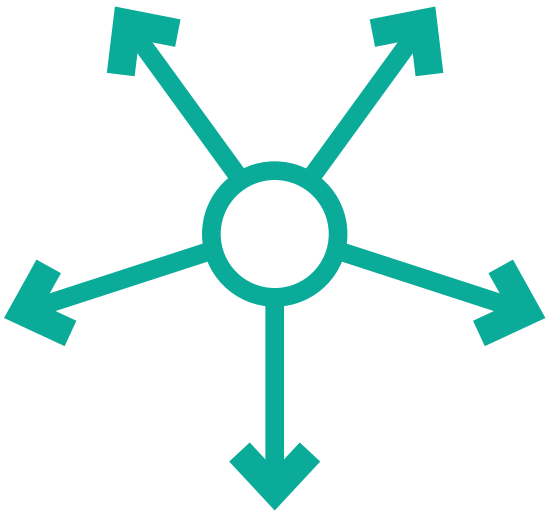
Tri-County Emerging Mobility Strategy

2020



Tri-County Regional Planning Commission

Tri-County
Emerging Mobility Strategy

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2020

This plan was prepared by TCRPC staff in collaboration with its member agencies, partnership organizations, and local stakeholders.

Tri-County Regional Planning Commission

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Context

Introduction

The Tri-County Regional Planning Commission (TCRPC) released their Smart Region Strategic Plan with the goal of creating a "Smarter, Greater Peoria"[1]. The goal of the strategic plan is to ensure that all segments of the region's population benefit from the disruptive changes resulting from new smart mobility technologies and innovations, while at the same time fostering overall regional economic development and reducing transit disparities. The plan is meant to create clearly identified strategies to support collaboration among agencies while encouraging partnerships with nonprofit organizations, private companies and other regional stakeholders. In addition, the Plan should also help local agencies secure grants aimed at creating redevelopment opportunities.[2] In conjunction with the Smart Regional Strategic Plan, the Tri-County Regional Planning Commission also pursued a US Department of Transportation (US DOT) Automated Driving System (ADS) Demonstration Grant application titled "Will It Drive in Peoria".[3] This grant sought to create a test market for connected and automated vehicles in the Greater Peoria area. The application, along with TCRPC's Smart Region Strategic Plan, showcases an interest and commitment to new transportation technology as a way to spur economic development and reduce transit disparities. The strategies included will create a local, vibrant, employment environment that acts as a catalyst for both retaining population and adding people to the region.

1. Smart Region Strategic Plan
2. IBID
3. https://www.transportation.gov/policy-initiatives/automated-vehicles/41-tri-county-regional-planning-commission-il

Image: *Peoria Skyline*
Image source: *Moonshot; https://flic.kr/p/po4EwK*

The disruptive change of new transportation technologies poses both challenges and opportunities for the Greater Peoria region. Existing ways of doing business will need to change in order to foster a more inclusive and collaborative approach while positioning the region to take advantage of these technology trends. The Greater Peoria's mobility future will see residents, agencies, companies and organizations grealy impacted by these technological advancements. By proactively creating a Smart Region Strategic Plan, the TCRPC has demonstrated how the region is looking at new, shared mobility technologies as a means to meet the future needs of the Greater Peoria community.

Existing Physical and Technological Infrastructure

The city of Peoria and the Greater Peoria metropolitan region has a population of just over 368,000 based on the 2018 US Census.[4] That makes the Greater Peoria Metropolitan area the 2nd largest in the state of Illinois after the Chicago Metropolitan area. The most recent labor report indicates that the regional unemployment and labor participation rates lag behind those at the state and federal level.[5] The Greater Peoria region's workforce has a higher level of high school education but a lower level of undergraduate and graduate degrees as compared to both the state and federal level.[6] Major employers in the region include Caterpillar with over 13,100 employees, OSF St. Francis Medical Center with 6,000 employees, UnityPoint Health with over 3,000 employees and others including Komatsu American Corp, Ameren Illinois and Bradley University.[7]

Regional Transportation Infrastructure

The Greater Peoria region supports over 2,200 jobs in the transportation and logistics industry, which is 128% above the national average.[8] The high employment level in the transportation and logistics industry is due to a number of factors. These include the location of the town in relation to other major metropolitan areas, access to the Illinois River, a rail terminal and rail line infrastructure, an international airport as well as a large, well established, agriculture and farming sector.

The city of Peoria sits near four major metropolitan areas, and is located 160 miles (approximately half way) between Chicago and St. Louis and almost half way between Indianapolis (213 miles) and Des Moines (260 miles). The intersection of the corridors linking these major metropolitan cities means that the Greater Peoria area has direct access to interstates I-74, I-55 and I-474 along with linkages to I-39, I-57, I-80 and I-88.[9] Due to its location, trucking logistics companies such as FedEx Ground Package

4. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk
5. https://data.greaterpeoria.us/workforce/
6. Ibid.
7. https://www.greaterpeoriaedc.org/data/regional-economy/
8. https://www.greaterpeoriaedc.org/logistics-transportation/
9. Ibid.

System and US Freightways, amongst others, have offices in the region to support the flow of goods to and through the region.[10]

Peoria is also situated on the Illinois River which links Lake Michigan to the Mississippi River. 13 Million tons of cargo pass through its local docks.[11] Peoria also has its own terminal and switching railroad, as well as four regional carriers and a number of rail lines.[12] Finally, the Greater Peoria region supports the Peoria International Airport which has non-stop flights to over 10 cities.[13] These available transportation networks also support a large and established regional farming industry, with world leading companies in the food industry including ADM, Monsanto, Syngenta and others having commercial production and processing facilities in the region.[14] The number of people employed in the transportation and logistics industry, as well as the breath of existing infrastructure, should be considered as a major asset to the region.

Key Transportation Agencies and Stakeholders

CityLink

The Greater Peoria's transit operator, CityLink, operates 23 routes, transporting around 2.7 million passengers in fiscal year 2018.[15] CityLink uses over 100 vehicles, both for traditional bus operations as well as for paratransit.

CityLink currently serves routes throughout the City of Peoria, and provides connectivity to key destinations outside of Downtown, such as commercial centers, the airport, library, county jail, Illinois Central College, and Pekin. Those areas outside of regular transit service can qualify for the door-to-door CountyLink service.

The CityLink Transit Center is located between Downtown Peoria and the river, at the intersection of Highway 40 and SW Adams Street, and provides transfers for all lines in the system. An additional transfer point is located at the Northwoods Mall, located to the northwest of Downtown.

As of the start of 2020, CityLink service is undergoing a service redesign planning process that will recommend updates to the system and other other improvements throughout the service. CityLink has outlined several initiatives to be implemented over the next several years, including:

- Intelligent Transportation System (ITS) infrastructure;
- Purchase of battery-electric busses and charging infrastructure;
- Renovation of current bus service lane;
- Renovation and upgrades to the maintenance/ operation/administration facility;
- Exploration into a bus collision avoidance system.

Image: *CityLink Bus*
Image source: *rideCitylink.org*

Image: *CityLink Transit Center*
Image source: *rideCitylink.org*

10. https://www.greaterpeoriaedc.org/logistics-transportation/
11. Ibid
12. Ibid
13. Ibid
14. http://greaterpeoriaedc.org/wp-content/uploads/2018/05/GPEDC-Food-Industry-2018.pdf
15. https://www.ridecitylink.org/wp-content/uploads/CityLink-On-the-Move-Existing-Conditions-Report_MedRes.pdf

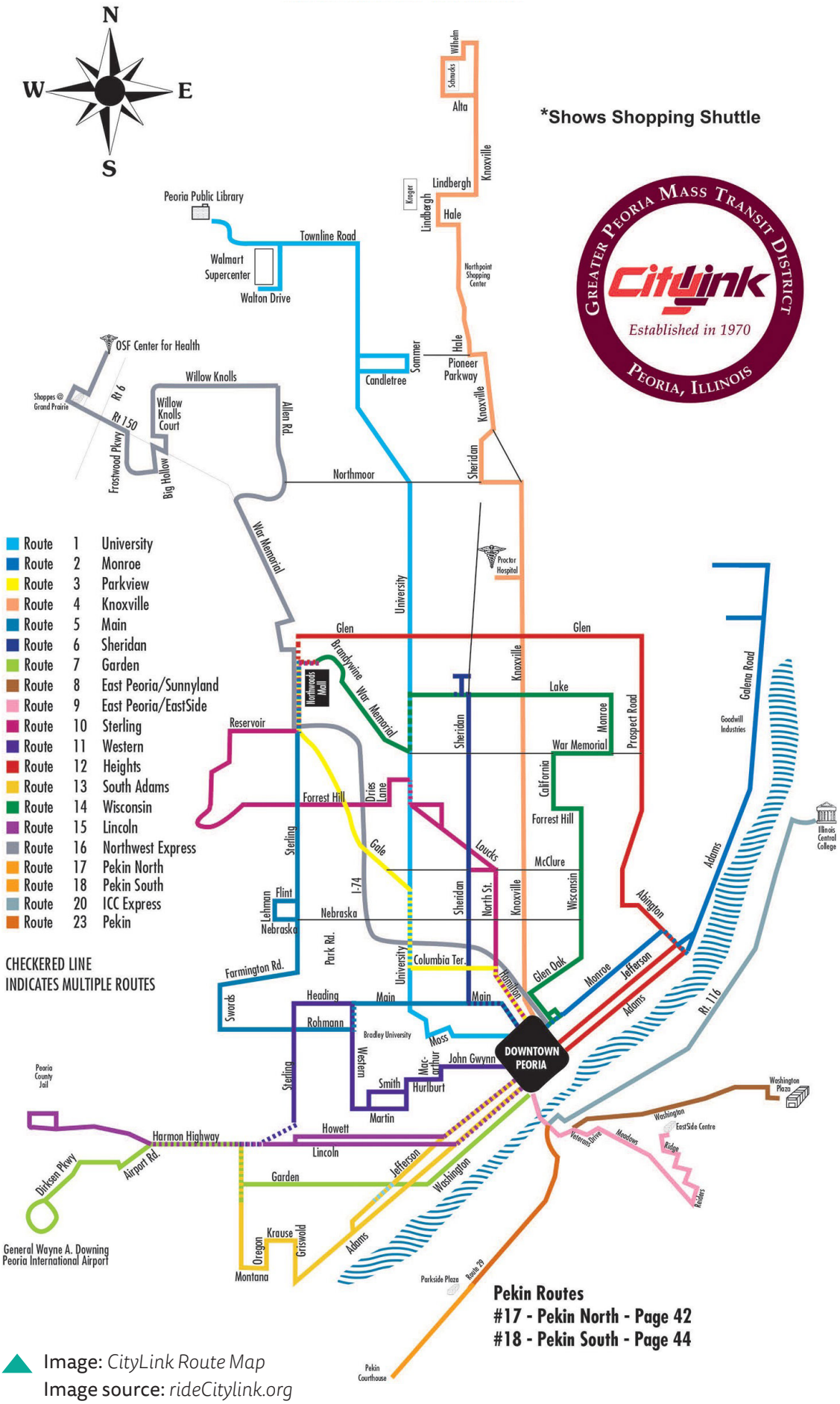


Image: *CityLink Route Map*
Image source: *rideCitylink.org*

IDOT

The Illinois Department of Transportation (IDOT) has installed traffic cameras and dynamic message signs (DMS) along with fiber optic communications to help with traffic congestion and management along the major roadways in the Greater Peoria Region. This includes I-74, I-474 and on smaller roads including US-150 and IL 29.

