





# Contents

<b>1. Executive summary</b>	<b>2</b>
<b>2. Introduction</b>	<b>4</b>
A. The Smarter Cities Challenge	4
B. The challenge	5
<b>3. Context, findings and roadmap</b>	<b>7</b>
A. Context and findings	7
B. Roadmap	8
<b>4. Recommendations</b>	<b>9</b>
Recommendation 1: Create a regional transportation governing body and technology team	9
Recommendation 2: Hire a data champion and a data custodian	12
Recommendation 3: Create a Chief Innovation Officer (CIO) position	14
Recommendation 4: Establish a data exchange	16
Recommendation 5: Adopt a data-driven approach to transportation	19
Recommendation 6: Implement data-driven highway infrastructure planning	23
Recommendation 7: Provide better channels for stimulating active citizen engagement	26
<b>5. Conclusion</b>	<b>29</b>
<b>6. Appendix</b>	<b>30</b>
A. Acknowledgments	30
B. Team biographies	34
C. References	36
D. Chief Innovation Officer job description	40

# 1. Executive summary

## Introduction

The City of Baton Rouge, East Baton Rouge Parish, Louisiana, US, was one of 16 cities selected to receive a Smarter Cities Challenge® grant from IBM in 2014 as part of the company's citizenship efforts to build a Smarter Planet®. During three weeks in October of 2014, a team of five IBM experts worked to deliver recommendations on a key challenge identified by Mayor-President, Melvin L. "Kip" Holden and the senior leadership team:

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Help Baton Rouge become a global model for high-performance, data-driven transportation.

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## The challenge

Baton Rouge is growing rapidly, with more than \$34 billion in industrial expansion and more than 20,000 new jobs forecast for 2015. But the City faces serious traffic and transportation issues. In light of this, the City of Baton Rouge aims to become a global model for how a fast-growing, emerging economy uses data to effectively manage, model, grow and sustain a high-performance transportation system.

Due to the high volume of traffic from adjacent parishes moving through a small number of access roads, the City of Baton Rouge cannot limit its strategy to the city proper. It needs to take a comprehensive approach that brings together regional stakeholders, many of whom often have conflicting agendas. This effort will require a comprehensive strategy that relies on citizen engagement, education, community awareness, data-driven decision making and governance.

For the City of Baton Rouge to realize its vision, it will need to establish an inclusive and holistic information strategy that allows the City to capture, share, analyze and use data generated from many sources, including sensors, cell phones, mobile apps and social media, as well as from organizations, such as government agencies, private companies and nonprofits. In order to engage the community and develop innovative transportation solutions, the City will need to establish an open data exchange that is available to private companies, nonprofits and government organizations and that supports a variety of business decisions, including prioritization of strategic investments, transportation modeling and optimization and planning and return on investment analysis.

## Findings and recommendations

During the three-week engagement, the IBM Smarter Cities Challenge team interviewed more than 80 stakeholders from diverse backgrounds. The list included mayors, planners, traffic engineers, politicians, private citizens and leaders from local communities, faith-based organizations, nonprofits and the private sector. We identified and fostered a number of alliances among key organizations that will help the City of Baton Rouge and the surrounding region ("the region") start the post-engagement journey of transformation. Table 1 details some of the key observations made during these interviews.

Following from these observations, the IBM team recommends that the Baton Rouge region take the following actions:

- Set up a data exchange to provide a common mechanism for stakeholders to contribute, share, analyze and derive value from the collective data. The data exchange should include a data governance framework to manage ownership, access, provenance, dependencies, security, auditing and compliance. The data exchange should provide reporting capabilities to track access, contributions, conflicts and notifications as well as support cooperation and transparency.
- Create an organizational structure to govern and oversee the implementation of the data exchange. This structure should include a governing body, a data champion and a data custodian who can work together to determine the appropriate governance model, make policy decisions and help identify and prioritize issues and solutions.
- Extend the use of data to optimize the transportation system, leveraging the Louisiana Transportation Research Center (LTRC) to execute these initiatives. Opportunities include using real-time and historical data for congestion modeling, incident detection and adaptive traffic signaling. Information and insights from data analytics should be shared with the public through citizen engagement projects.
- Bring together the Capital Region Planning Commission (CRPC) and the City-Parish Planning Commission (CPPC) to participate in a data-exchange platform in cooperation with other stakeholders. The CRPC should create and implement standardized processes to evaluate data and identify traffic problems, solution alternatives and funding priorities. The CRPC should also develop and implement a Citizens Advisory Board as part of the governing body to involve citizens in the decision-making process.
- Develop a communication and engagement strategy around social and mobile technologies, which uses existing social media tools, such as Facebook and Twitter, and leverages crowd-sourcing solutions, such as Waze, to enrich data collection and provide a channel for sharing regional transportation data with citizens. The City should build an active communication plan to ensure citizens know this new channel is available and that it is actively seeking citizen engagement and feedback.

Challenges	Strengths
There is consensus that the region has many traffic problems, but there is no agreement on the top priorities and no analysis to help compare competing needs.	There is universal agreement that things need to change, silos need to break down and teams need to share more data and analytics.
One of the biggest issues is the lack of predictability of travel times.	Stakeholders recognize that data and analytics must inform decision making.
Approximately 60% of local workers commute from neighboring parishes, which means traffic issues can be solved only by collaborating on a regional solution.	There is a significant amount of data being collected across various organizations, which is a great starting point.
There are increasing federal requirements, such as MAP-21, for data-driven decision making with respect to transportation.	People in key departments already possess some of the special skills and expertise required to execute these recommendations successfully.
Road capacity and design issues both affect traffic flow.	
There are many key stakeholders involved, as well as many important sources of data, none of which is integrated.	
Across every demographic group, perceptions of public transit were universally negative.	

**Table 1:** Key observations

## Conclusion

The recommendations in this report endeavor to help the City of Baton Rouge and the surrounding region become a data-driven Smarter City. The short-term recommendations will allow the region to see immediate results by identifying and implementing the appropriate IT platform to support a data-driven transportation planning process and by developing robust governance. The medium- and long-term recommendations are focused on smarter transport, smarter planning and citizen engagement. Our final recommendation to enhance citizen engagement will allow the region to use more available communications channels and obtain feedback from citizens more effectively. Implementing these recommendations will help make the region a global leader in traffic management and transportation planning.

## Highlights

A siloed approach to data collection is compromising the region's ability to effectively leverage transportation data. The Smarter Cities Challenge team recommends that the City address this issue through a data exchange.

To improve operational efficiency and maximize the current transportation infrastructure, the Traffic Engineering (TE) Division should improve the overall traffic experience by extending the scope of data used to analyze traffic patterns, leveraging real-time data, applying adaptive analysis and sharing data with the public.

To improve the quality of project proposals, the CRPC should use a data exchange mechanism to acquire appropriate data as well as create and standardize analysis procedures to quantify traffic problems, evaluate alternatives and prioritize projects and funding allocations.

To improve cooperation among governmental agencies and citizens, the region should establish a communication and engagement strategy based on shared data, analysis and reporting.

To successfully execute these recommendations, the City of Baton Rouge needs to establish organizational and governance structures.

# 2. Introduction

## A. The Smarter Cities Challenge

By 2050, cities will be home to more than two-thirds of the world's population. They already wield more economic power and have access to more advanced technological capabilities than ever before. Simultaneously, cities are struggling with a wide range of challenges and threats to sustainability in their core support and governance systems, including transport, water, energy, communications, healthcare and social services.

Meanwhile, trillions of digital devices, connected through the Internet, are producing a vast ocean of data. All of this information — from the flow of markets to the pulse of societies — can be turned into knowledge because we now have the computational power and advanced analytics to make sense of it. With this knowledge, cities could reduce costs, cut waste and improve efficiency, productivity and quality of life for their citizens. In the face of the mammoth challenges of economic crisis and increased demand for services, ample opportunities still exist for the development of innovative solutions.

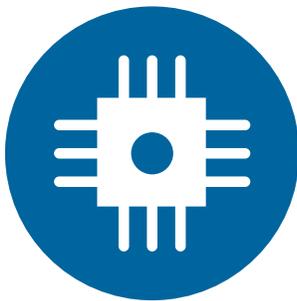
In November 2008, IBM initiated a discussion on how the planet is becoming “smarter.” By this it meant that intelligence is becoming infused into the systems and processes that make the world work — into things no one would recognize as computers: cars, appliances, roadways, power grids, clothes and even natural systems, such as agriculture and waterways. By creating more instrumented, interconnected and intelligent systems, citizens and policymakers can harvest new trends and insights from data, providing the basis for more informed decisions.

A Smarter City uses technology to transform its core systems and optimize finite resources. Because cities grapple on a daily basis with the interaction of water, transportation, energy, public safety and many other systems, IBM is committed to a vision of Smarter Cities® as a vital component of building a Smarter Planet. At the highest levels of maturity, a Smarter City is a knowledge-based system that provides real-time insights to stakeholders and enables decision makers to manage the city's subsystems proactively. Effective information management is at the heart of this capability, and integration and analytics are the key enablers.

Intelligence is being infused into the way the world works.

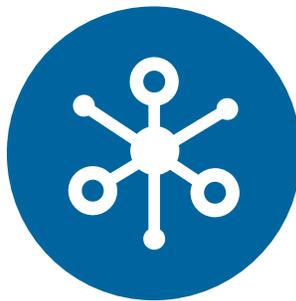
The IBM Smarter Cities Challenge contributes the skills and expertise of top IBM talent to address the critical challenges cities around the world now face. We do this by putting teams on the ground for three weeks to work closely with local leaders and deliver recommendations on how to make the city smarter and more effective. Over the past four years, more than 100 cities have received these grants. The Smarter Cities Challenge is the largest philanthropic initiative IBM has launched, with contributions valued at more than \$50 million to date.

The City of Baton Rouge, East Baton Rouge Parish, Louisiana, US, was selected through a competitive process as one of 16 cities to be awarded a Smarter Cities Challenge grant in 2014.



### Instrumented

We can measure, sense and see the condition of practically everything.



### Interconnected

People, systems and objects can communicate and interact with one another in entirely new ways.



### Intelligent

We can analyze and derive insight from large and diverse sources of information to predict and respond better to change.

Figure 1: Instrumented, interconnected, intelligent

## B. The challenge

During a three-week period in October of 2014, a team of five IBM experts worked in the City of Baton Rouge to deliver recommendations on a key challenge identified by Mayor-President, Melvin L. “Kip” Holden and the senior leadership team:

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### Help Baton Rouge become a global model for high- performance, data-driven transportation.

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The City of Baton Rouge wants to become a global model for how a fast-growing emerging economy uses data to effectively manage, model, grow and sustain a high-performance transportation system. Due to the high volume of traffic from adjacent parishes moving through a small number of access roads, the City of Baton Rouge cannot limit its strategy to the city or any one parish or municipality. It needs to take a comprehensive approach that brings together regional stakeholders, many of whom often have conflicting agendas. This effort will require a comprehensive strategy that relies on citizen engagement, education, community awareness, data-driven decision making and governance.

While the current administration has implemented a number of transportation solutions, there had been limited planning and funding in the previous administrations, leaving the City of Baton Rouge with a continuing transportation problem. Hurricane Katrina had a profound impact on the transportation system because the City of Baton Rouge was unable to handle the arrival of thousands of people fleeing New Orleans. The Smarter Cities Challenge team heard from many citizens that this event was the first time the City of Baton Rouge began to consider itself to be a mid-sized city. All current transportation planning, however, had been done with a smaller city in mind. As the City of Baton Rouge attracts new companies and as existing companies grow, traffic problems will be a mitigating factor given the potential impact of traffic delays on employee commutes and the delivery of supplies.

