10.000	10.000									
<b>Work Program Adjust. Needed:</b>			LOE A	LOE B	LOE C	LOE D	LOE F	<b>Target</b>				
<b>Current Program</b>			7,676	7,676	7,676	7,676	7,676	<b>C</b>				
<b>Difference</b>			89,356	50,849	-9,874	-65,166	-88,862	7,676				
<b>Total Program</b>			97,032	58,525	0	0	0	-9,874				
<b>LOE Factor</b>			<b>12.64</b>	<b>7.62</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>				
<b>LOE (Work Units / Inventory Unit)</b>			<b>0.098</b>	<b>0.059</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>				



# Communicating Needs

## Graphics: Visual representation of LOS



**LOS A:** This pavement is in very good to perfect condition.



**LOS B:** This pavement is in good condition with good ride quality.



**LOS C:** This pavement is in fair condition with fair ride quality.



**LOS D:** This pavement is in poor condition with poor ride quality.



**LOS F:** This pavement is impassable.



# Communicating Needs

## Graphics: LOS Trend Visualization

2004	Targets	Northwest	North Central	Olympic	Southwest	South Central	Eastern
		4B1 Movable & Floating Bridges	B	B+		B+	
6B1 Signal Systems	C	D	B	C+	A	C+	D
5B1 Snow & Ice	C+	C	A-	B-	B	A-	B-
4B2 Keller Ferry	B						B
4B3 Urban Tunnels	B-	B					
4A2 Structural Bridge	C	F+	A-	C+	A-	A-	C
6A4 Regulatory Signs	C	A-	C	D	B	B-	C
2A5 Slope Repair	C+	A	B	A	B+	B+	C+
6B3 ITS	C	C	B	F	A+	C+	A-
2A3 Catch Basins	C+	B-	A-	B+	B+	B-	B+
1A1 Pavement Patching & Repair	B-	B+	B+	A	A	A	C+
4A1 Bridge Decks	C-	B	A	A	A	B	B-
6A7 Guardrail	B+	B+	A	A	A	A	A
6A1 Striping	B-	C	B	B+	A-	B	C
6A2 Raised/Recessed Markers	C	C	A	B	C	B-	B
3A4 Veg Obstructions	C	C-	B	C	B+	A-	C+
1A2 Crack Sealing	C-	B	D+	B	B	C+	C-
7B1 Rest Areas	B	B-	B	B	B+	B+	B
1A4 Sweeping	B	A	A+	B+	A	A+	A+
2A1 Ditches	C	C+	A	A-	A	B+	B
6B2 Hwy Lighting	B	A	A-	A	B+	A	A
6A6 Guide Posts	D+	D+	C	C	C-	C-	C
1B1 Safety Patrol	C	A	C-	D	C	B-	B-
2A2 Culverts	D+	B-	C+	C	C+	C+	C-
6B4 Permits	B	B	B	B	C	B	B
6A3 Pavement Marking	D+	C	B	C	C+	C+	C-
3A2 Noxious Weeds	B	A	A	A	A	C+	A-
1A3 Shoulder Maint	C+	B	B	B+	C+	B	B-
6A5 Guide Signs	B-	A	B+	D+	B+	A-	B-
2A4 Detention Basins	C	C	C	C	C	C	C
4A3 Bridge Cleaning	C	B+	A-	B	B+	A-	B+
3A3 Nuisance Weeds	B-	A-	A	A-	B+	B-	B+
3A5 Landscape	C-	C-	C-	C	C+	C-	C-
3A1 Litter	D+	F+	C	D	C	D	C-

