Esri News
for State & Local Government
Winter 2021

How GIS Can Help Leaders Achieve Equitable, Speedy Vaccine Distribution

By Este Geraghty, MD, MS, MPH, GISP, Chief Medical Officer and Health Solutions Director at Esri

With a COVID-19 vaccine expected to roll out in 2021, governments around the globe must be ready to distribute vaccinations on a massive scale—an effort that includes the hurdles of meeting subzero storage requirements; prioritizing vulnerable communities; communicating with each other and the public; and ensuring equity across countries, counties, and cities.

At the pandemic's onset and throughout 2020, government and health-care leaders relied on Esri's geographic information system (GIS) technology for real-time visualization dashboards and data sharing, analysis, and planning. The same GIS approach will prove crucial for vaccine distribution.

In the US, for example, the Department of Health and Human Services (HHS), in coordination with Department of Defense (DoD) and the Centers for Disease Control and Prevention (CDC), recently provided a strategic vaccine distribution overview along with an interim playbook for state, tribal, territorial, and local public health programs and their partners.

The agencies outline next steps that include engaging with other leaders, stakeholders, and the public; distributing vaccines with speed and transparency; ensuring safe vaccine administration and availability; and monitoring through an IT system capable of supporting and tracking distribution, administration, and other necessary data.

GIS is an integral part of that IT system and will be central to vaccine distribution efforts, supporting engagement with stakeholders and the public as well as providing real-time situational awareness and transparency.

Here, we highlight five key ways GIS can support COVID-19 vaccine distribution to help health agencies and governments execute their plans and end this pandemic as quickly as possible.

1 Identify Facilities Capable of Storing and Distributing the Vaccine

Both of the leading vaccine candidates require cold storage, with one requiring ultracold storage at -70 degrees Celsius. Other factors—such as parking, accessibility to vulnerable populations, distance from vaccine production facilities, typical nearby traffic conditions, and overall venue size—will also impact which facilities can properly store and distribute a vaccine.

"States are currently surveying their systems to know where their sub-80 [degrees Celsius] freezers are," said Julie Swann, a professor of industrial and systems engineering at North Carolina State University, who was advising the CDC. "I would

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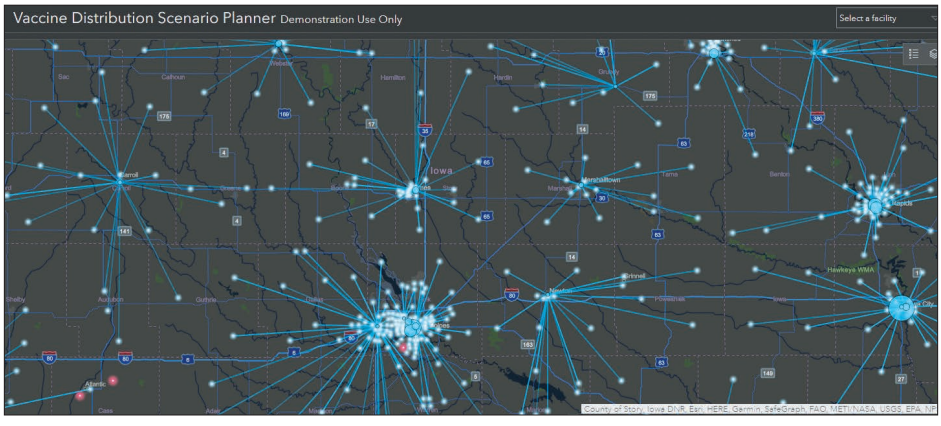
Featured Article

See how one city is helping local businesses stay resilient during the pandemic with GIS—pages 16–17.



↑ Using a vaccine distribution scenario planner map can help understand the accessibility of any distribution site and locations where distribution is not feasible..

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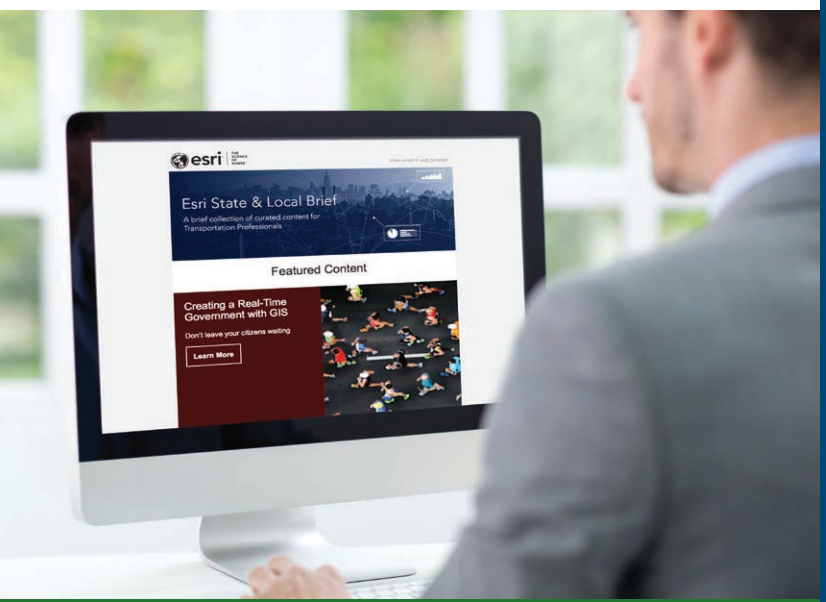

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Bring Clarity to the Redistricting Process

By Richard Leadbeater, State/Provincial Government Industry Solutions Manager at Esri

I am writing this article as we exit a somewhat contentious election season. To be sure, much of that same energy, both positive and negative, will now get channeled toward addressing the next political process: redistricting. It is an understatement to say that redistricting has gained attention over the last several decades. After all, the process of creating new congressional and state legislative districts has been weaponized through the evolving use of both maps and the census data.

While redistricting is an essential civic process, the public's level of involvement was historically very low. Often, the only way individual residents within a state became aware of the process was through the court cases they read about in the news. This lack of involvement represents the inspiration for the trend that's occurring—the movement to provide resident involvement within the redistricting process.

Defined in the US Constitution and further described in each state's constitution, redistricting is a political process. From the first attempt to reapportion the congressional seats assigned to each state and redistrict the areas they represent, the very human aspects of politics were present. Fast-forward to today—these base drivers still exist. From the beginning of 2019 through the November 2020 elections, 12 states introduced more than 20 bills to open the redistricting process to the public. In total, 28 states have some form of public input or resident participation in their redistricting process. To be clear, the idea of the involvement of residents can be defined in diverse ways, and it falls into the following five categories:

- Contributing maps of residents' own design to redistricting authorities
- Commenting on proposed plans throughout the map-drawing process
- Giving the public access to redistricting authorities through hearings and making information available
- Providing public notice of redistricting-related actions and meetings
- Prescribing a procedure for residents to seek court review of enacted plans

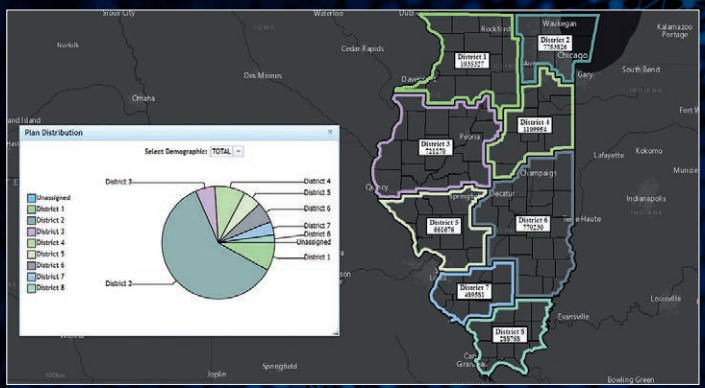
In more simple terms, these recent actions represent the desire of the public for openness and transparency. Jessika Shipley, staff director for the Colorado Independent Redistricting Commissions, said, "We want our data and software to be open and to engage the people who will be affected by these decisions. By using Esri Redistricting, we seek to engage community leaders and learn about their interests early in the process so we can take them into account when we are drawing plans for district boundaries."

Empowering users with 2020 US Census public law data, the Esri Redistricting solution includes local basemaps, demographics, streets, and imagery to provide a visual context to the redistricting process. Plans are shared privately or publicly within the security of the solution. It also allows for users and groups to be managed, including control over who can edit, add comments, or only view the plans.

Most legislatures' challenges are with the tremendously detailed data that redistricting is based on and the ability to share that information with the general public. Utilizing an enterprise approach to the redistricting process enables increased public participation. And by delivering that process through a web browser, the same data and tools that are accessible to professionals become available to the public for a more transparent process.

The Esri Redistricting solution provides legislatures at the state and local levels with the flexibility to create open and transparent processes while also enabling the public to contribute.

Eliminate some of the criticism from your redistricting plans this time around. Learn how Esri can help the government share its redistricting plans with residents for greater understanding, and watch the demo at **go.esri.com/EsriRedistrictingNow**.



A Win for Secure Elections

Voting in this year's elections in the United States was vastly different from how it used to be, because many citizens opted to vote by mail due to concerns about being exposed to coronavirus disease 2019 (COVID-19). Whether people ultimately decided to vote in person, mail in their ballots, or deliver them to drop boxes, one county in Utah realized there was a desperate need to modernize its antiquated, time-consuming election processes.

