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# Proactive Asset Management of Newport's Wastewater and Stormwater Systems Contributes to Performance Improvements

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## Department of Utilities-Water Pollution Control

The **Water Pollution Control Division** is responsible for the management of the City's Sanitary Sewer system and Storm Drainage system. Construction of the wastewater collection system dates back to the late 1800's and early 1900's. The system functioned as a combined sewer system until the 1970's when the City undertook an extensive sewer separation program to reduce CSO's discharging to Newport Harbor.

The Sanitary Sewer System contains:

- 97 miles of gravity and force main sewer collection pipe
- Over 1,800 Sanitary Sewer manholes

The Storm Drainage System contains:

- 50 miles of Storm Drain pipe
- Over 1,200 Storm Drain manholes
- Over 2,500 Catch Basins

# Objectives of Field Services



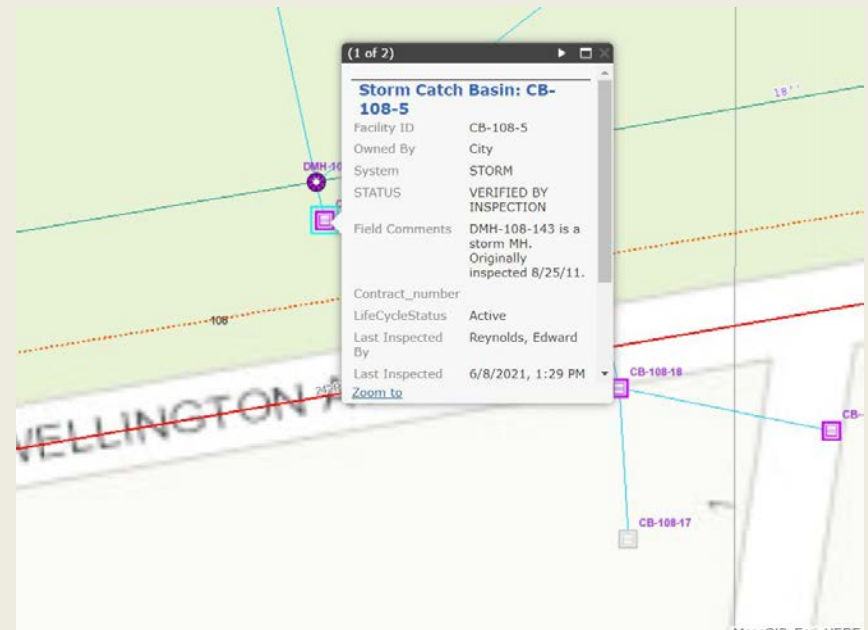
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- Maintain both systems in good operating condition
- Conduct systematic inspections and cleaning of all assets
- Early identification of needs for repairs and replacements
- Provide safe and reliable service to the community
- Track time, materials and costs associated with managing high risk assets

# What is GIS?



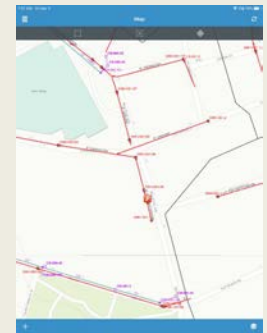
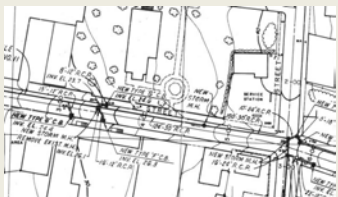
- A geographic information system (GIS) is a system that creates, manages, analyzes, and maps all types of data. GIS connects data to a map, integrating location data (where things are) with all types of descriptive information.





# History of GIS

- 1867 – 2010 - Engineering Record Library scanned to PDF
- 2010 – 2013 – As-built's converted to GIS in conjunction with Citywide baseline field survey of catch basins and manholes
- 2013 - First use of ArcGIS Mobile and ArcGIS Online for data collection and sharing
- July 2017 – Utilities Department Field Services Division created and adopted the use of ArcGIS Collector for asset inspections
- June 2020 - Azteca Cityworks Go Live for work orders and asset inspections