State Targets Missed – 1 Region Targets Missed - 19

2008	Targets	Northwest	North Central	Olympic	Southwest	South Central	Eastern
		4B1 Movable & Floating Bridges	B+		A		
6B1 Signal Systems	C+	B-	C	F+	D+	C-	C-
5B1 Snow & Ice	A-	A	B+	A	A	A	B+
4B2 Keller Ferry	B						B
4B3 Urban Tunnels	B	B					
4A2 Structural Bridge	C	D	A+	D+	F+	F	F+
6A4 Regulatory Signs	C+	D	C+	B+	C+	D	D-
2A5 Slope Repair	B	A-	A	A	A+	A	A
6B3 ITS	B-	A	A-	A	D	A-	C+
2A3 Catch Basins	B	D+	C	C	C	C+	F+
1A1 Pavement Repair & Crack Seal	B	B-	C	A-	B+	C	C+
4A1 Bridge Decks	B-	C-	A-	C	B	C-	D
6A7 Guardrail	A	B	B	A	B	A+	B+
6A1 Striping	C+	C-	C-	C	C-	C-	C
6A2 Raised/Recessed Markers	B	C-	A+	C+	F	F+	C
3A4 Veg Obstructions	B-	F-	A	D	B	A+	C-
7B1 Rest Areas	B	B-	B-	B	B	B	B
1A4 Sweeping	B+	A+	A+	A	A-	A	A
2A1 Ditches	B	B-	B+	A	B	A+	B+
6B2 Hwy Lighting	B+	D	D+	B	D	B	A
6A6 Guide Posts	C-	D+	D+	C	D	F	D
1B1 Safety Patrol	C+	B	C-	C	C	C-	C
2A2 Culverts	C	F+	F+	C	D	D	F
6B4 Permits							
6A3 Pavement Marking	C-	C-	D+	D	C	C	C
3A2 Noxious Weeds	B	A	A	A+	A	D+	D+
1A3 Shoulder Maint	B-	A	A	B+	A	C-	B-
6A5 Guide Signs	B-	C	A-	A	B	C+	B
2A4 Detention Basins	C						
4A3 Bridge Cleaning	C	B	B	B+	C	B-	B
3A3 Nuisance Weeds	B-	A+	B+	B	A+	D+	A-
3A5 Landscape	C-	D		C-	D	D+	C-
3A1 Litter	C-	D	D+	D	D	D	B

State Targets Missed – 16 Region Targets Missed - 85

Key:

