

# Why Many Municipal Asset Management Projects Fail?

*White Paper by: MRF Geosystems Corporation*

Many rural municipal governments try to implement asset management solutions. However, many of these projects, with much time and effort spent, end up not succeeding. The failures of these asset management projects are not well known as stakeholders usually do not want to talk about them. With over three decades of experience in municipal asset management implementation, MRF has identified crucial factors that frequently lead to the unsuccessful execution of these projects.

## The crucial factors that can lead to unsuccessful execution of these projects

- **Asset management projects involve high complexities.**

The high complexity reflects on the assets themselves. A typical municipal government possesses a variety of assets, which include paved and gravel roads, road signs, culverts, bridges, water and sewer systems, stormwater infrastructure, buildings, gas supplies, and a fleet of vehicles such as graders, spray trucks, snowplows, sanding trucks, and mowers. Each of these assets has its own unique characteristics and requires specific processes for information storage, management, and analysis.

The high complexity also reflects on the customer's requirements. Customization is frequently needed to meet these requirements, which usually involves the integration with other systems to fully support the asset management processes. However, the asset management software packages on the market are "generic" in nature, much like Microsoft Office, where everyone can use them. The vendors are trying to sell as many packages as possible with little or no customization or systems integration in mind. As a result, users of these packages cannot achieve a high degree of automation due to the limitations of the package. While it is possible to build additional capabilities on top of a basic asset management software package, most customers have not done it due to the high cost.

- **Asset management projects are a time-consuming process and must be executed step by step.**

The following are general logical steps throughout an asset management project.

### **Step 1:** Build asset inventory.

Asset management requires building a comprehensive asset inventory to capture the attributes of all the assets. But many municipalities have not completed this foundational task.

### **Step 2:** Digitize asset documents.

Many municipalities have piles of paper documents. Searching for information from paper-based asset documents is time consuming. The benefit of digitizing these documents allows the information to be accessed quickly and easily. In addition, it leaves the worry out of misplacing or losing these physical documents due to a building flooding or catching on fire.

**Step 3: Assess asset conditions.**

Regular asset condition assessment is crucial in the asset management procedure. It requires the implementation of diverse digital forms. The forms should be designed according to the specific assessment requirements for different asset categories.

**Step 4: Report asset problems.**

Asset problem reporting involves a communication procedure to inform asset problems and assign staff on the problem investigation. This communication procedure must be carefully designed to ensure that the information reaches the right person in a timely manner.

**Step 5: Asset lifetime modeling**

Asset lifetime modeling allows municipalities to make decisions to repair/replace assets to minimize the overall cost and maximize the service to the residents. However, very few municipalities have achieved this.

- **Asset management projects require consensus between various departments.**

Asset management requires the collaboration of multiple departments, such as public works, agriculture, finance, planning, assessment, fire, enforcement, utilities, etc. But building consensus is not easy. Usually finance departments want user-friendly reporting while public works focuses on software capabilities. Take one municipality as an example where the finance department was taking the lead on asset management. The asset management solution had all the culverts loaded into the software but did not have the location of the culverts. Without knowing their locations, it is very hard for public works to update the conditions of the culverts.

- **Asset management projects always face the challenge of an underfunded budget.**

Due to budget constraints, asset management tasks are assigned to current staff who are also responsible for their regular full-time duties. This dual responsibility can lead to continuous delays in the project timeline. It's not uncommon to see cases where only 70% of the asset inventory is completed after three years. With such incomplete implementation, the asset management system cannot be reliably used for daily decision-making, resulting in minimal investment returns.

- **Asset management projects face the challenges of power struggle.**

When a municipal asset management system is built, many of the operations can be visible to the entire organization. There are questions like *"why is this task taking so long? Why didn't you use another approach?"*. In a "pen and paper" environment, these questions will not be asked because people outside of the department have no easy way of knowing the operational details. Some departmental managers do not want to share the managerial power with others and therefore, try to stall the implementation of asset management.

- **Municipal staff may be reluctant to learn new software.**

Many municipalities have older staff who are fearful of learning new software. To facilitate the adoption, it is essential for the new software to be user-friendly, straightforward, and simple to use.

- **Municipalities lack well-trained asset management professionals.**

To successfully implement an asset management system, the implementation team needs to fully understand municipal operations. The team should also know all the enabling technologies such as GIS, AVL, Work Orders and Asset Management. Many rural municipalities cannot even retain a GIS technician for more than three years.

### MRF's approach for success when implementing an asset management system

- **MRF follows strict steps to implement an asset management solution.**

MRF has defined its own procedure for implementing the asset management solution. MRF follows this step by step procedure to ensure that each step is fully operational.

**Step 1:** Use MRF Web-based GIS and a Mobile GIS. These two systems are designed to synchronize with each other without the involvement of GIS technicians.

**Step 2:** Use MRF AVL that is integrated with the MRF Web-based GIS.

**Step 3:** Build a complete asset inventory.

**Step 4:** Implement regular asset condition assessments, such as LiDAR gravel road condition assessment, road sign condition assessment, culvert condition assessment, and vehicle condition inspection.

