

FROM DATA TO DECISIONS: SMARTER INFRASTRUCTURE STRATEGIES



INTRODUCTIONS



WALTER HAMBRICK

Director, Road and Bridge

20 years experience in transportation focused on roadway infrastructure, operations, maintenance and public service



JEREMY GASKINS

Director, Technology Solutions

25 years experience in technology, and leads a team of technologists focused on driving business value through technology



LEARNING OBJECTIVES

- **Recognize how technology adoption, connected systems, and trusted data create the foundation for better infrastructure decisions.**
- **Apply a practical framework for prioritizing pavement investments that balances condition, preservation, rehabilitation, safety, local priorities, and available funding.**
- **Use scenario planning and lifecycle analysis to evaluate investment strategies and support more defensible long-term planning and budgeting.**

WHY IS THIS SO CRITICAL RIGHT NOW?

Public works leaders face mounting pressure to deliver more value with fewer resources—while meeting rising expectations.



1. AGING INFRASTRUCTURE

Much of our infrastructure was built decades ago and is deteriorating faster than it can be repaired or replaced.



2. POPULATION GROWTH & INCREASING DEMAND

More people. More vehicles. More expectations. The demand for safe, reliable infrastructure continues to grow.



3. LIMITED FUNDING

Budgets are constrained and funding rarely keeps pace with needs, forcing difficult trade-offs.



4. INCREASED TRANSPARENCY

The public expects clear communication, visible results, and accountability for how infrastructure dollars are spent.



5. RISK UNCERTAINTY

Extreme weather and other risks are increasing costs, disrupting service, and making long-term planning more complex.



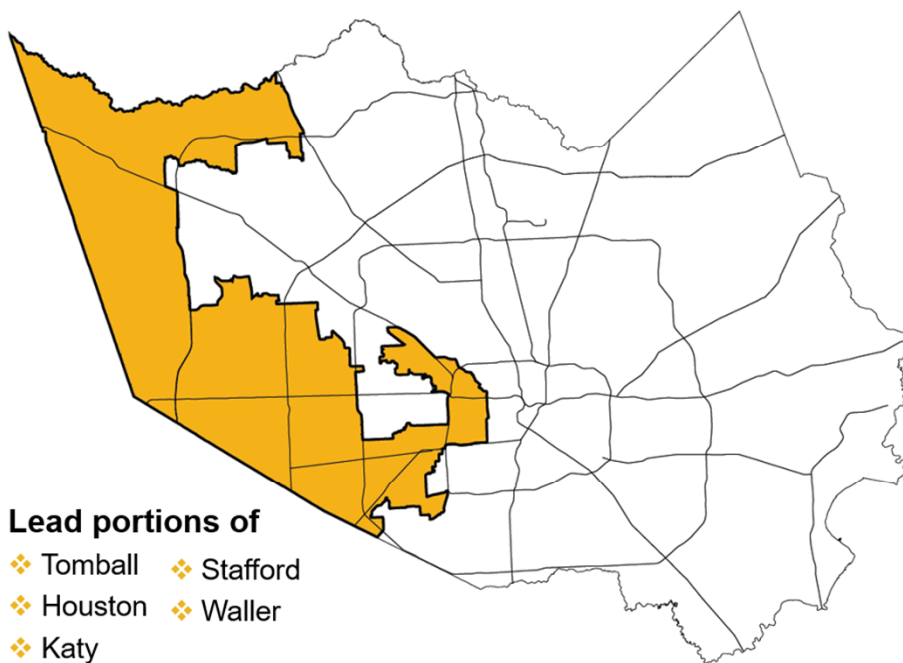
HARRIS COUNTY PRECINCT 4



AT A GLANCE



Serving Precinct 4



Lead portions of

- ❖ Tomball
- ❖ Stafford
- ❖ Houston
- ❖ Waller
- ❖ Katy



1.2 million people



1,600+ road miles



3,000+ miles of sidewalks & trails



7 school districts



10 community centers



62 parks



6.9 million feet of roadside ditches



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cp4.harriscountytx.gov

@hcprecinct4

We're building a resilient, connected, and safe Precinct 4





BGE, INC.



BGE SERVICES

Drawing from a diverse pool of dedicated talent, BGE is an engineering consulting firm for numerous public and private clients.

- Air Quality Services
- Construction Management
- Environmental Services
- Land/Site Development
- Planning + Landscape Architecture
- Public Works
- Surveying
- Transportation Services
- Technology Solutions



FIRST TASK: IMPLEMENT OPENGOV



TOP 4 CHALLENGES OF IMPLEMENTATION



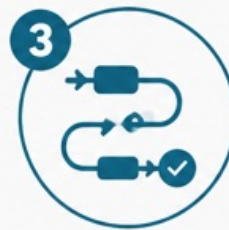
POOR OR INCONSISTENT ASSET DATA

Incomplete, outdated, or inconsistent data leads to unreliable information and poor decisions.



DISCONNECTED SYSTEMS & DATA SILOS

Critical systems don't communicate, creating data silos and inefficient, manual work.



TECHNOLOGY DOESN'T MATCH WORKFLOWS

Software not aligned to real-world processes creates workarounds and limits the value of the system.



STAFF ADOPTION & RESISTANCE TO CHANGE

Without user buy-in and ongoing support, adoption suffers and return on investment is lost.



Overcoming these challenges is the foundation for **trusted data**, **strong adoption**, and **better infrastructure decisions**.

A NEW CHALLENGE...

A new challenge emerged



IMPLEMENTED
OPENGOV



A NEW
CHALLENGE
EMERGED



HOW DO WE MAKE
BETTER LONG-TERM
PAVEMENT INVESTMENT
DECISIONS?



