



# Asset Management for Municipalities - From a GIS Perspective

MRF Geosystems Corporation & Tsuut'ina Nation  
Jun 14, 2023

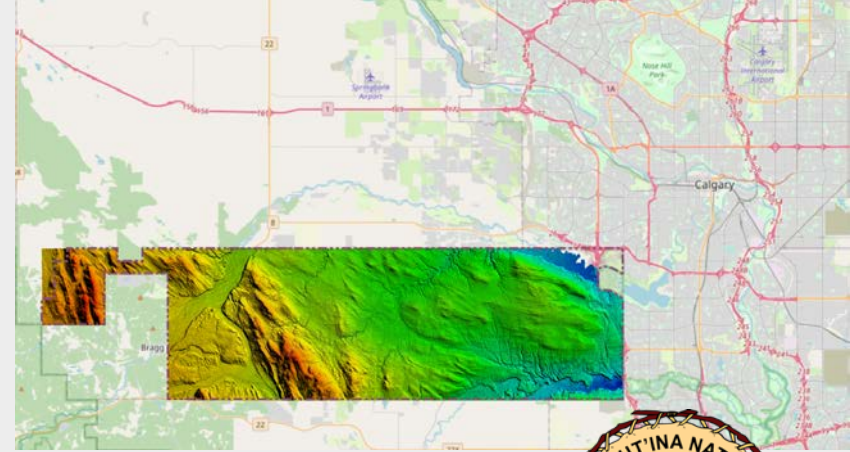
# Who Are We

- **Tsuut'ina Nation**

- First Nation band government in Alberta
- “Tsuut'ina” meaning “many people” or “beaver people”

- **MRF Geosystems Corporation**

- Professional GIS firm incorporated in Calgary, Alberta, Canada since **1992**, specializes in **M**apping, **R**esources, and **F**acilities (“MRF”)



# Contents

## Asset Management for Municipalities

- Scope of asset management here
- MRF's perspective

## Asset Management Case

- Tsuut'ina nation project
  - Asset regular maintenance scheduling
  - Integrated with work orders
- Summary

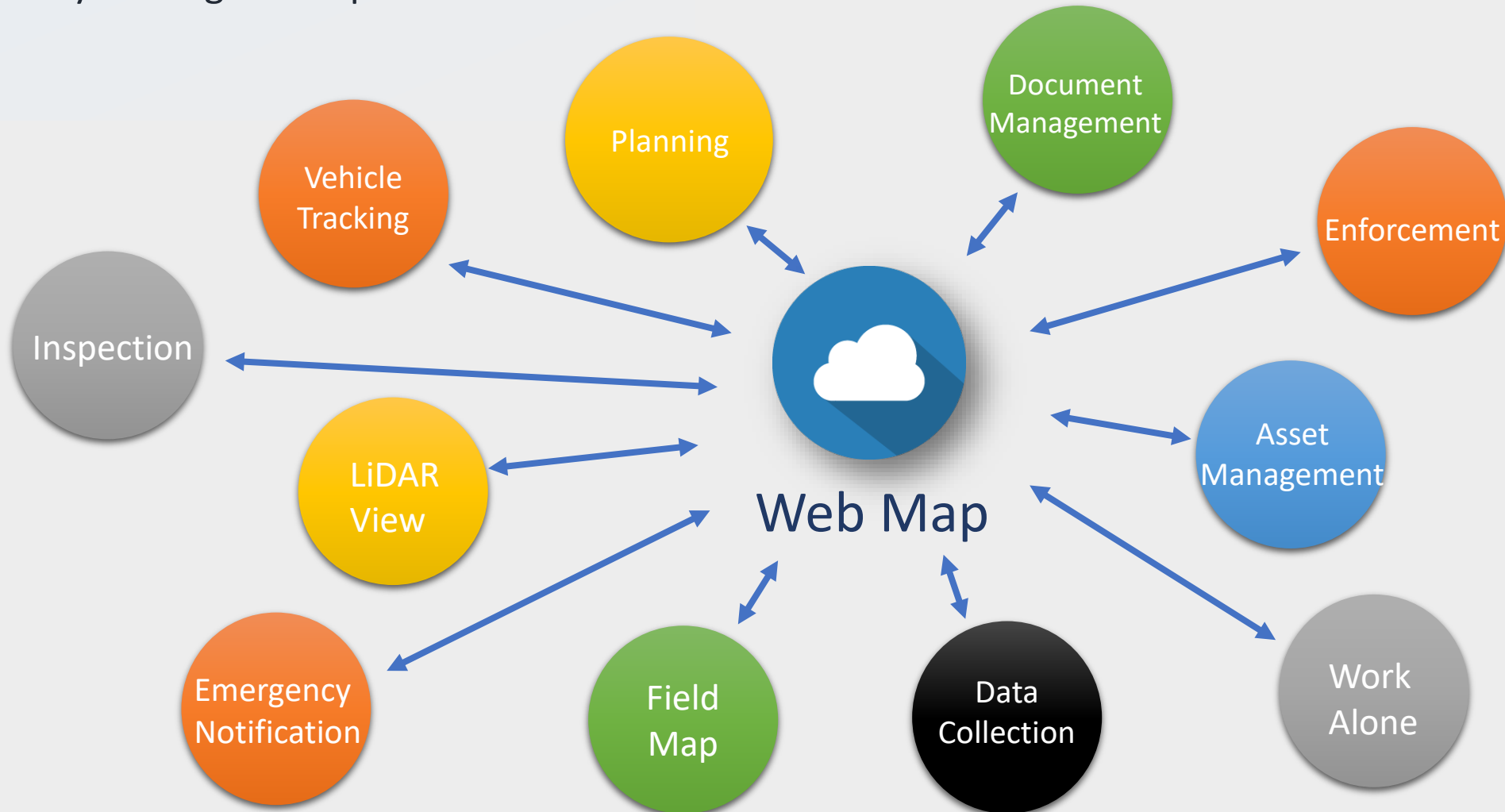
## Asset Management on Modern Web Map

- Asset Inventory Management
- Work Order Management
- Asset Condition Assessment
- Asset Information Integration



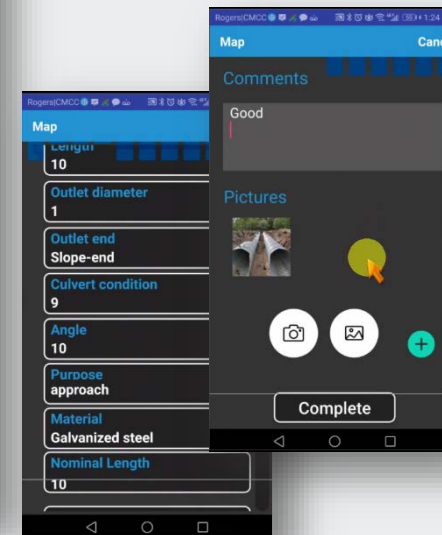
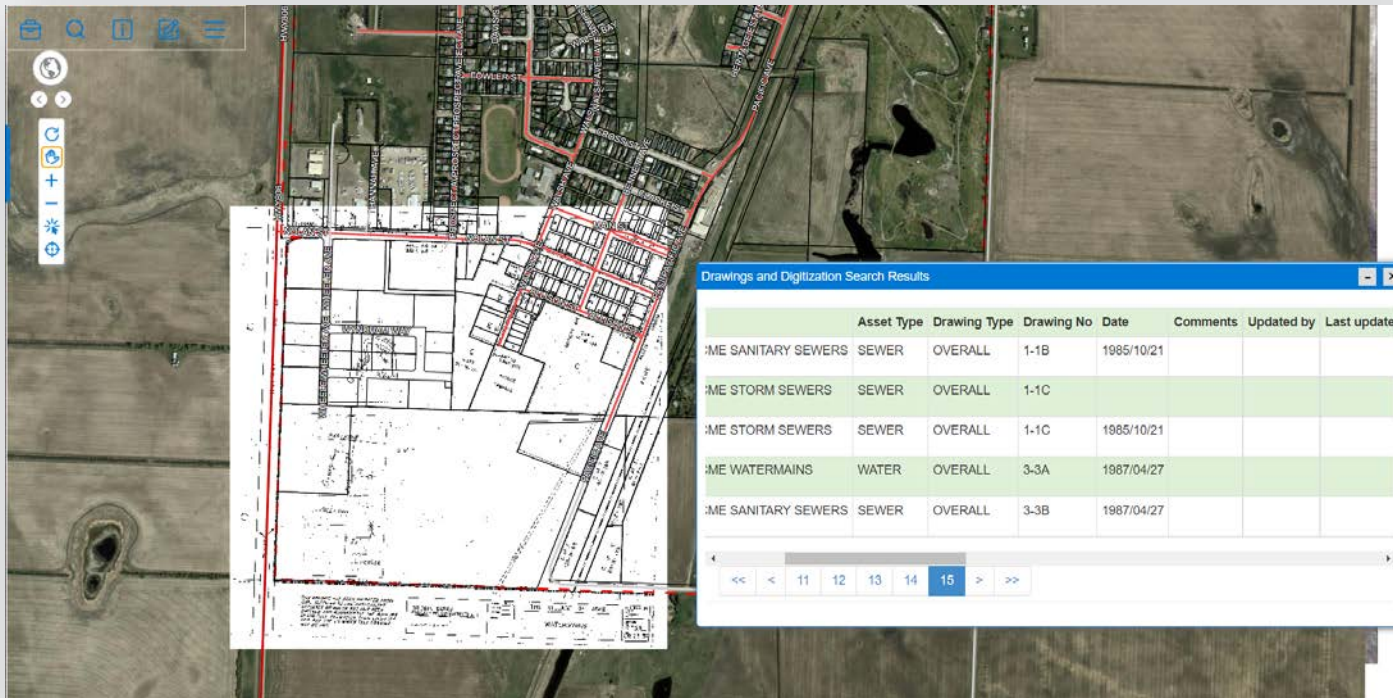
# MRF Web Map Platform

