

Implementing a Performance-Based Asset Management Approach in California

12th National Conference on Transportation Asset Management

San Diego, California

July 2018

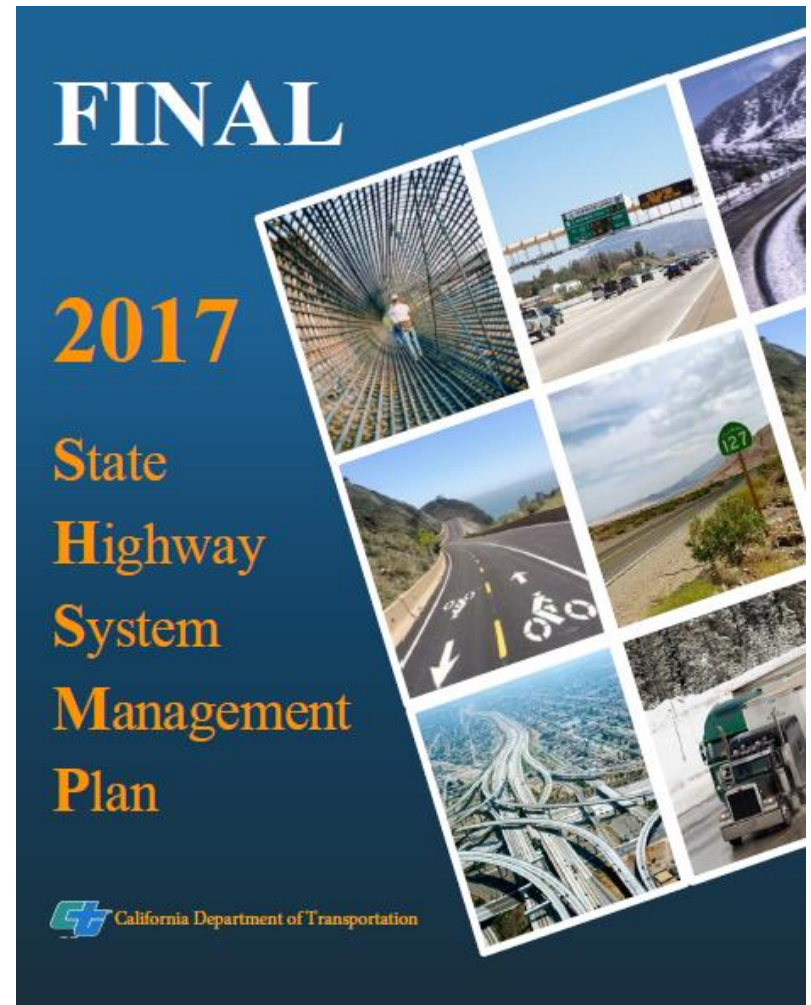
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California Department of Transportation

A Single Plan

- Integrates 10-Year Rehab and 5-Year Maintenance Plans.
- Aligns objectives with the Departmental Strategic Plan.
- Implements Performance Management.
- Unprecedented Transparency.



34 Objectives in Plan

● Safety Goal

- Bridge safety rail upgrades
- Collision severity reduction
- Roadside safety improvements
- Triggered safety improvements

● Sustainability Goal

- ADA Mitigation
- Advanced environmental mitigation
- Bridge resiliency
- Hazardous waste mitigation
- Roadside rehabilitation
- Storm water mitigation
- Zero emission vehicle infrastructure

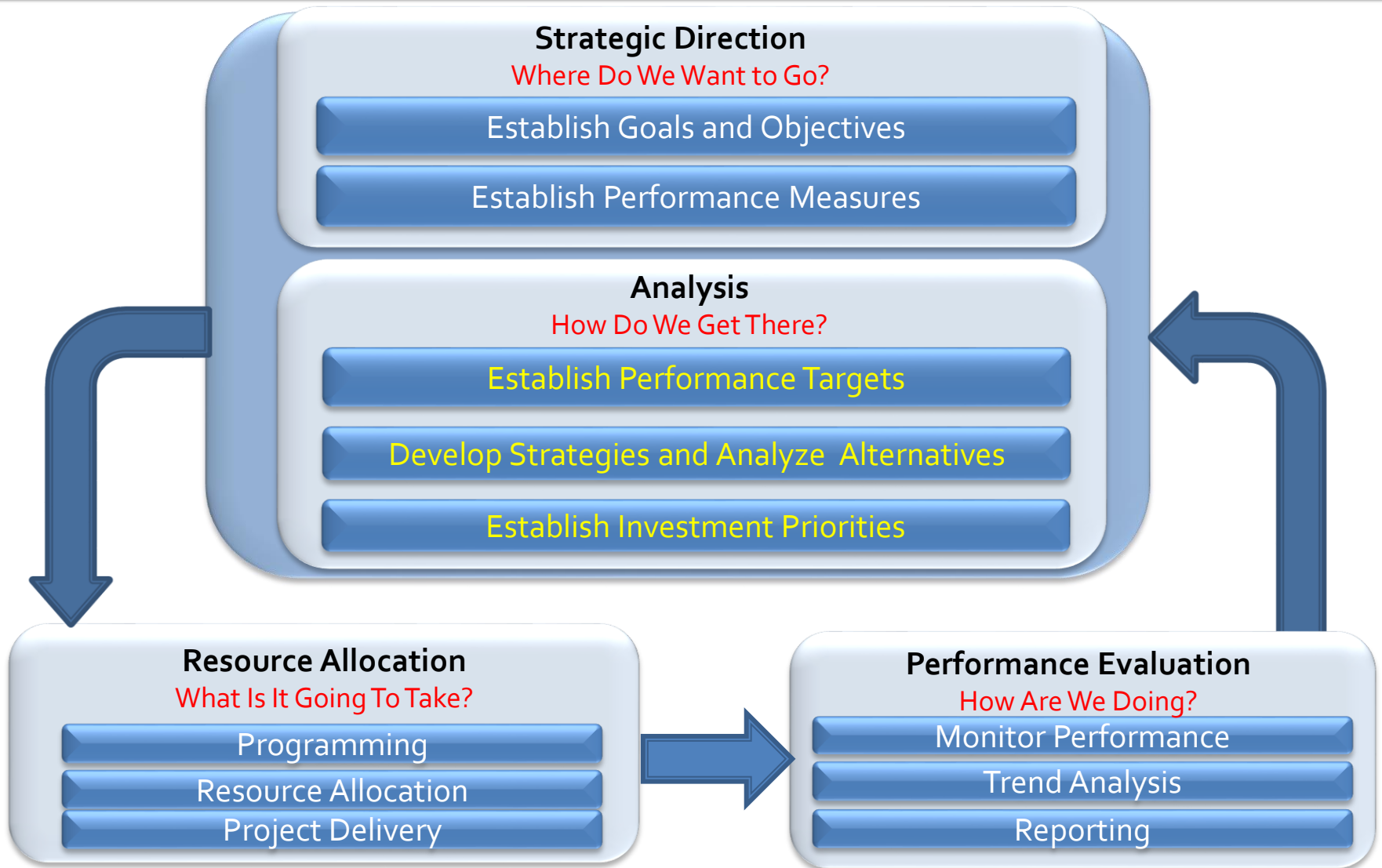
● Stewardship Goal

- Pavement & bridge condition
- Culverts / pump facilities
- Major damage / perm restoration
- Facilities (all types)
- Signs and lighting rehabilitation
- Roadside rest rehabilitation ...