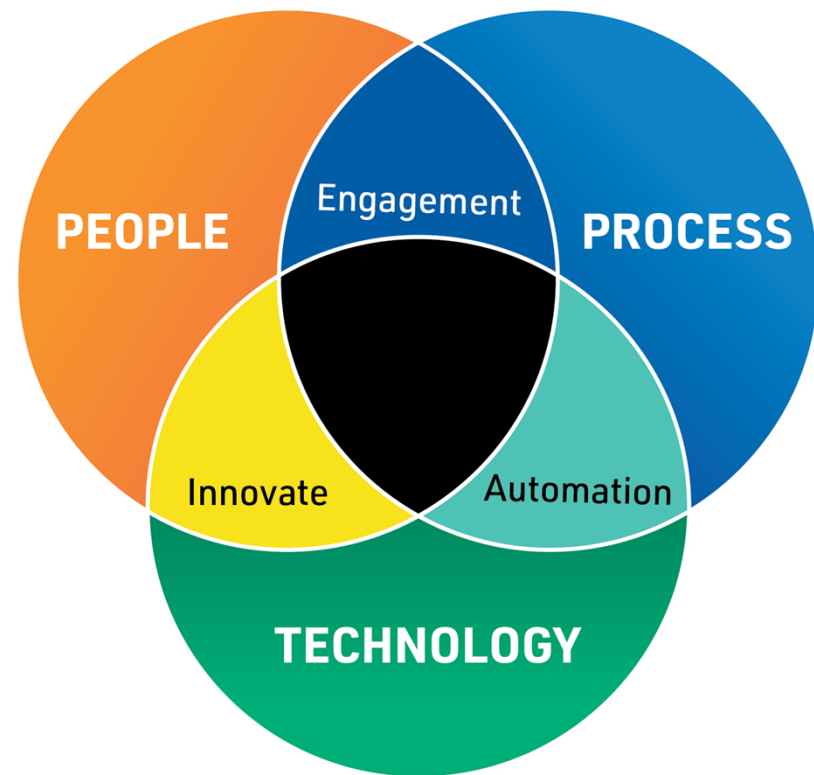
START WITH PEOPLE



PEOPLE FIRST APPROACH

“One reason people resist change is because they focus on what they have to give up instead of what they have to gain.”