Proudly serving municipalities across Canada



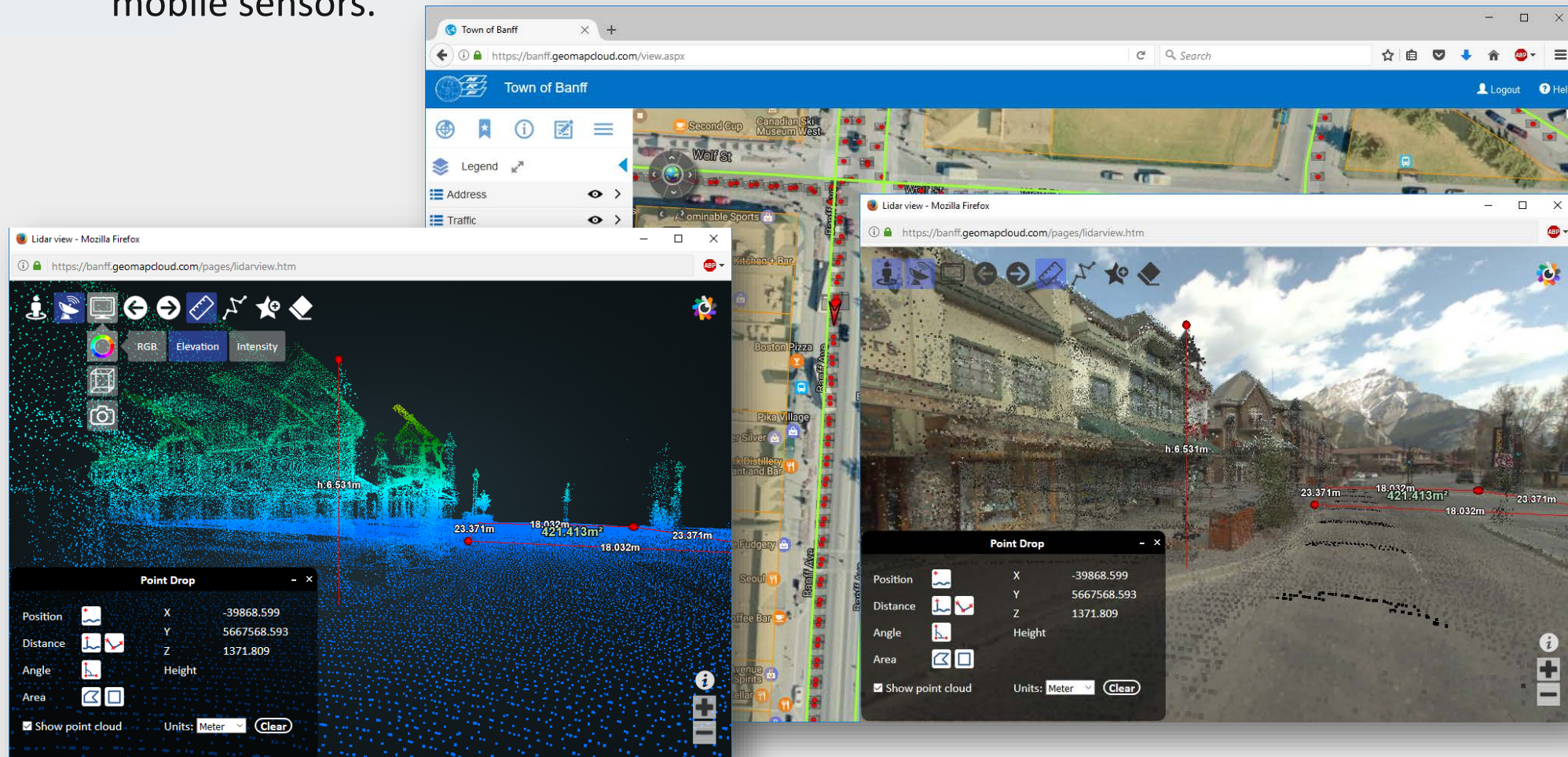
# Data Acquisition

- Mobile GIS
- Feature extraction from scanned documents



# Data Acquisition

- MRF StreetView - Next generation Web-based Street View
  - View the LiDAR point clouds as well as the traditional 360 degree imagery collected via mobile sensors.



# Asset Inventory Management

**Alexander Pierce** Online

Dashboard Asset Ma...

Search...

MAIN NAVIGATION

- Dashboard
- Request Management
- Work Management
- Resource Management
- Asset Management**
- Asset Management
- Warranty Management
- Asset Type
- Settings
- Schedule
- Manual Adjustment
- Default Depreciation Curve
- Asset Categories
- Asset Type

Others:

- View on Maps

**Asset Classification:**

- Land
  - Right-of-way
  - Undeveloped right-of-way
  - Parks
  - General
- Land Improvements
- Buildings
  - Permanent Structures
  - Portable Structures
  - Leasehold improvements
  - Construction in progress
- Engineered Structures**

**Dashboard for: Engineered Structures**

Asset Type	Count
Roadway Systems	765
Light rail transit system	505
Water Systems	17
Wastewater Systems	5
Storm System	75
Fibre optics	50
Electricity system	120
Gas distribution system	40

Map showing asset locations on a grid (R1-R11, T1-T20).

**600** Total Assets

**70,373,97** Net Book Value

**44** Total Work Orders(2021)

**5,268.37** 2021 Maintains Costs

To Do List

- Work order: Inspect road surface at 51 AVE 2 mins

# Assets Inside a Building

The screenshot displays a web application interface for asset management. A sidebar on the left contains navigation options: Request Management, Work Management, Resource Management, Asset Management, Asset Type Settings, Check in management, Check out management, Create Work Order By Fence, Schedule, Budget Generated By Score, and Openstreet Map. The main content area features a map with a grid overlay labeled R1-R10 and T1-T3. An 'Asset Management' window is open, showing a 'Warranty Information' tab and an 'Add Asset' button. Below the button is a search bar and a table of assets.

