

Delivering Smart Communities Through a Geospatial Strategy

INDUSTRY PERSPECTIVE



Introduction

At the core of government's mission is a civic responsibility to improve the lives of citizens. Government employees heed this call every day by responding to disasters, improving access to social services, managing programs that improve quality of life and much more.

There is a sense of urgency driving them to innovate with transformational technologies and processes and embrace the tools they have to develop smart communities. These employees are defining what it means to build smart communities – and they're using geospatial data to do it.

To better serve the public, smart communities embrace geospatial infrastructure and all the insights that come with it to make data-driven decisions. Geospatial infrastructure takes geographic information systems, or GIS, to the next level. It's a combination of content, mapping, analytics and integration that enable government employees to solve problems holistically.

Simply stated, geospatial infrastructure is GIS at scale. It leverages all the fundamental principles of GIS. It also connects multiple systems, serves as a platform for sharing information and brings together data from distributed systems to support a host of applications.

In this industry perspective, GovLoop partnered with Esri, a leader in GIS, to explore the four defining technology tenants of a smart community and the role of GIS in each of those areas. The report also features insights from Esri leaders and smart community pioneers from state and local government, including Cobb County, Georgia, Pasadena, California, and others that are tapping into the power of GIS to transform citizens' lives.

Understanding the Advent of Smart Communities

Depending on who you ask, you'll likely hear myriad responses on what makes a community smart. For this report, we will draw from government pioneers and their implementations of smart to demonstrate what success looks like. Smart communities are those that make the lives of their citizens better through technology. They understand that "smart" is a journey, not a tool or a destination.

These communities aren't waiting for someone to deem them "smart," they are simply using their investment in GIS and complementary technology like IoT, AI and more to make better decisions that lead to better outcomes. Those outcomes can then be shared and replicated in other communities that are tackling similar issues, such as addressing homelessness or improving infrastructure.

One of the biggest developments in the smart communities movement is shifting from the idea of a single application for making a community "smart" to a

series of interrelated technologies that can holistically address multiple issues. IT-savvy executives and their staff have embraced this truth, and are tapping into the power of GIS to change lives.

But what exactly are these connected technologies and capabilities that make up smart communities and the information systems needed to carry out critical work?

In the next section, we explain the four technology tenets of a smart community information system and share government success stories and best practices on how you can replicate these capabilities in your city, county, region or state.

"Geospatial Infrastructure is GIS at scale. It's a combination of content, mapping, analytics and integration that enable us to solve problems holistically."

- Jack Dangermond

What Makes a Strong Smart Community Strategy?

Before you begin investing in new applications and rethinking business processes, you must first have a strategy in place. The driving force behind selecting the right information system is a deep understanding of what matters most to your community.

What is your goal? Do you want your community to be safer, well-run or more resilient? Your strategy should address your overarching goal and purpose and will help you determine what technologies are needed to connect different systems of records, systems of insights and systems of engagement.

That's the approach government employees used in Cobb County, Georgia. As in many counties that include a large metropolitan area, Cobb County

