



With a history of innovating with location technology, the City of Moorhead focused on deploying web GIS in creative ways to solve its unique challenges and serve City-wide users efficiently, easily, and accurately.

The City of Moorhead, MN is a 20-year Pro-West client. Pro-West worked with the City to develop its parcels in GIS and move through a phased deployment of GIS from an internal GIS application in the late 1990s and early 2000s that centralized data and analysis tools, to internal and public web GIS and, most recently, mobile deployment including right-of-way excavation permits and traffic signal infrastructure maintenance. Along the way, Pro-West has served as the City's partner for application and software upgrades, training, infrastructure design and upgrades, parcel fabric migration, business system integrations, and strategic planning.



Operations Dashboard for Right-of-Way Excavation Permits

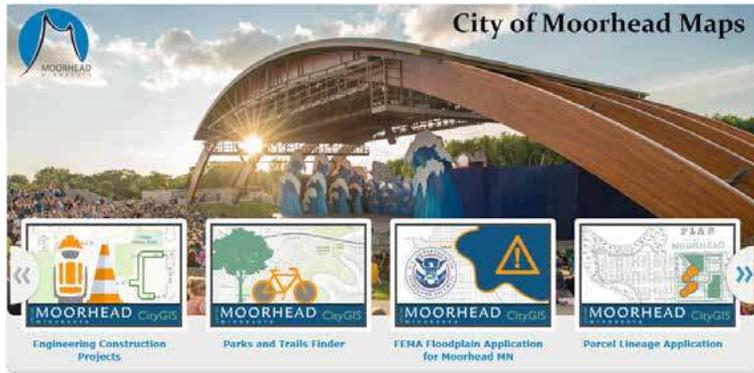
demands on municipal GIS by providing faster, easier-to-use information and services and greater functionality without large development costs.

Together, Anderson and Pro-West began by identifying goals for the deployment, key datasets to make publicly available and the right application strategy – COTS configuration, custom development, or a combination – to do so. The following priorities were identified:

1. Manage requests for data including sanitary and storm sewer, easements, parcels, zoning, property right-of-way, and elevation data
2. Provide a one-stop shop for publicly available real-time information on parks and trails in the city and linking directly to the Greater Minnesota Parks and Trails website
3. More efficient management of the City's flood-fighting emergency plan and flood mitigation infrastructure
4. Implement an easy way to view parcel history
5. Integrate GIS into service request tracking, delivering superior service to citizens contacting the City's Engineering Division to report problems
6. Deploy a Sales Comparison application for the Assessor's Department that will save staff time to more accurately define property values

Moorhead's GIS Manager, Brad Anderson, was eager to embrace the emerging ability of web GIS to support the growing expectations and

## A GATEWAY TO WEB GIS



To house the City’s web GIS resources in a single location, an [ArcGIS Online gallery](#) was created, serving as a “front door” from which all public maps and apps can be accessed. A brand identity was created to ensure consistency and visually communicate the purpose of each application.

The priorities listed above were addressed with the following solutions:

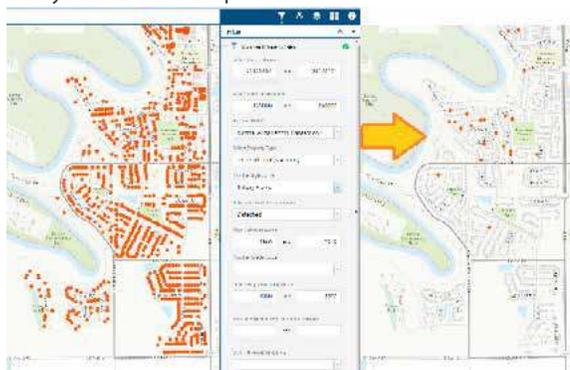
### 1. Managing Data Requests and Providing Authoritative Data

An open data portal emerged as the most effective way of making available data readily accessible to those who need it. Moorhead’s ArcGIS-based [open data site](#) provides a platform for users to explore the available data and easily find what they are looking for. Data served encompasses six categories including those most requested:

- Land records
- Transportation
- Administrative
- Flood data
- Infrastructure
- Utilities



*Sales Comparison App* - the City’s Assessor’s Department is using this easy-to-use, mobile-first ArcGIS Online app, which displays information on property sales dating back to 1990. Its value will become even more apparent in mid-January 2018 when Assessors will restart assessments with the app available for the first time to enhance their ability to equalize property values across the city. With Pro-West’s publishing script in place, data for the app will be automatically processed every night to ensure it is always accurate and up-to-date.



Sales Comparison App

Dedicated web maps and apps for *Sanitary and Storm Utilities*, *Subdivision Lookup* and *Property Information* maps are available via the ArcGIS Online public gallery to make the process of finding information even easier.