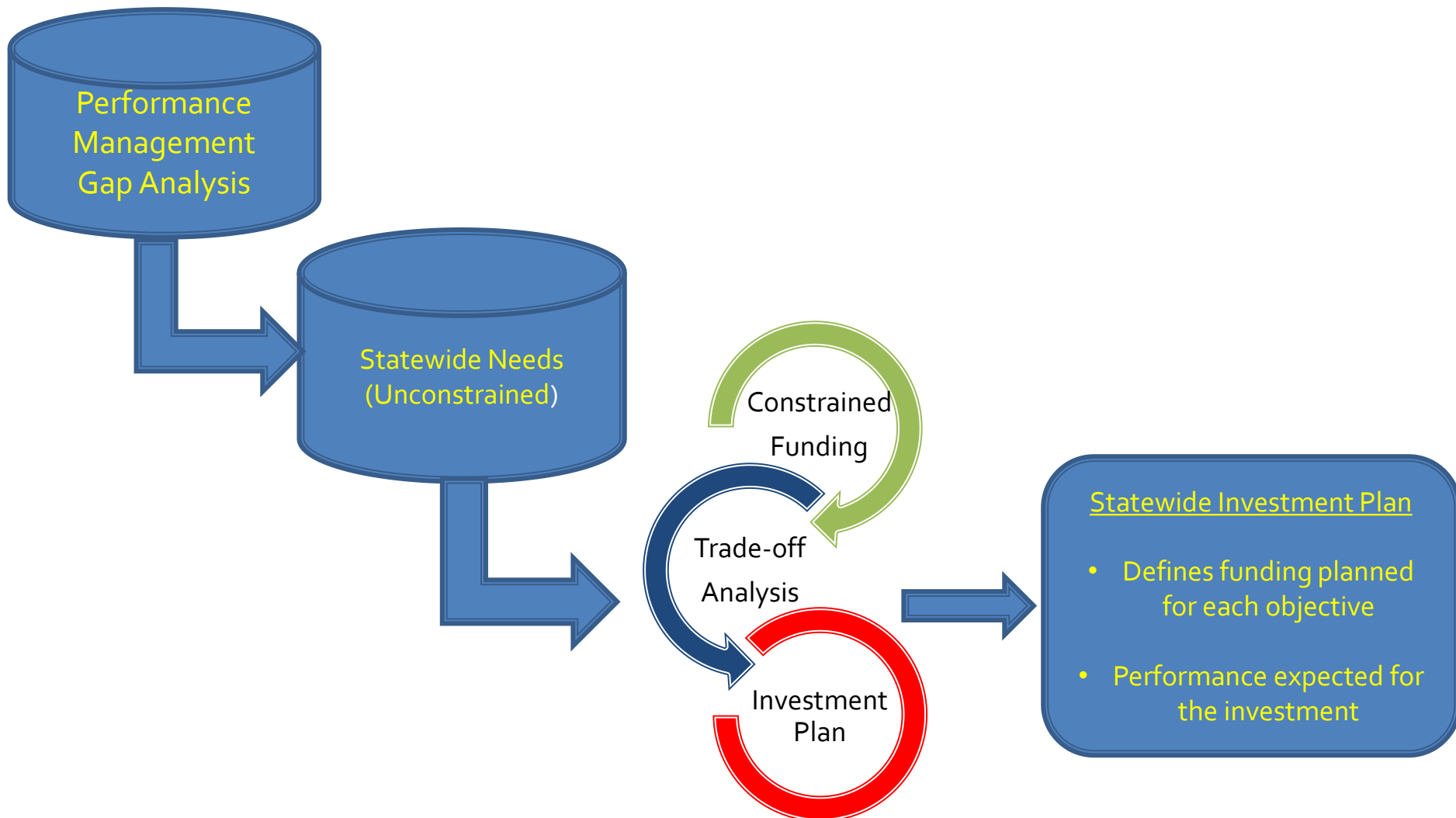
● System Performance Goal

- Commercial vehicle enforcement facilities
- Operational improvements
- Sign panel replacements
- Transportation management systems
- Bridge goods movement upgrades
- Weigh-in-motion scales

