



# GIS SERVICES IN THE CITY

May 4, 2021  
Council Study Session

**Leah Llamas**  
GIS Coordinator

# AGENDA



- GIS: What & Why
- Role Of GIS
- History Of GIS
- Layers and Core Business Systems
- GIS Software Platform
- GIS Services
- GIS Governance
- Key To Success
- What Is Next For GIS?
- Questions

# WHAT IS GEOGRAPHIC INFORMATION SYSTEM?



Geographic Information Systems  
Technology



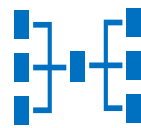
GEOGRAPHIC DATA  
Location, Address, GPS



USED FOR  
Capture, Storing, Viewing, Processing &  
Analyzing



TOOL FOR  
Citizens, Government Agencies,  
Private Entities



APPLIED TO  
Emergency, Asset Management, Planning,  
Transportation, Environmental monitoring



# GIS HISTORY



**Pre  
1990**



**No dedicated GIS staff**

**No central location for  
storing (spatial) data**

**Maps:**

*Hand drawn map  
sheets*

*Blue line maps*

*Auto CAD*

**Infrequent updates**

**Hundreds of map sheets  
manually maintained  
and updated**

**1990's**



**1st full-time staff hired**  
*(GIS Coordinator)*

**GIS Software acquisition**

**Base layers from 1992 aerial**

*Building outlines*

*Road edges*

*Contours*

*Any assets visible in the aerial  
map*

**Development of initial  
GIS Strategic Plan**

**Governance in the form of a  
GIS Steering committee formed**

**2000-  
2010**



**Growing day-to day workload:**  
*GIS requests, map updates,  
asset collection, analysis, field  
work*

**2nd GIS staff hired**  
*(GIS Utility Analyst)*

**Central database designed  
to store City's GIS layers**

**Information and Geographic  
Services (IGS) Department  
created to focus on more  
City-wide approach for GIS & IT  
Services**

