

# LINK TULSA

Leveraging Intelligent  
Networks & Key-Corridors:  
Peoria Avenue and Route 66



## U.S. DEPARTMENT OF TRANSPORTATION NATIONAL INFRASTRUCTURE INVESTMENTS BUILD DISCRETIONARY GRANTS

Lead Applicant: City of Tulsa (DUNS: 078662251000)  
Supporting Applicant: Metropolitan Tulsa Transit Authority  
Indian Nations Council of Governments

Contact Information: Brent Stout, City of Tulsa, *Engineering Services Department*  
2317 S. Jackson Ave., Ste. 221 | Tulsa, OK 74107  
brentstout@cityoftulsa.org | (918) 596-9520

Project Type: Urban, Traffic Engineering  
Project Cost: \$9.5 million  
BUILD Funds Requested: \$6.5 million

July 19, 2018

<b>Project Name:</b>	LINK Tulsa (Leveraging Intelligent Networks & Key-Corridors: Peoria Avenue and Route 66)
<b>Lead Applicant:</b>	City of Tulsa
<b>Project Partner:</b>	Metropolitan Tulsa Transit Authority (MTTA) Indian Nations Council of Governments (INCOG)
<b>Contact Information:</b>	Brent Stout, City of Tulsa City of Tulsa Engineering Services Department 918.596.9520 brentstout@cityoftulsa.org
<b>Location:</b>	City of Tulsa   Tulsa County Oklahoma Congressional District 1   Urban Area
<b>Population</b>	City of Tulsa: 401,800 (2016); Urbanized Area: 655,479 (2010)
<b>Project Type:</b>	Urban, Traffic Engineering, Technology & Transit
<b>Project Description:</b>	<p>The City of Tulsa, MTTA, and INCOG are partnering to enhance safety and the ridership experience along the Peoria Avenue and Route 66 bus rapid transit corridors, to reduce delays to residents and commuters, and remove barriers for pedestrians. The project will:</p> <ul style="list-style-type: none"> <li>» Install fiber/broadband that will connect 42 traffic signals, 60 BRT stations to the TMC</li> <li>» Install 42 intersections with TSP to reduce dwell time and improve traffic flow</li> <li>» Install 15 CCTV cameras to connect 15 critical arterial intersections with live video feed to the Traffic Management Center</li> <li>» Install 32 real time arrival display infrastructure at 32 BRT stops</li> <li>» Improve 60 crosswalks, including ADA, and several audible signals along the corridor</li> </ul>
<b>Project Cost:</b>	\$9,500,000
<b>BUILD Funds Requested:</b>	\$6,500,000 (68%)
<b>Local Match/ Other Source(s) and Amounts:</b>	\$1,500,000 – MTTA (Transit) Vision Tulsa Local Tax \$1,000,000 – City of Tulsa \$500,000 – Indian Nations Council of Governments (INCOG) Total: \$3,000,000 (32%)
<b>Project Schedule / Status</b>	Preliminary engineering underway for Route 66, NEPA (Categorical Exclusion) expected to be completed Fall 2018. NEPA and Final design completed for Peoria Ave, with service starting in 2019.
<b>Project Benefits</b>	Once completed, this Project will: <ul style="list-style-type: none"> <li>» Connect the Peoria Corridor &amp; Route 66/21st St Corridor signals with fiber and video to the Transportation Management Center (TMC)</li> <li>» Synchronize signals to reduce crashes, reduce wait times and improve operating times for transit on two BRT corridors</li> <li>» Provide safe pedestrian and ADA crossings along the corridors</li> <li>» Improve reliability and enhance real-time passenger information with reduction in travel time variance</li> <li>» Reduce operating costs for transit with reduced labor costs</li> </ul>
<b>Benefit – Cost Analysis Results</b>	Benefit-cost ratio: 7.53 (7% discount rate)
<b>Project Website</b>	<a href="http://www.cityoftulsa.org/BuildGrant2018">www.cityoftulsa.org/BuildGrant2018</a>

# COVER LETTER



**G.T. Bynum**  
**OFFICE OF THE MAYOR**

July 19, 2018

The Honorable Elaine Chao  
Secretary, U.S. Department of Transportation  
1200 New Jersey Avenue, SE  
Washington, D.C. 20590