Performance Management



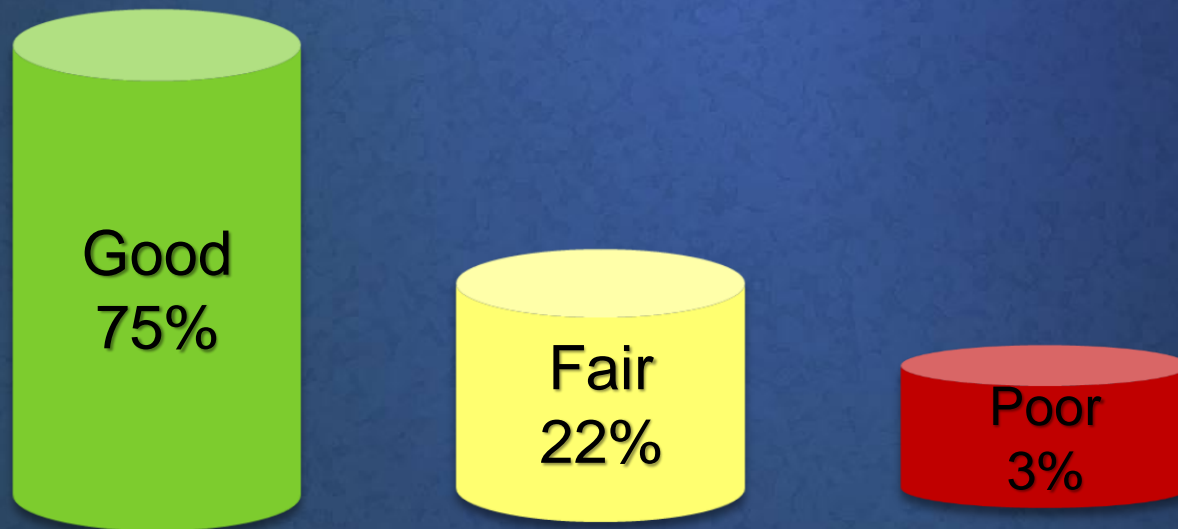
Overview of Process



Performance Management

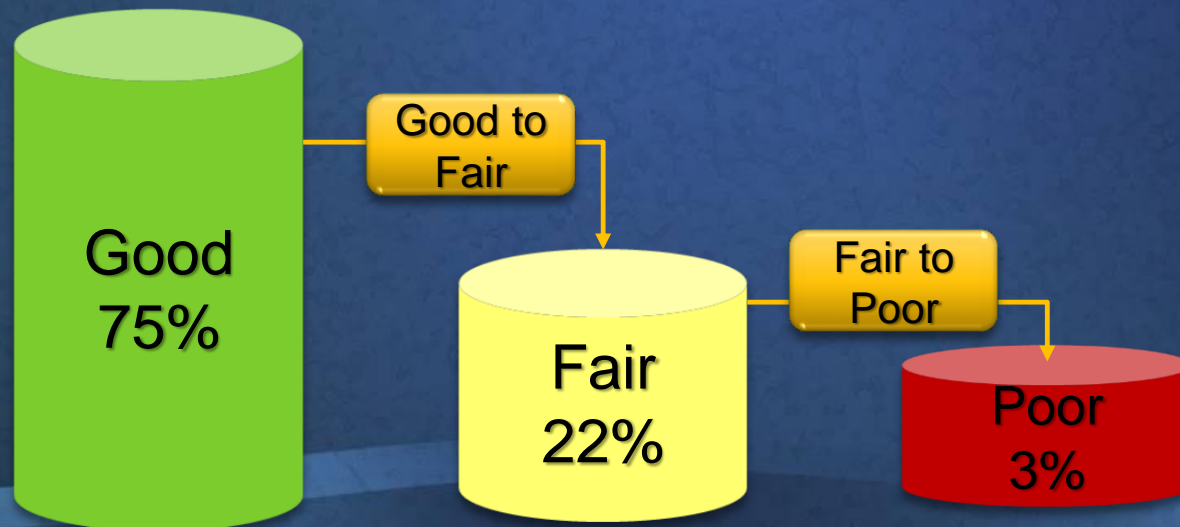
Physical Assets

- Current Condition Distribution (Bridges)



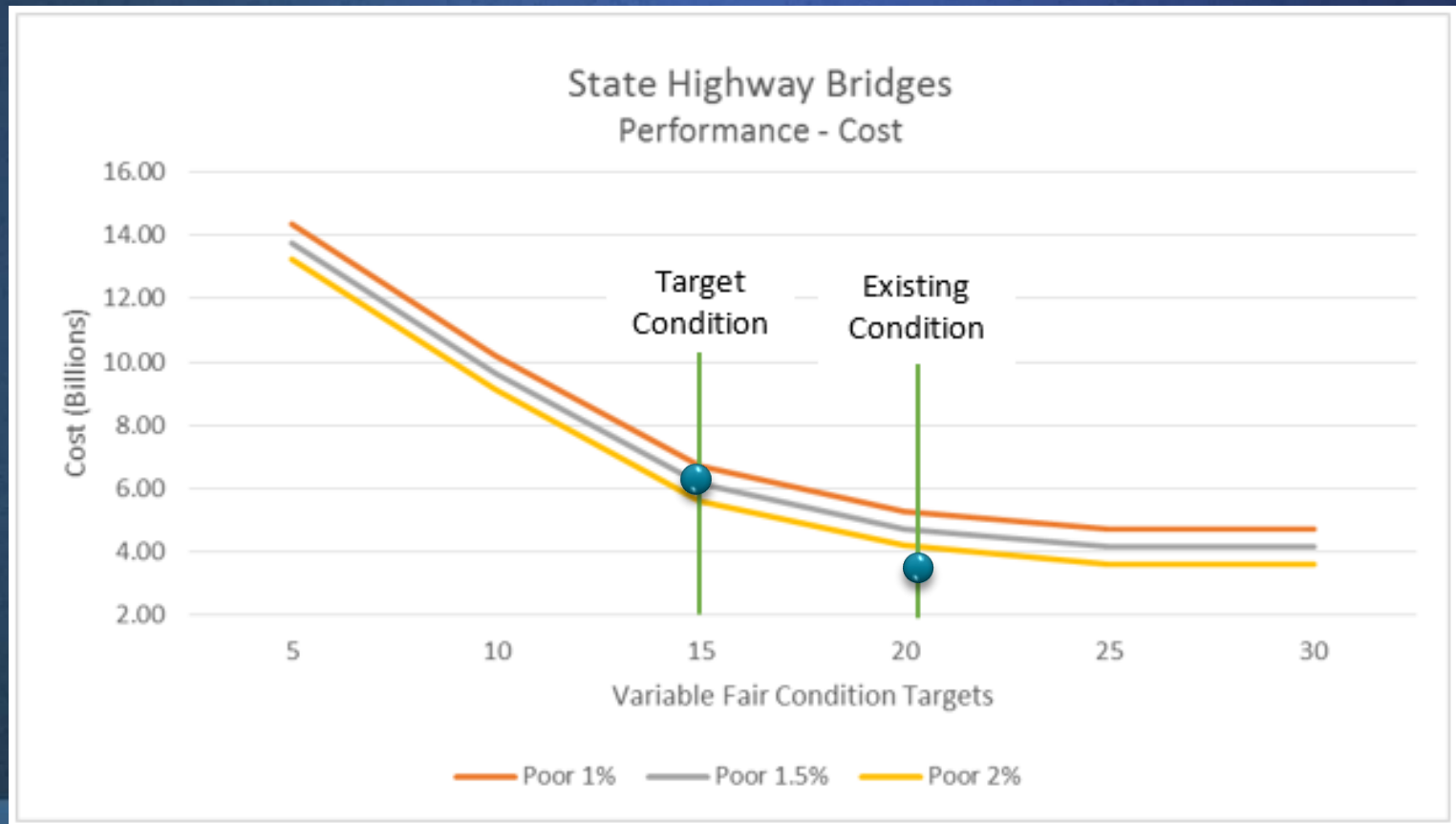
Performance Management Physical Assets

- Include Deterioration Rates
 - Use individual management systems
 - Use service life estimates / published research
 - Expert judgement