During the interview process, the Smarter Cities Challenge team learned that the Baton Rouge region has suffered from poor transportation planning since the x 1960s. Shrinking funding for federal and state infrastructure, along with limited revenue sources, has led to inadequate physical infrastructure. The region has made some recent infrastructure investments (The Green Light Plan, for example) to address this prolonged lack of planning. However, several decades’ worth of infrastructure planning and implementation remain unfinished.

In our interviews, we identified several traffic issues that contribute to congestion. There are too many curb cuts on major roads, leading to increased congestion and accidents. Bottlenecks exist on a variety of regional and state roads, such as the bridges, the Washington Street exit, College Avenue and Bluebonnet Boulevard, with little or no buffer to handle potential disruptions caused by accidents, road construction, sporting events and inclement weather.

Current infrastructure planning and funding decisions, including the prioritization of needs, are not driven by data in a holistic or systematic fashion. Generally, these decisions are politically motivated. Data gathered by city departments across the region is stored primarily in incompatible formats, distributed across many systems and kept in silos. Certain operational data resides in systems that, for security reasons, offer limited accessibility and are kept behind firewalls. Real-time data is not used in any significant capacity to dynamically optimize the transportation system. Data sharing among regional organizations is not done automatically.

Finally, the Capital Area Transit System (CATS), which is the public transit system, has limited funding, outdated buses and does not serve the broader region due to limited routes outside of the City of Baton Rouge. In some cases, routes outside the city have only two stops per day, which means the total travel time can greatly exceed driving time, and the passengers lack flexibility to and from their destinations. Stakeholders and citizens agreed that this system has a severe image problem and is not seen as a viable transportation option by citizens in all demographic groups.

During the three-week engagement, the Smarter Cities Challenge team interviewed more than 80 stakeholders from diverse backgrounds. The list included mayors, planners, traffic engineers, politicians, private citizens and leaders from local communities, faith-based organizations, nonprofits and the private sector. They identified and fostered a number of alliances among key organizations that will help the City of Baton Rouge and the surrounding region (“the region”) start the post-engagement journey of transformation. Table 2 details some of the key observations made during these interviews.

Challenges	Strengths
There is consensus that the region has many traffic problems, but there is no agreement on the top priorities and no analysis to help compare competing needs.	There is universal agreement that things need to change, silos need to break down and teams need to share more data and analytics.
One of the biggest issues is the lack of predictability of travel times.	Stakeholders recognize that data and analytics must inform decision making.
Approximately 60% of local workers commute from neighboring parishes, which means traffic issues can be solved only by collaborating on a regional solution.	There is a significant amount of data being collected across various organizations, which is a great starting point.
There are increasing federal requirements, such as MAP-21, for data-driven decision making with respect to transportation.	People in key departments already possess some of the special skills and expertise required to execute these recommendations successfully.
Road capacity and design issues both affect traffic flow.	
There are many key stakeholders involved, as well as many important sources of data, none of which is integrated.	
Across every demographic group, perceptions of public transit were universally negative.	

**Table 2:** Key observations

# 3. Context, findings and roadmap

## A. Context and findings

The following are some of the key observations made during the Smarter Cities Challenge team's time in Baton Rouge:

**Agreement on priorities:** There was universal consensus that the Baton Rouge region has a traffic problem. In fact, it has many traffic problems, and therein lies the challenge. However, there was no agreement on which problems are the most pressing or which solutions would be best for the region. While there have been many studies of this issue, there is no comparative data analysis to help decision makers weigh the relative value of competing solutions. While studies can be informative, they generally do not provide details about the methodology or data sources, which makes comparative analysis difficult.

**Predictability of travel times:** One of the biggest transportation issues is the lack of predictability. Everything moves without a problem until there is an accident on the interstate, a surface road is closed for construction or there is an event in the city. When these and other events occur, gridlock can dramatically increase a daily commute, turning a trip that normally takes 30 minutes into one that takes 90 minutes or more.

**Regional perspective:** Nearly 60% of workers in the City of Baton Rouge are nonresidents who commute from neighboring parishes.<sup>1</sup> This fact means that traffic issues can be solved only through collaboration around truly regional solutions.

**Funding opportunities:** The MAP-21 federal program requires the establishment of a performance- and outcome-based program so that states invest resources in projects that collectively will make progress toward the achievement of national goals. This program puts increasing pressure on cities, including Baton Rouge, to collect data and perform rigorous analysis before submitting proposals for federally funded projects.

**Road capacity vs. design:** There are definite capacity issues affecting roads across the region, but not all traffic issues are caused by a lack of available capacity. Design issues, such as the frequency of curb cuts and the connectivity of surface roads, also have a significant impact on traffic flow.

**Organizational and data silos:** Many stakeholders play key roles in potential transportation solutions. These include government organizations, such as the CRPC, CPPC, the Louisiana Department of Transportation and Development (DOTD), TE and the Baton Rouge Department of Public Works (DPW). External stakeholders include corporations, universities, nonprofit organizations and private citizens. To effectively build a high-performance transportation system, the City will need to integrate these teams and their respective data.

**Public transit:** Across every demographic, perceptions of the current public transit system were universally negative. This raises concern for the long-term outlook because no city can grow effectively without a holistic and integrated multimodal transportation system.

The team also observed many strengths in the Baton Rouge region, including all of the following:

**Agreement on priorities:** There is universal agreement among stakeholders that the regional transportation situation needs to change, that silos need to be broken down and that teams need to share more data and analytics.

**Data and analytics:** There is widespread recognition that data and analytics could and must inform decision making.

**Data availability:** Regional stakeholders are already collecting a great deal of data. Even if the data resides in silos and is not readily available for analytics, the Baton Rouge region will not be starting its data and analytics efforts from scratch.

**Critical skills:** Many organizations, including TE and the CRPC, have demonstrated expertise in analytics. These skills will be key to implementing the recommendations successfully.

## B. Roadmap

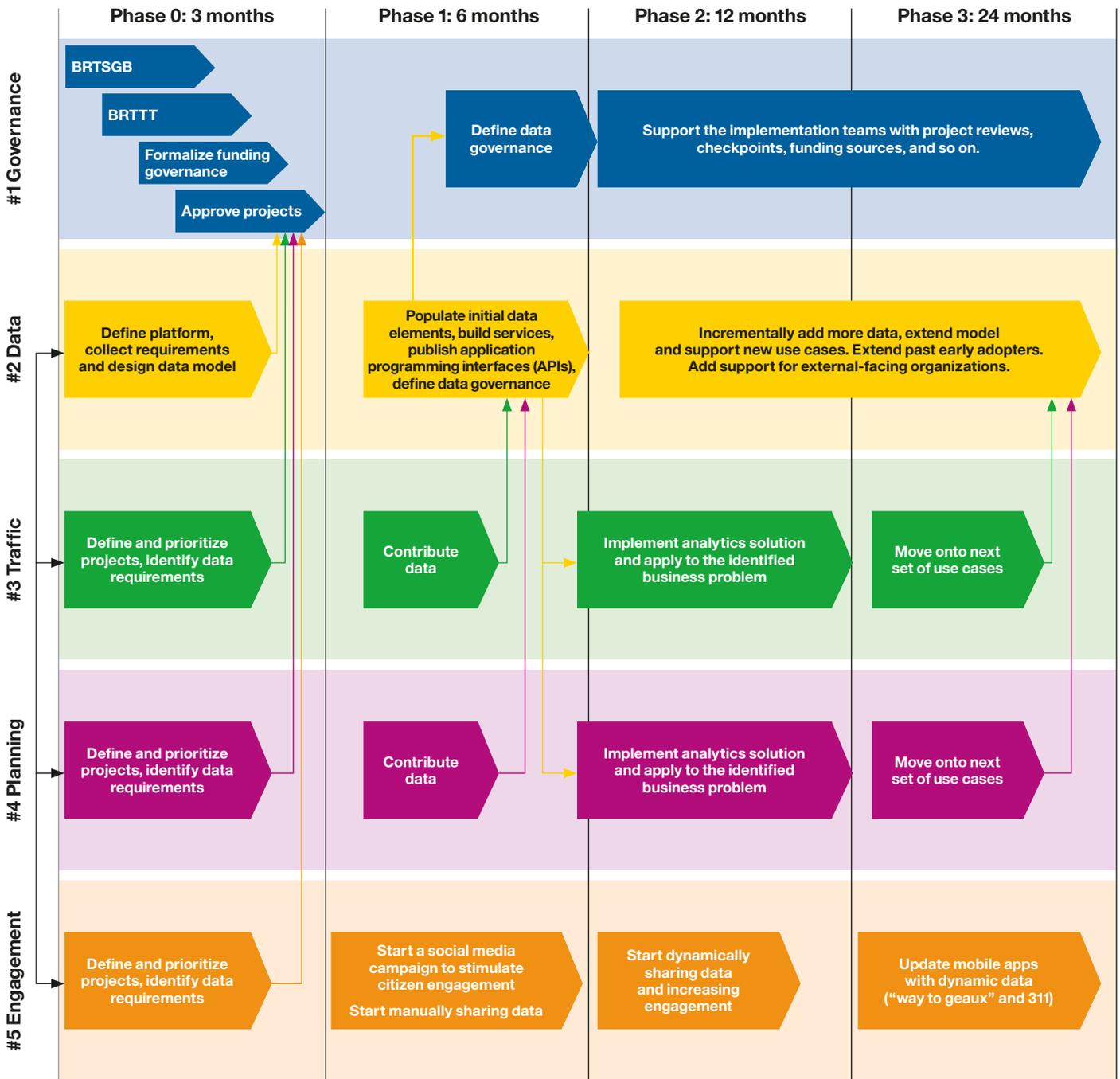


Figure 2: Roadmap of recommendations

# 4. Recommendations

## Recommendation 1: Create a regional transportation governing body and technology team

The City of Baton Rouge needs a coordinated approach to planning, zoning and transportation. To achieve this, the City will need to create a more integrated transportation planning process and implement leadership and governance models. Currently, planning and transportation functions within the City are separate and report to two distinct organizations. DPW reports to the Mayor and President of Baton Rouge, while the CPPC reports to the Metropolitan Council. While both departments participate in the development planning process, incidents of joint review and data-driven recommendations are limited. In addition, the CPPC is not included in transportation decisions. The City needs to change the process to ensure that the CPPC, DPW and TE all are involved in transportation and zoning decisions and that those decisions are made according to data-driven recommendations.

The lack of coordination among these agencies compromises the effectiveness of transportation decisions in the region. During our interviews with the stakeholders, we recognized the need to end this fragmented approach and replace it with a more coordinated response driven by sharing both data and limited resources. Strong leadership, the ability to set aside territorial differences and a solid governance model will set the stage for success.

Given how many organizations are involved in transportation planning and the regional nature of traffic flow, this recommendation refers to the entire Baton Rouge region. Specifically, the Smarter Cities Challenge team recommends that the regional organizations create a governance structure that includes a governing body, a technology team and a few key technical positions (see Recommendations 2 and 3) that will help enable regional collaboration.