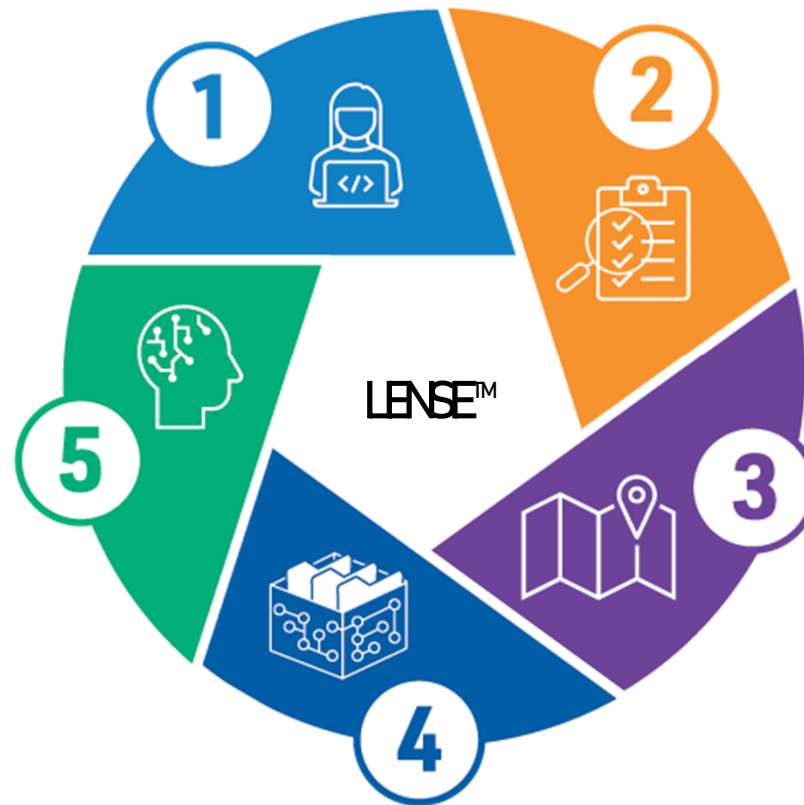
John Assaraf



ASSET INTELLIGENCE

LENSE™

We move from raw data to insight to action through a structured approach



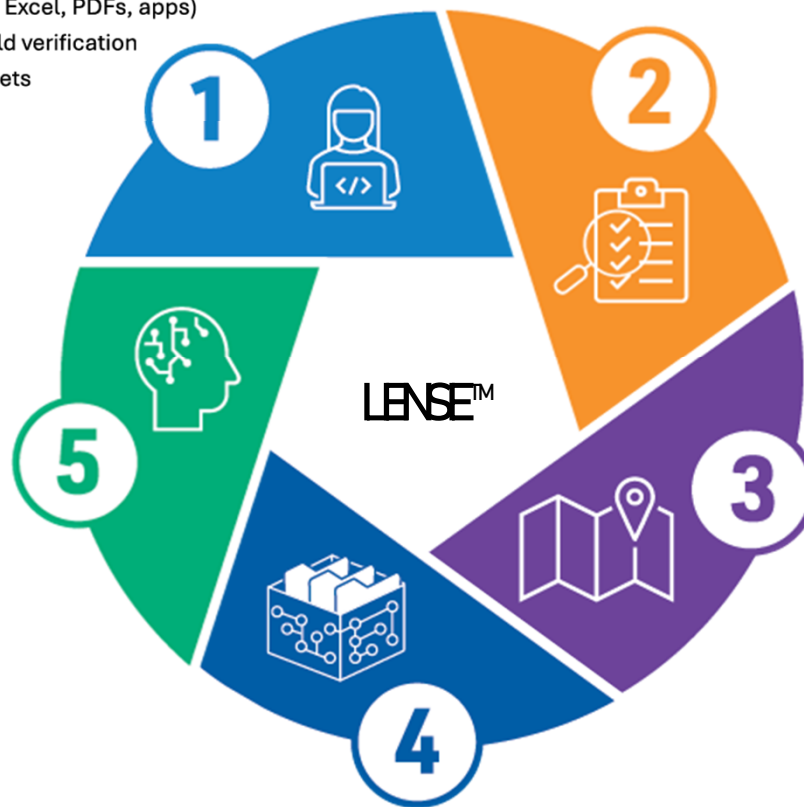
ASSET INTELLIGENCE

LENSE™

LOG

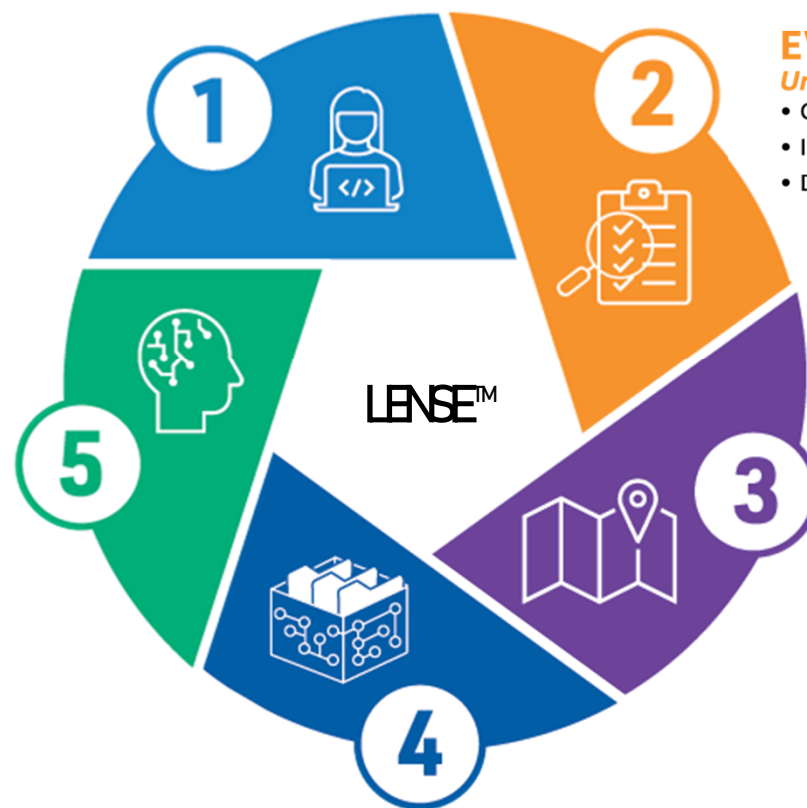
Find the Data

- Disconnected data (GIS, Excel, PDFs, apps)
- Manual handoffs and field verification
- Limited visibility into assets



ASSET INTELLIGENCE

LENSE™



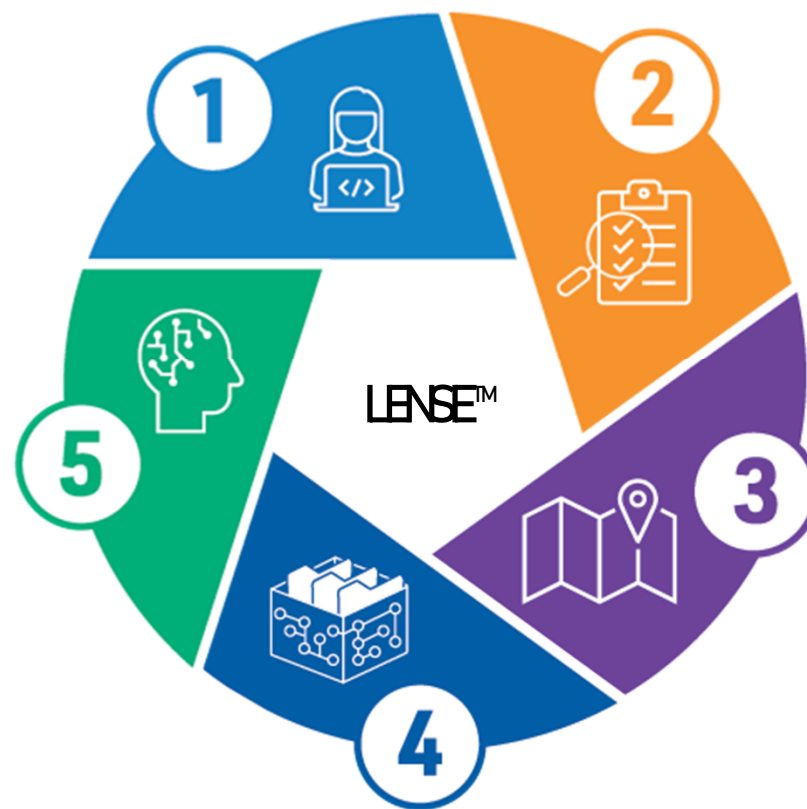
EVALUATE

Understand the Data

- Centralized asset data
- Integrated with O&M and other systems
- Dashboards and basic reporting

ASSET INTELLIGENCE

LENSE™

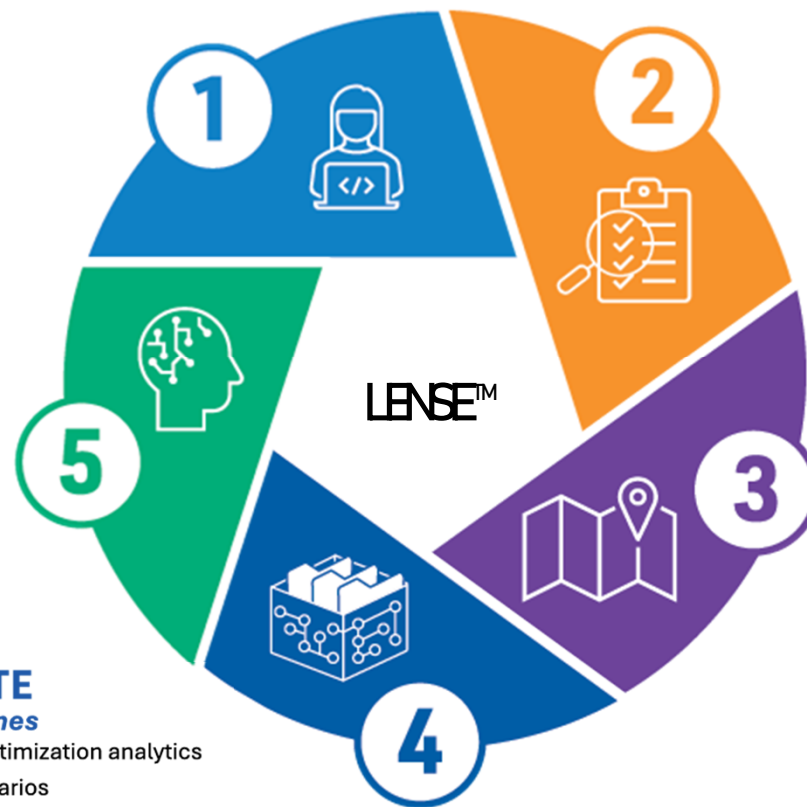


NETWORK *Connect the Data*

- Near real-time asset performance insights
- Preventive & predictive maintenance
- Linked across enterprise systems