Missed State Target

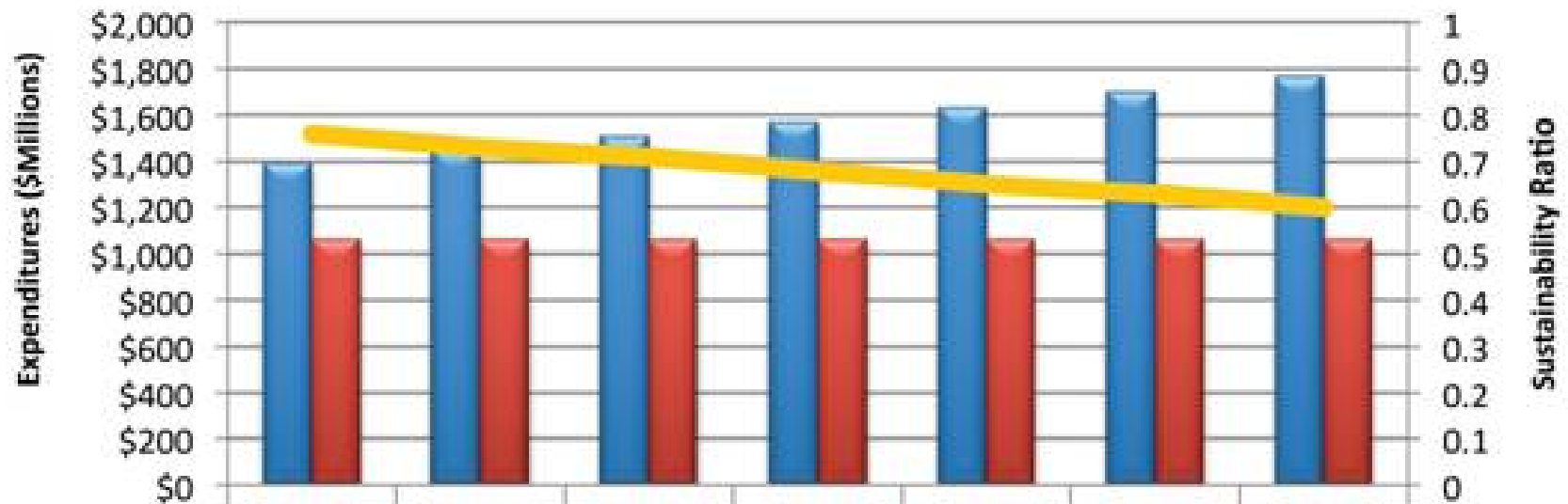
Missed Region Target



# Communicating Needs

## Graphics: LOS Trend Visualization

### Maintenance Sustainability Index

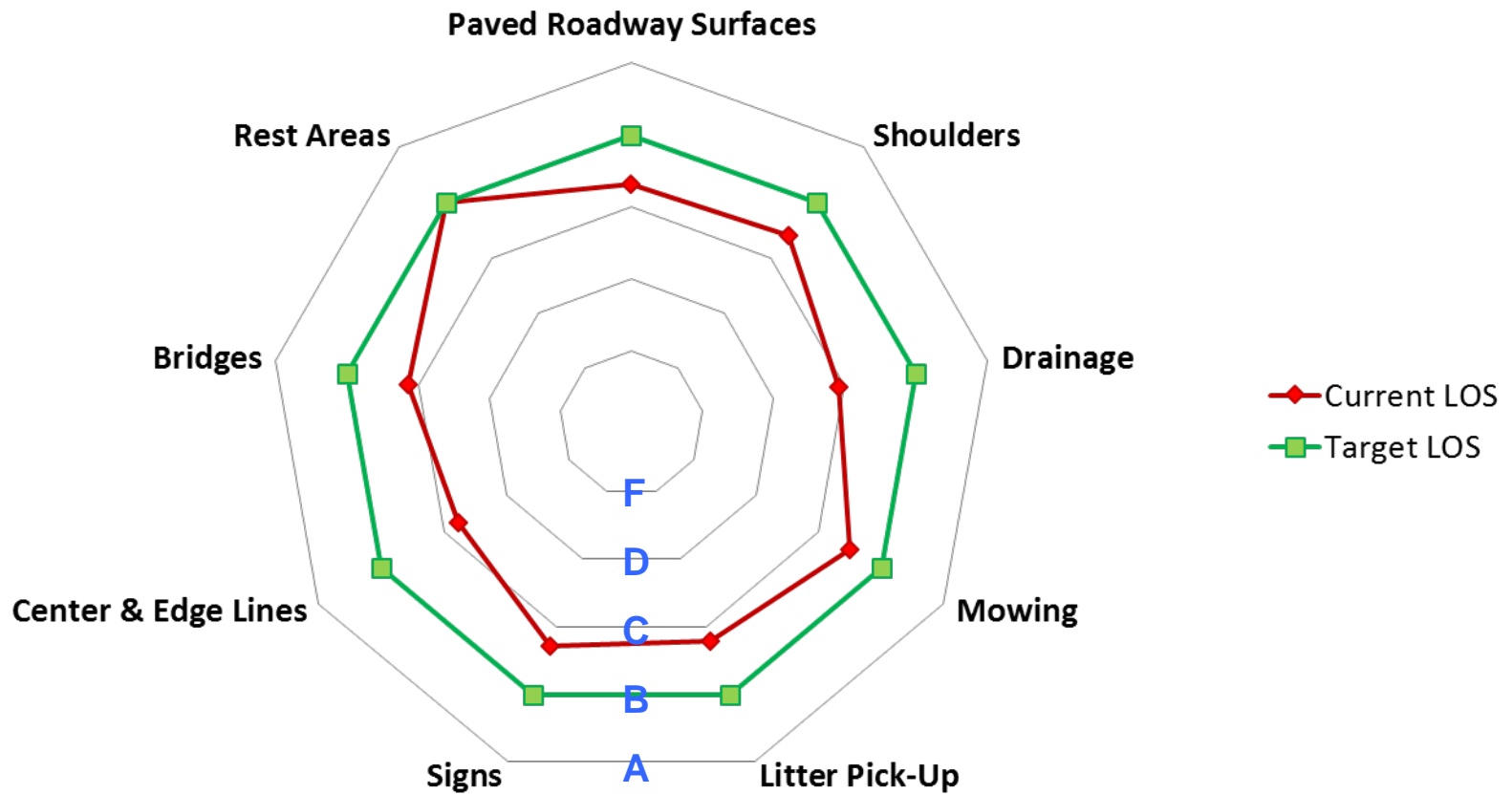


	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Maintenance Needs	\$1,393	\$1,448	\$1,507	\$1,568	\$1,632	\$1,699	\$1,769
Budget	\$1,063	\$1,063	\$1,063	\$1,063	\$1,063	\$1,063	\$1,063
Sustainability Index	0.76	0.73	0.71	0.68	0.65	0.63	0.6