1867-2010 - Paper As-builts

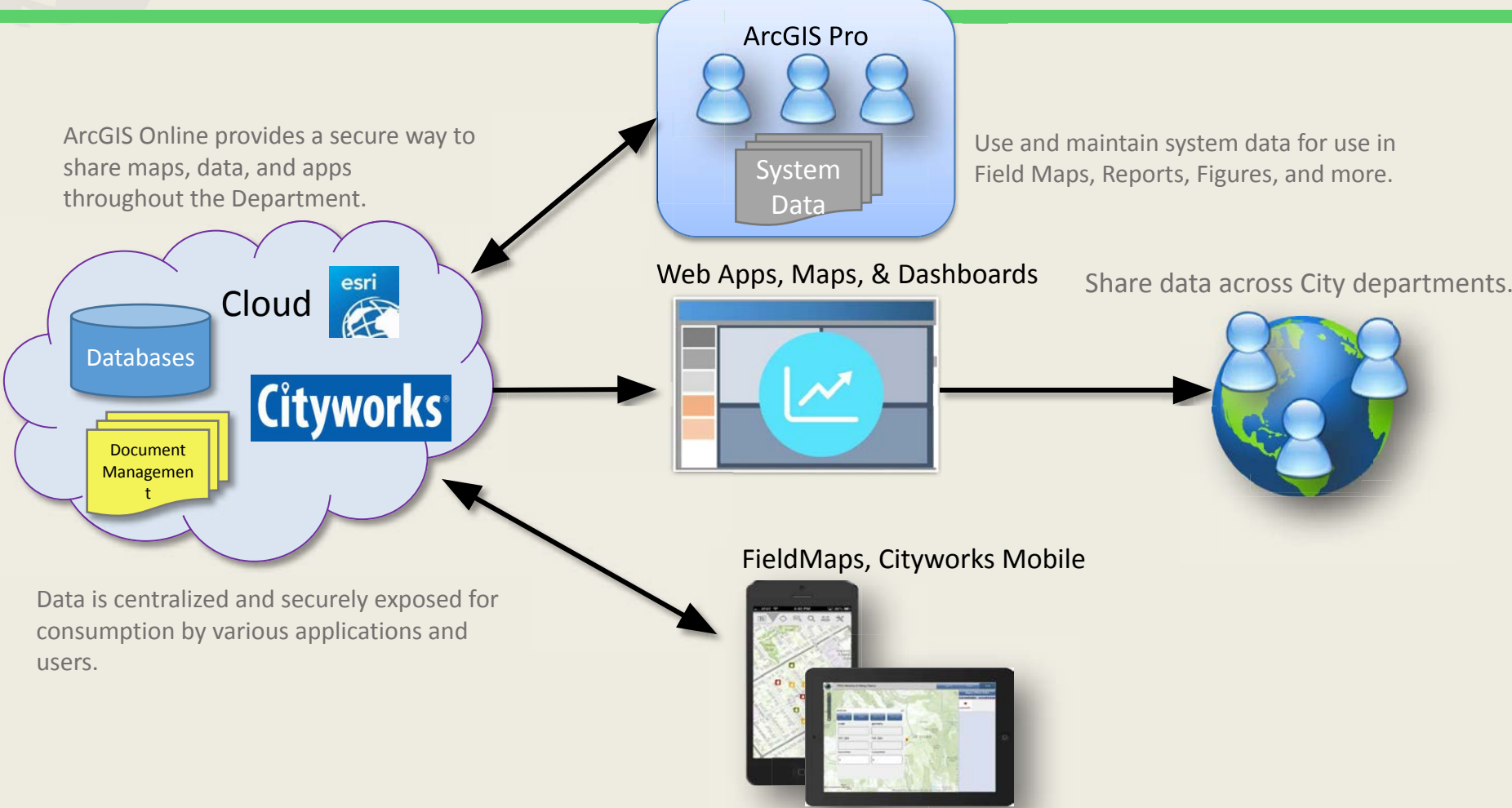
2010 - Conversion to GIS -  
Field Survey's

2013 – Early Adopter ArcGIS  
Online

2018 – Utilities Department –  
WPC Field Services using  
ArcGIS Collector for  
Inspections

June 2020 – Cityworks Go  
Live!