Utah County, the second largest county in the state, used GIS to transform its outdated election processes into a modern, location-enabled system. ArcGIS Solutions for Local Government—Elections from Esri helped the county support a secure and efficient process for collecting ballots from drop boxes and quickly sharing the results of the vote after the polls closed.

The Utah County elections department collaborated with the county's GIS team to eliminate hours of staff time typically spent updating results on election night and developed an efficient process to collect ballots from drop boxes across 2,144 square miles.

Providing the Public with Real-Time Results

Prior to implementing the elections solution, the county used a standard tabulated document that showed the number of votes cast per candidate. Unfortunately, this system lacked a point of reference to indicate which candidates won in which precincts, and it had no visualization capabilities.

Utah County's GIS analyst, Andrea Befus, understood the need to create an elections dashboard to allow residents to view election results in near real time, in an easy-to-understand format. To create this dashboard, Befus embedded ArcGIS Dashboards into a classic Esri Story Maps Series template.

By using ArcGIS, Befus was able to input voter data—voter turnout, political party affiliation, number of total ballots cast, election night results, and other essential information.

Residents can now refer to any recent election, filter out specific voter data, and do their own analysis, thus enabling the public to interact with the voter data for the county like never before. Not only is the election results dashboard useful for displaying historical data, it's also a vital resource on election night itself.

According to Befus, county staff saved about four hours' work throughout election night during a recent primary election by updating the county's public-facing dashboard as results came in.

Once a 50-minute process, ArcGIS takes only 3 minutes to produce an updated count and information on which candidates are winning per precinct.

"Additionally, the new election night results reporting dashboard is now the envy of the state," said Utah County clerk/auditor Amelia Powers Gardner.

"It was so successful in our municipal elections that several cities abandoned their own results tools and directed voters to our website. The mapping feature provides a visual display of the votes tabulated. The tool allows voters to zoom in on their specific precinct to see how many voters participated and how the votes were cast."

As the county updates election results at an unprecedented rate on the dashboard—thereby freeing hours of staff time—the county can allocate more resources to securely collecting ballots leading up to and during election day.

Managing Drop Box Ballot Security

Many jurisdictions across the country allowed mail-in ballots for the November election and tried to do this securely and efficiently.

Because mail-in voting has been the norm in Utah for several years, Utah County has developed a streamlined workflow to efficiently track, dispatch, and collect data from field staff, minimizing any issues stemming from collecting ballots at various locations. Ballot security was a major public concern during this year's election season.

During a recent primary, Utah County placed 20 ballot drop boxes near strategic locations such as libraries, recreational centers, and city offices. To maintain ballot security, Utah County's GIS department used ArcGIS QuickCapture, a mobile app that gives the field staff who collect the ballots the ability to capture photos, text, and other data quickly for drop box ballot tracking.

To ensure that every ballot is accounted for, the county equipped each election day mobile worker, or rover, with the ArcGIS QuickCapture app on their smartphone. As each rover arrives to their assigned drop box, they drop a point on a map in QuickCapture, weigh the ballots and enter that information into the application, and provide a time stamp of when the ballots were picked up.

Once the rover returns to the elections department office, staff weigh each bag of ballots to ensure that its weight—and therefore the number of ballots inside—matches the information that the rover typed into the application. This way, staff verify that no ballots are lost in transit.

These measures illustrate transparency and accountability to residents because elections staff have the exact time stamp and location of each drop box pickup. If residents contact the elections department to ask if their ballots are secure and safe, the data that the rovers collect enables the department to share that information.

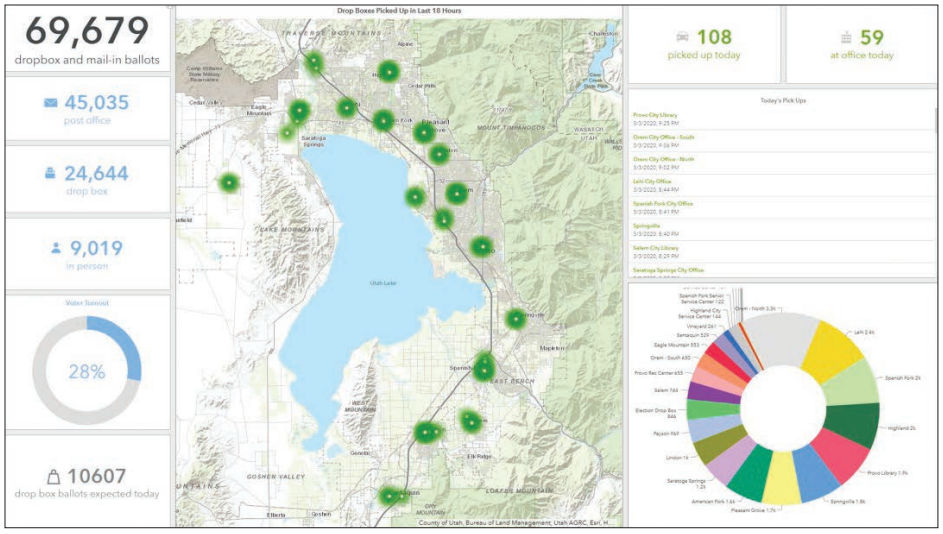
Gardner acknowledges, "In today's election environment, security at every step of the process is crucial to ensure public trust and confidence in our system—the very system that undergirds democracy itself . . . . The new drop box tracking and mapping feature allows us to anticipate the volume of ballots and ensure that we are staffed appropriately. It also gives us critical security oversight on the movement of returned mail ballots."

Befus agrees that data accountability is crucial.

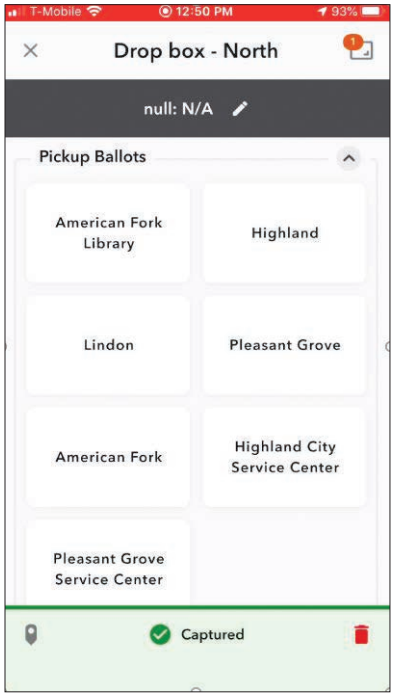
"Our elections team now knows what we can do as [a] GIS department, and they know how much we both want to show accountability and help the public by providing good data. Their confidence in GIS has skyrocketed because of the amazing things we have been able to produce to help their day-to-day workflow," she said.

It is essential for elections departments to work efficiently, offer access to real-time election results, and provide transparency to communities during an election, as voting is one of Americans' most important constitutional rights. This year, most jurisdictions faced a steep increase in mail-in voting, a unique process that presented the challenge of securely gathering the ballots—whether they were mailed in, deposited at a drop box, or turned in at a polling location.

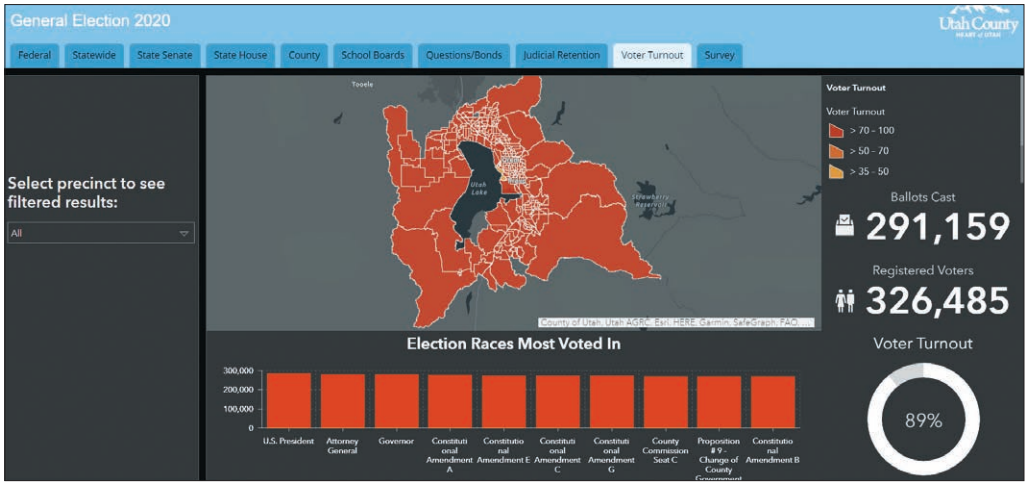
ArcGIS streamlines the elections process by capturing drop box location activity as well as collecting and sharing election results more efficiently. You can update your jurisdiction's election processes by incorporating GIS technology before your next election.



↑ This dashboard gives complete information about the status of the county's ballot collection proccess before and on election day.



← Screenshot of the ArcGIS QuickCapture mobile app staff used to select which drop box they were picking ballots from.



↑ Utah County's Election Results interactive map dashboard was updated on election night periodically as more accurate counts arrived.