ASSET INTELLIGENCE

LENSE™



SIMULATE *Test Outcomes*

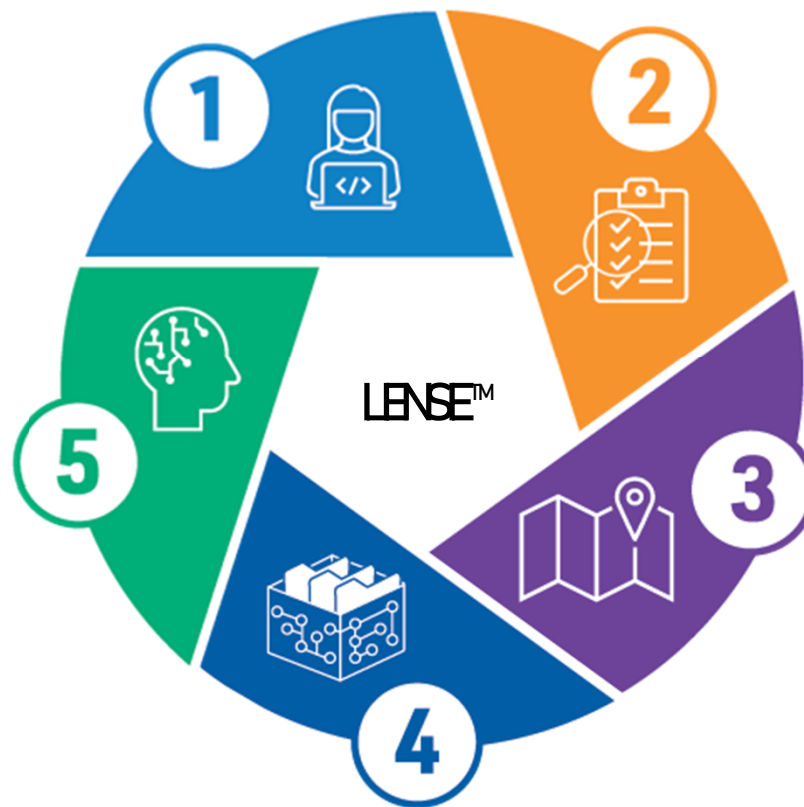
- Real-time optimization analytics
- What-if scenarios
- System-driven recommendations

ASSET INTELLIGENCE

LENSE™

EMPOWER *Operate Smarter*

- Augmented or autonomous operations
- Systems working together end-to-end
- AI/ML-driven decision support



ASSET INTELLIGENCE

LENSE™