# Utilities Department GIS



# Benefits of a GIS / Mobile



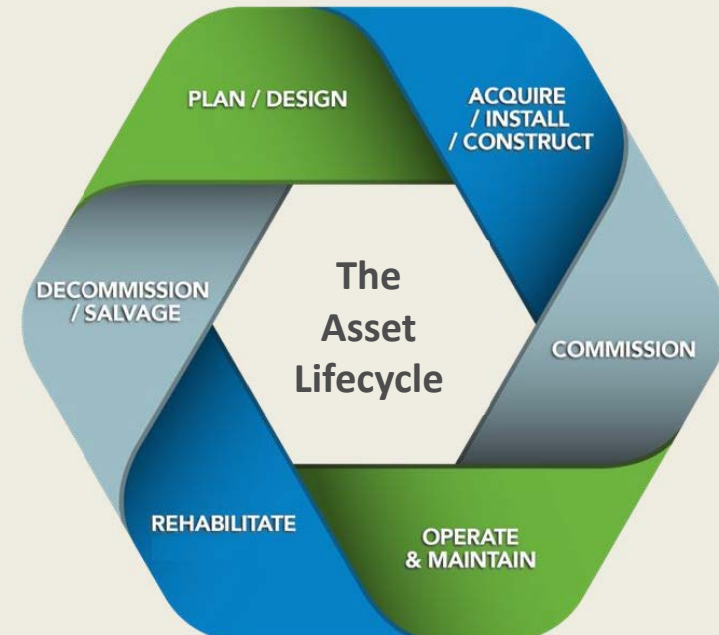
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- Mobile access to all GIS map data allows crews to adapt to unforeseen conditions
- Inspection progress is updated in real-time, eliminating old or obsolete information and maps
- Field crews can help to correct system map errors
- All inspection data is linked to the GIS asset ID during the field inspection process
- Eliminates data transition/entry errors
- Improved data quality
- Digital records are easier to store, protect, find, and share
- Asset history available in the field



Modern asset management is strategic, collaborative, and integrated across the utility, and focuses on the asset lifecycle

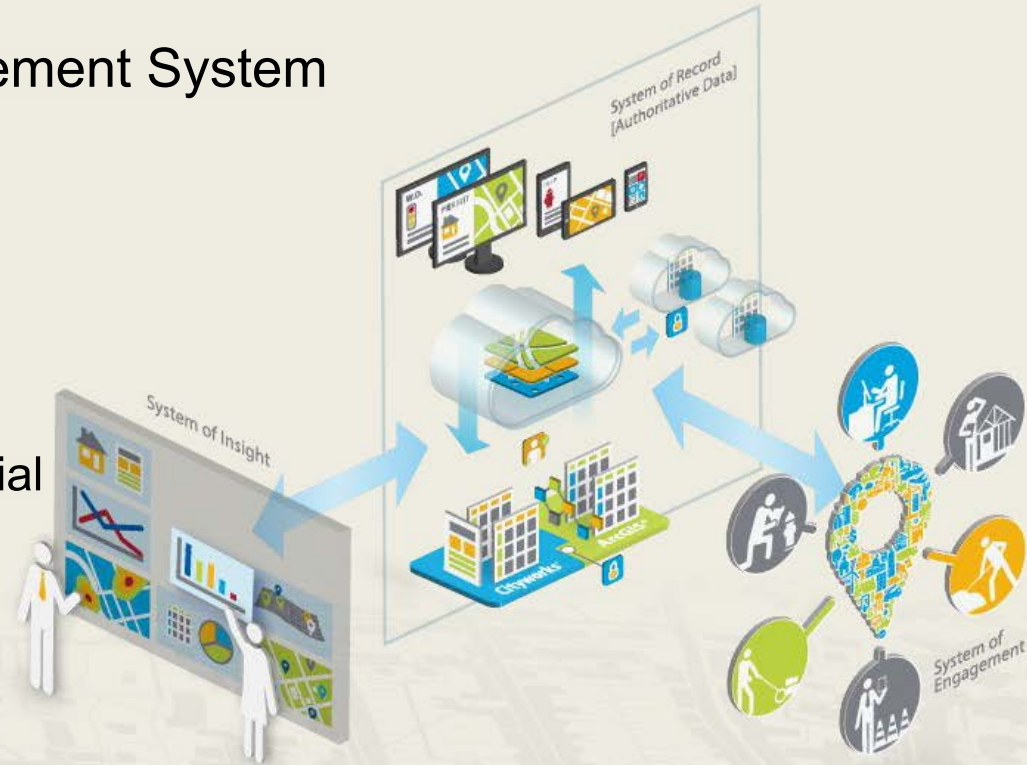
- Uses fact-based decision-making that is documented, defensible and reproducible
- **Is data-driven with accurate and current data**
- Considers stakeholder needs and expectations
- Involves multi-disciplinary activities and collaboration among staff
- Focuses on delivering established levels of service while minimizing lifecycle costs and keeping risk at an acceptable level