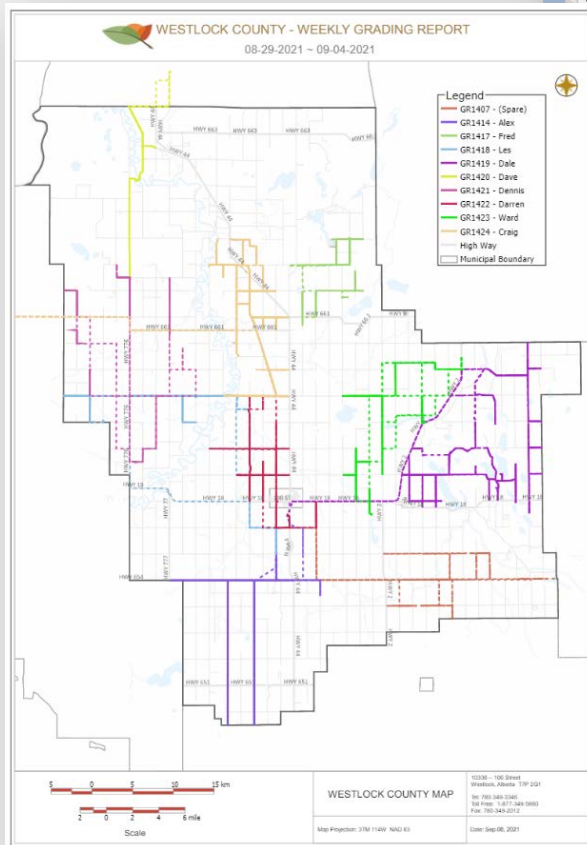
	Asset code	Asset Name	Asset Cost	Asset type name	Asset userlife	Asset score	Item Operate
+	BU_004	Fire Hall	47964.5	Buildings	40	10	+ ↗ 🔍 ✕
+	SCWVR00012	WAT_Valves	4200	Combination Air Valve	25	10	+ ↗ 🔍 ✕
+	SCWVR00005	WAT_Valves	4200	Combination Air Valve	25	10	+ ↗ 🔍 ✕
+	SCWVR00010	WAT_Valves	4200	Combination Air Valve	25	10	+ ↗ 🔍 ✕
+	SCWVR00020	WAT_Valves	4200	Combination Air Valve	25	10	+ ↗ 🔍 ✕
+	SCWVR00018	WAT_Valves	4200	Combination Air Valve	25	10	+ ↗ 🔍 ✕
+	SCWVR00016	WAT_Valves	4200	Combination Air Valve	25	10	+ ↗ 🔍 ✕
+	SCWVR00014	WAT_Valves	4200	Combination Air Valve	25	10	+ ↗ 🔍 ✕

Showing 1 to 10 of 827 rows  rows per page < 1 2 3 4 5 ... 83 >



# Movable Assets

- Real-time location tracking
- Geo History Search
- Customized Report



**Vehicle Management**

Department:  Category:  Filter by Department: All  Search:

Unit	ESN	Status	Last Update	Category	Driver	Department
143 - ASB SidebySide	5571053378	unknown	2023-06-09 11:47:28	Spray UT		Public Works
201 - Plow Truck	4871097459	offline	2023-05-12 11:32:58	Plow		Public Works
202	4871097315	offline	2023-05-31 09:57:11	PW Truck		Public Works
204	4871097308	unknown	2023-06-08 11:50:48	PW Truck		Public Works
207 Picker Truck	4871131584	offline	2023-06-01 13:45:18	Picker		Public Works
208	4871097153	unknown	2023-06-12 16:47:03	Construct		Public Works
211 - Plow Truck	4871097155	unknown	2023-06-12 16:11:28	Plow		Public Works
213	4871097141	unknown	2023-06-09 09:33:06	PW Truck		Public Works
214 - Water Truck	4871104062	offline	2023-05-02 10:38:25	Water Tru		Public Works
216	4871097146	unknown	2023-06-06 15:34:08	PW Truck		Public Works

Showing 1 to 10 of 86 rows | 10 rows per page



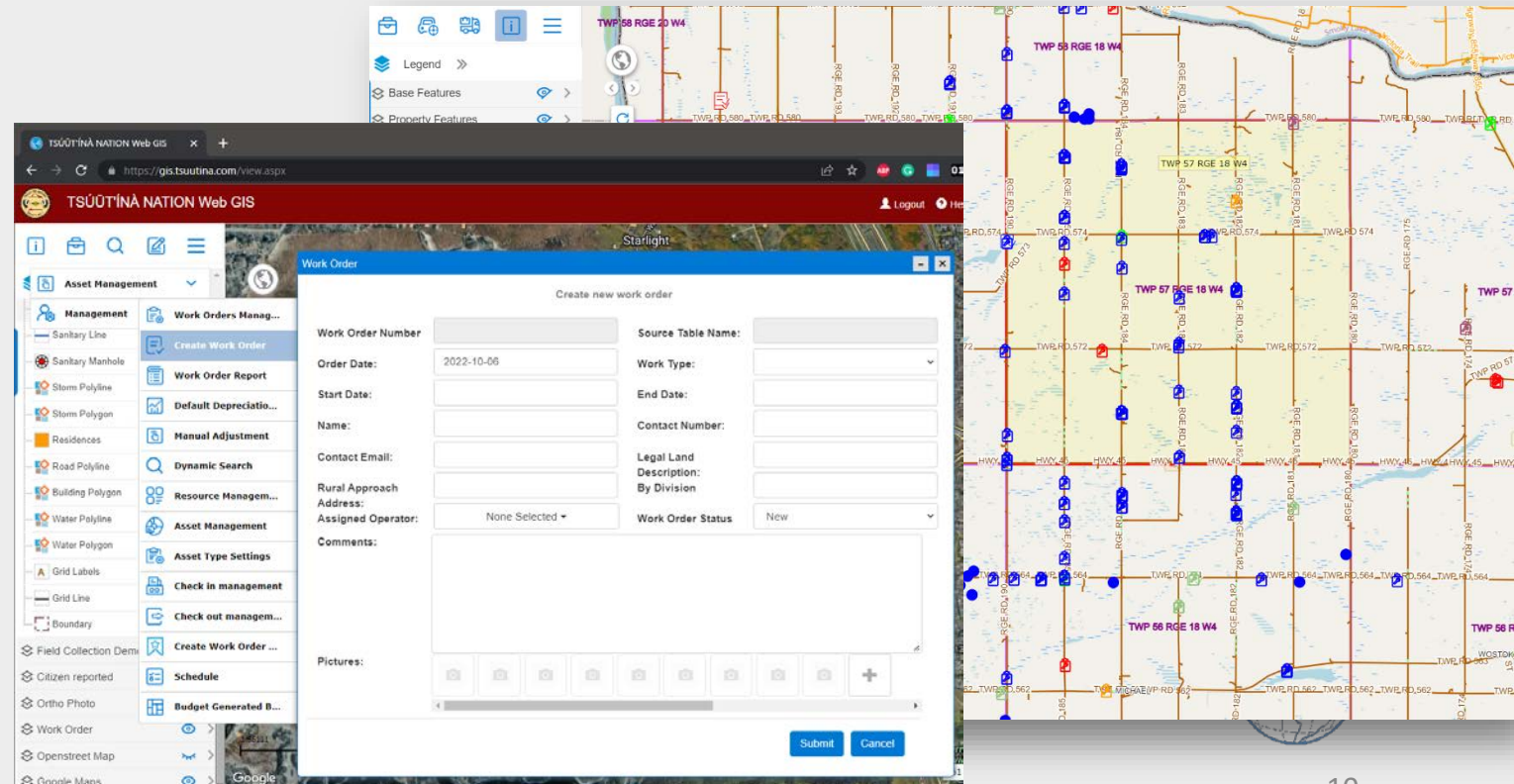
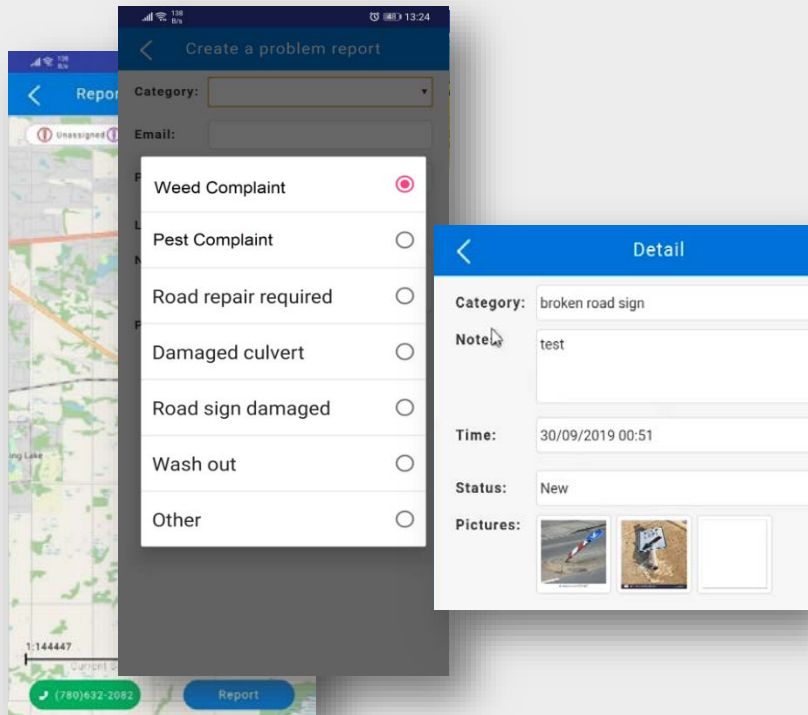
# Citizen Report App and Work Order