The governing body will have the following responsibilities:

- Create the overarching governance model
- Make technical and strategic IT decisions, such as the definition, implementation and management of a data exchange (see Recommendation 4)
- Oversee data-driven transportation planning
- Break down silos between various organizations
- Define prioritization criteria for transportation projects to identify projects that will provide the most-effective results
- Identify funding for a shared data exchange (see Recommendation 4) and transportation projects from federal, state, local and/or private sources

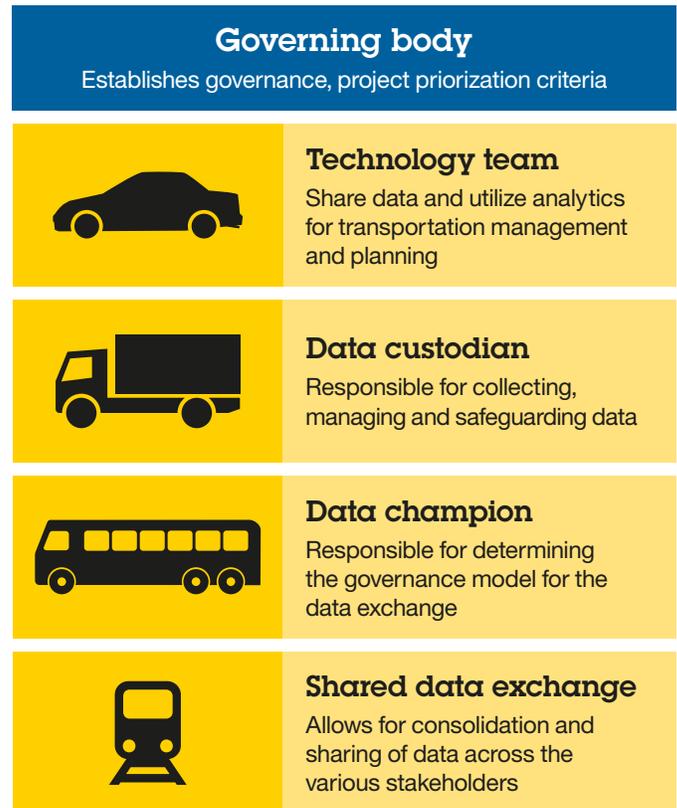


Figure 3: A formal governance structure will help drive regional collaboration

The current regional planning organization, the CRPC, should be a key member of the governing body with responsibility for harmonizing data-driven transportation solutions within its own funding process. The CRPC also will be responsible for submitting proposals for data-driven transportation solutions within its existing processes and for funding sources managed by CRPC. However, the governing body should strive to expand its funding sources and planning beyond the current CRPC model and consider both local and private sources of funding.

The governing body will oversee the technology team, an organization that will be vital for establishing a successful data exchange. The technology team should include representatives from various organizations that collect transportation data and would benefit from pooling the data and skills needed to perform analytics and make the use of data analytics more effective and cost efficient.

The technology team will be responsible for creating the data governance model to fit within the overarching governance model, as well as defining and implementing the data exchange and making recommendations for both strategic and tactical IT projects.

Establishing a governing body in this manner has been done successfully in other cities and states. In Utah, for example, the Utah Department of Transportation (UDOT) and the Utah Transit Authority (UTA) formed the Joint Policy Advisory Committee (JPAC) in 2002 to coordinate short- and long-term programs for the Salt Lake County and Utah County region.<sup>2</sup> This body evaluated highway and transit projects for both regions and worked on funding strategies for transportation projects. Over time, the body generated sufficient value to extend its work to include four metropolitan planning organizations (MPOs) across the state.

Again, the universally negative feedback about public transit raises concerns about the region's long-term transportation outlook. No city or region can grow effectively without a holistic, integrated, multimodal transportation system. The Smarter Cities Challenge team therefore recommends that the governing body should conduct a broad review of the Capital Area Transit System (CATS), one that examines public perception, quality of service, funding, bus stops, footpaths, bus corridors, street cars and other relevant issues in detail. The review should help generate further recommendations to resolve issues identified by the governing body.

### Recommendation 1: Create a regional transportation governing body and technology team

The Baton Rouge region, together with regional stakeholders, should establish a governing body and a technology team responsible for defining and establishing a governance model and data exchange, creating IT policy decisions and establishing data-driven criteria for prioritizing potential transportation solutions.

#### Scope and expected outcomes

##### Scope

The governing body will oversee transportation solutions, including IT and physical infrastructures. It will develop a governance model, review and approve IT infrastructure recommendations from the technology team and assist with identification of funding sources. Using data analytics, it will review transportation issues, prioritize solutions and help find funding for physical infrastructure projects. The technology team, which will report to the governing body, will define a data exchange platform (see Recommendation 4) and work closely with the data champion to define technology needs and help identify funding sources. As solutions are implemented, the technology team will be responsible for determining scope changes, implementation plans, expenses associated with new technology and sources of funding, as well as making recommendations to the governing body for adoption and/or approval.

##### Expected outcomes

Creating the governing body is a vital first step for many of the recommendations that follow. With the governing body and technology team focused on broader transportation decisions and funding sources, the Baton Rouge region will be better able to develop a comprehensive, data-driven transportation plan that helps minimize territorial and political disputes that can cause gridlock and compromise results.

##### Cost of inaction

The cost of inaction is transportation decisions that are not data driven or informed by analytics and therefore not as effective. Without a governing body, these decisions will continue to incite territorial and political disputes.

Recommendation 1: Create a regional transportation governing body and technology team (continued)	
Proposed owner and stakeholders	Suggested resources needed
<p><b>Chair/Owner:</b> TBD by the City of Baton Rouge after meeting with the governing body</p> <p><b>Stakeholders:</b></p> <ul style="list-style-type: none"> <li>• City of Baton Rouge: DPW, TE, Information Services (IS) department and Chief Innovation Officer (see Recommendation 3)</li> <li>• Planning Commission (reports to Metropolitan Council)</li> <li>• CRPC (Baton Rouge region MPO)</li> <li>• Federal Highway Administration</li> <li>• DOTD</li> <li>• LTRC</li> <li>• Baton Rouge Area Foundation</li> <li>• Baton Rouge Chamber of Commerce</li> </ul> <p><b>Technology team:</b></p> <ul style="list-style-type: none"> <li>• Data champion, Chair</li> <li>• TE</li> <li>• IS</li> <li>• LTRC</li> <li>• CRPC</li> <li>• CPPC</li> </ul>	<ul style="list-style-type: none"> <li>• Governing body chair</li> <li>• Data champion (see Recommendation 2)</li> <li>• Data custodian (see Recommendation 2)</li> </ul> <p><b>Cost estimate:</b> Medium. However, when compared to the cost of current inefficiencies in decision making that compromise the ability to secure funding, this recommendation incurs a much lower cost than maintaining the status quo.</p>
Dependencies	Key milestones, activities and timeframe
<ul style="list-style-type: none"> <li>• Data champion (see Recommendation 2)</li> <li>• Data custodian (see Recommendation 2)</li> <li>• City of Baton Rouge Chief Innovation Officer (CIO) (see Recommendation 3)</li> <li>• Funding of IT solution and ongoing maintenance, including updates</li> <li>• Shared data exchange (see Recommendation 4)</li> </ul>	<p><b>Short term:</b></p> <ul style="list-style-type: none"> <li>• Define the data governance model for the technology team</li> <li>• Define metrics and goals</li> <li>• Identify sources of funding</li> <li>• Establish a meeting cadence</li> <li>• Get commitment from initial technology team members</li> </ul> <p><b>Medium term:</b></p> <ul style="list-style-type: none"> <li>• Establish governing body and define data governance model</li> <li>• Obtain funding for the data exchange</li> <li>• Approve technology solutions</li> <li>• Establish two-way communication vehicles to solicit citizen input</li> </ul> <p><b>Long term:</b></p> <ul style="list-style-type: none"> <li>• Create citizens’ advisory board (See Recommendation 6)</li> <li>• Identify additional funding sources for transportation solutions</li> </ul>
Priority	
<p>High — Establishing a governing body and technology team will help regional stakeholders better implement these and other recommendations. Both bodies should be formed within the first 30 days.</p>	

## Recommendation 2: Hire a data champion and a data custodian

To help in developing the data exchange (see Recommendation 4), the Smarter Cities Challenge team recommends that the City of Baton Rouge and the governing body create two key roles — a data champion and a data custodian. The data champion would belong to the governing body and chair the technology team. The data champion also will be responsible for defining the governance model for the data exchange and the underlying IT platform. The data custodian will be a member of the technology team and will be responsible for collecting, storing and managing data within the data exchange.

### Recommendation 2: Hire a data champion and a data custodian

The governing body should designate a data champion and a data custodian to provide critical support for the data exchange (see Recommendation 4).

### Scope and expected outcomes

#### Scope

The data champion will be responsible for defining the governance model for the data exchange and the underlying IT platform. The data custodian will be responsible for collecting, storing and managing transportation-related data from various stakeholders. The data custodian should be an impartial individual who can help ensure all of the following:

- All stakeholders have equal access to data
- Access to data is authorized and controlled according to the governance model as well as relevant laws and regulations
- Technical processes maintain data integrity, and technical controls ensure its safety
- Processes for data quality issue resolution are established
- New data remains consistent with the common data model
- Change management practices are applied to database maintenance
- Data, as well as changes to it and the data exchange, can be audited

#### Expected outcomes

The expected outcome of this recommendation is the creation of a consolidated data source that is neutral and trusted because it has been developed by the data champion as the leader of the technology team. The data custodian will optimize the use of data across the Baton Rouge region, encourage collaboration among various stakeholders and enable data-driven transportation decisions. Together, the data champion and data custodian will ensure that the data exchange provides the Baton Rouge region with the appropriate analyzed data to develop a more comprehensive transportation plan that eases traffic congestion and meets the needs of its citizens based on real-time data, analysis and the projection of future needs. Making data-justified decisions should help resolve some of the territorial differences about transportation funding.

#### Cost of inaction

Without a data champion and a data custodian, the ability to collect and share data across regional functions will not be as effective. Without shared data, the City of Baton Rouge will not be competitive when requesting funding and will not have appropriate justification for proposals. Additionally, the federal government demands data-driven proposals, so Baton Rouge will be prevented from acquiring its fair share of federal funding.

Recommendation 2: Hire a data champion and a data custodian (continued)	
Proposed owner and stakeholders	Suggested resources needed
<p><b>Owner:</b> Governing body</p> <p><b>Stakeholders:</b> Members of the governing body</p>	<ul style="list-style-type: none"> <li>• Identification and hiring of the data champion</li> <li>• Identification and hiring of the data custodian</li> </ul> <p><b>Cost estimate:</b> Low. The salaries of the data champion and the data custodian are low compared to the amount currently spent on transportation projects.</p>
Dependencies	Key milestones, activities and timeframe
<ul style="list-style-type: none"> <li>• Creation of the governing body (see Recommendation 1)</li> <li>• Identification of skilled individuals or hiring of the data champion and the data custodian</li> </ul>	<p><b>Short term:</b></p> <ul style="list-style-type: none"> <li>• Determine reporting organization</li> <li>• Identify funding sources for the positions</li> <li>• Develop the job descriptions and/or skills required for the positions</li> <li>• Solicit, identify and hire candidates</li> </ul>
Priority	
<p>High — The data champion and data custodian positions will be critical for consolidating data in a manner that is trustworthy and accessible to all regional stakeholders.</p>	

### **Recommendation 3: Create a Chief Innovation Officer (CIO) position**

To maximize the effectiveness of these recommendations and the use of data across departments and organizations, the City of Baton Rouge should consolidate the data from all of the departments under the City's IS department and create a Chief Innovation Officer (CIO) position to help facilitate the successful and prompt implementation of the data-driven recommendations in this report. While the initial purpose of the position is to manage transportation issues, the role can help City government in many other initiatives, such as crime prevention and development planning. In addition, the CIO can work with the private sector, universities and private entrepreneurs to create innovations based on its new open data application programming interfaces (APIs) thereby enhancing the value of the data exchange.

This approach has helped bring about desired outcomes in other situations. The U.S. Department of Transportation (DOT), for example, hired a CIO who initially found a deeply siloed department that was unstructured and ineffective. By helping the IT department become more consolidated, he has improved efficiency in several agencies.<sup>3</sup> In another case, the City of Colorado Springs recently hired a CIO to bring its IT department "back to a level of service comparable to other cities our size," according to the Colorado Springs Chief of Staff.<sup>4</sup> Just as these other organizations have benefitted from adding a CIO, the City of Baton Rouge can benefit even more from adding one because the CIO also will focus on business development and IT innovation, all of which will enhance Baton Rouge's growing business climate.



