

**Innovations in establishing  
priorities for roadway  
maintenance & capital projects**

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Presented by: Chris McConn

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# Identifying a need

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- Our client is one of the top 5 largest cities in the country in terms of population and covers over 650 square miles of land area
- City population is over 2 million
- Nearly 6 million people in the metro area
- City maintains nearly 16,000 lane miles (around 5,500 centerline miles) of roadways
- Existing roadway condition assessment information was from 2001
- Limited funding for street maintenance
  - *Distribution of maintenance funds was highly politicized*

# Possible/traditional solutions

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- Renewal of previous assessment approach
  - Outside engineering/consultant solutions
- Utilize internal forces- 2 approaches
  - Reallocation of existing workforce
  - Request an increase in workforce

# Problems with traditional solutions

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- Outside contractor
  - Contract rate per assessment- \$1.7 million
  - Lack of control over assessment process
  - Extensive time required
- Reallocation of existing workforce
  - Less employees available for actual work
- Increase workforce
  - Difficult during tough budget years

# Problems with traditional solutions

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- “Human Nature” factors (subjective assessments)
  - Visual inspections rely on human judgment
  - Ratings vary from inspector to inspector (turnover)
  - Safety concerns (traffic dangers)
- Other concerns
  - Time intensive
  - GASB 34 requirements
  - Maintenance priorities still a question
  - Review of assessment decisions required reassessments

# Goals identified for an alternative solution

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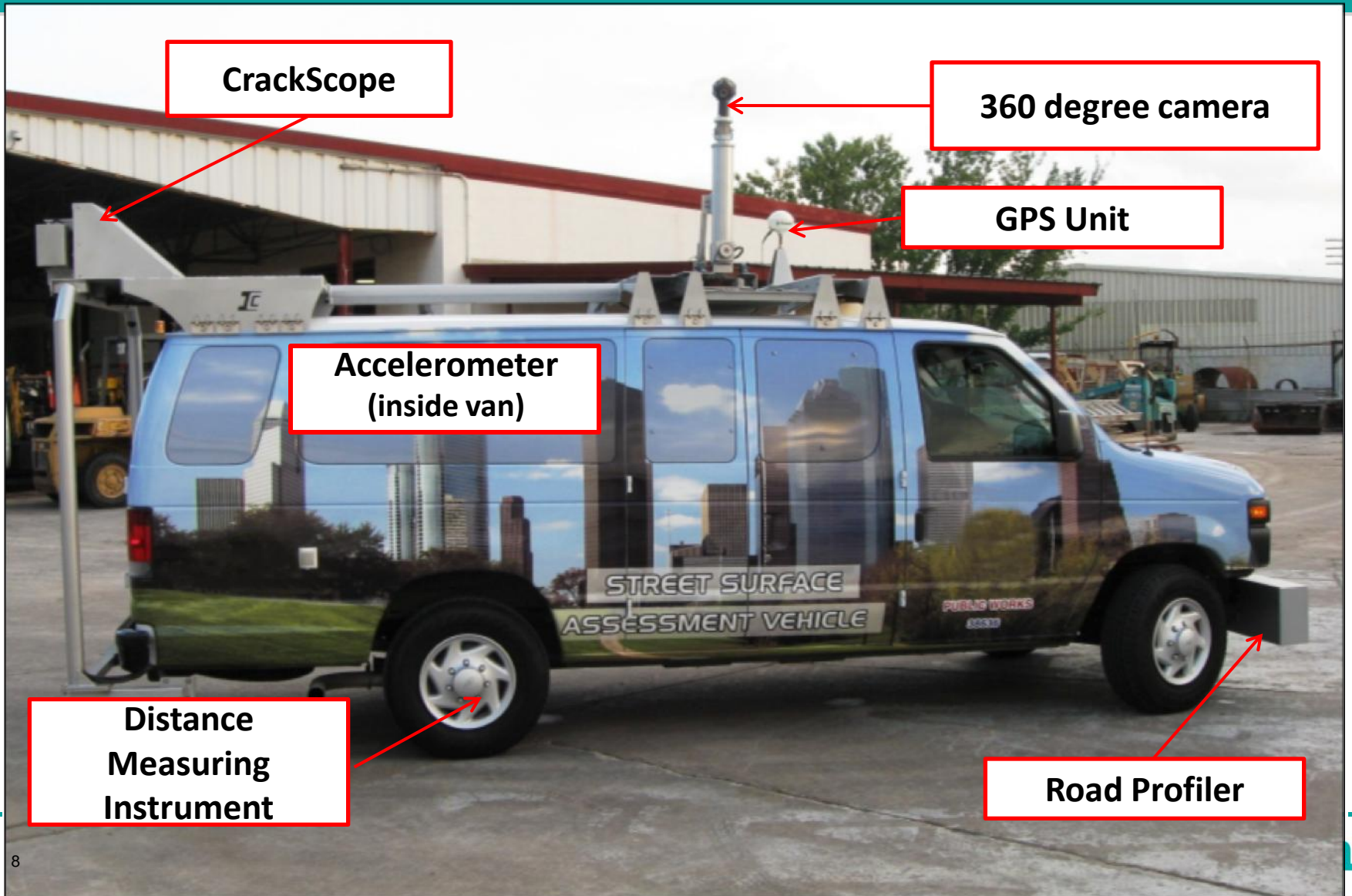
- Efficient assessment of roadways in a timely manner
- Non-subjective process for pavement rating
- Data accessible to multiple viewers & the public
- GIS integration
- Customizable PCR score range utilizing specific street conditions
  - Roughness
  - Rutting
  - Cracking
  - Other various street conditions