# What is Cityworks?



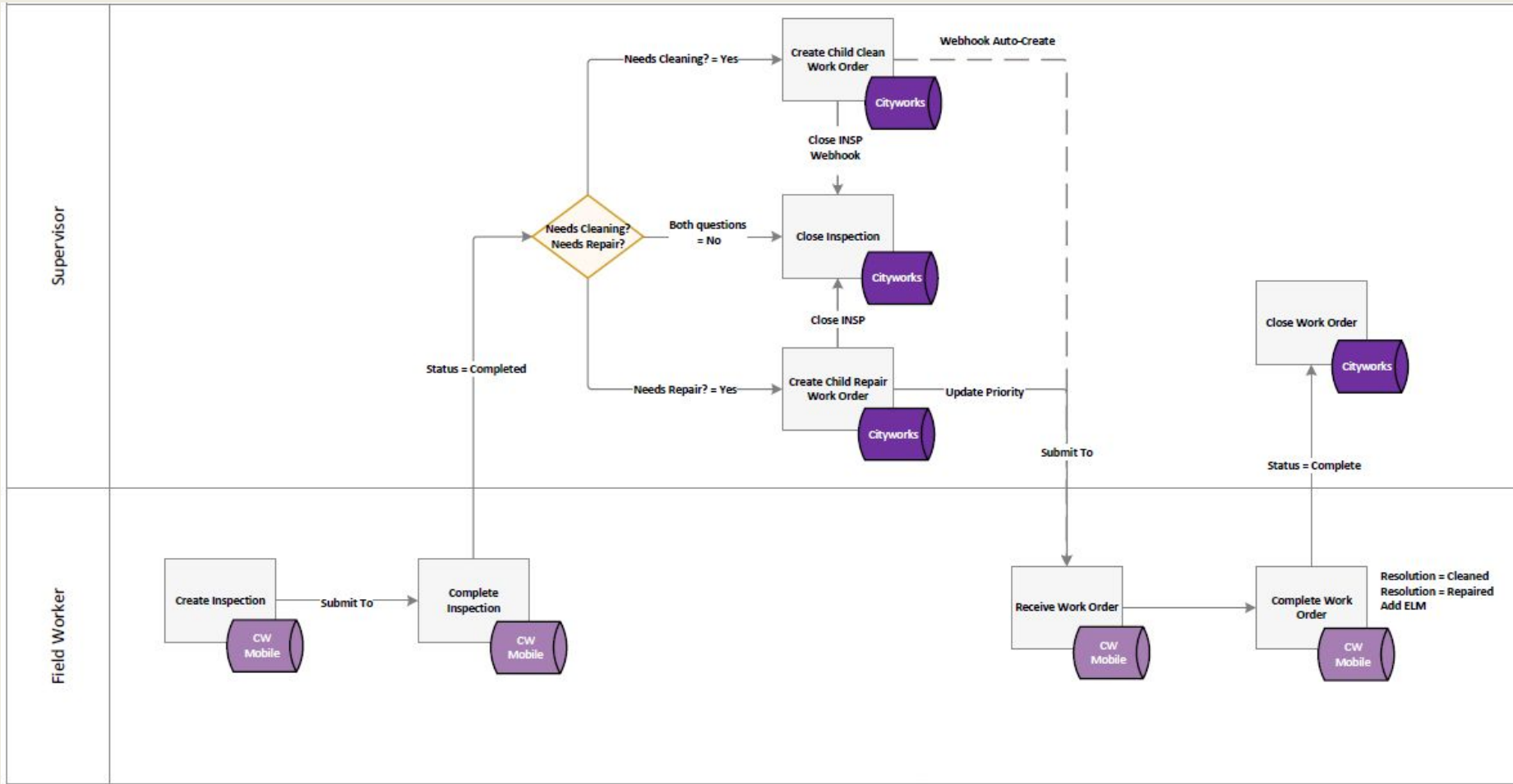
- Enterprise Asset Management System
- GIS-Centric
  - ESRI ArcGIS Enterprise
- Work Management
  - Service Requests
  - Work Orders
  - Inspections
  - Equipment, Labor, Material
  - Mobile – Field
- Analysis
  - Cost –ELM
  - Asset History
- Reporting



# Department Workflows



## Repair/Clean Workflow Diagram





# Work Orders

- Reactive and Preventative Maintenance
- Asset upkeep, Cyclical
- 84 Work Order Templates

GIS Asset	
Storm	
	Manhole
	Drain
	Catch Basin
	Discharge Point
	Lateral
	Network Structure
Sewer	
	Manhole
	Gravity Main
	Pressurized Main
	Pump Station