The following is a screenshot of the MRF Vehicle Inspection App:

03:37 STOP

New Inspection Report

126- Muv All Trailer ▾ Alberta

Inspection Template

Com NSC DVIR-no air/with ▾ Add Item

Com NSC DVIR-no air/with ▾

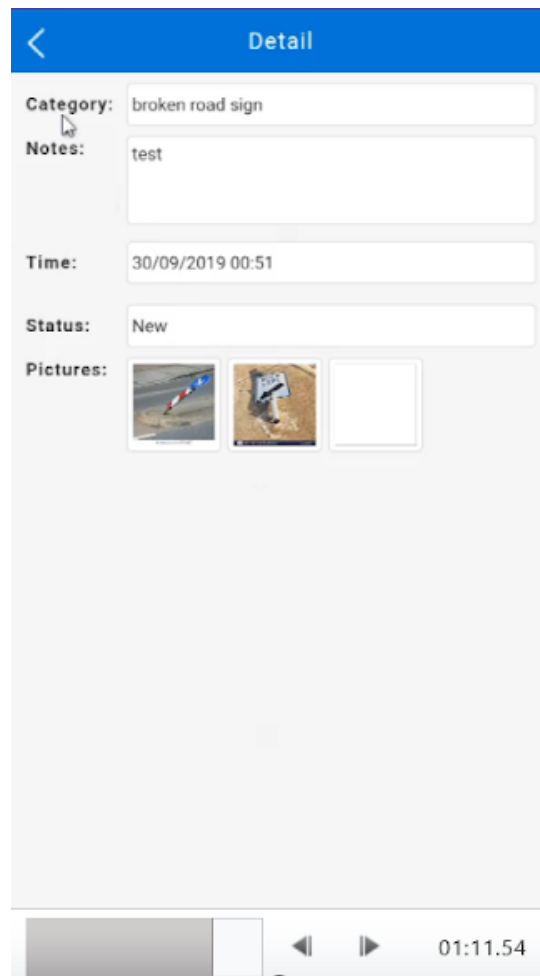
Tractor/Truck Check all

| Inspection Item    | Check                    | Defect                   |
|--------------------|--------------------------|--------------------------|
| Cab N              | <input type="checkbox"/> | <input type="checkbox"/> |
| Cargo Securement N | <input type="checkbox"/> | <input type="checkbox"/> |
| Coupling Devices N | <input type="checkbox"/> | <input type="checkbox"/> |
| Dangerous Goods N  | <input type="checkbox"/> | <input type="checkbox"/> |

01:08.55

### Step 5. Implement asset problem reporting

MRF supports both web-based asset problem reporting (location, description of the problem, and a picture of the problem) and smartphone app-based reporting (as shown below). One innovation of MRF asset reporting is to *allow residents to report asset problems*. Enabling residents to report asset problems is a win-win. The municipality is informed of an issue without having to send staff out, while the residents starts the process of addressing the issue as soon as possible.



The screenshot shows a mobile application interface titled "Detail" with a blue header bar containing a back arrow. The form fields are as follows:

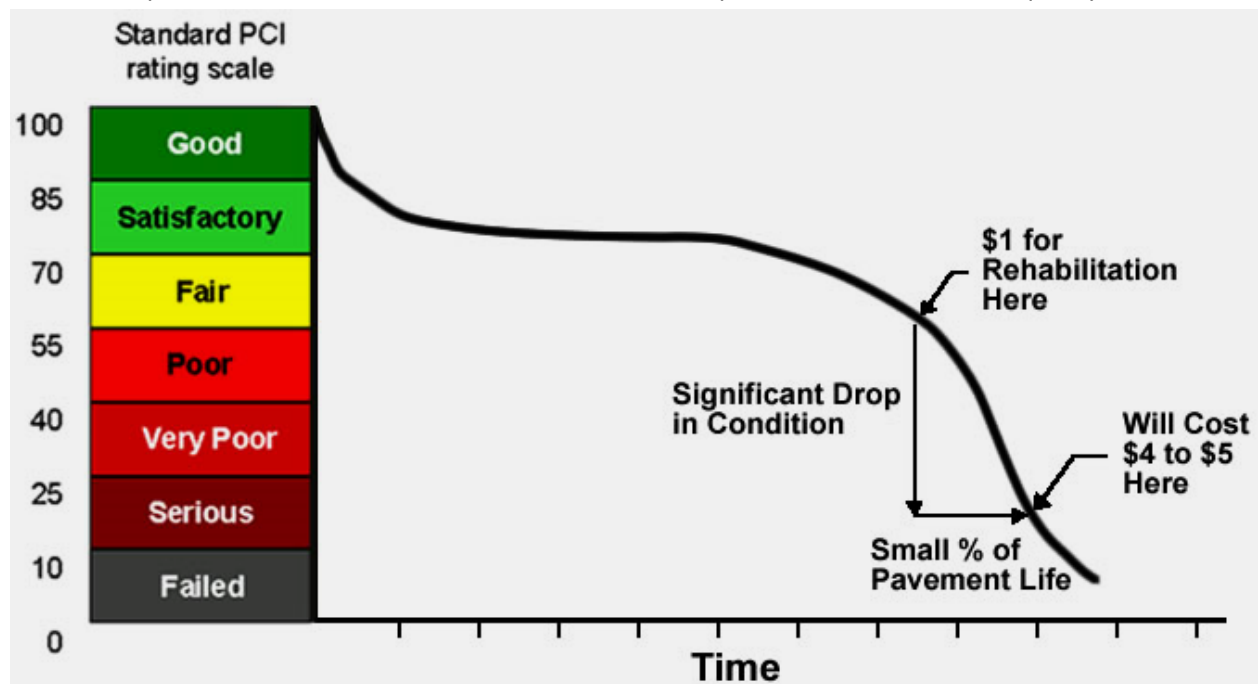
- Category:** A text input field containing "broken road sign".
- Notes:** A text input field containing "test".
- Time:** A text input field containing "30/09/2019 00:51".
- Status:** A text input field containing "New".
- Pictures:** A section with two small image thumbnails and one empty square placeholder.