Currently, IDOT is rehabilitating and reconstructing the eastbound US 150 traffic on the McClugage Bridge across the Illinois River. The average daily traffic use of over 20,000 eastbound vehicles predicts that the current two-lane bridge will be insufficient for accommodating future traffic needs. Furthermore, the needs of cyclists and pedestrians must be considered since this bridge is a major crossing point over the Illinois River.[16]

In addition to the McClugage Bridge work, IDOT is also working on the Murray Baker Bridge, which will close in April of 2020 for seven months to replace the bridge's deck. In addition to replacing the decking, IDOT will be installing weather sensing pucks and, when networked and integrated with DMS, will allow motorist to know about roadway conditions on the bridge, including when there are icy roadway conditions. During the bridge closure, IDOT will reroute traffic away from the bridge crossing utilizing traffic cameras and DMS to alleviate the congestion and reduce travel times.

Future planned IDOT project work in the Greater Peoria region (which currently lack funding) includes Illinois Route 29, where a completed study looked at proposed improvement enhancements including increased travel efficiency, providing better transportation continuity, and facilitating modal interrelationships along IL Route 29 between IL Route 6 and Interstate 180.[17] Another potential project is Illinois 336, where a study was completed on a proposed four-lane highway to provide a modern motorized transportation route from Peoria to Macomb.[18]

City of Peoria

The City of Peoria recently released a request for proposal (RFP) for street light conversion and enhancements. This proposal includes retrofitting city streetlights with LED

Image: *McClugage Bridge*
Image source: *Anton Peck, https://flic.kr/p/6Gtirj*

technology that reduces the overall costs and enhances streetlight functionality by implementing advanced controls.[19] In addition, the city wishes to explore the deployment of environmental sensors that can provide data to support a variety of smart city technologies including advanced traffic signal controls, parking control and enforcement, pedestrian and traffic counts as well as public wifi, public information kiosks and electric vehicle charging.[20]

The City is planning on a phased project to convert Adams Street and Jefferson Avenue from one-way traffic to two-way traffic. These are important urban corridors through the heart of Downtown Peoria and extend parallel to the river, providing connections between significant business, commercial, cultural, and industrial areas. Redevelopment has taken place along these corridors, with more redevelopment planned in the coming years, especially in and around the Downtown area. The conversion of these roads could be an opportunity to incorporate new ideas and technologies into the infrastructure in ways that increase mobility options, highlight innovation, and work to support the ongoing redevelopment efforts in the area.

Ameren

Ameren is an electric and natural gas utility that serves customers in both Illinois and Missouri. In October of 2019, Amaren announced the implementation of a large-scale project to fortify the electric grid in Peoria and Stark

16. http://mcclugagebridgeproject.com/project-overview/project-background/
17. http://idot.illinois.gov/projects/il-29-project-study
18. http://www.fultonco.org/wp-content/uploads/2014/02/Route_336_Corridor_Plan___July_11_2011_reduced_size.pdf
19. http://www.peoriagov.org/content/uploads/2012/11/43-19_City-of-Peoria_RFP-for-Street-Light-Conversion-and-Enhancement_FINAL-low-res_1571867589_add.pdf
20. Ibid

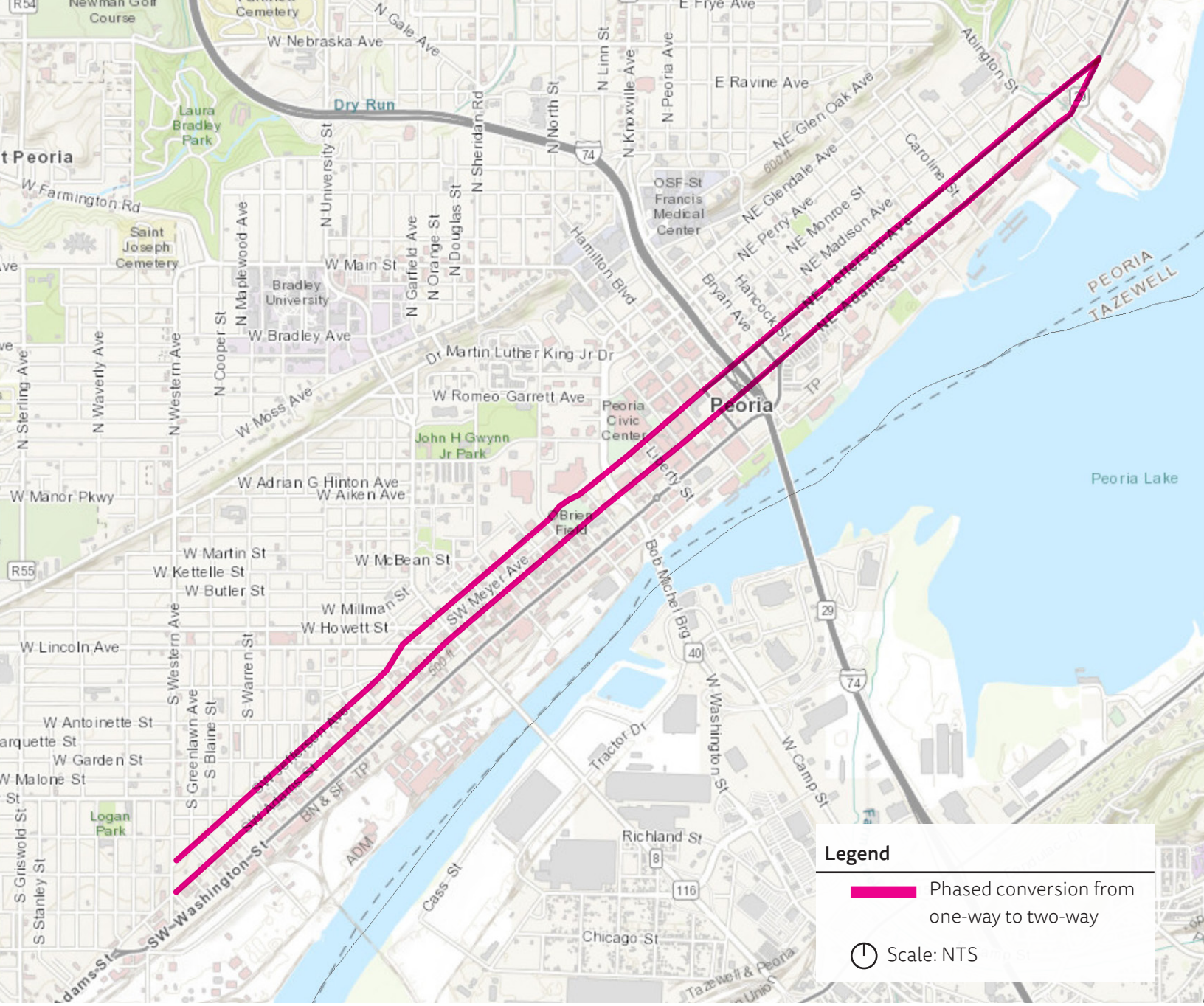


Image: *Peoria Corridor Conversions*
Map Image source: *ESRI*

counties. In addition, the company is nearing completion on more than 20 underground transformers with smart switch technology that can detect faults on the system and re-route power from another source in the event of an outage in downtown Peoria.[21]

AutonomouStuff and Nexmobi

AutonomouStuff is a private company that produces open-source platforms that combines sensors, software, and other critical components to enable vehicle and robotic autonomy. The company started in 2010 and has been located in Morton, IL since then.

Nexmobi is a non-profit organization located in Peoria with a focus on the implementation of autonomous systems to promote economic development in the region.

Starting in the summer of 2019, Downtown Peoria has been operating as a testbed for the region's own autonomous systems company to test autonomous vehicles and systems within a mixed-traffic environment.[22] The testing has been narrowed to a small block in Downtown, adjacent to the Adams Street corridor.

21. http://ameren.mediaroom.com/2019-10-25-Ameren-Illinois-Storm-Hardening-30-Mile-Stretch-of-Power-Grid-from-Peoria-County-to-Stark-County
22. https://autonomoustuff.com/services/open-autonomy-pilot/

2

Transportation Technology Trends

Current trends in technology and mobility

There are a number of emerging technology trends which will have an impact on transportation access and usage for the Greater Peoria region. While not every technology that is currently being conceived and developed will make its way to the region in the near-term. Many of these cutting edge technologies will become a part of the fabric of the local community.[23]

ACES

Autonomous, Connected, Electric, and Shared (ACES) are the four key trends that are certain to definine the future of mobility. These trends are allowing new modes and new service models to be developed, challenging the traditional notions of mobility and transportation. As advancement in each of these categories continues to progress at a rapid pace, the coming changes in mobility will provide new opportunities for how people move around our cities and places.

Autonomous - The ability for a vehicle to navigate and operate without human intervention. These systems have been progressing rapidly over the last several years, with companies deploying vehicles in mixed-traffic throughout the world.

Connected - The ability for information and data to be communicated. For consumers, this is best exemplified through the rapid adoption of smartphone technology, which has enabled new forms of mobility such as TNCs and shared mobility, but also new features such as trip planning and mobile payments. In a broader sense, the

23. https://www.mobilitychoiceblueprintstudy.com/assets/docs/MCB_Final_Report_.pdf

Image: *Micromobility - eScooter*
Map Image source: *ecitycycles.com*

Image: *Drone delivery*
Map Image source: *Safesmartcity.com*

Image: *Autonomous microshuttle*
Map Image source: *Muji.com*

Image: *Autonomous delivery vehicle*
Map Image source: *Forbes.it*

deployment of advanced communications technology is a critical component to managing our transportation system, ensuring better safety, and enabling advanced functionality in autonomous vehicles.

Electric - The electrification of the country's vehicle fleet is already underway. While the number of electric vehicles on the road is still comparitively low, economic forces will push toward a larger share of electrified mobility once it reaches cost parity is reached with internal combusion engines.

Shared - This can refer to a shared trip or a shared vehicle. Examples of a shard trip include a Transportation Network Company (TNC) that can pick up multiple passengers, or a shared vehicle, such as a bikeshare or a scootershare.