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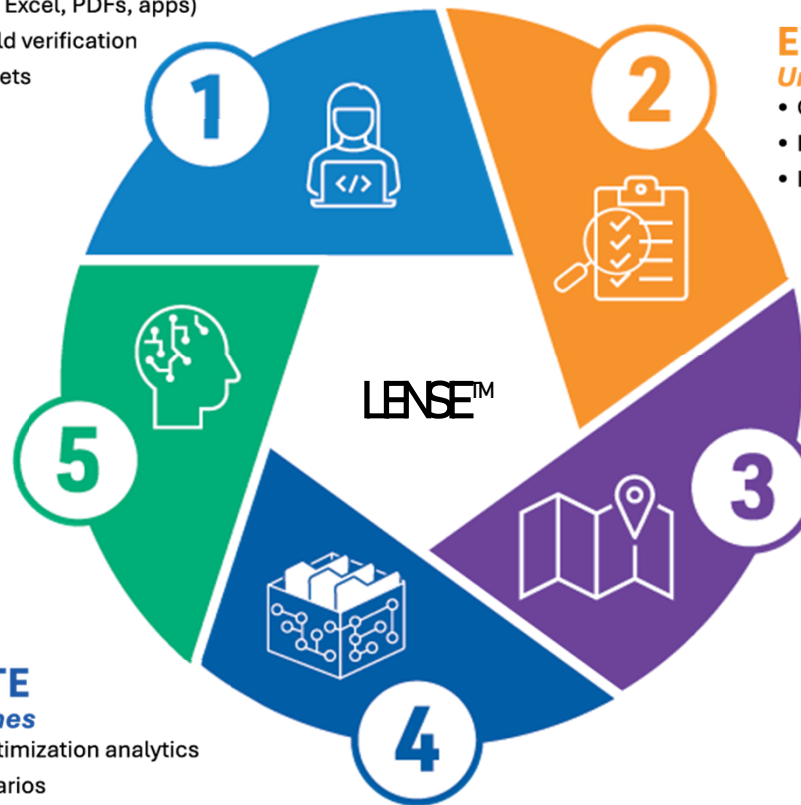
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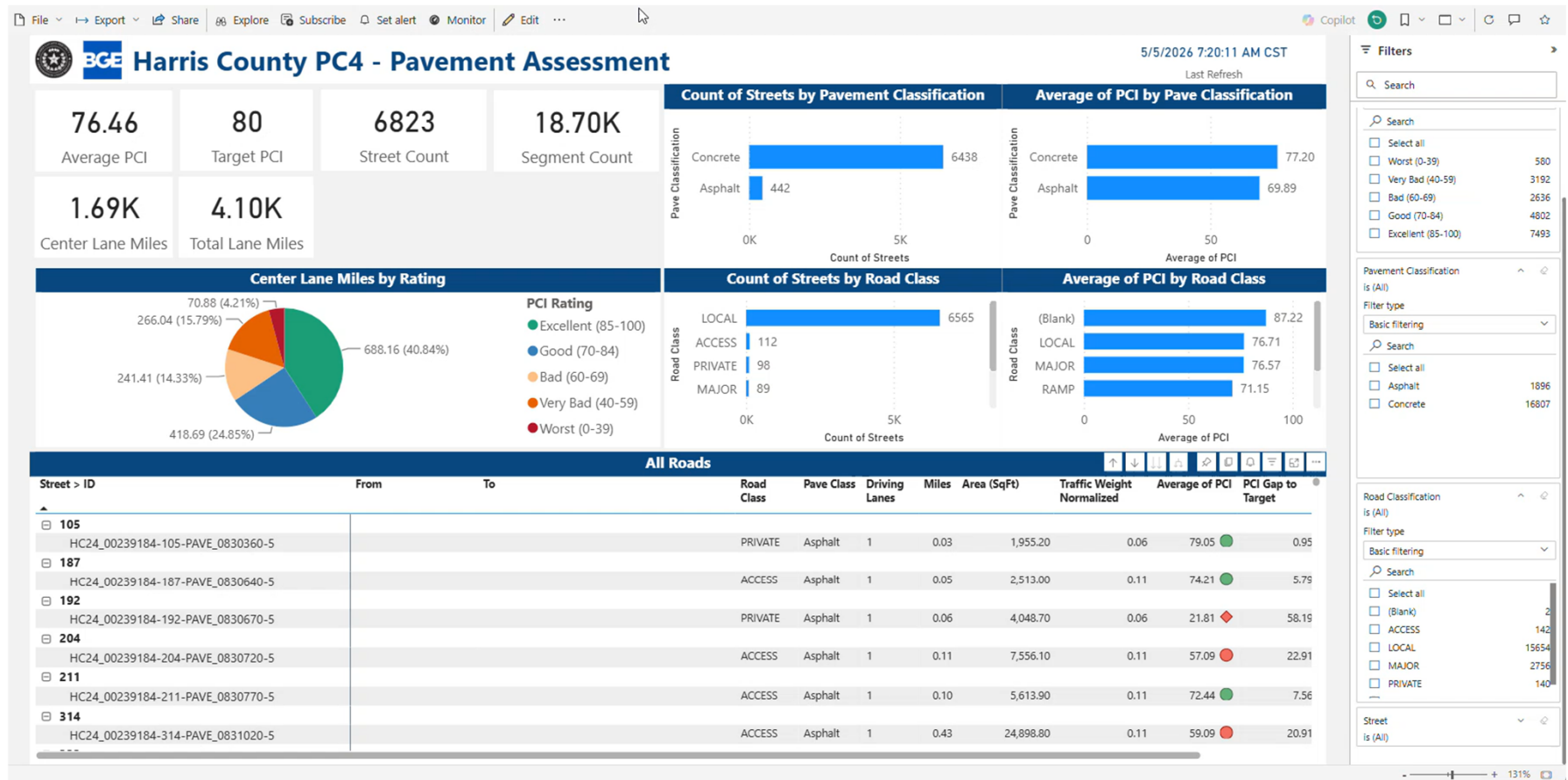
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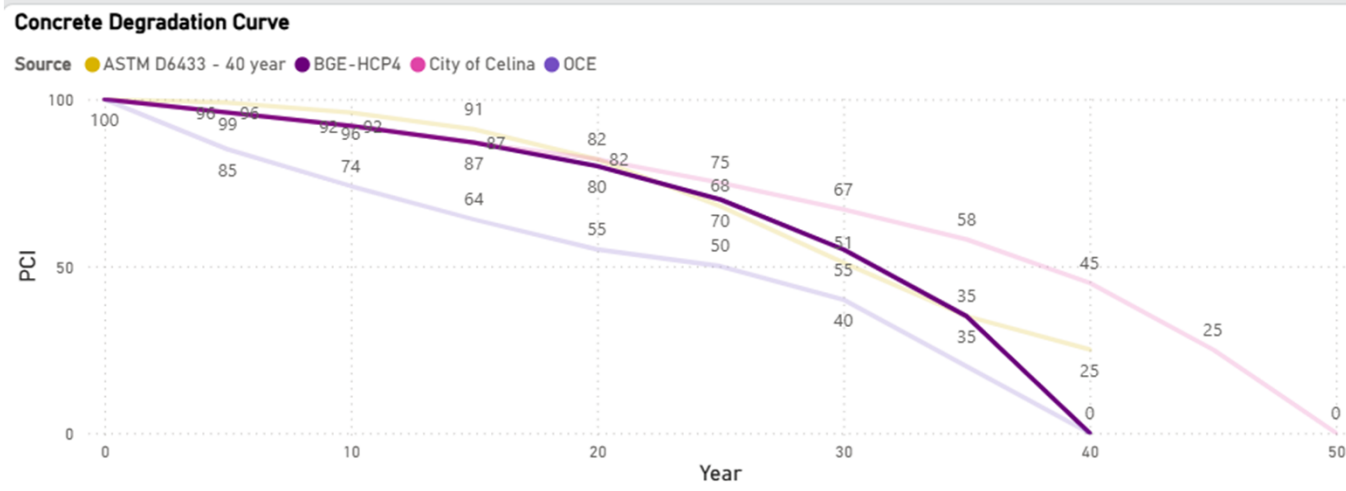
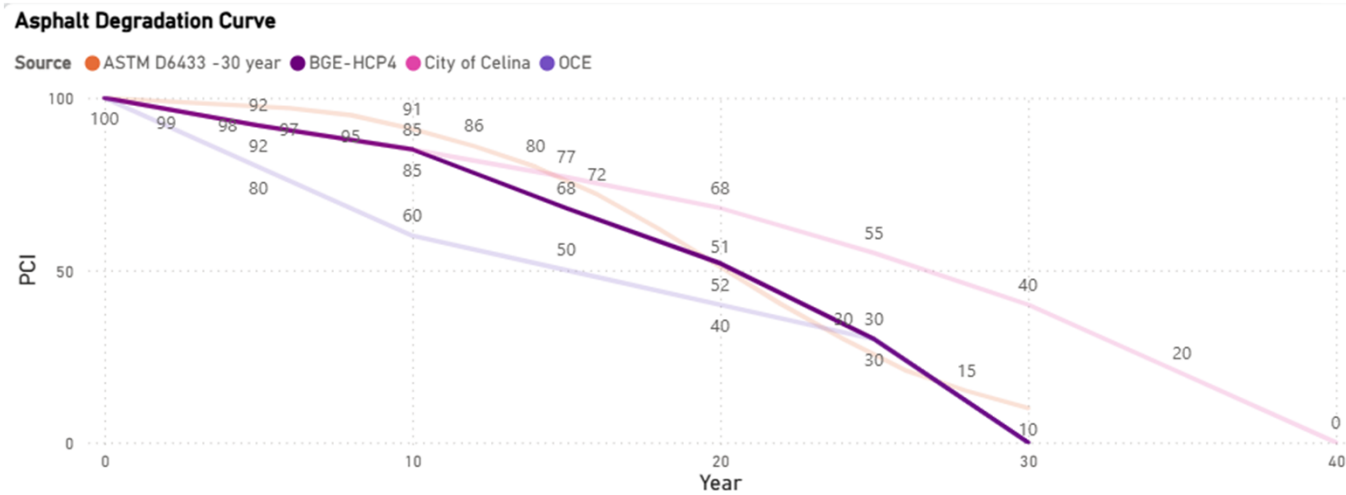
STEP 1: REVIEW PAVEMENT ASSESSMENT DATA AND DEGRADATION CURVE