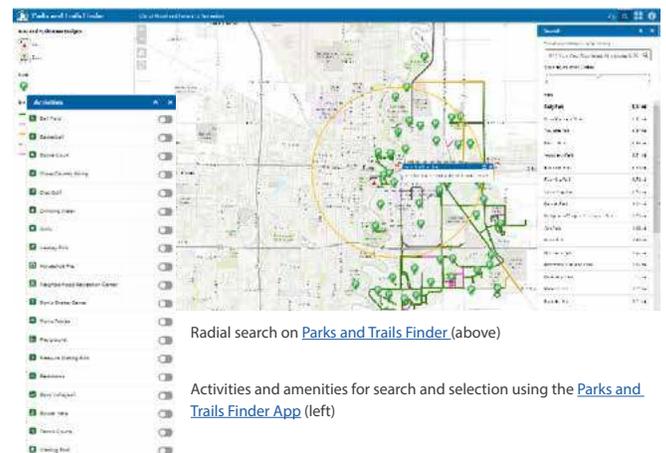


[Subdivision Lookup application](#)

### 2. Parks and Trails

The City of Moorhead has an abundance of parks, bike trails, and other outdoor public recreation facilities. ArcGIS Online offered the ideal solution for developing a single source of at-a-glance information to the many users of such locations. The resulting Parks and Trails Finder app is mobile-friendly and displays the following:

- Community and neighborhood parks
- Bikeways – trails as well as dedicated road lanes and wide sidewalks
- Status of bike and pedestrian bridges crossing the Red River – up or down
- Radial search for public recreation facilities
- Search by activity, e.g. disc golf, pleasure skating, playground
- Search by amenity, e.g. picnic shelter, drinking water, restrooms
- Links to individual facilities’ websites via pop-up windows



Radial search on [Parks and Trails Finder](#) (above)

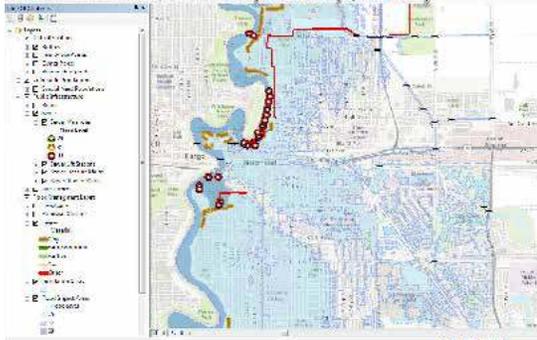
Activities and amenities for search and selection using the [Parks and Trails Finder App](#) (left)

### 3. Focus on Floods

Situated next to the Red River, whose northward flow and flat surrounding land make it vulnerable to seasonal flooding, Moorhead is one of the nation’s most advanced communities when it comes to identifying and deploying flood mitigation tools.

For over 20 years, GIS has been a key component of the City's arsenal and a focal point of its history of working with Pro-West. A desktop application was developed in 1996 to monitor data such as flood elevation – the most advanced GIS in the area at that time – and, later, an ArcIMS-based interactive website in 2002 that displayed half-foot flood inundation polygons, providing invaluable information to City staff and the public. A new version of this site will debut in spring 2018, with updated inundation polygons that enables users to visualize the results of flood mitigation projects over the years.

As web GIS has taken hold, location technology has emerged as an indispensable tool in Moorhead's flood-fighting abilities. In 2012, Moorhead worked with Esri to develop the Flood Planning Map, the first in a series of maps and apps to help communities prepare for flooding events.



The Flood Planning Map, developed by Esri working with Moorhead.

The City now uses ArcGIS Online to manage many of its GIS-enabled flood mitigation measures, including getting information to the public with new half-foot flood stage inundation layers that reflect nine years of flood mitigation projects (after the record flood of 2009). Recent additions include the [FEMA Floodplain Application](#), which displays the current FEMA floodplain information and FEMA's official Letters of Map Correction (LOMCs).

As the City's emergency flood-fighting plan – already having been significantly streamlined as a result of flood mitigation projects – becomes more mature, so does the role of GIS. Goals for further GIS integration include:

- Portal for ArcGIS to ensure tight security should the emergency flood plan need to be actioned
- Transitioning more components of exercising the emergency plan from paper to GIS
- Extended field capabilities for enhanced monitoring and information provision

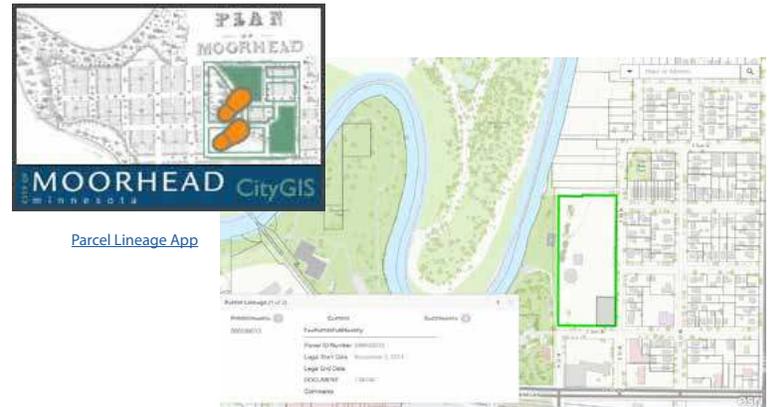


FEMA Floodplain Application

#### 4. Instant Parcel History

To further streamline its parcel maintenance process, Moorhead implemented Pro-West's [Parcel Lineage App](#), designed to provide

users of Esri's Parcel Fabric with instant visibility of a parcel's history. As an early adopter of the parcel fabric, the City had built up several years of history in this format and wanted to achieve the additional value offered by this application. A single click on any parcel displays historical information, making it quick and easy to discover the required data.