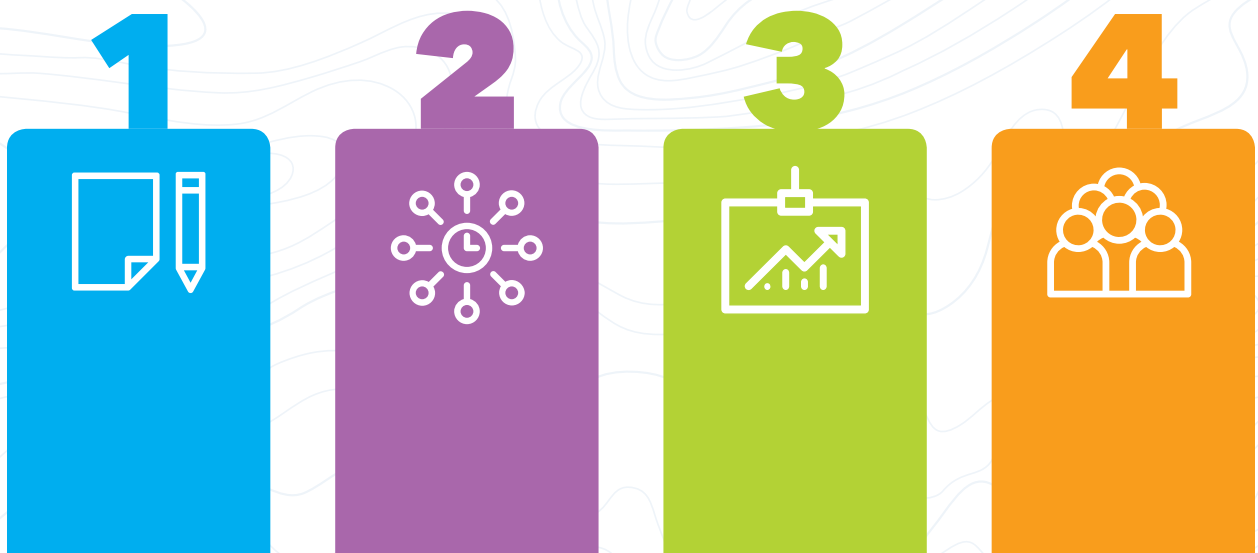
residents contend with a lot of traffic. Knowing this was a pain point for their constituents, county officials invested in an adaptive traffic system that can detect vehicle and pedestrian traffic at each juncture and intersection and change the light accordingly.

Central to the county's smart strategy is engagement. "Our citizens in Cobb County want to be involved," said Sharon Stanley, Director of the county's Information Services Department. "We try to inform them. We're transparent. We want them involved in the decisions we make."

You can read more about Cobb County on [Page 9](#) of this report.

4 Technology Tenets of a Smart Community Information System

To help you prioritize your efforts, we've highlighted four repeatable technology tenets that have emerged and are being embraced to improve government.



Planning and Engineering

What is it?

We are faced with new opportunities to shape our communities. Today, planning and engineering disciplines must balance the needs of people, infrastructure and the environment. A GIS-based smart community information system that incorporates planning and engineering capabilities enables governments to model the impacts of proposed development, adjust to shifting demographics and lifestyles, and account for changes in climate and economic shifts.

Success Story: Honolulu, HI

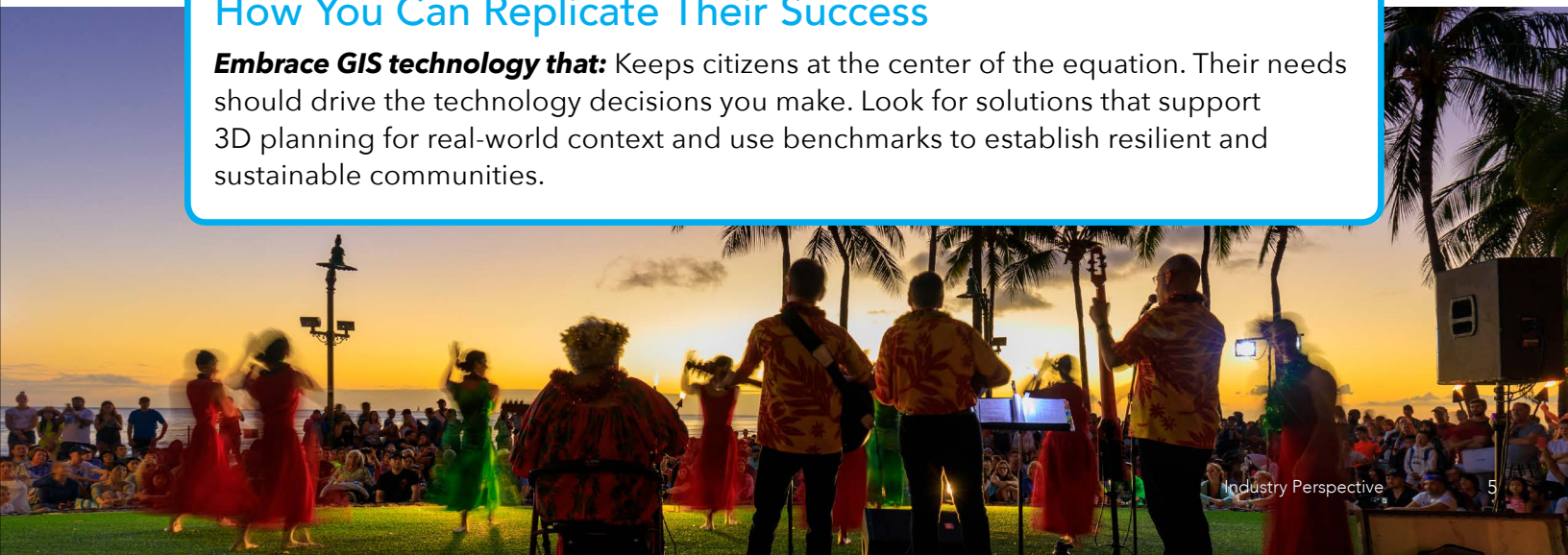
Preserving Honolulu's rich culture while developing its arrangement of island communities is a delicate balance. As the city and county of Honolulu continues to grow, community leaders have relied on the power of GIS to maintain cultural, environmental and coastal standards. Since the 1980s, there has been a growing focus on developing a system to help examine the land development patterns and impacts of what's happening in the community. The goal is to promote and conduct better planning and decision-making about proposed developments and site-specific construction occurring throughout the city and county of Honolulu, said GIS Administrator Ken Schmidt.