Dear Secretary Chao:

The City of Tulsa is pleased to submit this application for the **LINK Tulsa: Leveraging Intelligent Network within Key-Corridors Project** under the Better Utilizing Investments for Leveraging Development (BUILD) program. The request is for \$6.5 million in federal BUILD grant for the Project, which is matched by \$2.5 million in local investment and additionally leverages \$500,000 of Congestion Mitigation and Air Quality Improvement (CMAQ) federal funding in these corridors. The City of Tulsa will be the lead implementing agency, implementing the traffic signal upgrades along with the required Broadband capacity to connect, in coordination with Metropolitan Tulsa Transit Authority (MTTA), which owns, operates, and maintains the Bus Rapid Transit (BRT) routes. Any cost overruns above the allocated amounts for the Project will be covered by the City of Tulsa, from other local sources of funding to improve Traffic and Transit within City of Tulsa.

Currently the two identified corridors suffer from antiquated technology, high traffic, high crash counts, and lack of pedestrian-activated signals. The technology investments of the Project will enhance multi-modal safety, improve traveler reliability, and reduce operating costs. BUILD funds will support the improvement and installation of new technology that will enhance the safety along the Peoria Avenue and Route 66 corridors. The Project includes installing fiber that connects traffic signals and BRT stations; connecting intersections with Transit Signal Priority (TSP) to reduce dwell time and improve traffic flow; installing signals to connect intersections to the Traffic Management Center (TMC); installing real-time arrival infrastructure at BRT stops; and improving crosswalks, including ADA, and audible signals along the corridors.

We greatly appreciate the United States Department of Transportation's consideration of the requested investment in this Project as it is a critical component of the transportation infrastructure in and of significance to the City of Tulsa, the County of Tulsa, and the region.

We believe the Project is a strong candidate for BUILD funding with construction anticipated to begin in June 2019. The project will enhance safety of the system & reduce operating costs; improve reliability for the bus systems & travel time; reduce crashes and injuries in the corridors; enhance passenger experience; and provide safe crossings for pedestrians along the Peoria Avenue and Route 66 corridors.

Please contact Paul Zachary, Director of Engineering Services, at (918) 596-9565 if you have any further questions regarding this Project application.

Best Regards,

G.T. Bynum  
Mayor  
City of Tulsa

175 E. 2<sup>nd</sup> St. • Tulsa, OK 74103 • Office 918.596.7411 • Fax 918.596.9010

Email: [Mayor@cityoftulsa.org](mailto:Mayor@cityoftulsa.org)  
[www.cityoftulsa.org](http://www.cityoftulsa.org)

## Table of Contents

<b>Cover Letter</b> .....	<b>ii</b>
<b>1. Background</b> .....	<b>1</b>
<b>2. Project Description</b> .....	<b>1</b>
2.1. Corridor Description .....	2
2.2. Project Elements .....	3
2.3. Prior Investment in Corridors .....	3
2.4. Impact on Transit Ridership .....	4
2.5. Addressing Transportation Challenges .....	5
<b>3. Project Location</b> .....	<b>6</b>
3.1. Major Activity Centers .....	7
<b>4. Project Parties</b> .....	<b>9</b>
<b>5. Grant Funds, Sources And Uses of Project Funds</b> .....	<b>10</b>
5.1. Eligible Project Costs .....	10
5.2. Capital Sources of Funds .....	10
5.3. Capital Uses of Funds .....	11
5.4. Operating Sources and Uses .....	11
<b>6. Merit Criteria</b> .....	<b>12</b>
6.1. Safety .....	12
6.2. State of Good Repair .....	14
6.3. Economic Competitiveness .....	14
6.4. Environmental Protection .....	17
6.5. Quality of Life .....	17
6.6. Innovation .....	18
<i>Innovative Technologies</i> .....	18
<i>Innovative Project Delivery</i> .....	18
6.7. Partnership .....	19
6.8. Non-Federal Revenue for Transportation Infrastructure Investment .....	19
<b>7. Project Readiness</b> .....	<b>20</b>
7.1. Technical Feasibility .....	20
7.2. Project Schedule .....	20
7.3. Financial Feasibility .....	22
7.4. Required Approvals .....	22
<i>Environmental Approvals</i> .....	22