Emerging Mobility Systems

The new mobility systems that have been emerging over the past several years cover a wide variety of technologies that are affecting existing transportation systems in both a positive and sometimes, negative ways.

New Modes and Models

The Share Mobility Use Center defines shared mobility as transportation services and resources that are shared among users, either concurrently or one after another.[24] Shared mobility technologies cover bikes to scooters and car sharing to transportation network companies.

» **Bike Sharing** – A service in which bicycles are made available for shared use to individuals on a short term basis. Bicycles are located at docking stations, or dockless systems allow bicycles to be parked anywhere. Companies that offer this service include Jump and Lime.

24. https://sharedusemobilitycenter.org/what-is-shared-mobility/

Image: *Autonomous Vehicle Platform*
Map Image source: *Autonomoustuff.com*

» **Scooter Sharing** - Similar to bikesharing, but the mode of transport is electric scooter. Electric scooter sharing can be docked or dockless systems. Companies that offer this service include Bird, Lime, and Spin.

» **Car Sharing** - A service in which cars are made available for shared use to individuals on a short-term basis. Companies that offer this service include Zipcar and Getaround.

» **Micromobility** - Micromobility refers to personal shared transportation devices like bicycles, mopeds, and e-scooters that are paid for through an app.

» **Microtransit** - A privately or publicly owned and operated shared transportation system that can offer fixed routes and schedules, as well as flexible routes and on-demand scheduling. The vehicles generally include vans and buses. Companies that offer this service include Via Transportation and CityLink.

» **Mobility as a Service (MaaS)** - A shift away from personally owned modes of transportation and towards mobility solutions that are consumed as a service. This is enabled by combining transportation services from public and private transportation providers through a unified gateway that creates and manages the trip, which users can pay for with a single account. Users can pay per trip (single trip MaaS program) or a monthly fee for a metered distance (subscription MaaS program).

» **Ridehailing** - Procuring a ride from a 'for-fare' driver pool accessible through an app-based platform.

» **Ridesharing** - Transportation in which multiple people share the same vehicle to arrive at a similar destination. Includes carpooling and ridehailing services that match passengers with similar routes into a single vehicle. Companies that offer this service include Uber and Lyft.

» **Shared Mobility** - Shared mobility represents the wide range of transportation options involving fleet ownership or fleet operation of various modes of transportation. It includes public transit; taxis and limos; bikesharing; carsharing; ridesharing; ridesourcing or ride-hailing; scooter sharing; shuttle services and microtransit; jitneys and dollar vans; and more.

» **Transportation Network Companies** - TNCs operate ridehailing services. Companies that offer this service include Uber and Lyft.

Vehicle Technology

The past few years have seen a rush of investment in companies and technologies that are starting to revolutionize the way we drive and interact with vehicles.

» **Automated Vehicles** - Vehicles with automated driver assistance features, up to and including driverless vehicles. The Society of Automotive Engineers (SAE) has a classification scheme that categorizes automated vehicles into five levels. Companies that make these vehicles include Waymo (Google) and Uber.

» **Connected Vehicles** - Vehicles with the capacity to communicate with other vehicles and infrastructure through interoperable networked wireless communications. Companies that make these vehicles include Tesla and Cruise.

» **V2I** - Vehicles that are connected by smart technologies to infrastructure (I).

» **V2V** - Vehicles that are connected by smart technologies to other vehicles (V).

» **V2X** - Passing of information from a vehicle to any entity (X) that may affect the vehicle, and vice versa. Includes V2I and V2V.

Transportation Systems Optimization

Transportation systems optimization is the process of determining the most efficient means of moving traffic while maintaining a desired service level in a given roadway system. Cities and States across the U.S. are starting to rollout transportation systems optimization to address traffic management issues and congestion, especially around roadway construction.

» **Adaptive Traffic Signals** - Continuously monitors arterial traffic conditions and the queuing at intersections, and dynamically adjusts the signal timing to optimize one or more operational objectives, such as minimize overall delays.

» **Adaptive Ramp Metering** - Deploys traffic signal(s) on freeway ramps to dynamically control the rate vehicles enter a freeway. This smooths the flow of traffic onto the mainline, efficiently using of existing freeway capacity.

» **Big Data** - Datasets from a variety of public and private sources that are so large or complex that traditional data processing application software is inadequate to deal with them.

» **Smart Parking** - A parking system that uses parking occupancy sensors to provide information to users.

» **Traffic Management Centers** - Traffic management centers collect and disseminate data on weather, roadway, and traffic conditions to manage traffic congestion and to direct incident response.

» **Transit Signal Prioritization** - Adjusts traffic signal green and red times when possible as buses approach to improve bus travel time and reliability.

Travel Information and Payment

With the advent of the smart phone, travelers today have access to a myriad of transit planning and payment options offering seamless integration between different transportation technologies. Companies like Moovit have developed trip planning and payment applications that allow private and public transit operators to integrate their services in a ways that reduce the need for a traveler to utilize multiple stand-alone transit applications.

» **Intermodal Trip Planner App** - An app that melds multiple modes of transportation, allowing commuters to find the fastest, cheapest, and greenest routes to their destinations. Similar to Google Maps, but includes additional travel options such as bikeshare, carshare, microtransit, etc.

» **Mobile Transit App** - An app that allows users to see real-time arrival information for transit services. Could evolve to include all forms of on-demand/scheduled transport in a unified format.

» **Mobile Travel Incentives App** - A trip planning and transportation demand management app that connects users with multiple options for commuting using a leaderboard to encourage more carpooling, biking, etc. Oftentimes the apps are connected to employer incentive programs, allowing users to track commuting behavior and receive benefits from their employer.

» **Transit Mobile Ticketing/Payment** - An app that allows transit riders to pay for fares online and use their phones to present proof of fare upon boarding. Could evolve to include all forms of fare-based transport in a unified payment platform.

Freight & Delivery

The use of networked, automated and connected technology to deliver goods is just beginning to happen. Drone delivery of goods has gained momentum as the Federal Aviation Administration (FAA) has begun approving trial aerial drone delivery service in parts of the United States to complement the ground-based drone testing already underway.

Courier Network Services App - An app that allows customers to request pickup or delivery of goods by a local courier. Customers and couriers use the mobile app to interact and exchange payment. Concept is similar to ridehailing, but provides a different service.

Driverless Freight Package Delivery - Automated (driverless) vehicles delivering packages, food, or other goods. Three are a number of companies that are trying to develop driverless freight package delivery including Amazon, FedEx, Nuro, and Doordash.

Drone Freight Package Delivery - Delivery by an unmanned aerial vehicle or drone of packages, food, or other goods. There are a number of companies that are trying to develop drone deliveries including Amazon and Wing (Google).

Communications Infrastructure

Unlike previous generations, 5G technology can exist in very different versions depending on which of three spectrum bands it operates on. Low-band spectrum (currently used for most LTE networks in the U.S.) allows for large coverage areas and great penetration, but the tradeoff is slower data speeds (around 100Mbps). Mid-band spectrum offers faster speeds (around 1Gbps), but in return coverage area decreases and the network often fails to penetrate buildings. High-band spectrum is what is usually described when 5G is discussed. The solution to improving coverage and penetration lies in trading large cell towers for small cells placed throughout a region at close distances from one another, each covering a small geographic area and together forming a reliable network. The most expected and useful form of 5G would be on high-band spectrum, with small units placed on existing infrastructure such as street poles or the sides of buildings. Small cells use available spectrum more efficiently by re-using the same frequencies in their geographical range.

Much of the technology required for 5G to exist has been successfully tested, but the biggest challenge continues to be figuring out how to implement the required network. The average densification project will involve 100-350 cells per square kilometer by 2020. Some cities will see significant coverage of 5G by 2020; however, the implementation of a broad network will take time. Some analysts and industry insiders warning that a lack of cash and local cooperation could slow 5G rollout or even stall it completely outside the richest, densest cities. According to CTIA, a wireless industry trade organization, to achieve full 5G coverage—carriers will have to roll out an additional 769,000 small cells by 2026. Unlike 4G technology, which uses large cell towers of upwards of 200 hundred feet to achieve coverage, 5G cells need to be placed on poles that are between 20 and 30 feet high, since the coverage range is much smaller than 4G.

The automotive industry is on the edge of a technology change with the adoption of C-V2X. Potential advantages of 5GLTE over DSRC, including greater interoperability, wider bandwidth, increased cybersecurity and a decentralized network that runs on private cell towers instead of dedicated roadside units that the government has to pay for and maintain.

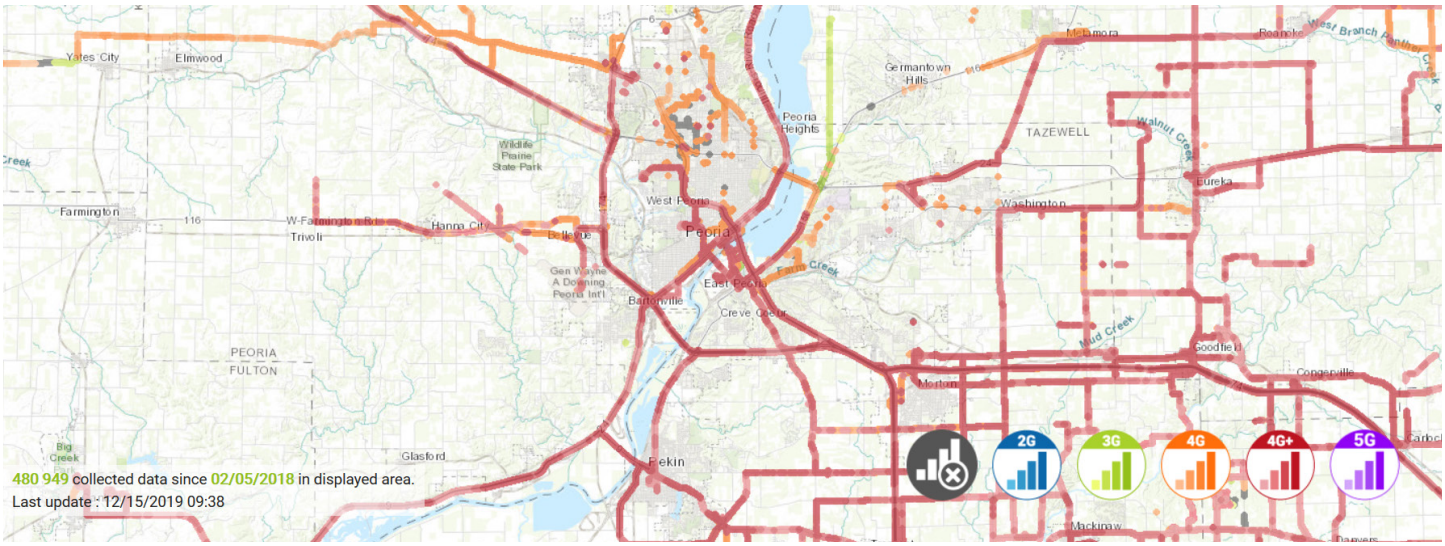
In addition to the auctioning of frequency to spur the deployment of 5G, the FCC has been updating infrastructure policy and encouraging the private sector to invest in 5G networks. This includes speeding up the Federal review of small cells, speeding up State and Local review of small cells, and modernizing outdated regulations to promote the wired backbone of 5G networks.