# Development of a solution

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- Partnership with Idea to develop the Street Surface Assessment Vehicle (SSAV)
- Utilization and coordination of various technologies housed in a mobile unit
- Began testing July 2009
- Full production began May 2010
- Assessments are anticipated to occur every 2-3 years
- Estimated 5 year initial system life
  - 3 assessments

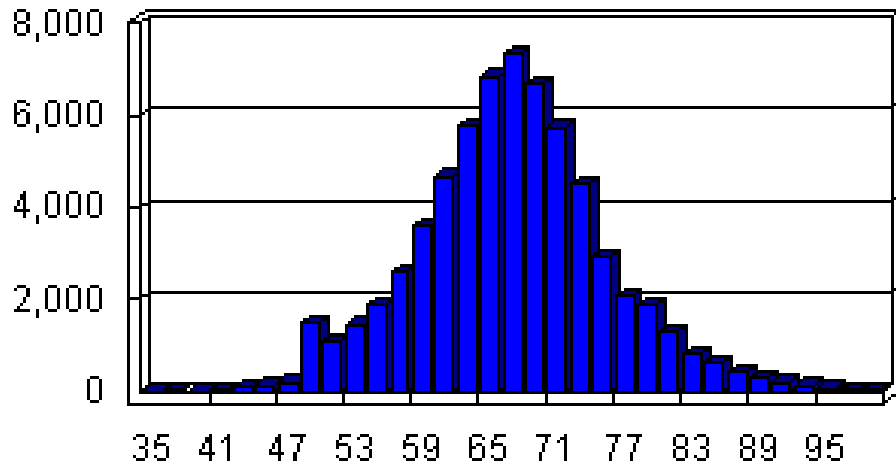
# Technical components of the Street Surface Assessment Vehicle





# Examining the results

**Frequency Distribution**



**PCR Score Distribution**

	All City Street Scores		% of total
	35	58.65	10.00%
	58.66	64.62	20.00%
	64.63	71.69	40.00%
	71.7	78.07	20.00%
	78.08	100	10.00%