At the bottom of the screen, there is a progress bar and a timer showing "01:11.54".

### Step 6. Asset lifetime modeling

MRF implements asset lifetime modeling to support the cost effectiveness analysis of asset maintenance. The following figure is a lifetime model for a paved road. Using this model, the best strategy is to

maintain/repair the roads at a time that will minimize the rapid decline of the asset's quality.



- **MRF implements user-centered solutions that best fit the user's needs.**

MRF understands the needs of the user and optimizes the system to make it user-friendly and easy to use. For example, upon understanding the working environment of grader operators, MRF's Mobile for Drivers App, with its big button interface, allows operators to effortlessly report problems they see. Concerns or issues such as a damaged road sign, blocked culverts, or roadkill can easily be reported while driving. The app also includes an audio recording feature, allowing graders operators to verbally describe any problems.

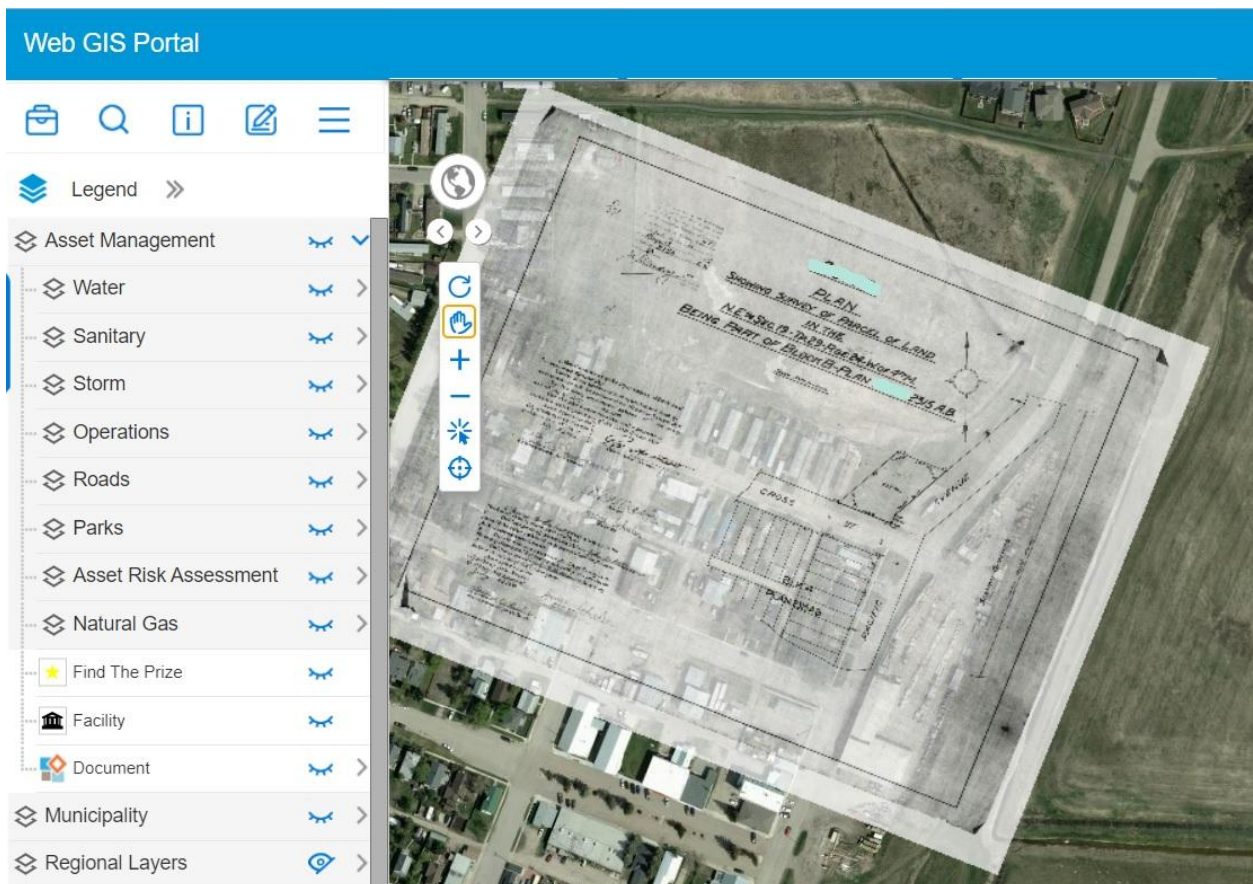
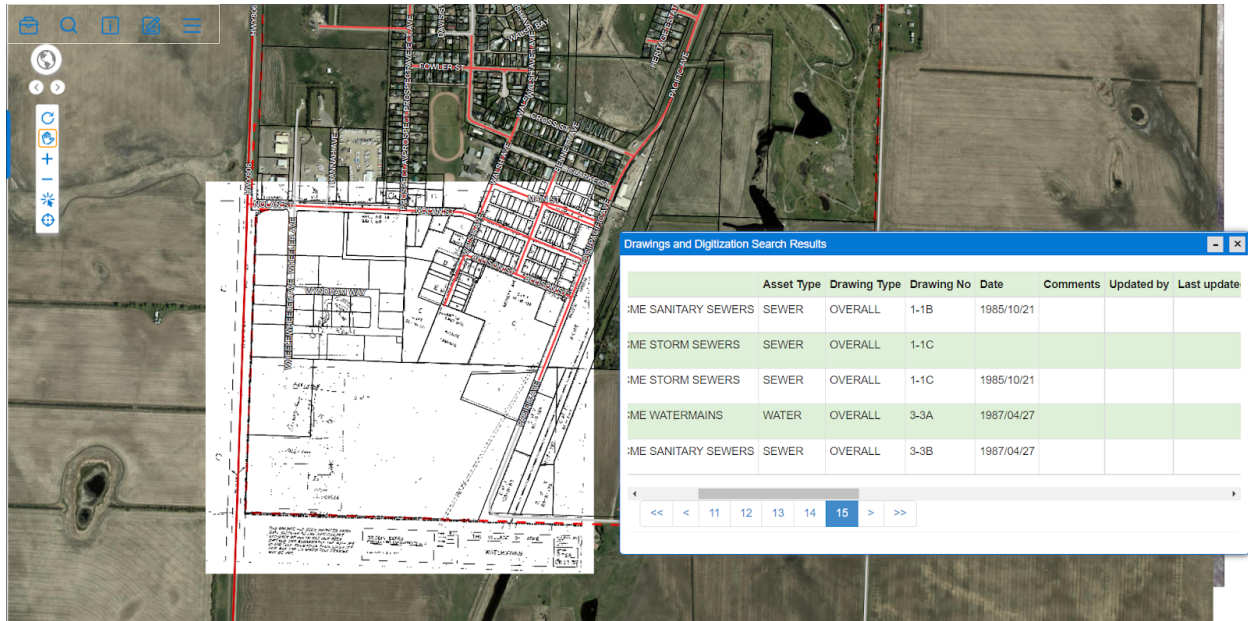
- **MRF is always prepared to help the customer.**