Legislative Approvals.....	22
State and Local Planning.....	22
<b>7.5. Assessment of Risks and Mitigation Strategies .....</b>	<b>23</b>
<b>8. Project Costs and Benefits.....</b>	<b>24</b>
Costs.....	24
Safety.....	24
Travel Time Savings.....	24
Environmental Benefits.....	25
<b>Appendices .....</b>	<b>A-1</b>
<b>List of Tables</b>	
<b>Table 1.</b> Project Elements .....	3
<b>Table 2.</b> Ridership Profile .....	6
<b>Table 3.</b> Project Capital Budget Summary by Source (2018 \$ Millions).....	11
<b>Table 4.</b> Project Capital Budget Summary by Use (2018 \$ Millions) .....	11
<b>Table 5.</b> Peoria Ave. and Route 66 Crashes, by Type and Severity (2012 - 2016).....	12
<b>Table 6.</b> Pedestrian Accidents along both Corridors .....	13
<b>Table 7.</b> Major Activity Centers within the Project Limits .....	16
<b>Table 8.</b> Project Schedule - Project Element Construction / Implementation.....	21
<b>Table 9.</b> Detailed Milestone Project Schedule .....	21
<b>Table 10.</b> Benefit-Cost Analysis Summary .....	24
<b>List of Figures</b>	
<b>Figure 1.</b> Project Map.....	2
<b>Figure 2.</b> Tulsa Transit System.....	3
<b>Figure 3.</b> Economic Gap within Project Area .....	7
<b>Figure 4.</b> Major Activity Centers along Route 66.....	7
<b>Figure 5.</b> Major Activity Centers along Peoria Ave.....	8
<b>Figure 6.</b> Operating Funding for the City of Tulsa .....	20
<b>List of Images</b>	
<b>Image 1.</b> Incident on E 21st and S Sheridan Rd.....	13
<b>Image 2.</b> Pedestrian Crash Location.....	13
<b>Image 3.</b> Lack of Sidewalks .....	14
<b>Image 4.</b> Proposed New Bus Stop.....	15
<b>Image 5.</b> Connection to Bike Share Stations, Shared Use Trails, and Bicycle Lanes .....	19
<b>Image 6.</b> 24 Hour Traffic Flow Chart for the Peoria Corridor .....	25





## 1. BACKGROUND

The City of Tulsa, Oklahoma is requesting funding for the proposed LINK Tulsa (Leveraging Intelligent Networks & Key-Corridors) Project, which will utilize improved signals and other technological improvements to enhance safety, traffic flow, and transit service on the city's two most important corridors – a north-south route through downtown along Peoria Avenue, and an east-west corridor along the old Route 66 from near the Cherokee reservation west to downtown.

This Project was conceived as part of roadway and transit improvement to enhance transit service, however, the proposed signal optimization improves overall system performance and safety, with the vast majority of the \$34 million in assessed travel time benefits accruing to private vehicle drivers, and the \$37 million in safety benefits going to drivers and pedestrians, as detailed in Section 8, Project Costs and Benefits.

Recognizing the need to connect the diverse communities along these historically important corridors to the growing number of job opportunities, the City of Tulsa is implementing a long-planned initiative to provide Bus Rapid Transit (BRT) along Peoria Avenue and Route 66. This BRT implementation, already underway in the Peoria Corridor, includes improved stations, more frequent bus service, and new vehicles. The program does not, however, provide exclusive (bus-only) lanes, as both corridors are well-developed, have limited right-of-way, and carry substantial auto and truck traffic. This proposed LINK Tulsa Project provides the City of Tulsa with the only way to improve the BRT service, with management of the traffic systems.

To leverage the effectiveness of these BRT investments, the City of Tulsa is requesting \$6.5 million in Better Utilizing Investments to Leverage Development (BUILD) funds for a \$9.5 million project to:

- » Provide new traffic signals that ensure that transit has priority at intersections.
- » Connect these signals, along with CCTV cameras, to the Tulsa Traffic Management Center (TMC) to optimize traffic flow along both corridors, and throughout the City's network.
- » Provide improved "real time" bus information systems at the new BRT stations, allowing riders to know how long they have until the next bus arrives.