**WebGIS launched**  
*Internal and Public*

**2011-  
present**



**GIS projects & requests  
continue to expand**

**Enterprise License Agreement**

**Power Users** *(Parks & Public Works)*

**Value-added layers**

**Core business system & field  
integrations**

**Online Maps**

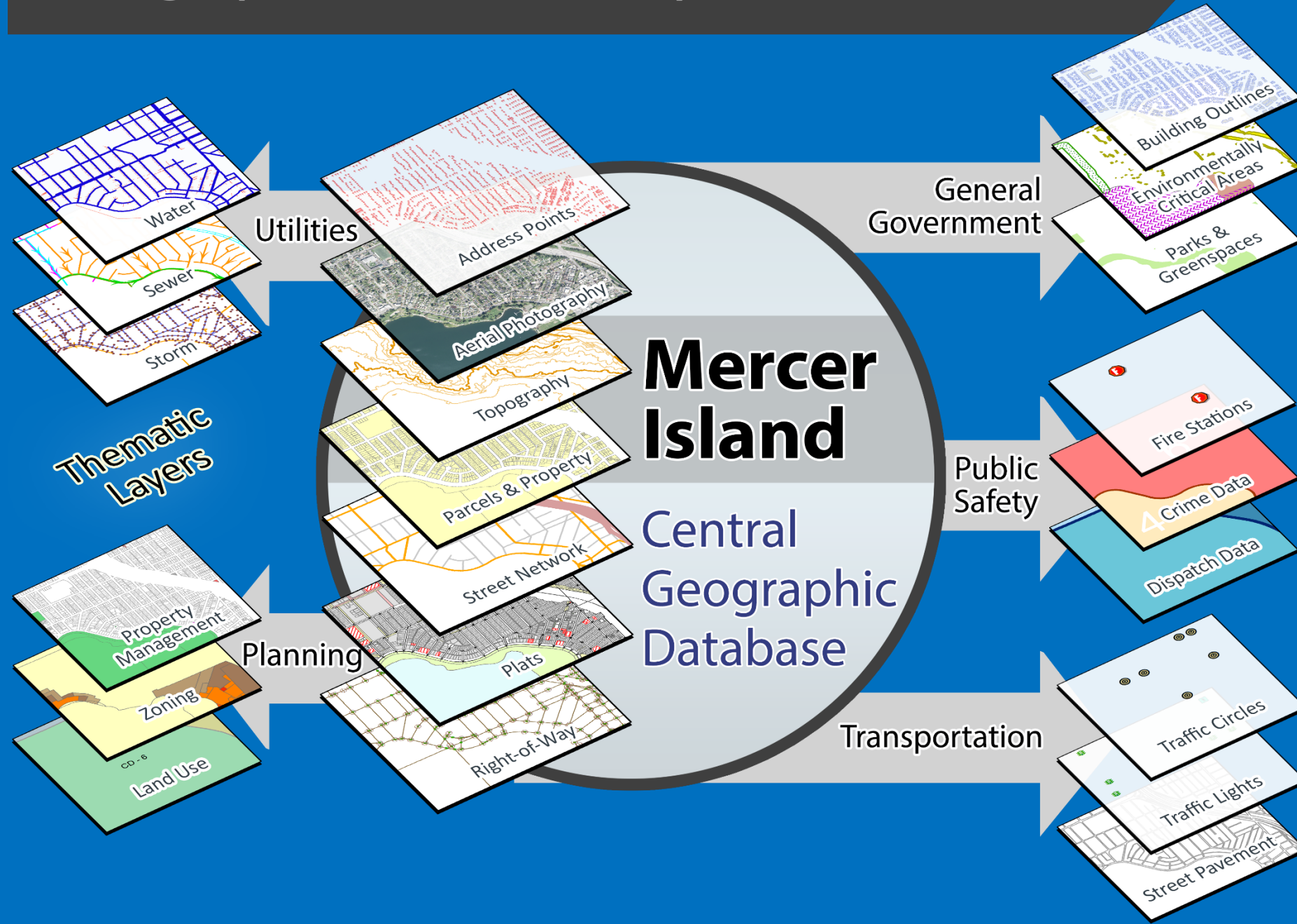
**GIS Think Tank**

**Regional Partnerships**

**Transition to Administrative  
Services Department**



# Geographic Information Systems Environment



# HUNDREDS OF **LAYERS** & **DATA**

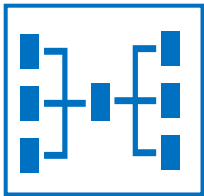


- **Base map** (address, building, streets)
- **Property** (parcels, easements, legal rights of way)
- **Utility** (water, sewer, storm)
- **Public Safety** (crimes, aid calls, Emergency Operation Management)
- **Planning** (zoning, land use, environmental areas, impervious surfaces, cell towers)
- **Parks** (trails, trees, invasive species, natural resources, park assets)
- **Imagery** (3D terrain, aerial photos)
- ...and anything with an address, GPS location or asset ID





# GIS IS A KEY COMPONENT OF CORE BUSINESS SYSTEMS



- Online maps (*WebGIS*)
- Permitting, Address (*TRAKiT*)
- Enterprise Asset Management, Work Orders, Inspections & Requests (*Cityworks*)
- Pipe Inspections (*ITPipes*)
- Field Device Monitoring (*SCADA*)
- Police & Fire Dispatching
- Meter Reading (*AMI*)
- Customer Request Management (*QAlert*)
- Emergency Operations Center

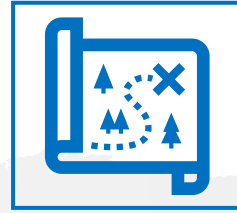
# ESRI SOFTWARE PLATFORM



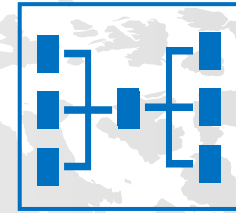
- Environmental Systems Research Institute
- City's main GIS software
- Unlimited licensing (2015)
- Industry standard
- Easy data sharing (especially in emergency)
- Integrates with core business systems



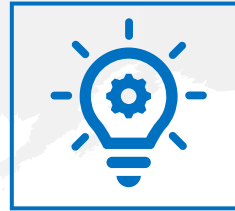
# GIS SERVICES



MAPS



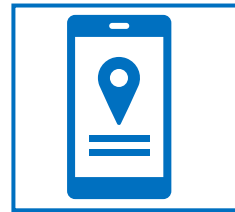
INTEGRATION



SPATIAL  
ANALYSIS



PROJECTS



TOOLS &  
APPLICATIONS



TRAINING



DATA



USER  
SUPPORT



# GIS MAPS



## MAP GALLERY

- Hazard Maps - Landslide, Geology, Erosion
- Snow & Ice Maps
- Zoning

## STREET MAPS

- Transportation Improvement Plan (TIP)
- Pavement Condition Index (PCI)