Cloud-Based GIS Streamlines Neighborhood Revitalization Efforts

By Brita Austin, Allworld Project Management

In Memphis, Tennessee, the Community Redevelopment Agency (CRA) works with local organizations, residents, and businesses to address blight and provide affordable housing. Using the Tax Increment Financing (TIF) tool, the CRA identifies underdeveloped areas that are ripe for improvement and calculates how much funding the projects can obtain based on future expected tax revenue. Projects that the CRA works on include single-family housing rehabilitation, which provides up to $30,000 in home improvement funds to homeowners in need of assistance, and targeted infrastructure improvement in high-crime areas, which focuses on efforts to lower crime by removing weeds, cleaning up graffiti, and fixing broken streetlights.

For several years, the CRA has used GIS on a limited basis to map parcels, analyze appraisal changes, and communicate with the public—essentially, to do quick analysis and data visualization. But recently, one of the CRA's big projects, the Uptown TIF District, required a more robust GIS implementation.

This 100-block revitalization effort of a north Memphis neighborhood focuses on several important community anchors, including the downtown Memphis area; St. Jude Children's Research Hospital; the Memphis medical district; and a number of community centers, historic businesses, schools, and parks. The idea is to use the $95 million allocated to the project by TIF over the next 10 years to strengthen these anchors so that they have the greatest impact on the community, resulting in a neighborhood revival that gives residents a sense of collective pride, makes them feel safe, and attracts additional investment.

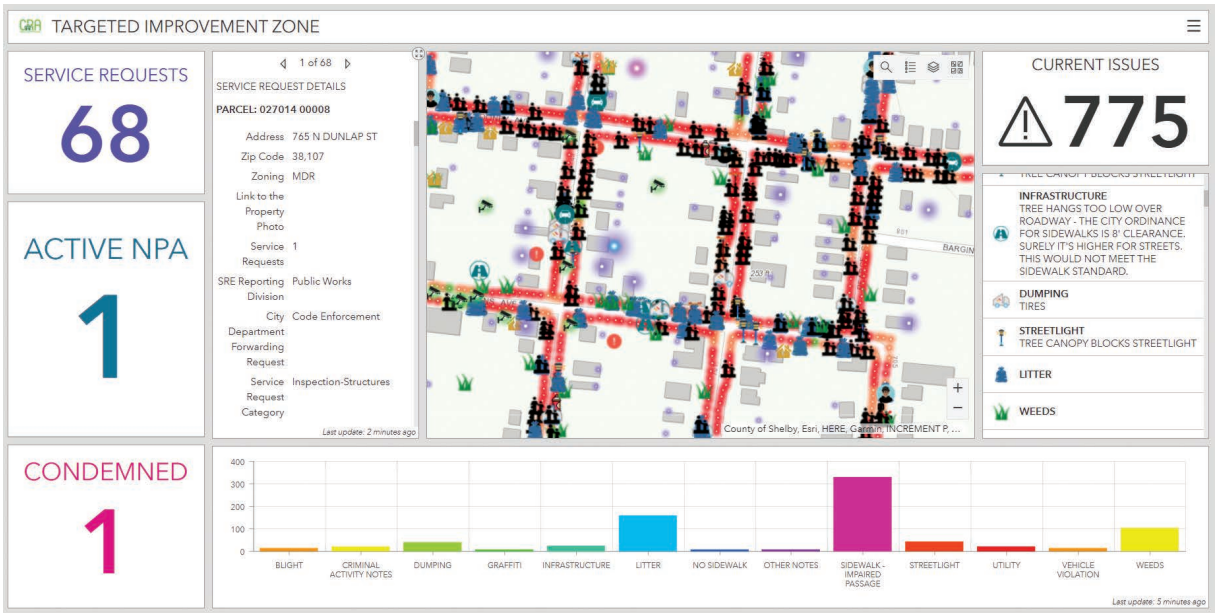
To accomplish this, the CRA needed to streamline its data management, mapping analysis, and visualization capabilities. So it turned to Esri partner Allworld Project Management, a Memphis-based professional services firm, to assemble a powerful suite of cloud-based ArcGIS technology.

For the Uptown TIF District project, the CRA had a very specific vision:

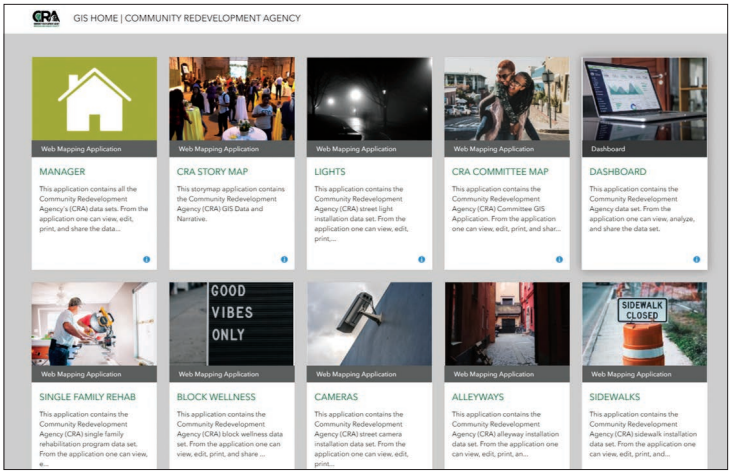
- Promote the area as a great place for residents of various income levels and ages to live
- Protect already-existing single-family homes from dilapidation and gentrification
- Preserve and create vibrant community anchors that strengthen residents' connections to one another and make it easier to get to nearby downtown

To prioritize and manage the projects that would be key to this revitalization effort—including handling Crime Prevention Through Environmental Design (CPTED) data and tracking blight removal, housing rehabilitation, and infrastructure improvements—Allworld configured a series of GIS solutions. Most of them were built in ArcGIS Online and included apps configured using ArcGIS Web AppBuilder, ArcGIS Survey123 forms, a custom configuration of ArcGIS Collector, and dashboards built with ArcGIS Dashboards.

For example, CRA staff members are able to use the Community Redevelopment Manager app, created with Web AppBuilder, to record new data about ongoing projects, such as their status and cost, and edit existing entries. The app also enables staff to perform quick, exploratory, and inferential analysis on where to implement changes and invest funds. Using a new business analysis widget linked to Esri Tapestry Segmentation data, the app allows staff members to dig into background and up-to-date information about specific neighborhoods. And Allworld built a similar app for the Uptown Advisory Committee—which is made up of community members—to show much of the same content, just without the



↑ GIS apps like this dashboard helped the Community Redevelopment Agency determine which areas to target for revitalization efforts.



→ Allworld Project Management developed several apps that stakeholders could access from an easy-to-use gallery.

editing capabilities available to CRA staff.

The ease of use of ArcGIS Online, coupled with web-based apps, makes it easy for other stakeholders, in addition to the CRA, to communicate and visualize data as well. For instance, by employing the Community Redevelopment Manager web app to collect data on infrastructure projects, such as sidewalk, alleyway, and camera installations, city officials can keep track of who is doing what project, how much it's costing, the project's status, and more. City officials also use the Block Wellness app to monitor the removal of environmental factors—like weeds, graffiti, and broken streetlights—that contribute to crime.

The feature services that Allworld used to create the Community Redevelopment Manager app were also used to build a Survey123 app that the CRA can employ in the field to keep tabs on project inspections. Another option (though the CRA didn't choose this) would have been to use ArcGIS Workforce coupled with Collector or Survey123—or even Collector by itself—to manage field crews and conduct project inspections. The versatility of employing a feature service paired with ArcGIS apps is extremely helpful when trying to meet end users' various data collection, management, editing, visualization, and communication needs.

To help key stakeholders with decision-making, Allworld used ArcGIS Dashboards to assemble multiple dashboards that provide a quick, focused understanding of real-time project data. The dashboards, which feature simple visual formats such as maps and charts, include macro views of project statuses and costs as well as descriptive data—ranging from who owns the land to what kinds of improvements are needed.

Because ArcGIS Online is secure and makes it easy to duplicate apps, the team at Allworld was able to build one set of internal solutions and employed it to manage the project, while the CRA and the Uptown Advisory Committee rely on their own set of solutions to carry out redevelopment operations. Given that all these solutions were tied to the same datasets via cloud-based storage in ArcGIS Online, everyone was working from the same data. This has saved the CRA time in determining which areas in the Uptown TIF District to target for revitalization, which, ultimately, has helped everyone involved streamline funding.

About the Author

Brita Austin is a GIS architect for Allworld Project Management. She has a bachelor's degree in geography, with a focus on the environment and climate, and a master's degree in geoscience, with a focus in GIScience, both from Western Kentucky University.

Counties Assessors Modernize Public Engagement with GIS Hubs

By Brent Jones, PE, PLS, Global Manager of Cadastre/Land Records at Esri

One day, I received a phone call at work. It was my neighbor, saying, "Brent, there's a fire truck outside your house." I hurried home, and within minutes my house was engulfed in flames. Three-quarters of everything we owned—gone. Thankfully, many special family items were rescued, including hundreds of irreplaceable photos. There were three huge fire trucks, and at least 15 firefighters worked well into the night before the fire was out.

From fire departments and public safety to parks and public works—county government improves our lives. County officials deliver essential services that make our lives better, safer, and more enjoyable. And there are a lot of services that unfortunately do not get the recognition they deserve. The majority of these services are supported by local property taxes.

