City of Chula Vista

Asset Management Program
Technical Advisory Committee

March 4, 2015

"above, below, and all around you"

Agenda

- Asset Management Goals and Objectives
- Asset Management Methodology
- Criticality/Risk Assessment Methodology
- Life Cycle Cost Methodology
- Asset Management Systems:
  - Roadway Management System
  - Open Space Management System
  - General Government Management System
- AMP Tool Demonstration

Asset Management

Delivering an established

level of service

while managing individual assets to

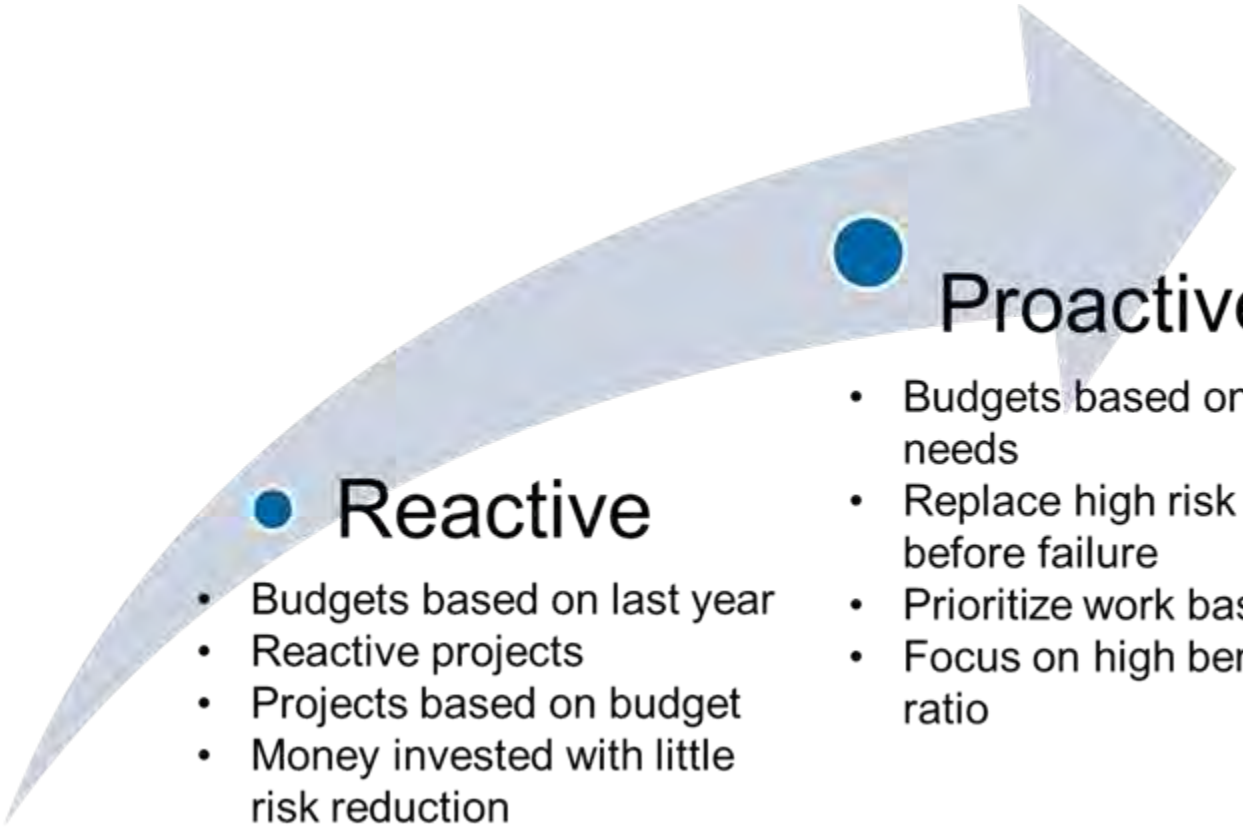
minimize the life cycle cost

with an acceptable

level of risk

Optimized Sustainable Stewardship

Effective Asset Management



Goal of Asset Management

Customer Expectations

Cost of Service

Level of Service

Risk

Asset Management Program Objectives

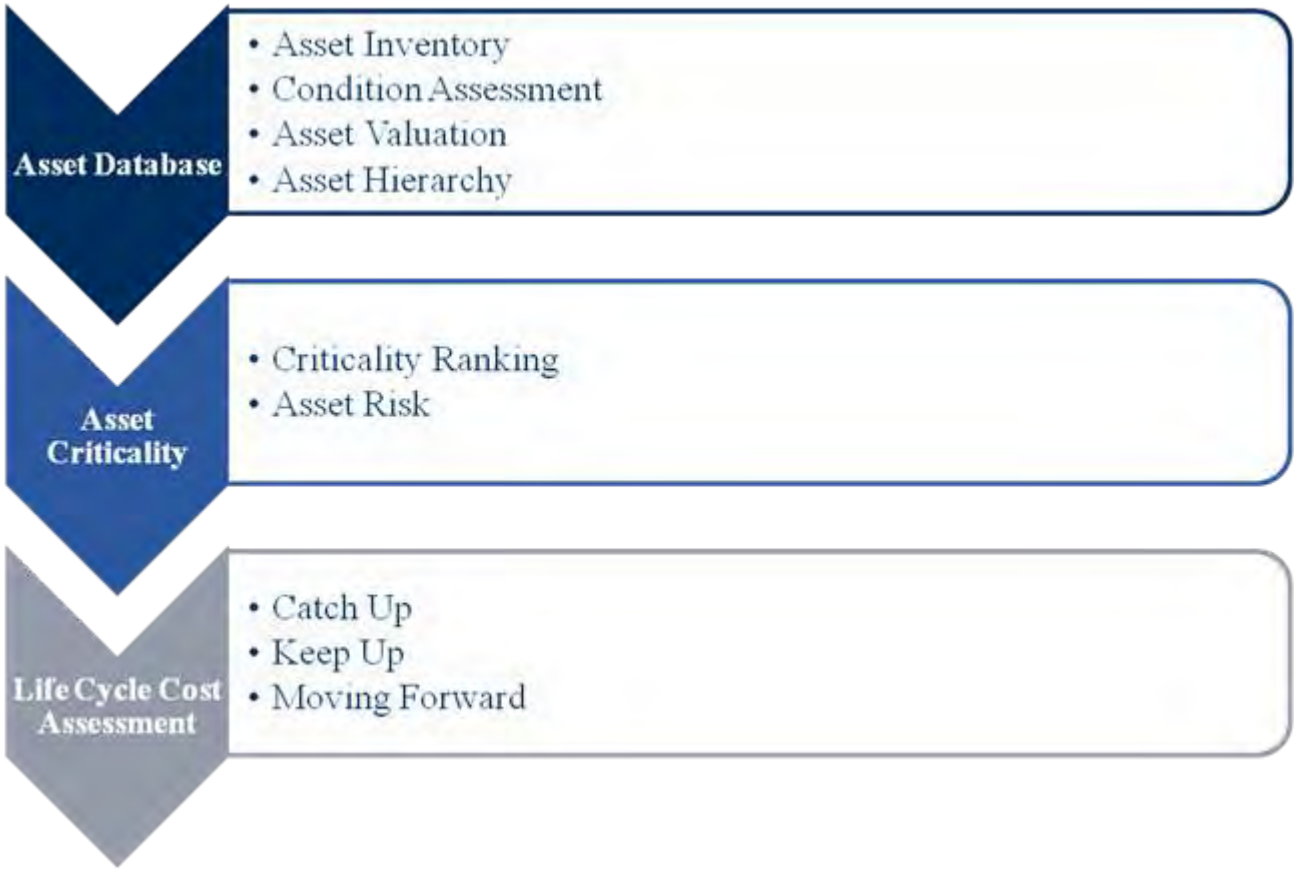
- **Catching Up $**
- **Keeping Up $**
- **Moving Forward $**

Asset Management Program (AMP)

Building Management System	BMS
Drainage Management System	DMS
Fleet Management System	FMS
General Government Management System	GGMS
Open Space Management System	OSMS
Parks Management System	PMS
Roadway Management System	RMS
Urban Forestry Management System	UFMS
Wastewater Management System	WMS

9 Asset Management Systems for 100 years of investments

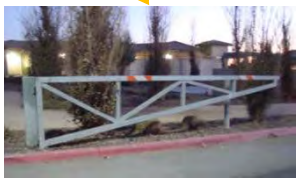
Asset Management Methodology



Data Collection Activities

Condition Assessment

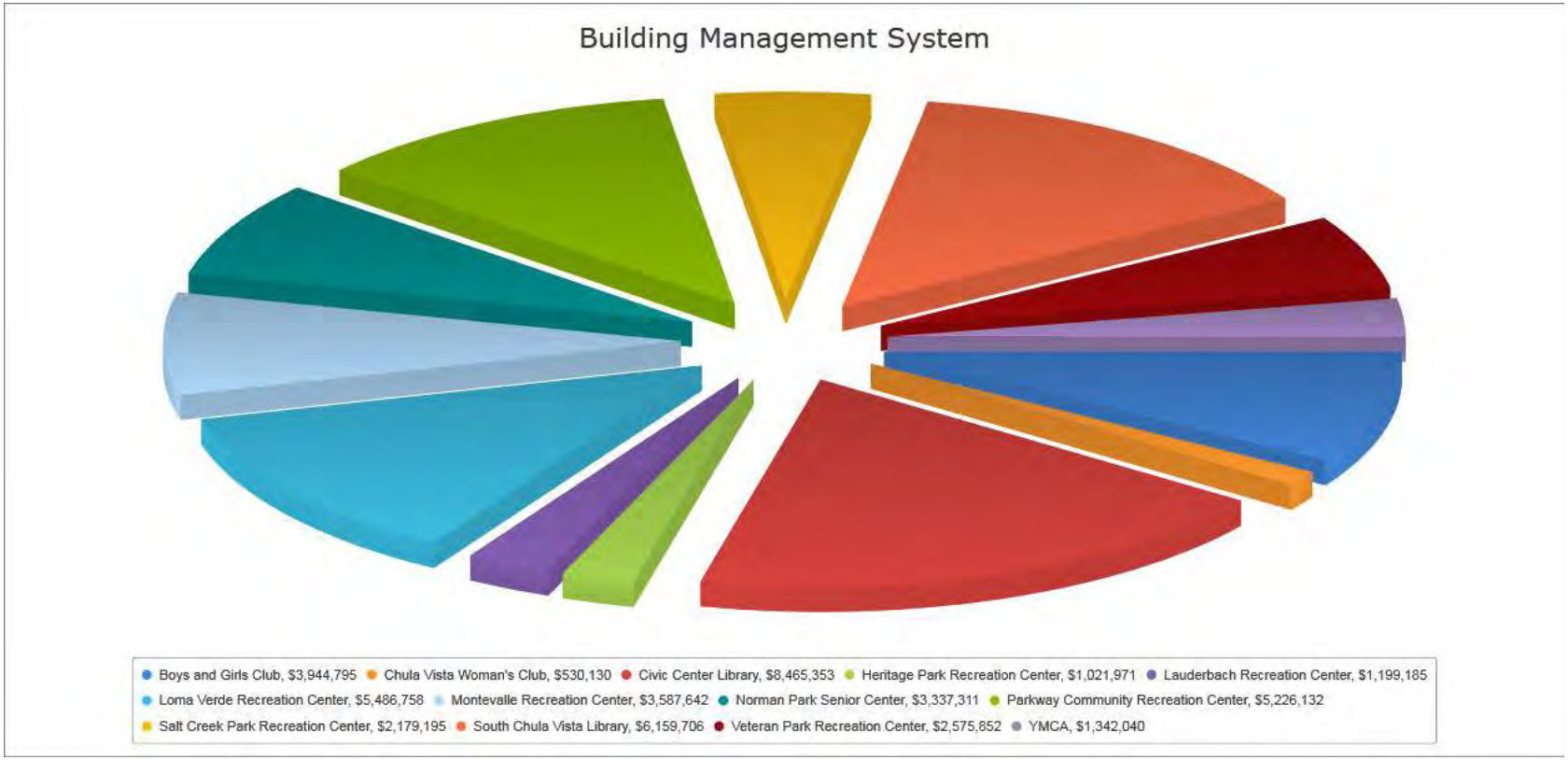
Asset Mapping



Documenting What is Managed (Asset Register)

Location	Sub-Location	Name	Asset ID	Size	Size Unit	Size 2	Size 2 Unit	Quantity	Material	Asset Class	Type	Installation Year	Age	Life	Condition (1 to 5)	CoF	PoF (%)	Condition Comments	Replacement Cost	Additional Comments
Knots Lane	Wet / Dry Well	Wet Well	SLS16005	449.6	CY			1	Reinforced	Well	Wet	1999	14	75	2	5	8.06%		$ 314,689	
Knots Lane	Wet / Dry Well	Dry Well	SLS16006	1220	CY			1	Reinforced	Well	Dry	1999	14	75	2	5	8.06%		$ 354,156	
Knots Lane	Wet / Dry Well	Stairway	SLS16007					5	Galvanized	Stairway		1998	14	40	2	2	20.71%		$ 21,000	
Knots Lane	Wet / Dry Well	Stairway Handrail	SLS16008	64	LF			1	Galvanized	Handrail	Aluminium	1999	14	40	2	3	20.71%		$ 13,440	
Knots Lane	Wet / Dry Well	Single Leaf Alum. Access Hatch	SLS16009	32	SF			1	Galvanized	Hatch		1999	14	40	2	3	20.71%		$ 5,000	
Knots Lane	Wet / Dry Well	Alum. Pump Removal Hatch	SLS16010	27	SF			1	Galvanized	Hatch		1999	14	40	2	3	20.71%		$ 5,000	
Knots Lane	Wet / Dry Well	Manhole Cover and Frame #1	SLS16011	3	Diam			1	Cast Iron	Manhole Cover		1999	14	75	2	1	8.06%		$ 1,400	
Knots Lane	Wet / Dry Well	Manhole Cover and Frame #2	SLS16012	3	Diam			1	Cast Iron	Manhole Cover		1999	14	75	2	1	8.06%		$ 1,400	
Knots Lane	Wet / Dry Well	Handrail (Pump Removal Hatch)	SLS16013	19	LF			1	Galvanized	Handrail	Aluminium	1999	14	40	2	3	20.71%		$ 3,990	
Knots Lane	Wet / Dry Well	Supply Fan	SLS16014					1		HVAC		1999	14	20	2	2	58.57%		$ 4,200	"No odor contro
Knots Lane	Wet / Dry Well	Exhaust Fan	SLS16015					1		HVAC		1999	14	20	2	2	58.57%		$ 4,200	
Knots Lane	Wet / Dry Well	Pump #1	SLS16016	7.5	HP	355	gpm	1		WW-Pump-S		1998	14	5	5	5	100.00%	Needs to be replaced.	$ 42,000	"0.6 Hours
Knots Lane	Wet / Dry Well	Inflow Plug Valve with Handwheel Operator	SLS16017	6	Inches			1	Steel	WW-Valve-L	Plug	1999	14	40	2	5	20.71%		$ 21,000	"Maintained
Knots Lane	Wet / Dry Well	Outflow Check Valve, Spring Loaded #1	SLS16018	4	Inches			1	Steel	WW-Valve-S	Check	1999	14	30	2	4	50.00%		$ 2,100	"Maintained
Knots Lane	Wet / Dry Well	Outflow Plug Valve with Handwheel	SLS16019	4	Inches			1	Steel	WW-Valve-S	Plug	1999	14	30	2	4	31.88%		$ 6,160	"Maintained
Knots Lane	Wet / Dry Well	Pump #2	SLS16020	7.5	HP	355	gpm	1		WW-Pump-S		1998	14	5	5	5	100.00%	Needs to be replaced.	$ 42,000	"0.6 Hours
Knots Lane	Wet / Dry Well	Inflow Plug Valve with Handwheel Operator	SLS16021	6	Inches			1	Steel	WW-Valve-L	Plug	1999	14	40	2	5	20.71%		$ 21,000	"Maintained
Knots Lane	Wet / Dry Well	Outflow Check Valve, Spring Loaded #2	SLS16022	4	Inches			1	Steel	WW-Valve-S	Check	1999	14	30	2	4	31.88%		$ 2,100	"Maintained
Knots Lane	Wet / Dry Well	Outflow Plug Valve with Handwheel	SLS16023	4	Inches			1	Steel	WW-Valve-S	Plug	1999	14	30	2	4	31.88%		$ 6,160	"Maintained
Knots Lane	Generator & Control	Generator & Control Room Building	SLS16024	190	SF			1	CMU	Non-office		1999	14	60	2	4	11.27%		$ 23,750	"2 x 3" x 4' Louver
Knots Lane	Generator & Control	Flow Meter	SLS16025	6	Inches			1		Flow Meter		2013	0	25	3	2	50.00%		$ 15,000	"K-Factor: 0.9732
Knots Lane	Generator & Control	Bubbler Control System	SLS16026					1		Electric Panel		1999	14	20	2	5	58.57%		$ 10,000	"Wetwell level
Knots Lane	Generator & Control	Security System	SLS16027					1		Electric Panel		1999	14	20	2	5	58.57%		$ 10,000	
Knots Lane	Generator & Control	Telemetry	SLS16028					1		SCADA		1999	14	5	2	3	100.00%		$ 140,000	
Knots Lane	Generator & Control	Switchboard "SE"	SLS16029					1		Electric Panel		1999	14	20	2	5	58.57%		$ 10,000	
Knots Lane	Generator & Control	Transfer Switch (ATS)	SLS16030					1		Electric Panel		1999	14	20	2	5	58.57%		$ 10,000	
Knots Lane	Generator & Control	Main Control Panel (MCP)	SLS16031					1		Electric Panel		1999	14	20	2	5	58.57%		$ 10,000	"Pump on/off
Knots Lane	Generator & Control	Generator	SLS16032					1		Generator		1999	14	30	2	5	31.88%		$ 84,000	"Generator mair
Knots Lane	Generator & Control	Generator Diesel Tank	SLS16033	137	Gal			1		Tank	Diesel	1999	14	30	2	2	31.88%		$ 14,000	
Knots Lane	Generator & Control	MCC	SLS16034	208	V			1		MCC		1999	14	20	2	5	58.57%		$ 210,000	CAT. NO. 858
N. Batiquitos	Site	Paving		5050	SF			1	Asphalt	Pavement-AC		1998	15	50	2	1	16.43%		$ 353,500	condition. UV fadir
N. Batiquitos	Site	Outdoor Lighting #1 (South East)						1		Lighting		1998	15	30	2	1	35.36%		$ 4,900	
N. Batiquitos	Site	Outdoor Lighting #2 (North East)						1		Lighting		1998	15	30	2	1	35.36%		$ 4,900	
N. Batiquitos	Site	Outdoor Lighting #3 (South West)						1		Lighting		1998	15	30	2	1	35.36%		$ 4,900	
N. Batiquitos	Site	Outdoor Lighting #4 (North West)						1		Lighting		1998	15	30	2	1	35.36%		$ 4,900	