Performance Management Physical Assets

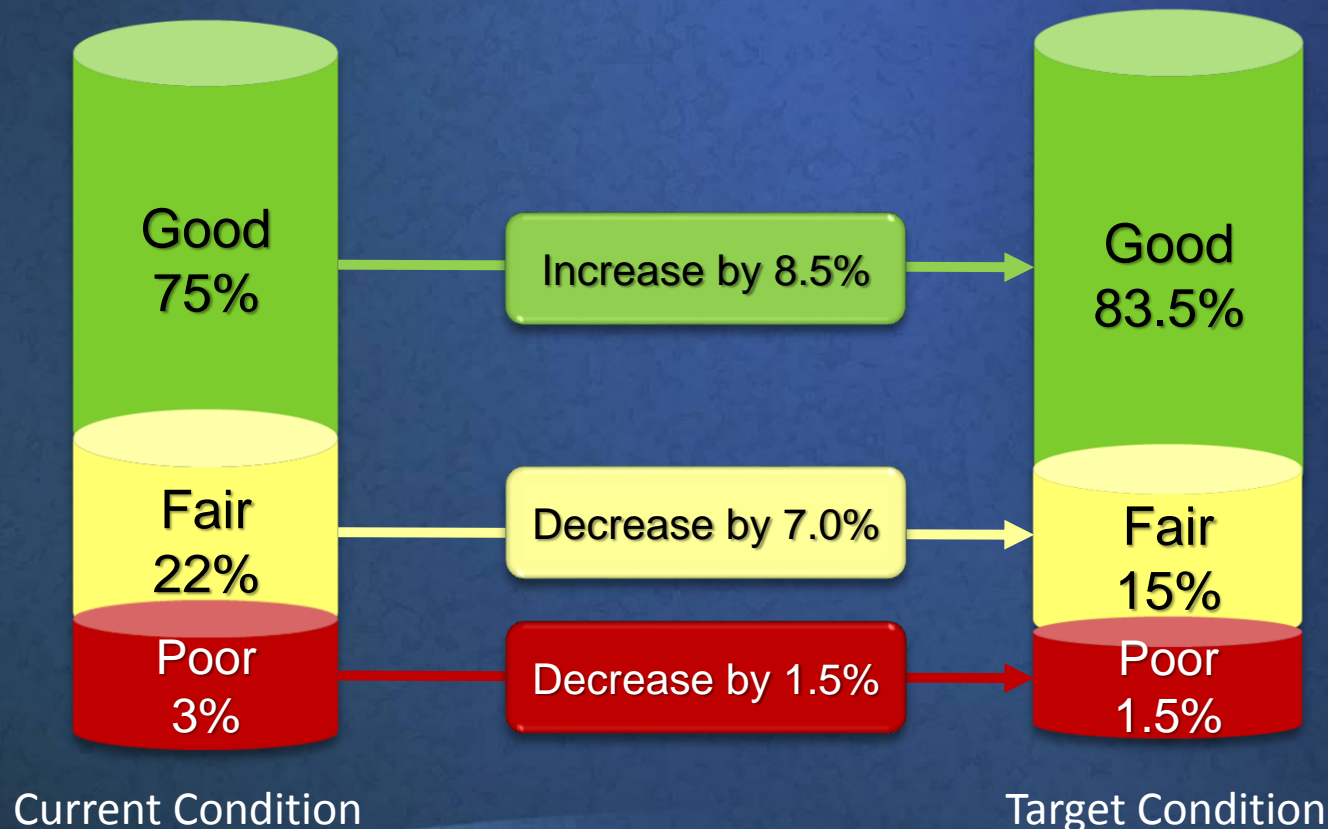
- Establish Condition Targets



Performance Management

Physical Assets

- Determine Performance Gaps



Performance Management

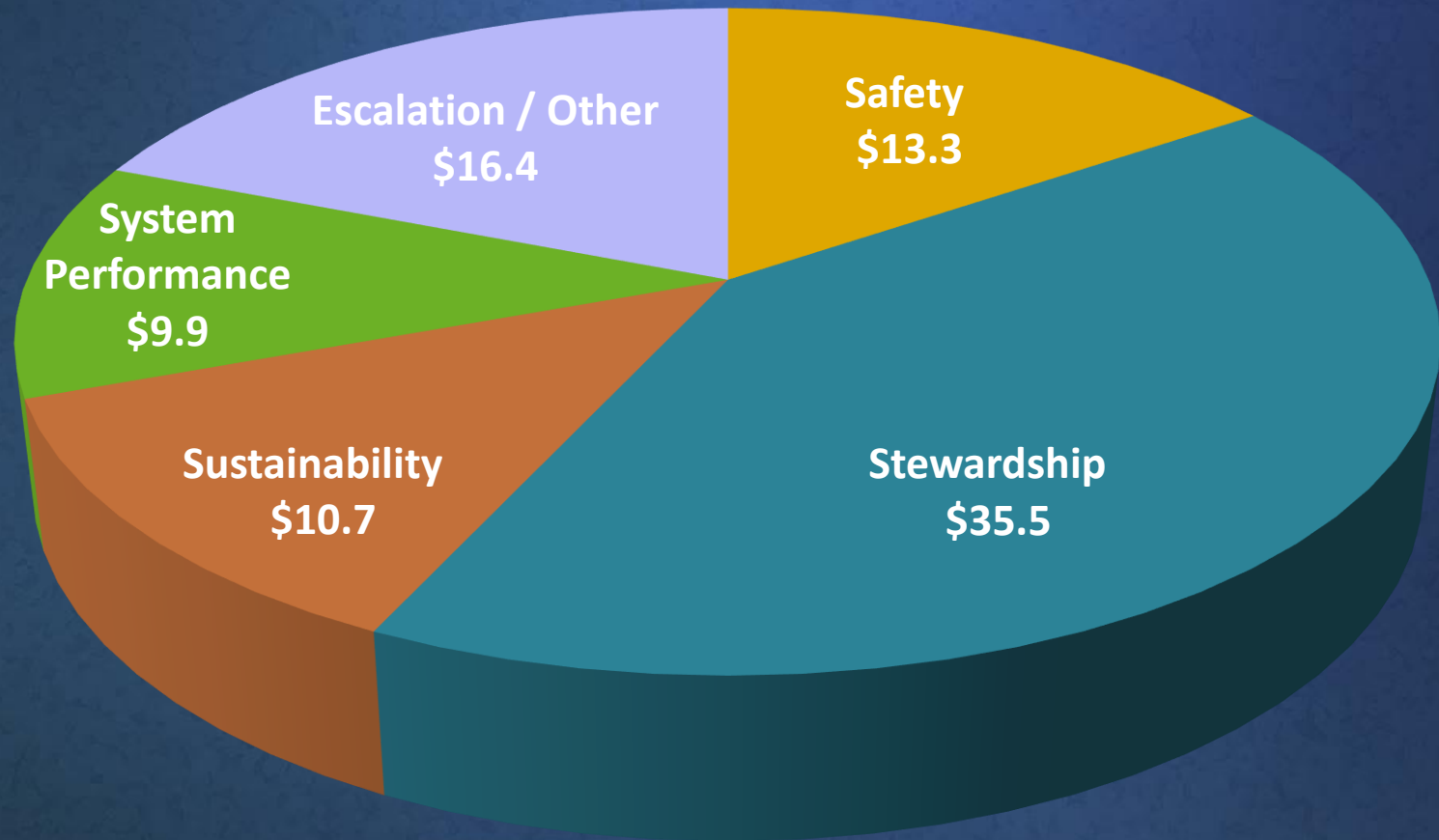
Physical Assets

- Deduct Pipelined Work
 - Existing project commitments need to be deducted from the measured gaps
 - The remaining gaps are the unmet need

Performance Management

- Estimate costs
 - The unconstrained costs to close the performance gaps were estimated
 - Unconstrained needs exceeded available funding
 - A constrained investment plan was required