Type of work →

WO Template Types
Install
Repair
Replace
Inspect
Clean
Others
CCTV
Abandon

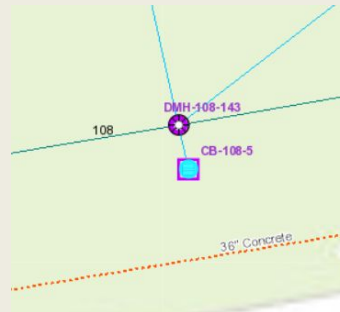


## Work Order Form

Work Order	
Number: 3481	Date: 10/6/2021 7:26 AM
Description: Repair Catch Basin	
Status: Closed	Priority: Medium
Submit To: Nunes, Kevin	Supervisor: Norton, Robert
Date: 10/6/2021 7:28 AM	
Actual Start:	Actual Finish: 10/6/2021 1:59 PM
Projected Start: 10/6/2021 7:26 AM	Projected Finish: 10/6/2021 7:26 AM
Completed By: Nunes, Kevin	Date: 10/8/2021 10:53:17 AM
WO Address: BELLEVUE AVE	
Location Details: CB-141-220	
Comments: Add Comment <span>Sort ▼</span>	
<b>Nunes, Kevin</b> 10/6/2021 2:23 PM Had to use existing frame and cover	
<b>Nunes, Kevin</b> 10/6/2021 2:23 PM Raised frame and grate	
<b>Norton, Robert</b> 10/6/2021 7:26 AM Observations: Grate is sinking significantly, right above where there a...	
Instructions: Remove frame and grate. Build up to road grade and install new frame and grate.	
Resolution: Repaired	Reactive? <input type="checkbox"/>

- Routine
- Preventative Maintenance
- Condition Assessment
- Update GIS Directly

Inspection Templates
Dual-Vortex Separator Inspection & Maintenance Log
High Tide Inspection
Outfall Inspection
Perk Filter/DV Sep. Maintenance Log
Sewer Manhole - Monthly
Sewer Manhole - Quarterly
Sewer Manhole Inspection
Storm Catch Basin Inspection
Storm Manhole Inspection
Tide Gate Inspection



Inspection Form

Observations	
Needs Cleaning?	No
Needs Repair?	Yes
Needs Investigation?	No
Depth of Debris?	25% Full

GIS Updates	
Access Type?	Grate
Type of Inlet?	2x2 Grate
Depth of Basin?	3
Depth of Sump?	0

GIS Attributes

STORM CATCH BASIN	
ACCESSTYPE	Grate
Contract_number	
Depth_of_Basin	3
Depth_of_Sump	0
FACILITYID	CB-108-5
FieldComments	DMH-108-143 is a storm MH. Originally inspected 8/25/11.
FieldInspectionDate	07/03/2012 08:47:50

# Service Requests



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## Service Request Type

- Damaged Structure
- Illegal Dumping
- Illegal Sump Pump Discharge
- Sewer Odor
- Storm Debris Pick Up
- Storm Drain Clog
- Water Over Road
- Other
- Noisy Manhole
- Sewer Backup



**Service Request**

Request id: 78 Status: Closed

Description: Noisy Manhole

Category: Priority: Medium

Initiated By: Norton, Robert Date: 12/10/2021 8:31 AM

Date: 12/10/2021 8:33 AM

Dispatch To: Date:

Project Name: Proj. Comp. Date:

Investigation:  Emergency:  WO Needed:

Project Tree:

Cancel?:  Date:

Cancel Reason: Cancelled By:

Closed By: Norton, Robert Date: 12/10/2021 9:05:50 AM

Comments: Add Comment [Save]

Norton, Robert 12/10/2021 8:35 AM  
Both the SMH and DMH covers were making noise. We were able to ...

Resolution: Work Completed Labor: 0

**Incident Information**

Address: 21 GREENE LN

Unit #: City: Newport

State: RI Zip Code: 02840

Location: In front of 21 Greene Ln

Facility Id: Level Id:

**Callers**

Last Name	First Name	M.I.	Call Time	Caller Type	Commer
UNKNOWN			12/10/2021 8:28:28 AM	RESIDENT	

New Request From Caller

**Related Work Activities**

**Inspections**

Add: [ ] Inspection: [ ] Create

**Work Orders**

Add: [ ] WO Template: [ ] Proj. Start Date: [ ]

Submit To: [ ] Supervisor: [ ]