Asset Valuation

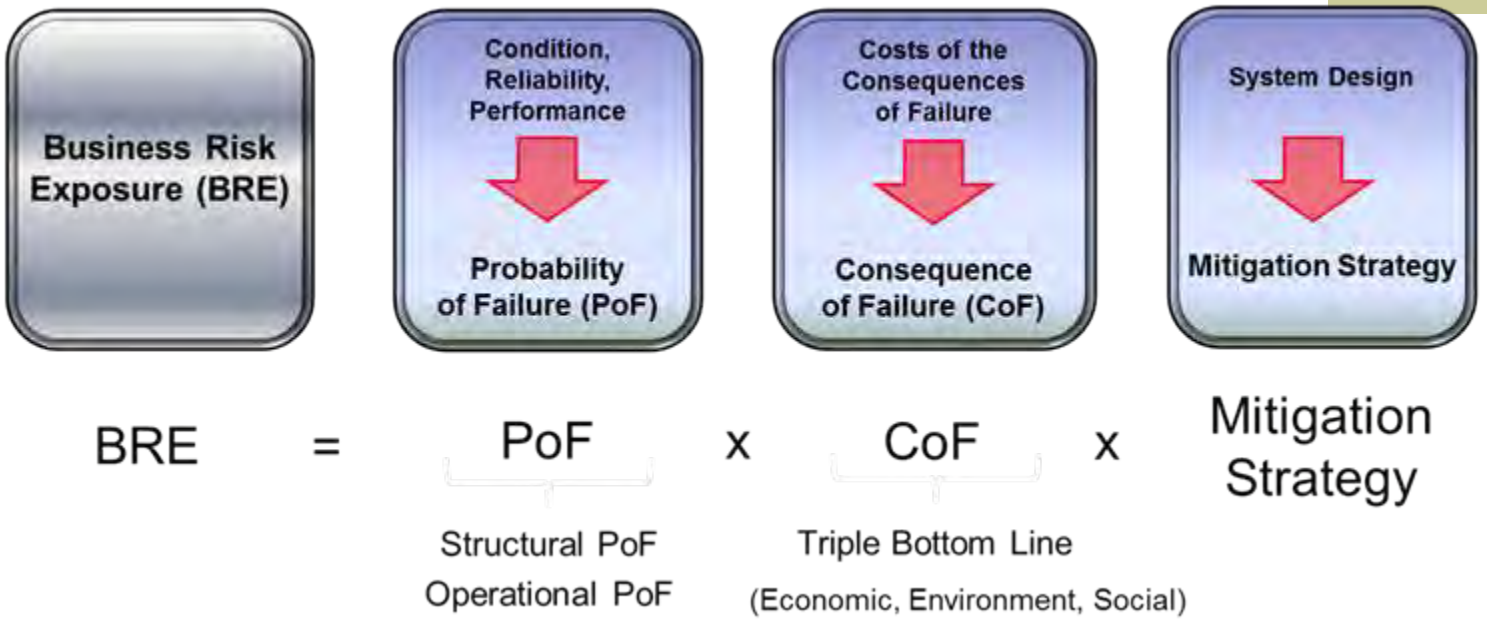


Asset Criticality

Criticality Methodology

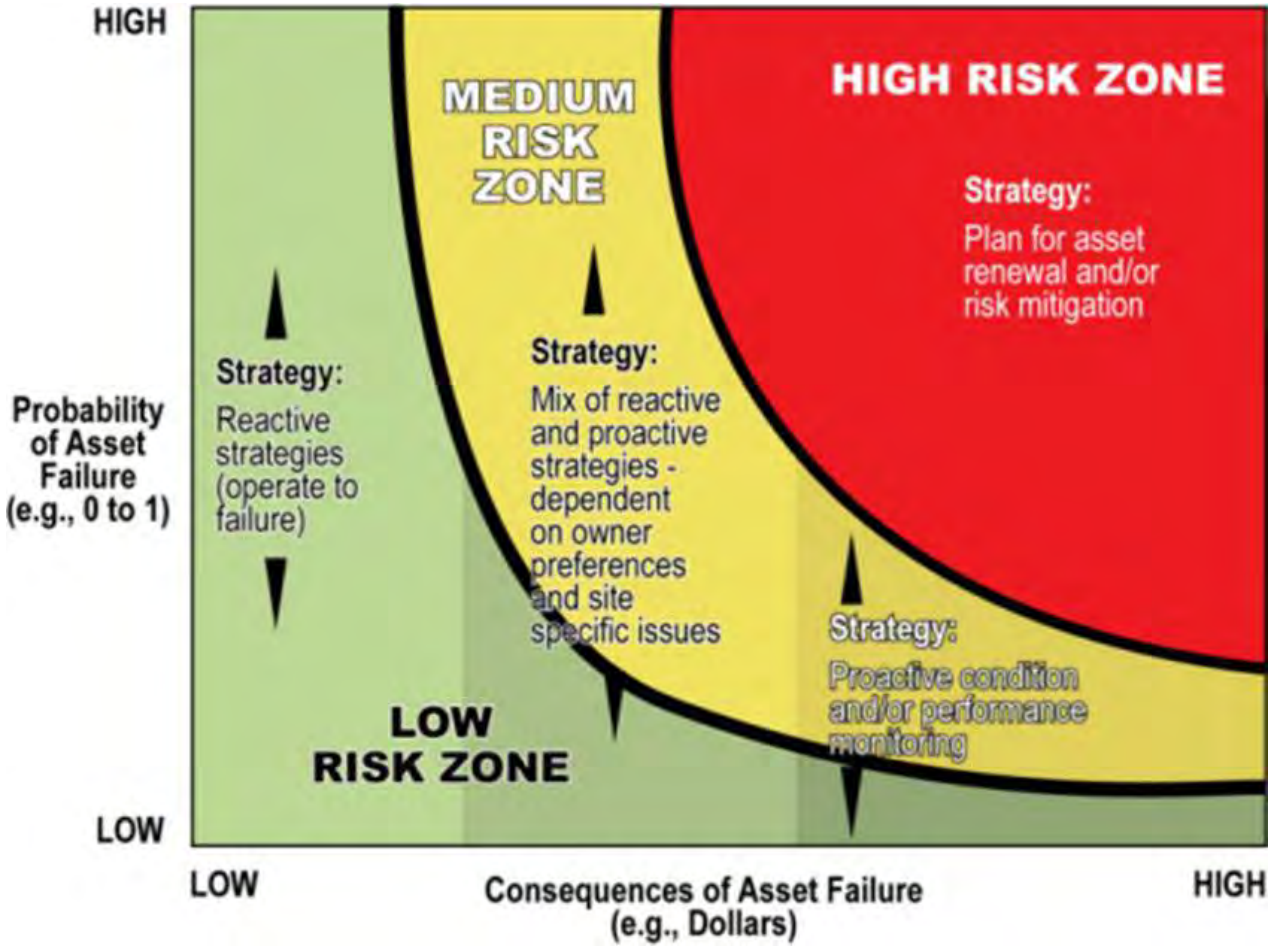
- By asset type and location
  - Type
  - Usage
  - Location
- By asset class
  - Example:
    - Playground
    - Sports courts

Risk

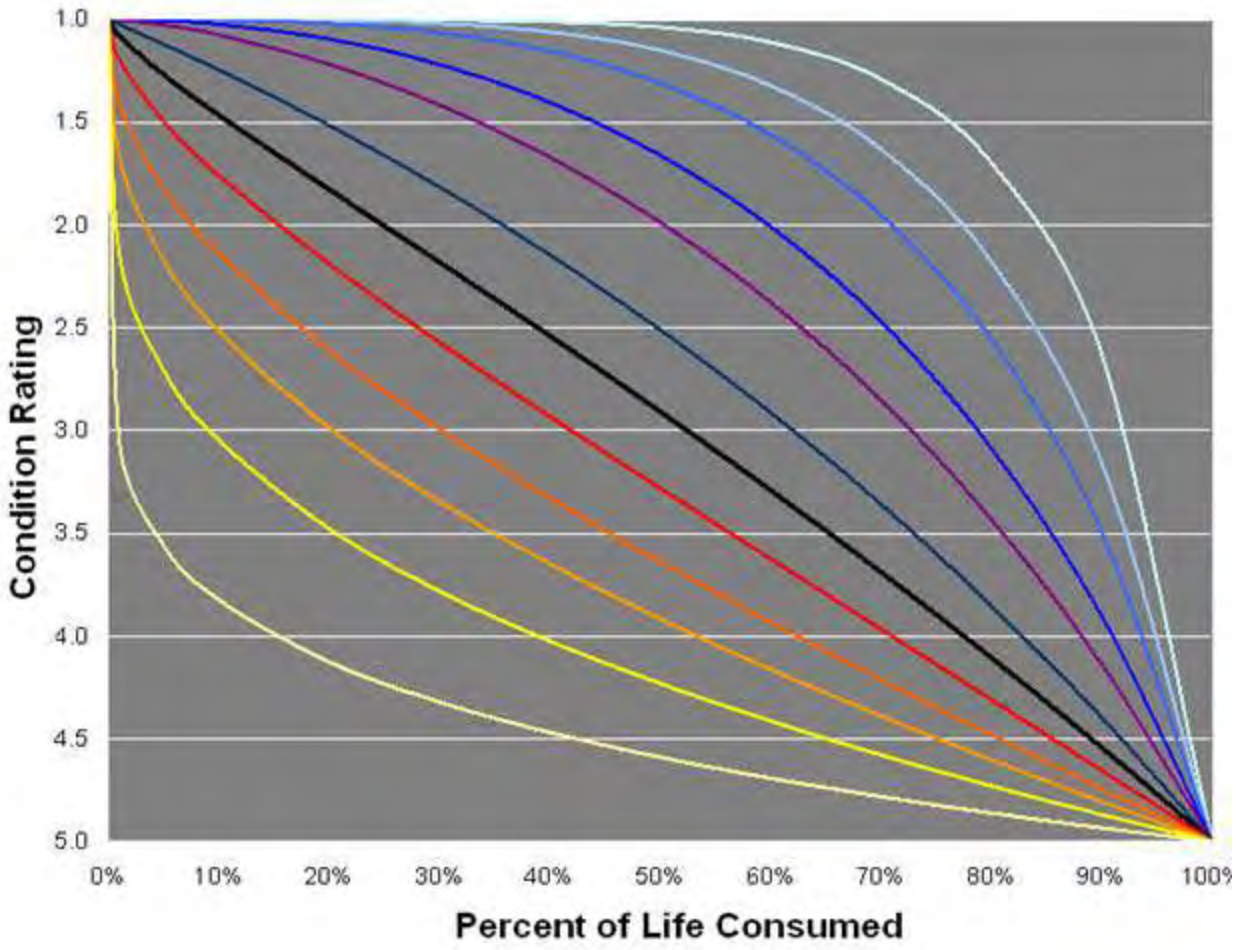


- Where PoF is driven by failure modes
- Physical Mortality (age)
- Capacity
- Levels of Service
- Financial Efficiency (life cycle cost)

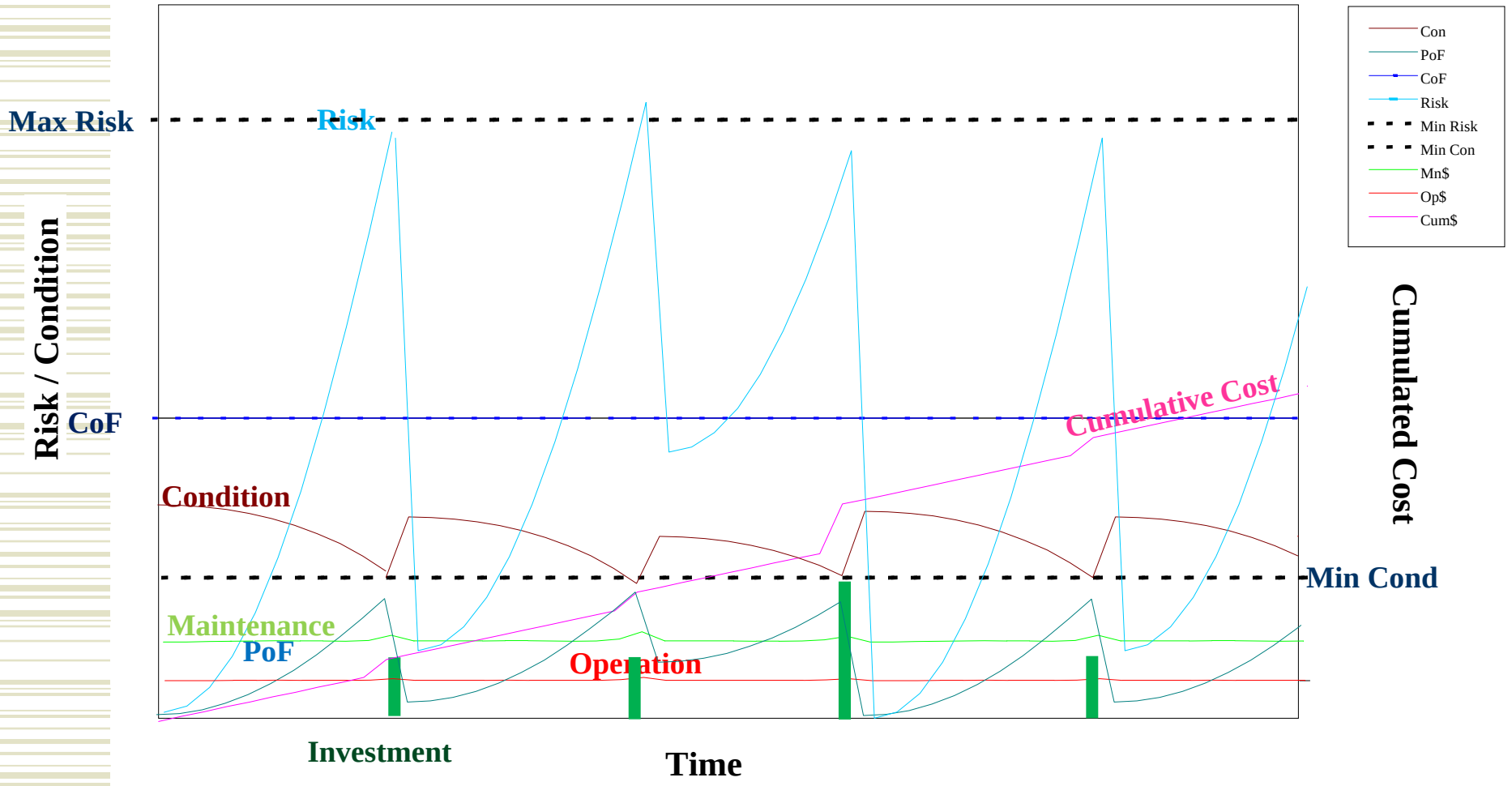
Management Strategy (Risk-Based)