### Recommendation 3: Create a Chief Innovation Officer (CIO) position

The City of Baton Rouge should create a CIO position with senior level executive responsibility to identify best practices and recommend appropriate standards and technologies for transportation planning and related technology needs.

#### Scope and expected outcomes

##### Scope

The CIO would lead the IS department's day-to-day operations, managing technology and infrastructure. The CIO would serve as the policy advisor to the City on IT policies, including the establishment of interoperability of the City's data platforms with the data exchange. The CIO would also sit on the governing body and collaborate with the data champion.

##### Expected outcomes

The expected outcome of this recommendation is the creation of uniform and strategic technology policies for transportation management in the City of Baton Rouge. The CIO will help create one common, integrated technology platform for data that is currently stored in silos. The CIO also will collaborate with the data champion on governance and technology needs and assist with analytical services related to transportation planning. All of this will result in improved, transparent decision making with respect to transportation solutions. The CIO would be instrumental in developing data-driven transportation proposals for federal, state, local and other funding sources.

##### Cost of inaction

The cost of inaction would be a lack of uniform and strategic technology-related policies for regional transportation management. Data would remain siloed. The lack of IT infrastructure, technology funding and incompatible technology platforms would make the implementation of these recommendations much more difficult.

Proposed owner and stakeholders	Suggested resources needed
<p><b>Owner:</b> City of Baton Rouge</p> <p><b>Stakeholders:</b> City of Baton Rouge</p>	<ul style="list-style-type: none"> <li>CIO job responsibilities defined (see Appendix D)</li> </ul> <p><b>Cost estimate:</b> Low. The salary of the CIO is low in comparison to the total amount spent on transportation projects.</p>
Dependencies	Key milestones, activities and timeframe
Funding	<p><b>Short term:</b></p> <ul style="list-style-type: none"> <li>Determine funding required and identify funding sources for the position</li> <li>Develop the job description and/or skills required for the position</li> <li>Solicit candidates</li> </ul> <p><b>Medium term:</b></p> <ul style="list-style-type: none"> <li>Interview candidates and hire an appropriate candidate</li> <li>Consolidate IT policies for CIO review</li> </ul> <p><b>Long term:</b></p> <ul style="list-style-type: none"> <li>See Appendix D for job responsibilities</li> </ul>

#### Priority

Medium — The CIO position will help the City identify best practices, appropriate standards and technologies for addressing transportation planning and other issues the City faces. The CIO will help increase the use of data-driven solutions to many of these issues.

## Recommendation 4: Establish a data exchange

In order to effectively manage, model, grow and sustain a high-performance transportation system, regional stakeholders need access to data that accurately reflects actual events occurring across many systems. This is necessary from both an operational (real-time) perspective and a planning (historical/future) perspective. Much of the data in the Baton Rouge region is stored in formats that are unsuitable for analytics, including paper, PDFs, web pages and other documents and images. Much of the machine-readable data, specifically the operational data, resides in systems that have limited accessibility for security reasons. Traffic light data is just one example of this. In general, data is distributed across many organizations. These disconnected data sources have the potential to play a critical role in the management and optimization of regional transportation systems — but only if the key participants can access it. Here are some examples:

**The City of Baton Rouge Traffic Engineering (TE) Division** controls, coordinates and times traffic light systems for all surface roads. It captures data about traffic flow, volumes, capacity and congestion. Due to the critical nature of these systems, TE cannot risk a network breach that could disable the traffic light system. TE needs a way to share subsets of this data with a broader set of stakeholders but in a way that does not compromise operational system integrity.

**The Capital Region Planning Commission (CRPC)** is responsible for prioritizing project applications submitted from various sources and implementing transportation plans based on their priority. The quality and accuracy of these plans depend on the accuracy, timeliness and completeness of data from other organizations. This data typically comes in a variety of incompatible formats. Often, the data is old, incomplete, conflicting, semantically misaligned and difficult to integrate. This makes it difficult for the CRPC to generate a single, integrated view of Baton Rouge's transportation needs now and in the future.

**The City of Baton Rouge Department of Public Works (DPW)** has data that directly or indirectly affects the traffic system. Examples include data about road closures, surface quality, intersection issues, improvement plans and traffic flow.

**Private enterprise** and local industry are increasingly affected by regional traffic congestion. Specifically, employees' commute times are affecting productivity and limiting business growth. To address this, employers are sharing information about commute times and headcount projections. But this data, which has a direct impact on current and future traffic flow, is not shared in a way that makes it easy to integrate with transportation or planning models.

**Private citizens** are experiencing growing frustration with the current transportation system and have expressed an urgent need for greater transparency into "all things transportation." The City has tried to make more data available to citizens through a variety of websites and has launched an open data initiative to improve transparency. However, due to existing data issues, including completeness, accuracy and availability, transparency is increasingly difficult to achieve.



## Recommendation 4: Establish a data exchange

The City should establish a data exchange that will provide a simple way to share discrete data elements among many regional organizations without elevating the risk of compromising operational systems, secure networks or data integrity.

### Scope and expected outcomes

#### Scope

The Smarter Cities Challenge team recommends building a data exchange with standards-based APIs that mobile and web applications can easily conform to for simple data sharing.

The data exchange will provide a common way for various stakeholders to contribute, share, analyze and derive value from collective data. It is critical that the data exchange uses a common, extensible and standards-based semantic model to support a variety of use cases, including the following:

- Networks of physical assets (roads, intersections, traffic lights, cars and businesses)
- Geographic information system (GIS) coordinates and/or a linear referencing system
- Connections to different actors (engineers, planners, owners)
- References in different events (closures, permits, commute starts, accidents)
- Property information details (start date, end date, type)

There is a growing set of transportation models and open standards described in “IBM Smarter city data model standards landscape, Part 2: Transportation”,<sup>5</sup> some of which could provide a base on which to build these use cases.

The data exchange should include a data governance framework (see Recommendation 1) to manage ownership, access, provenance, dependencies, security, auditing and compliance. This is particularly important considering the complex nature of regional data and the fact that different organizations may generate conflicting data about the same assets or events. Without robust governance, ownership of different data sets can be vague and result in conflicting or incorrect data.

The data exchange should provide reporting capabilities to track access, contributions, conflicts and notifications as well as support cooperation and transparency.

#### Expected outcomes

By establishing a common data exchange, the Baton Rouge region will be able to achieve the following results:

- TE will be able to use key traffic-related information, such as road closures (planned or incident-based), to better coordinate traffic through real-time and dynamic optimization of traffic signal timing.
- CRPC will be able to get a complete view of regional traffic-related information, expand its models and ultimately make better planning decisions.
- The Baton Rouge region will be better able to meet federal and state requirements for data-driven project selection and prioritization.
- The Baton Rouge region will have a way to share data with the public through existing or new communication channels (see Recommendation 7). This could allow all citizens and their representatives to gain greater access to complete, timely and accurate information about local transportation systems.

Reporting capabilities within the data exchange will deliver the following outcomes:

- The Baton Rouge region will be able to meet new federal requirements for complete and accurate transportation performance and outcome measures.
- The Baton Rouge region will be able to identify assets under the most pressure, such as roads over capacity, bridges at risk and intersections that are choke points, and share these with all stakeholders to improve transparency and insight into major regional traffic challenges. This capability will help inform planners about which areas require attention. Data could be shared with the public to provide a more holistic view of traffic conditions in local communities.
- The combination of the semantic model and reporting capabilities will allow the Baton Rouge region to identify and resolve conflicting data elements. For example, planning authorities may classify a road as public, while the DPW classifies it as private. Or TE may have classified a road as over capacity, but the City Clerk is issuing a planning permit for a new office building on the same road. Flagging these and other potential conflicts and notifying the appropriate actors will facilitate a level of coordination and collaboration that does not exist today.

#### Cost of inaction

Without this recommendation, the City of Baton Rouge will be unable to effectively win federal or state funding for transportation projects due to its inability to provide the required data and analytics that justify funding requests. The Smarter Cities Challenge team has learned that there are requirements to provide ongoing performance data for all federal and state projects. This data will be difficult to provide without robust data and analysis.

The lack of consistent, reliable, accurate and complete data also has a significant effect on all the other recommendations. Without a data exchange, the City will not be able to optimize traffic operations, plan for the future or engage citizens.

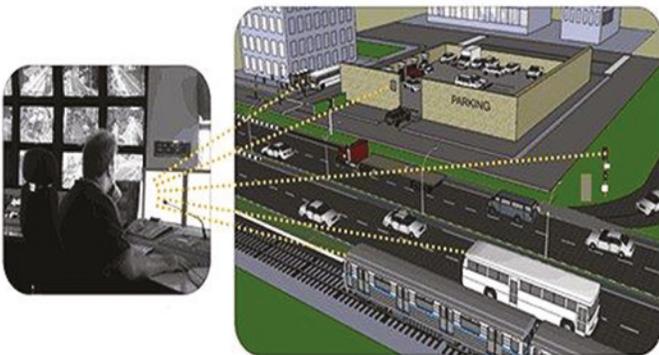
**Recommendation 4: Establish a data exchange (continued)**

Proposed owner and stakeholders	Suggested resources needed
<p><b>Owner:</b> Data custodian</p> <p><b>Stakeholders:</b></p> <ul style="list-style-type: none"> <li>• CRPC</li> <li>• TE</li> <li>• DPW</li> <li>• Citizens</li> <li>• Private enterprise</li> </ul>	<p><b>Proposed skills:</b></p> <ul style="list-style-type: none"> <li>• Semantic web knowledge</li> <li>• Big data architecture</li> <li>• Information architecture and modeling</li> </ul> <p><b>Suggested technologies:</b></p> <ul style="list-style-type: none"> <li>• Semantic web-related standards and supporting development tools</li> <li>• Big data platform, such as Hadoop</li> <li>• Databases, such as RDB, NOSQL and Graph</li> <li>• GIS technology</li> <li>• Application server to develop and deploy web and mobile applications</li> </ul> <p><b>Cost estimate:</b> Medium</p>
Dependencies	Key milestones, activities and timeframe
<ul style="list-style-type: none"> <li>• Governing body (see Recommendation 1)</li> <li>• Data champion (see Recommendation 2)</li> <li>• Data custodian (see Recommendation 2)</li> <li>• Data-driven transportation approach (see Recommendation 5)</li> <li>• Data-driven highway infrastructure planning (see Recommendation 6)</li> <li>• Citizen engagement (see Recommendation 7)</li> </ul>	<p><b>First 30 days:</b></p> <ul style="list-style-type: none"> <li>• Choose the optimal data platform to support the recommendations for the data exchange.</li> <li>• Identify a first set of users. It is our recommendation that TE, DPW, LTRC and CRPC should be the early adopters of the system.</li> </ul> <p><b>First 90 days:</b></p> <ul style="list-style-type: none"> <li>• Submit analytics project request for funding to the technology team for allocation or redirection of funds.</li> <li>• Collect requirements (data elements, APIs and so on) and solution priorities from the early adopters.</li> <li>• Develop an inventory of available transportation data sets across departments, prioritizing the requirements of the early adopters.</li> <li>• Classify data sets for quality, completeness, frequency of updates, provenance, accuracy and format.</li> <li>• Define the semantic model (classes) required to accurately describe the data using existing transportation models and vocabularies.</li> </ul> <p><b>First six months:</b></p> <ul style="list-style-type: none"> <li>• Develop a data ingestion component that will ensure accurate semantic mapping of metadata and will fill in gaps as required. Gaps on the source side can be addressed during data ingestion, minimizing impact on existing operational systems.</li> <li>• Develop an action plan for how data can be shared. The plan should include technical aspects (APIs, semantic classes and so on) and governance (access, user agreements and so on).</li> </ul> <p><b>First 24 months and beyond:</b></p> <ul style="list-style-type: none"> <li>• Incrementally populate the data exchange according to user requirements and priorities.</li> <li>• Add external users as providers and consumers of data.</li> </ul>
Priority	
<p>High – The data exchange is the primary means of collecting and sharing the traffic-related data, ensuring that the various stakeholders can make effective use of the data.</p>	

## Recommendation 5: Adopt a data-driven approach to transportation

The financial implications of traffic congestion affect cities and economic growth. According to the Texas A&M Transportation Institute's annual Urban Mobility Report, US urban areas wasted 2.9 billion gallons of fuel and 5.5 billion hours due to congestion in 2011 at a cost of \$121 billion.<sup>6</sup> In this same report, the City of Baton Rouge was ranked worst in terms of commuter delays for midsize cities in the continental US based on the congestion of its freeways and arterial roads.