Submit  
Complaints/  
Work Orders

Staff Review &  
Assign Complaints  
/Work Orders

Field Worker Process  
Task List

Supervisor Review  
and Close Tasks



# Work Order by Fence

The screenshot displays the MRF Web application interface. On the left is a legend with categories like 'General Map Text', 'Road & Railway', 'Municipal Boundaries', 'Hydrography', 'Township Lines', 'Base Features', 'Sanitary Network', 'Storm Network', and 'Water Network'. The 'Water Network' category is expanded, showing various assets like 'Water Network Fittings', 'Water Network Curb Cocks', 'Water Network Hydrants', 'Water Network Sample St...', 'Water Network Valves', 'Water Manhole', 'Water Network Meters', 'Water Network Pressure ...', 'Water Network Gravity M...', and 'Water Network Service LI...'. The map shows a street grid with 'Grenfell Ave' and 'Hwy 1' visible. A scale bar at the bottom left indicates 1:1809, 50 m, and 200 ft.

The 'Create Work Order by Fence' dialog box is open, containing the following fields:

- Layer:** WAT\_Meters
- Fence Name:** WAT Meters
- Start Date:** WAT Meters
- Finish Date:** 2021-09-14
- Inspection Interval:** 0 year
- Specific Staff:** None Selected

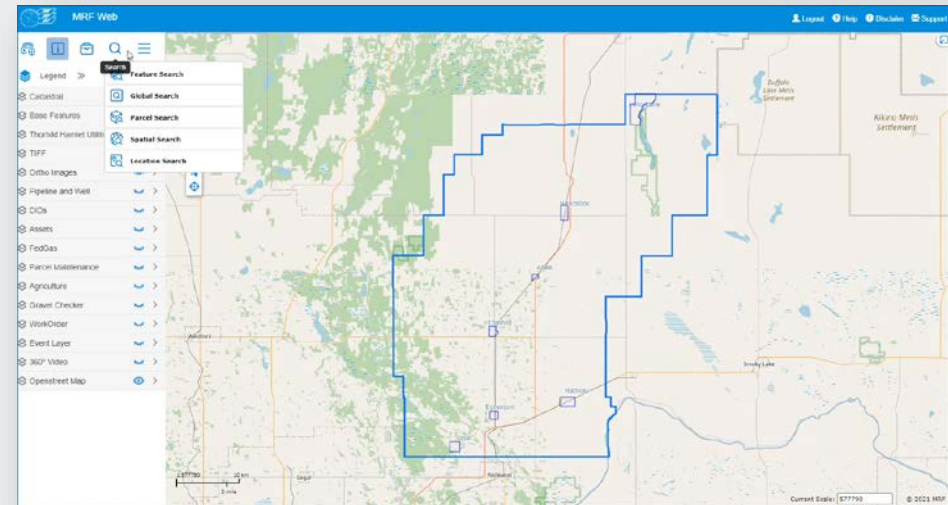
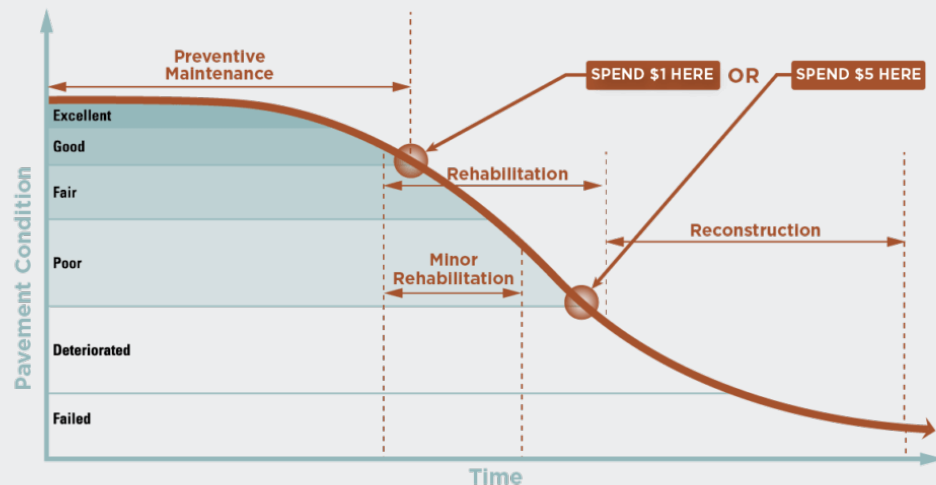
Below the fields is a table with the following columns:

asset id	installyea	life status	asset type
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At the bottom of the dialog are 'Submit' and 'Cancel' buttons.

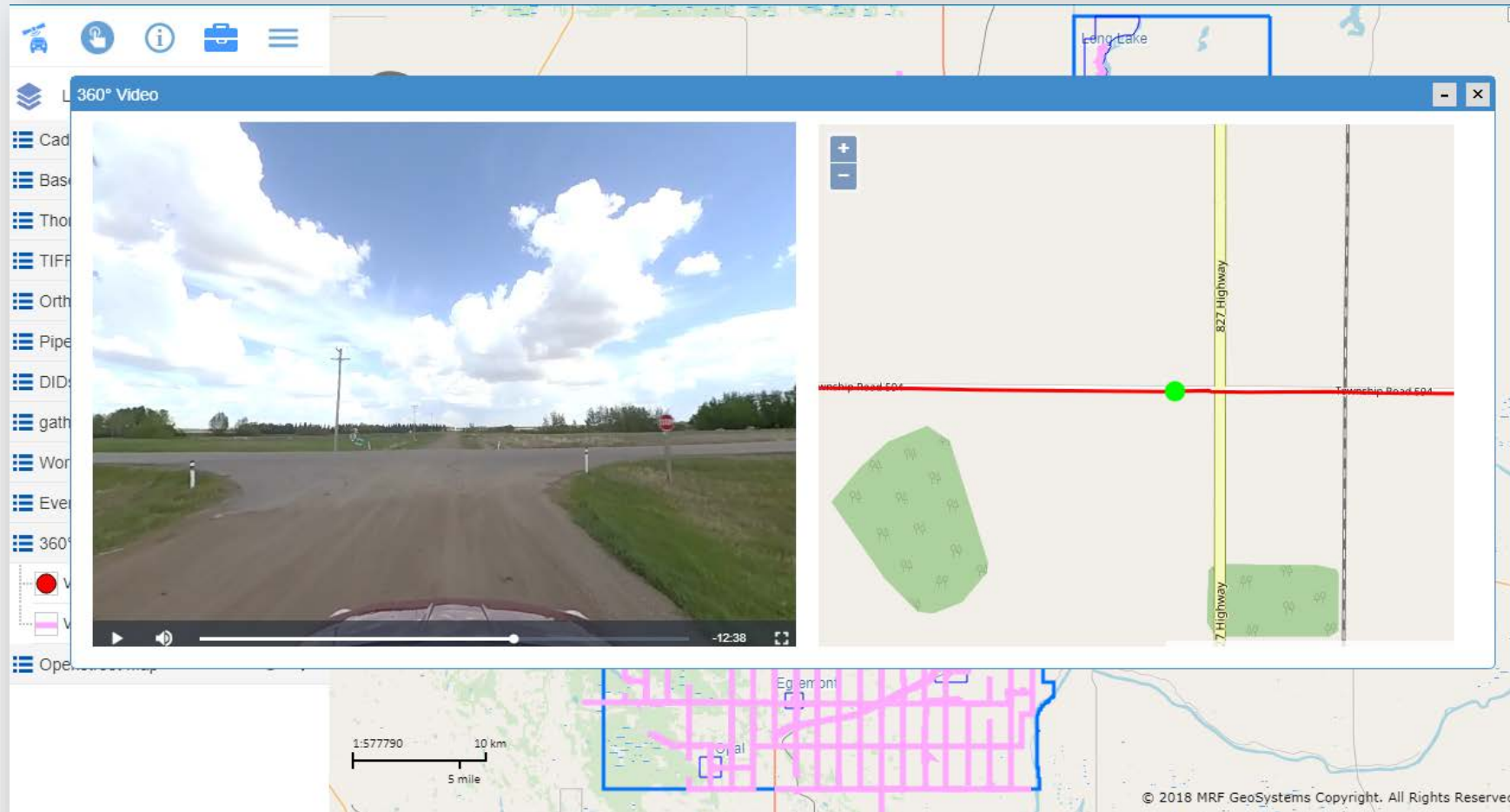
# Asset Preventative Maintenance Scheduling