The request also includes the improvement of crosswalks along both corridors, as these corridors have a very high accident rate, including an average of four fatalities each year, and over 200 injury crashes.

## 2. PROJECT DESCRIPTION

The Project involves an investment of \$6.5 million in BUILD funds for the proposed LINK Tulsa Project to improve safety and all traffic flow on the Peoria Avenue and Route 66/21<sup>st</sup> Street corridors. This amount would be matched with \$2.5 million from the City of Tulsa (27% non-federal match), and \$0.5 million in CMAQ funds from Indian Nations Council of Government (INCOG), the Tulsa region's Metropolitan Planning Organization (MPO).

The Project elements will improve safety and traffic flow along the Peoria BRT corridor (which will be starting service in 2019), and along the planned Route 66 corridor (**Figure 1**). These corridors, described in Section 3, Project Location, are key corridors linking the region to downtown Tulsa and other major regional employment centers. They are also important to ensuring that Tulsa's workforce has reliable access to the growing number of jobs in the region. Tulsa is expecting an additional 76,000 residents and 51,000 jobs in the next three decades. Connecting the workforce



to jobs is already a concern – a survey by the Tulsa Regional Chamber found that 93 percent of service sector businesses in the city cited lack of access to workforce as a barrier for growth. On the supply side of the equation, over 20 percent of the City’s residents live in poverty. **This Project will help maximize every opportunity to utilize the full potential of the regional workforce to ensure reliable access to opportunities, and transportation improvements – particularly transit improvements – that are critical to this effort.**

### 2.1. Corridor Description

The **Peoria Avenue Corridor** BRT is fully funded, and operations are scheduled to begin in late summer 2019. The route stretches 15 miles from north to south, including a diversion to the Denver Avenue Station in the heart of downtown Tulsa. This corridor includes many of the major employment and cultural centers, and has been identified in local plans for higher-density development.

The **Route 66 Corridor** is currently in preliminary design and is scheduled to begin BRT operations in 2021. This 11-mile route is the major east-west transit corridor in Tulsa. The route augments major local investment in the Peoria BRT north-south route, forming a BRT backbone for the Tulsa transit system.

These two corridors together provide **transportation access, mobility options and job opportunities** for nearly 25 percent of Tulsa residents, connecting to 46,000 jobs within a half mile of the corridors. The existing Peoria bus route carries the highest transit ridership within the Metropolitan Tulsa Transit Authority’s (MTTA’s) service area with a 30-minute frequency today, while the Route 66 bus route is the second most utilized service. The new BRT routes will double the frequency during peak hours to 15-minute headways, add capacity to meet demand, increase service hours, and add amenities that will appeal to both captive and choice riders.

The City of Tulsa, in partnership with MTTA, is prepared to begin improvements on the LINK Tulsa Project in Spring 2019 with project implementation completed in both corridors by Spring 2024. We invite the federal government

FIGURE 1. Project Map



**One in five City of Tulsa residents and one in four jobs within the city limits are within a 10-minute walk of these corridors. With the completion of Route 66, these two BRT corridors will provide connections for 18,000 students, 92,000 residents, 2,000 hospital beds, millions of visitors, and access to 46,000 jobs.**



to partner in the region’s effort to fully realize the immense benefits of LINK Tulsa to create a safer environment for all users – trucks, cars, transit, and pedestrians.