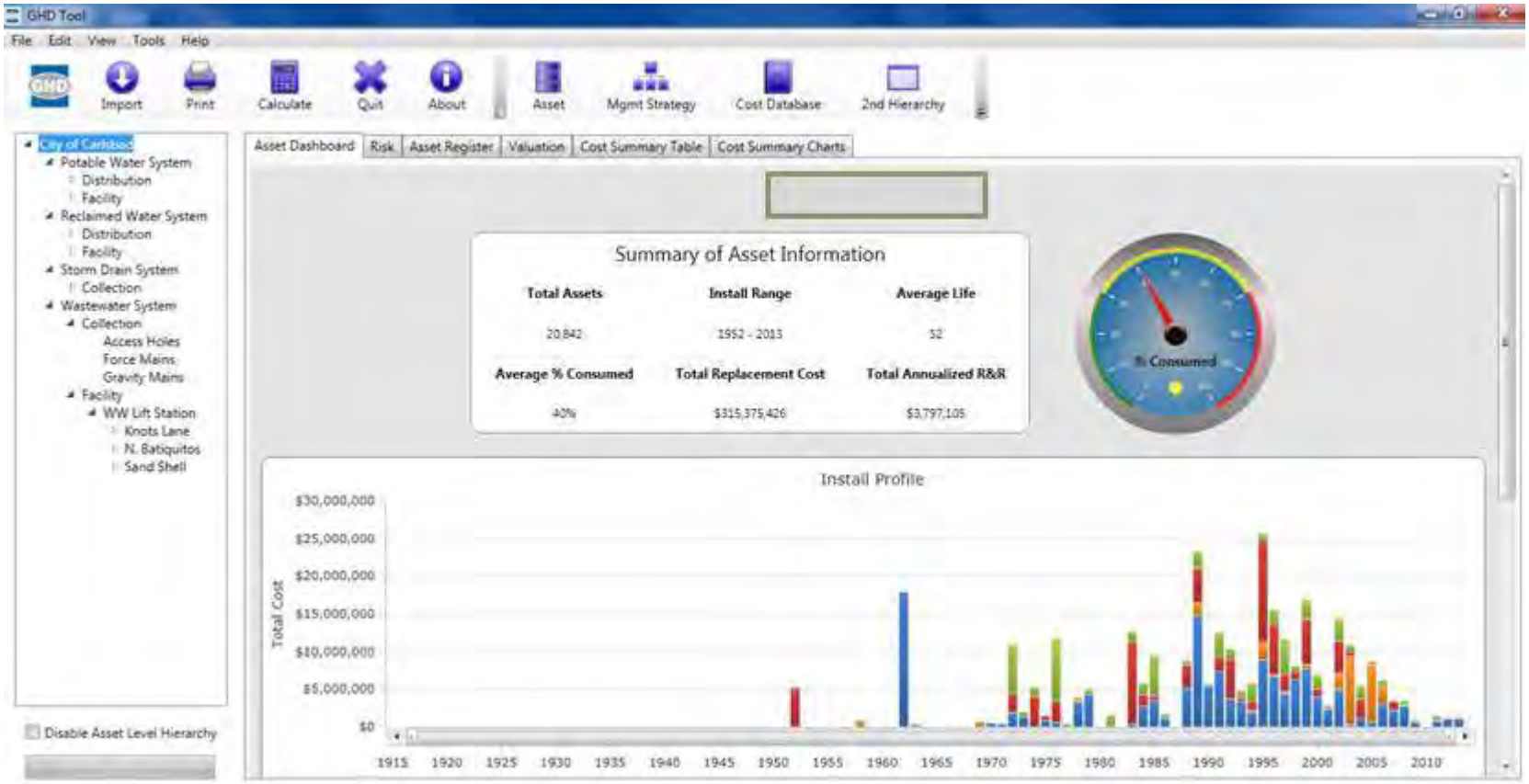
Calculating the Timing to Failure



Asset Life Cycle Investment Logic

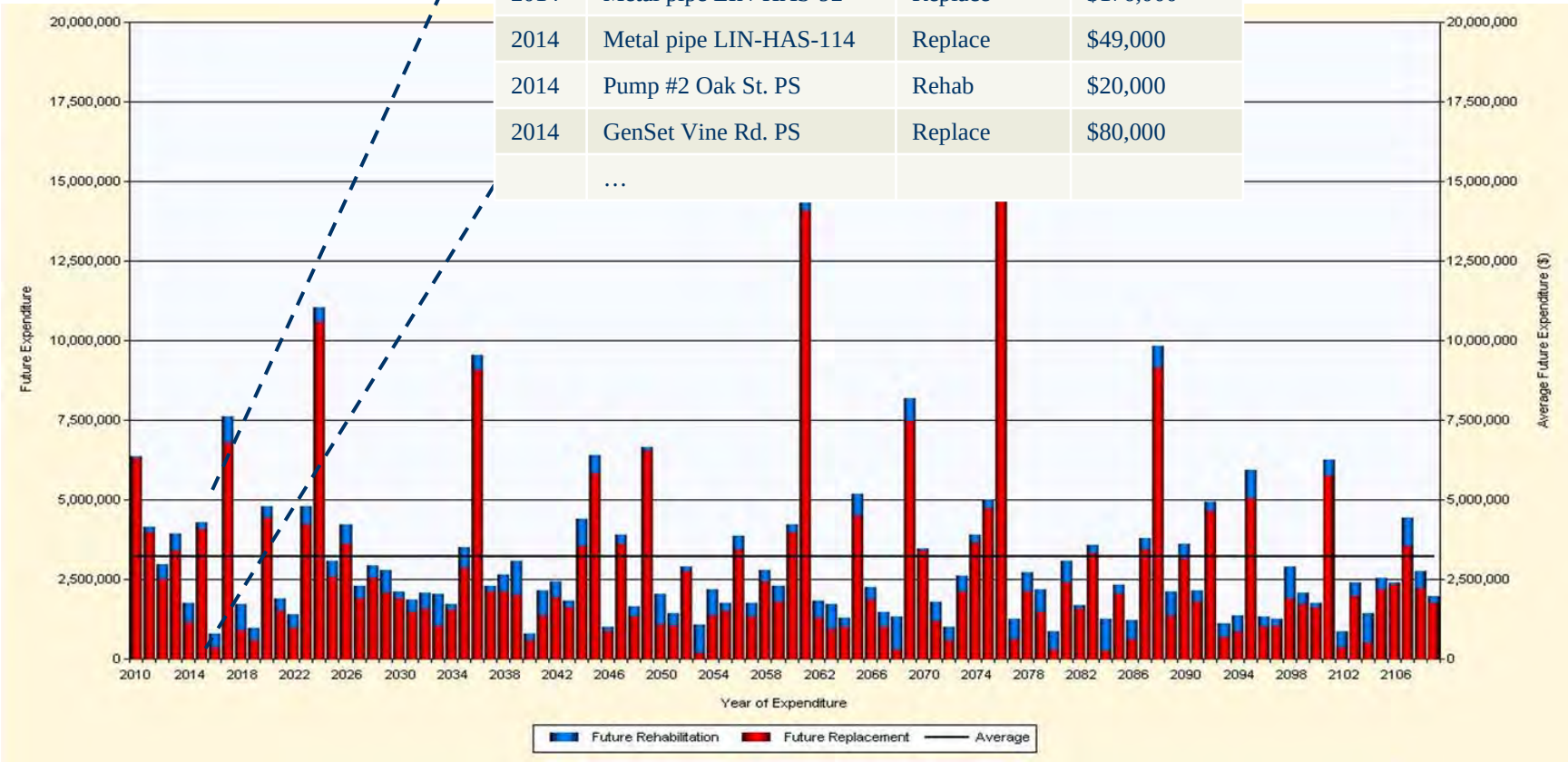


Asset Management Tool



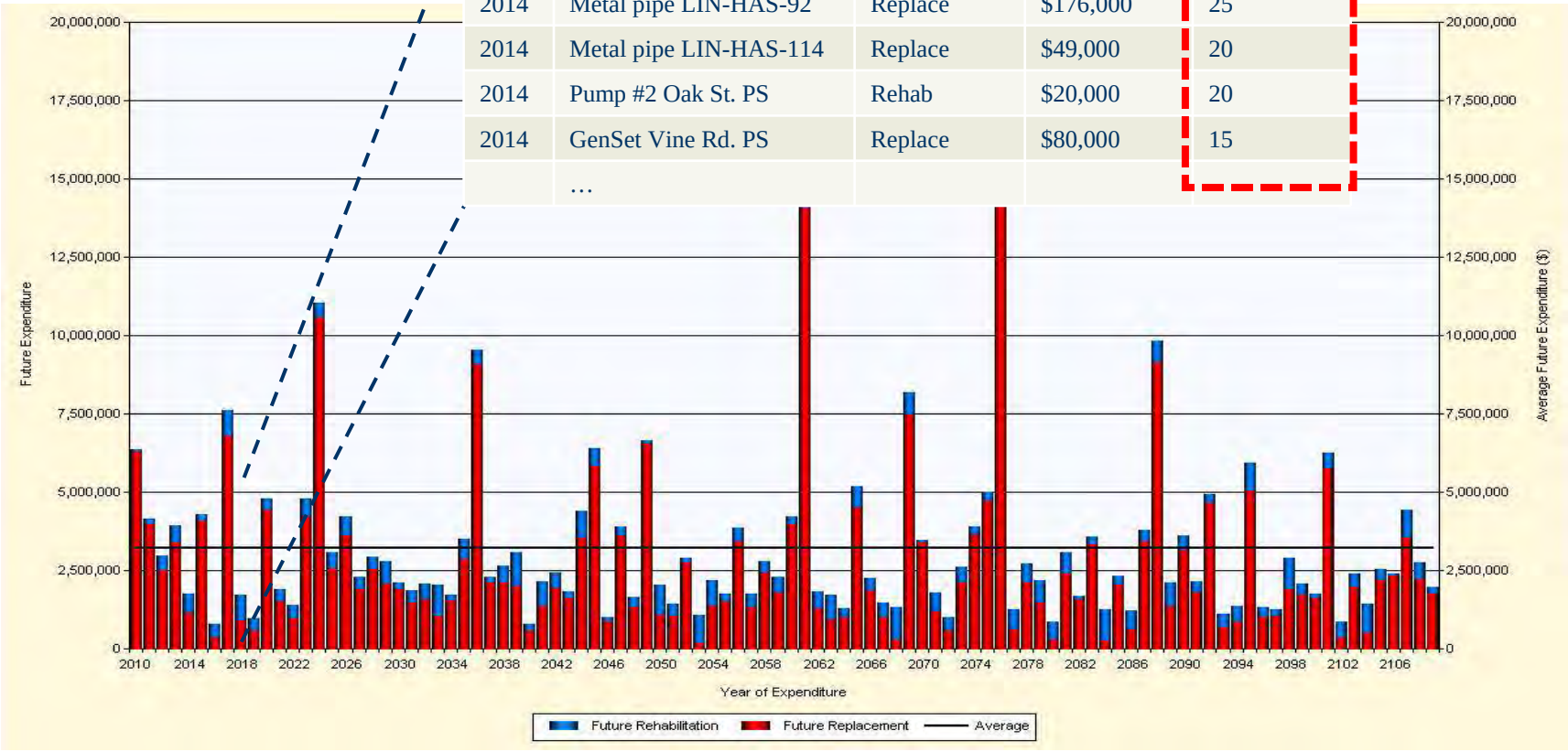
Understanding the Need (Year By Year, Asset By Asset)

Year	Asset Name	Action Type	Action Cost
2014	Metal pipe LIN-HAS-78	Replace	$340,000
2014	Metal pipe LIN-HAS-92	Replace	$176,000
2014	Metal pipe LIN-HAS-114	Replace	$49,000
2014	Pump #2 Oak St. PS	Rehab	$20,000
2014	GenSet Vine Rd. PS	Replace	$80,000
	…		



Risk-Based Prioritization

Year	Asset Name	Action Type	Action Cost	Risk Score
2014	Metal pipe LIN-HAS-78	Replace	$340,000	25
2014	Metal pipe LIN-HAS-92	Replace	$176,000	25
2014	Metal pipe LIN-HAS-114	Replace	$49,000	20
2014	Pump #2 Oak St. PS	Rehab	$20,000	20
2014	GenSet Vine Rd. PS	Replace	$80,000	15
	…			