Priority: [ ] Group assets?:  Create

**Attachments**

+ Add attachment... Remove all attachments



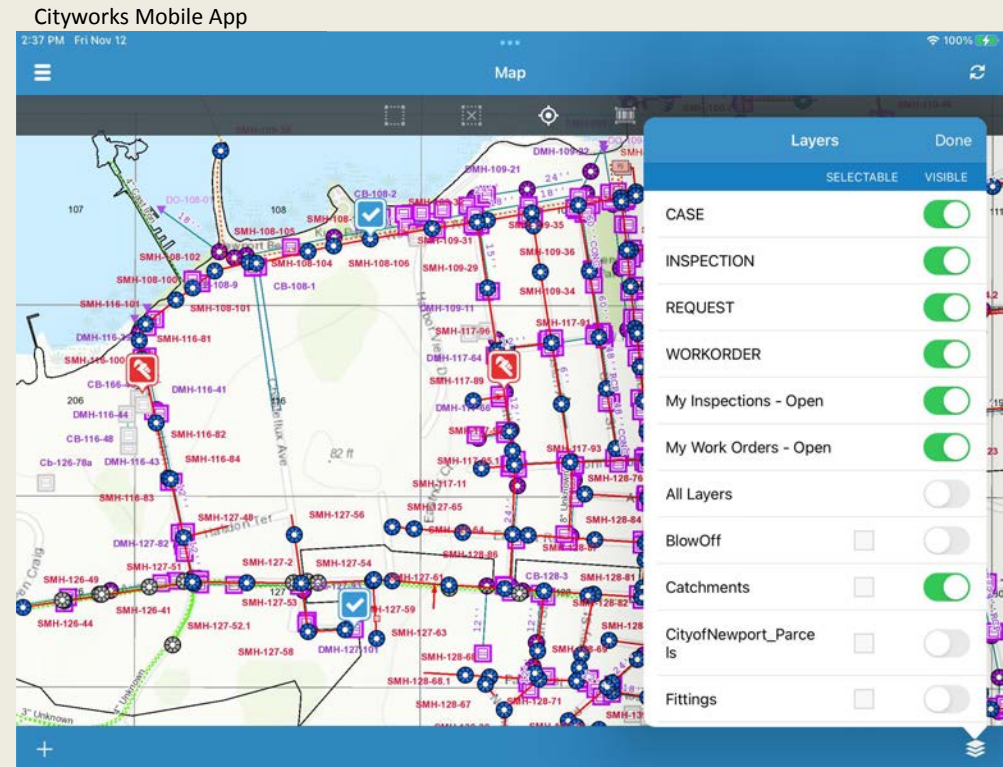
# Mobile – Field Services



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- Field Use
- Connected & Disconnected
- Streamlined Interface
- Auto-scales to device type
- Create & Perform Planned & Unplanned Work Activities



# Reporting / Analysis



- Crystal Reports
- Dashboards – Realtime

### Daily Asset Inspections 8/1/2021 - 11/12/2021

Inspection Total Report

	8/2/2021	8/3/2021	8/4/2021	8/5/2021	8/6/2021	Total
SEWER CATCH BASIN	1	0	0	0	0	1
SEWER MANHOLE	11	1	15	0	0	27
STORM CATCH BASIN	0	0	0	5	0	5
STORM MANHOLE	0	0	1	13	0	14
STORM NETWORK STRUC	0	0	0	0	4	4
<b>Total</b>	12	1	16	18	4	51

Cityworks Status Dashboard

**Newport Utilities Department Cityworks Status**

Storm Drain Pipe - Completed/Closed	SMH - Completed/Closed - Insp	DMH - Completed/Closed - Insp	CB - Completed/Closed Insp
9	207	127	257
	SMH - Needs Cleaning - Inspection	DMH - Needs Cleaning - Inspection	CB - Needs Cleaning - Inspection
	0	1	2
Sewer Gravity Main - Completed/Closed	SMH - Cleaned - Completed/Closed WO	DMH - Cleaned - Completed/Closed WO	CB - Cleaned - Completed/Closed WO
478	130	4	25
	SMH - Needs Cleaning Open WO	DMH - Needs Cleaning Open WO	CB - Needs Cleaning Open WO
	0	0	0

The map on the right shows a street grid with green and yellow markers indicating asset locations. Labeled streets include Bridge St, Marsh St, and 2nd St. A green square marker is located near Storer Park.