MRF is consistently ready to assist its customers by providing a variety of solutions for a single problem. For instance, they have presented several methods for creating the inventory of all assets of a municipality.

#### **Creating the inventory of current assets:**

##### ***Engineering drawing scanning and head-up digitization***

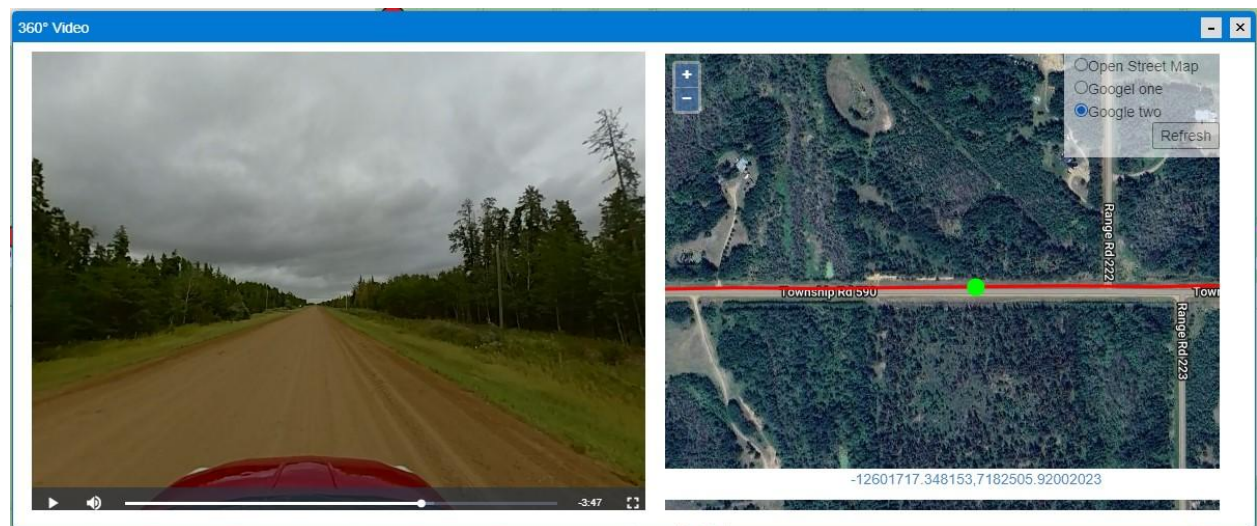
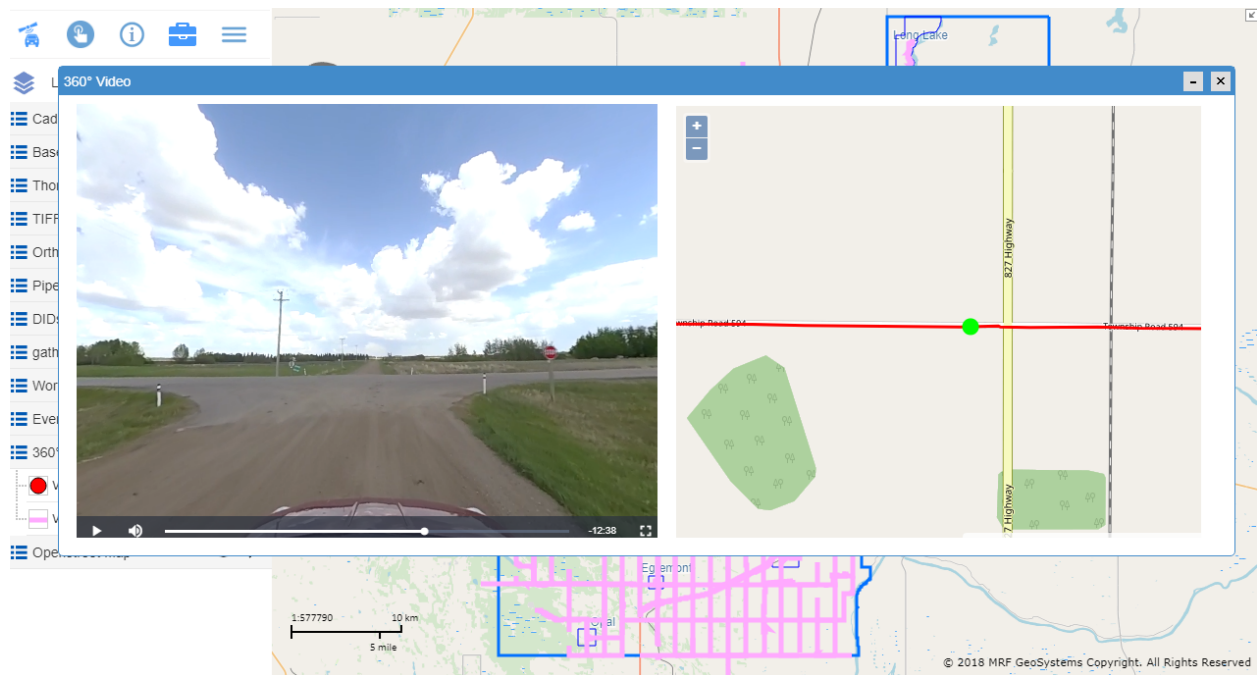
This is a standard operation, and GIS Technicians usually know how to do this. The following screenshot shows the display of a scanned engineering drawing within MRF's GIS system. A Technician can just digitize a point, line, or polygon and enter attributes to create GIS features.