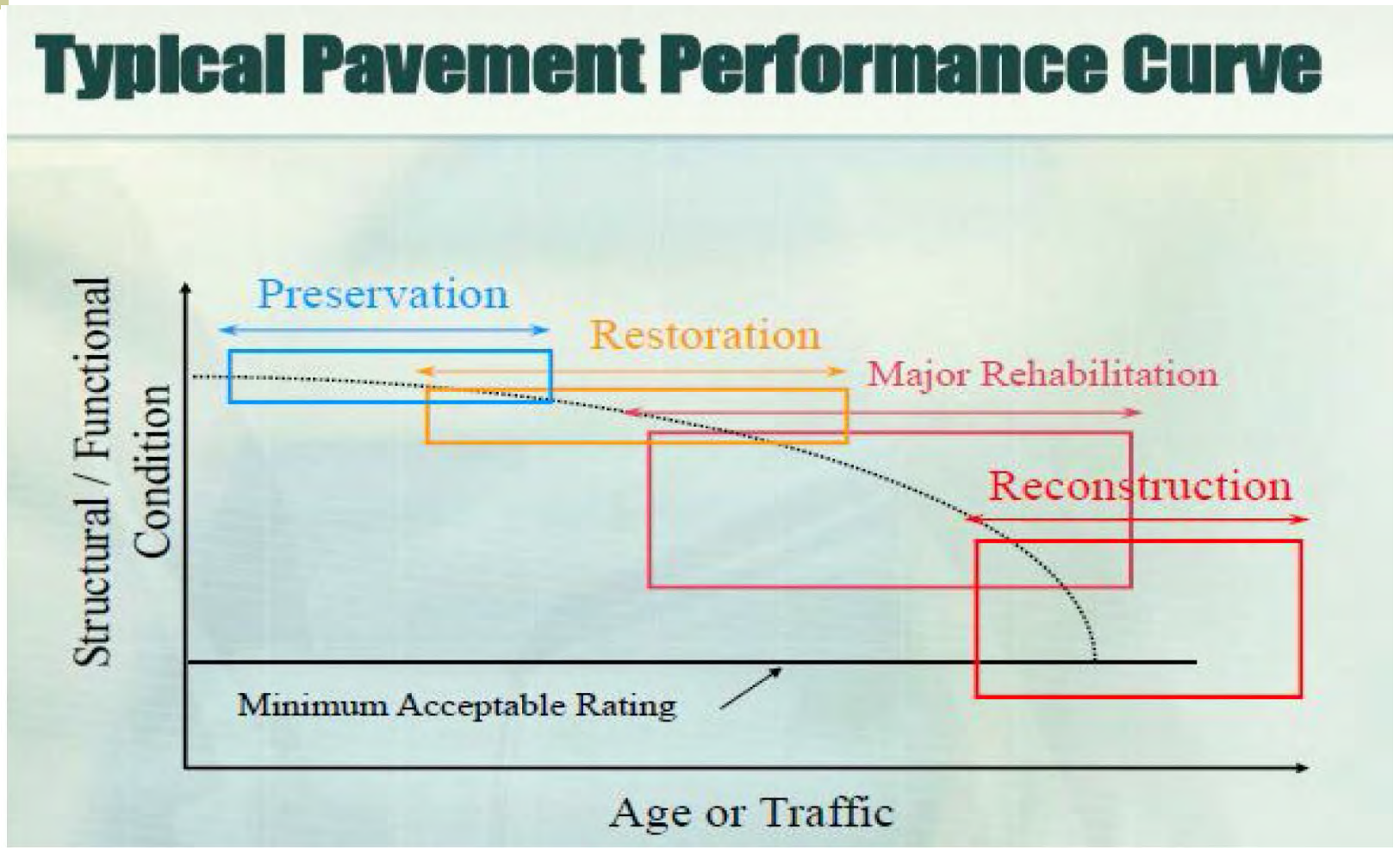


ROADWAY

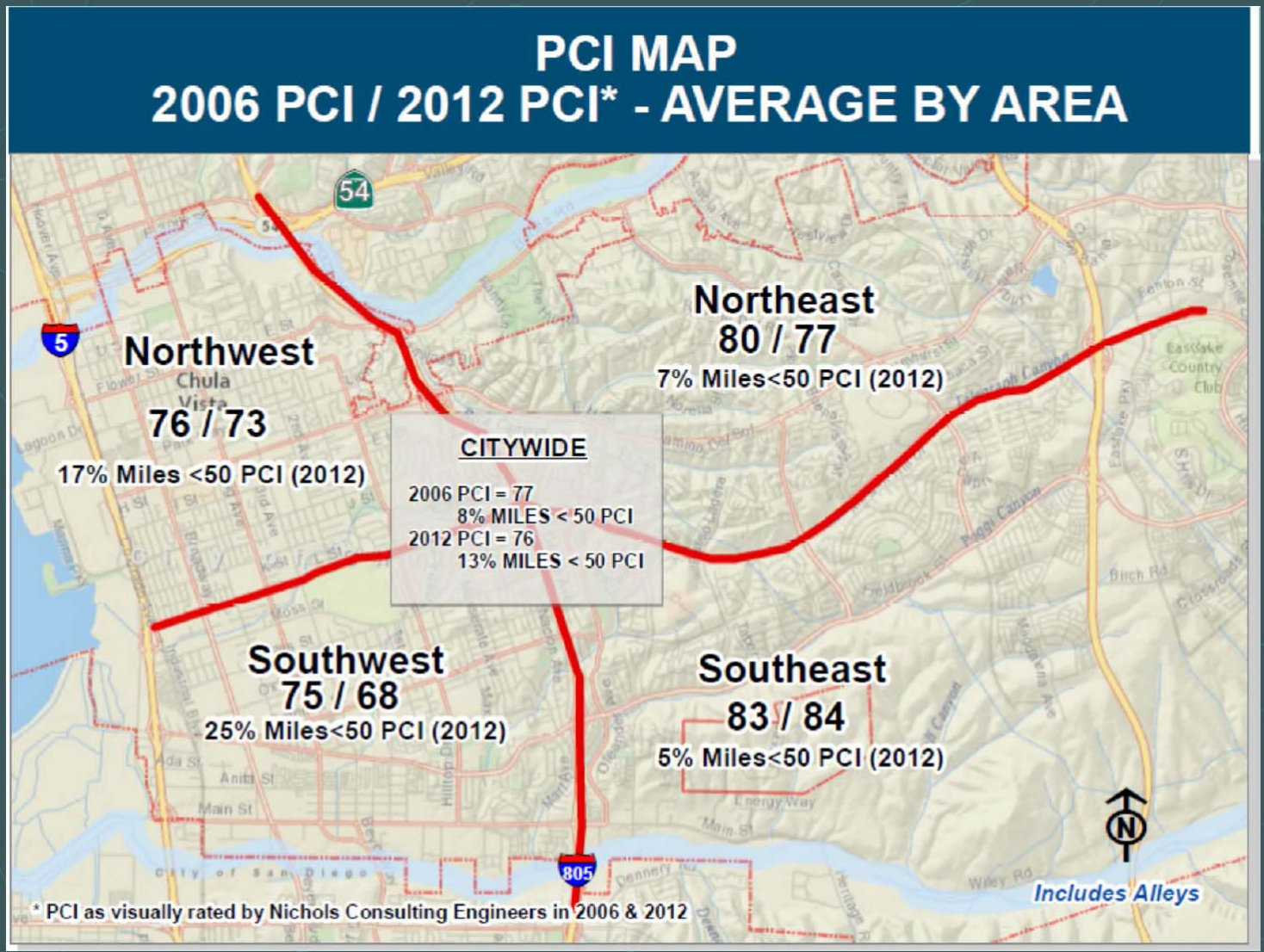
Roadway Assets

- Bridge
- Curb & Gutter
- Driveway Approach
- Guardrail
- Median
- Parking Lot
- Parking Meter
- Parkway
- Pavement Striping and Marking
- Pedestrian Ramp
- Sidewalk
- Traffic Sign
- Traffic Signal System
- Street Lighting

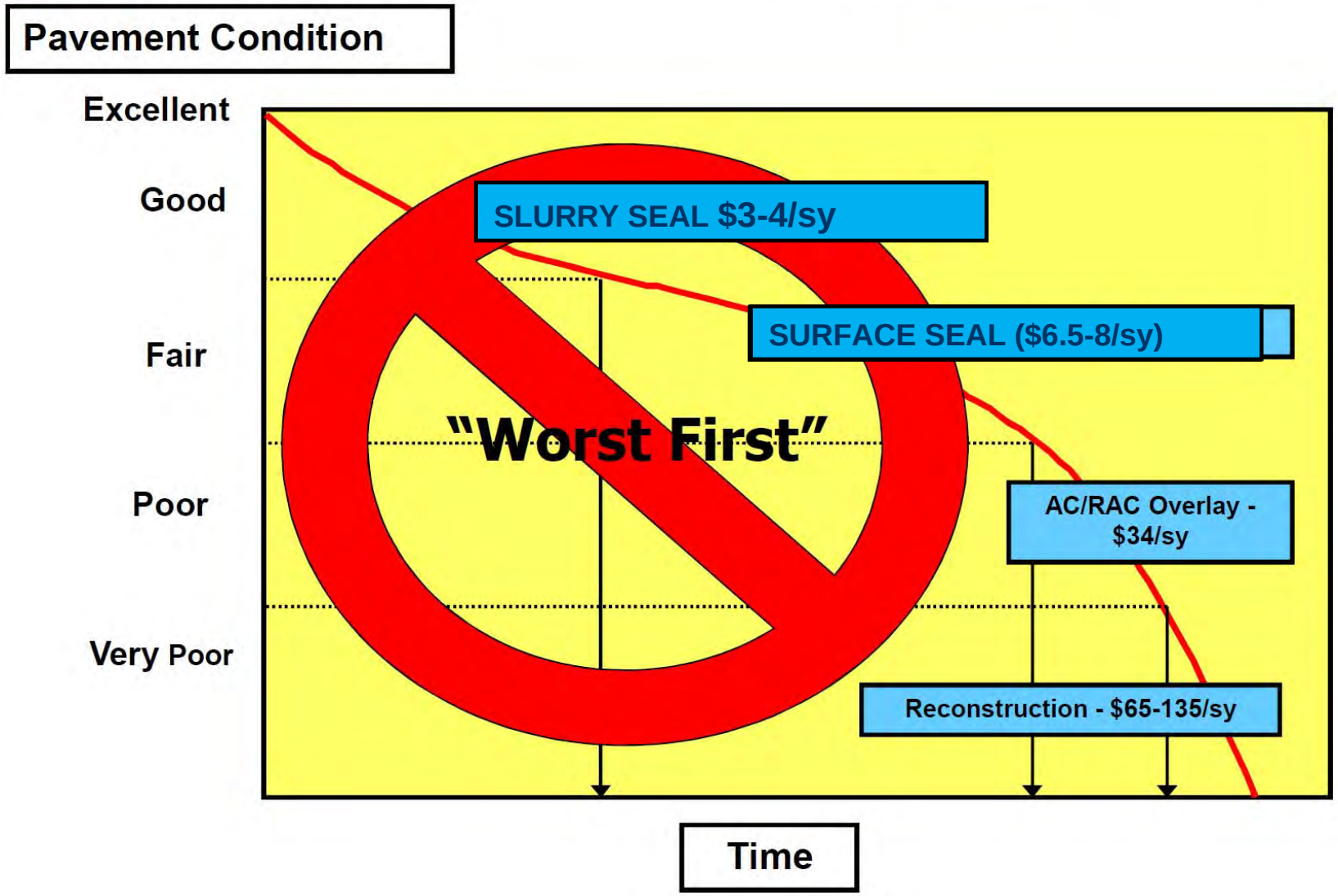
Pavement


Typical Pavement Performance Curve
Preservation
Restoration
Major Rehabilitation
Reconstruction
Structural / Functional Condition
Minimum Acceptable Rating
Age or Traffic

PCI MAP – 2012 & 2006

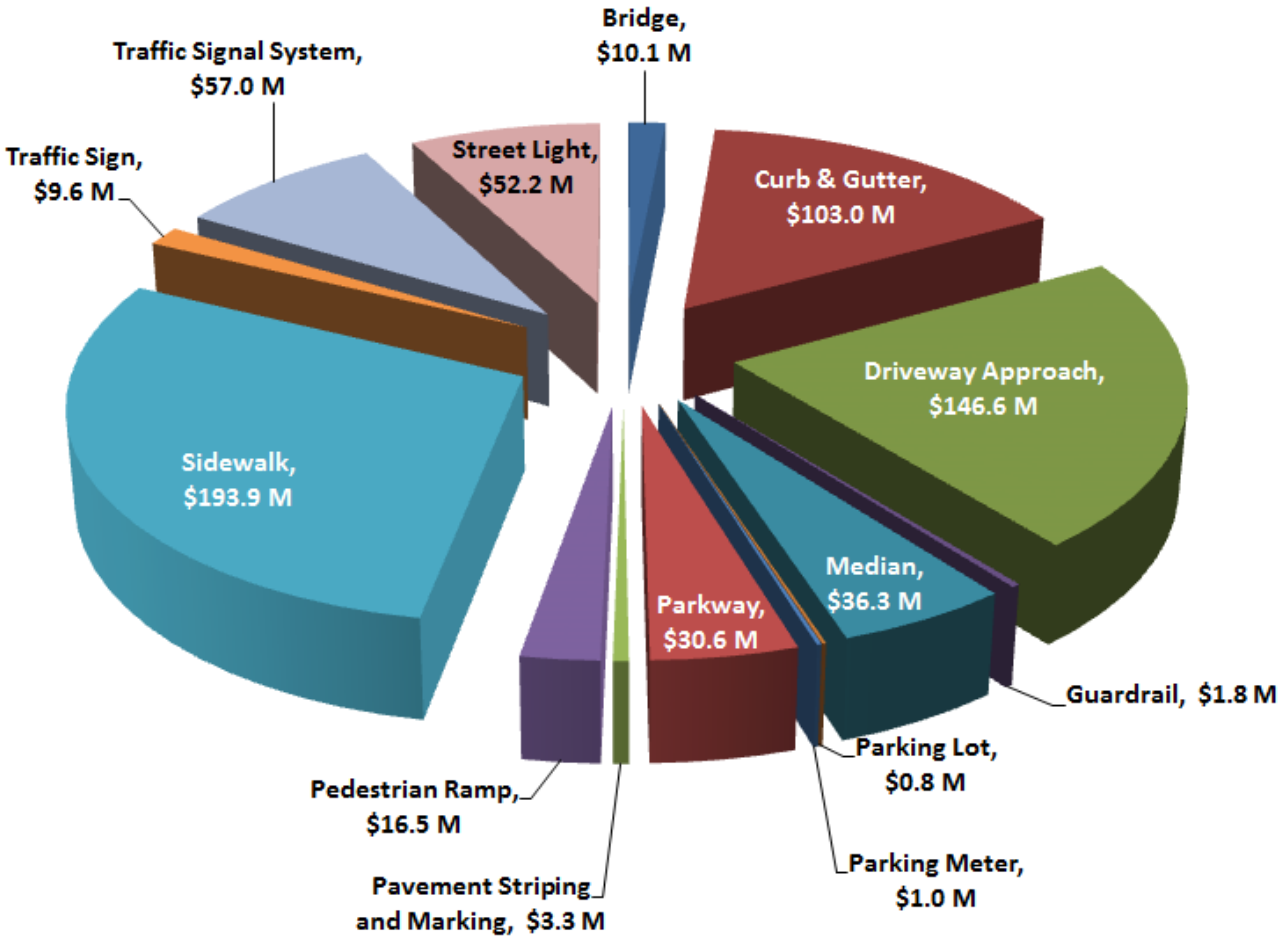


"Pay Now or Pay More Later"