- A water valve has to be turned in order to avoid rust-shut.
  - MRF Web Map can keep a schedule and notify staffs to turn the valve at fixed intervals
- The same process applies to road signs, hydrants, catch basins, buildings, vehicles, etc.



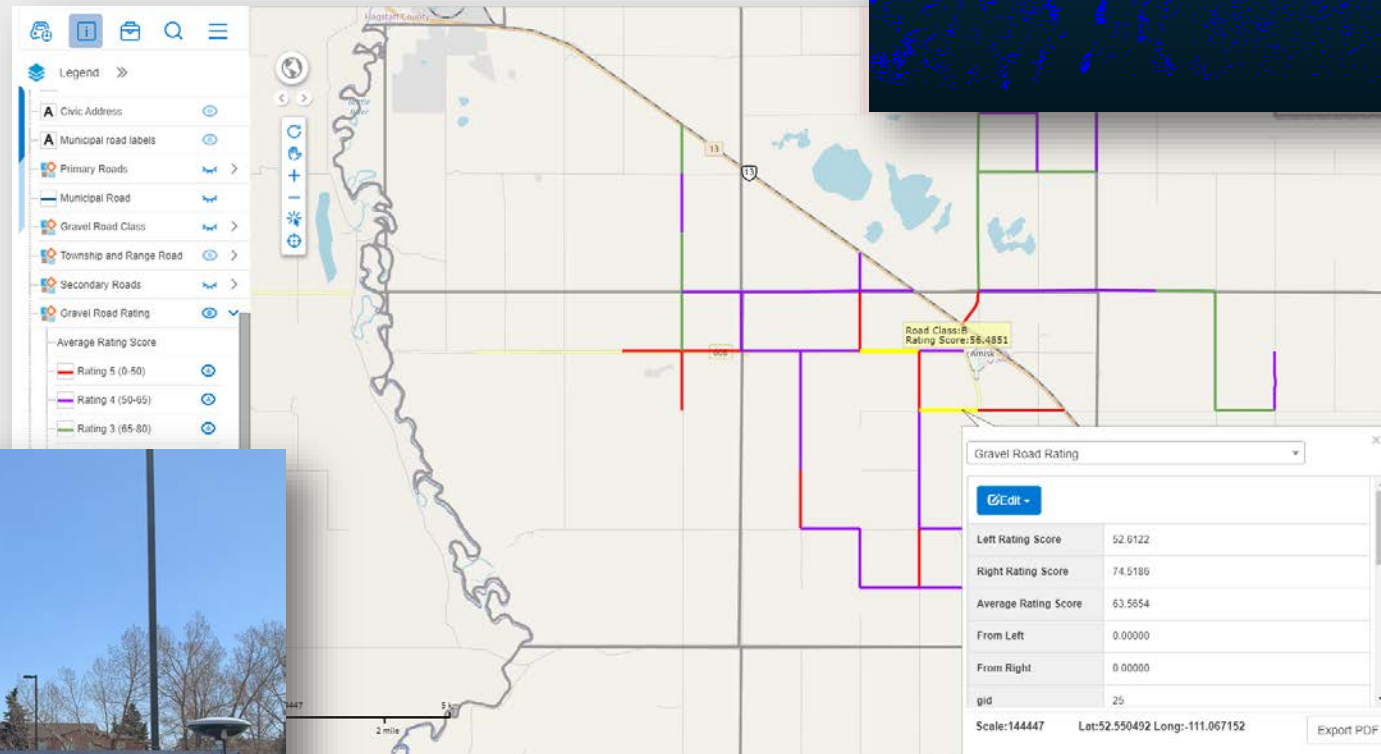
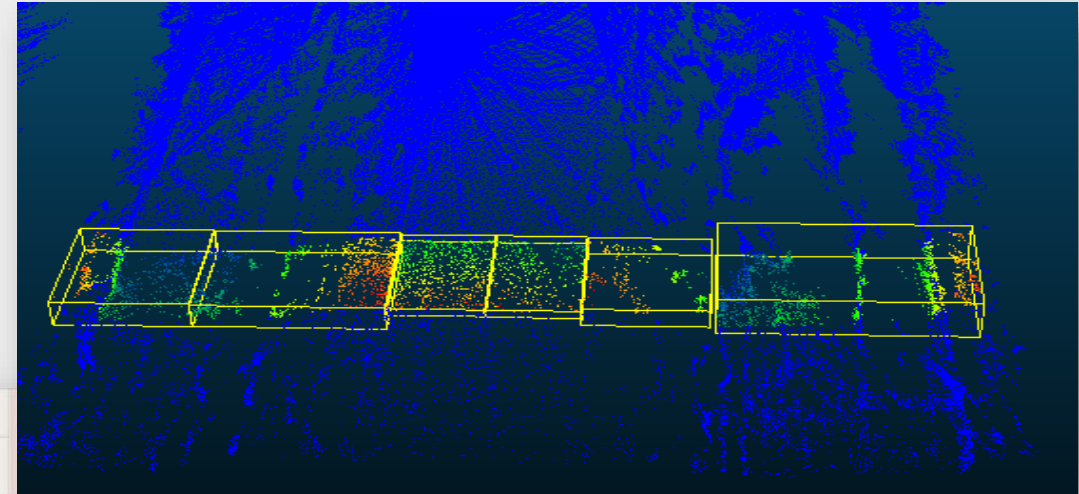
# Asset Condition Assessment

- Asset Inspection from 360° Road Video



# Asset Condition Assessment

- LiDAR for Gravel Roads
  - Assign a rating based on the LiDAR scanning result score



# Asset Condition Assessment

Manual Adjustment

Original Cost: \$4,520

Designed Lifetime: 30 years

In service: 8 years

Remaining Useful Life:

Remaining Percentage:

Residual Value:

The screenshot displays a GIS interface with a map of road networks. A 'Print' dialog box is open, showing a preview of the map and print settings. The print settings include:

- Print Template: Default
- Map Title: Map Title
- Subtitle: Subtitle
- Title Size: 16
- Page Size: Letter
- Aerial Quality: Normal
- Page Orientation: Landscape
- North Arrow:
- Scale Bar:
- Legend:
- Redlining:
- Disclaimer:
- Use Map Scale:
- Preview Scale:

The map shows a grid of roads with various colored markers (red, green, blue) indicating asset conditions. The map is titled 'Map Title - Subtitle' and includes a scale bar and a north arrow. The current scale is 144447. The map is overlaid on a background of aerial imagery.