RAW DATA FROM IVISION TO POWER BI



DEGRADATION CURVE



STEP 2: PARAMETERS, CONSTRAINTS, AND WORK FLOW



IMPLEMENTATION OF OPENGOV

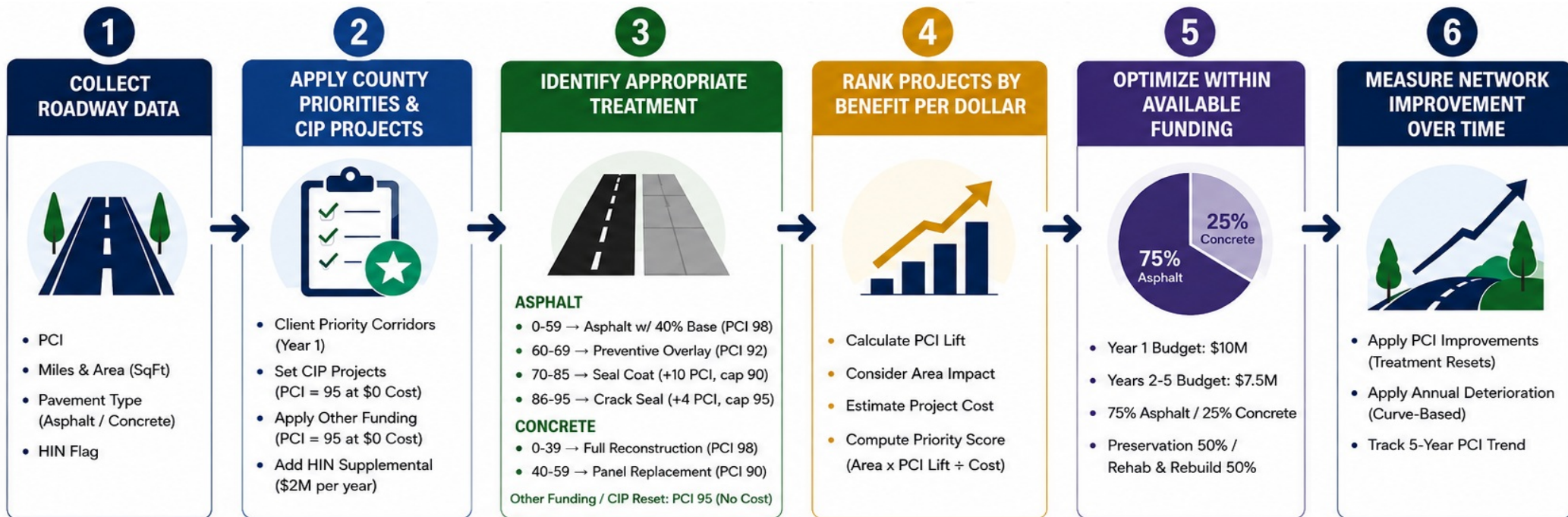
PAVEMENT PLAN PARAMETERS & CONSTRAINTS

CATEGORY	CONSTRAINT / RULE
 BUDGET	Annual funding is limited and varies by year.
 BUDGET SPLIT	Funding is allocated between asphalt and concrete each year.
 SUPPLEMENTAL FUNDING	Additional funding is available annually for the High Injury Network.
 PROJECT-LENGTH RULES	Minimum project length requirements apply to certain treatments.
 TREATMENT RULES	Treatment selection is determined by pavement condition (PCI) and asset type.
 OTHER FUNDING / CIP RESET	Certain conditions are reset to a defined PCI at no cost.
 PRIORITY STRATEGY	Funding is balanced between preservation and rehab/rebuild priorities.
 DETERIORATION	Pavement condition declines over time based on a defined deterioration curve.
 EXCLUSIONS	Ineligible roadways are excluded from treatment selection.
 PRIORITY SCORE	Priority Score = Impact Per Dollar × Strategy Multiplier × Road Class Multiplier, where Impact Per Dollar = (Area SqFt × PCI Lift) ÷ Project Cost and Strategy Multiplier reflects preservation opportunity and rehab need.

 These parameters define the logic and rules used to develop the pavement plan scenarios.



WORK FLOW PROCESS



STEP 3: SCENARIOS AND ANALYSIS



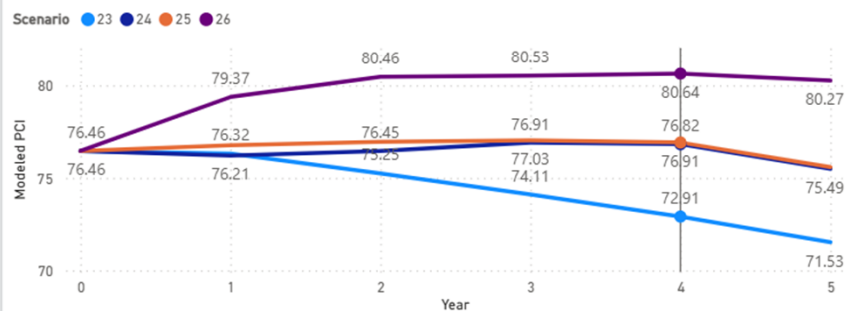
RUN SCENARIOS TO OPTIMIZE OPTIONS



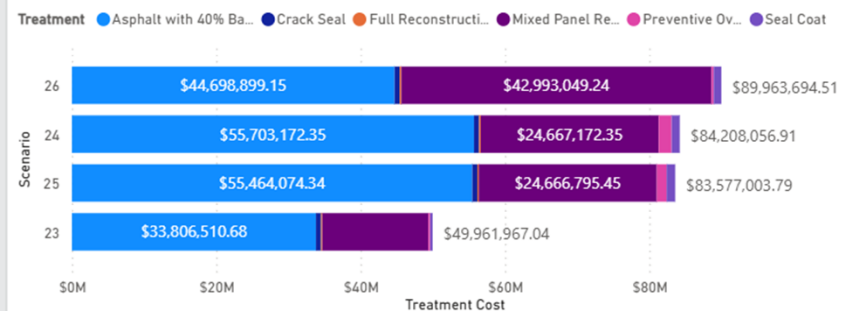
BGE Harris County PC4 - Pavement Assessment

Scenario	Planned Cost	Starting PCI	Ending PCI	PCI Difference	Project Count	Planned Miles	Miles Per Million \$
#26 - Increase Budget - V2 & No Budget Split	\$89,963,694.51	76.46	80.27	3.81	3587	605.05	6.73
#25 - Increase Budget - V2	\$83,577,003.79	76.46	75.58	-0.87	1479	445.27	5.33
#24 - Increase Budget - V1	\$84,208,056.91	76.46	75.49	-0.97	1488	445.67	5.29
#23 - 10M Yr 1, 7.5M Yrs 2-5: BGE Deg V2, W/ Prev	\$49,961,967.04	76.46	71.53	-4.93	874	316.21	6.33