## PUBLIC SAFETY

- Marine Patrol
- Fire Wall Map

## ATLAS

- Water, Sewer, Storm
- Fire

## OTHER MAPS

- Agenda Bills
- Vicinity Maps

# GIS SPATIAL ANALYSIS



## TRACKING MAPS

- Brushing
- Sweeping
- Snow Clearing

## CELL SIGNAL MAPS

- Signal strength around the Island

## LIDAR (*Light Detection and Ranging*)

- Contour layers
- Watercourse analysis

## OTHERS

- Modeling
- Water Main Capital Improvement Project (CIP)
- Transportation Improvement Project (TIP)



# MERCER ISLAND SNOW RESPONSE PRIORITIES (2021)

- Snow Response Priorities**
- Priority #1- Primary Arterial
  - Priority #2- Primary Residential
  - Priority #3- Secondary Residential

- Other Streets:**
- Interstate (I-90)
  - Public Residential Streets\*
  - Private Streets\*\*

**Note:**  
\* Public streets not indicated on the map as response priorities are plowed as resources become available and or site conditions allow for feasible Staff response.

\*\* Across the Island, there are numerous private streets serving individual neighborhoods and developments. As with most other maintenance activities related to these streets, removal of snow and ice is the responsibility of the private property owner(s), not City crews.

0 1,500 3,000 Feet

Disclaimer: The City of Mercer Island does not guarantee that the information on this map is accurate or complete. No warranties of any sort including accuracy, fitness or merchantability accompany this map. This data is provided on an "as is" basis.