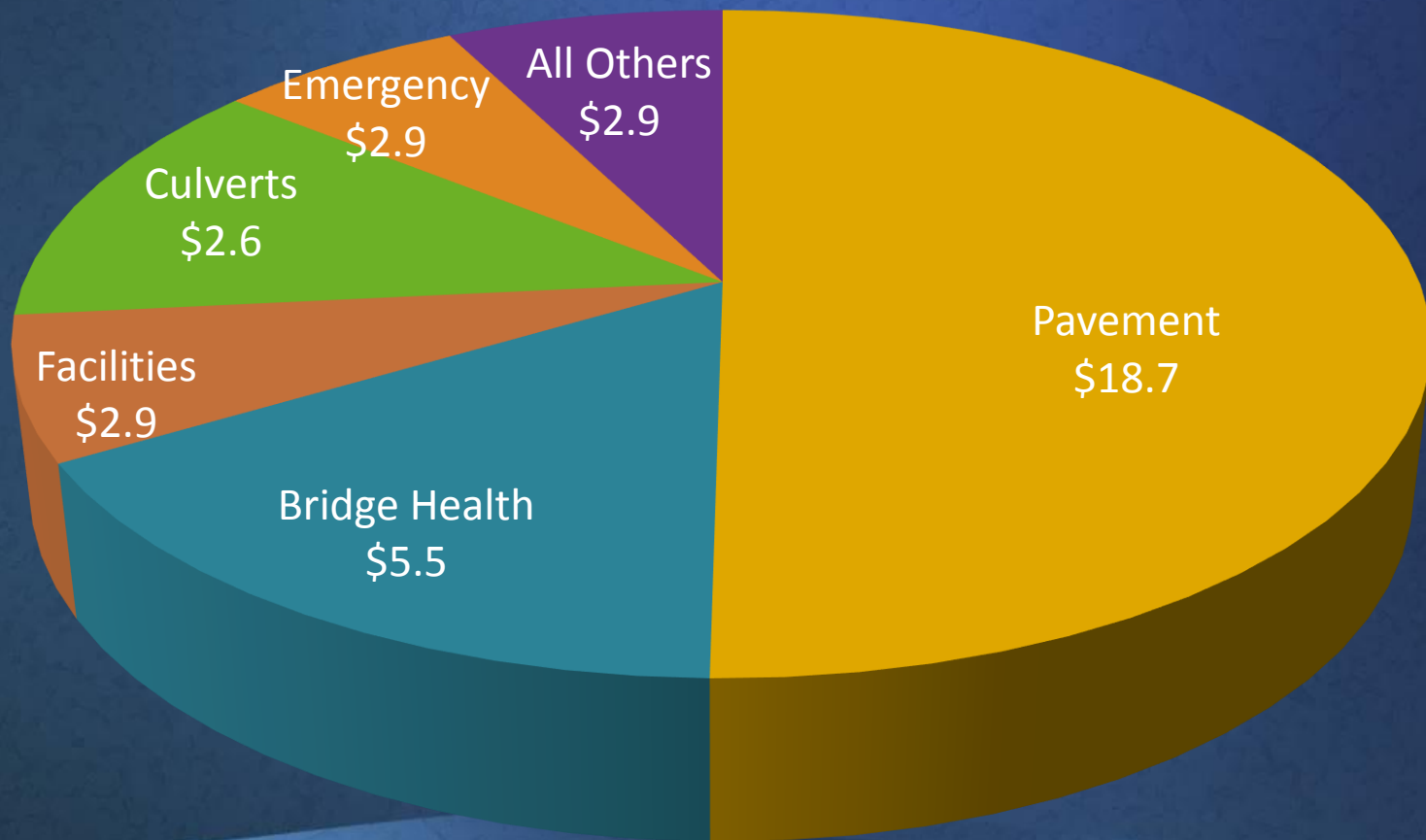
SHOPP Needs Assessment - \$85.8 B



SHOPP Stewardship Needs

(Unescalated)

10 Year Needs (Billions)



Investment Plan



- Investment Plan defines where available resources are recommended to be allocated to effectively manage the State Highway System.