5G has three main focuses -- mobile networking, IoT, and very high-performance industrial control -- of which mobile networking will be the most important for most people over the next few years. While the 5G standardization process covers core network and base station topology as well as other aspects of running high-performance networks, most of the factors that will affect our first experiences of 5G are affected by the subset of standards called New Radio, or 5G NR. Work on 5G-NR began back in 2016, by the 3GPP, 3G Partnership Project, with the goal of creating standards for 5G –NR.

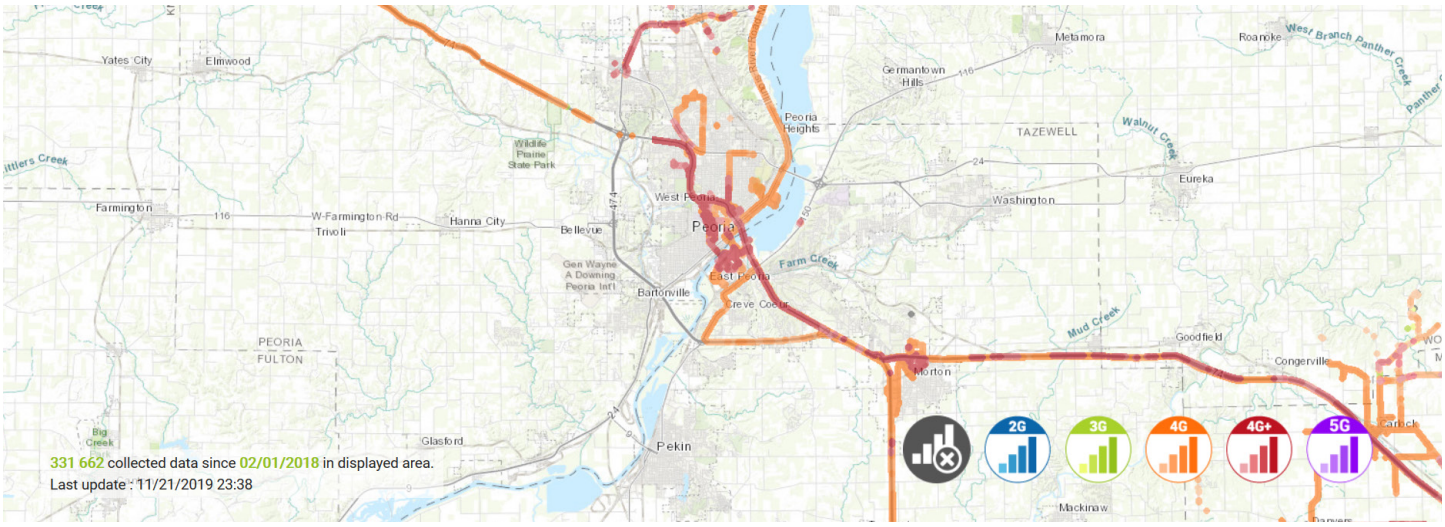
3GPP has defined three broad areas of use for 5G NR: Enhanced mobile broadband: (eMBB) for intensive applications like HD streaming video, gaming, and other streaming uses.

- Ultra-reliable and low-latency communications: (uRLLC) for critical applications like command and control functions in autonomous vehicles and remote control in healthcare and manufacturing services.
- Massive machine type communications: (mMTC) supporting massive IoT, connecting millions of new, low-powered devices at a huge scale.
- In addition to 5G-NR, other aspects to the rollout of 5G include PC5, which allows for a direct interface between vehicles (V2V), infrastructure (V2I) and pedestrians (V2P) which is enabled by C-V2X.

While there is backing from companies and Federal and State governments, the rollout of 5G hasn't taken off without push back from local government entities, consumers, and other stakeholders. Some cities have enacted "dig once" policies that requires all fiber goes into one trench or pipe as opposed to allowing 3 or even 4 different carriers digging, deploying and laying fiber cables on the same street. The permitting process is also overwhelming some cities who don't have the staff or resources to handle the applications and are not permitted by either state or federal law from charging additional permitting fees for approving cell permits.



▲ Image: *Verizon Service Coverage*
Image source: *www.nperf.com*



▲ Image: *AT&T Service Coverage*
Image source: *www.nperf.com*

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Implementation **Framework**

Framework

This Plan is intended to be a high-level roadmap to spur coordination among regional partners. It outlines the desired outcomes and goals related to transportation technology in the region, and gives direction on key projects and initiatives that work toward those goals and outcomes. The goals of this strategy were formulated to ensure the desired outcomes were being addressed through each of the initiatives. Put simply, the goals should be the guiding principles that steer the outcome of the Plan initiatives.

The initiatives outlined in this chapter were identified by examining the context within the region, understanding the emerging trends in technology, and engaging with regional stakeholders to identify where realistic, actionable steps can be developed to meet the goals of the plan. These projects and programs were selected to represent a range of effort and investment, starting small with a prototyping program. Subsequent ideas require increasing capabilities and investment, ending with an infrastructure project that can bring all the previous concepts together. These are intentionally kept at a high-level, and should answer the question of "what to do" and "where to do it." Each of these will require additional efforts to plan, fund, and ultimately implement.

Strategic Goals

What do we want to get out of this plan?

1. **Increase mobility choices for Peoria area residents**
   Mobility can be a matter of choice, and Peoria area residents should have a number of mobility options at their disposal, allowing travelers to choose the method of travel that best fits their needs.

2. **Promote equity**
   Projects, policies, and programs should promote equitable outcomes that leverage the expanding world of transportation and technology for the good of the Tri-County Region's residents.

3. **Spur economic development**
   Projects, policies, and programs should maximize opportunities to leverage public investment, acting as a catalyst for private investment and innovation in the Region.

4. **Facilitate the growth of the technology sector in greater Peoria area**
   Peoria's tech sector has momentum, and efforts should be made to continue and increase that energy through an ecosystem of public/private collaboration that will attract additional and complementary technology partners.

5. **Drive collaboration between regional partners and stakeholders**
   Changes in transportation can present big issues and opportunities, which should be addressed on a regional scale, with wide support of area stakeholders. Projects, policies, and programs should present an opportunity for regional partners and stakeholders to work together to reach positive outcomes.

6. **Highlight innovation in the region**
   Projects, policies, and programs should be innovative enough to highlight the hard work and innovation occurring in the area.

Key Initiatives

Seven Concepts that can catalyze action in the Tri-County Region, while working toward the strategic goals of this plan

Rapid ROW Prototyping

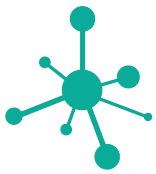
As transportation technologies continue to evolve at an ever accelerated pace, cities throughout the country are faced with the dilemma of managing the operation of these new technologies on permanent, static infrastructure. With the presence of an autonomous vehicle systems company, the Greater Peoria Region will likely see an increase in the types of mobility options using public streets. That could include; autonomous MaaS fleets, autonomous microshuttles, shared electric scooters, and autonomous delivery robots. Rapid ROW prototyping creates a program to configure different rights-of-way allocations in order to test how new and emerging modes interact with the existing transportation system. These prototyping efforts would help the Peoria Region to prepare for the transportation future by evaluating how these new forms of mobility will function through iterative and highly adaptable approaches.

Electrification

Electric vehicles are expected to reach cost parity with internal combustion vehicles by 2025 or sooner. These electric vehicles are nearly silent, produce no pollution from the vehicle and, if the electricity is generated from renewable sources, can be a carbon-neutral option for travelers. Establishing charging facilities throughout key areas of the region is one of the key ways that municipalities and governments can facilitate this change. This initiative would provide charging infrastructure within public parking districts, incentivize installation of charging facilities in residential areas that have no current access, and promote the electrification of the transit fleet.

Creating Foundational Systems

A robust regional communications infrastructure program is needed to promote the advanced communications infrastructure needed to enable the next generation of transportation and emerging mobility to occur. This foundation in advanced communications is a core component of a smart city, enabling a true IoT of infrastructure, as well as the basis for advanced transportation and mobility applications.



Total Mobility App

Combining planning and payment for mobility-services within the Greater Peoria Region will create the bridge between public, quasi-public, and private mobility options. At a minimum, this could include transit passes and planning, on-street parking, public garage parking, and bike share. Third party entities, such as private car-share, ride hailing, dockless e-bikes and dockless scooters could also be incorporated into the planning and payment functions of the app. Consolidating planning and payment of basic mobility services within the region will simplify and increase the usability of public transportation options, providing a frictionless mobility ecosystem for the benefit of the Peoria community.

Mobility Hubs

Providing better options for first-mile/last-mile mobility at transit stops can expand the catchment area of each stop and serve transit riders with better connectivity to their destinations. This may include shared mobility options, such as electric scooters or car-share, along with active transportation approaches such as bicycle storage as a way to encourage transit usage. To be effective, dedicated multi-modal routes should be available to travelers to ensure safety to and from the stop.

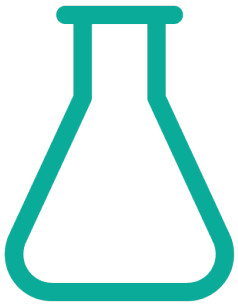
Autonomous and Connected Testbed

Peoria's autonomous technology industry could be promoted through a shared-use testing area combining testing of multiple systems in real-world or near real-world situations. Not only a place for vehicle manufacturers, this area could welcome communications providers, data analysts, and smart infrastructure companies who could all test their products in a broader "smart city" environment. This concept could utilize vacant commercial property in the area, and adjacent corridors that could be used for corridor-specific testing.

Smart Corridor

Complementing the conversion of key corridors from one-way to two-way traffic, Peoria has an opportunity to completely re-imagine what a corridor can be by creating smart corridors.. By combining the latest thinking in the worlds of urban design, mobility, and smart technology, the smart corridor can demonstrate new forms of mobility integration, cutting edge communication, widespread electrification, shared mobility, all supported by infrastructure that was designed specifically for this intent. This concept would use many of the other concepts outlined previously, such as micromobility hubs, innovative ROW approaches, electrification and communications, all accessible through a consumer-facing app.

Rapid ROW Prototyping



An agile development process to pilot new roadway configurations that promote new mobility modes

Background

As transportation technologies continue to evolve at an ever accelerated pace, cities throughout the country are faced with the dilemma of managing the operation of these new technologies on permanent, static infrastructure. With the presence of an autonomous vehicle systems company, the Greater Peoria Region will likely see an increase in the types of transportation using public streets that could include; autonomous MaaS fleets, autonomous microshuttles, shared electric scooters, and autonomous delivery robots.