## 2.2. Project Elements

There are five key elements to this Project, summarized in the following table:

TABLE 1. Project Elements

Project Element	Description	Benefit to Corridor
Fiber/Broadband	Install fiber/broadband connecting 42 traffic signals and 60 BRT stations	Enhance safety of the system and reduce operating costs
Transit Signal Priority (TSP)	Connect 42 intersections with TSP to reduce dwell time and improve traffic flow	Improve reliability for the bus systems and travel time
Traffic Technology Upgrades	Install 15 CCTV cameras and signals to connect intersections to the TMC	Reduce crashes and injuries in the corridors
Dynamic Message Signs	Install 36 real-time arrival infrastructure at BRT stops	Enhance real-time passenger information for the corridors
Pedestrian Safety Infrastructure	Improve various crosswalks, including ADA, and audible signals along the corridor	Provide safe crossings for pedestrians at each BRT station

The purpose of these project elements is to enhance traffic flow to reduce signal delays for residents and commuters, improve safety along the corridor, enhance the experience for riders, encourage transit ridership; and enhance reliability of the system to link all areas of the City of Tulsa.

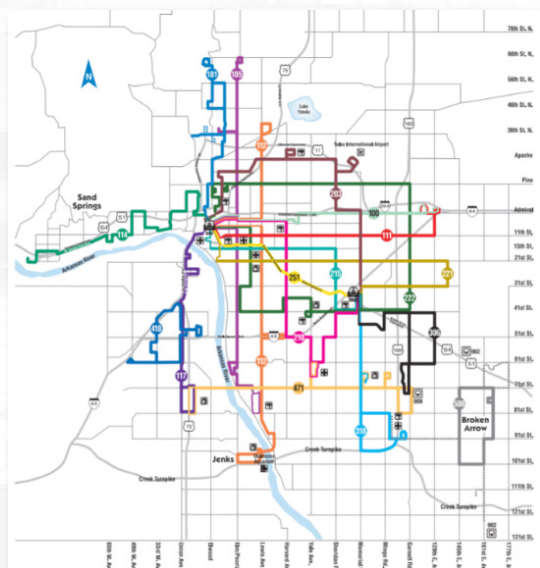
## 2.3. Prior Investment in Corridors

The LINK Tulsa Project is a continuation of two ongoing projects: Peoria Avenue and Route 66. The City has committed approximately \$22 million to the Peoria corridor, and plans to commit a similar amount to the Route 66 corridor. These funds (which are outside the proposed grant request) are being spent over the next five years to make the following BRT improvements to these two corridors:

- » Nine CNG-Fueled BRT vehicles to serve the Peoria corridor
- » Construct 39 level-boarding BRT stations along Peoria Avenue
- » Install ticket vending machines at 11 stations along Peoria Avenue
- » Nine new BRT vehicles to serve the Route 66 corridor
- » Construct 36 BRT shelters along Route 66

The proposed high-quality, high-frequency, and high-capacity BRT transit service connecting Tulsa’s major destinations is transformational for the city. When completed, the two BRT corridors will connect to all other 20 Tulsa Transit (MTTA) routes (Figure 2). Further,

FIGURE 2. Tulsa Transit System







the City's commitment to these two corridors is not limited to transit improvements. **Tulsa has identified these corridors as priorities, and plans to transform these historic corridors by attracting density and investment.**

LINK Tulsa significantly leverages the effectiveness of these planned BRT investments, benefiting the corridor by implementing signal coordination, video feed to the TMC, additional pedestrian improvements at BRT stations, and the Signal Priority system. This will reduce travel time, increase reliability, and provide substantial safety benefits for transit users as well as pedestrians, bicyclists, and private vehicle drivers.

**While this section demonstrates the local commitment of funding for the BRT, the independent utility for the Project's proposed TSM improvements emanates from the fact that it provides benefits to all traffic, including automobile, bike and pedestrian traffic. The project will provide additional transit benefits, as these two corridors have the highest transit ridership.**

## 2.4. Impact on Transit Ridership

The benefits of this Project reflect the importance of the two corridors within the larger MTTA system. Existing local buses currently operating on the future BRT routes account for nearly 30 percent of system ridership. Nearby routes within a mile from the BRT lines serve approximately 5,000 transit patrons, and are expected to generate additional ridership on the corridors as frequency is improved. **The Tulsa MPO's modeling analysis shows that the completion of the two BRT systems is anticipated to grow overall system ridership by 17 percent.**

The Route 66 and Peoria BRT lines will intersect in Downtown at the Denver Avenue Station, providing the versatile backbone of the MTTA system as envisioned in the Tulsa Comprehensive Plan "PlaniTulsa," as well as the USDOT award-winning "Fast Forward" Regional Transit System Master Plan (RTSP).