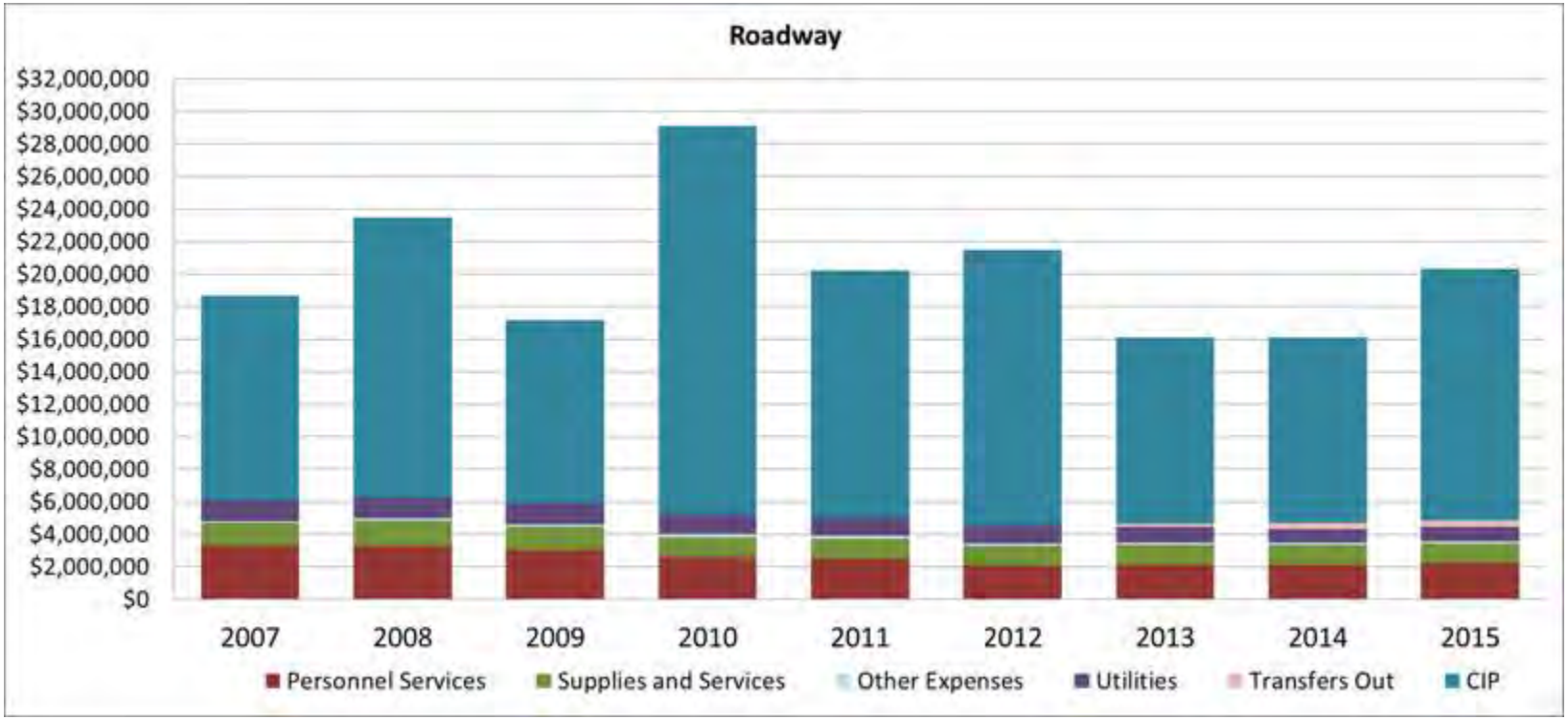


Roadway Valuation

Total: $662.5 M



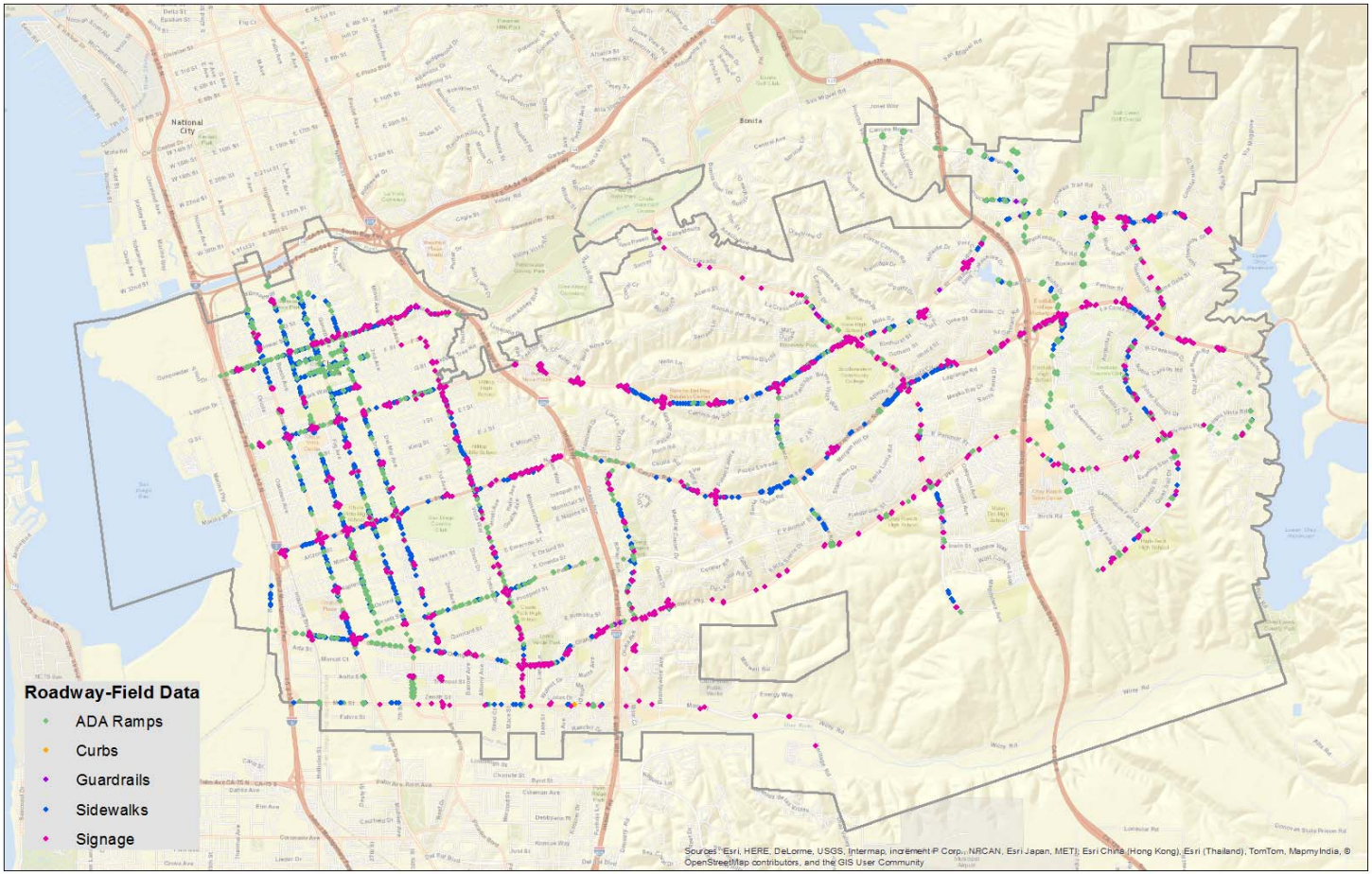
Historical Budget



Asset Inventory

Condition Assessment / ADA Compliance

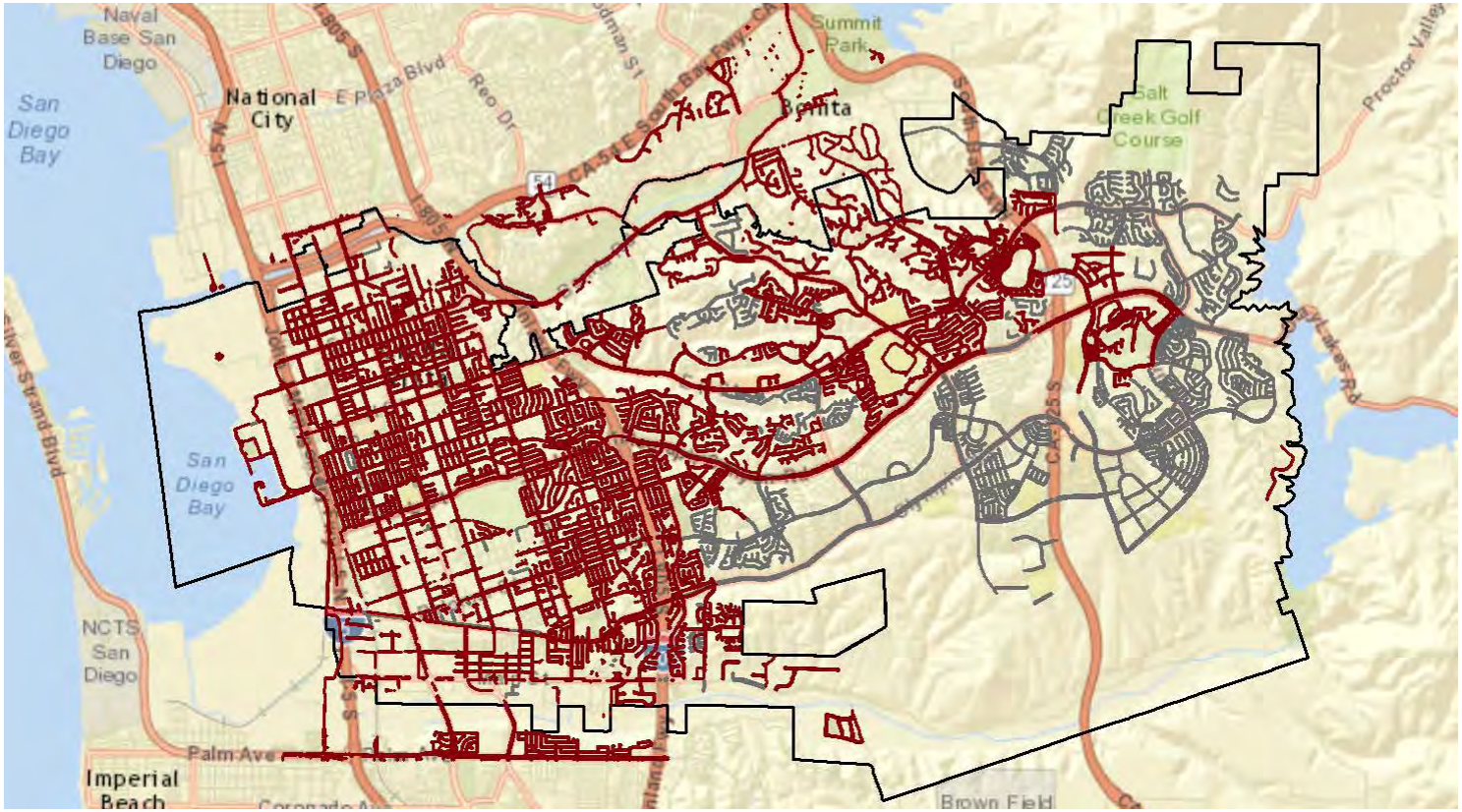
Field Assessment



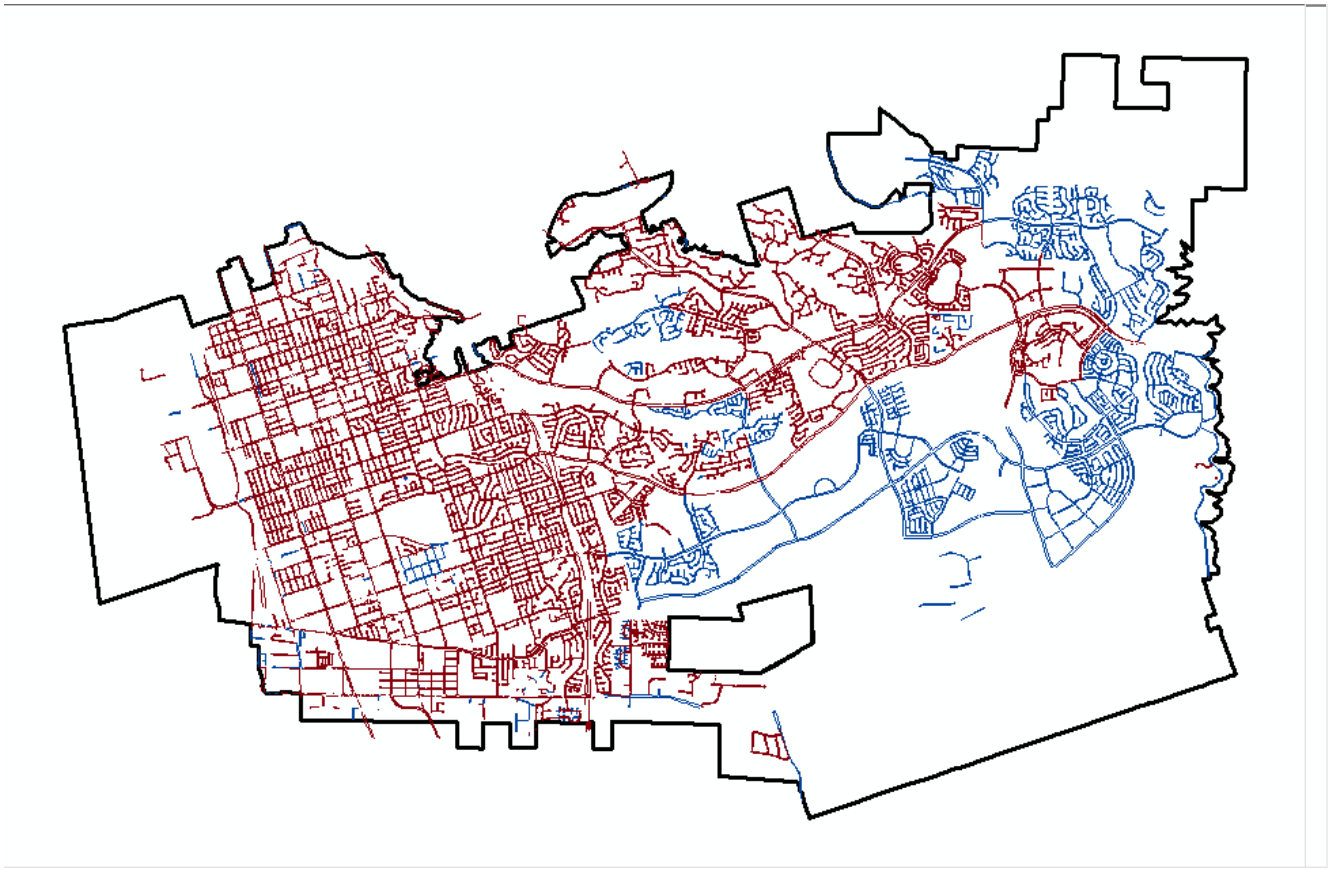
Asset Inventory

Asset Type	Inspected (count)	Inspected (mile)
Traffic Signs	1200	
ADA Ramps	1227	
Sidewalks		150 miles of roadway system
Guardrails		7 miles
Curb & Gutter		150 miles of roadway system
Medians		40 miles
Pavement Striping & Markings		150 miles of roadway system
Street Lights	450	
Parking Lots	11	
Parking Meters	380	