Currently, our rights-of-way are organized and segregated by mode which, until now, has worked to ensure safety and efficient flow of the system. These spaces are usually segregated by as many as four broad modal categories; pedestrians, cyclists, vehicles, and transit. Trends in mobility such as automation, electrification, connectivity, and shared services are causing transportation to rapidly progress into modes that defy the typical categories that our rights-of-way are designed around. From autonomous vehicles, scooters, personal mobility, and delivery robots, the permanent infrastructure that connects our cities is not capable of accommodating new modes quickly or easily. The geometry of our ROWs is finite, and we cannot continue to expand this space to accommodate an increasingly diverse array of modes. To prepare for a future that has already begun, and to reevaluate how these new forms of mobility will function within our rights of way, we must:

» Better utilize the geometry of our existing right of way;

» Rethink how an expanding variety of modes can be accommodated within the existing space;

» Redefine how our rights-of-way are organized so different modes of transportation and mobility can co-exist without strict modal segregation.

Concept

A program of short-term deployments to test different right-of-way allocations and redefine how new and emerging modes interact with the existing transportation system. This program could explore any of the following components of the system:

Intersections – How can intersections accommodate an increase in modes? How do different modes move through intersections?

» **Signals** – How do signals relate to additional modes? Is any additional equipment required?

» **Lanes** – How can new modes safely move within the existing right of way? Ideas such as slow mobility lanes can be tested, allowing e-scooters and e-bikes a safe environment for operation.

» **Curbs** – Are any changes of the curb needed to accommodate new modes? Can robotic modes function alongside existing curbs?

» **Parking** – How can the need for parking be mitigated through new mobility? How can parking be coordinated with new modes? What are the requirements and best practices for parking shared mobility modes within the public way?

» **Charging and storage** - How can storage and charging of different mobility modes be accommodated?

Because the region offers a number of different development and roadway contexts, this concept would include a multi-faceted program that involves three to four different context areas that may include the following scenarios:

		Modal Category		
		Personal	Shared	Robotic
Context	Urban mixed-use	X	X	X
	Single family residential		X	X
	Arterial	X	X	
	Transit	X	X	

The intent is not for governments to do the actual testing of vehicles, but rather to develop a program that can offer the flexibility for transportation partners to operate within these areas, providing policymakers a better understanding of how these modes can potentially operate within the specific context. Piloting of concepts should be nimble, low risk, easy to implement, and easy to revert. This could be a similar strategy to "tactical urbanism" concepts, and with the intent of producing meaningful information that can inform policy and future mobility decisions for city leaders.

As an example, the City of Columbus, Ohio has developed a similar program that has already tested a "slow mobility" lane that used a portion of a downtown corridor to accommodate emerging modes such as electric shared scooters. The program was not overly complex, and used temporary cones to separate vehicular traffic from personal mobility and transit traffic for a set period of two weeks. This test generated significant data and "lessons learned" that are now being evaluated with the objective for more permanent installations. These types of limited-term pilots allow the City to rapidly test new ideas without significant investment, and provide the needed real-world feedback that can inform future programs and infrastructure investments.

By creating a program to explore solutions to this problem, the Peoria Region can be a pioneer in integrating emerging mobility technologies and modes into the transportation system. Piloting different concepts for how new mobility modes can operate within the community can generate meaningful results, and if successful, can allow the concept to be scaled and potentially institutionalized.

Outcomes

At a minimum, the program will help Peoria leadership and policymakers better understand the capabilities of new and emerging technologies, and to prepare the city for their arrival and continued operation. These outcomes can be categorized in to three broad groups:

» **Policy** – Testing and piloting can provide valuable insight and information that Peoria's leaders can use when crafting policy. This can be a high-level understanding of when and where certain technologies are most applicable, potential use cases, and what role the city may take in promoting or limiting their use.

» **Infrastructure** – What are the potential infrastructure needs for scaling and institutionalizing a concept? The program can generate data to inform long-range transportation plans and capital improvement plans, ensuring that emerging mobility modes are represented and accounted for.

» **Best practices** – What worked and what didn't? These findings can inform future projects, and help provide a basis for testing of future modes. It could also provide data on potential use-cases for new technologies, and allow Peoria to better harness the opportunities they will bring.

Image: *City of Columbus pop-up mobility lane concept*

Image source: *Columbus Underground*

Electrification

Paving the way for the future of electrified mobility

Background

Since the roll-out of the first mass electric vehicles (EVs) over a decade ago, there have been a number of predictions on the speed of adoption of EVs. These vehicles are nearly silent, produce no tailpipe emissions, and if the electricity is generated from renewable sources, can be a carbon-neutral option for travelers. A drawback has been the lack of deployed charging stations creating "range anxiety" or the fear of running out of power. Despite federal and state tax credits, the cost of the EVs have led to lower adoption rates than were initially predicted. Recently, however, there have been a number of both technology changes and infrastructure investments that have led to the growth of EVs in the United States. This includes an 85% reduction in the cost of lithium-ion batteries, which makes up the majority of the cost of EVs.

With both falling battery prices and increased range, the number of EV models has increased along with the number of sales, and this growth is expected to continue. By 2025, it is estimated that just over 21% of all US auto sales (and 67% in California) will be from EVs

Concept

Today's fossil-fuel vehicles require a significant amount of infrastructure, such as fueling stations and maintenance facilities (and the mechanics to staff them) to keep travel easy and efficient. Electric vehicles likewise require their own set of infrastructure and promoting the related investment can help clear the path for electric vehicles.

One of the best ways that municipalities and governments can facilitate this change, is to offer charging facilities throughout key areas of the region. This concept would creates an electrification program to provide charging infrastructure serving public parking districts, and to potentially incent installation in residential areas who have no current access, such as multifamily districts.

Locations

With "range anxiety" highlighted as one of the largest barriers for consumers wanting to purchase an electric vehicle, a program that works to provide charging infrastructure in key areas within the tri-county region will help to address concerns and incentivize the adoption of electric vehicles within the region.

- **Public charging stations** - Charging infrastructure that can be incorporated into existing or planned publically-owned parking areas. Areas can include on-street parking, public lots, public garages, and publically-owned buildings such as libraries and courthouses.
- **Multifamily charging stations** - Unlike people living in single family homes, residents living in multifamily developments may not have access to the charging infrastructure that would make owning an electric vehicle possible. By incenting the installation of charging infrastructure within existing or new multifamily developments, the potential user-base of electric vehicles could expand significantly.
- **Commercial charging stations** - Employees and customers can both utilize charging stations located within commercial areas. Office parks with high concentrations of workers, retail centers and hotels that draw high concentrations of customers would all make ideal candidates. These areas have the added benefit of offering parking incentives for drivers of electric vehicles, reserving premier parking spaces for use by electric vehicles for charging.

» **Transit stops and storage facilities** - Electrification of the transit fleet will require charging infrastructure at key areas within the system. Two potential areas include bus storage and maintenance facilities, where vehicles can charge overnight while not in service. The other location would be coordinated along with transit stops or layovers, where vehicles can get a quick "top-up" charge while waiting for passenger boarding or alighting.

In each of the locations described, the intent is to provide the same level of convenience for drivers using electric vehicles, as those driving conventional vehicles would have, thus reducing the potential "range anxiety" and increasing the appeal and potential feasibility of electric vehicle ownership.

Applications

Charging technology are grouped into levels that correspond to the voltage and therefore the speed of vehicle charging. These chargers can integrate into their context in a number of ways, including:

» **Conventional charging stations** - Typically wall-mounted or pylon, these stations would be most applicable as additions to existing parking spaces in public, residential, and commercial areas.

» **Light pole charging** - Charging ports incorporated into street light poles are appropriate in urban areas, and eliminates the need of obtrusive charging infrastructure.

» **Induction charging** - Still in its infancy, this technology allows the charging of induction-capable vehicles without the need to physically connect a plug. Supporting bus charging at key transit stops is the most straightforward application of this technology, allowing a quick charging while in-service, and without the need for a plug. Additionally, this is a key enabling technology for fully electric and autonomous vehicles, allowing a human-free method of charging.

Implementation strategies

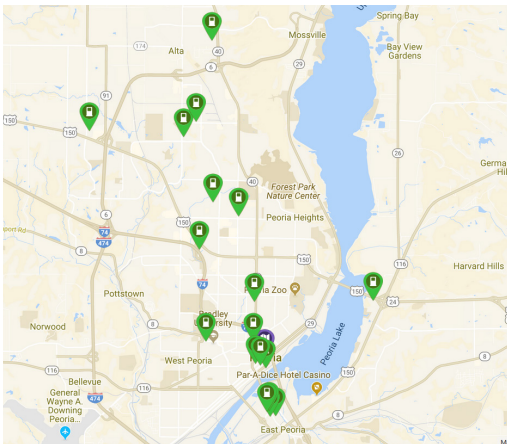
» **Publically-owned** - A government entity owns or contracts the charging station to serve a public parking area.

» **Financial incentive** - For areas owned by private entities, such as multifamily developments and commercial districts, governments can use financial incentives or tax incentives to promote the development of charging infrastructure. This could be a competitive grant program or a rebate on taxes or civil services.

» **Development incentive** - New development or redevelopment can offer an opportunity to incorporate charging infrastructure by offering parking reductions or development bonuses during the planning process.

▲ Image: *Charging infrastructure in a multifamily development*
Image source: *https://jpwhitetesla.com/2019/09/14/edison-apartments-in-gallatin-tn-add-ev-charging-station/*

▲ Image: *Street light charging port*
Image source: *www.evstreetcharge.co.uk/*



▲ Image: *Existing charging areas within Peoria*
Image source: *www.plugshare.com*

Creating **Foundational Systems**

▲ Image: *Connected ecosystem*
Image source: *HDR*

Build the foundation of tomorrow's advanced smart city infrastructure

Background

Digital communications constitute the backbone of an advanced mobility ecosystem. A robust communications system can enable transfer of critical data between vehicles, infrastructure, travelers, and management systems to optimize the transportation network, increase safety, and enhance the travel experience for community members.

From telephone to broadband internet, and cell service to WiFi, communications infrastructure is omnipresent in modern America. Each of these systems has a different function with different benefits and drawbacks, as well as different requirements for implementation. Adding to the mix of these systems are the new and emerging standards that will be the basis of advanced smart cities projects and programs.

Concept

This concept is to create a regional communications infrastructure program that will promote advanced emerging communications infrastructure to enable the next generation of transportation to occur.