LINK Tulsa will make Tulsa's BRT a more robust system by increasing transit speeds, improving reliability, and providing real-time bus arrival information at stations to enhance the rider experience. The BRT is being designed to increase ridership, and the LINK Tulsa Project will support and strengthen the attractiveness of transit in the two corridors.



## 2.5. Addressing Transportation Challenges

The City of Tulsa and MTTA have prioritized this key project for the region based on the following benefits it provides:



» **Safety:** The LINK Tulsa Project will reduce the number of accidents that take place within the corridors, which are currently higher in the Project area than any other corridor in the city of Tulsa. Specifically, the Project will improve pedestrian crossings and therefore reduce pedestrian injuries in the corridor.



» **State of Good Repair:** The LINK Tulsa Project will improve antiquated signals, timing plans, remove ADA impediments, install pedestrian countdown heads, and reduce overall life-cycle costs. The Project will improve the condition and resilience of both corridors by providing new technology to better manage the transit systems in the city of Tulsa, maximizing the performance of existing transportation infrastructure.



» **Economic Competitiveness:** The LINK Tulsa Project will strengthen the Tulsa metropolitan areas by reducing auto travel time along two major arterials in the City of Tulsa, and improve transit service as a viable alternative to private vehicle use. Additionally, the Project will improve access to various destinations in Tulsa, including Tribal land and the Cherokee Casino.



» **Environmental Protection:** The LINK Tulsa Project will reduce idling at traffic signals, decreasing emissions, reducing fuel usage, and contributing to energy security. Additionally, the improved bus service will lead to a reduction of vehicle-miles-traveled (VMT), improving air quality.



» **Quality of Life:** The LINK Tulsa Project will improve the reliability, frequency, and efficiency of the BRT routes. With greater mobility and flexibility for existing and future transit users, Tulsa residents and visitors will be linked to essential community services; and transportation choices for individuals will be increased, providing more freedom on transportation decision; for Tulsa residents and visitors to Tulsa, including the tribal communities.



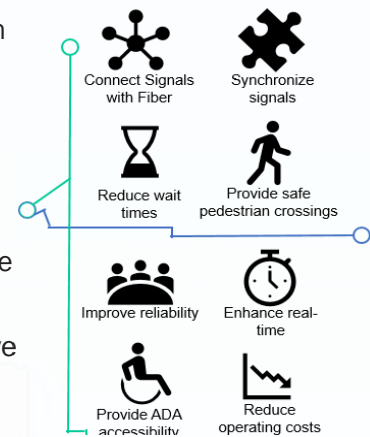
» **Innovation:** The LINK Tulsa Project will improve detection, mitigation, and documentation of safety risks with intersection alerts and signal prioritization and by installing and advancing technology in the project corridors. A first for Oklahoma, the Project will provide reliable information to passengers with real-time arrival information.



» **Partnership:** The LINK Tulsa Project demonstrates strong collaboration among multiple partners, including the City of Tulsa, MTTA, and INCOG, all of which have worked closely together in the development of this Project and in implementation of other similar projects in the past.



» **Non-Federal Revenue for Transportation Infrastructure Investment:** The City of Tulsa has taken action to secure non-Federal revenue to transportation infrastructure investment with Vision Tulsa, a voter approved sales tax, approved by voters in 2016. The City of Tulsa will use part of this dedicated transportation funding for both Peoria BRT and Route 66 BRT corridors.





### 3. PROJECT LOCATION

**Project Coordinates:** Latitude: 36.147917, Longitude: -95.975697

The BUILD Project is located within Oklahoma’s 1<sup>st</sup> Congressional district in the City of Tulsa in Tulsa County. The Project elements are located on two BRT corridors as illustrated in **Figure 1**.

- » The **Peoria Route Corridor** from 38th Street North to 81st Street South (15 miles), is a critical north-south arterial street just east of Downtown Tulsa that connects neighborhoods, employment centers, commercial areas, and regional destinations.
- » The **Route 66 Corridor** from Denver Avenue Station (downtown Tulsa) to S 145th East Avenue (11 miles), connects the urban core with rural Tulsa County on the east end of Tulsa where significant minority populations reside.