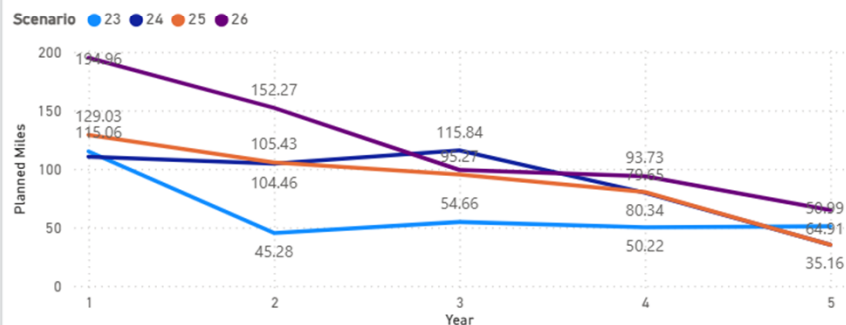
Modeled PCI by Year



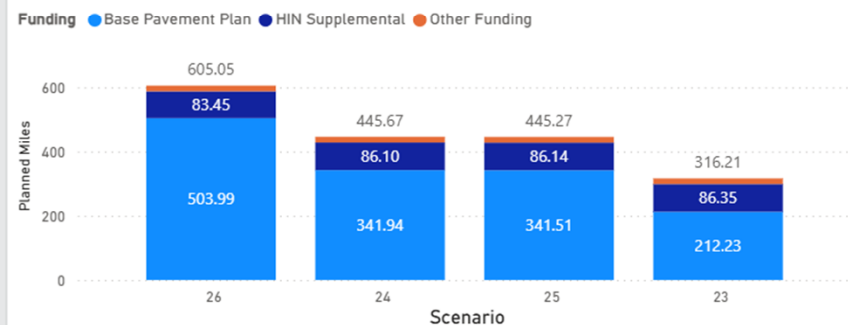
Planned Cost by Scenario



Planned Miles by Year



Planned Miles by Scenario



STEP 4: RESULTS AND NEXT STEPS



SELECT OPTIMIZED, DATA-DRIVEN PLAN

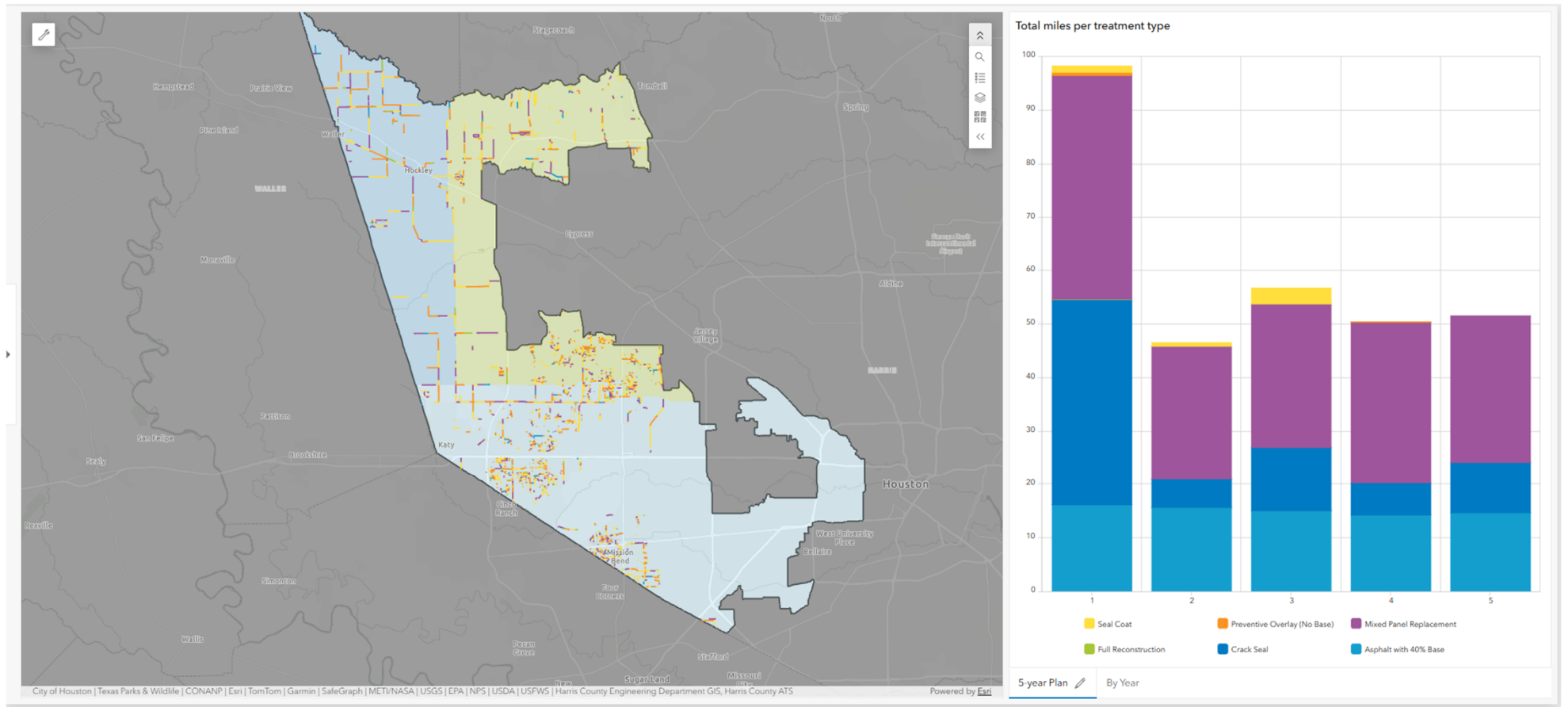
PAVEMENT PLAN PARAMETERS & CONSTRAINTS

Key assumptions and rules used to develop the 5-Year Pavement Plan

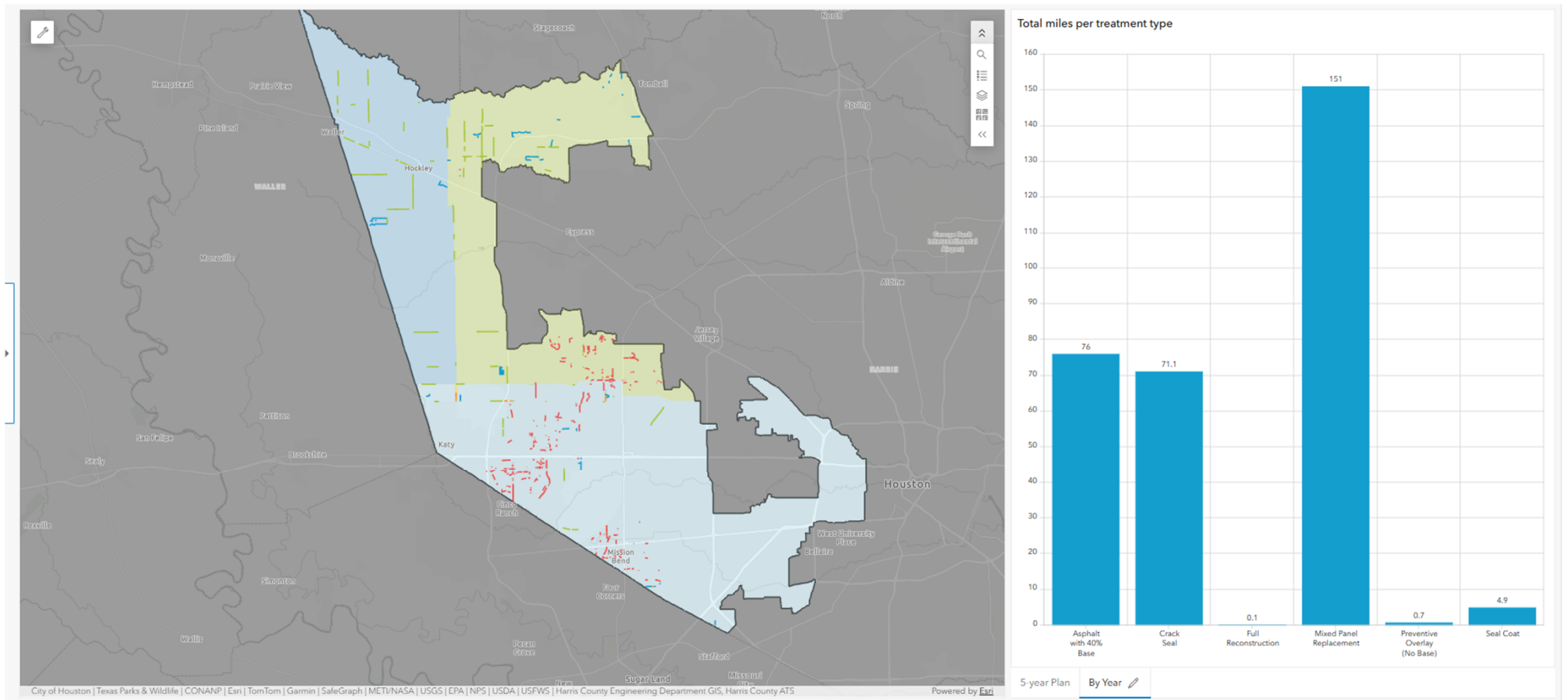
	BUDGET	• Year 1: \$10,000,000 ; Year 2-5: \$7,500,000		
	BUDGET SPLIT	• Base plan targets 75% asphalt and 25% concrete each plan year.		
	HIGH INJURY NETWORK SUPPLEMENTAL	• \$2,000,000 per year.		
	PROJECT-LENGTH RULES	• Asphalt uses a minimum threshold of 1 mile .		
	ASPHALT TREATMENTS	• PCI 0 – 59	Asphalt with 40% Base	Reset to 98
		• PCI 60 – 69	Preventive Overlay (No Base)	Reset to 92