TE has started to use data to manually adjust networked traffic signals and would benefit from more comprehensive real-time data. Current models are inadequate due to incomplete data (for example, no integration exists between surface streets and interstate data). Furthermore, the current system only generates data for East Baton Rouge Parish, and there are no equivalent services for surrounding parishes. This puts TE at a significant disadvantage as it tries to optimize traffic flow. As mentioned previously, transportation issues are regional due to the large number of commuters coming into the city. Regional issues require a holistic traffic model. In several cases, changing the traffic pattern in one area leads to unexpected results in another area, such as increased accidents and congestion.



**Figure 4:** Data is captured from several parts of the transportation system (Source: [www.its.dot.gov](http://www.its.dot.gov))

One of the important benefits of a data-driven approach to decision making is acquiring all the information needed to share a decision with stakeholders in a meaningful way and allow them to act on that decision effectively. In this case, the two most important sets of stakeholders are traffic operations managers and the general public.

Examples of data-driven success are plentiful. New York City has implemented an advanced traffic controller and decision support system to capture data in real time and dynamically adjust traffic signals.<sup>7</sup> The proposed decisions are presented to traffic engineers who act on them following visual confirmation from traffic cameras. The solution has resulted in a 10% reduction in travel time in midtown Manhattan.<sup>8</sup> Another study in Portland, Oregon, showed that optimizing the location of bus stops could save more than \$100,000 in operating costs per year.<sup>9</sup>

Communicating decisions to the public is equally important. One example could be providing the public with a complete interactive map that allows them to see what changes have been made (or will be made) in their areas. Louisiana's 511 system provides this information on a website.<sup>10</sup> Simulation studies for Washington, D.C., show that drivers using traveler information arrived at their destination closer to the target arrival time more often than drivers without this information.<sup>11</sup> In Japan, the use of a personal traveler planning system was shown to reduce greenhouse gas emissions by 20%.<sup>12</sup>

To understand how a data-driven approach could improve the operational efficiency of the transportation system, consider the fact that a large amount of daily traffic in the City of Baton Rouge originates outside the city.<sup>1</sup> Due to its geographical location, the region is surrounded by rivers, bayous and waterways that necessitate a large number of bridges. Imagine a situation in which every bridge inspection or closure was preceded by a "what if" scenario to consider the impact of the disruption on traffic and help determine the optimal date for the event. Another benefit of a model-based approach is that multiple objectives, constraints and tradeoffs can be considered. A good example is the optimization of traffic flow and reduction of accident rates by setting speed limits on roads and/or implementing ramp metering on highways. Currently, the Baton Rouge region uses ramp metering but does not perform any systemwide optimization. Other areas of interest to City officials and citizens include minimizing travel time, increasing public transit ridership, improving air quality, reducing greenhouse gases and minimizing highway operating and maintenance costs.

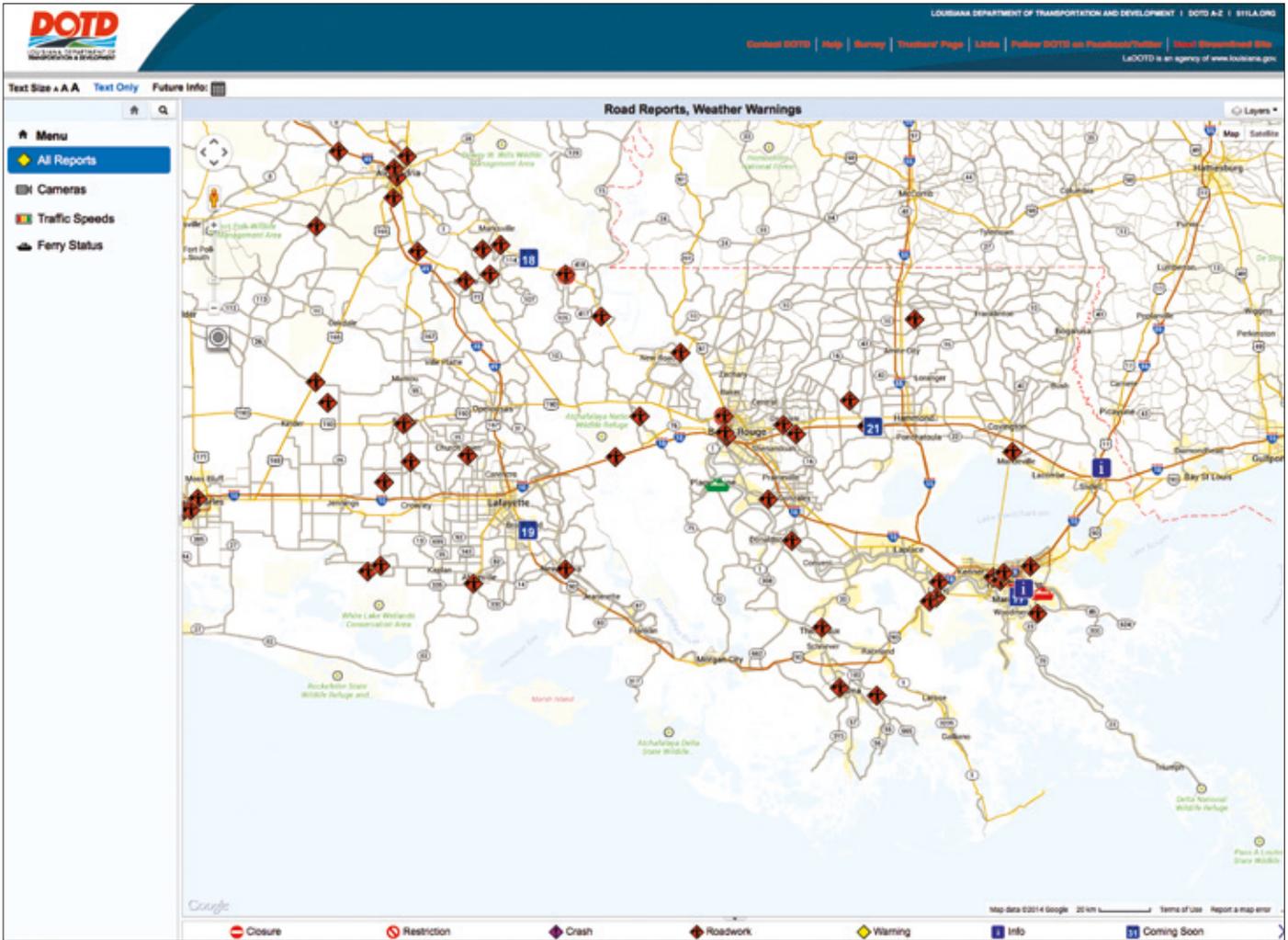


Figure 5: The Louisiana 511 system provides updated information to the public about road closures and weather warnings

## Recommendation 5: Adopt a data-driven approach to transportation

The City should adopt a comprehensive data-driven approach to continuously monitor, analyze and optimize the multimodal transportation system.

### Scope and expected outcomes

#### Scope

Currently, TE uses traffic-flow data to optimize sequencing of traffic lights. The Smarter Cities Challenge team recommends that the Baton Rouge region extend this approach in a number of ways:

- Extend data sources with data (real-time or historical) from multiple stakeholders, including traffic operations managers (traffic count data from TE and travel surveys from CRPC), government entities (census data and state traffic safety data), businesses (employee ZIP code data from the Greater Baton Rouge Industry Alliance (GBRIA)) and private citizens (social network data).
- Use real-time data for traffic congestion modeling, automated incident detection and adaptive traffic signaling in order to maximize the operational efficiency of the region's bridges and roadways. Some of this data has already been collected in various forms but is not available in usable or shareable formats (see Recommendation 4).
- Share information and insights with the public so that individuals can make better daily transportation decisions. This can be accomplished through a variety of citizen-engagement activities (see Recommendation 7).
- Leverage the resources of the LTRC during the implementation of these initiatives.

#### Expected outcomes

The expected outcome of this recommendation is that the Baton Rouge region can more efficiently utilize all transportation resources, including bridges, roadways and public transit, while improving the quality of life for local citizens. In addition, the data exchange will support coordination within and across geographical and organizational boundaries to maximize the value of captured data. For example, roadwork data from public works can be used to adjust traffic light timing and reroute traffic to alleviate congestion.

Another expected outcome is that the data exchange can help other City operations, such as waste management, emergency response and police and fire department dispatch. For instance, EMS responders with knowledge of road closures and traffic congestion can respond to emergencies more effectively.

Close collaboration with the LTRC at Louisiana State University (LSU), a research institute jointly sponsored by LSU and DOTD, can help the City develop innovative intelligent transportation solutions (ITS). The computer science departments at LSU and Southern University (SU) can be leveraged through vehicles, such as hackathons,<sup>13</sup> to develop software solutions for visualization, analytics and information dissemination.

#### Cost of inaction

The MAP-21 transportation bill emphasizes performance measurement<sup>14</sup> and would require TE to measure the performance of the traffic system over time. Inability to do this could adversely affect ongoing funding and future projects.

In addition, the current transportation system cannot support rising traffic volumes as the region grows. This imbalance can restrict economic growth, discourage business investments and compromise the vitality of the region. The ability to optimize traffic with existing infrastructure is critical, particularly in light of current financial constraints.

Without a smarter transportation system (that includes data and analytics), the region's roadways will be ill equipped to handle future innovations, such as connected vehicles and autonomous vehicles with vehicle-to-infrastructure (V2I) components that require transportation infrastructure to sense, communicate with and control vehicles on the road.<sup>15</sup> According to Navigant Research, autonomous vehicles are expected to reach 95.4 million in annual sales in 2035,<sup>16</sup> and Morgan Stanley projects complete autonomous driving capability as early as 2018, with rapid adoption from 2022 onward.<sup>17</sup>

**Recommendation 5: Adopt a data-driven approach to transportation (continued)**

Proposed owner and stakeholders	Suggested resources needed
<p><b>Owner:</b> TE</p> <p><b>Stakeholders:</b> DOTD, CRPC, LTRC, Public</p>	<ul style="list-style-type: none"> <li>• GIS solutions</li> <li>• Traffic modelers/simulators</li> <li>• Statistical analysis tools</li> <li>• Optimization tools and analytics engine</li> </ul> <p><b>Cost estimate:</b> Medium</p>
Dependencies	Key milestones, activities and timeframe
<ul style="list-style-type: none"> <li>• Governing body (see Recommendation 1)</li> <li>• Data champion (see Recommendation 2)</li> <li>• Data custodian (see Recommendation 2)</li> <li>• Shared data exchange (see Recommendation 4)</li> </ul>	<p><b>First 30 days:</b></p> <ul style="list-style-type: none"> <li>• Work with the technology team to identify transportation data sets that could contribute to the shared data exchange.</li> </ul> <p><b>First 90 days:</b></p> <ul style="list-style-type: none"> <li>• Identify and prioritize analytics projects, clearly describing the required data elements, value proposition, resources and benefits. Recommended projects include optimizing traffic flow, minimizing travel time and implementing GIS-enabled information dissemination to traffic operations managers and citizens.</li> </ul> <p><b>First 12 months:</b></p> <ul style="list-style-type: none"> <li>• Implement the first set of analytics solutions.</li> <li>• Initiate collaboration with LSU/LTRC/SU on ITS projects leveraging the shared exchange.</li> </ul> <p><b>First 24 months and beyond:</b></p> <ul style="list-style-type: none"> <li>• Based on feedback about initial projects, iterate and implement through the next set of analytic solutions and amend the data model as necessary.</li> <li>• Share solutions and collaborate with other City operations.</li> </ul>
Priority	
<p>Medium — Using a comprehensive data-driven approach to monitoring, analyzing and optimizing the multimodal transportation system will decrease traffic problems and increase quality of life for citizens.</p>	

## Recommendation 6: Implement data-driven highway infrastructure planning

In order to realize its long-term vision, the Baton Rouge region needs to create and execute an efficient regional transportation plan. Currently, CRPC and CPPC have to manage complex negotiations at the City, regional and state levels to get transportation projects approved. As a result, decisions are often made according to negotiation skills and not according to the solutions' merits, including whether the relevant data demonstrates the solution's effectiveness. This dynamic affects the entire region and impacts the true effectiveness of traffic solutions.