The City of Tulsa is dedicated to enhancing Peoria Avenue and Route 66 first and foremost to creating a safer traveling experience, but also link diverse areas and demographics of Tulsa, as described below.

**Table 2** summarizes the population within a half mile of the two BRT Corridors. These averages mask the substantial variation within the two corridors, which include wide-ranging economic differences, as well as racial and ethnic diversity.

**Racial & Ethnic Diversity:** The Environmental Justice (EJ) analysis of the Transportation Management Area (TMA) and the corridors shows the significant racial and ethnic diversity of these corridors. These corridors contain census tracts with over 95 percent minority population as well as tracts with fewer than 6 percent minority population.

**Economic Gap:** The Peoria Avenue and Route 66 corridors connect communities with a diverse economic set of circumstances ranging from populations with the highest household incomes (median of \$152,700) to those with the lowest household incomes (median of \$12,700) in Tulsa. Such economic variance is rare in transit corridors around the country. The new services along Peoria Avenue and Route 66 will be attractive to a wide range of young professionals, as well as to the existing ridership seeking access to services, jobs, and other opportunities. This unique mix of income ranges allows for growth in choice riders and significant enhancement of the service level for existing users.

**Poverty:** The US Census data shows the corridors having significant range of income along the BRT routes within Tulsa County. Seventy-one percent of Tulsa County’s census tracts which have high levels of poverty (where more than 40 percent of the families are below poverty level) are within the Peoria corridor. On the other side of the economic spectrum, there are five census tracts in Tulsa County where 25 percent of households have incomes which exceed \$250,000; two of these are within the Peoria corridor.

By connecting areas of the city with robust services such as grocery stores, educational institutions,

TABLE 2. Ridership Profile

	Project Corridors within 10-minute walk	City of Tulsa
<b>Population</b>	92,162	401,800
<b>Total Jobs</b>	45,783	272,349
<b>Total Unemployed</b>	7.2%	4.0%
<b>Median Household Income</b>	\$36,784	\$43,172
<b>Per Capita Income</b>	\$25,365	\$29,092
<b>% of Population in Poverty</b>	21.4%	20.3%
<b>% Zero-Car Households</b>	11.9%	8.3%

*American Community Survey 2012-16*





and healthcare with those that have fewer services, the Project bridges the City's diverse geographic and demographic communities. The range of socio-economic conditions in the Project's service area underscores the corridors' potential in linking all communities to services, reducing disparity in opportunities along the corridor.

### 3.1. Major Activity Centers

The Project corridors provide transit connections to key activity centers and neighborhoods in urban areas of Tulsa while strengthening the regional network and improving access to education, health care, and employment opportunities. Many of Tulsa's largest employers, including both Fortune 500 Headquartered companies (ONEOK and Williams Companies) are located within one-half mile of the Peoria Avenue and Route 66 BRT systems in addition to a number of Tulsa's largest employers. Significant reinvestment in the Peoria Avenue and Route 66 corridors over the past decade provides the backdrop for exciting potential future growth and economic development. The images below highlight existing key destinations and activity centers within one-half mile of the Route 66 (Figure 4) and Peoria Avenue (Figure 5) alignments.