**Supplemental Data For All Streets:**

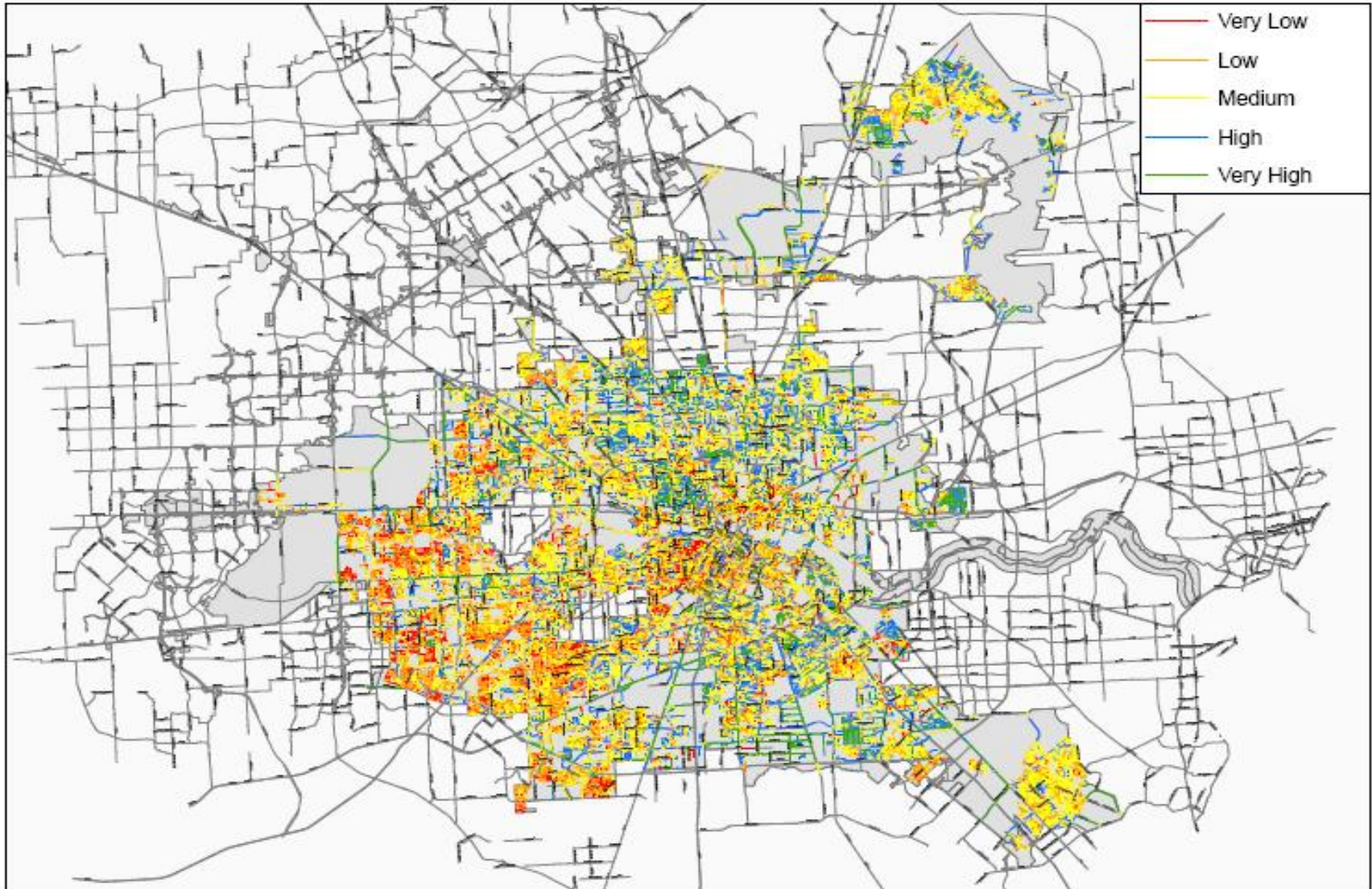
**Mean PCR score: 67.50**

**Minimum PCR score recorded: 