Honolulu is using ArcGIS Urban to determine the impacts of a proposal that would change the zoning height restrictions for apartment complexes without elevators – from three stories to five stories. In this instance, engineers and planners can view web-based, shareable 3D models to determine the number of housing units that might be created under the proposed regulation change. These efforts are part of a larger push to support healthy community development and address housing affordability issues using data.

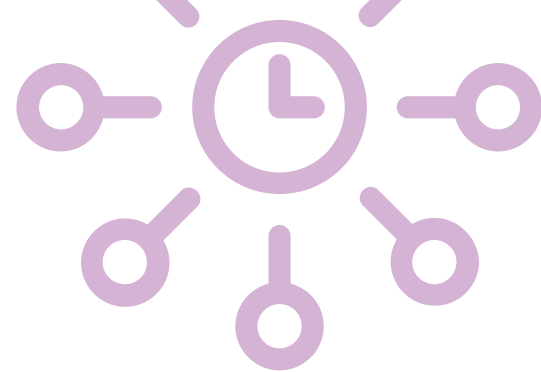
"This can be used to empower the communities to be more engaged in some of these planning practices, so that they're just not reacting to plans that are being proposed, and providing comments," Schmidt said. "They could actually get involved and ... make their own scenario."

How You Can Replicate Their Success

Embrace GIS technology that: Keeps citizens at the center of the equation. Their needs should drive the technology decisions you make. Look for solutions that support 3D planning for real-world context and use benchmarks to establish resilient and sustainable communities.



Operational Efficiency



What is it?

Balancing your resources and applying them to the best locations that benefit the most people helps improve citizen satisfaction. Operational efficiency is a critical pillar of a smart community information system because it enables governments to collect information in real time and feed it back into performance dashboards for real impact. More efficient workflows come from being able to collect information at the source, dispatching staff to where they are most needed, and maximizing materials and resources to improve response times, while reducing costs.