The screenshot shows the MRF Web GIS application interface. The sidebar menu includes the following items:

- Home
- Asset Management
- Management
- Hyperlink Tool
- Feature Spatial Search
- Summary Report
- Resource Budget
- Layers
- Edits
- County Boundary
- Railway
- Contour
- Road
- Building
- Agricultural
- Co. Reclamation
- Commercial
- Listing Of Historic Resources
- Institutional Public Utility
- Lin Bridge Buffer
- Co Industrial
- Waterbody

The map displays a network of roads and other features, with a sidebar menu on the left and a toolbar at the top.

Culvert Condition and Drainage Analysis

# Asset Condition Assessment

- Sewer Inspection – Linear Referenced Video

The screenshot displays a GIS interface for asset condition assessment. On the left, a legend lists layers: San Defects (P6), Sanitary, Base Features, and Open Street Map. The main map shows a network of sanitary lines and nodes, with a scale bar indicating 200 meters and 500 feet. A video window is overlaid on the right, showing a camera view from inside a manhole. The video window contains the following text:

- Incident Description: Access Point - Manhole
- Meters: 0000.0
- Comments: Starting Manhole: MH1
- 00 00 00 | LC1: +0000.00 m





# Asset Information Integration

- Grading/Brushing/Mowing History Search
- Road Use Agreement Management
- ...

The screenshot displays a GIS application interface with several key components:

- Left Panel:** A legend and a list of grader beats (Year 1(2017) through Year 6(2022), Complaint Point, Complaint Line, Grader Beat 1-11, and MISC).
- Top Panel:** A navigation menu with options: Edit, Asset Management, Management, Weed Inspection, Mobile for driver settings, Hyperlink Tool, Road Grading History Search, Grader Activity, and Openstreet Map.
- Road Use Agreement Window:** A search form with fields for Type (Company Search), Search Text (BURNCO ROCK PRODUCTS LTD.), Ended Before, and File Name. It includes a 'Query' button and a 'Show documents only' checkbox.
- Documents Window:** A table listing documents with columns for #, Company, Sign Date, End Date, and Name. The table contains one entry: 1, BURNCO ROCK PRODUCTS LTD., 2020-01-01, 2021-01-01, RUA-2020-002.
- Road Grading History Search Window:** A search form with fields for Grader (063), From Date (2021-10-01), and To Date (2021-11-18). It includes 'Clear' and 'Show Data' buttons and a note: 'Grading criteria: 0 < speed < 15'.
- Road Grading History Search Results Window:** A table showing search results with columns for Grader, Date, and gid. The table contains five entries, all for Grader 063.

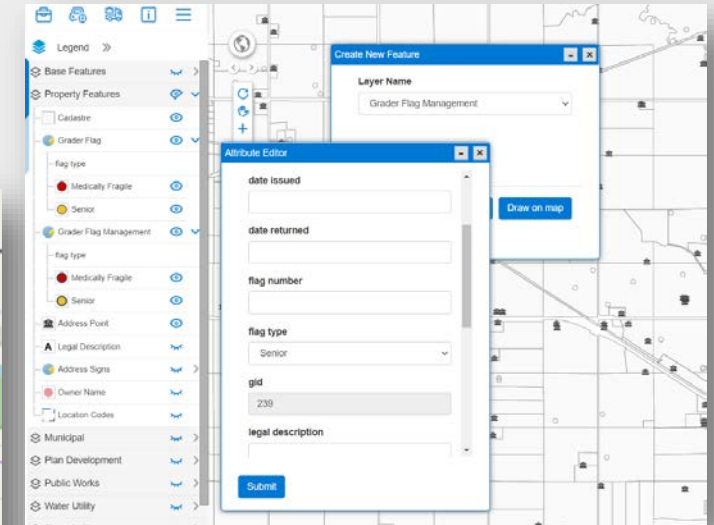
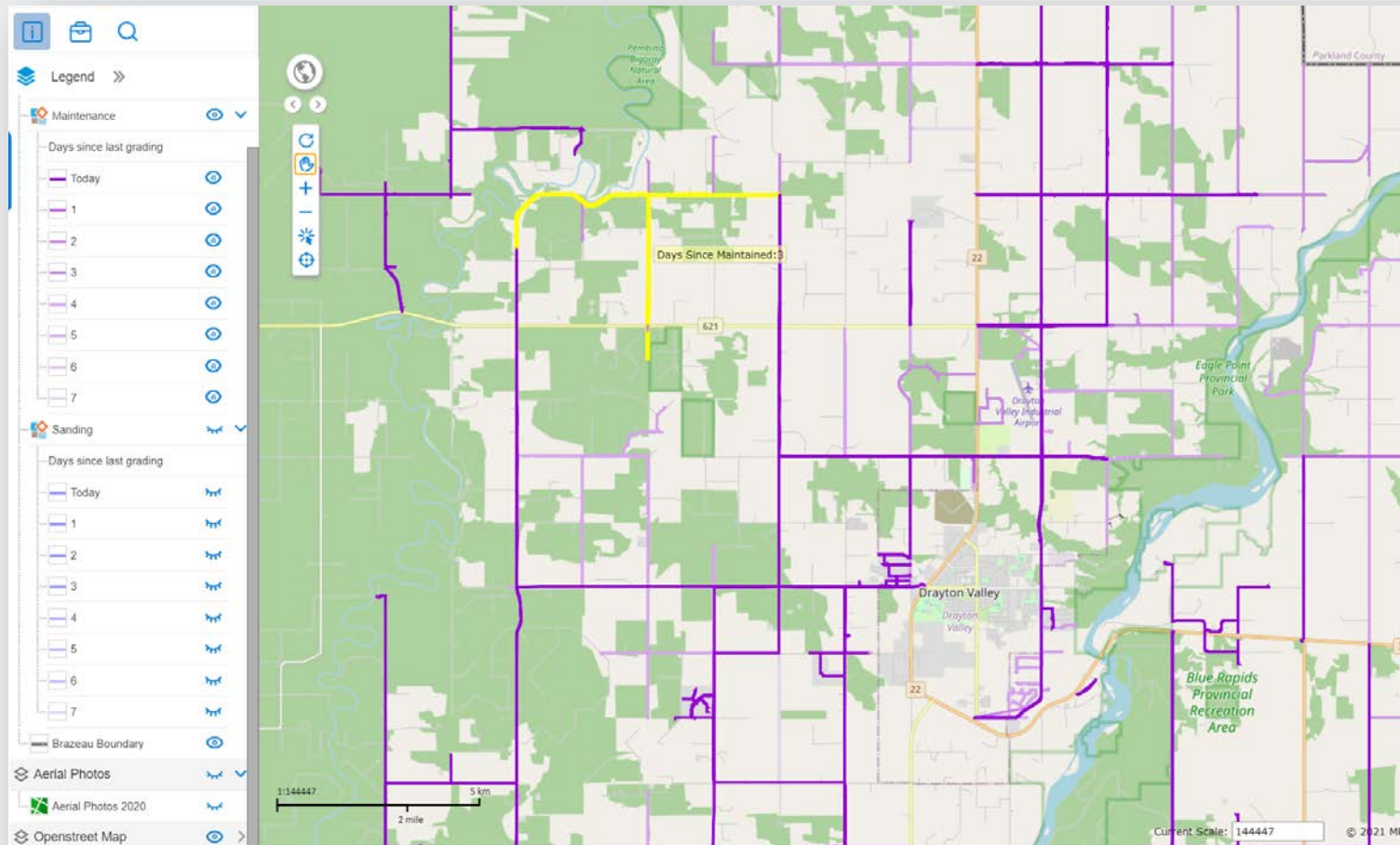
Grader	Date	gid
063	2021-10-04 14:36:38	60899
063	2021-10-04 15:20:43	60938
063	2021-10-04 15:27:35	60939
063	2021-10-04 15:42:48	60940
063	2021-10-04 17:00:00	60974

Map details include a scale bar (1:72223), a 1-mile scale, and a copyright notice for 2021 MRF.