# Communicating Needs

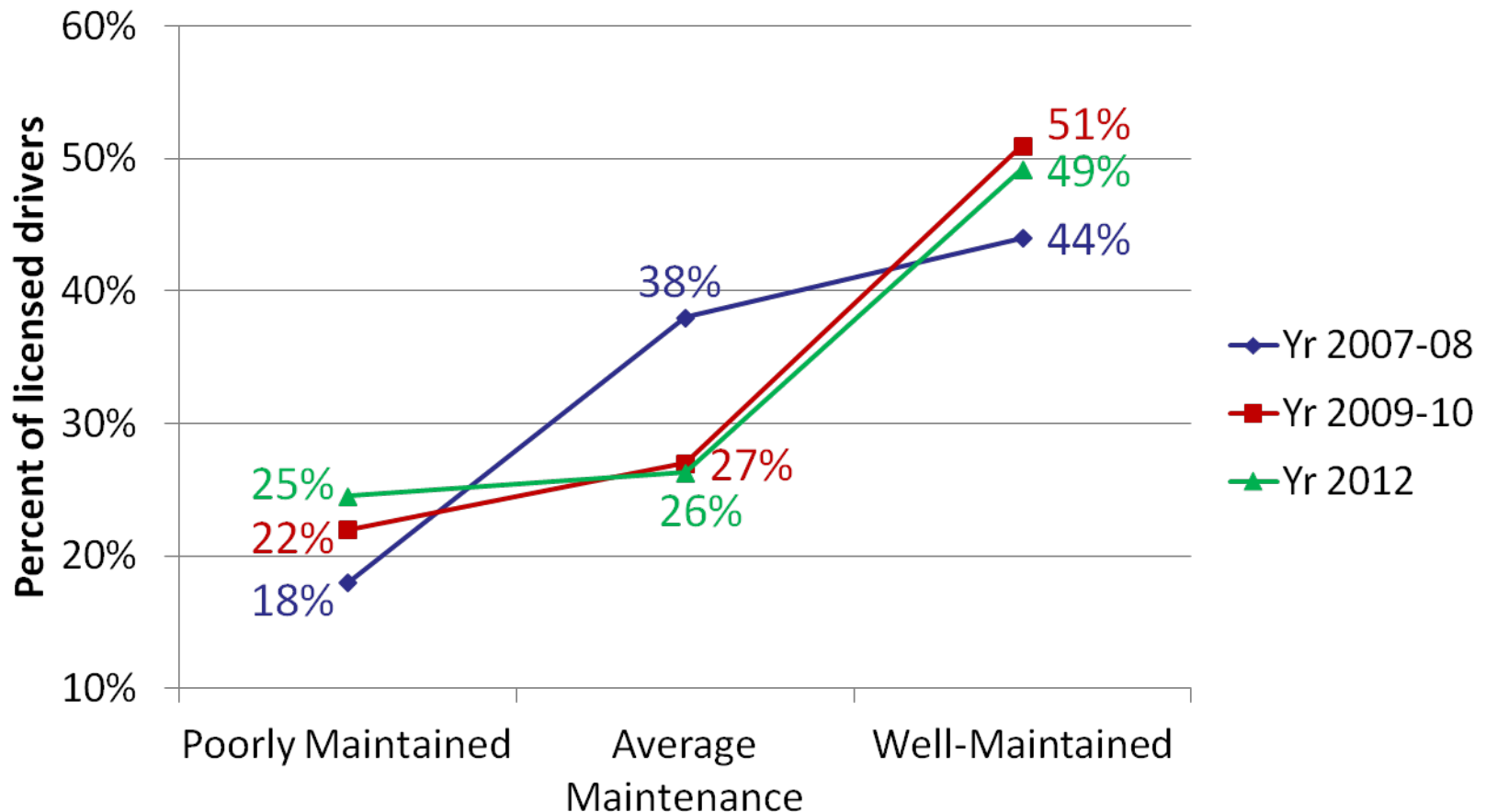
## LOS Scorecard- RADAR Chart





# Communicating Needs

## Customer Perceived LOS - Paved Roadway Surfaces Multi-Year Trend







# Communicating Needs

- Simulations
  - Budget model “what if” analyses
  - May include decision makers in a budget workshop
  - Can be used to demonstrate impact of funding levels
  - Set expectations for actual budgeted funds



# Communicating Needs

Group	Feature	Current Data		1-Yr Goal		3-Yr Goal		5-Yr Goal	
		Current LOS	Current Budget	Target LOS	Target Budget	Target LOS	Target Budget	Target LOS	Target Budget
	<b>Total Budget</b>		\$ 143,649,000		\$ 166,631,622		\$ 151,756,026		\$ 149,181,892
	<b>Unallocated Funds</b>		\$ 17,000,000		\$ 19,500,000		\$ 19,500,000		\$ 19,500,000
	<b>Non-LOS Spending</b>		\$ 72,465,373		\$ 72,465,373		\$ 72,465,373		\$ 72,465,373
	<b>LOS Spending</b>		\$ 54,183,627		\$ 74,666,249		\$ 59,790,653		\$ 57,216,519
Roadside	Fence	B+	\$ 2,774,508	B+	\$ 3,779,191	B+	\$ 3,109,402	B+	\$ 2,975,445
	Guardrail	B-	\$ 3,058,079	A	\$ 4,650,452	A	\$ 3,588,870	A	\$ 3,376,554
	Impact Attenuators	A+	\$ 663,467	A	\$ 652,457	A	\$ 659,797	A	\$ 661,265
	Length Requiring Sweeping	C+	\$ 689,602	A	\$ 900,206	A	\$ 759,803	A	\$ 731,723