Success Story: Pasadena, CA

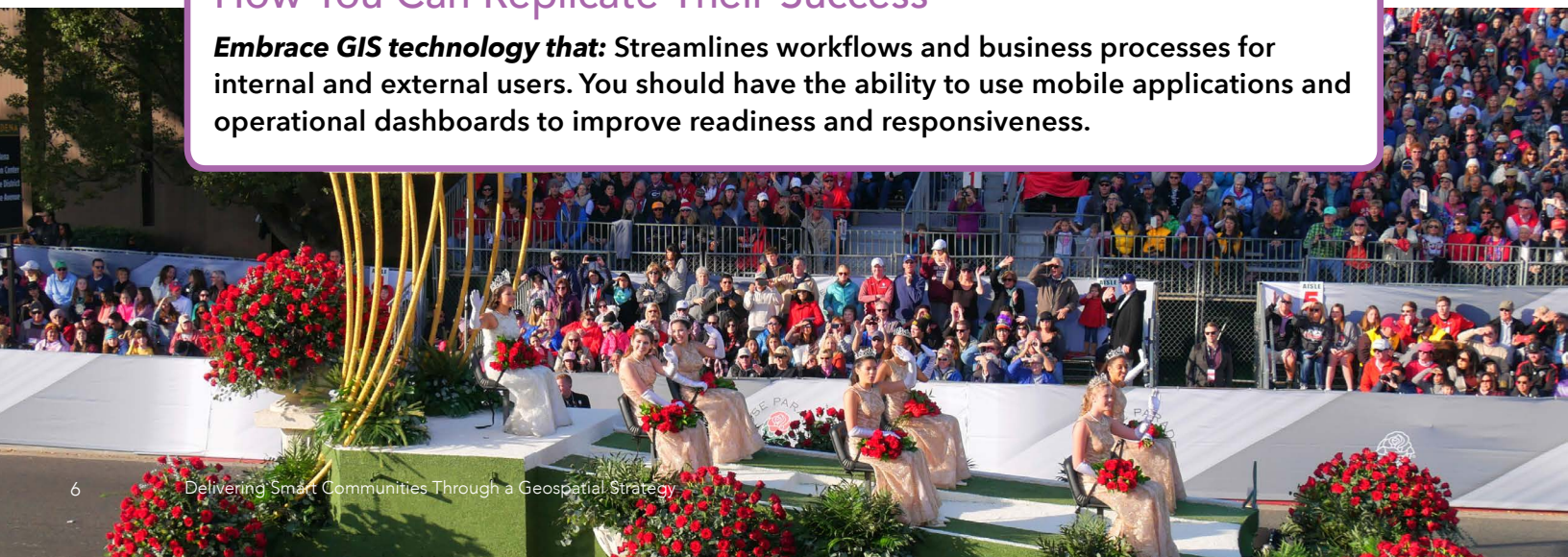
Planning for the Rose Parade is a year-round activity for the city of Pasadena, California. The GIS staff, and fire and transportation departments work especially close to properly and efficiently prepare the city to support and protect millions of visitors who attend the parade. Everything from traffic to parking to street closures and the location of emergency vehicles must be coordinated and communicated across public safety organizations. Thanks to ArcGIS Online, officials were able to process and analyze this data in a visual way. They had operational visibility across easy-to-use dashboards in the city's Emergency Operations Center during the event, as well as via tablets and mobile devices for personnel in the field, said Pasadena CIO Phillip Leclair.

The city also piloted Tracker for ArcGIS to quickly locate personnel, fire trucks and other equipment during the parade and use that data to drive response efforts.

"Everything I talked about was on paper," Leclair said. Before, not everyone had access to the data because information was tracked in binders full of plans and staging documents. Now that data is created digitally, and can be quickly accessed, analyzed and shared by multiple people – all with the goal of improving operational efficiencies and keeping the public safe.

How You Can Replicate Their Success

Embrace GIS technology that: Streamlines workflows and business processes for internal and external users. You should have the ability to use mobile applications and operational dashboards to improve readiness and responsiveness.



Data-Driven Performance



What is it?

High-performing organizations are using location as the standard analytical approach to achieve new insights. Increasingly, smart devices, the Internet of Things and cloud computing are feeding data about the locations of people, nature, vehicles and infrastructure. By geo-enabling data and enterprise systems, governments can enhance business intelligence, establish more efficient workflows, improve communication and tackle an issue in its entirety as opposed to its individual parts.