5G - 5G is the latest iteration of cellular technology, engineered to exponentially increase the speed (up to 100 times current levels) and responsiveness of wireless networks. 5G will facilitate a massive increase in the amount of data transmitted over these networks. 5G is designed from the ground up to support the Internet of Things (IOT). In addition to delivering faster and more data, it will help connect everything from autonomous vehicles and medical equipment to smart trash cans and intelligent lighting. This increased speed and capacity will require extensive infrastructure investments including "vertical real estate," like towers and other tall structures and new data centers to process the increased information load. . Global technology analyst and advisory firm Moor Insights & Strategy estimates the infrastructure spending on 5G will exceed $326 billion by 2025.

5G is an enabling technology that allows communication between devices, but C-V2X is the critical application that allows for the connectivity between vehicles and everything else. C-V2X, which was standardized in 2017, is designed to connect vehicles to each other, to roadside infrastructure, to other road-users and to cloud-based services. C-V2X employs two complementary transmission modes:

1. Direct communications between vehicles, between vehicles and infrastructure, and vehicles and other road users, such as cyclists and pedestrians. In this mode, C-V2X works independently of the cellular networks.

▲ **Image:** *Smart Street Light*
Image source: *https://www.signify.com/global/innovation/brightsites*

2. Network communications, in which C-V2X employs the conventional mobile network to enable a vehicle to receive information about road conditions and traffic in the area.

The application of C-V2X will have a wide ranging effect on existing traffic management, traffic management safety, traffic tolling in dense urban areas, and the speed of adoption of autonomous vehicles. Examples of applications include platooning, co-operative driving, queue warning, collision avoidance, road hazard warning, V2X tolling, and increasingly autonomous driving.

Implementation

» **Plan and Coordinate** - Preparing for the next generation of advanced communications infrastructure is no small task, and establishing a planning process that will identify the necessary steps, critical partners, full implementation steps, and outcomes will be necessary for a successful implementation.

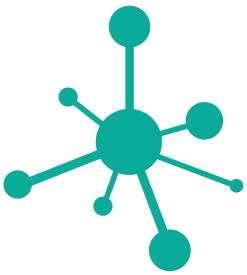
» **Prioritize** - This will be a component of the planning process, and will establish a road-map for how and where the roll-out of this infrastructure will take place. Understanding the outcomes can help inform this process, and the prioritization can be linked with other efforts, both within this strategy, but also alongside other efforts that could utilize this technology, such as the sensor arrays or public utilities.

» **Establish Policy** - The rollout of 5G will likely be done by private entities, and the policy component is important to ensure an orderly and proper rollout. Some communities have created "dig once" policies that would require fiber conduit to be large enough to accommodate multiple carriers, and force those carriers to use the conduit. Other communities have required that all roadway work include conduit and verticals that can accommodate future electrification and communications infrastructure. Streetscape infrastructure and design will need a policy framework as a way to manage antenna arrays and cabinets within our rights of way in an unobtrusive manner.

Outcomes

At a basic level, a program to establish 5G communications will be deemed successful when 5G is operating within the region in a well-conceived and well-managed rollout. But this technology is meant to enable other functionality, and improved outcomes can be leveraged with the technology. Developing a connected ecosystem that enables fast and ubiquitous digital communications will be a game-changer for mobility and transportation access for members of the Peoria community.

Total Mobility App



Connecting the mobility dots in the digital world

Background

Our transportation ecosystem contains numerous modes, with different ways to access, pay for, and plan trips for each. Most often, usability between these modes are not coordinated, meaning there is no effective way to understand and compare options, and no way to consolidate payment between modes.

Cities throughout the world have begun to develop systems that combine multiple transportation modes under one umbrella application that offers the ability to plan trips across multiple modes and coordinate payment between those modes into one transaction. For users, this means the ability to access all transportation options without the need to download multiple apps, and the ability to compare different trips based on different criteria. For example, a user can filter trips by the fastest trip from origin to destination, the least expensive, modes that are handicapped accessible, those that have the lowest carbon footprint, or those that cater to a traveler's individual needs.

Most importantly, this approach offered provides transparency and an easy way to understand all the options at a traveler's disposal.

Concept

Adopt an app that would "connect the mobility dots" and combine trip planning and payment across multiple modes within the Tri-County Region. This platform would coordinate between existing modes such as CityLink and public parking, as well as future private modes, such as shared electric scooters, carshare, or TNCs.

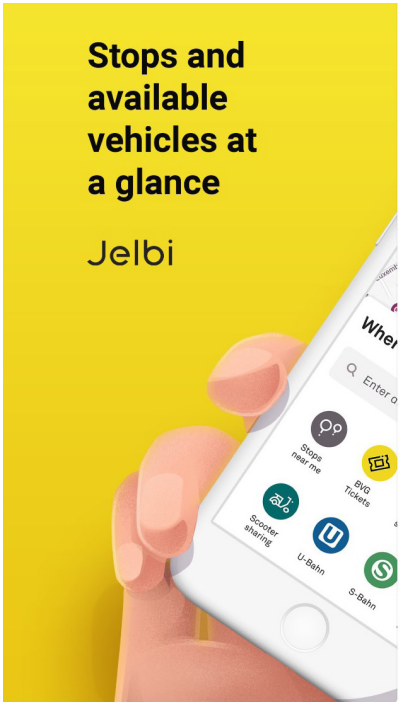
What would it do?

Some of the basic functionality that has been observed in different applications of the concept within different cities often include the ability to:

- Allow a traveler to input an origin and destination into the app and see the available mobility options for the trip.
- Compare options between available trips, such as ETA, total travel time, cost, etc...
- Combine modes for a trip (for example, public transit combined with a bicycle rental)
- Consolidate payment among different modes into a single payment platform
- Incorporate ticketing or digital access for available modes (digital tickets for transit, codes for shared mobility)

Image: *An all-in-one mobility app launched in Berlin, Germany*

Image source: *Screenshot from Jelbi app*



» Show real-time information for available modes, such as bus locations or the locations or availability of shared modes

» Allow Payment of municipal parking

How would it work?

From a user's perspective, the basic steps are outlined, simplifying the process of accessing and comparing mobility options in the Tri-County Region:

» A traveler within the region would first download the app, register a credit card or add credit to the account.

» When a trip is needed, the traveler would identify the desired destination within the region.

» The system would calculate and present the different trip options or combination of options to connect the traveler's origin and destination. The traveler can choose between different criteria to determine the best combination of options for their specific needs, such as time or cost.

» The traveler would choose the best option for their trip and request the trip.

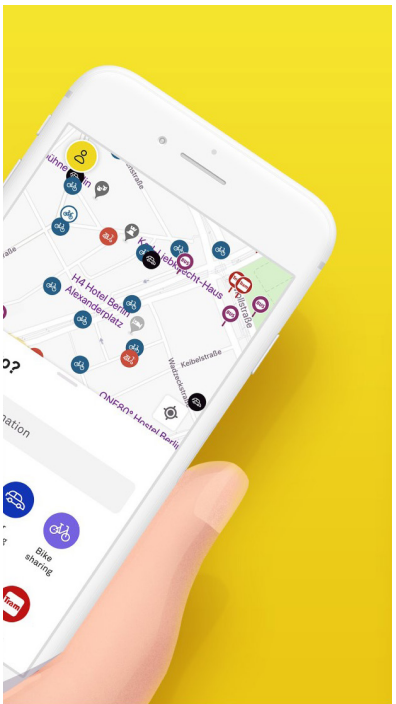
» For modes such as transit, the app would create a digital ticket to access the system, or for bikeshare, would provide a code for a rental.

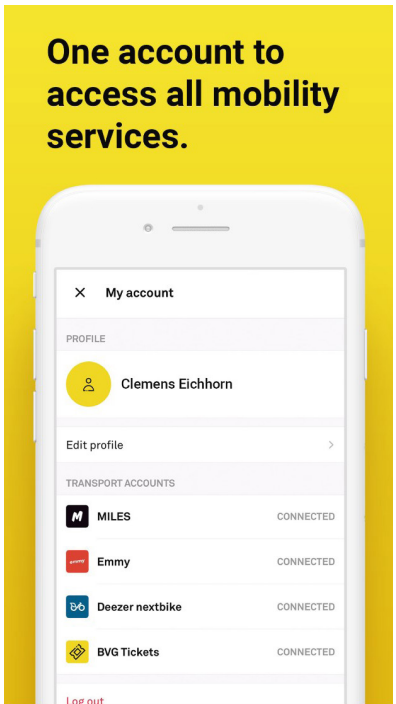
Implementation

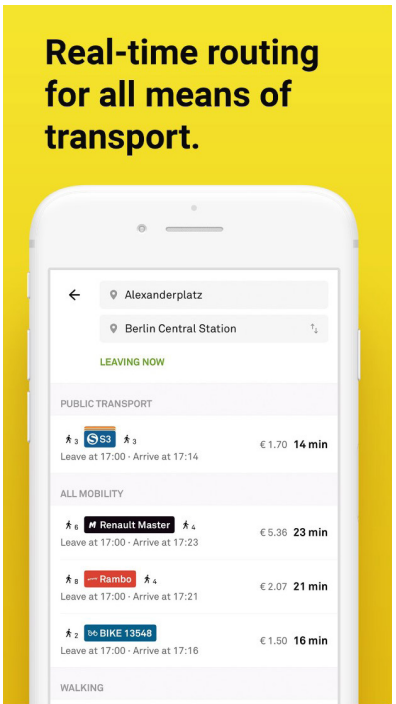
Although simple in concept, the implementation of this system would likely take significant effort to become fully operational. The biggest challenge will be coordinating among multiple vendors if private transportation companies are involved, as each will want their own app on a user's phone. Each mobility vendor will need to make data available to function within the app, and to allow processing and payment from the public system. A phased approach however, could allow for options controlled by public entities to be involved, while leaving room for future incorporation of private or quasi-public modes as they come available.

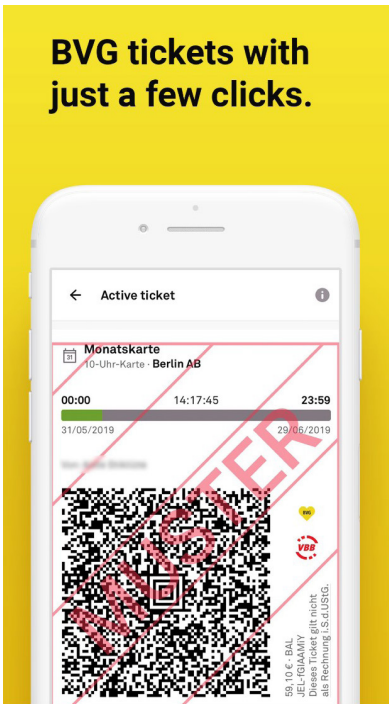
The app should support planning and payment (where applicable) for the following modes: walking, cycling, transit and paratransit, bikeshare, municipal parking, dockless eBikes and eScooters, carshare, TNCs, and taxis. This concept does not recommend a ground-up approach to app building, but rather utilize commercially-available platforms already developed and deployed in other cities. As part of the Smart Cities Grant Program, the City of Columbus, Ohio has been developing an open-source app that uses the smart cities operating system and secure blockchain technology that will be available to other cities once fully developed, offering another option for deployment. The concept would require coordination with a range of regional stakeholders, including all participating mobility providers and services operating in the region.