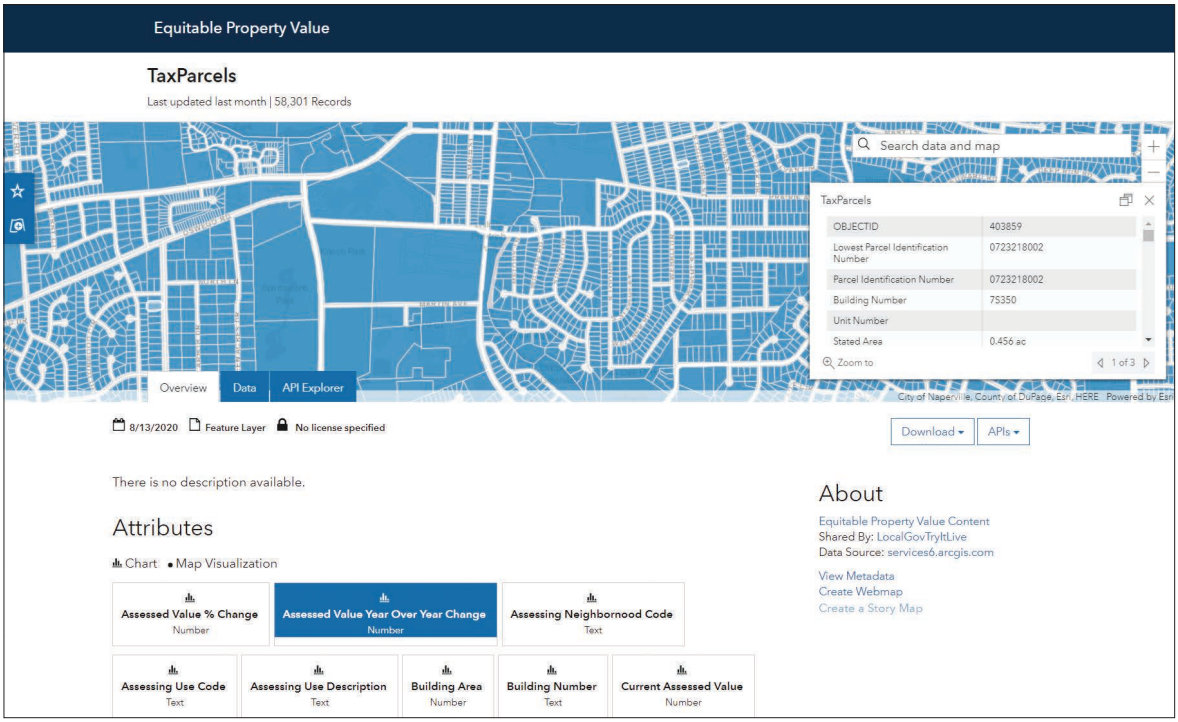
County assessors, property appraisers, and equalization departments are responsible for valuing property fairly and equitably for taxation. Transparency is a key element in the valuation process. Ensuring that all property is treated the same way, with accurate and authoritative assessment data, communicates to taxpayers that the process is fair, and it reduces valuation appeals and tax challenges. Transparency improves the public's trust and confidence in government.

Part of assessing is gathering a tremendous amount of property data. Many counties maintain more than 150 characteristics on every property to determine market value as accurately as possible. This data—structure type and age, siding type and condition, lot size, roof material, number of rooms, heating system type, and so forth—is used daily by assessors. Many county departments depend on this data being accurate and usable, adding responsibilities to the assessor's office. The public relies on this data too. Property and parcel data may be the most used and shared data in the county.

Data—Not Just for the Counties

Although property tax is local, states have the responsibility to oversee the process to

→ Cross-collaborating with other departments becomes effortless with GIS. As assessors update their parcel, property tax, and other types of data, other departments can always have access to the same authoritative information.



ensure that county-to-county assessments and tax rates are fair and equitable. As a result, many states aggregate parcel data for better oversight and analysis of tax rates, sales ratios, untaxed property, and general legal compliance. Statewide parcel data is useful in other areas: addressing systems, transportation planning, watershed management, wildland firefighting, and many more. Aggregating data in the past was a time-consuming manual task. Today, commercial off-the-shelf (COTS) software GIS solutions reduce the burden on county assessors while also empowering state government agencies. Sharing aggregated parcel data is a force multiplier for many state functions, including economic development, resource management, and policy making.

Open Data, Transparency, and Hubs

Property tax works well when we know we are being taxed fairly and equitably. If property owners think otherwise, they will appeal. Appeals are costly, so to avoid them, assessors do their best to deliver the most accurate property values. Publishing valuation data and the property data used to calculate values reduces the number of appeals.

Open data capabilities create a base level of transparency that enables assessors to share their authoritative data with everyone. But public expectations on how data and information are accessed continue to evolve, and technology continues to advance to meet these changing expectations, creating a new type of transparency: hubs.

So what is a hub? A hub is a community engagement platform that helps organize data and supports your communication with the public. Counties of any size can improve engagement, communication, collaboration, and data sharing with a hub. Hubs can be configured for specific initiatives and to help users track progress and understand outcomes.

For assessors, there is a specific ArcGIS Hub initiative, Equitable Property Value (EPV) Hub. It delivers essential property data; summary statistics; and the ability to share information on the assessment process, advancing public trust and confidence. EPV Hub is configurable to your county website's look and feel and has a variety of apps and maps, including a parcel data viewer, a floodplain locator, information about where property taxes go, a comparable sales locater, an assessment appeal app, and a calendar of events. You can easily add other apps into a Hub site to fulfill your community's needs.

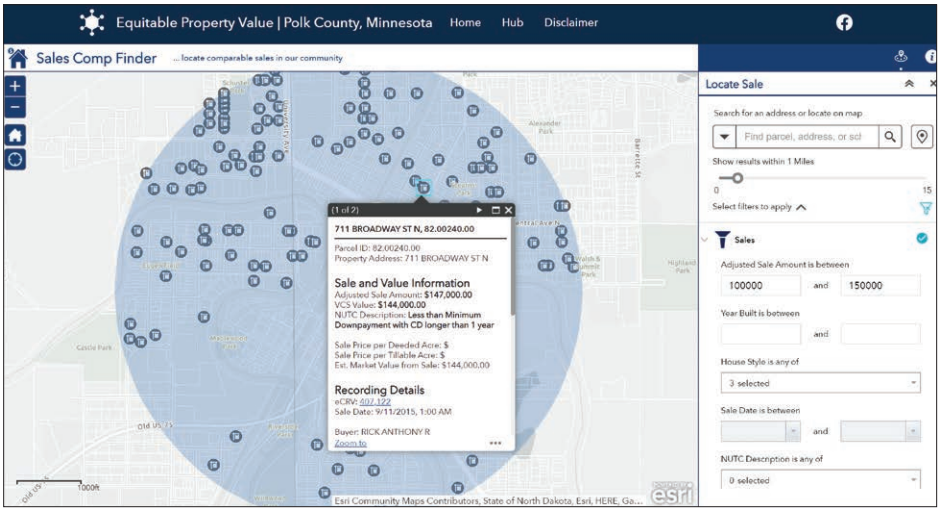
This single public engagement destination increases taxpayer satisfaction and general awareness of the county property valuation process. It will help your county share property information, facilitate the appeals process, and promote fair and equitable property values.

Credit Where It Is Due

Counties provide many essential services that make our lives better, and the majority of them are paid for by fair and equitable property valuation and taxation. Assessors should be recognized for contributing to successful county operations and the valuable data they collect and manage. Their use of GIS to manage and share this data within the county and with the public has evolved into a critical and valuable government service that will continue to grow in value.

For information on how to better communicate property information to taxpayers, download Esri's e-book—visit **go.esri.com/EPV-Ebook**.

↑↓ The ArcGIS Hub initiative Equitable Property Value is a one-stop-shop site that delivers self-service apps and maps to taxpayers with real answers to their questions.




smart
Data-Driven
Performa
Dashboards
Performance
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Autonomous
Vehicles
Real Time
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Aware
Analytics

Smart Communities Result When Governments Improve Operational Efficiency

Smart communities deliver unparalleled service to their constituents. They do this by streamlining workflows, optimizing resources, collecting data in real time, and feeding performance dashboards.

To see how to improve operational efficiency, visit **go.esri.com/SmartOpEfficiency**.

 continued from page 1

expect that kind of cold storage to be available at large hospitals, scientific research facilities, and some large pharmacies."

The facilities Swann mentions are likely already administering other vaccines in their normal course of business. These larger facilities may be prioritized in phase 1 of the vaccine distribution process. During this phase, vaccines will be limited and focused first on people serving in healthcare settings who may have direct exposure to patients infected with COVID-19. Second will be those who work in essential jobs that keep society running (e.g., emergency and law enforcement personnel, food packaging and distribution workers, teachers and school staff, and childcare providers).

A larger vaccine supply is expected to be available to support phase 2 of the distribution process. In that phase, additional facilities will be needed such as private provider offices, worksites, clinics, hospitals, health departments, retail settings, and senior centers. Mapping the breadth of potential facilities in the vaccination process is the first step to ensuring adequate population coverage.

2 Identify and Prioritize Critical Populations

There won't be enough doses of the vaccine immediately, so it's important to be both strategic and ethical with the available resources. The proposed prioritization, as described below, ensures that critical infrastructure workers—those most likely to be exposed to COVID-19—are the first to be vaccinated.