# Proactive Management



- The use of ArcGIS Collector 2017-2019 allowed good tracking of inspections and maintenance & cleaning on point assets
- The switch to Cityworks since 2020 has allowed excellent tracking of inspections and work orders for maintenance & cleaning for both point and linear assets
- The UD's goal of inspecting all assets at least once per year has been exceeded!
- Removed 1367 tons of material from the system
- **Uses fact-based decision-making that is documented, defensible and reproducible**
- **Is data-driven with accurate and current data**

Updated inspection counts to the end of 2021

	2017	2018	2019	2020	2021
Gravity Sewers	6	15	43	112	87
Storm Drains	1	2	7	48	10
Manholes <sup>b</sup>	703	1,254	865	6,429	2,859
Catch Basins	963	1,262	705	3,856	2,082
Outfalls	17	24	24	89	119
Tide Gates	5	22	53	105	72

<sup>b</sup> Represents the sum of storm and sewer infrastructure

Updated maintenance and cleaning counts to the end of 2021

	2017	2018	2019	2020	2021
Gravity Sewers	N/A	N/A	N/A	308	1860
Storm Drains	N/A	N/A	N/A	-	10
Manholes <sup>b</sup>	68	782	1102	752	705
Catch Basins	361	443	633	666	330
Outfalls	-	-	3	5	10
Tide Gates	0	13	20	9	5

# Performance Improvements

Year	SSO's
2003-2006	25
2007-2010	36
2011	5
2012	7
2013	14
2014	9
2015	7
2016	8
2017	9
2018	6
2019	3
2020	0
2021	0