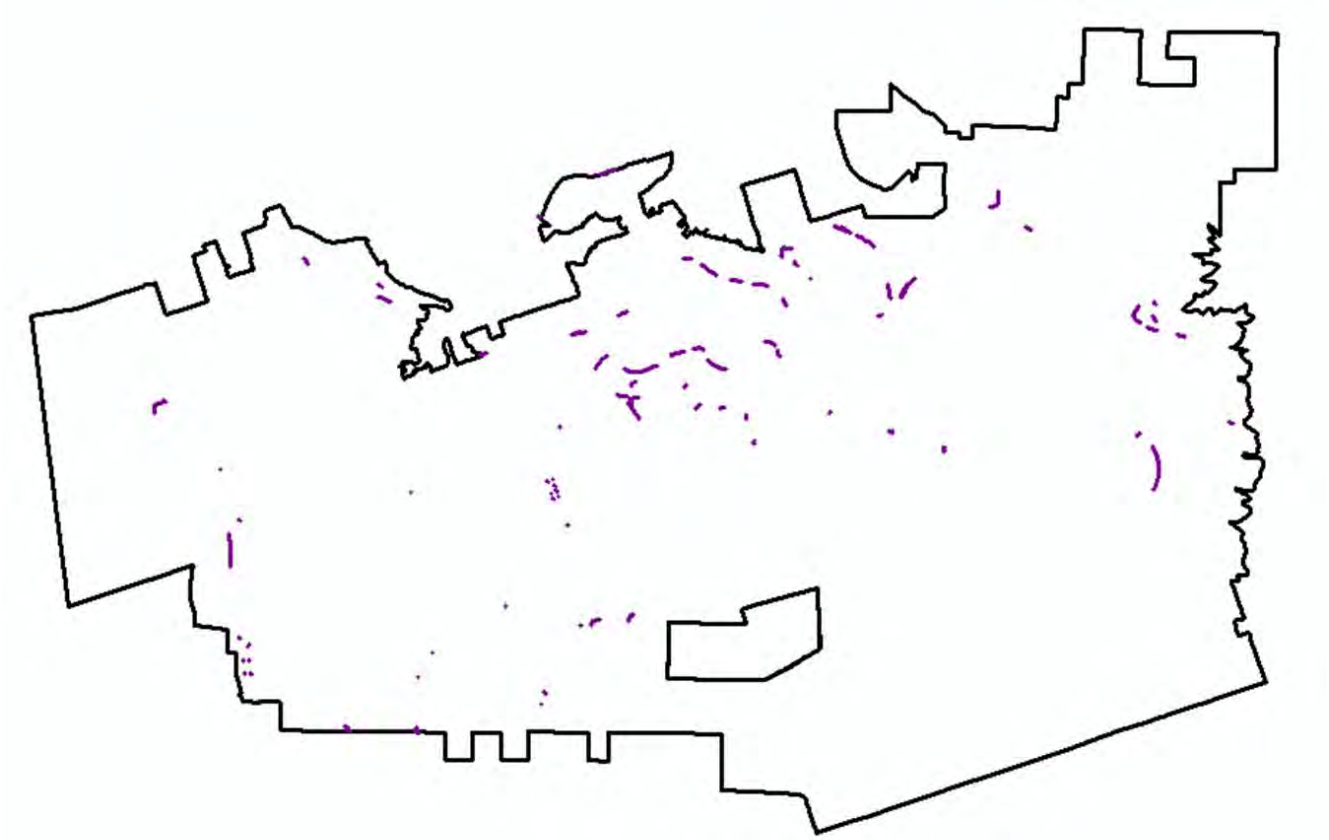
Sidewalk Inventory



Asset Inventory: Curb & Gutter



Asset Inventory: Guardrails



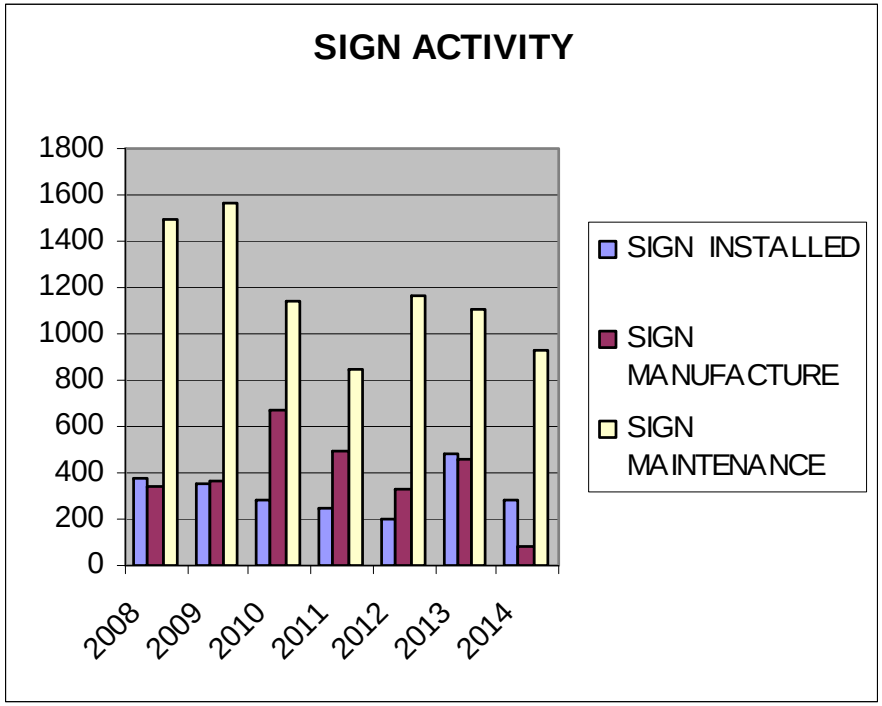
Asset Inventory: Parking Meters

Sign Assessments

- 28,242 Signs Citywide

Sign Maintenance Installation and Manufacture

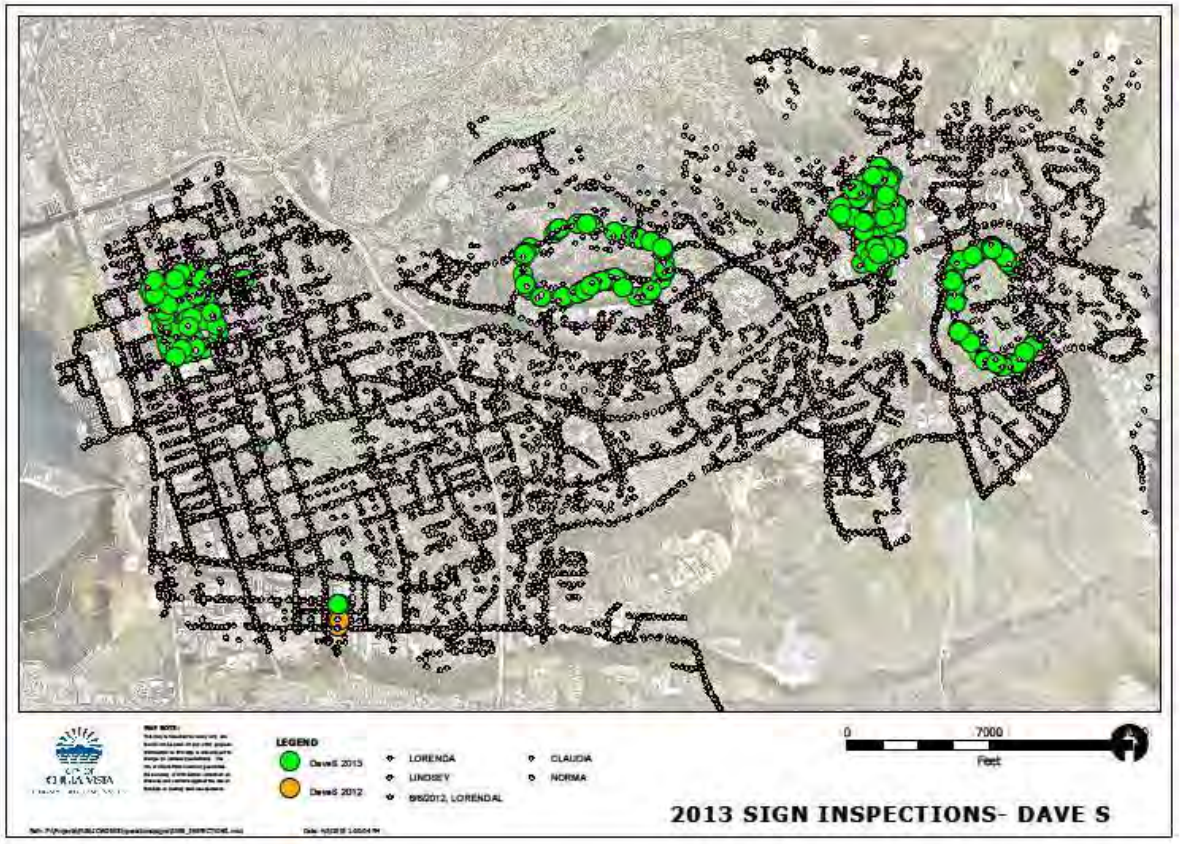
- Sign crew consisting of two persons installs and maintains on average 1338 signs per year
- Currently sign shop manufactures on average 484 new signs a year
- Over the last few years demand has increased in both areas



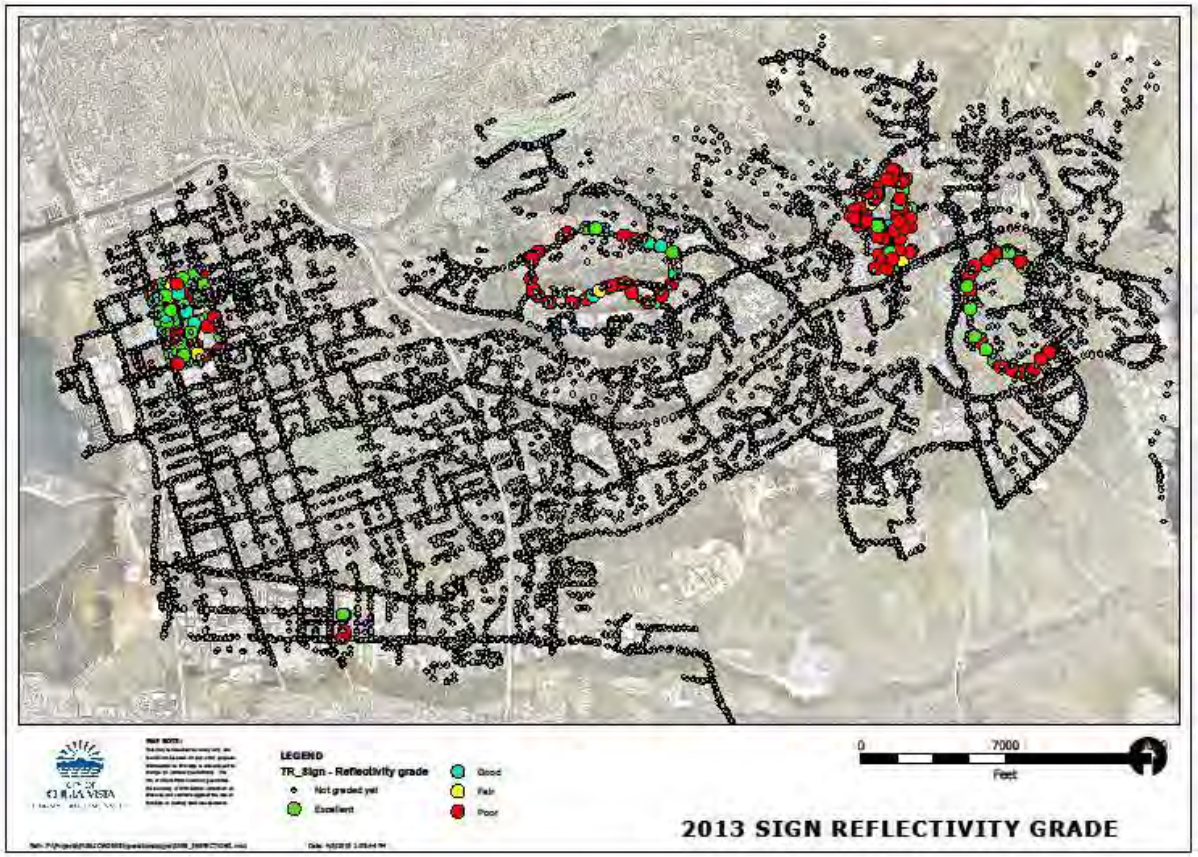
Sign Reflectivity

- 638 signs measured to determine if they meet mandated reflectivity standards
  - Sampled areas in each of the four quadrants of the City
  - 247 signs fell below the mandated reflectivity level – a **39% failure rate**
  - Estimated 9,157 non-compliant signs city-wide

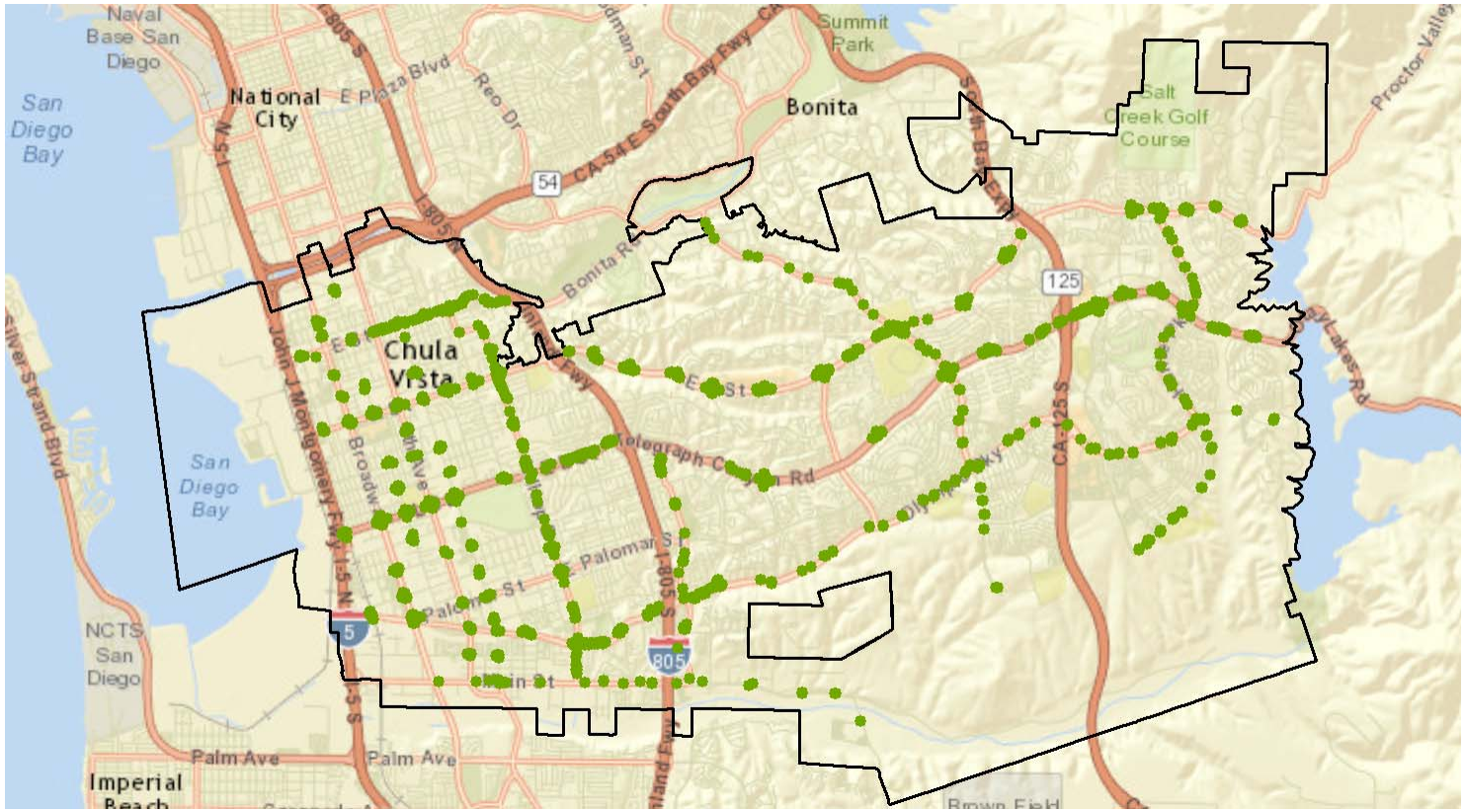
Sampled Areas



Sign Reflectivity



Signage Condition Assessment

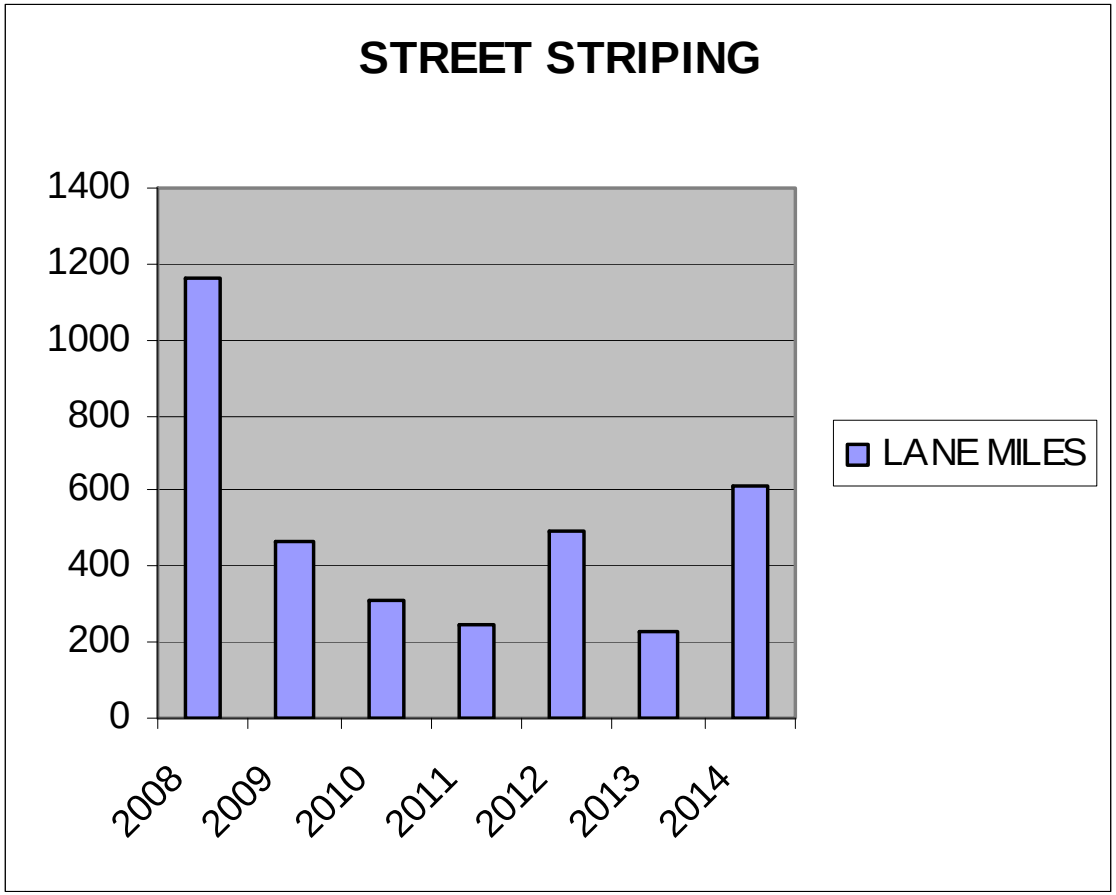


Traffic Sign Inspection Results

- Average age of inspected signs is 8 years
- Of all signs inspected, 71% passed retroreflectivity requirements

Sign Type	Expected Life
Black on Orange	10 years
Black on White	10 years
Black on Yellow	10 years
White on Green	10 years
Red on White	10 years
White on Red	10 years

Striping


STREET STRIPING
1400
1200
1000
800
600
400
200
0
2008
2009
2010
2011
2012
2013
2014
LANE MILES

How Are We Doing Now?