### 360° Road Video

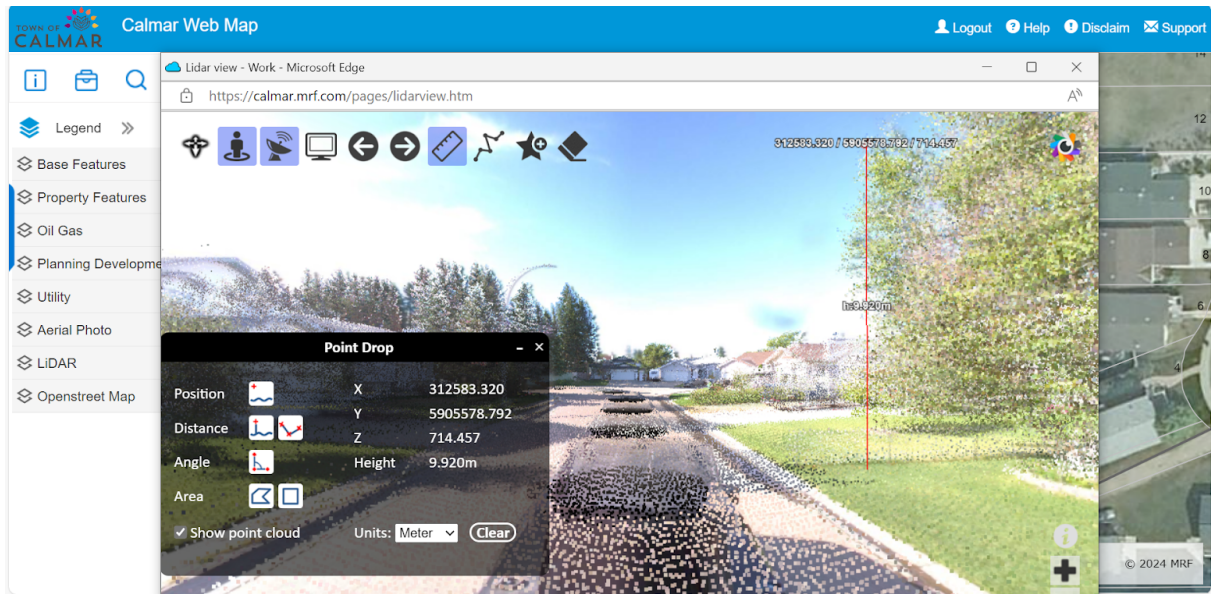
360° Road Video plus GPS tracking allows the Technicians to capture the location of road signs, guardrails, hydrants, etc. MRF has used this approach to capture many road assets. Road Videos can be

accessed easily by staff members within the MRF environment. This approach is proven to be very effective.



### ***LiDAR + 360° Pictures***

For urban customers, using this approach can help capture all the assets (road signs, hydrants, park benches, trees, etc.) visible in the pictures with about one meter accuracy. It will save more than 50% of the cost when compared with using a typical GPS plus Mobile GIS field data capture method.