	Length Requiring Litter Patrol (Phx)	B-	\$ 312,928	A	\$ 449,614	A	\$ 358,489	A	\$ 340,264
	Length Requiring Litter Patrol (non-Phx)	A+	\$ 1,377,521	C-	\$ -	C-	\$ 290,180	C-	\$ 725,117
	Shoulders	A	\$ 1,351,232	B+	\$ 1,308,816	B+	\$ 1,337,093	B+	\$ 1,342,749
Drainage	Ditch	C+	\$ 338,893	B	\$ 5,187,493	B	\$ 1,955,093	B	\$ 1,308,613
	Lined Channels	C+	\$ 1,623,039	B+	\$ 1,783,358	B+	\$ 1,676,479	B+	\$ 1,655,103
	Pipes & Culverts	B-	\$ 1,455,676	B-	\$ 1,459,908	B-	\$ 1,457,087	B-	\$ 1,456,522
Paved Surfaces	Alligator Cracks	B-	\$ 702,743	B-	\$ 1,478,879	B-	\$ 961,455	B-	\$ 857,970
	Bleeding	B+	\$ 463,416	B+	\$ 15,854,291	B+	\$ 5,593,708	B+	\$ 3,541,591
	Cracks > 1/4"	C	\$ 6,603,889	C	\$ 3,814,785	C	\$ 5,674,188	C	\$ 6,046,068
	Cracks < 1/4"	D+	\$ 2,177,664	C-	\$ 3,400,808	C-	\$ 2,585,379	C-	\$ 2,422,293
	Potholes	B+	\$ 1,335,915	A+	\$ 1,631,882	A+	\$ 1,434,571	A+	\$ 1,395,109
	Raveling	B	\$ 5,812,465	B	\$ 4,126,374	B	\$ 4,706,340	B	\$ 4,822,333



# Communicating Needs

- Accountability
  - Evaluation phase
  - Planned vs. actual analysis
  - Did we achieve our targets based on budget?
    - If not, why?
  - Use results to improve next year's performance-based budgeting process



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