Success Story: Tempe, AZ

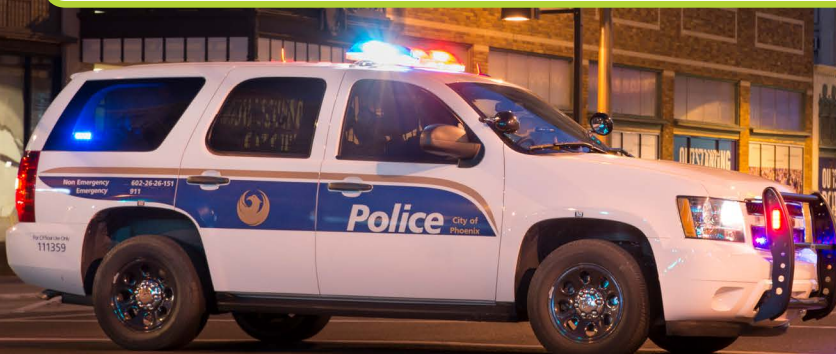
More than two people die every day from opioid overdoses in Arizona, according to the Arizona Department of Health Services. In addition to a statewide response, cities and communities such as Tempe, Arizona, are tapping into the power of GIS, storymapping and analytics to save lives and promote educational awareness campaigns.

Using an EMS response dashboard powered by GIS data, the city's fire department can pinpoint areas experiencing high overdoses calls and in need of educational outreach, said Stephanie Deitrick, Tempe's Enterprise GIS Manager. The city also teamed with researchers at Arizona State University to test and monitor Tempe's wastewater and detect the presence of opioids and other substances, which helps develop a more accurate picture of the epidemic.

"Before [GIS], there were a lot of assumptions that were made about our strategic priorities and how well we were doing," said Tempe Chief Information Officer Mark Wittenburg. "We were measuring things like our community surveys, but the information wasn't in such a way that our decision-makers, the City Council, the department heads could visualize that and then start to come up with conclusions."

How You Can Replicate Their Success

Embrace GIS technology that: Analyzes data quickly and empowers agencies to move from static to real-time decision-making. To identify trends and outliers, invest in technology that integrates artificial intelligence and machine learning that helps you see what others can't.



Civic Inclusion



What is it?

What occurs in a community is geographically personal; everyone who lives in a place cares about that place. Prioritizing civic engagement as a facet of your smart community information system provides an opportunity to evolve how governments think about civic inclusion. It can help raise questions, such as where people are speaking up and where are they not, what neighborhoods are at risk of falling behind and how a connected citizen can act as a sensor to help governments keep on the right course.

Success Story: California

California is steadily perfecting its groundbreaking health screening tool, which uses GIS to help identify communities that are most vulnerable to and affected by pollution. The Office of Environmental Health Hazard Assessment (OEHHA), along with the California Environmental Protection Agency (CalEPA), developed the California Communities Environmental Health Screening Tool (CalEnviroScreen) to analyze environmental, health and socioeconomic information across every census tract in the state. The tool ranks each of the state's 8,000 census tracts using data on 20 indicators of pollution, environmental quality and socioeconomic and public health conditions.

With each version of the tool that's released, there is a robust public process, including workshops in various communities, to show and discuss GIS maps and determine if the data is representative of conditions that residents are facing, said Walker Wieland, a Research Scientist with the state of California who helped develop the tool. "We are committed to continually updating and refining the tool, and it's not cast in stone."

The mapping tool has been successfully used to administer environmental justice grants, promote greater compliance with environmental laws, prioritize site-cleanup activities and identify opportunities for sustainable economic development in heavily impacted neighborhoods.

How You Can Replicate Their Success

Embrace GIS technology that: Transforms the way you engage and collaborate with the community. The capabilities you select should enable you to express the value of what's being done - through data - to support all citizens.





How GIS Transformed Cobb County Into a Smart Community

For the past three years, **Cobb County, Georgia**, has been strategically moving down the path of digital transformation with GIS. The county's goal was to use technology to improve the way it conducts business and serves citizens.

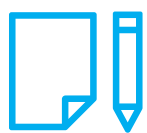
"I remember two or three years ago when smart came out, [and] the word was IoT, Internet of Things," said Sharon Stanley, Director of the county's Information Services Department. "So I thought, 'How is that [smart] going to apply to me?'"

Stanley believes that smart devices are a part of the solution, but it's much more. "For us, being a smart community is [about] using technology to actually improve the lives of our citizens – where they work, live and play. Anywhere where we can make it more convenient for our citizens to do things."