# Real-time Asset Information Update

- Snow removal /Road Maintenance Public Map



# Internet of Things (IoT) and Sensor Integration

- Building Monitoring
  - Alert
    - Temperature
    - Pressure
    - Power Loss
  - Query
    - Total water loading hours

The screenshot displays a web-based IoT monitoring dashboard for the MD of Wainwright. The interface is divided into several sections:

- Header:** MD of Wainwright logo and navigation icons.
- Vehicle List:** A table showing the status of various tankloaders.
- Map:** A satellite map showing the geographical location of the tankloaders, with a red pin indicating the current location.
- Sensor Data Panel:** A table displaying real-time sensor data for the building.

Name	Status	Last Update
Ascot Tankloader	online	1 minutes
Clubhouse - Armlake	online	0 minutes
Clubhouse - Riverdale	offline	0 minutes
Giltedge Tankloader	online	4 minutes

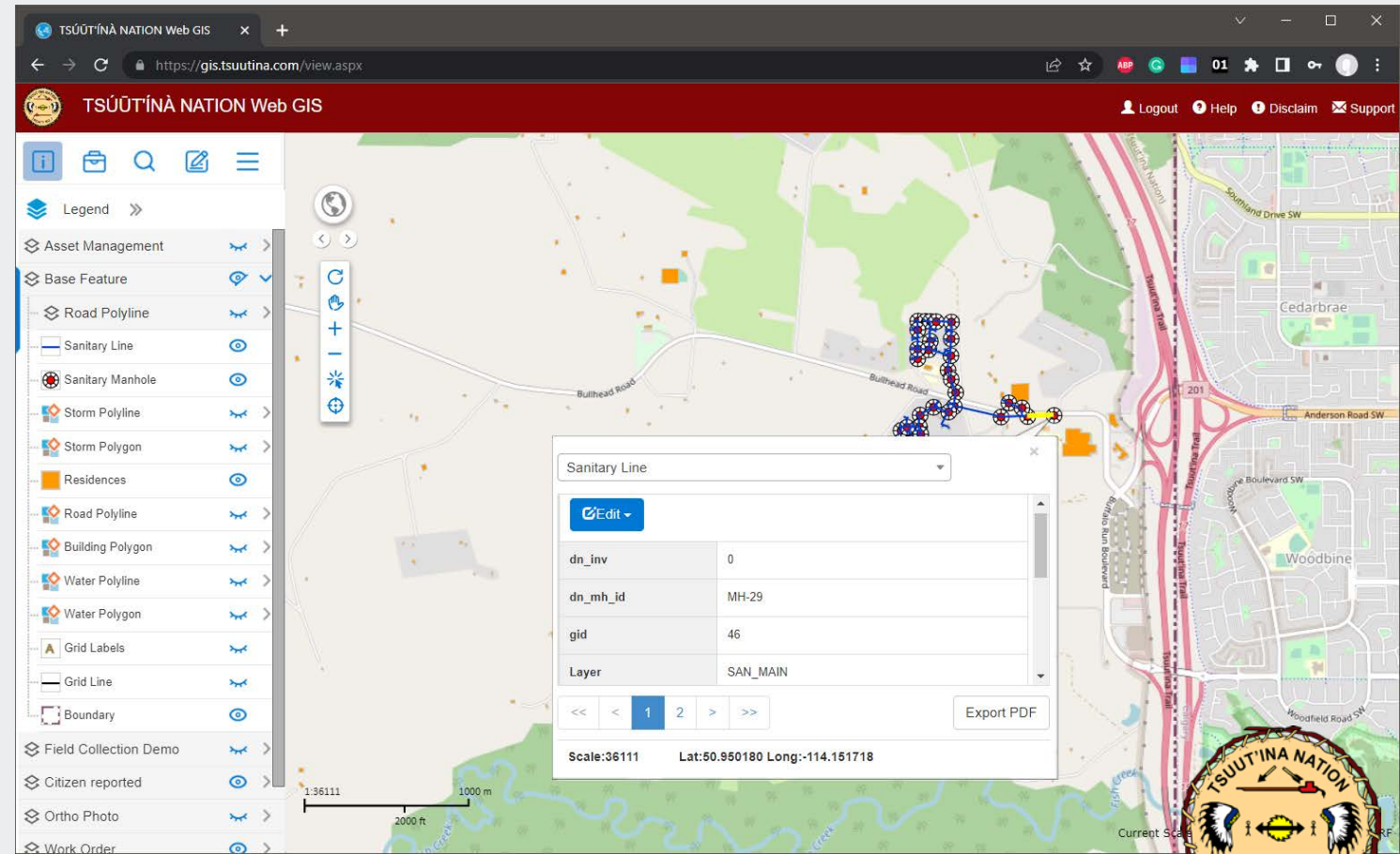
Attribute	Value
Total Distance	0.1 (km)
Hours	484.1
Building Temperature	26.5 °C
(In1) Building Low Temp Alert	Safe Temperature
(In2) Building Pump Pressure	Pump Pressure good
(In3) Building Power	Building Power good
(In4) Currently Loading Water	Not loading water