		• PCI 70 – 85	Seal Coat	Add 10 to PCI (cap 90)
		• PCI 86 – 95	Crack Seal	Add 4 to PCI (cap 95)
	CONCRETE TREATMENTS	• PCI 0 – 39	Full Reconstruction	Reset to 98
		• PCI 40 – 59	Mixed Panel Replacement	Reset to 90
	OTHER FUNDING / CIP RESET	• PCI 95 with no cost.		
	PRIORITY STRATEGY	• Preservation 50% of budget; Rehab/Rebuild weighting 50% of budget.		
	DETERIORATION	• Curve-based deterioration based on BGE-P4 derived curve.		
	EXCLUSIONS	• Unnamed, Private, Access		
	PRIORITY SCORE	Impact Per Dollar (Area SqFt × PCI Lift) ÷ Project Cost	× Strategy Blend (0.50 × Preventative Opportunity) + (0.50 × Rehab Need)	× Road Class Multiplier = PRIORITY SCORE Impact Per Dollar × Strategy Multiplier × Road Class Multiplier



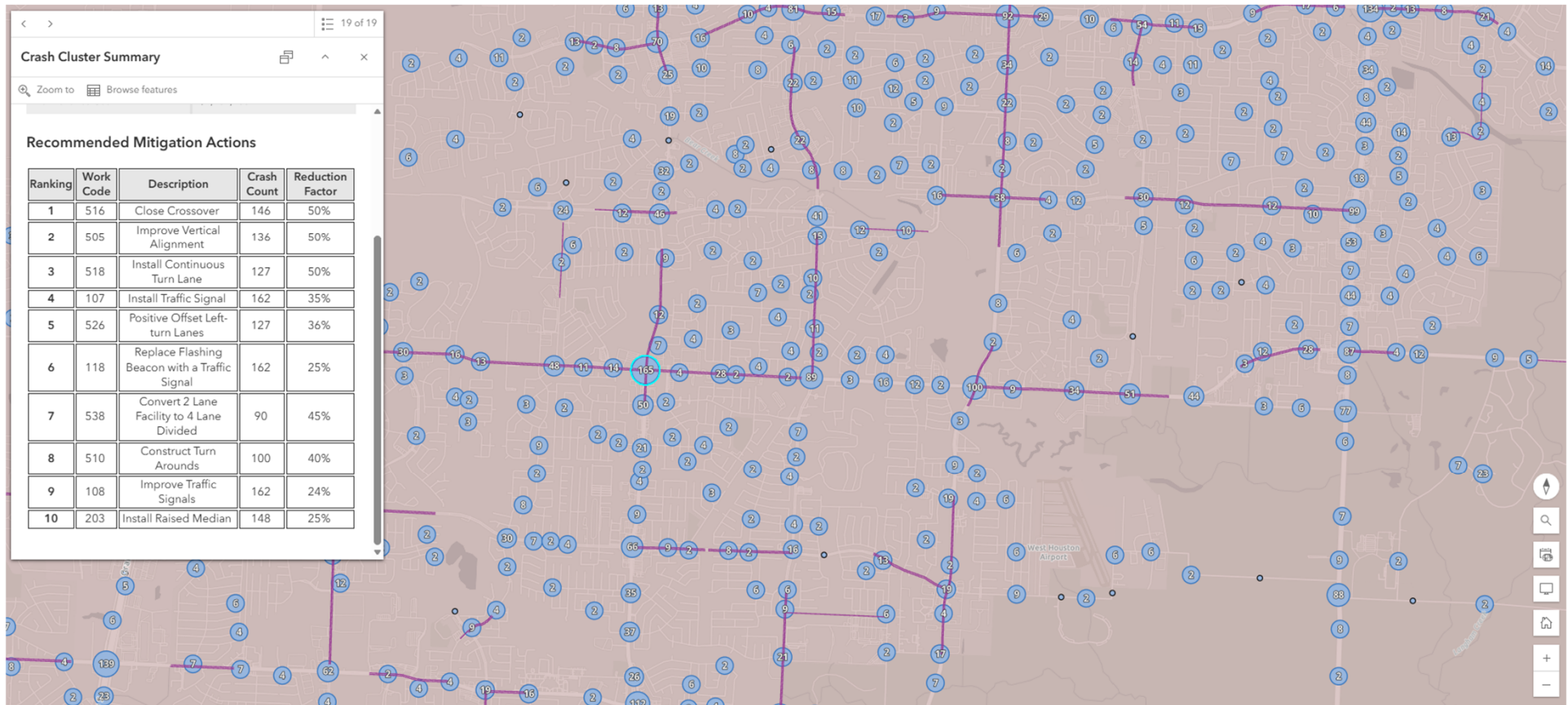
5-YEAR OUTLOOK



YEAR 1 OUTLOOK



SAFETY IMPROVEMENT OPTIONS





THANK YOU