- 43% of lane lines are arterials or collectors
- From 2009 thru 2013 on avg. only 350 lane miles have been restriped
- In 2014 striping doubled to 615 lane miles including residential restriping
- Currently 85% of all lane lines city wide were restriped in 2014 (including striping done under capital improvement projects)

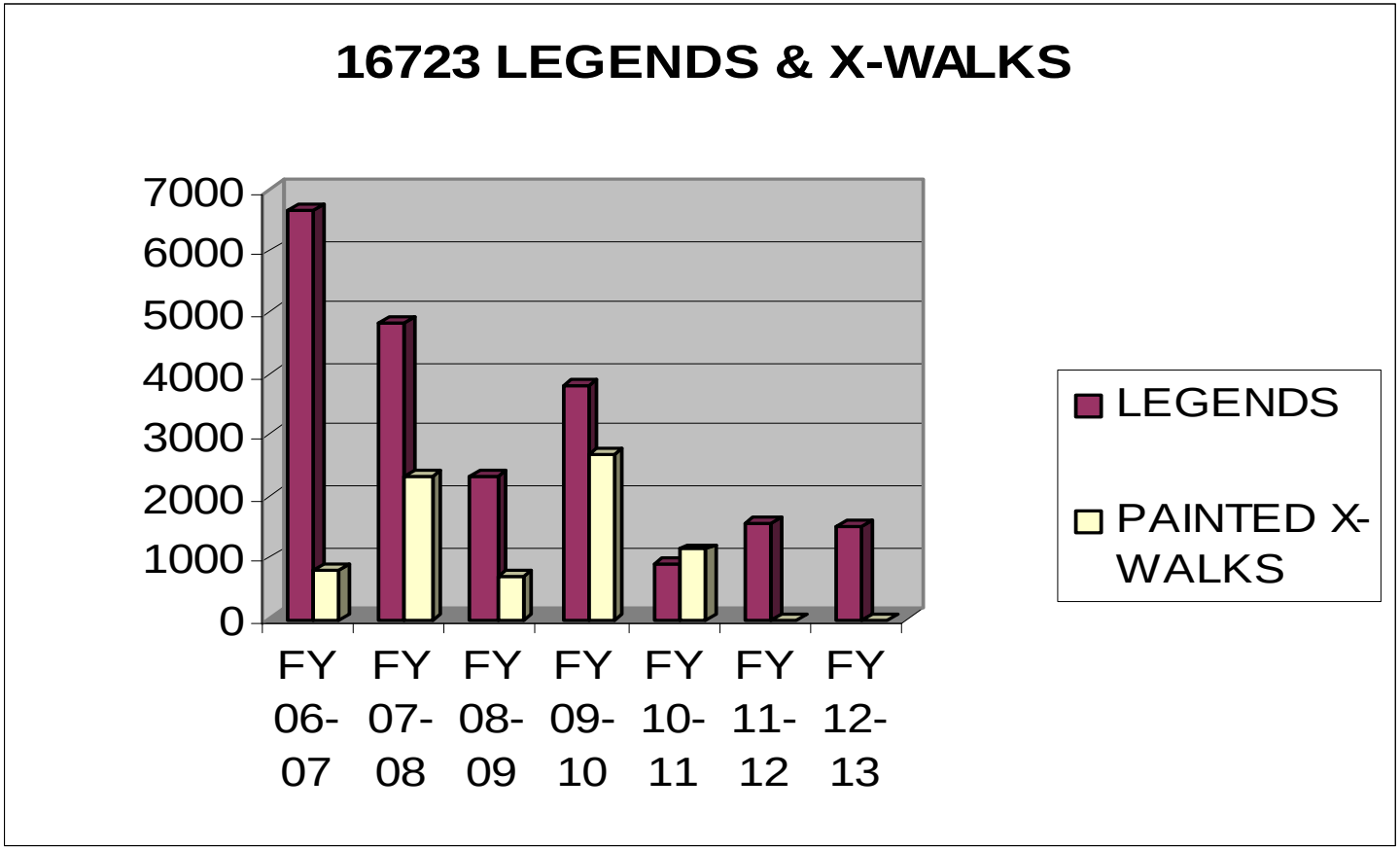
Pavement Marking Assets

- Approx. 6500+ pavement legends such as stop and bars, arrows, speed limits, etc.
- Approx. 55,000+ linear feet of crosswalks and limit lines

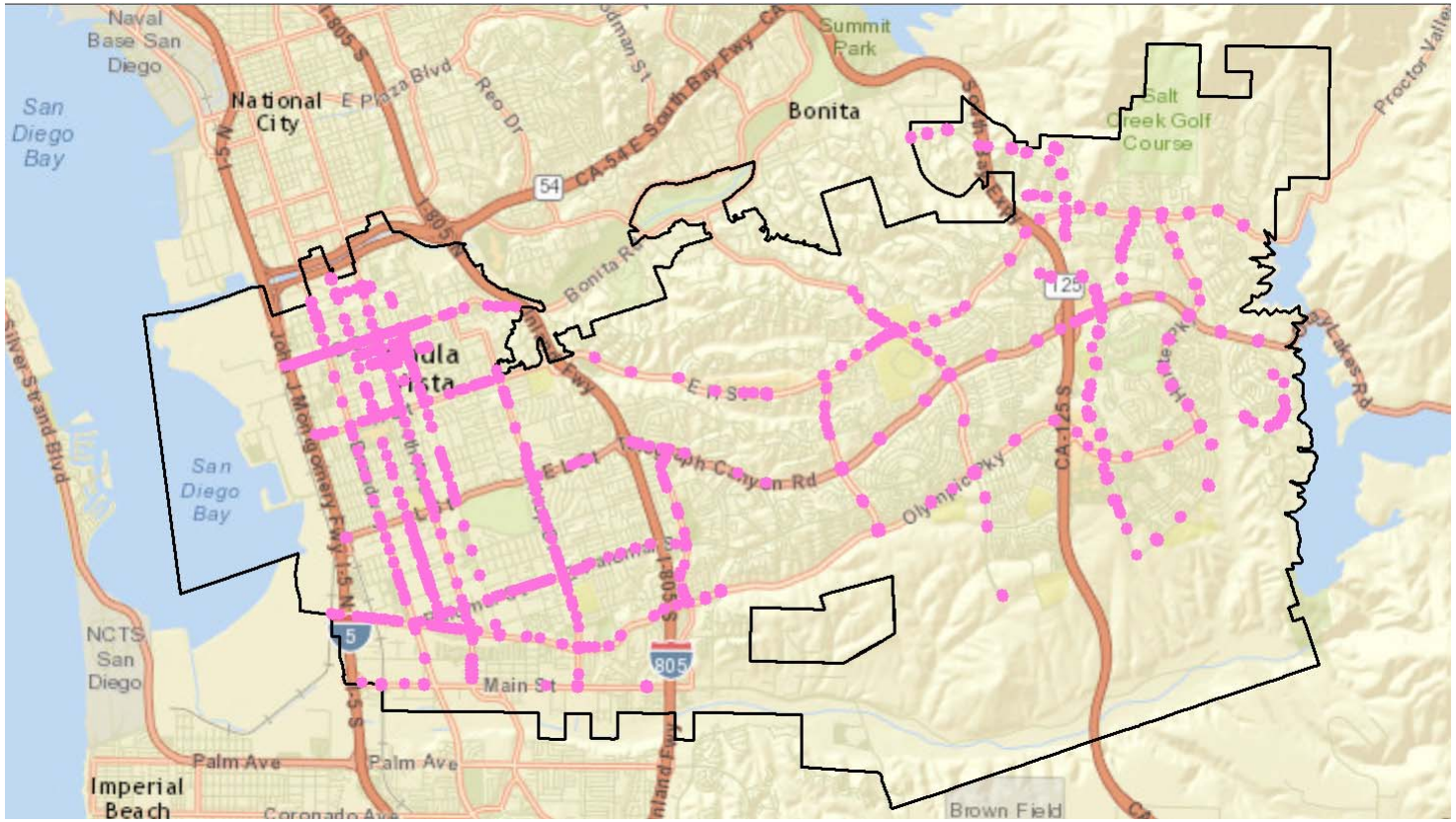
What Gets Repainted?

- Over the last 7 years 35% of legends have been converted to plastic
- Thermoplastic has a life of approx. 5 years.
- 35% of the 4333 painted pavement marking are repainted
- Over the past 5 years stops and bars and speed limits have been concentrated on
- Over the last 2 years only a limited amount of crosswalks redone

Reduction in Repainting of Pavement Markings

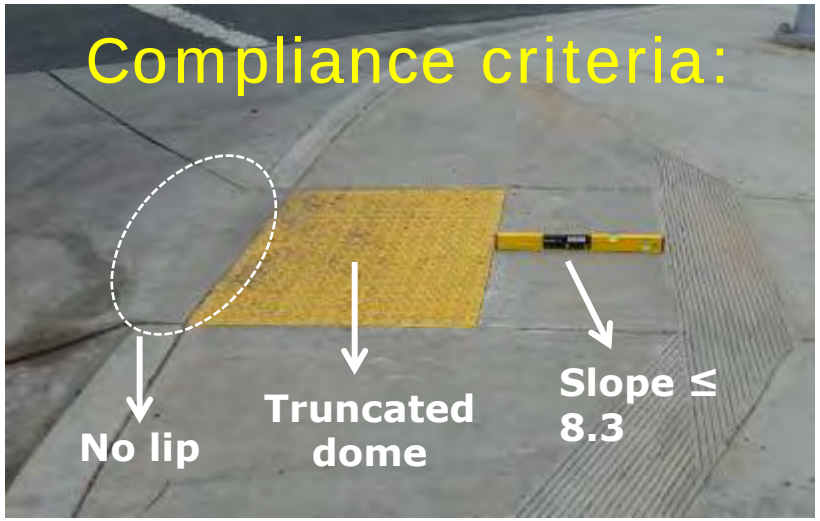


ADA Ramp Assessment



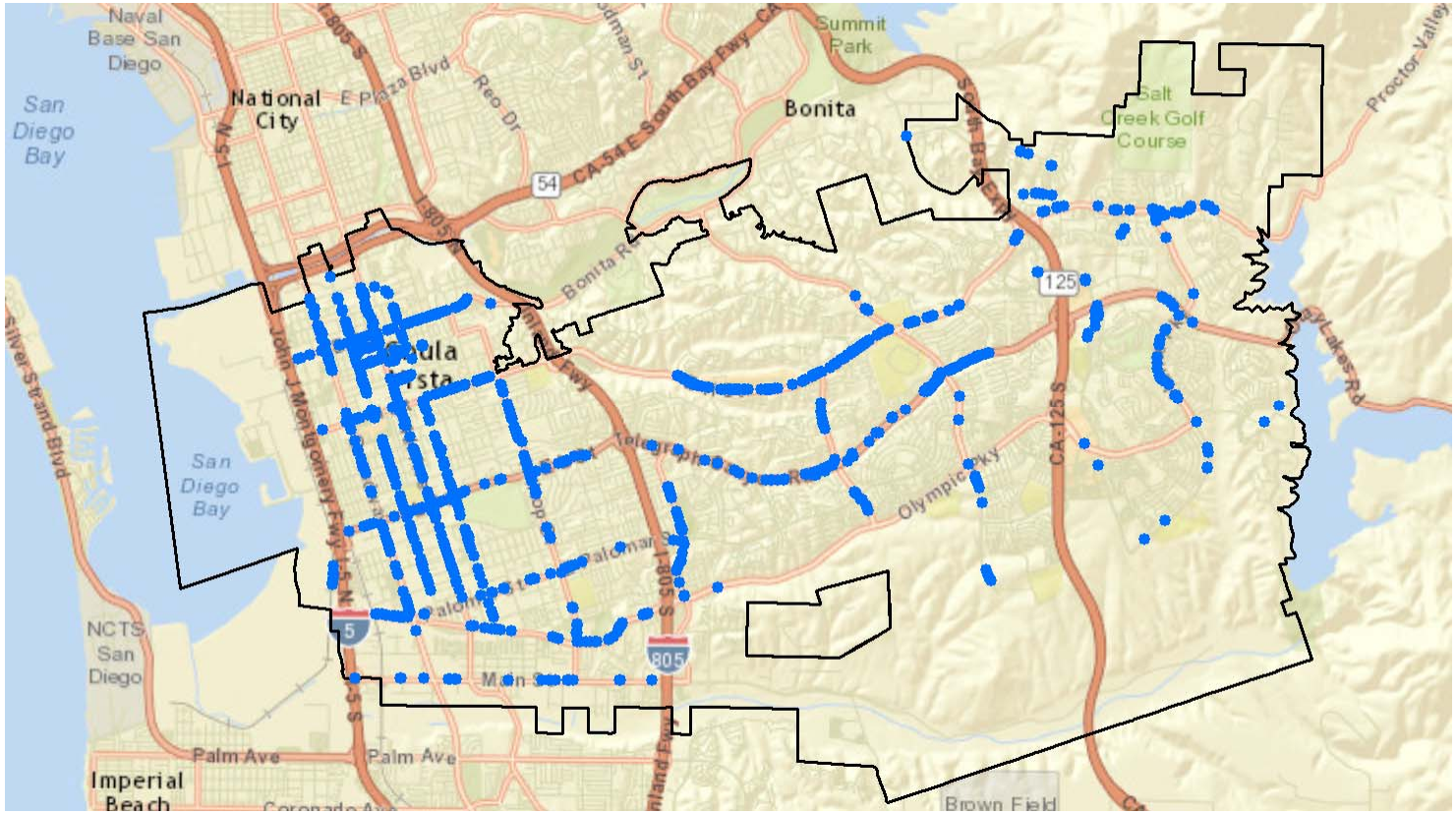
ADA RAMPS

- 1,227 ADA ramps inspected
- 528 new ramps have been added to existing inventory
- Results:
  - 31% are fully compliant
  - 19% are partially compliant (missing 1 criteria)
  - 47% only meet slope criteria
  - 3% are non-compliant