Map Date: 2/10/2021  
SnowRemovalPriorityStreets\_2021.mxd

MAP

SPATIAL  
ANALYSIS

# MERCER ISLAND SNOW RESPONSE TRUCK PASSES 2021

**Number of Truck Passes:  
(between 02-12-2021, 5am  
through 02-16-2021, 12am)**

- Count 7+
- Count 5-6
- Count 3-4
- Count 1-2

- Other:**
- Public Streets
  - Private Streets
  - Interstate-90

0 1,500 3,000 Feet

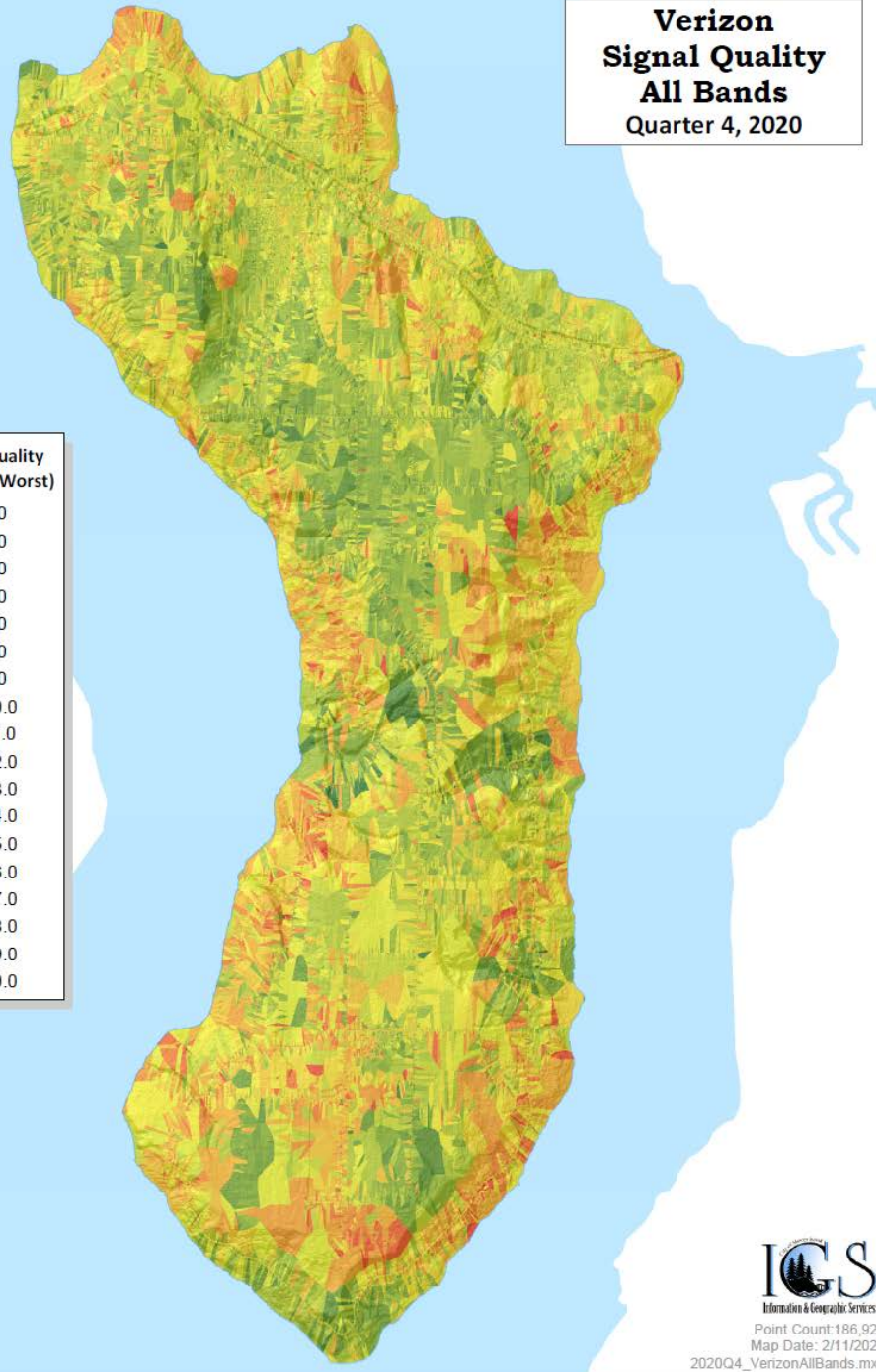
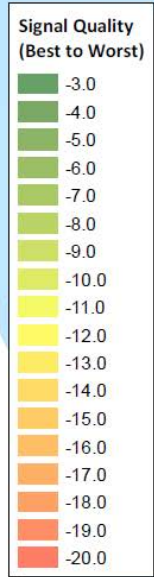
Disclaimer: The City of Mercer Island does not guarantee that the information on this map is accurate or complete. No warranties of any sort including accuracy, fitness or merchantability accompany this map. This data is provided on an "as is" basis.