As an outcome, the establishment of a friction-free mobility system for payment should create an equitable way to access and evaluate transportation options for are visitors and residents, highlighting an innovative approach to promoting mobility choices in the Tri-County Region.









Mobility hubs

▲ Image: *Mobility Hub in Bremen, Germany*
Image source: *https://www.flickr.com/photos/northsearegion/10607314564/in/photostream/*

Connecting the mobility dots in the physical world

Background

Providing better options for first-mile/last-mile mobility at transit stops can expand the catchment area of each stop and serve transit riders with better connectivity to their destinations. Similar concepts have included shared mobility options, such as electric scooters or car-share, while others have used secure bicycle storage as a way to encourage transit usage. To be effective, dedicated multi-modal routes should be available to travelers to ensure safety to and from the stop.

While a digital platform can connect information and data about the available mobility options, mobility hubs provide the physical location where those modes intersect, better connecting trips throughout the region using multiple modes. This has been an emerging concept in the world of shared mobility, with major cities across the United States, Canada, and Germany launching programs to better connect transportation options in their cities.

Concept

Create a mobility hub program within the Tri-County region that will better connect existing and future mobility options in key areas around the region. Relying on experience from a robust mobility hub program in Bremen, Germany, along with other cities in the United States, the Shared Use Mobility Center has identified seven key principles[1] for establishing an effective program:

1. Build around strong transit stops
2. Target areas with high parking pressure
3. Get as close as possible to your users
4. Leverage mobile technology for wayfinding and fare integration
5. Use mobility hubs to promote multimodal living, not (necessarily) multimodal trips
6. Make mobility hubs visible
7. Market mobility hubs

The "Total Mobility App" concept described in the previous concept is a building block to promote better functionality of the mobility hub concept, eliminating the friction often associated with changing modes. Basing the hubs around transit lines is key, and several areas within the existing transit system should be considered for incorporation, including:

1. https://sharedusemobilitycenter.org/build-your-own-mobility-hub-7-lessons-for-cities-from-bremen-germany/

- Pekin
- Washington Plaza
- Illinois Central College
- Northwoods Mall
- Downtown Peoria
- Jefferson / Adams Transit Transfer Center

This concept also solves one of the issues cities have experienced with the introduction of dockless mobility such as bikes, scooters, e-scooters, and e-bikes, which will allow an available area for parking, charging, and storage of vehicles that will be an easier way for governments to manage the deployments.

Implementation

Identifying locations to start the program will be a critical first step, along with getting the mobility app functioning. Specific properties large enough to accommodate a diverse array of modes will be identified. But sites should also be close enough to key transit lines and transit stops to support the "multimodal lifestyle" identified by the Shared Use Mobility Center.

Creating the hubs is also an opportunity to expand pedestrian, cycling, and personal mobility options on streets throughout the region. The modes present at the hubs must have the ability to navigate efficiently and safely to their destination, meaning work may need to be done to support additional mobility infrastructure to better serve the community.

Coordinating between stakeholders will also be key, and must include CityLink, local governments, mobility operators, Zagster, TCRPC, and the Peoria Innovation Alliance. Additional stakeholders can be brought into the program including civic groups, art groups, and designers to create unique, branded, and easily identifiable areas that can be immediately recognized as a mobility hub.

Image: *Mobility Hub in in Minneapolis*
Image source:http://www.minneapolismn.gov/publicworks/trans/mobilityhubs

Key outcomes of this effort will be providing more mobility options for residents and visitors and lowering the barrier of entry for travelers across multiple modes while providing better first mile/last mile connectivity to transit options. These hubs could be a ready-made testing areas for new and advanced mobility, with a built-in group of travelers to serve. Hubs could also allow the facilitation of pick-up and drop-off services that would be well-suited to an autonomous MaaS/TaaS system that functions like a TNC or taxi service.

AV Testbed

Create a "Living Lab" for advanced mobility technologies and concepts

▲ **Image:** *Application of CAV technologies into a transit environment*
Image source: *NACTO Transit Street Design Guide*

Background

Promote the growth of Peoria's autonomous technology industry through a shared-use testing area that can combine testing of multiple systems in real-world or near real-world situations. Not only a place for vehicle manufacturers, this area could welcome communications providers, data analysts, and smart infrastructure companies who could all test their products in a broader "smart city" environment. This concept could utilize vacant commercial property in the area, which would likely have an adjacent corridor that could be used for corridor-specific testing.

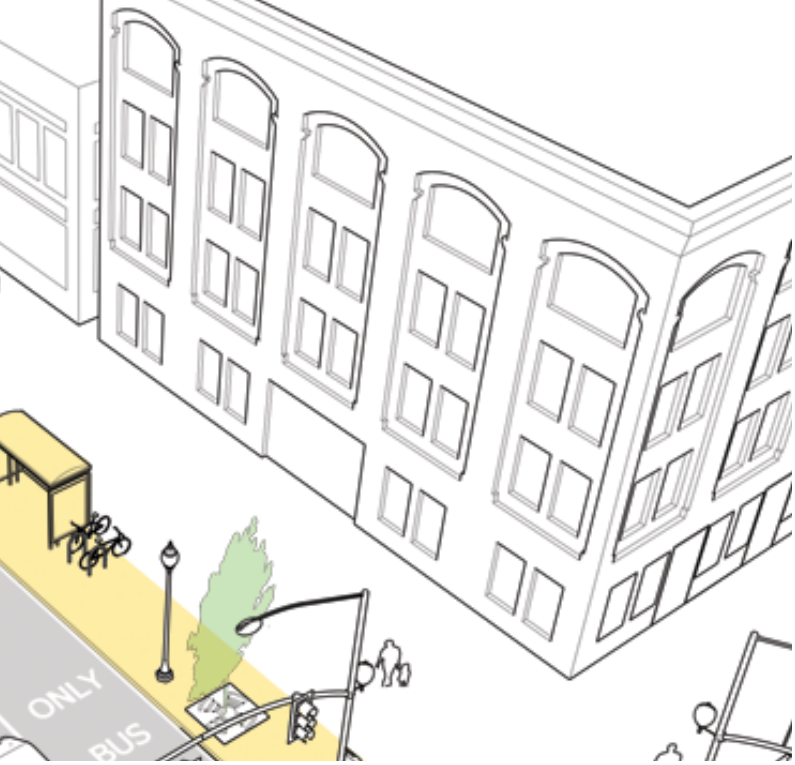
Few communities have the advantage of being a headquarters for an autonomous vehicle systems company, and the Tri-County Region has an opportunity to leverage the presence of such a company to both ensure their success, but to draw additional technology and mobility groups into the region.

Concept

The concept of a testbed for connected and automated vehicles and related technology would create a space or a series of spaces where multiple companies can test various aspects of autonomous and connected technologies within an integrated testing area.

A number of states and regions have already developed autonomous-specific testing areas, and the concepts here are not intended to duplicate those efforts. Because live-traffic testing is already occurring in Peoria, these concepts are intended to provide an area for rapid prototyping of ideas and integration outside of a live traffic environment, and to create corridors to test regular vehicle operation, and to test the operation of autonomous transit vehicles.

» **Managed Testing Area** - The lowest barrier to entry for establishing a testing area of this type will likely be underutilized retail or commercial areas, where public utilities and services are already available, large areas are paved, interior space is available in large footprints (in the case of large-format retail or industrial), and are typically located along easily-accessible corridors. The intent is to provide a space for rapid prototyping and testing of technologies or the integration of technologies, and the ability to quickly deploy testing scenarios in a flexible, easily changeable environment.
Proximity should be considered, especially in relation to



▲ **Image:** *Autonomoustuff NEV platform*
Image source: *www.autonomoustuff.com*

key stakeholders and likely supporters of this concept, including AutonomouStuff and Bradley University.

» **Integrated Testing corridor** - Whether it's one of the corridors identified as a "Completely Smart Corridor" or others identified as equally appropriate, the ability to operate and test CAV technology within live traffic should prove valuable to the region's companies. An example of this concept can be seen on the Las Vegas Boulevard in Las Vegas, which has been outfitted with Dedicated Short Range Communications (DSRC) radios at each intersection that relays SPaT information to a fleet of autonomous vehicles that operate along the corridor. This system has been integrated with the Lyft app, and carries passengers up and down the corridor in the CAV fleet in mixed traffic.

» **Quasi-Transit Testing Corridor** - This concept could certainly overlap with the Integrated Testing Corridor concept, but instead focusing on vehicles that could be used within a transit environment. The corridor could function as an autonomous transit testing area, providing a space for transit-oriented AV platforms, allowing the Tri-County region the ability to interact with the technology, and allowing companies to better understand the needs of the transit-going public.

This concept could be further enhanced by integrating the mobility hub concepts along the testing corridor, and making sure the mobility app has the future functionality to request a pickup and drop-off location. Additional requirements would be addressed to assign appropriate areas or curbspace for pickup and drop-off in a safe manner.

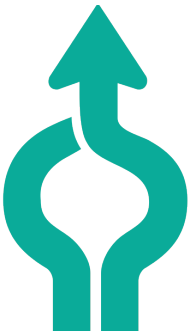
Wherever a testing area is eventually established, the specific testing needs of Autonomoustuff should be at the highest priority. The companies who could also play a role, such as 5G, DSRC and other communications systems will need to be considered, along with the roadside infrastructure, ITS, and EDGE computing suppliers.

Implementation

Coordination among stakeholders and project partners will be a critical first step in the process. As mentioned, this should directly serve the needs of the Tri-County Region's existing advanced technology industry, and work to create a cluster of transportation-technology focused industries that can work in a mutually supportive environment.

Identifying areas and corridors where testing could occur will be an important consideration, and project partners should be engaged early-on to ensure the characteristics and scenarios of the potential locations are valuable for testing.

Completely Smart Corridors



Where it all comes together

Background

With the conversion of the Adams and Jefferson corridors from one-way to two-way traffic, Peoria has the chance to completely re-imagine what a corridor can be. By combining the latest thinking in the worlds of urban design, mobility, and smart technology, the corridor can become a demonstration in integrating new forms of mobility, cutting edge communication, widespread electrification, shared mobility, all supported by infrastructure that was designed specifically for this intent. This concept would use many of the other concepts outlined previously, such as micromobility hubs, innovative ROW approaches, electrification and communications, all accessible through a consumer-facing app.