While there is data available, such as occupancy rates of roads and interstates, as well as ramps leading to the interstates (from the DOTD), occupancy rates on major roads within the city (from TE) and census data, the planning organization lacks access to this data in real time. It also lacks standardized tools to analyze the data. Similarly, other data sets, such as industry growth plans, commute data, zoning data and zoning plans, are available from various industry organizations and City departments. This data could be used in a variety of important ways:

**To identify problems:** A number of areas in the Baton Rouge region have roads that are handling traffic in excess of recommended capacity. Frequent bottlenecks and traffic delays have been reported on a number of road segments, including Siegen Lane, Essen Lane, Airline Highway, Bluebonnet Boulevard, Perkins Road and Florida Boulevard. Similarly, frequent bottlenecks and traffic delays have been reported on LA-1 in West Baton Rouge Parish as well as the Mississippi Bridge crossing of I-10. These are just a few examples of the problems mentioned in our interviews. Without shared data and a standardized process, planning organizations cannot quantify traffic problems and determine economic loss.

**To evaluate alternatives:** The traffic issues on I-10, to take just one example, could be resolved with any number of alternate solutions. Examples include developing a new roadway and a second bridge as suggested by the BR Loop study; building a bridge for workers in Plaquemine to get to East Baton Rouge without going to I-10; building a connector between LA-1 and 415; reconfiguring I-10 at the Washington Street exit; creating a park and ride in the City of Baton Rouge; and increasing ferry service between East Baton Rouge and Plaquemine. Without the right data and analysis, planning organizations cannot quantify the value and costs of these options or determine which will be the most effective.

**To prioritize projects for funding:** The CRPC is currently limited in terms of the data used to prioritize projects for maximum regional value and could greatly benefit from more data.

**To engage citizens in planning:** The CRPC needs to get active citizen participation so that citizens can stay informed about planned projects and priorities as well as provide feedback and support about CRPC activities.

## Recommendation 6: Implement data-driven highway infrastructure planning

The CRPC and CPPC planning organizations should use a data exchange to access data that could help them better identify, evaluate and prioritize traffic issues and potential solutions as well as plan the implementation of solutions.

### Scope and expected outcomes

#### Scope

The Smarter Cities Challenge team recommends that the CRPC participate in a data exchange to acquire the necessary data from TE, DPW, DOTD, CPPC and industry organizations. Once the CRPC participates in the data exchange, we recommend that it take the following actions:

- Define data sources to identify and quantify traffic problems
- Create and standardize analysis procedures to quantify traffic problems
- Identify data sources to evaluate alternatives
- Create and standardize analysis procedures to quantify and evaluate alternatives
- Create and standardize analysis procedures to prioritize projects and allocate funding

We recommend that the CRPC implement the standardized processes approved by the governing body to evaluate data and identify problems, solution alternatives and priorities for funding.

In addition, we recommend that the CRPC develop and implement a citizens' advisory board as part of the governing body to help citizens become more involved in the decision-making process. It is important that the CRPC recognizes that it has to actively reach out to citizens. In addition to using technology-based communication channels, it should include community outreach through faith-based organizations and nongovernmental organizations (NGOs).

#### Expected outcomes

By establishing a data-driven approach to planning and decision making, the Baton Rouge region will be able to address traffic issues in a structured, nonpartisan way. This will improve cooperation among government agencies, industry and planning organizations and help fund and implement the right solutions for the region.

By effectively prioritizing projects, the CRPC and CPPC should develop a more reliable pipeline of projects. A comprehensive vision for future improvements will spur economic growth in anticipation of infrastructure improvements.

When the planning organizations engage citizens proactively, those same citizens will be more likely to support CRPC and CPPC goals and be better prepared to deal with impending roadway projects.

#### Cost of inaction

Without appropriate methodologies and due diligence with respect to data usage and analysis, TE and the CRPC will not be able to solve regional transportation issues in a holistic way. Without access to all the available data that may affect transportation issues, the CRPC will be unable to develop robust plans. During our interviews, we heard many examples of plans that were implemented without a clear understanding of the adverse effects on other roads. We also spoke with industry leaders who clearly articulated concerns about the effect of traffic congestion on business growth. The ability to accurately incorporate industrial growth projections into transportation plans is critical.

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Recommendation 6: Implement data-driven highway infrastructure planning (continued)	
Proposed owner and stakeholders	Suggested resources needed
<p><b>Owner:</b> CRPC</p> <p><b>Stakeholders:</b></p> <ul style="list-style-type: none"> <li>• TE</li> <li>• DPW</li> <li>• IS (for East Baton Rouge Parish)</li> <li>• CPPC</li> <li>• DOTD</li> <li>• Federal Highway Administration</li> <li>• LTRC</li> </ul>	<ul style="list-style-type: none"> <li>• Simulation tools</li> <li>• Traffic modeling software</li> <li>• GIS solutions</li> <li>• Statistical analysis tools</li> <li>• Optimization tools and analytics engine</li> </ul> <p><b>Cost estimate:</b> Medium. The ongoing cost should be offset by potential funding grants in the future.</p>
Dependencies	Key milestones, activities and timeframe
<ul style="list-style-type: none"> <li>• Governing body (see Recommendation 1)</li> <li>• Data champion (see Recommendation 2)</li> <li>• Data custodian (see Recommendation 2)</li> <li>• Shared data exchange (see Recommendation 4)</li> <li>• Data-driven transportation approach (see Recommendation 5)</li> <li>• Citizen engagement (see Recommendation 7)</li> </ul>	<p><b>First 30 days:</b></p> <ul style="list-style-type: none"> <li>• Identify data elements that planning could contribute and use from the shared data exchange.</li> <li>• Define the first analysis procedures to quantify traffic problems.</li> </ul> <p><b>First 90 days:</b></p> <ul style="list-style-type: none"> <li>• Start contributing and consuming data from the data exchange.</li> <li>• Identify and prioritize analysis procedures, clearly describing the required data elements, value proposition (whether it quantifies traffic problems, evaluates alternative traffic solutions or optimizes funding) and overall benefits of the procedure.</li> <li>• Identify funding required for implementing these tasks and coordinate with the governing body for allocation or redirection of funds.</li> </ul> <p><b>First 12 months:</b></p> <ul style="list-style-type: none"> <li>• Confirm that stakeholders agree on how to use analysis procedures to quantify traffic problems, evaluate alternatives and prioritize projects and funding allocation.</li> <li>• Use the defined procedures to produce a prioritized list of projects for 2016.</li> </ul> <p><b>First 24 months and beyond:</b></p> <ul style="list-style-type: none"> <li>• Use data-driven analytics to identify and prioritize key problem areas to be addressed by the 2017 Transportation Improvement Program (TIP) and Statewide Transportation Improvement Program (STIP).</li> <li>• Develop a project case to submit funding requests to other federal agencies using a data-driven approach.</li> </ul>
Priority	
<p>High — The use of a data exchange allows the region to better identify, evaluate and prioritize traffic issues and potential solutions for more effective long-term transportation planning.</p>	

### Recommendation 7: Provide better channels for stimulating active citizen engagement

To quote Open Society Foundations: “Active citizenship is one of the most important steps towards healthy societies”.<sup>18</sup> With this recommendation, the Smarter Cities Challenge team proposes a series of steps to help the Baton Rouge region actively engage citizens in the process of solving transportation challenges, whether the citizen is a private individual, community leader, elected official or business leader.

The City of Baton Rouge currently shares data with citizens through a number of initiatives. However, these have been limited in nature and largely focused on publishing historical information. Real-time data sharing has been limited. This is to be expected considering that real-time data is largely inaccessible, distributed across different organizations, not integrated or semantically aligned and lacks the provenance and formal governance required for easy or automatic sharing. In addition, there is little to no citizen engagement with respect to which data should be shared.

While this “publish only” approach to sharing data may have worked in the past, the advent of social and mobile technologies has changed our view of the world. Namely, it has become smaller and more transparent. With the advent of social media, everyone has a voice and everyone expects to be heard, be they citizens, retailers, employers, elected officials or the City. Social technologies have changed our expectations about the timeliness of information, in that people want to know what is happening now — not last week or last month.

Mobile technologies have transformed our expectations about how information is consumed, in that citizens expect access to information that is easy to understand, delivered in context (for example, travel information delivered through a favorite travel app) and available whenever and wherever they want it. The latest numbers from Pew Research are informative<sup>19</sup>:

Demographic	Cell phone	Smartphone
American adults	90%	58%
Hispanic		61%
African American		59%
White		53%
College graduates		71%
High school graduates or less		44%
Income < \$30,000/year		47%

Figure 6: Data from Pew Research about the habits of smartphone users

In addition, this research shows that 74% of adult smartphone owners use a phone to get directions or other information based on their current location, and that 20% have used their phone to get up-to-the-minute traffic or public transit information in the past 30 days. Clearly, leveraging social technology offers an effective way to reach the public with transportation information.

## Recommendation 7: Provide better channels for stimulating active citizen engagement

As the Baton Rouge region gets better at actively managing the collection, analysis and sharing of transportation-related data, it should focus on creating channels to share this data with citizens in ways that stimulate active engagement.

### Scope and expected outcomes

#### Scope

The Smarter Cities Challenge team recommends that the Baton Rouge region should design a communication and engagement strategy that features social and mobile technologies and uses existing social media tools. This approach has several benefits:

- It allows the region to connect with citizens through channels that are familiar to them.
- It gives the region access to features that allow them to more effectively engage citizens, solicit feedback, generate discussion, receive and report problems (via 311, for example) or socialize ideas.
- It reduces development and deployment costs by leveraging existing infrastructure and choosing innovative solutions built on existing platforms.
- It allows the region to tap into an existing network of citizens and leverage it to more effectively share messages and get traction for its engagement strategy.
- In some cases, as with Waze (a crowdsourced traffic and navigation mobile app), it allows the region to tap into new public data that can be integrated with its own data.

We recommend that the Baton Rouge region leverage crowdsourcing solutions, such as Waze, to enrich the data collected through the shared data exchange (see Recommendation 4). Waze has recently announced a “Connected Citizen” program<sup>20</sup> that allows cities to use the Waze platform and social network to share city-specific travel information with citizens in return for access to Waze’s aggregated, crowdsourced traffic data. As the Baton Rouge region improves its ability to collect, categorize, geo-tag, analyze and share data, its constituent organizations will be better positioned to use data APIs, such as RSS, to transform citizen engagement. We recommend that the region use this data to enable a broad spectrum of communication channels (in addition to social networks and apps):

- Data APIs, such as RSS, could feed existing websites. Because this would not require manual intervention, it would be possible to generate personalized web pages for every community in the region using geo-tag details. This would make it much easier for community leaders to share data with members of the community who would otherwise have no access to digital channels.
- RSS would make it easy for local radio stations to subscribe to a data feed and receive accurate transportation information.
- Daily or weekly reports could be delivered to citizens through e-mail.
- Smaller and more targeted categories of data, such as emergency road closures, could be delivered to citizens through SMS (text messaging) in order to include citizens who do not own smartphones.
- Geo-tagging and categorization of data would allow certain information, such as the notification of an accident location or the estimated time to cross the next bridge, to be streamed to digital road signs.