Map Date: 2/19/2021  
SnowResponseTruckPasses2021.mxd

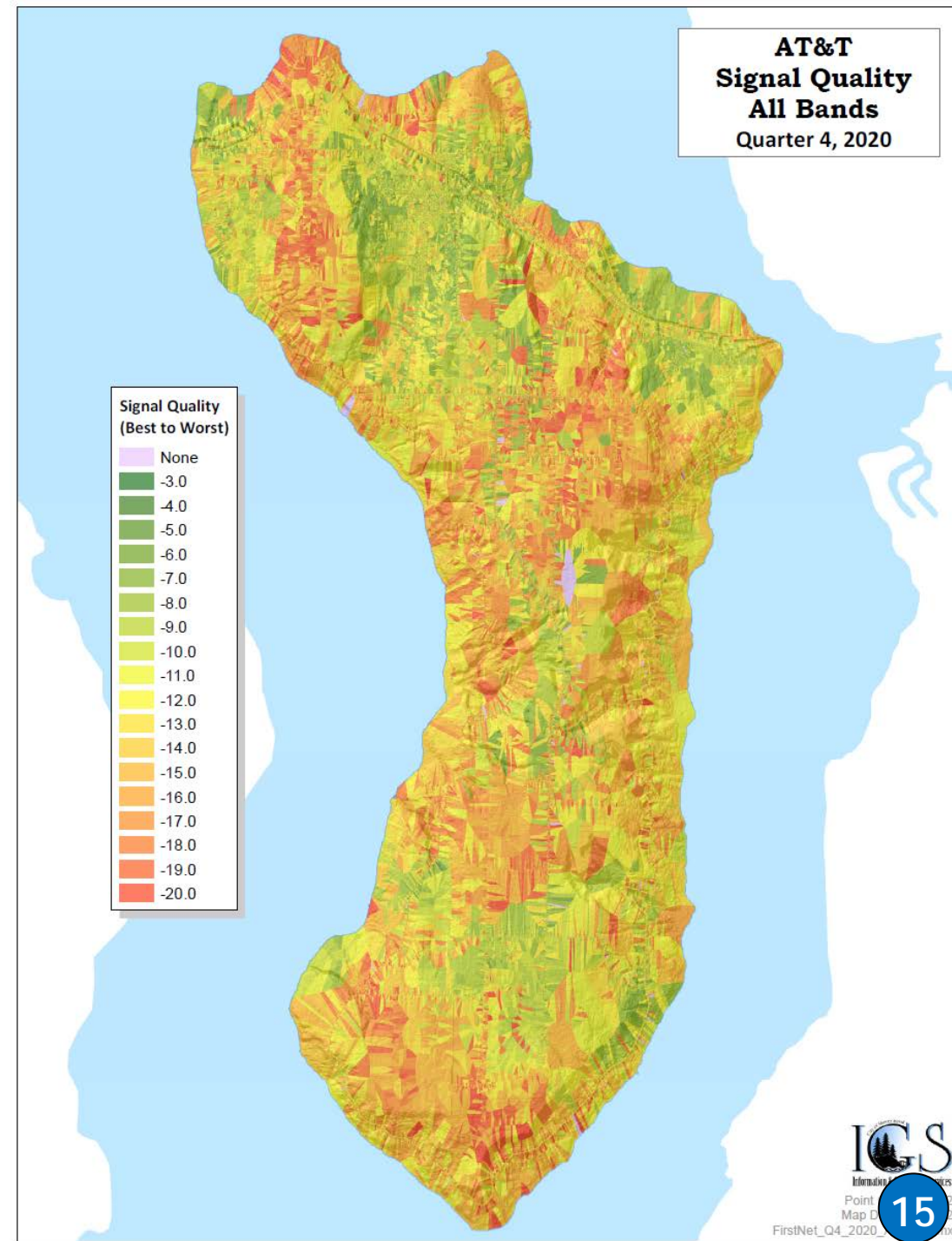
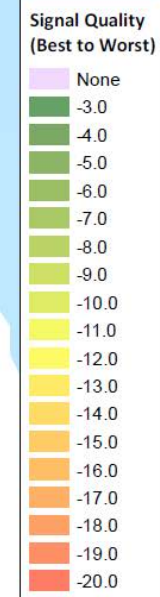


**Verizon  
Signal Quality  
All Bands  
Quarter 4, 2020**



**SPATIAL  
ANALYSIS  
MAPS**

**AT&T  
Signal Quality  
All Bands  
Quarter 4, 2020**



# GIS TOOLS & APPLICATIONS



## WEB MAPS

- WebGIS ([Internal](#) & [External](#))
- Crime Map
- Art Story Map
- Donated Benches
- Tree Assessment

## FIELD COLLECTION

- Invasive Species
- Manhole Inspection
- Sewer Jetting
- Park Signs
- HISTORICAL: Benches, park assets, I-90 hydrants catch-basins, sign-verification

## MORE TO COME!

- Dashboards
- Live Tracking
- Data Hub





Search

Navigation

Identify Features

Layers



I want to...

Filter Layers...



- ☒ Special Interest Layers
- ☒ Utility Layers
- ☒ Environmental Layers
- ☒ Property & Land Use
- ☒ Basemap
- ☒ Aerial Photos







# GIS DATA



## PERMIT DATA (*TRAKiT*)

- Active Permits
- Land Use Projects
- Code Enforcement
- Permit History



## DOCUMENT MANAGEMENT (*OnBase*)

- Document retrieval through WebGIS
- Document uploads into OnBase



## SPECIAL LAYERS (*Various Reports*)

- Traffic Studies
- Streets & Utility Projects
- Geo-Technical Reports
- Landslide Reports



## GIS DATA LAYER UPDATE & MANAGEMENT

- Work Orders (*Cityworks*)
- Addressing
- As-builts from new constructions projects/remodels





### ASSET MANAGEMENT SYSTEM (*Cityworks*)

- GIS-centric asset management to track & analyze infrastructure assets
- “Main Hub” for City utility asset lifecycle