The second group prioritized are those at increased risk for severe disease or death from COVID-19. This includes people in congregate living situations such as nursing homes and assisted-living facilities; those who have underlying medical conditions or risk factors for severe disease like obesity, cancer, and diabetes; and adults age 65 years and older.

The third group in the prioritization includes people who are at increased risk of contracting and transmitting the virus (e.g., those experiencing homelessness, college students, tribal communities, communities of color, and incarcerated individuals).

Health departments will need to develop a detailed view of the various priority populations across their jurisdictions. At the same time, they will need to assess any additional burdens the priority populations may face in receiving the vaccine, such as language barriers or the lack of transportation.

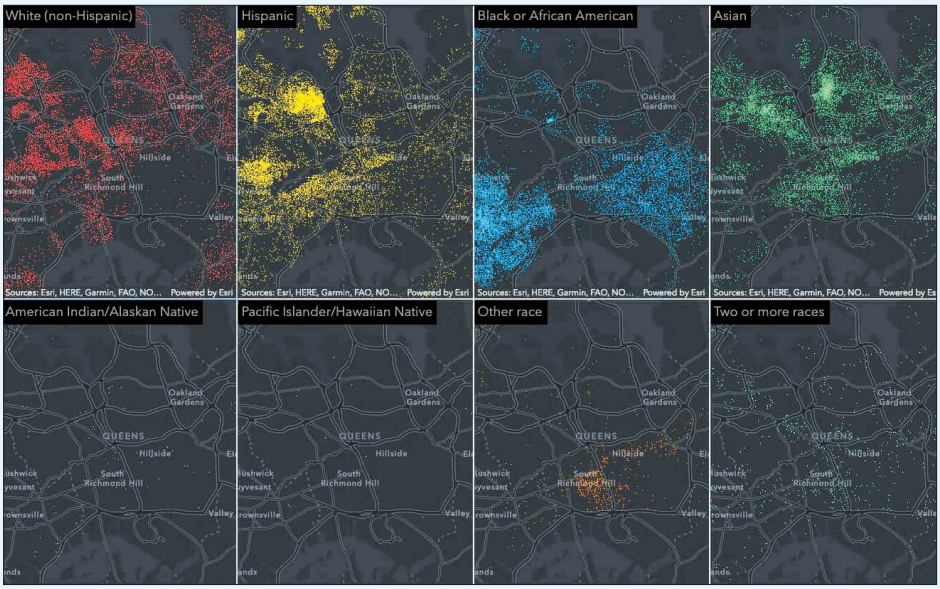
Beyond visualization, health departments will need actual population counts for the total population and each priority group. To be most effective, those counts should be available in context—in other words, how many of the population are within 1 mile, a 15-minute walk, or a 30-minute drive of a vaccination venue. It will be critical to match facility capacity, vaccine supply, and population groups across locations to ensure that all needs are met.

3 Identify Gaps in Access and Formulate Distribution Options

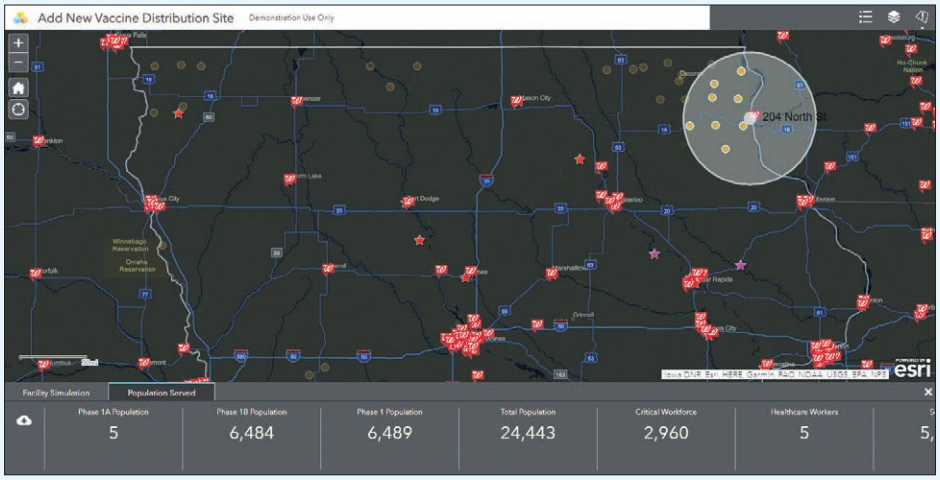
After communities have identified potential vaccine distribution facilities along with critical populations to prioritize, they will be able to see potential gaps and evaluate solution scenarios for mitigation.

It is possible and perhaps likely that in phase 2 of the vaccine distribution plan, the general population's desire to be vaccinated will overrun capacity in vaccination venues. Government leaders will have options to increase capacity by engaging new partners in the process and/or by siting Points of Dispensing (PODs) in strategic locations to meet demand. GIS technology has long been used for various types of site selection and is especially useful when considering complex criteria—accessibility, population makeup, ingress and egress, budget, and more.

There are special populations that should be targeted for more intentional outreach. These include those who—living in rural communities—have limited access to vaccination venues, people with disabilities, under- or uninsured people, people experiencing homelessness, and others who may be less likely to seek out vaccination when available. Mobile vaccination teams may be deployed to fill the gaps. Health organizations, like the Texas Children's Hospital system, use GIS to plan and optimize routes so that they can more efficiently serve a larger population.



↑ A dot density map provides a useful method for showing where various populations cluster. A similar approach to mapping priority groups for each phase of COVID-19 vaccination offers insight to leaders as they plan vaccine distribution across their communities.



↑ A configurable situational awareness viewer can provide insight when partnering to site new vaccination venues and determining who among the phased populations could be served by the new location.

4 Implement a Vaccine Management and Inventory System

Both of the current vaccine candidates require two doses for immunity against COVID-19. However, each vaccine candidate has its own time interval between doses, and the vaccines are not interchangeable. Therefore, it will be essential to understand who has received the first dose of a vaccine, which vaccine they received, and when they are due for the second dose.

For this, health-care providers and/or governments will need a quick and accurate data capture system that records individual vaccination information along with the bar code identifying the vaccine carton and/or vial. The data capture system will need to keep pace with the fast-moving vaccination process and support tracking of vaccine supply, expiration dates, and any potential adverse events. In addition to tracking vaccine supply, officials will need to keep tabs on inventory of personal protective equipment (PPE) for health-care personnel as well as vaccine kits (needles, syringes, alcohol prep pads).

The ArcGIS® Survey123 app from Esri offers an easy-to-use option for collecting this data, using a smartphone or tablet. Similar to an earlier COVID-19 effort to collect data on hospitalizations and PPE inventories, the app could track vaccines and read 2D bar codes.

All collected data can feed into a web-based dashboard, using ArcGIS Dashboards, to give decision-makers a real-time view of the constantly changing situation.

5 Provide Transparency and Accurate Communication

As vaccines are distributed, states and communities will need to know how well each facility is doing in executing the plan, monitoring whether their populations are experiencing adverse events, and tracking the proportion of the community that has been vaccinated.

Early transparency will both inspire trust and provide critical information about how and why vaccination resources are allocated in each community. ArcGIS Hub℠ was built

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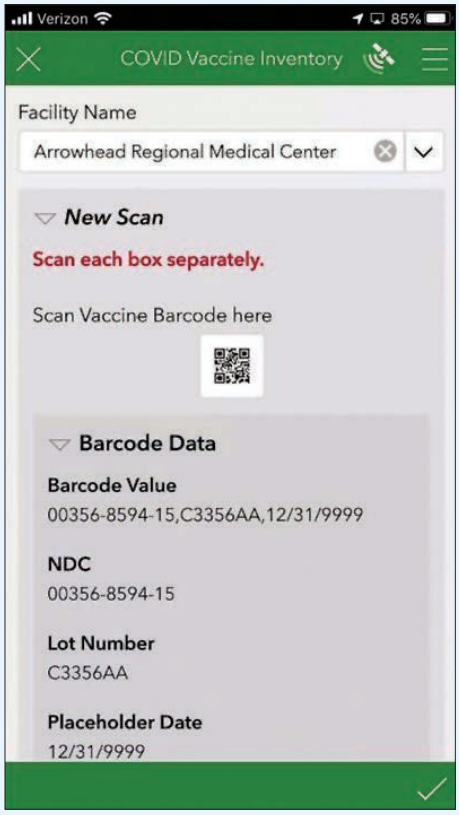
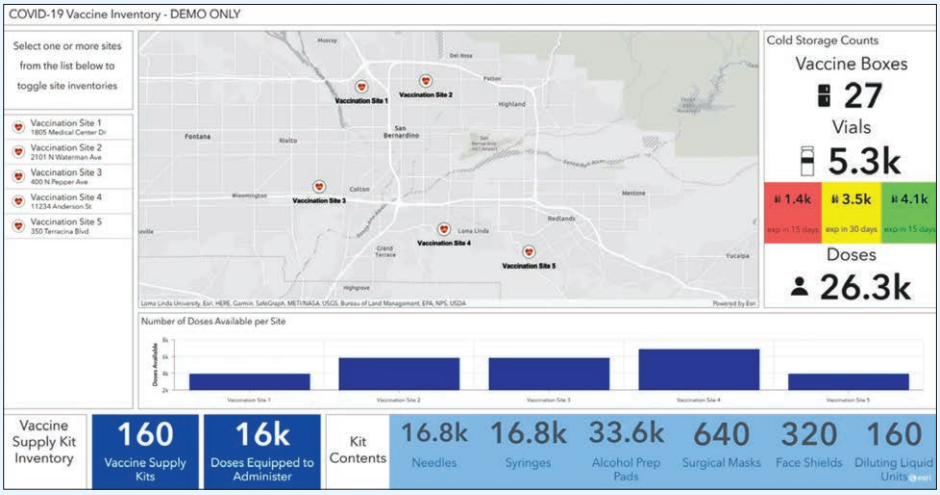


↑ A digital survey tool can be configured to capture relevant data at vaccine administration sites or in inventory reconciliation.