The Smarter Cities Challenge team recommends that the region invest in creating an active communication plan to ensure citizens know these new information channels are available and that the City is actively requesting their engagement and feedback.

#### Expected outcomes

All citizens will have the ability to learn what is happening with transportation in their area through accurate data delivered via familiar channels. They will be able to actively engage with regional organizations and know that these organizations are receiving their feedback. The region will be able to consolidate citizen communications into a single, validated and authorized data set within the data exchange. The region will be able to collect and leverage crowdsourced data to improve operational and planning activities.

#### Cost of inaction

If this recommendation is not followed, citizens will continue to be disengaged and cynical about the transportation system and the City’s ability to solve these problems. Transportation in the Baton Rouge region is a complex issue that cannot be addressed overnight. It will be a gradual process, making it critical for citizens to have visibility into what is happening and to be able to provide feedback.

**Recommendation 7: Provide better channels for stimulating active citizen engagement (continued)**

Proposed owner and stakeholders	Suggested resources needed
<p><b>Owner:</b> City of Baton Rouge (initially) and the governing body (later, to cover the entire region)</p> <p><b>Stakeholders:</b> Governing body, citizens</p>	<ul style="list-style-type: none"> <li>• Social media</li> <li>• Communications</li> <li>• Marketing</li> </ul> <p><b>Cost estimate:</b> Low</p>
Dependencies	Key milestones, activities and timeframe
<p>Shared data exchange (See Recommendation 4)</p>	<p><b>First 30 days:</b></p> <ul style="list-style-type: none"> <li>• Identify data elements that the City could contribute to the shared data exchange.</li> <li>• Establish a communication strategy to support this outreach initiative and ensure as many citizens as possible, across all demographic groups, are aware of this effort.</li> </ul> <p><b>First 90 days:</b></p> <ul style="list-style-type: none"> <li>• Identify and prioritize the first set of engagement projects, clearly describing the required data elements, the value proposition and the benefits of each project. We recommend starting with social channels, such as Facebook.</li> <li>• Create a social media presence on Facebook and Twitter.</li> <li>• Let citizens know that the City will be sharing data with them in the coming months.</li> <li>• Manually publish selected data, such as DPW road closures, to begin engagement. For example, the Chief Traffic Engineer could share the “traffic tip of the day.”</li> <li>• Include traditional communications channels, such as radio or messaging through community leaders.</li> </ul> <p><b>First 12 months:</b></p> <ul style="list-style-type: none"> <li>• After the data exchange is up and running, dynamically publish data from DPW, TE, CAD and others on Facebook and Twitter.</li> <li>• Create community pages and update them dynamically.</li> <li>• Include reports in the stream, such as the busiest intersections, the most improved roads or a list of traffic lights that have had their timing updated in the last month.</li> <li>• Proactively engage with social traffic applications, such as Waze, to build a partnership for the future.</li> </ul> <p><b>First 24 months and beyond:</b></p> <ul style="list-style-type: none"> <li>• Include planning information in the external feed and solicit citizen engagement via social channels.</li> </ul>

**Priority**

High — The Baton Rouge region should actively engage citizens in the process of solving transportation challenges.

# 5. Conclusion

The recommendations in this report endeavor to help the City of Baton Rouge and the surrounding region become a data-driven Smarter City and a global leader in transportation planning. The short-term recommendations — establish a governing body, name a data champion and a data custodian, consolidate the City's IT data into the IS department and hire a CIO — will generate immediate results by enabling the City to identify and implement an IT platform that supports a data-driven transportation planning process and will help develop robust governance. The data exchange will enable the Baton Rouge region to plan and prioritize traffic solutions more effectively. The medium- and long-term recommendations — establish a data exchange and use that data for traffic demand and planning — are focused on smarter transportation, smarter planning and citizen engagement.

While the Smarter Cities Challenge team did not make recommendations for how to improve the regional public transportation system, we believe the best course of action is for the Baton Rouge region to establish a group of stakeholders who will be responsible for conducting a thorough review of the system's strengths and weaknesses and creating recommendations for how to establish a more effective regional public transportation system. Without a more effective multimodal transportation system in place, progress in transportation planning will be significantly hampered.

Local citizens should be involved in planning processes, and the region needs to employ two-way communication channels that address a growing demand for transparency. To this end, our final recommendation to enhance citizen engagement will allow the region to use more available communications channels and obtain feedback from citizens more effectively.

Overall, the Smarter Cities Challenge team fully expects that implementing these recommendations will help make the Baton Rouge region a global leader in traffic management and transportation planning as well as eliminate data silos and enable the region to identify the right solutions using data analysis and citizen engagement.

# 6. Appendix

## A. Acknowledgments

Stakeholders	Title/Organization
Adam Knapp	President and CEO, Baton Rouge Area Chamber
Adam Smith	Director of Parking Operations, LSU Athletics
Alkis Tsolakis	Dean, College of Art and Design, Louisiana State University
Allison Schilling	District Administrator, Louisiana Department of Transportation and Development (DOTD)
Ann Trappey	Principal, CEO/President, Forte & Tablada; Member, Baton Rouge Area Chamber (BRAC) Transportation Council
Honorable Barney Arceneaux	Mayor/Administrator, City of Gonzales
Beverly Moore	Director of Civic Leadership Initiatives, Baton Rouge Area Foundation
Bob Mirabito	CEO, Capital Area Transit System (CATS)
Brandon Buckner	Transportation Planner, Federal Highway Administration
Brian Wolshon, PhD	Edward A. Karen Wax Schnitt Professor, Department of Civil & Environmental Engineering, Louisiana State University
Bruce Wickert	Saturday Intermediate Ride Chair, Baton Rouge Bike Club
Bryan Harmon	Interim Director, Department of Public Works, City of Baton Rouge/Parish of East Baton Rouge
Councilmember Buddy Amoroso	East Baton Rouge Parish Metropolitan Council District 8
Councilmember C. Denise Marcelle	East Baton Rouge Parish Metropolitan Council District 7
Carl Dabadie, Jr.	Chief of Police, Baton Rouge Police Department
Cathy F. Gautreaux	Executive Director, Louisiana Motor Transport Association
Cathy Perry	Chief of Staff for Lieutenant Governor Jay Dardenne
Chad Guillot	Interim Administrator, Emergency Medical Services, City of Baton Rouge/Parish of East Baton Rouge
Councilmember Chauna Banks-Daniel	East Baton Rouge Parish Metropolitan Council District 2
Councilmember Chandler Loupe	East Baton Rouge Parish Metropolitan Council District 3
Chris Davezac	Director, Department of Public Works, City of Zachary
Connie Fabré	Executive Director, Greater Baton Rouge Industrial Alliance
Cordell Haymon	Board Chairman, Center For Planning Excellence
Crissie Molina	Technical Writer, Office of Research and Economic Development, Louisiana State University
Honorable David Amrhein	Mayor, City of Zachary
David Barrow	Chief Administrative Officer, City of Central
Davis Rhorer	Executive Director, Downtown Development District
Dennis Hebert, Sr.	Pastor, True Light Baptist Church

Stakeholders	Title/Organization
Councilmember Donna Collins Lewis	East Baton Rouge Parish Metropolitan Council District 6
Dr. Eric Kalavoda	Deputy Secretary, Louisiana Department of Transportation and Development (DOTD)
Elizabeth “Boo” Thomas	President/CEO, Center For Planning Excellence
Eric Romero	Interim Director of Information Services, City of Baton Rouge/Parish of East Baton Rouge
F. King Alexander	President and Chancellor, LSU
Frank M. Duke	FAICP Planning Director, East Baton Rouge Parish Planning Commission
Gerard Anthony Robinson, Sr.	Pastor, McKowen Missionary Baptist Church
Graysen Walles	CEO, Mentorship Academy
Gus Kousoulas	Associate Vice Chancellor, Office of Research and Economic Development, Louisiana State University
Honorable Harold Rideau	Mayor, City of Baker
Hayley Brown	Manager, Human Resources Business Partner, Axiall Corporation
Ingolf Partenheimer	Chief Traffic Engineer, City of Baton Rouge/Parish of East Baton Rouge
Honorable James E. “Jimmy” Durbin	Mayor, City of Denham Springs
Jamie Setze	Executive Director, Capital Region Planning Commission
Jason Chapman	Data Collection and Analysis Administrator, Louisiana Department of Transportation and Development (DOTD)
Jay Dardenne	Lieutenant Governor, State of Louisiana
Jeff Campbell	Senior Director, Administrative Services and Risk Management, Louisiana State University
Jessica Kemp	Vice President, Policy and Advocacy, Center for Planning Excellence
Jocelyn Johnson	Interim Chief, Southern University Police Department
Jody Colvin	Traffic Engineering Division Administrator, Louisiana Department of Transportation and Development (DOTD)
Councilmember Joe Boe	East Baton Rouge Parish Metropolitan Council District 9
Honorable Joey Normand	Mayor, City of Brusly
John Broemmelsiek	ITS/Traffic Operations Engineer, Federal Highway Administration (FHWA)
Councilmember John Delgado	East Baton Rouge Parish Metropolitan Council District 12
John Spain	Executive Vice President, Baton Rouge Area Foundation
Johnny Anderson	Executive Church Administrator, Greater King David Baptist Church
Honorable Jr. Shelton	Mayor, City of Central
Justin Priola	Senior GIS Coordinator, East Baton Rouge Parish Planning Commission
Kathy M. Stuart	Executive Director, West Baton Rouge Chamber of Commerce
Kirk Zeringue	Senior Special Studies Research Engineer, Louisiana Transportation Research Center

Stakeholders	Title/Organization
Lawrence Rabalais	Chief, Louisiana State University Police Department
Honorable Layton Ricks	Parish President, Livingston Parish
Leo D. Cyrus, Sr.	Pastor, New Hope Baptist Church
Logan Anderson	Policy and Research Project Manager, Baton Rouge Area Chamber
Captain Marshall Walters	Louisiana State University Police Department
Mark J. Morvant	Associate Director, Research, Louisiana Transportation Research Center
Mary Stringfellow	Program Delivery Team Leader, Federal Highway Administration
Matt Watson	Legislative Assistant, Councilmember Heck, East Baton Rouge Parish Metropolitan Council District 11
Honorable Melvin “Kip” Holden	Mayor-President, City of Baton Rouge/Parish of East Baton Rouge
Michael DiResto	Senior Vice President of Economic Development, Baton Rouge Area Chamber of Commerce
Michael Falcon	Traffic Engineer, Department of Public Works, City of Baton Rouge/Parish of East Baton Rouge
Michael Songy	CEO, CSRS
Honorable Mike Lambert	Mayor, Town of Sorrento
Nick Ferlito	Engineer Manager, Neel-Schaffer Engineers
Paul Sawyer	Director of Federal Programs, State of Louisiana Department of Economic Development
Rachel DiResto	Executive Vice President, Center for Planning Excellence
Ravi Ponnappureddy	Director of Transportation, Capital Region Planning Commission
Bishop Raymond Johnson	Founder and Pastor, Living Faith Christian Center
Rayford Thomas Iglehart, Sr.	Pastor, Gloryland Baptist Church
Raymond Anthony Jetson	Pastor, Star Hill Church
Dr. Richard Koubek	Dean, College of Engineering, Louisiana State University
Honorable Richard Lee III	Mayor, City of Port Allen
Honorable Rick Ramsey	Mayor, Town of Walker
Honorable Riley Berthelot	Parish President, West Baton Rouge Parish
Captain Robert Stone	Traffic Commander, East Baton Rouge Sheriff’s Office
Roger Husser	Director of Planning, Design and Construction, Office of Facility Services, Louisiana State University
Ronald Mason, Jr.	President, Southern University System
Councilmember Ronnie Edwards	East Baton Rouge Parish Metropolitan Council District 5
Ronnie Harris	Executive Director, Louisiana Municipal Association
Ronnie Robinson	Assistant District Administrator, Louisiana Department of Transportation and Development (DOTD)