### PIPE INSPECTION (*IT Pipes*)

- CCTV (*Closed-circuit television*)
- Pipe inspection program



### CITIZEN REQUEST MANAGEMENT (*QAlert*)

- Manage non-emergency requests, work orders and other complaints

### SCADA

(*Supervisory Control and Data Acquisition*)

- Future integration
- GIS provides spatial view of the network while SCADA gives real time parameters of the utility network

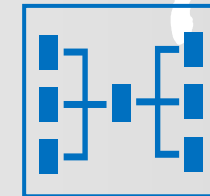


### AUTOMATIC METER INFRASTRUCTURE (*AMI*)

- Future integration
- Accurate meter inventory and locations
- Creates a smart grid for meter reading



# GIS INTEGRATION



# GIS PROJECTS



## HIGH ACCURACY AERIAL PHOTOS (2020)

- 2 or 3- year program
- 14 individual aerial captures (1946 to 2021)
- Building, roads, topography, tree canopy
- Construction history (code enforcement)
- Sensitive area analysis (watercourse, wetlands)

## WATERCOURSE & WETLAND ANALYSIS (2020)







- Updated watercourse ordinance
- Accurate flow analysis
- Wetland probability

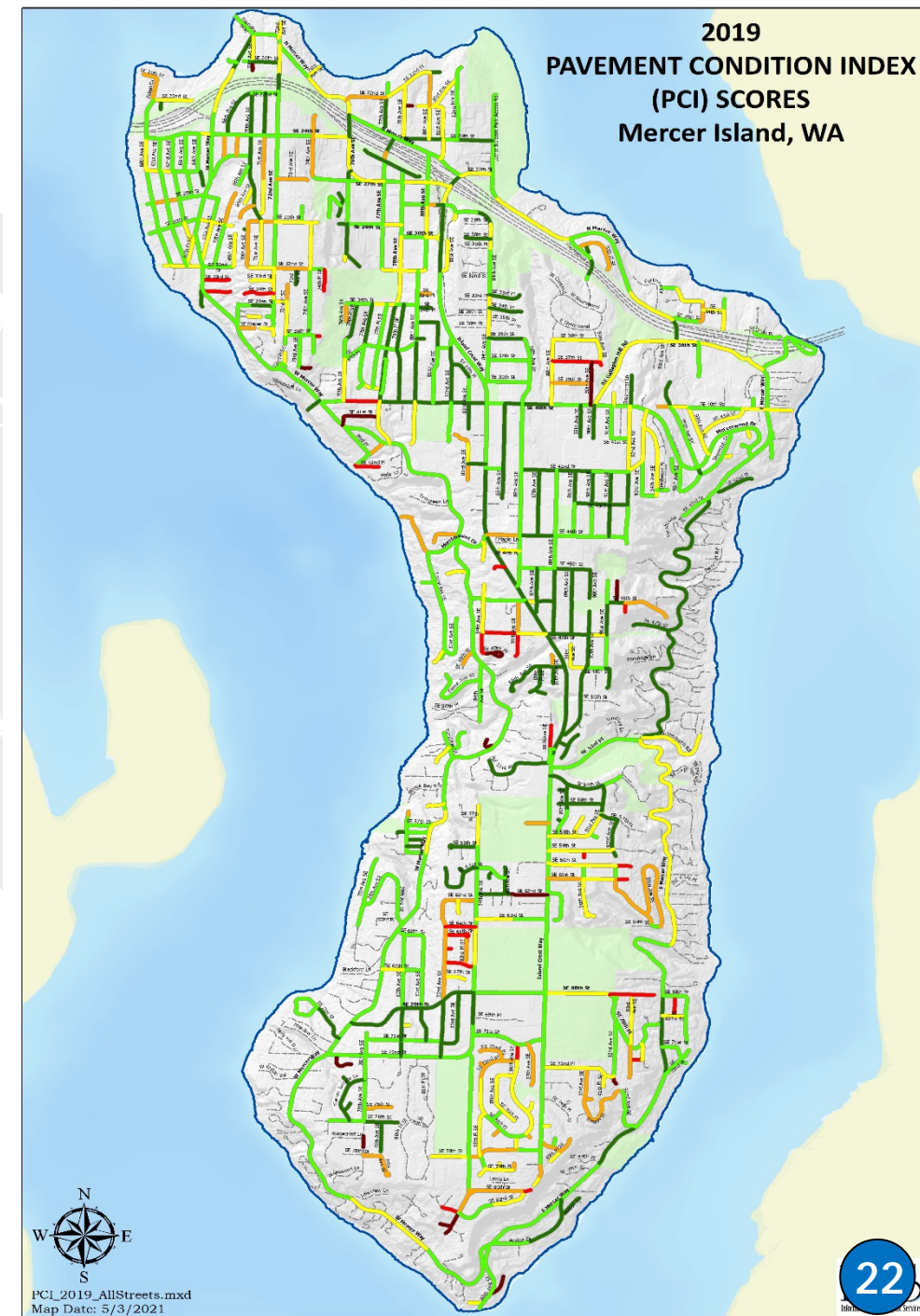
## MOBILE ASSET DATA COLLECTION (2019)