Expected Growth in Inventory

Longer Term Life-Cycle Costs

Past Investment Levels

Permit Requirements

Legislative Mandates

Consequence of Inaction

Policy Directives

Balance Safety, Asset Condition, System Performance, and Sustainability

Legal Mandates

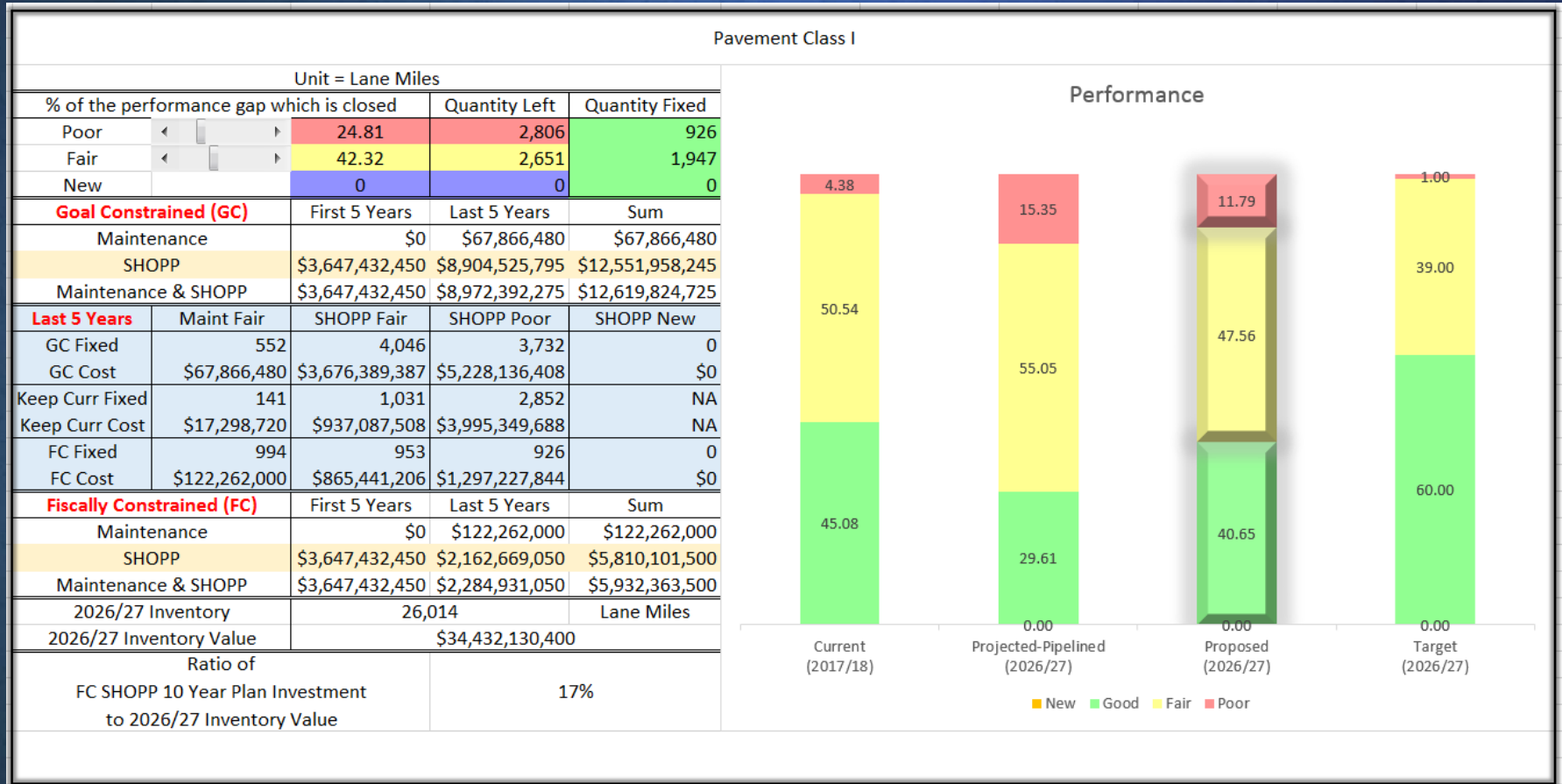
Expected Deterioration

Current Condition of Assets

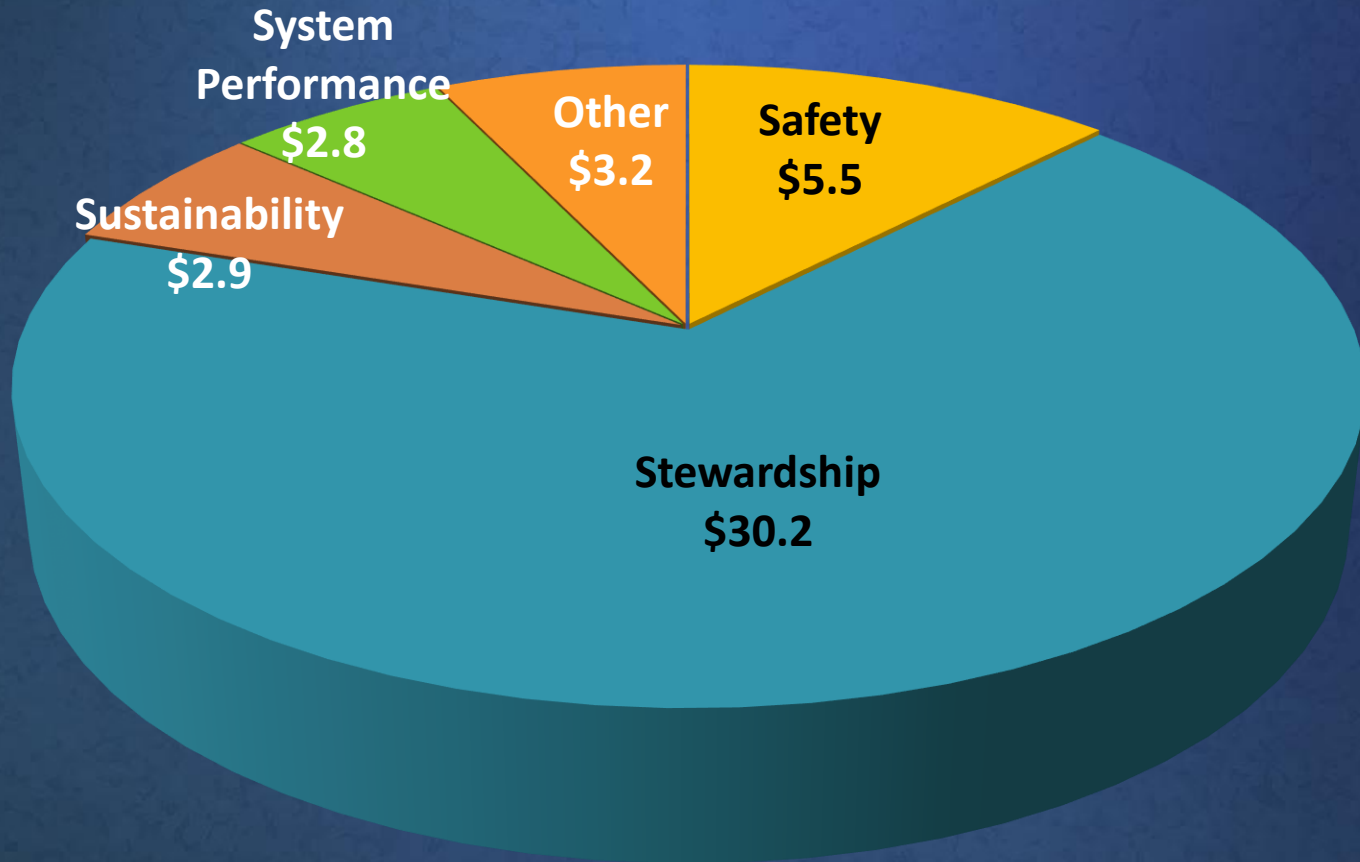
Preservation versus Rehabilitation

Effective Use of Other Funds

Performance Management Analysis Tool



Investment Plan - \$44.6 B



District Performance Plans

SHOPP Performance Plan - District 11																			
Objectives	Unit	Current Inventory / Need	Current Condition			Pipelined Projects			SHOPP Investment Plan			Sum			Projected Condition 2027			Poor % 2027	
			Good	Fair	Poor	Fair	Poor	New	Remaining Performance			Fair	Poor	New	Good	Fair	Poor	District	State
									Fair	Poor	New								
Safety																			
Bridge Rail Replacement and Upgrade	Linear Feet	945,635	606,372	324,340	14,923	7,168	7,311	-	0	837	-	7,168	8,148	-	621,688	317,172	6,775	0.7%	4.7%
Collision Severity Reduction	Injuries	4,827	-	-	4,827	-	47	-	-	349	-	-	396	-	396	-	4,431	91.8%	91.4%
Roadside Safety Improvements	Locations	2,263	-	-	2,263	-	433	-	-	609	-	-	1,042	-	1,042	-	1,221	54.0%	49.3%
Safety Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stewardship																			
Bridge Health	SF	25,492,125	19,180,734	5,466,834	844,557	1,292,863	559,368	-	477,143	312,820	-	1,770,006	872,188	-	20,959,795	4,149,948	382,382	1.5%	1.5%
Drainage Pump Plants	Locations	5	4	1	0	0	0	-	0	0	-	0	0	-	3	2	0	0.0%	9.3%
Drainage System Restoration	Linear Feet	1,541,632	1,156,849	273,583	111,200	170	12,008	-	0	76,665	-	170	88,673	-	1,739,281	893,084	303,013	10.3%	10.6%
Lighting Rehabilitation	Each	6,574	3,476	2,852	246	0	0	-	0	437	-	0	437	-	3,291	1,974	1,309	19.9%	39.9%
Major Damage (Emergency Opening)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Damage (Permanent Restoration)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Office Buildings	SF	0	0	0	0	0	0	-	0	0	-	0	0	-	0	0	0	0.0%	25.9%
Overhead Sign Structures Rehabilitation	Each	2,228	1,719	483	26	0	0	-	0	70	-	0	70	-	1,481	537	210	9.4%	11.4%
Pavement Class I	Lane Miles	2,741	557	2,138	46	576	16	-	626	171	-	1,202	187	-	1,553	1,161	27	1.0%	1.0%
Pavement Class II	Lane Miles	1,041	242	767	32	82	5	-	133	247	-	215	252	-	493	527	21	2.0%	2.0%
Pavement Class III	Lane Miles	375	154	213	8	0	0	-	18	35	-	18	35	-	75	292	8	2.1%	2.0%
Relinquishments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roadway Protective Betterments	Locations	0	-	-	0	-	0	-	-	0	-	-	0	-	0	-	0	0.0%	71.4%
Safety Roadside Rest Area (SRRAs) Rehabilitation	Locations	6	4	2	0	0	0	0	0	0	0	0	0	0	1	3	2	33.3%	51.2%
Transportation Related Facilities	SF	216,712	0	159,669	57,043	0	0	0	0	7,255	-	0	7,255	0	7,255	79,834	129,623	59.8%	65.1%
Water and Wastewater Treatment at SRRAs	Locations	1	1	0	0	0	0	-	0	0	-	0	0	-	0	1	0	0.0%	11.1%
Sustainability																			
ADA Pedestrian Infrastructure	Locations	12,567	-	-	12,567	-	463	-	-	257	-	-	720	-	720	-	11,847	94.3%	92.7%
Advance Mitigation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bridge Scour Mitigation	SF	1,798	-	-	1,798	-	1,798	-	-	0	-	-	1,798	-	1,798	-	18,883	91.3%	51.1%
Bridge Seismic Restoration	SF	319,268	-	-	319,268	-	96,391	-	-	18,828	-	-	115,219	-	115,219	-	365,692	76.0%	73.1%
Hazardous Waste Mitigation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roadside Rehabilitation	Acre	4,407	881	1,322	2,204	0	0	-	0	106	-	0	106	-	632	879	2,985	66.4%	59.4%
Storm Water Mitigation	Acre	1,760	-	-	1,760	-	111	-	-	336	-	-	447	-	447	-	1,313	74.6%	71.0%
Zero Emission Vehicle Infrastructure	Locations	2	-	-	2	-	0	-	-	2	-	-	2	-	2	-	0	0.0%	0.0%
Performance																			
Commercial Vehicle Enforcement Facilities	Stations	7	0	7	0	0	0	-	0	1	-	0	1	-	1	3	3	42.9%	31.5%