Stakeholders	Title/Organization
Councilmember Ryan Heck	East Baton Rouge Parish Metropolitan Council District 11
Ryan Holcomb	Assistant Director, East Baton Rouge Parish Planning Commission
Sarah Paul Edel	Traffic Engineer, Department of Public Works, City of Baton Rouge/Parish of East Baton Rouge
Councilmember Scott Wilson	East Baton Rouge Parish Metropolitan Council District 4
Sheila Ponders	Director, Customer Service, Entergy Louisiana
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Sherri LeBas	Secretary, Louisiana Department of Transportation and Development (DOTD)
Sid Gautreaux III	Sheriff, East Baton Rouge Sheriff's Office
Stephen Deselles	Operations Manager, Mall of Louisiana
Representative Steve Carter	District 68, Louisiana House of Representatives
Councilmember Teri Casso	Ascension Parish
Councilmember Tara Wicker	East Baton Rouge Parish Metropolitan Council District 10
Thomas "Brad" Ponder	Business Unit Leader, CSRS; Program Manager, The Green Light Plan
Tom Stephens	Chief Design Engineer, Department of Public Works, City of Baton Rouge/Parish of East Baton Rouge
Councilmember Trae Welsh	East Baton Rouge Parish Metropolitan Council District 1
Captain Waldon Robert	Traffic Commander, Baton Rouge Police Department
Warren Kron	GIS Manager, Information Services, City of Baton Rouge/Parish of East Baton Rouge
William Daniel	Chief Administrative Officer, City of Baton Rouge/Parish of East Baton Rouge

## B. Team biographies



**Maria Fernandez**  
Senior Counsel  
Alliances and Microelectronics Division  
Somers, NY, US

Maria Fernandez is Senior Counsel, Alliances and Microelectronics Division at IBM. In her current role, Fernandez and her team oversee all legal aspects associated with the division, which includes semiconductor and packaging process development and manufacturing, sales and marketing for the OEM microelectronics business, as well as all legal issues associated with several development and manufacturing locations. Fernandez leverages her technical, business and legal knowledge to structure, prepare and negotiate technology-related agreements for the IBM Microelectronics and Research divisions, such as joint development, alliances, acquisitions and divestitures.

Previously, Fernandez was Senior Counsel, Trust and Compliance Officer responsible for overseeing and managing the team that designs and implements the company's global compliance program, communication strategies and employee training modules. Fernandez has held various legal roles and worked in both Latin America and the US during her 22 years with IBM.

Fernandez holds a Bachelor of Arts degree in psychology from Lehman College, City University of New York, and a Juris Doctor from Cornell University School of Law. She is admitted to the bars of New York and California and the US Supreme Court. Fernandez sits on the Board of LatinoJustice PRLDEF and is on the board of the Cornell Law School Alumni Association. She serves on the Council of Urban Professionals (CUP) Fellows Alumni Board and is a member of the Advisory Board of the Pre Law Institute at John Jay College. She was a 2011CUP Fellow. She is married with three children.



**Marie Wallace**  
Analytics Strategist  
Dublin, Ireland

Marie Wallace is an Analytics Strategist for IBM. She crafts analytics strategy across the IBM Social Business and Smarter Workforce organizations and leads the company's big data engagement analytics solution development. Wallace spent more than a decade in the IBM Research and Development organization, building content, semantic and social analytics technologies that today underpin solutions, such as IBM Watson™ offerings. In recent years, her primary focus has been on the analysis of people networks to deliver smarter, personalized and contextualized solutions for individuals and organizations.

Wallace is a lover of technology and is fascinated with all things analytics. She has a particular interest in how analytics transforms the ways people live and work. Wallace is a globally recognized thought leader in analytics with an active social media presence and a popular blog, AllThingsAnalytics.com.

Wallace holds a bachelor's degree in applied physics from the University College Galway in Ireland and a master's degree in applied physics from Queens University in Northern Ireland. She is passionate about history and the humanities and sits on the advisory boards of the Digital Repository of Ireland at the Royal Irish Academy and the Digital Arts and Humanities PhD Program at Trinity College, Dublin. In her spare time she loves to sail and go skiing whenever the opportunity arises.



**Karthikeyan Seetharaman**  
Practice Leader  
Smarter Cities  
Germantown, MD, US

Karthikeyan Seetharaman works as a practice leader on the IBM Smarter Cities team. In this role, he helps customers craft the right IT solutions for their growth objectives. Seetharaman provides technical leadership to solution implementation teams. Recent solutions include a monitoring and traffic management system for a state highway authority, a monitoring system for water quality that provides water resources data to city water agencies and a license revenue fraud detection system for city management.

Seetharaman has 20 years of experience with IBM. During his formative years with IBM India and IBM Watson Research Centers, he developed electronic marketplaces for IBM WebSphere® Commerce suite products. His other works include the development of Integrated Information Framework and Integrated Information Core products.

Seetharaman holds a bachelor's degree with honors in mechanical engineering from Birla Institute of Technology and Science, Pilani, India, and an MBA with a concentration in finance and information technology from the Stern School of Business, New York University. He enjoys classical Indian music and hiking on the many trails in Maryland. He is fluent in English, Hindi and Tamil and lives in Maryland with his wife and son.



**Dr. Chai Wah Wu**  
Research Staff Member and Manager  
Numerical Methods Group  
Yorktown Heights, NY, US

Dr. Chai Wah Wu is currently a Research Staff Member and Manager of the Numerical Methods group at IBM T. J. Watson Research Center in Yorktown Heights, NY, leading a team of talented researchers to develop next-generation solutions for modeling, analyzing, controlling and optimizing complex systems.

Dr. Wu has been with IBM since 1996 and has worked on projects in many fields, including circuit tuning, image half-toning, optimization and scheduling. Dr. Wu has been published extensively in more than 200 peer-reviewed publications and has been granted more than 65 US patents. His recent awards include the IBM Outstanding Technical Achievement award and the Institute of Electrical and Electronics Engineers (IEEE) Region 1 Technological Innovation Award. He was elected to fellow grade of the IEEE in 2001. In 2006, he was on assignment as Technical Staff to the VP of Technical Strategy and Worldwide Operations and was responsible for coordinating and managing the yearly IBM Global Technology Outlook effort.

Dr. Wu holds degrees in cognitive science and computer engineering from Lehigh University, masters' degrees in mathematics and electrical engineering and a PhD in electrical engineering from the University of California at Berkeley. Dr. Wu's formative years were spent in several places around the world, including Hong Kong, Netherlands Antilles and the US. He speaks Cantonese, Dutch, English and Papiamentu.



**Jose Alfredo González Altamirano**  
IBM Strategy Executive  
Mexico City, Mexico

Jose Alfredo González Altamirano is currently the Strategy Executive for IBM Mexico. In this role, he is responsible for applying global strategy at the country level and for creating the IBM Mexico Roadmap 2017.

Altamirano has been with IBM for 24 years and has served in various client-facing roles, from client executive to marketing strategist in the financial services sector, working primarily with large banking institutions. He has held positions at IBM in Mexico and Spain and has spent most of his career working with clients on business transformation strategies.

In 2006, Altamirano took on an additional assignment, serving as the People with Disabilities Country Leader for Mexico. In this role, he worked on integration and inclusion programs for people with disabilities within IBM. He also has been an ongoing active volunteer in his community through the IBM On Demand Volunteer program, mentoring elementary school children.

Altamirano holds a bachelor's degree in civil engineering and architecture, as well as an MBA from Instituto Tecnológico y de Estudios Superiores de Monterrey in Mexico. He has completed executive leadership programs for IBM at Harvard Business School and Boston University Business School. He is married and has one son. In his spare time, Altamirano enjoys reading, music, painting and travel. He also enjoys swimming, golfing and watching movies. He speaks English and Spanish.

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City-Parish Planning Commission (CPPC). Office of the Planning Commission. <http://brgov.com/dept/planning/default.asp>

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Federal Highway Administration Research and Technology. Federal Highway Administration. US Department of Transportation. [www.fhwa.dot.gov/research/researchopportunity](http://www.fhwa.dot.gov/research/researchopportunity)

Intelligent Transportation Systems. Office of the Assistant Secretary for Research and Technology. US Department of Transportation. [www.its.dot.gov](http://www.its.dot.gov)

## **Baton Rouge region traffic and public transit projects/studies**

Baton Rouge Loop. [www.brloop.com](http://www.brloop.com)

Future BR. Comprehensive Plan. CPPC.  
<http://brgov.com/dept/planning/cpElements.htm>

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<http://brgov.com/dept/dpw/traffic/pdf/flowcount.pdf>

Louisiana Crash Data Reports. <http://datareports.lsu.edu>

The Green Light Plan. <http://greenlight.csrsonline.com/HOME.aspx>

## **Transit and traffic departments and websites**

3-1-1 Call Center. Baton Rouge Department of Public Works.  
<http://rgov.com/dept/dpw/311>

Way to Geaux. App. <http://play.google.com/store/apps/details?id=com.infolog.waytogeaux>

Traffic Engineering. Baton Rouge Department of Public Works.  
<http://brgov.com/dept/dpw/traffic>

CRPC. Facebook page.  
[www.facebook.com/CapitalRegionPlanningCommission](http://www.facebook.com/CapitalRegionPlanningCommission)

City-Parish Planning Commission, Office of the Planning Commission. <http://brgov.com/dept/planning>

Highway Safety Research Group. <http://hsrg.lsu.edu>

## **Local industry and civic organizations**

Greater Baton Rouge Industry Alliance. [www.gbria.org](http://www.gbria.org)

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## Chief Innovation Officer

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## D. Chief Innovation Officer job description

While the City of Baton Rouge should identify specific skill requirements for the Chief Innovation Officer (CIO) position, here are some recommended responsibilities to consider. In general, the CIO needs to have the appropriate skills to fulfill the responsibilities listed here and should be a true innovation leader rather than a traditional IT professional.

- **Shared data exchange** — The CIO will be responsible for collaborating with the data champion on uniform and strategic technology-related policies and infrastructure for shared data exchange, as well as for chairing the technology team. Additional responsibilities include establishing the criteria for and performing analytical reviews of shared data.
- **Communication** — The CIO will implement and maintain effective systems that foster real-time communication among internal and external stakeholders.
- **Standards** — The CIO should be able to develop, review and update IT-related policies and procedures that govern, among other things, administrative and operational standards and architecture. The CIO will align overarching technical policies with the strategic business initiatives of the City of Baton Rouge/Parish of East Baton Rouge.
- **Performance** — The CIO will implement key performance improvement projects, develop implementation plans and create supporting policies. The CIO will be responsible for creating and implementing performance-related metrics to measure and evaluate results against established goals.
- **IT infrastructure** — The CIO will determine the infrastructure platform needs of Baton Rouge, consolidate existing technology infrastructures into a common platform and integrate and host all City of Baton Rouge/Parish of East Baton Rouge data on that common platform.
- **Human resources** — The CIO will administer IS HR services, including recruiting, staffing, employee/labor relations, employee engagement, employee benefits, workforce development, classification and compensation, performance management, employee discipline and training.
- **Security** — The CIO will implement and manage security policies and procedures that protect data and networks from a variety of threats and malicious activity.



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