Parcel Lineage App

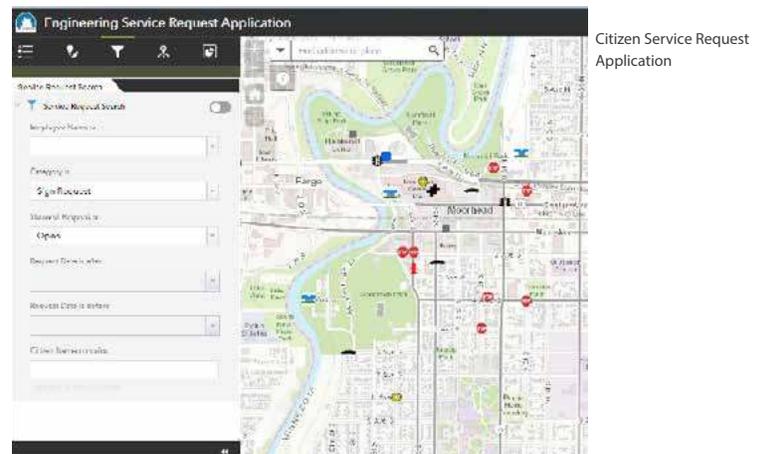
#### 5. Service Request Tracking

Moorhead needed to move citizen service requests from paper to web GIS, with the goal of resolving existing challenges:

- When citizens called the City to make a request, their name and address was recorded, but that was typically not the location of the issue being reported. This prevented the ability to analyze any geographic pattern of the issues affecting the City.
- City leaders and managers were not able to easily track a citizen's request to be able see whether or not it had been resolved in a timely manner

However, the potential ease and efficiency of adopting a web GIS-based app for submitting and tracking requests brought its own challenges. Operating with limited staff resources, how could the City guarantee that all requests received timely responses and resolutions?

The answer lay in an internal GIS application. This allows City Engineering staff taking service request calls from the public to use a GIS web app to indicate the type of request and record relevant details. If the call is subsequently dealt with by another individual or department within the City, information on the request is instantly available, ensuring only relevant information is collected and eliminating the need for repeated call transfers or explanations.



Citizen Service Request Application

## RESULTS

Prior to making the City's datasets instantly available via an open data portal, the average response to a request for data consumed 30 minutes and required a dozen steps to complete. The ArcGIS Online-based portal has been instrumental in **freeing time** previously spent gathering responses, as well as delivering **faster, more accurate service** to users from local engineering firms, consultants, developers, title companies, and property appraisers.

The use of an internal GIS application to record and track citizen service requests is also serving the dual purposes of **improving customer service** and **helping the City run more efficiently**. Members of the public provide information just once instead of multiple times, minimizing citizens' time and **saving an estimated 2 hours per day** for City staff to process the request and providing a **single, authoritative source of information**.

Moorhead's level of GIS deployment is exceptional amongst rural communities; the City has long been a leader in seeking out state-of-the-art technologies to deliver public services that offer **ease of use, efficiency, convenience, and rich information** wherever users are and whatever their device. This ethos has remained foremost in the City's rollout of web GIS and plans for the continued growth of its GIS program.

The deployment of **easy-to-use single-task GIS apps** has been perhaps the most significant driver of change for the City of Moorhead.

**“The move to focused applications designed to accomplish a single task has been a game changer for our city.”**

**“Simply put, it has changed the way people think about GIS. It has opened their eyes to new ways they can use maps, which were once thought of as the exclusive domain of “the GIS guy”.**

**“Now, they are seen as a way to visualize and interpret many different types of data in a way that's easy to understand and, most importantly, useful! This has generated greater use of GIS, greater momentum for our GIS program and, in turn, greater efficiency and better service for our city.”**

## THE FUTURE

Moorhead has clear plans for expanding its GIS program, taking full advantage of the capabilities of GIS to support City business processes.

*The Emergency Flood Plan* – already significantly improved as GIS technology has evolved over the years, goals for the plan include transition to ArcGIS Online to enhancing sharing and Portal for ArcGIS for security purposes. This would facilitate City staff engaged in the flood fight to manage the emergency action steps out in the field providing instant updates to management back in the office.

*Collaboration* – Moorhead plans to work with other local entities to expand data sharing that offers mutual benefit. Moorhead has been successfully collaborating on data preparation and standardization with other local entities since 2001, when the area's 911 call center became the *first PSAP in the nation* to take calls from two different states (Minnesota and North Dakota).

*Engineering Capital Improvement Projects* – organize and link all infrastructure project record drawings and data with GIS.

*Emergency Management* – facilitate GIS analysis of Fire Department incident data and mobile access to building preplan inspections.