Operational Improvements	DVHD	90,000	-	-	90,000	-	612	-	-	1,258	-	-	1,870	-	1,870	-	88,130	97.9%	97.6%
Sign Panel Replacement	Each	6,878	0	0	6,878	0	1,963	-	0	885	-	0	2,848	-	2,848	0	4,030	58.6%	74.6%
Transportation Management Systems	Each	1,578	946	0	632	0	80	20	0	836	30	0	916	50	1,465	0	163	10.0%	10.0%
Bridge Goods Movement Upgrades	SF	25,492,126	22,438,945	1,365,864	1,687,317	0	0	-	0	0	-	0	0	-	22,438,945	1,365,864	1,687,317	6.6%	12.2%
Weigh-In-Motion Scales	Stations	21	0	21	0	1	0	0	0	4	0	1	4	0	5	9	7	33.3%	31.8%
Investment Plan Target*									\$2,054,125,745										
(* The Investment Plan Target includes the estimated SHOPP cost of the Remaining Performance AND additional funding for project-level cost anomalies, Complete Streets elements, etc.																			

(*) The Investment Plan Target includes the estimated SHOPP cost of the Remaining Performance AND additional funding for project-level cost anomalies, Complete Streets elements, etc.

Reporting Project Level Accomplishments


SHOPP Project - Accomplishment - Performance Measures - Benefits

District: 11 Tool ID: 16889 Project ID: 1116000068 EA: 42480 Co-Rte-PM: SD-054-0/6.4 (Primary Location) View/Print PIR (Performance) Report

Res In PID WP: 07/01/15 Project Manager: Bruce Lambert HQ PM Conc TYP: 07/20/17 HQ PM Conc PID: 05/27/15 HQ PM Conc PRG: 09/11/17

☐ Bridge
 ☒ Pavement
 ☒ Drainage
 ☐ Facilities
 ☒ Safety
 ☒ Mobility
 ☒ Roadside
 ☒ Complete Streets
 ☐ Sustainability /Climate Change
 ☐ Advance Mitigation
 ☐ Other
 ☐ Major Damage
 ☒ Green-house Gases

Performance & Accomplishments (PRG)

	Activity Detail	Performance Objective	Unit of Measurement	Quantity	Assets in Good Cond	Assets in Fair Cond	Assets in Poor Cond	New Asset Added	Comment
1	Mainline existing Asphalt CAPM (e.g. 2" thin overlay (w or w/o wearing surface, cold in place, digouts, etc) (201.121)	Pavement Class II	lane-miles	9.3		9.3			FY 2021 SE 2.2%, RE 0.0%
2	Mainline existing Concrete CAPM (e.g. slab replace, grinding, thin overlay, spall repair) (201.121)	Pavement Class II	lane-miles	26.6		26.6			FY 2021 - SE=2.2%, RE=0.0%
3	Existing Ramps & Connectors (201.121, .122, .120)	Pavement Class II	lane-miles	1.0			1.0		rehab all ramps & connectors
4	Existing Shoulders (201.121, .122, .120)	No Performance Objective in the SHSMP	SF	1.0			1.0		rehab all SHL area = 2,462,000 SF
5	Replace/Install Culverts (201.151)	Drainage System Restoration	EA 	18.0			18.0		14 exist culv, 3 new culv+ 1 concr ditch
6	Replace Install/Culverts (201.151)	Drainage System Restoration	LF	678.0			488.0	190.0	Replace 488 LF, install 190 LF
7	Crash Cushions (201.010, .015)	No Performance Objective in the SHSMP	EA	58.0			58.0		
8	Guard Rail (201.010, .015)	No Performance Objective in the SHSMP	LF	11800.0			11800.0		
9	Rumble Strips (201.010, .015)	No Performance Objective in the SHSMP	LF	124800.0			124800.0		
10	Signing (201.010, .015)	No Performance Objective in the SHSMP	EA	58.0			58.0		
11	Ramp Meter (201.315)	Transportation Management Systems	EA	6.0			6.0		Modify existing ramp meters
12	ADA - Repair/upgrade curb ramp (201.361)	ADA Pedestrian Infrastructure	EA	28.0			28.0		
13	Traffic Signals (201.315)	Transportation Management Systems	EA	5.0			5.0		Modify existing signals
14	Irrigation System (201.210)	Roadside Rehabilitation	Acres	1.0			1.0		
15	Enhanced Crosswalk Visibility (201.999)	No Performance Objective in the SHSMP	EA	7.0			7.0		7 Existing marked crosswalks
16	Is any location within the project limits Ped/Bike accessible?	No Performance Objective in the SHSMP	Yes/No						yes
17	Qualitative	No Performance Objective in the SHSMP							TMP and local materials will be used

Performance Objective Report

Attachment B - District 11 Asset Management Performance Fact Sheet (Data as of 07/13/18 10:07 AM)