GIS was already in use in Cobb County's government because officials found that location intelligence allowed them to provide more proactive services to their constituents.

"Never have we had access to the kind and amounts of data we have now," Stanley said. "It's not just about data. It's what you and I can do with that data that counts."

Here are examples of transformational efforts that Cobb County rolled out and how they align with each of the smart community technology tenets:



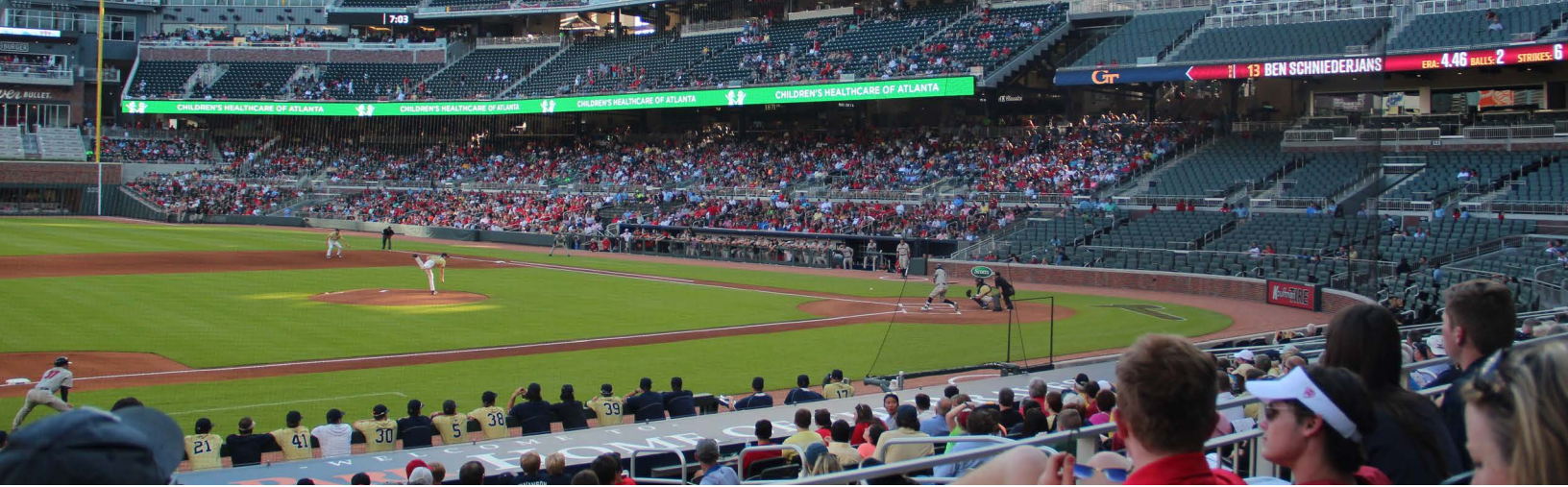
Planning and Engineering

Last year, officials used 3D scenario planning to plan for new development and zoning near the Atlanta Braves' relocated stadium. It's one of the fastest-growing economic development areas in the county. The team was able to create a model of an avenue bordering a popular mall with existing trees, and also model how the same area would look without trees. Ultimately, the 3D model provided real-world context for various development options. They were able to take into account traffic, the surrounding environment, road networks and more by building a representation of what the development would look like and how it would impact the area. Now the community development team is in the process of developing a 3D model of the entire county.



Operational Efficiency

The evolution of Cobb's operational capabilities were on full display during Super Bowl LIII. Using a new GIS-based mobile tool called Tracker for ArcGIS, the county was able to capture and monitor locations of its police officers, some of whom were assigned to assist the Atlanta Police Department. Cobb County's Chief of Police and the city of Atlanta were especially interested in knowing where public safety personnel were located at any given time so that they knew who to dispatch in response to an incident, based on their proximity to it.



Data-Driven Performance

When the Atlanta Braves relocated their stadium in 2017, it marked the most aggressive public-private partnership in county history. "We would not have been able to do this without the efficiencies and the intelligence provided via our GIS platform," Stanley said. The county combined the powers of artificial intelligence with GIS to carry out a comprehensive traffic management plan to reduce gridlock during game days. The goal: Ensure all fans are parked before the first pitch, and return traffic flow to normal within 45 minutes after the game. Taking their lessons learned, they are extending this to the entire county.