Sidewalks

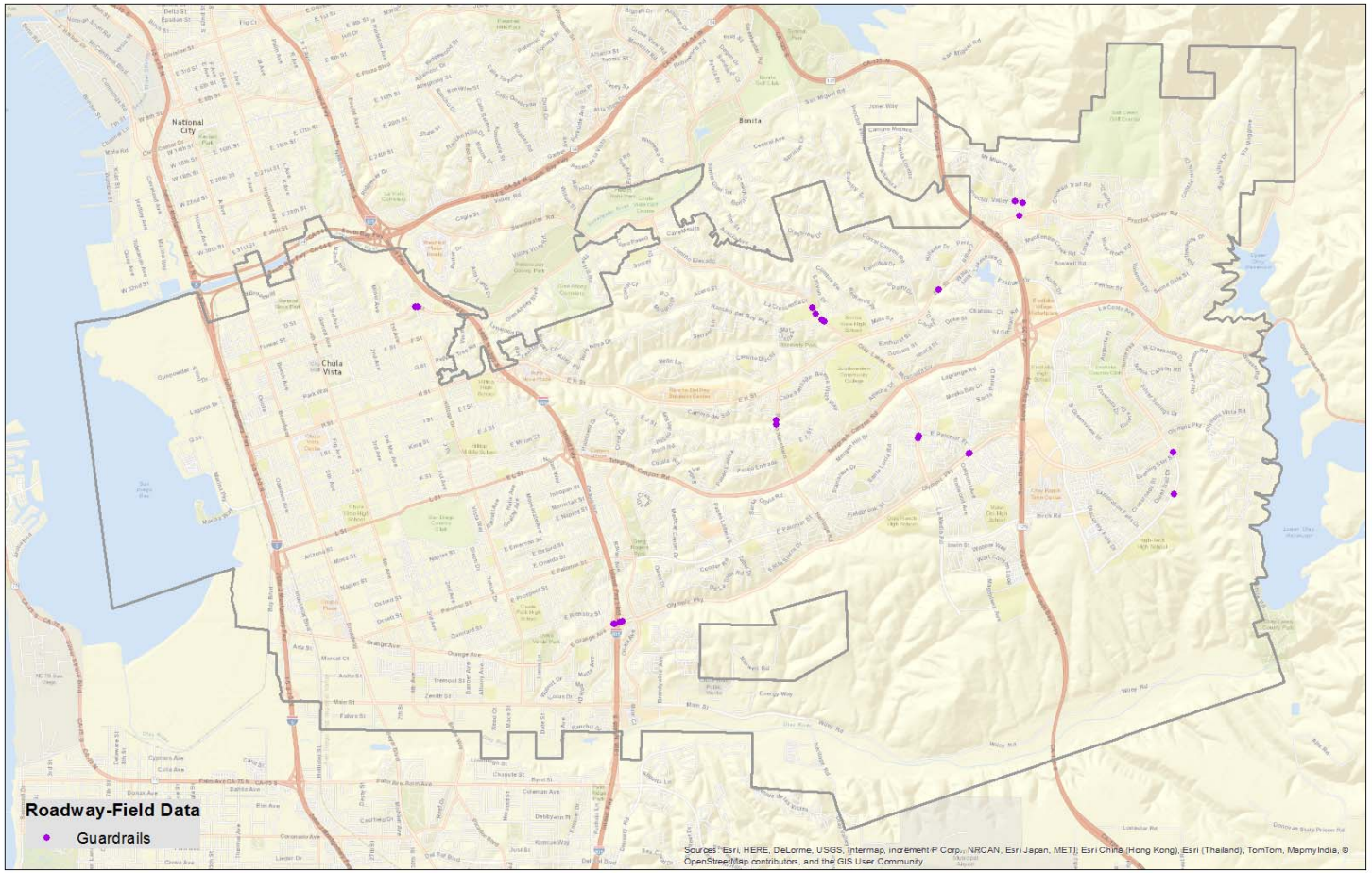
Sidewalk Assessment



Sidewalks

- 70 miles of sidewalks inspected
- Within the inspected sidewalks, there are 1,070 locations of trip hazards (uplift ≥ 0.25 in)
  - 63% are ≥ 0.5 in
  - 29% are ≥ 1 in
  - 7% are ≥ 2 in
- Most uplifts are due to close proximity to trees
  - Install root barrier when planting new trees

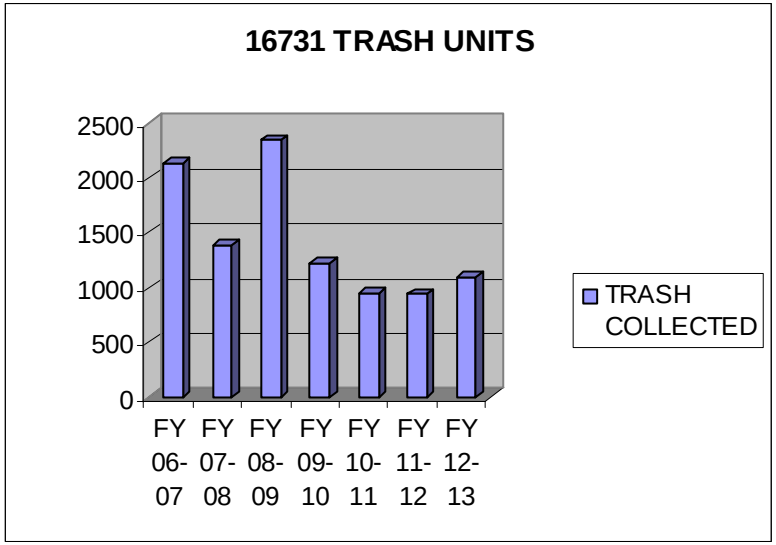
Guardrails


National City
Bonita
Chula Vista
Roadway-Field Data
Guardrails
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

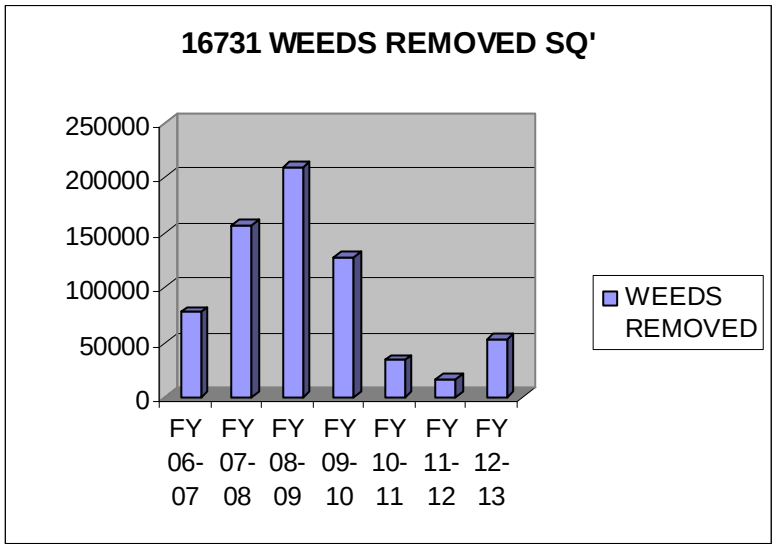
Guardrails

- 60 sections out of a 113 sections of guardrails were inspected.
- Transferred City rail inventory (excel) to a shape file.

Trash Abatement

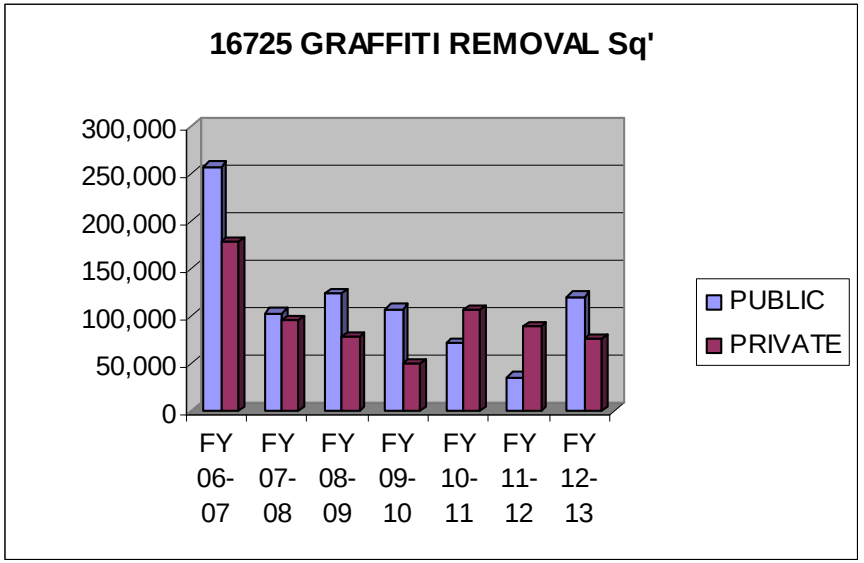


Weed Abatement



Graffiti Removal

- On avg. 93,415 sq' public graffiti removed yearly
- On avg. 70,755 sq' private graffiti removed yearly
- Approx. 37.5% decrease in graffiti removal yearly from previous years



Management Strategy Example

- Street Lights
  - Replace every 50 years
- Traffic Signal System
  - Replace every 50 years
  - Upgrade controller every 15 years
- Sidewalks
  - Replace every 75 years
  - Minor rehabilitation (grinding and/or asphalt patching) at uplift 0.25 in or more
  - Major rehabilitation (panel replacement) as needed

Life Expectancy

Asset Type	Recommended Life Expectancy
Curb & Gutter	50
Medians	50
Sidewalks	50
Driveway Approaches	50
Street Lights	50
Traffic Signal Systems	50
Pedestrian Ramps	50
Parkways	50
Bridges	75
Parking Meters	25
Traffic Signs	8
Guardrails	35

Life Expectancy – Pavement Marking & Striping

Pavement Marking and Striping Material	Recommended Life Expectancy
School paint	1
School plastic	2
Paint	5
Plastic	10
Ceramics	7
Paint w/ Ceramics	5
Markers	5
Other	5

Life Expectancy – Parking Lot Assets

Parking Lot Assets	Recommended Life Expectancy
Bollard	30
Trash Bin	15
Asphalt Pavement	30
Concrete Pavement	50
Pay Machine	25
Lighting	25
Bench	20
Fencing	25

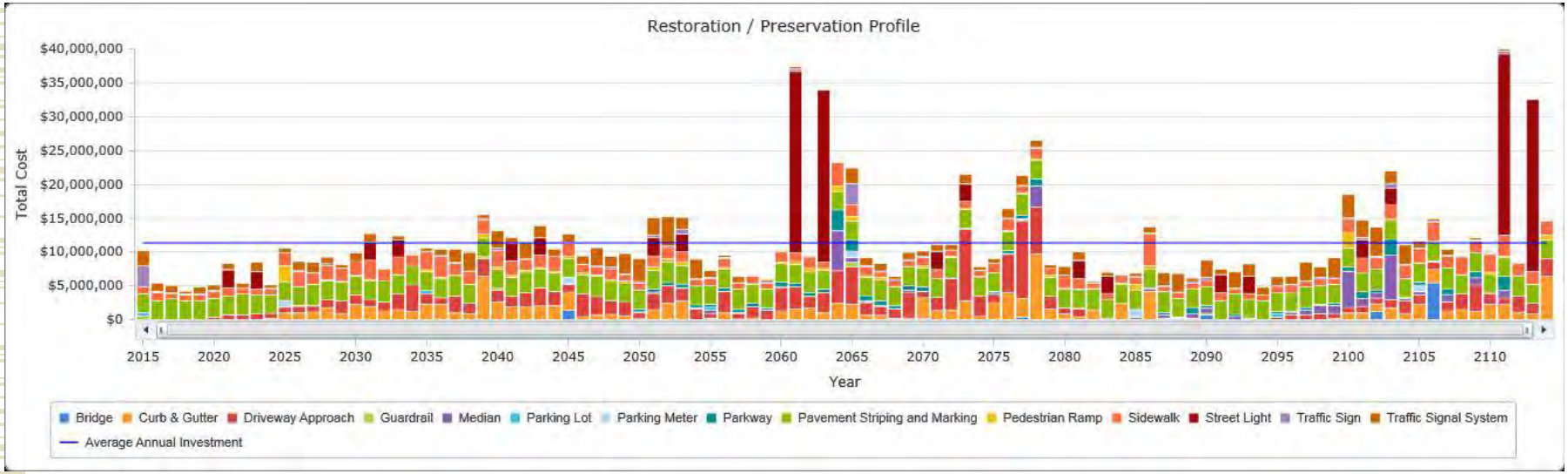
Asset Type CoF

Asset Type	Economic	Social			Environmental	Final CoF
	Economic Impact	Loss of Service	Safety	City's Image	Environmental Impact	
Weight 1	24%	23%	24%	24%	5%	
Bridges	5	4	5	5	4	5
Traffic Signal Systems	4	5	5	3	2	4
Sidewalks	3	2	4	3	1	3
Guardrails	1	3	5	3	1	3
Pavement Striping and Marking	2	2	4	3	1	3
Street Lights	3	2	4	2	1	3
Parking Lots	4	3	1	3	1	3
Traffic Signs	2	3	4	2	1	3
Pedestrian Ramps	2	2	3	3	1	2
Curb & Gutter	2	2	2	3	4	2
Driveway Approaches	3	2	2	2	1	2
Parking Meters	3	3	1	1	1	2
Medians & Median Curbs	2	2	2	1	1	2
Parkways	1	1	1	3	1	1

Asset Types & Asset Classes		Criticality Assessment		Management Strategies
Asset Type	**Asset Class**	**Additional Categories for Criticality**	**Criticality within Asset Classes (1-5)**	**Useful Life**
Curb & Gutter	Six Lane Prime Arterial		5	50
	Six Lane Major Arterial		5	50
	Four Lane Major Arterial		4	50
	Class I Collector		3	50
	Class II Collector		2	50
	Residential		1	50
Median Curbs	Six Lane Prime Arterial		5	50
	Six Lane Major Arterial		5	50
	Four Lane Major Arterial		4	50
	Class I Collector		3	50
	Class II Collector		2	50
	Residential		1	50
Medians	Six Lane Prime Arterial		5	50
	Six Lane Major Arterial		5	50
	Four Lane Major Arterial		4	50
	Class I Collector		3	50
	Class II Collector		2	50
	Residential		1	50
Sidewalks	Sidewalk			50
Driveway Approaches	Driveway Approach	Six Lane Prime Arterial	5	50
		Six Lane Major Arterial	5	
		Four Lane Major Arterial	4	
		Class I Collector	3	
		Class II Collector	2	
		Residential	1	
Pavement Striping & Markings	Striping-School_Paint	Six Lane Prime Arterial	5	1
	Striping-School_Plastic	Six Lane Major Arterial	5	2
	Striping-Paint	Four Lane Major Arterial	4	5
	Striping-Plastic	Class I Collector	3	10
	Striping-Ceramics	Class II Collector	2	7
	Striping-Pnt w Cer	Residential	1	5
	Striping-Pnt w Mar			5
	Striping-Markers			5
	Striping-Other			5
	Marking-School_Paint			1
	Marking-School_Plastic			2
	Marking-Paint			5
	Marking-Plastic			10
	Marking-Ceramics			7
	Marking-Pnt w Cer			5
	Marking-Pnt w Mar			5
	Marking-Markers			5
	Marking-Others			5
Street Lights	Single	Arterial		50
	Double	Collector		50
		Residential		50
Traffic Signal Systems	Signal_6-6			50
	Signal_6-4			50
	Signal_6-2			50
	Signal_4-4			50
	Signal_4-2			50
	Signal_2-2			50
Pedestrian Ramps	Ped_Ramp	Residential	5	50
		Class II Collector	5	
		Class I Collector	5	
		Four Lane Major Arterial	4	
		Six Lane Major Arterial	4	
		Six Lane Prime Arterial	3	
Parkways	Parkway			50
Bridges	Bridge			75
	Pedestrian Bridge			75
Parking Meters	Single			25
	Double			25
Parking Lots	Bollard		1	30
	Trash Bin		1	15
	Asphalt Pavement		4	30
	Concrete Pavement		4	50
	Pay Machine		5	25
	Lighting		4	25
	Bench		2	20
	Fencing		2	25
Traffic Signs	Traffic Sign	Regulatory	5	Until Mandate
		Warning	4	
		School	4	
		Guide	2	
		Other	1	
Guardrails	Guardrails			35

Annual Investment Need

Total Annualized R&P: $16.0 M



Catch Up

- $27.1 M
  - Includes
    - Bridge
    - Pavement Striping and Marking
    - Pedestrian Ramp
    - Sidewalk
    - Traffic Sign
    - Traffic Signal System

OPEN SPACE
To Be Continued…

GENERAL GOVERNMENT
To Be Continued…

AMP Assessment

Asset Management Systems	Asset Inventory	Condition Assessment	Risk Assessment	Life Cycle Costing	Catch Up	Keep Up	Moving Forward	Technical Committee Review
Building Management System								
Drainage Management System								
Fleet Management System								
General Gov't Management System								
Open Space Management System								
Parks Management System								
Roadway Management System								
Urban Forestry Management System								
Wastewater Management System								