35      Maximum PCR score recorded: 100**

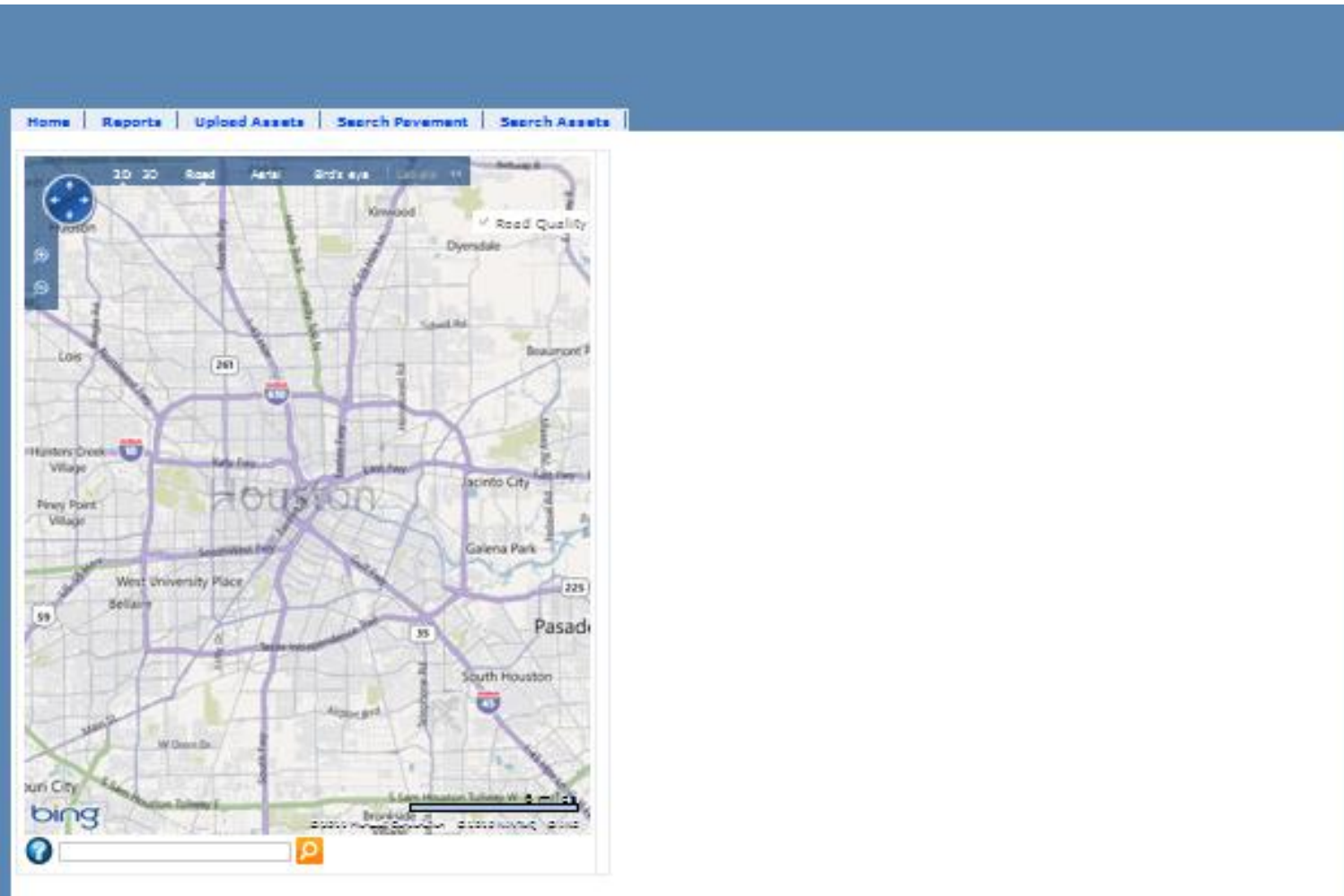
**\*Over 66,000 street segments analyzed\***