↑ The survey and other sources feed a shared dashboard to enhance situational awareness. A dashboard view gives stakeholders and the public an up-to-date and transparent window into the current status of the vaccination effort.

HUB BUILDS COLLABORATION FOR FOREST PLAN

Montana's unique approach to improving forest health and reducing wildfire risk statewide includes a web-based location platform in which the state brings together forest data and makes it accessible. Forest stakeholders use the platform to collaborate on completing the 2020 Montana Forest Action Plan.

Good stewardship and management of forests are essential to many Montanans. Recreationalists; the forest products industry; federal, state, tribal, and local-level land managers; private forest landowners; representatives of conservation organizations; collaborative and watershed groups; ranchers and farmers; wildlife watchers; and other partners all have vested interests in the health of the state's forests. While these stakeholders value the state's 23 million acres of forested land in different ways, they all have a common goal—keep Montana's forests healthy and resilient.

Under the authority of the 2008 and 2014 Farm Bill, Congress tasked states and territories to assess the condition of the forests within their boundaries, regardless of ownership, and develop strategies to promote forest health and resiliency through a state forest action plan. Montana's first plans were static hard-copy or digital documents that left little room for change or making iterative versions.

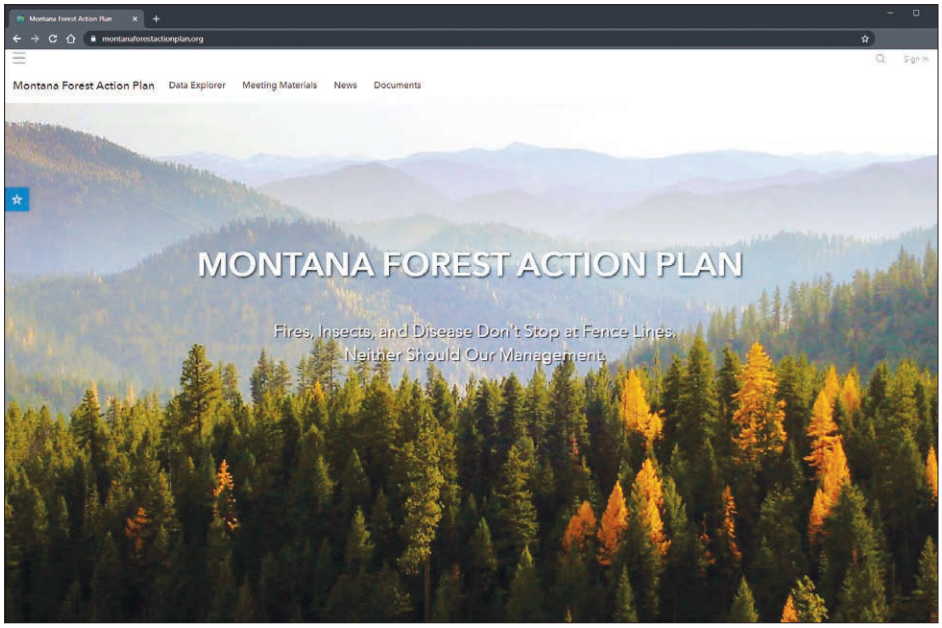
When it came time to revise the Montana Forest Action Plan in 2020, the Montana Department of Natural Resources and Conservation (DNRC) became the principal agency responsible for the revision of the state's forest action plan. DNRC wanted to use technology that would ensure the plan's continued relevancy.

Montana's web-enabled plan would be a living document—easy to access, explore, and update. By using ArcGIS Hub applications, the 2020 revision incorporated the most up-to-date data and science as it became available, thereby providing accurate and timely information as Montana changes over the next decade.

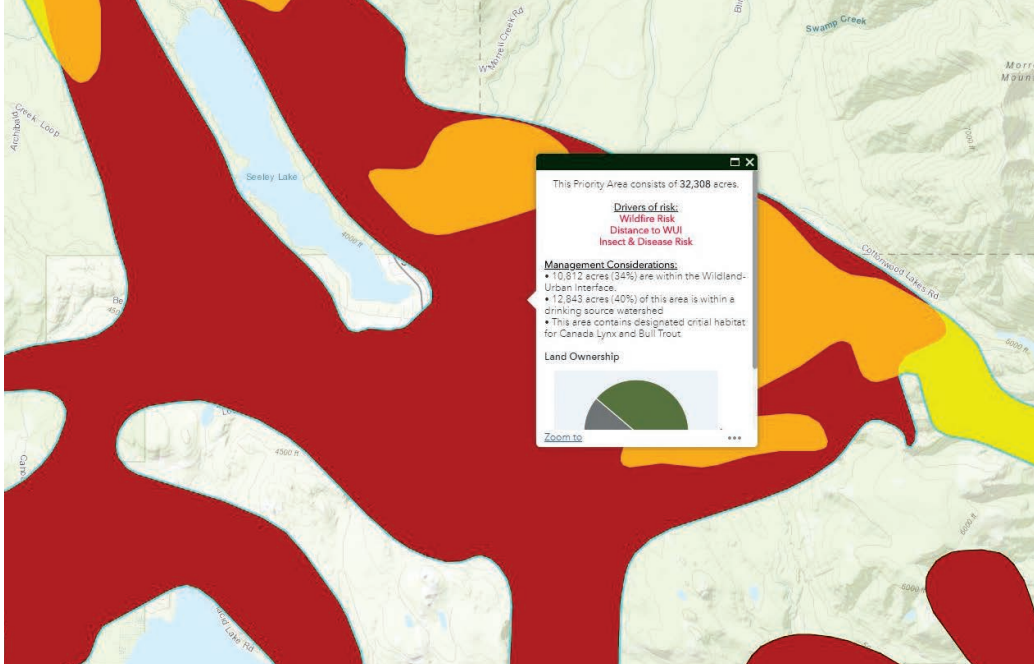
More importantly, the hub will show, at landscape scales, how the Montana Forest Action Plan has changed forest health and wildfire risk and communicate that information in ways that are accessible and easily understood.

DNRC's geographic information system (GIS) team members had experience developing web mapping applications, which bolstered revision efforts. They had previously created the Montana Interactive Wildland Fire Information Tool for sharing wildfire information with fire managers, decision-makers, and the public. This web application proved its worth, particularly during the intense 2017 fire season, when thousands of individuals used it daily to see up-to-date information about fire conditions.

DNRC GIS manager Brian Collins thought a similar solution would work for the 2020 Montana Forest Action Plan. This time, he wanted to use the GIS platform to



↑ Montana Department of Natural Resources and Conservation revised the Montana Forest Action Plan, using ArcGIS Hub to ensure that the web-enabled plan is easy to access, explore, and update.



→ This is an example of one of the ArcGIS Dashboards apps showcased in the web-enabled plan. The dashboard identifies priority areas with dynamic pop-up content, such as risks and management considerations.

build an information center for participants to share their data, ideas, and goals.

Collins knew that buy-in from top department executives, who make decisions and build policies, would be critical to the project's success. He set up a meeting with Montana's State Forester Sonya Germann, who is the administrator of the DNRC Forestry Division. Collins pitched the idea of implementing a GIS platform to serve as a focal point, which would encourage collaboration and engagement with the Montana Forest Action Plan.

"The 2020 Montana Forest Action Plan was an opportunity to use geospatial technologies that improve planning, reporting, and understanding," Collins said.

Collins described GIS capabilities to Germann by demonstrating the functionality of ArcGIS Dashboards and ArcGIS StoryMaps℠ from Esri. He then introduced the concept of a cloud-based engagement platform with a hub for sharing information between departments and engaging the public. It could be the venue for planning and collaboration.

ArcGIS Hub manages content and data and can display them as maps, dashboards, StoryMaps stories, documents, and website pages. Organizations use hubs to gather data for their projects and contribute their own data for others to use.

During the Montana Forest Action Plan revision process, staff and relevant partners used the hub to collaborate and share information and ideas. The public and important forest stakeholders also used the hub to engage in conversation and submit feedback.

"I explained how ArcGIS Hub consumes different types of data and then represents that information through different means, so it connects with people in ways that make sense to them," said Collins. "When it comes to communicating data, we need to make it as accessible as possible, and ArcGIS Hub allows us to do that."

State Forester Germann saw value in the technology and immediately got behind the project. The GIS platform and hub would support the Montana Forest Action Advisory Council. The council is a group assembled by Montana's governor to help develop the Forest Action Plan and implement strategies to help improve and sustain forests throughout the state. Germann also made certain that the GIS manager played a key role on the project's core team.

The DNRC GIS team implemented the ArcGIS Hub platform and used the department's existing open data to make and share maps. Data resources grew because agency partners and council members began to share authoritative open data via the hub.