District 11 2017 Ten-Year Book		Meeting Performance?		
Performance objective	Unit of Measurement	New	Fair	Poor
Primary Asset Classes				
Pavement Class I	Lane Miles	YES	YES	
Pavement Class II	Lane Miles	YES	YES	
Pavement Class III	Lane Miles	YES	YES	
Bridge Health	SF	YES	YES	NO
Transportation Management Systems	Each	YES	YES	YES
Drainage System Restoration	Linear Feet	YES	YES	YES
Supplementary Asset Classes				
Drainage Pump Plants	Locations	YES	YES	YES
Lighting Rehabilitation	Each	YES	YES	YES
Office Buildings	SF	YES	YES	YES
Overhead Sign Structures Rehabilitation	Each	YES	YES	YES
Roadside Safety Improvements	Locations	YES	YES	YES
ADA Pedestrian Infrastructure	Locations	YES	YES	YES
Transportation Related Facilities	SF	YES	YES	YES
Weigh-in-Motion Scales	Stations	YES	YES	YES
Other SHSMP Objectives				
Bridge Scour Mitigation	SF	YES	YES	YES
Bridge Seismic Restoration	SF	YES	YES	YES
Bridge Rail Replacement and Upgrade	Linear Feet	YES	YES	YES
Bridge Goods Movement Upgrades		YES	YES	YES
Collision Severity Reduction	Injuries	YES	YES	YES
Safety Improvements		YES	YES	YES
Safety Roadside Rest Area (SRRAs) Rehabilitation	Locations	YES	YES	YES
Major Damage (Emergency Opening)		YES	YES	YES
Major Damage (Permanent Restoration)		YES	YES	YES
Relinquishments	Center Line Miles	YES	YES	YES
Roadway Protective Betterments	Locations	YES	YES	YES
Water and Wastewater Treatment at SRRAs	Locations	YES	YES	YES
Advance Mitigation		YES	YES	YES
Hazardous Waste Mitigation		YES	YES	YES
Roadside Rehabilitation	Acre	YES	YES	YES
Storm Water Mitigation	Acre	YES	YES	YES
Zero Emission Vehicle Infrastructure	Locations	YES	YES	YES
Commercial Vehicle Enforcement Facilities	Stations	YES	YES	YES
Operational Improvements	DVHD	YES	YES	YES
Sign Panel Replacement	Each	YES	YES	YES

Attachment A - District 11 Asset Management Financial Fact Sheet (Data as of 07/13/18 10:07 AM)

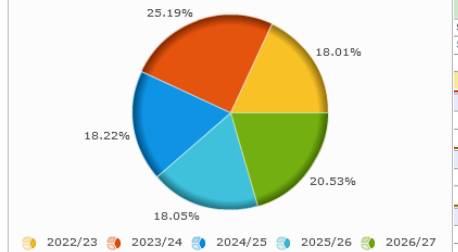
5 Year Financial Assessment - Portfolio Balance

5-Year Financial Assessment - Balanced Annual Budget (\$K)						
Fiscal Year	Ten-Year Target Funding (\$K)	Annual Target Funding (\$K)	*Project Costs (\$K)	*Projects Count	Within 20% (+/-5%) Annual Target Funding?	Balance (\$K)
2022/23	\$2,054,126	\$410,825	\$356,300	4	YES	\$54,525
2023/24	\$2,054,126	\$410,825	\$498,422	12	YES	-\$87,597
2024/25	\$2,054,126	\$410,825	\$380,420	15	YES	\$50,405
2025/26	\$2,054,126	\$410,825	\$357,183	12	YES	\$53,642
2026/27	\$2,054,126	\$410,825	\$406,300	21	YES	\$4,526

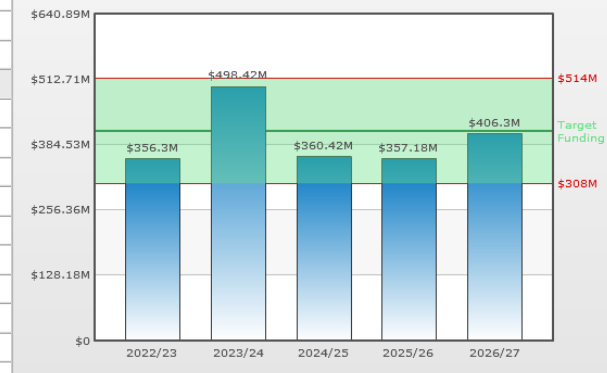
- Excludes reservation project.

5-Year Financial Assessment - Total 5-Year Budget (\$K)						
All Years	\$2,054,126	\$410,825	\$1,978,625	64	YES	\$75,500

Project Costs - Portfolio Balance



5-Year Financial Assessment



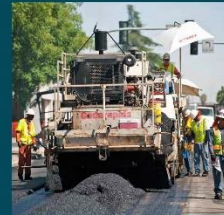
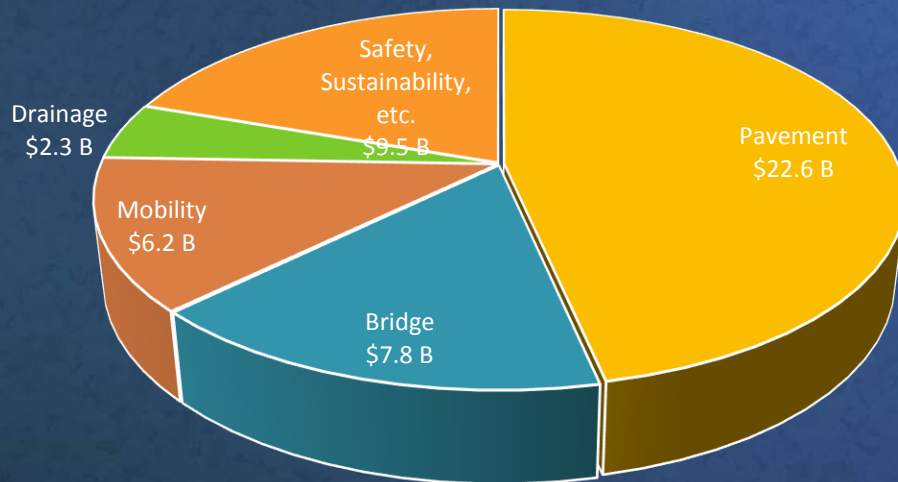
10 Year Funding and Performance Criteria

	Year 1-5 (Programmed)	Year 6-10 (Planned)
Funding Constraint	Sum of project costs to date, including PCRs, for projects with RTL in years 1-5 from the 2016 and 2018 SHOPP	5 Year Investment Plan Target from the 2017 District Performance Plan
Performance Constraint	Maintain the performance originally put forth in the 2016 and 2018 SHOPP.	2017 SHSMP Target Objectives, reflected in the Performance Objectives Report (POR) in the SHOPP Tool

[illegible]

SHOPP Ten-Year Project Book

- 3,187 Projects
- \$48.4 B of Project Costs



State Highway Operation and Protection Program Ten-Year Project Book

Fiscal Years 2017/18—2026/27



Fiscal Year 2017/18 (Quarter 3)
April 2018



Thank You