- 3-year program to collect "street health"
- Data integrated with City's TIP process
- Collection of other City assets (signs, utility features)

# MOBILE ASSET DATA COLLECTION

- Vans equipped with cameras and sensors
- Measures Pavement distresses
- PAVEMENT CONDITION INDEX (PCI)
  - A numerical (0-100) indicator that rates the surface condition of the pavement based on visual distresses
  - Indicator of structural integrity
  - Applied for determining maintenance & repair needs & priorities
- 2019 PCI Score: **74** (Satisfactory)
- % of Good Streets **24%** (85 & above)
- Backlog: **3%** (Fall below 40)

COLOR	RATING SCALE	ARTERIAL		RESIDENTIAL	
		2019 MILES	2019 PERCENT	2019 MILES	2019 PERCENT
	Good 86-100	4.8	18.9%	13.6	23.3%
	Satisfactory 71-85	15.2	60.1%	22.4	38.4%
	Fair 56-70	5.1	20.2%	12.2	20.9%
	Poor 41-55	0.1	0.4%	6.9	11.8%
	Very Poor 26-40	0.1	0.4%	2.0	3.4%
	Failed 0-25	0.0	0.0%	1.2	2.1%
	<b>TOTAL</b>	<b>25.3</b>	<b>100.0%</b>	<b>58.2</b>	<b>100.0%</b>





# GIS TRAINING & SUPPORT



## SOFTWARE

- WebGIS (*GeoCortex*)
- ESRI Products
- Enterprise Asset Management Software (*Cityworks*)
- Document Management (*OnBase*)
- Data Sharing

## FIELD SUPPORT

- Inventory efforts

## EDUCATION

- Asking the right question
- What can GIS
  - Do
  - Answer
  - Model

# GIS THINK TANK



## GOVERNANCE

- An open forum to discuss GIS-related projects, ideas and initiatives with representatives from each department
- GOALS
  - Identify and prioritize citywide GIS goals and objectives
  - Create opportunities for departments to cooperate in meeting those goals and objectives
- GIS TEAM:
  - Listens, provides solutions & recommendations
  - Shares new innovative ideas
  - Assists in GIS-related projects
  - Recommends best practices

# KEY TO SUCCESS



## USING A STANDARD PLATFORM

ESRI Software

Enables

## DATA SHARING, TOOLS, KNOWLEDGE

GIS Think Tank

GIS user support & training

Enables

## MAXIMIZE RETURN ON INVESTMENT

Integration in Core Business Systems  
Projects

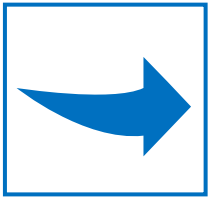
Enables

## CONTINUOUS STRATEGIC GOALS

Efficiency

Open Data, Sharing, Planning

# WHAT IS NEXT FOR GIS?



## PUBLIC GIS DATA HUB

- One-stop location to find, download, and use GIS data

## WebGIS UPGRADE

- Web-based maps

## REAL-TIME STREAMING DATA

- Track moving assets
- Monitor stationary sensors
- Display real-time data

## DASHBOARDS

- Snapshot of current activity
- Put data into context

## CORE BUSINESS SYSTEM INTEGRATIONS

- SCADA
- Automatic Meter Infrastructure (AMI)





# QUESTIONS



**Leah Llamas**  
GIS Coordinator

**Mike Helten**  
GIS Utility Analyst

# THANK YOU!