Lead geospatial analyst for the Forest Action Plan team, Nick Youngstrom, said "Hub has enabled us to reduce the friction between data and the people that need to be informed by it. We've removed some of the technical knowledge and staff power needed to leverage and access geospatial information on Montana's forests."

All the council's data, as well as interactive maps and additional information, is available on the Montana Forest Action Plan website (montanaforestactionplan.org). Visitors can explore data layers used in the plan, such as wildfire hazard potential and an interactive analysis of Montana's urban forests. Participants can also dig deeper into the plan's data, using the Hub dashboard to visualize and understand information and track progress toward the accomplishment of goals and objectives set by the council. The GIS team created mapping applications to help the public better understand where projects are located and the specific goals or purposes of those projects.

Additionally, the website hosts a StoryMaps story that presents the plan's initiatives. For instance, to help illustrate the Shared Stewardship initiative, the "Finding Common Ground" story explains the concept of cross-boundary forest restoration management. Although the topic sounds daunting, the story format makes the concept understandable and engaging.

"Hub technology made this planning process, by far, the most successful effort we've had for collaborating on data collection efforts with a multitude of partners," Collins said.

The Montana Forest Action Plan was due on the governor's desk in fall 2020; but this time, the plan is a living document that can evolve with the times. Its platform serves as a nexus of information, analysis, and engagement and ensures that all Montanans have the information and resources they need to keep Montana's forests healthy and resilient.

For more information on how GIS can help natural resources agencies, visit **go.esri.com/GIS4ENR**.

San Rafael Supports Businesses Owned by People of Color with GIS

The restaurant industry is suffering significant losses due to the coronavirus disease 2019 (COVID-19) pandemic, with more than 8 million employees out of work and $120 billion in sales shortfalls, according to the National Restaurant Association. Businesses owned by people of color have experienced disproportionate impacts.

In response, the Northern California city of San Rafael created an interactive online map of open restaurants with an added map layer highlighting eateries owned by Black, Indigenous and People of Color (BIPOC).

"We were making this map at the same time as our community was having a lot of conversations and protests and dialogue about what we can do to better support businesses owned by people of color in our community," said Rebecca Woodbury, director, Digital Service and Open Government department, City of San Rafael.

Since the launch of the Open Restaurants Map in June, more than 140 small and BIPOC-owned businesses across Marin County have been added—as far south as Sausalito and as far north as Novato. In the first two months of going live, the map accumulated over 8,200 views.

"During the COVID-19 pandemic, helping small businesses stay connected to their community has never been more important," said Danielle O'Leary, director, Economic Development and Innovation, City of San Rafael. "Offering this map to businesses who are struggling has been one of several other support efforts that have helped show our businesses that we care and we're here to help."

Mapping for Small Business, Racial Equity

A team from the City of San Rafael's Digital Service and Open Government department made the mapping application in collaboration with the city's chamber of commerce and the County of Marin's economic development department.

"Restaurants are the flavor of our city … I think when you live in Marin County and you think of San Rafael, you actually think of all those restaurants," Woodbury said. "When we think about the livelihood of our downtown, it's the restaurants. And so, it was this really important part of our economy that was really, really scared and hurting. We wanted to raise awareness."

Built with geographic information system (GIS) technology, the new public-facing web map gives local businesses a way to connect with residents, letting them know about open status, outdoor seating, takeout, and delivery options.

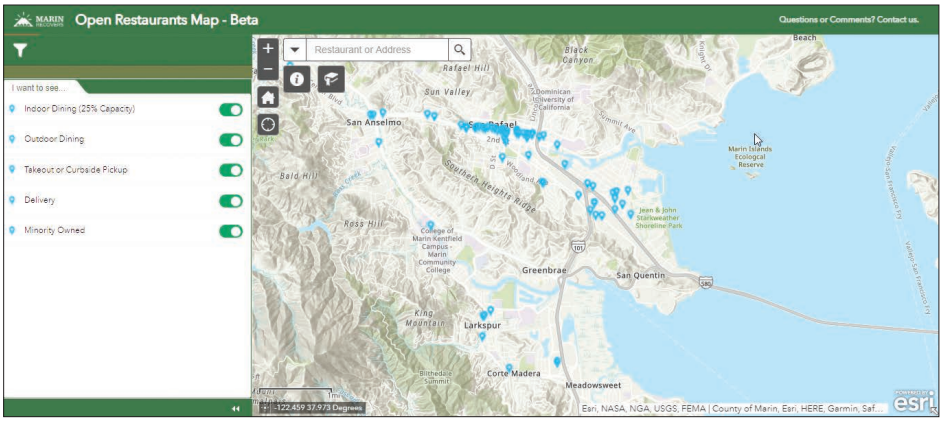
The City of San Rafael's commitment to supporting racial justice influenced the inclusion of the BIPOC-owned component of the Open Restaurants Map providing an easy way for residents to locate and support self-identified, restaurants owned by people of color. Woodbury says the map is one way the city is trying to lift up local businesses and help people who want to give support.

Crowdsourcing Data for the Map

With a tight deployment timeline for the Open Restaurants Map, the city's digital team employed a crowdsourcing strategy to collect the data it needed.

"This was a good-sized project for us, and we felt like it would add value [to the small business community]. And I think in this really, really difficult time, we were just looking at how we can help," said Woodbury.

Zachary Baron, open data officer at the city's Digital Service department, took on the task of creating the Open Restaurants Map, inspired by several similar applications, including the City of Seattle's Support Puget Sound Small Businesses map.



↑ This map shows open restaurants as the City of San Rafael and Marin County's economy reopens during the COVID-19 pandemic.

He built the first iteration using the ArcGIS Web AppBuilder tool. To populate the map, Baron adopted existing static listings of open businesses from the city's Economic Development department and chamber of commerce website.

The city also launched a public information campaign to grow awareness of the new map and encourage local restaurant owners to add their business information. Using the ArcGIS Survey123 app, business owners can add their restaurant to the map, update their listing, and designate whether they are minority owned.

Countywide Expansion

After its launch, the restaurant map garnered positive feedback from the chamber of commerce, the downtown business improvement district, and the county's economic development department.

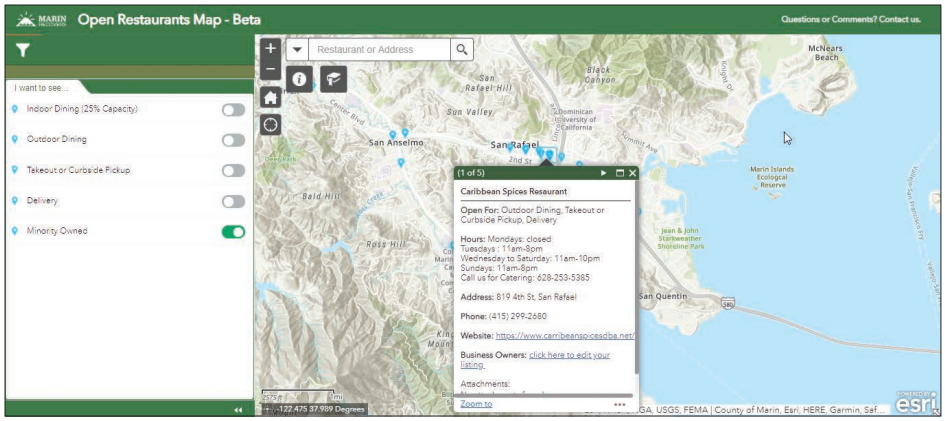
With that sign-off, Baron expanded the radius of the map to include open restaurants throughout Marin County. The map was then incorporated into the Marin Recovers COVID-19 initiative and website dedicated to the county's phased reopening plan.

"We wanted that home [for the map]. We had it on our city website, but we really wanted it to be on [the official Marin County COVID-19 website] and to have that countywide branding, so all of the other cities and towns felt like it was theirs, too," said Baron.

Creating a tool to support local restaurants that could be used by residents in other cities throughout the county was an exciting achievement for San Rafael's digital team.

"I think that Marin is this really interesting place … and I want to see more sharing. And so, I just think, what more can we do that benefits others?" Woodbury said. "I think there's so much more … there's a really interesting shared service space for technology and digital work."

For more information on how to address racial inequities by using location intelligence in your community, visit **go.esri.com/GIS4LocalIneq**.



↑ This map shows an interactive pop-up of a local restaurant's business information for the public to access.

How GIS Can Help Leaders Achieve Equitable, Speedy Vaccine Distribution continued from page 13

specifically as a community engagement platform, offering access to data, maps, and apps related to a designated initiative. For example, the Lake County, Illinois, data hub provides an excellent account of crucial COVID-19 information for that region.

Another feature that jurisdictions should strongly consider adding to their ArcGIS Hub site is a vaccination locator service, allowing people to find key information about nearby venues.

Beyond communication to the general public, government leaders will also need to consider targeted outreach to special populations—those with vaccine hesitancy or nontraditional preferences for receiving information. Esri® Tapestry™ Segmentation data, which goes beyond demographics to offer unique insights into US neighborhoods, can help officials learn more about the needs and communication preferences of their population. By adding Tapestry data to maps, charts, and reports, officials can learn how to deliver relevant and effective messages to their communities.

Looking Ahead, Planning Now

Governments and responding organizations around the world must consider the aforementioned factors as they develop plans for distributing the vaccine. Communication has to be handled with clarity and great transparency to drive an effective vaccination campaign and strengthen public confidence in the vaccine distribution process.