Scale: 577790 Lat: 52.897987 Long: -111.225794

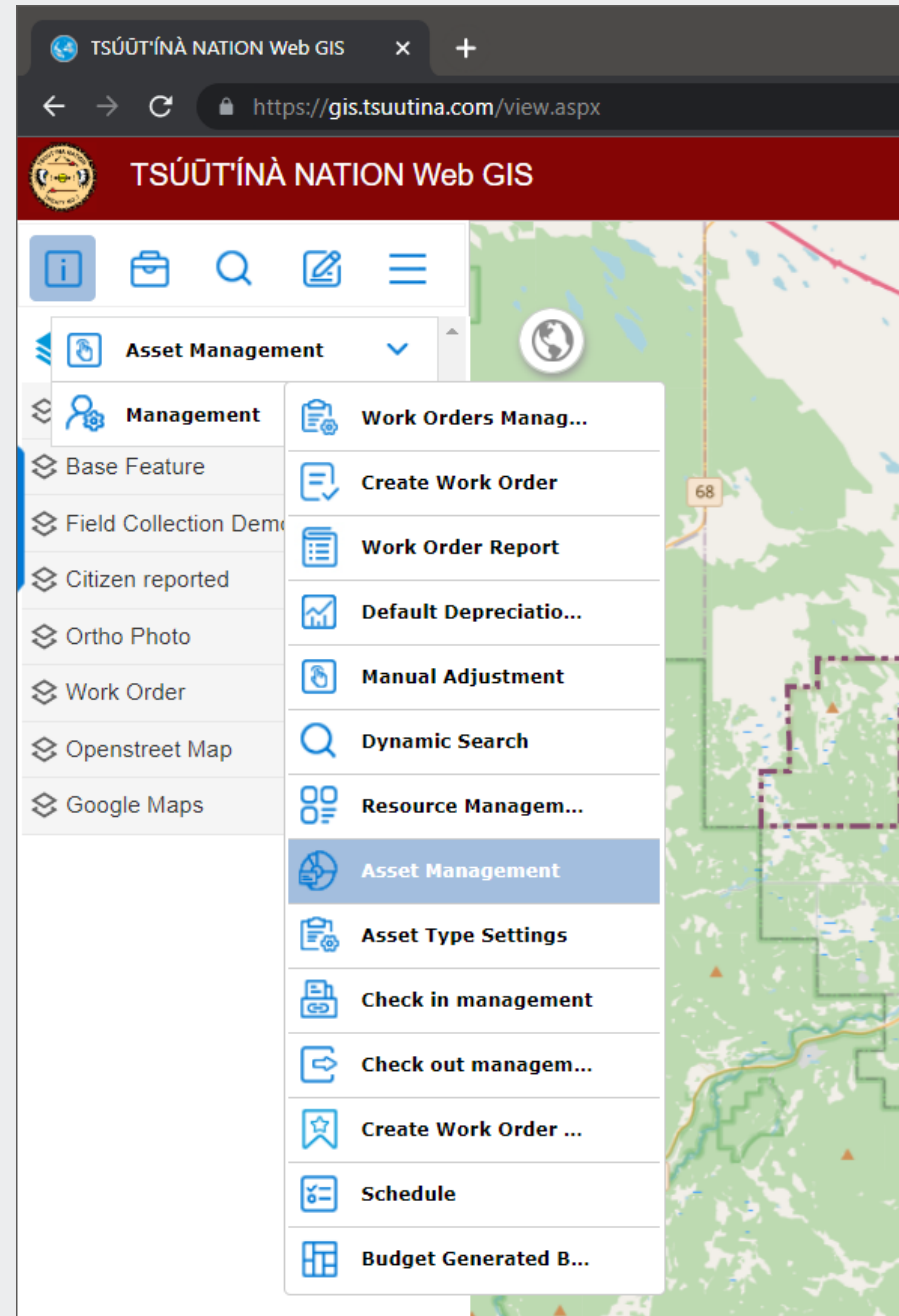
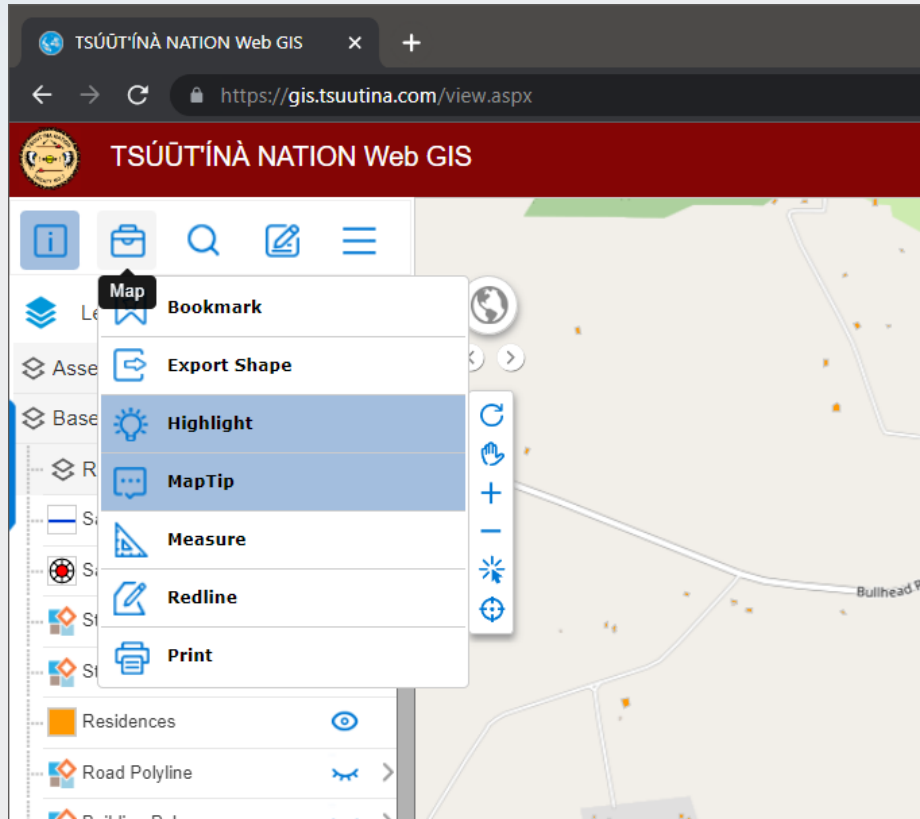
Current Scale: 577790 Lat: 52.85655 Long: -111.225794

# MRF Web GIS for Tsuut'ina Nation

- Over 30+ registered users in 5 departments
  - Land Conservation
  - Consultation
  - Public Works
  - Utilities
  - Lands & Environment Research Department

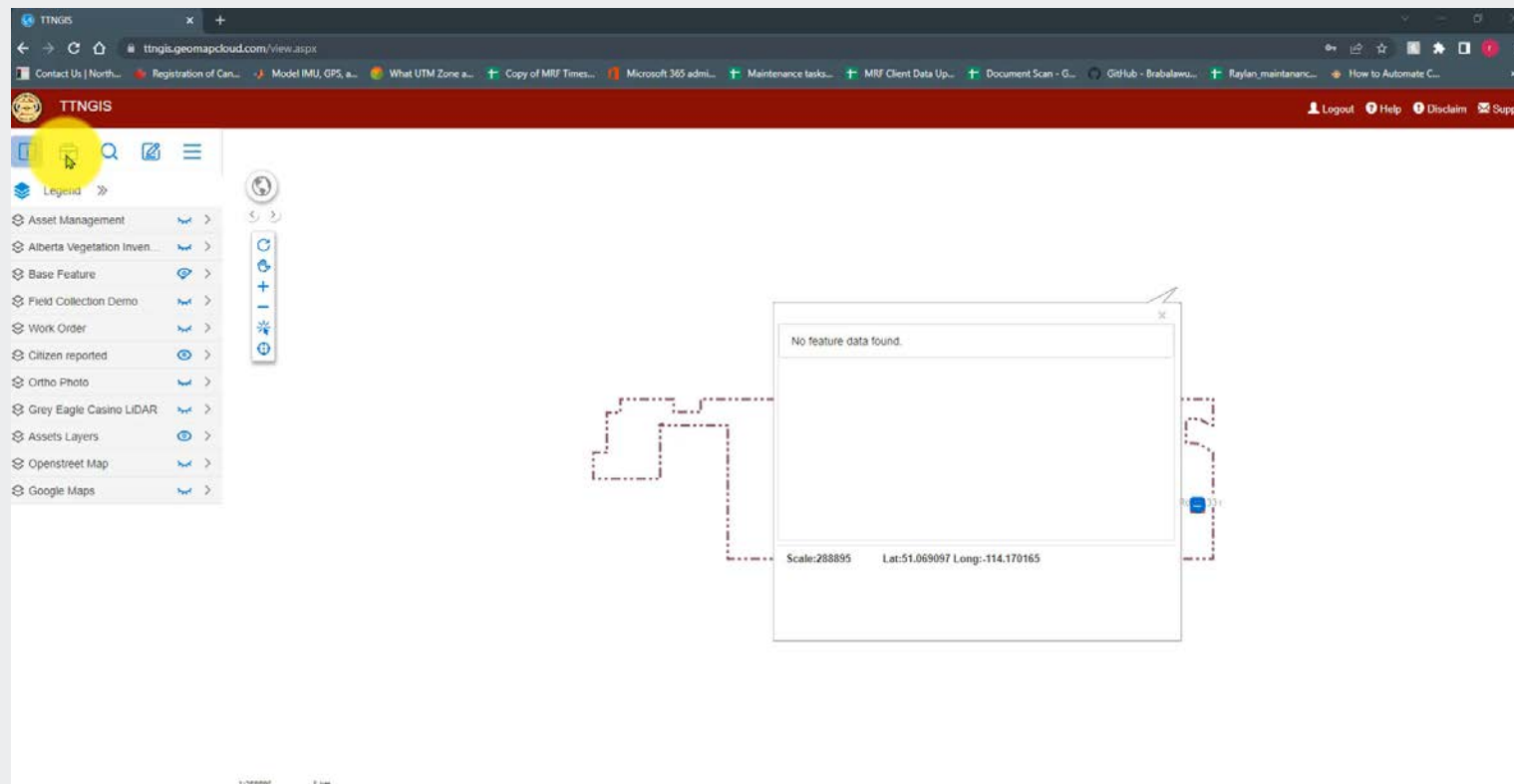


# Advanced Functions



# Demo

- Asset as group
- Integrated with Work Order and Quotation



# Why MRF

- A strong motivated GIS team
  - Industry-leading GIS Technologies
- 30+ yr North American GIS industry experience
  - An excellent track record of customer satisfaction



MRF awarded by Alberta Science and Technology Leadership (ASTech) Foundation

## MRF Municipal Customers in Alberta





# Thank You

MRF Geosystems Corporation