# Public outreach/ accessing information

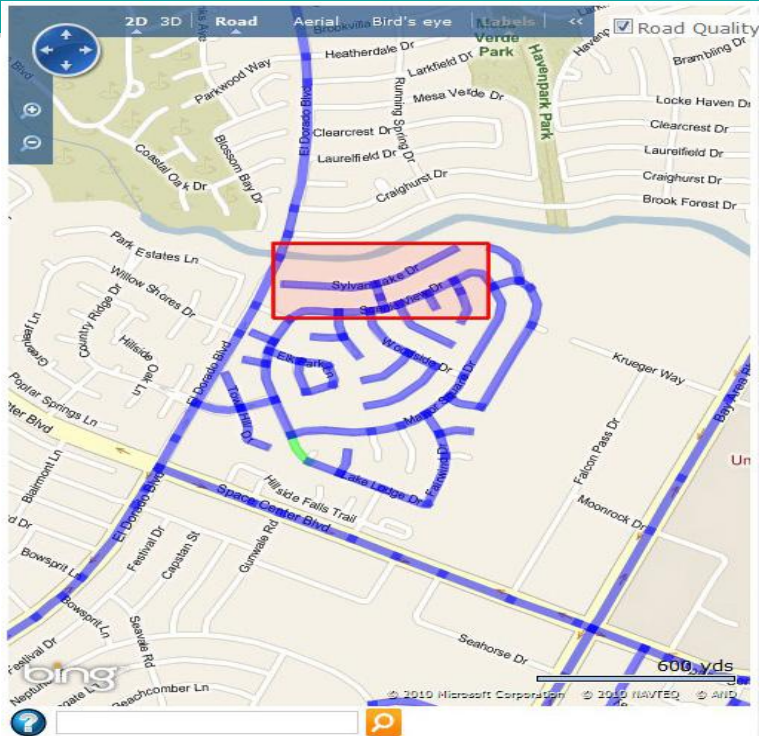
## COMPLETED STREET ASSESSMENTS - 2011



# Public outreach/ accessing information



# Public outreach/ accessing information



StarMap	KeyMap	Street Name	From Block	Miles Driven	Total C
<a href="#">1143600</a>	618F	EL DORADO BLVD	2300	0.23	
<a href="#">1141224</a>	618F	EL DORADO BLVD	3000	0.11	
<a href="#">1141230</a>	618G	MEADOW GARDENS DR	2214	0.10	
<a href="#">1355702</a>	618G	PALM VISTA DR	2200	0.04	
<a href="#">1355703</a>	618G	PALM VISTA DR	2300	0.06	
<a href="#">1141236</a>	618G	ROCKHAVEN DR	2200	0.26	
<a href="#">1141192</a>	618F	SCENIC VIEW DR	15700	0.09	



## Section Information: 1141103

Street Name: SYLVAN LAKE DR From Block: 15800 To Block: 15899  
 PCR: 65.23

### Current Pavement Survey Data

Lane	PCR	Pot Holes	Survey Date	Pavement Type
E1	65.23	0	2/20/2009	Rigid

Asset Type	Assets	Date In Service	Edit
Planning And Engineering	Street Cut	9/1/2009	<a href="#">Edit</a>

StarMap ID: 1141103	Overall PCR: 65.23	Potholes: 0
Key Map: 618G	Street Name: SYLVAN LAKE DR	Miles Driven: 0.32
Council District: E	From Block: 15800	To Block: 15899

[View/Add Work Order](#)