In a recent memorandum, the National Governors Association encouraged state leaders to take action. "The challenge of vaccine development is matched by the challenge of vaccine distribution. . . . Although a vaccine is not yet available, lessons learned from the acquisition and distribution of COVID-19 diagnostics and therapeutics suggest that governors may want to begin addressing the challenges of mass distribution before its arrival."

This sentiment is shared and felt around the world, in both government and health care. By relying on a GIS technology platform, leaders will be able to prepare for, implement, and manage COVID-19 vaccine distribution to avoid many of the struggles with capacity and communication encountered at the outset of the pandemic.

Try out three new COVID-19 vaccine distribution tools to evaluate population phases, select existing distribution sites, and select new sites.

THE CITY OF CIBOLO USES ESRI TECHNOLOGY TO INCREASE TRANSPARENCY

By Alyssia Church, GIS/Addressing Coordinator, City of Cibolo, TX

The city of Cibolo is located just outside the northeast corner of San Antonio, Texas. It is a small city with about 30,000 residents, sandwiched between the major routes of I-35 and I-10. Due to Cibolo's desirable geographic location and large swaths of undeveloped land, the last 10–15 years have seen explosive growth in this once-rural Texas town. Expansion continues to march along rapidly, with multiple subdivisions being built each year and businesses quickly filling in the gaps along major thoroughfares. Along with this growth comes an increase in questions and concerns, which are brought to the attention of the city's staff through phone calls, emails, or residents' presentations at city council meetings. Residents may express curiosity about new businesses, concern about road construction projects or stormwater drainage, or just a desire to view site plans or structure renderings.

With so many construction projects going on at once, the city's staff was often overwhelmed by these questions and concerns. It also wasn't easy for the city council and staff to keep track of what was going on and where the projects were located. To mitigate this issue, the city's assistant director of planning and engineering called in her department's geographic information system (GIS) coordinator and requested that a web app be created to keep everyone more informed. Employees from the public works, planning and engineering, and public relations departments as well as the Economic Development Corporation (EDC) were quickly mobilized to assist in gathering information on all the current development projects. In March 2019, the city launched its Current Development Projects web app, using the classic Esri Story Maps Tour template.

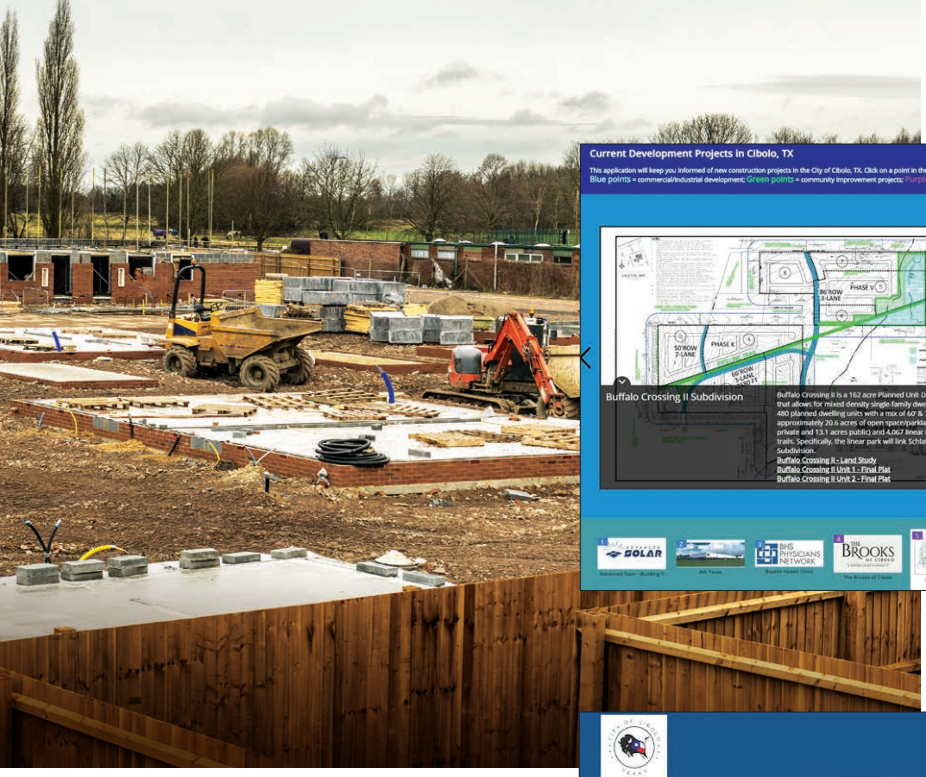
To make it easier for users to get an overview of the types of projects in their community, each project was assigned to one of four categories, which were color-coded on the map as follows:

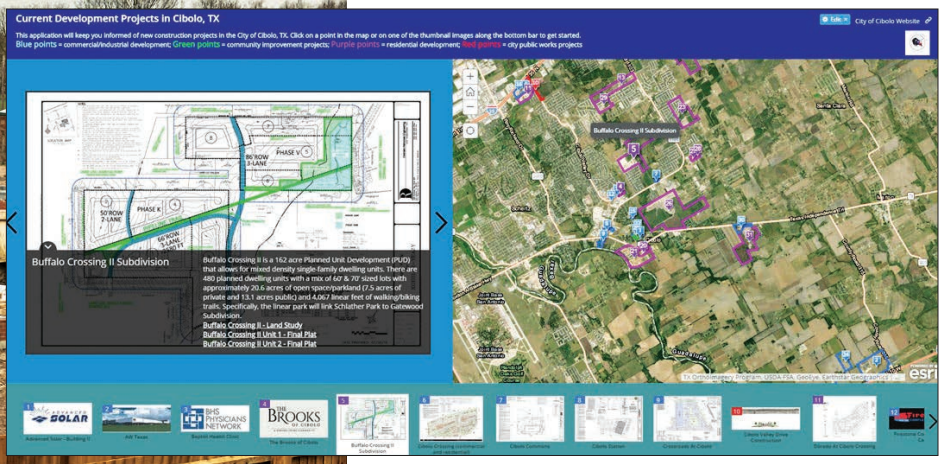
- Blue—commercial/industrial development
- Green—community improvement projects
- Purple—residential development
- Red—city public works projects

A polygon layer was added to the Map Tour template's associated web map so that boundaries of larger or more complicated projects could be shown around numbered project points. Users could either search for a specific address to see what projects were nearby, or click on the numbered points on the map to access an informational side panel and learn more about those projects. For each numbered point shown on the map, there was a short description of the associated project, followed by hyperlinks to PDF documents—hosted on the city's website—of site plans, final plats, or renderings. These were inserted into the Storymap using simple HTML code.

The Current Development Projects application was a hit with residents, businesses, the city council, and staff. Christine Pollok, the city's public relations manager, states that the web app "allows residents to view what construction projects are happening around our city and increases our ability to visually communicate with our residents. [It] has answered many questions from our residents, and the amount of information that is linked within the application is a one-stop shop for those interested in the project and our community."

Pollok publicized the web app on the city's home page and Facebook page, which instantly drew in the active members of the community. The app later included links to businesses that wanted to show off their new building or location before their doors even opened. The application has resulted in fewer phone calls and emails about development projects, and it has made it much easier for the city council and staff to access information about





↑ With the Current Development Projects web app, users could click points on the map and get additional information on a side panel, including links to development documents.

↑ Cibolo's Current Development Projects web app was redesigned with Esri's ArcGIS Experience Builder. Above is a close-up of the app's information panel for a residential development.

current projects and answer residents' questions in a timely manner.

The data in the application is updated on a continual basis by the GIS coordinator, who gets automated alerts from the permits office about new commercial and residential projects and is contacted by parks and public works departments whenever they have a new project starting. Due to the sometimes lengthy process of plan reviews and revisions, construction projects are not posted until the developer or contractor is about to break ground, and new businesses are only posted after they obtain their first permit. Public works projects are posted after a preconstruction meeting is held and work is about to begin.

After the Current Development Projects app had been live for a little over a year, the GIS coordinator saw the need for a customizable app that would not require complex coding but would allow for longer descriptions and have a cleaner appearance and a more streamlined, flexible updating workflow. This is when she discovered Esri's brand-new ArcGIS Experience Builder—which turns data and content into mobile-adaptive applications—and redesigned the Current Development Projects app. With the new design, launched in June 2020, the app is now easier to access on tablets and mobile devices because the creator can customize it for different screen sizes. The app is also able to consume a greater amount of information for each project and display it in a more organized format to improve readability. Users can now choose to view projects either summarized on a list or individually with details such as project type, description, and links to plans. The color coding from the web app's previous version was retained since it had proved useful for visualizing the balance of project types.

The redesigned Current Development Projects app will be the main focus at the city's next town hall meeting. The app will be used to answer residents' questions and prompt discussion on various topics related to the city's growth. The ability to see the location of one project in relation to other projects or areas of concern greatly increases the user's understanding of the issues at hand. This prevents misunderstandings that can occur from a lack of organized, visual information. "A picture says a thousand words; however, this interactive map allows for dialogue," said Lisa Gonzalez, assistant director of planning and engineering. With the assistance of Esri's configurable web applications, the City of Cibolo has been able to easily provide better information and greater transparency for the people it serves without staff having to become expert coders.

For more information on how your community can leverage location intelligence for planning and community development, visit **go.esri.com/ComDevGIS**.

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