Concept

Although segments have already been completed, the planned phases of one-way to two-way conversion of Adams Street and Jefferson Street present an opportunity to re-imagine the relationship between transportation infrastructure and the new and emerging technologies that will use it. The concepts presented in this plan all have the potential to be implemented within these streets, creating corridors based on complete streets principles that tightly integrate infrastructure, emerging technology, and urban design to promote greater mobility options for area residents and visitors. Emerging technology and mobility concepts can be integrated into the following corridor components:

» **Travel lanes** - The two corridors are currently four lanes of travel plus a parking lane, with an average curb-to-curb width ranging from 50-60 feet. Using findings from the ROW prototyping project, the corridors can be reorganized to accommodate a number of modes such as pedestrians, cyclists, transit, micromobility, robotic, autonomous, and automotive. Establishing new ideas such as slow-mobility lanes or a graduated lane assignment based on speed or conflict could maintain a high degree of flexibility for future modes that may come along in the future.

» **Intersections** - Managing how traffic flows through intersections will be one of the key challenges with emerging mobility modes. Again, findings from the ROW prototyping could lead to best practices to manage flow, along with emerging intersection designs such as the cycling-friendly Dutch junction design and roundabouts. Traditional signalized intersections could be managed by leading-edge ITS technology, giving priority to transit and emergency vehicles while maximizing traffic flow and safety among competing modes.

» **Nodes -** Ideally arranged around transit stops, public nodes located throughout the corridors should combine development density, transportation options, and place-making strategies to link people and economic activity to mobility that can connect throughout the region. These nodes should utilize the mobility hub concept to facilitate shorter-range modes such as pedestrians, cyclists, shared eScooters, and bikeshare, with longer-range modes such as transit, car-share, TNCs, and traditional vehicles. Dockless modes will be managed These options should all be accessible through a multi-modal app that will facilitate a seamless transition between modes and allow quick and easy planning and payment for all a traveler's options.

» **Parking** - Advanced technologies should be used to maximize the utility of parking infrastructure through advanced sensor, communication, and payment technologies. Whether through AI-enabled optical

cameras that can detect empty parking spaces, or through magnetometer sensors that detect the presence of cars, communicating real-time information to drivers on where they can park. Vehicle charging infrastructure located in key parking areas throughout the corridor will promote the use of electrified mobility options, while the multi-modal app will provide an all-in-one interface to find parking, reserve a space, and make payments. Such a system could also employ dynamic parking pricing and dynamic curb management that could allocate different areas of the curb during different times of the day for different uses, such as loading, TNC drop-off, parking, or temporary transit lanes.

» **Technology Infrastructure -** Communication and electrification infrastructure will form the backbone technologies that enable many of the other advanced technologies to function. With the coming of 5G communication technology, supporting the latest in V2V, V2I, and V2X concepts, enabling the latest in autonomous and connected vehicles and advanced sensor and signal technology will be critical. At a basic level, ensuring adequate conduit space throughout the corridor with enough capacity for fiber optic cable and additional electric capacity to ensure future functionality.

Implementation

Creating corridors of this nature is no small task, and the technologies and approaches used within this concept are built off of the previous efforts in this section. That said, planning for an effort of this type can begin immediately, even incorporating some of the concepts in this section as part of an incremental approach to building the corridor. Planning will be the first step for a project of this nature, and will establish a vision for what these corridors can ultimately be, and prove how the technology concepts can be integrated. As planning moves forward, overarching planning principles should be observed. At a minimum, these corridors should:

1. Incorporate complete streets concepts;
2. Function as a public space, with the human as its most basic component to be served;
3. Support higher intensity economic development and urban development;
4. Provide a flexible and adaptable infrastructure system to accommodate new and emerging technologies;
5. Prioritize the movement of people and goods over any specific mode;
6. Use technology to solve specific problems or to create opportunities not possible otherwise;
7. Become a hotbed of innovation where the latest in technology, mobility, and urban design come together in one space

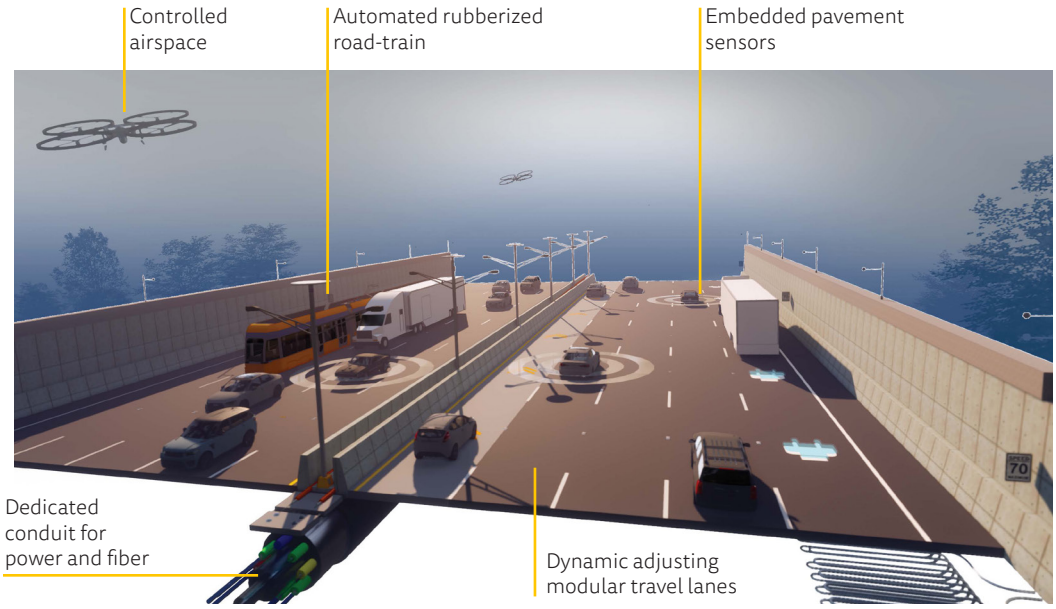
This concept will need input and assistance from a wide array of stakeholders throughout the region to be successful.

Outcomes

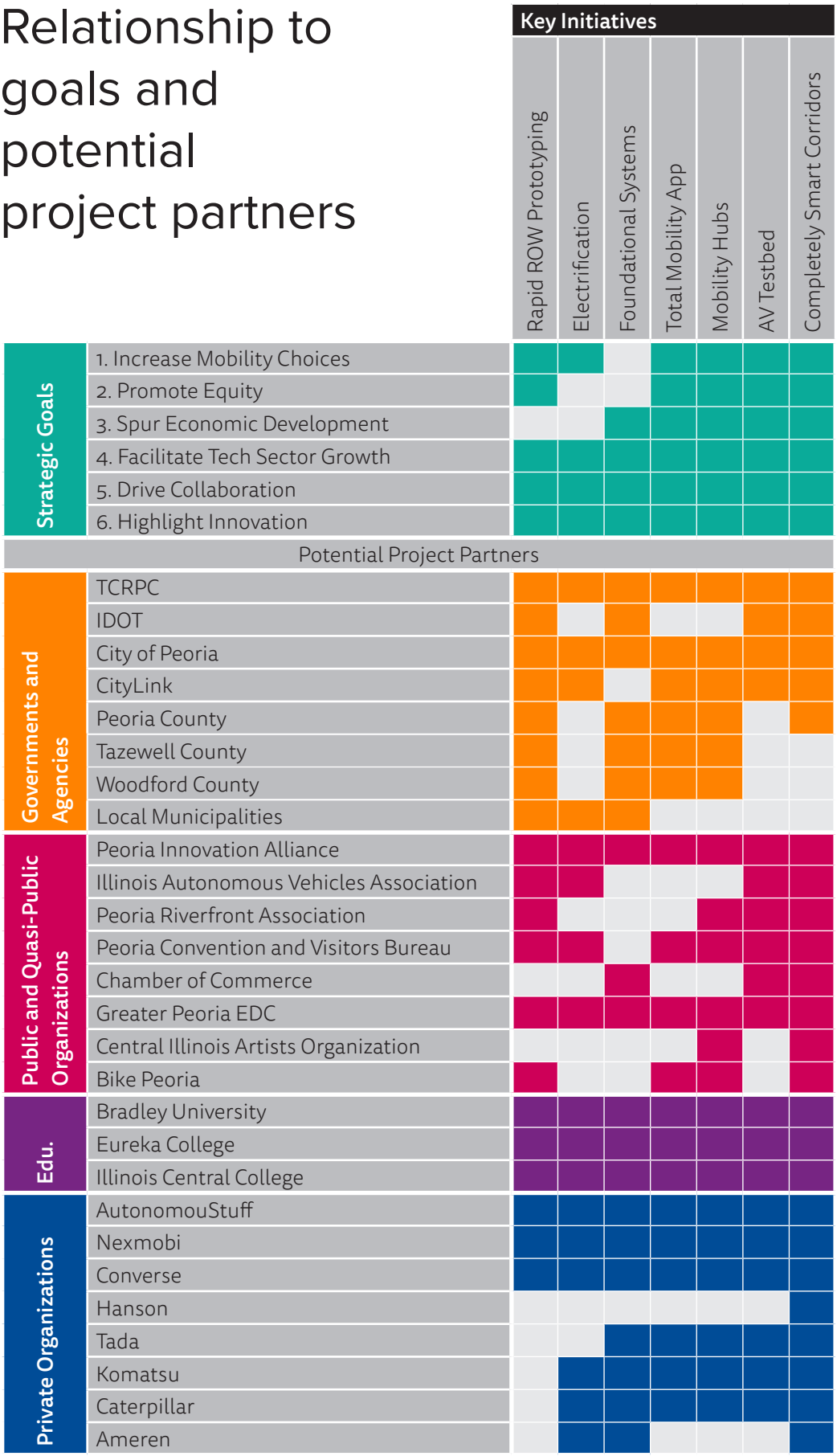
This concept has the potential to address each of the strategic outcomes outlined in this strategy, providing area residents a number of equitable mobility options, catalyze economic development and investment in new and emerging technologies, create a forum for regional collaboration, and highlight the innovation of the region.

Image left: *Integrated smart corridor concept example*

Image source: *HDR*



Relationship to goals and potential project partners



Conclusion

The table to the left outlines how each of the initiatives will meet the stated goals. Additionally, the potential partners have been identified for each initiative. These are provided as an initial guide, and are not intended to exclude any group willing to take part. But at a minimum, the groups identified should be involved in the planning and implementation of each initiative.

This document is intended to set the direction of efforts within the region, and align regional stakeholders toward common goals and projects. This is a starting point, and as efforts continue, changes may occur as momentum continues to build.

As these intiatives are addressed, it is important for stakeholders and agencies involved in the projects to consider the following:

- **Be flexible;**
- **Coordinate and engage with with a broad stakeholder coalition;**
- **Prioritize easy wins to gain momentum;**
- **Work to create an ecosystem of innovation in the region.**

Because technology and transportation are both constantly evolving, it will be necessary to reevaluate the projects and programs outlined, and to update if necessary.

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