### ***MRF GIS Mobile with Sub-meter GPS***

Many MRF customers use MRF's GIS Mobile with EOS Arrow 100 Bluetooth GPS receiver to do field asset data collection. The collected data can then be synchronized with MRF GIS Web without relying on GIS Technicians.

- **MRF excels at integrating various systems to support comprehensive asset management.**

MRF is very experienced in system integration. Its asset management solution is comprehensive and supports all the following capabilities:

- o Geographical Information System (GIS)
- o Automatic Vehicle Location (AVL)
- o Document Management System (DMS)
- o Work Order Management
- o Timesheet
- o Asset problem reporting (web-based and smartphone apps)
- o Asset inspection (for all asset types)
- o Asset preventative maintenance management
- o Asset reporting

Most asset management packages on the market do not address all the above needs. A municipality may request two vendors work together to provide a link between their independent software packages. For example, one vendor with a work order management system may team with a GIS vendor to display the work orders and assets on digital maps. But this kind of integration usually results in limited functionality.

Most asset management vendors have not made the effort to bring their solutions “closer” to the end customer. As a result, the municipality must take the additional risk in trying to integrate their existing systems to achieve a higher degree of automation. Most municipalities choose not to do this. Customers that do try this, usually end up feeling dissatisfied due to the high initial costs and the high ongoing maintenance costs.

## Sampling of MRF Asset Management Modules

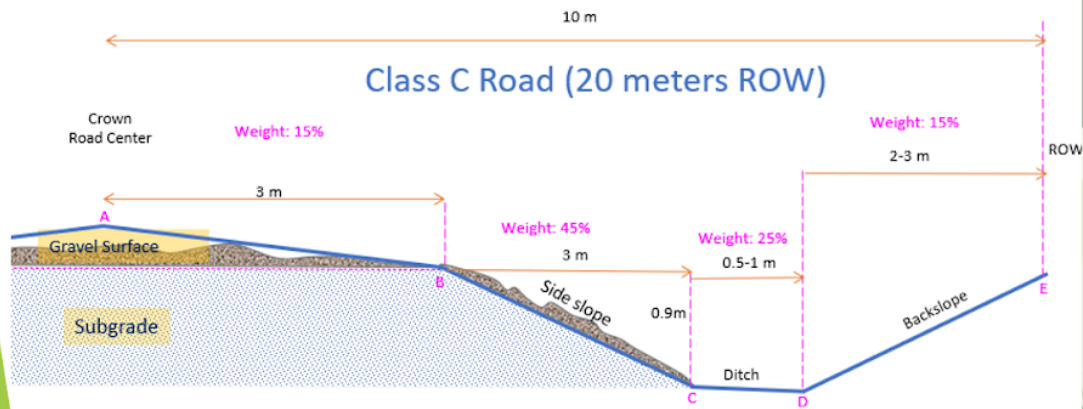
### **Gravel Road Condition Assessment:**

MRF is one of very few vendors that can offer all the above capabilities. Many of the MRF capabilities took years of research and development. For example, MRF used LiDAR + Differential GPS + IMU to develop a truck-mounted system for gravel road condition assessment. MD of Provost, AB and MD of Pincher Creek, AB used this new approach for gravel road condition assessment and achieved the following results:

- The assessment is based on science. There is no subjective assessment. This approach assures consistency across the entire municipality.
- High degree of automation. The truck can drive 40 km/hour. For a municipality with 2000 km of gravel roads, the data capture can be completed within three weeks.
- MRF took a cross section every 25 meters to measure the various slopes (crown to shoulder, shoulder to ditch, back slope). The measurements for the entire road segment are averaged and provide a score for the road segment.



## Road Condition Rating



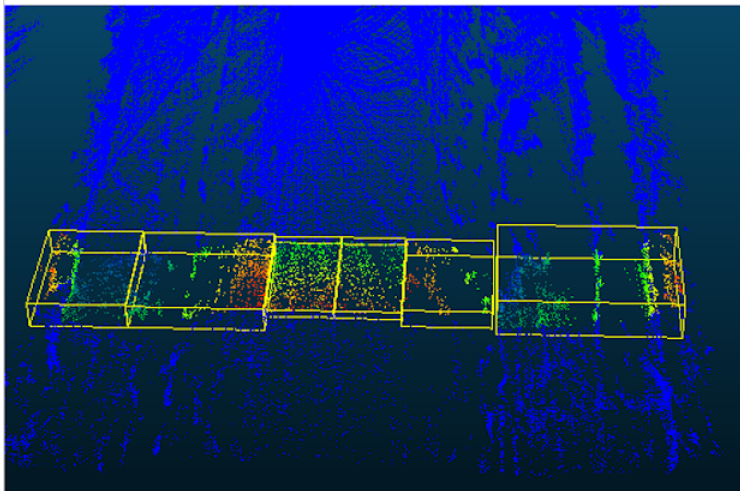
- Rating rule for Road class C

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## Road Condition Rating



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### Road Left Side

Left AB (Crown – Shoulder): 0.02516  
 Left BC (Shoulder – Ditch): 0.00000  
 Left CD (Ditch): 5.52100  
 Left DE (Ditch to Backslope): 0.09685  
 Left total score: 52.58039

### Road Right Side

Right AB: 0.08794  
 Right BC: 0.00000  
 Right CD: 3.91254  
 Right DE: 0.10583  
 Right total score: 40.00000