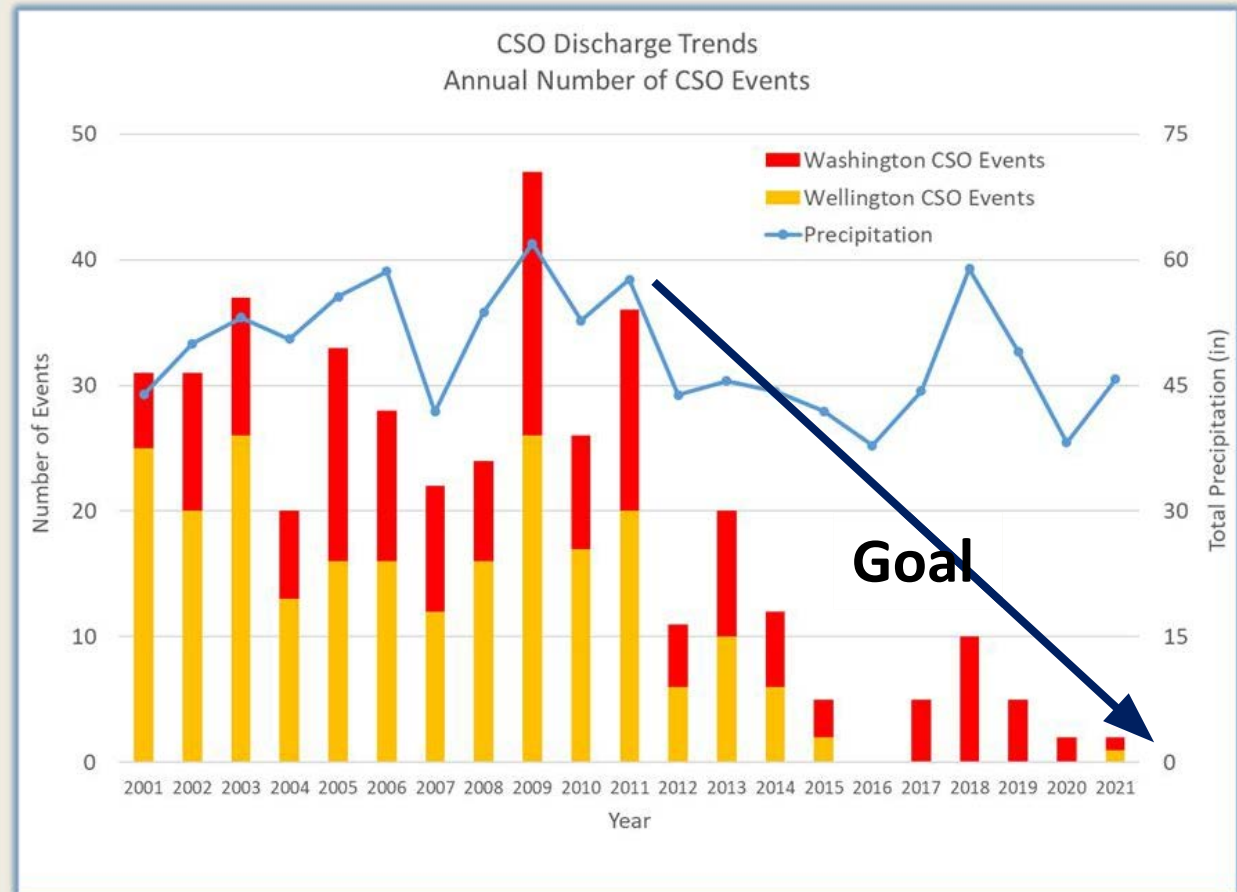


# Performance Improvements

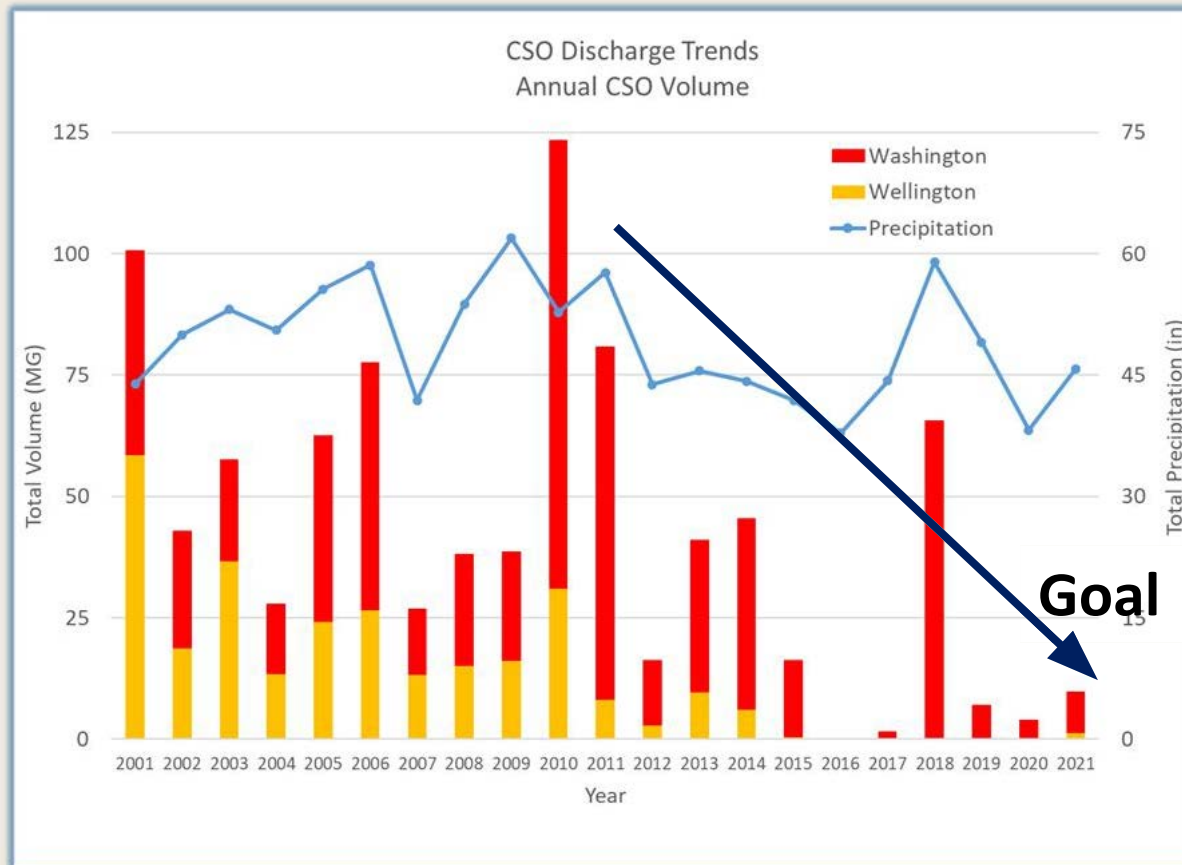


CSOs also reduced through combinations of

- Infrastructure upgrades
- Operating protocols
- Systematic inspections/cleaning



# Performance Improvements



- 2018 CSO volumes are anomaly - high volume of rainfall, treatment plant was being upgraded



- Adding new position for an Asset and Information Manager
- Capturing time and materials costs for maintenance and repairs for individual assets
- Mobilizing city-owned CCTV inspection and repair vehicle
- Adapting inspection and cleaning frequencies for high and low risk assets
- Risk based prioritization for Capital Improvements

# Thank you!



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## Questions?

- Rob Shultz – Director of Utilities - [rschultz@cityofnewport.com](mailto:rschultz@cityofnewport.com)
- Ed Roworth – Jacobs – [Edwin.Roworth@jacobs.com](mailto:Edwin.Roworth@jacobs.com)