# Public outreach/ accessing information

As Of Date: 8/5/2010  Key Map:  NULL

Council District:  NULL Street Name: Washington  NULL

From Block:  NULL To Block:  NULL

From PCR:  NULL To PCR:  NULL

Star Map Id:  NULL Road Class: All

1 of 2 ? 100% Find | Next Select a format Export

Star Map Id	Key Map	Council District	Street Name	From Block	To Block	Potholes	Overall PCRScore	Miles Driven	Pavement Type	Road Class
1088268	493L	H	WASHINGTON AVE	1200	1299	0	80.14	0.048	Flex	MAJOR
1088254	493L	H	WASHINGTON AVE	1300	1317	0	75.15	0.055	Flex	MAJOR
1088237	493L	H	WASHINGTON AVE	1318	1399	0	69.13	0.048	Flex	MAJOR
1353316	493L	H	WASHINGTON AVE	1400	1421	0	66.79	0.072	Flex	MAJOR
1353317	493L	H	WASHINGTON AVE	1422	1499	0	65.41	0.029	Flex	MAJOR
1088224	493L	H	WASHINGTON AVE	1500	1599	0	69.61	0.105	Flex	MAJOR
1088211	493K	H	WASHINGTON AVE	1600	1605	0	82.18	0.067	Flex	MAJOR
1074896	493K	H	WASHINGTON AVE	1606	1609	0	79.85	0.02	Flex	MAJOR
1088197	493K	H	WASHINGTON AVE	1610	1613	0	73.7	0.042	Flex	MAJOR
1088192	493K	H	WASHINGTON AVE	1614	1699	1	73.52	0.049	Flex	MAJOR
1088189	493K	H	WASHINGTON AVE	1700	1799	1	73.81	0.118	Flex	MAJOR
1088171	493K	H	WASHINGTON AVE	1800	1899	0	74.13	0.186	Flex	MAJOR
1088155	493K	H	WASHINGTON AVE	1900	1999	1	72.58	0.136	Flex	MAJOR
1088132	493K	H	WASHINGTON AVE	2000	2099	0	76.08	0.138	Flex	MAJOR
1088117	493K	H	WASHINGTON AVE	2100	2199	0	77.66	0.131	Flex	MAJOR
1088104	493K	H	WASHINGTON AVE	2200	2299	0	79.14	0.135	Flex	MAJOR
1088094	493K	H	WASHINGTON AVE	2300	2399	1	65.31	0.13	Flex	MAJOR
1088090	493K	H	WASHINGTON AVE	2400	2499	0	70.29	0.131	Flex	MAJOR
1088070	493K	H	WASHINGTON AVE	2500	2599	2	73.35	0.2	Flex	MAJOR
1088069	493E	H	WASHINGTON AVE	2600	2699	2	71.03	0.096	Flex	MAJOR

# How we use this data

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- Results provided identify areas of need
  - Recommendations reflect most efficient use of funds
  - Political influence is minimized
- Guide and expand maintenance programs
  - Overlay program
  - Concrete repairs
- Primary factor for development and scheduling capital projects for roadways
- Secondary factor for projects that involve other considerations
  - Drainage
  - Transportation
  - Traffic control
  - Other projects in the right of way

# Costs involved

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- \$2.95 million for SSAV development and implementation
  - Existing technology allows for 3 assessments over a 5 year period
  - Cost versus \$5.21 million for 3 outside assessments
- \$100,000 annual warranty budget
- Upgrades (costs vary)
  - Asset tagging
  - Roadway width calculations
  - Ground-penetrating radar
  - Other system improvements

# Asset tagging interface



Run Videos : [1](#) [2](#) [3](#) [4](#) [5](#) [6](#)

StarMap ID: 1141107	Overall PCR: 66.88	Potholes: 0
Key Map: 618F	Street Name: SYLVAN LAKE DR	Miles Driven: 0.32
Council District: E	From Block: 15700	To Block: 15799

## Add New Asset :

StarMap ID:	1141107	Overall PCR:	66.88	Potholes:	0
Key Map:	618F	Street Name:	SYLVAN LAKE DR	Miles Driven:	0.32
Council District:	E	From Block:	15700	To Block:	15799

Asset Type :

Asset :

### Asset Data

Condition:

Comments:

Date In Service:

Side:

Create

Cancel

## Add New Asset

Right click [here](#) to download current high resolution video (200+ mb).



# Workforce requirements

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- Requires 2-3 operators
  - 1 driver
  - 1 instrument operator
  - 1 navigator/instrument assistant
- Requires internal program coordination (as needed)
  - IT
    - Data migration
    - Web presence
  - Data analysis
    - Capital projects/maintenance decisions

# Apply this approach elsewhere

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- Acquire individual mobile unit & related technology
  - Develop pavement rating program
  - Establish rating criteria
  - Identify technology partners
  - Acquire mobile unit & necessary technology
  - Assign section to manage/implement
  - Analyze and interpret data

# Apply this approach elsewhere

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- Interlocal agreement
  - Develop internal criteria for ratings
  - Acquire required hardware
    - Dedicated SQL server
  - Acquire software/interface from Idea
    - System setup/customize and develop necessary interface
    - Integrate GIS components
  - Partner with City for data collection
    - COH performs field work
  - Assign section to manage data
  - Analyze and interpret data

# The benefits realized

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- Faster and less expensive roadway assessments
- Safer environment for workforce
- Quantitative data based on pre-determined factors
- 360-degree real time video
- By minimizing political influence, neighborhood/council district “competition” is reduced

**Q.A**

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