**Road Total Score: 92.58039**

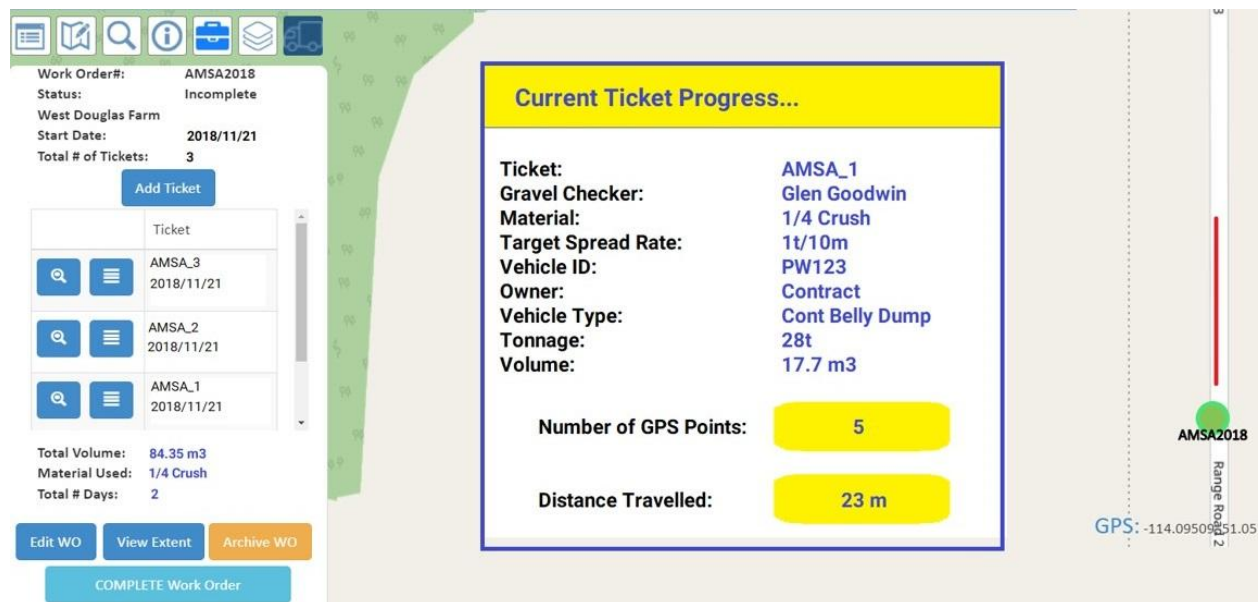
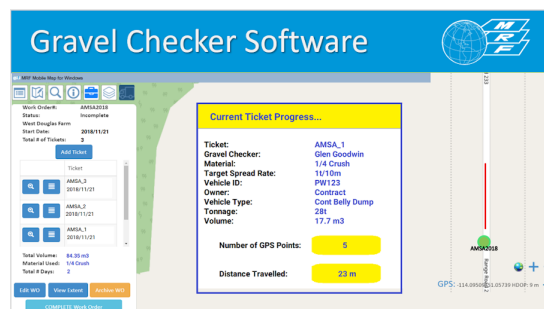
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## Gravel Checker:

MRF also developed software called “Gravel Checker” to automate the gravelling operation:

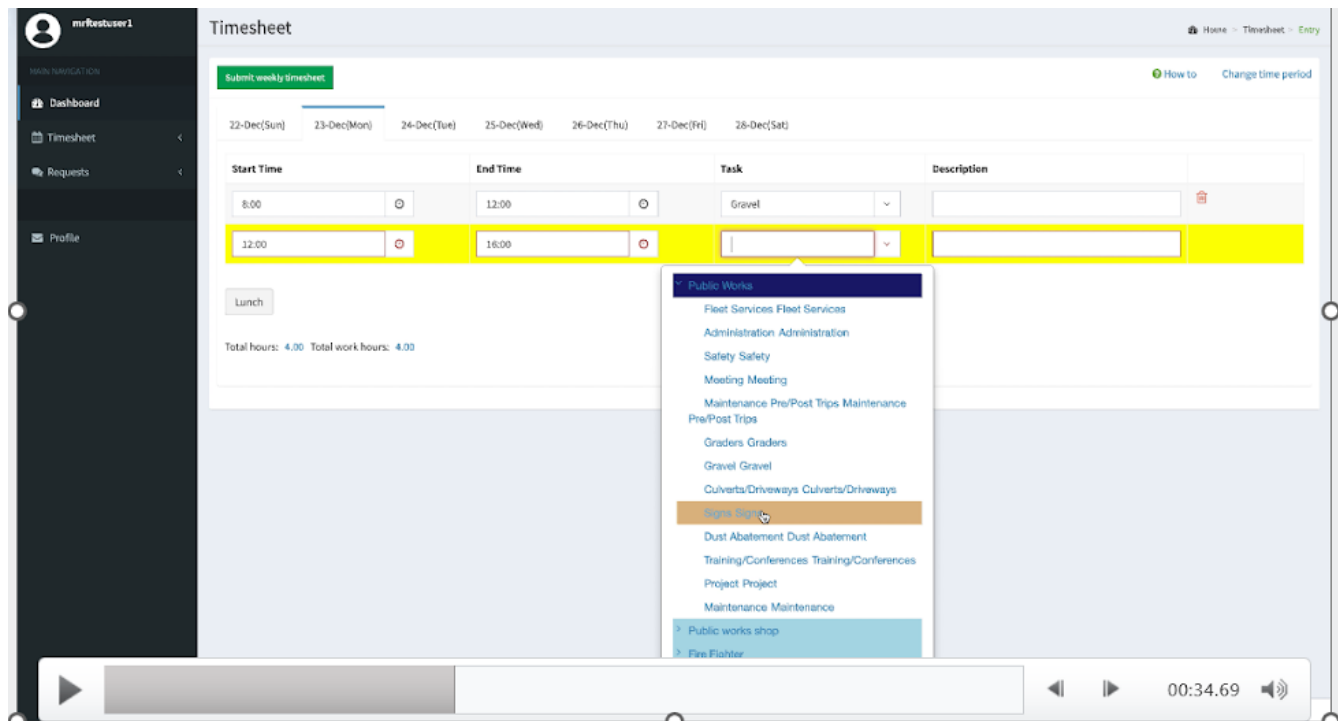
- The beam scale sends the gravel information (material type, weight, gravel pit) to MRF server.
- The MRF server forwards the gravel information to the gravel checker’s tablet in the field
- MRF AVL tracks the location of the gravel trucks
- The gravel checker directs the gravel truck where to dump the gravel
- A report is created by end of the day to show the total amount of gravel hauled, the amounts of budget spent, the amount that should be paid to the pit and the amount that should be paid to each contractor truck.