Civic Inclusion

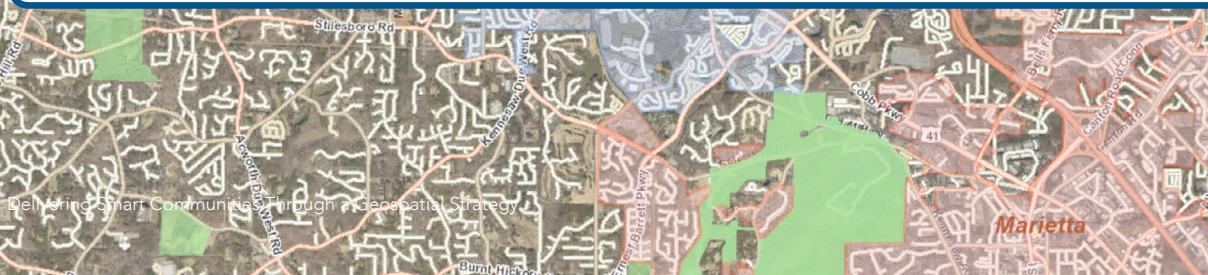
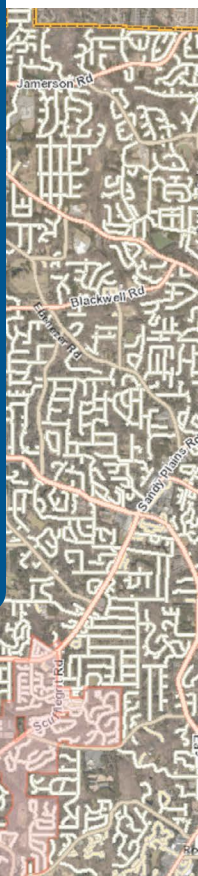
Public health specialists in Cobb County are among the most avid users of GIS. They use it to analyze data about the county's senior centers, as well as other departments and public service agencies. Using GIS, they were able to quickly and easily communicate the work they do and show how their analyses help them to understand what events resonate with the senior community, how they can boost participation and target underserved populations.

What's Next

Cobb County's Department of Transportation (DoT) is one of the most advanced users of GIS among county agencies. The team is putting the infrastructure in place to support self-driving vehicles that might be more ubiquitous on the road 10 or 20 years from now. They are using artificial intelligence (AI), GIS and other complementary technologies to make roads better.

Stanley explained that employees outside the IT team are rapidly adopting GIS technologies to better serve the public. "These tools have become so much easier to use. But we have to be very targeted about what we select to solve business problems," she said. "We don't do cool things for the sake of it. We have to make sure that it's needed."

By embracing GIS technology that incorporates civic inclusion, data-driven performance, operational efficiency, and planning and engineering, Cobb County is proactively adapting to meet the community's current and future needs.



Conclusion

GIS is about more than making maps. It's about using technology to make impactful changes that improve how citizens live and interact with government.

Smart communities like those highlighted are practical examples of how GIS can help improve traffic patterns, ensure all populations are considered and adequately serve and equip decision-makers with new insights for development.

The possibilities are endless when employees are empowered with the right tools. Government employees are increasingly relying on GIS to better serve the public. Today's smart communities understand that this technology is a powerful and foundational piece of their smart strategy. With the right people, tools, data and processes in place, communities can not only transform the way they operate but also improve citizens' lives.



When Esri was founded in 1969, we realized even then that geographic information system (GIS) technology could make a difference in society. Working with others who shared this passion, we were encouraged by the vast possibilities of GIS.

Today our confidence in GIS is built on the belief that geography matters - it connects our many cultures and societies and influences our way of life. GIS leverage geographic insight to ensure better communication and collaboration.

Explore our website to discover how our customers have obtained the geographic advantage by using Esri software to address social, economic, business, and environmental concerns at local, regional, national, and global scales. We hope you will be inspired to join the Esri community in using GIS to create a better world.

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