## Timesheets:

MRF Timesheet allows municipalities to apply its own rules for the different employee types such as salaried, seasonal, hourly and allows these workers to select their requests such as overtime, sick leave and vacation time. Timesheets are well integrated with the MRF work order system so that employees can easily enter their times against each work order. Timesheets allow the municipality to assign a labour

cost associated with the repair or replacement of an asset. When an AVL DriverID is used, MRF can also link the vehicle usage cost to the work order.



## **Q & A:**

**Q: If we have trouble retaining our GIS Technician or other team members, how can we make sure that our asset management implementation is a success?**

**A:** Have a Plan B. Sign an agreement with an external company such as MRF to provide the required skills.

**Q: What has MRF done to make it easier for customers to achieve success in asset management?**

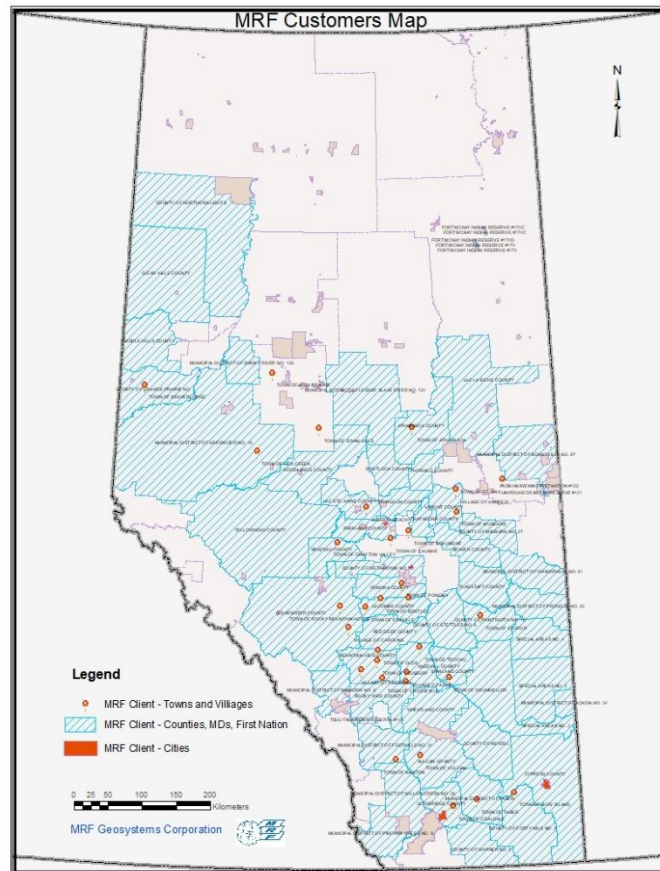
**A:** MRF has done the following:

- User interface optimization for municipal staff with varying degrees of IT expertise.
- Has done integration with popular finance software on the market.
- Developed the modules needed for asset management . With the integration of these modules, customers do not need to take on the risk of customization and systems integration.
- Increased ease-of-use for asset management related modules. MRF user training is usually half a day for a typical module.
- Excellent customer support. IT challenges do come up. When they do, customers want to get them resolved as soon as possible. Most reported IT issues are addressed within 24 hours.

- Competitive pricing. MRF offers lower prices compared with other vendors. This allows MRF to gain more customers very quickly. With more customers to share the cost of software development, MRF can still maintain a reasonable profit margin. This strategy has worked well as shown in the following MRF customer map in Alberta.

**Q: Do I have to implement all the modules from MRF at the same time?**

**A:** No. You can start with the modules with higher priorities to you and add other modules when needed. If using a module from another vendor, you may need to be prepared to implement system integration. System integration involves both vendors. While MRF is willing to assist with system integration, the other vendor must also support this integration.



To learn more about MRF Geosystems and our industry-leading Municipal Asset Management solutions, please visit us at [www.mrf.com](http://www.mrf.com)