FIGURE 3. Economic Gap within Project Area

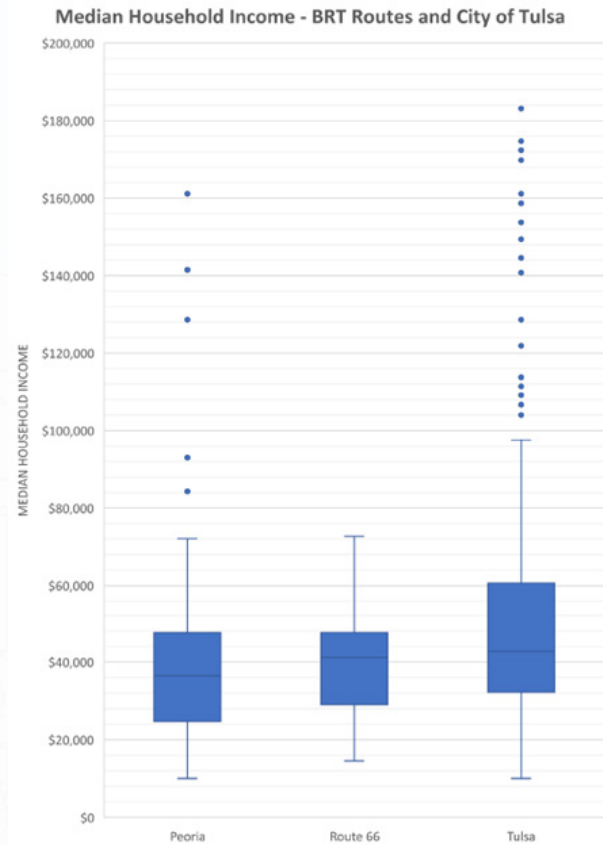


FIGURE 4. Major Activity Centers along Route 66

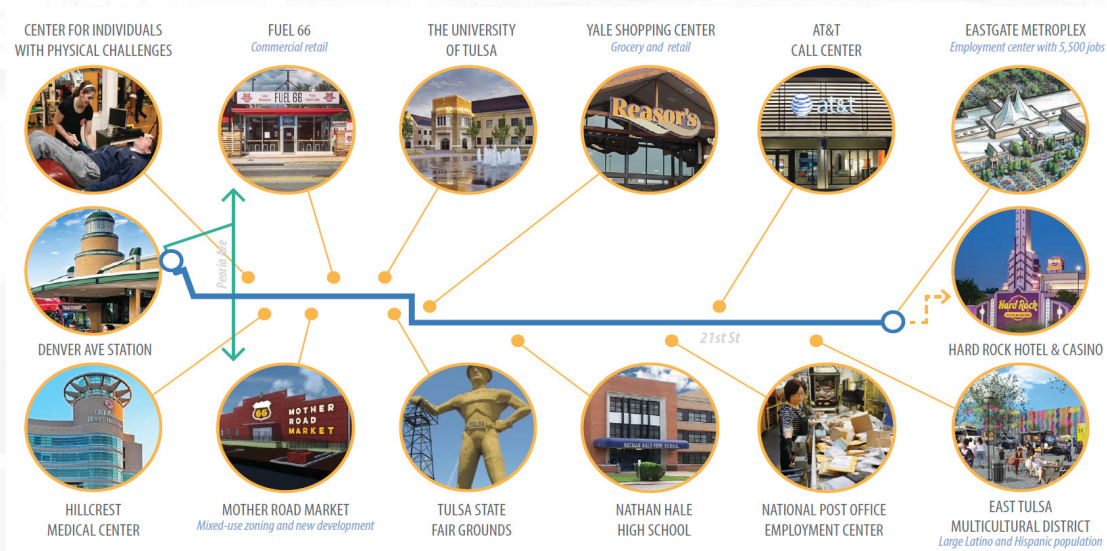






FIGURE 5. Major Activity Centers along Peoria Avenue





## 4. PROJECT PARTIES

The BUILD Project represents a broad, united coalition of partners and stakeholders that have been instrumental in efforts to move it towards completion.

**The City of Tulsa:** The Project's sponsor, the City of Tulsa (DUNS: 078662251000), is the second largest city in Oklahoma. With a population of 401,800, the city comprises about 63 percent of Tulsa County's population and about 42 percent of the population in the Metropolitan Statistical Area (MSA). The City of Tulsa serves as the BUILD applicant, implementing agency, and will own, operate, and maintain the non-transit elements of the system.

**Metropolitan Tulsa Transit Authority (MTTA):** The MTTA, functioning as Tulsa Transit, is a public trust of the City of Tulsa. MTTA operates local bus service in Tulsa, and on a limited contract basis in Jenks, Broken Arrow, and Sand Springs. MTTA is the only public transit operator serving the City of Tulsa. MTTA is supporting the BUILD application and will own, operate, and maintain the transit elements of the system.

**Indian Nations Council of Governments (INCOG):** INCOG is the designated Metropolitan Planning Organization (MPO) for the Tulsa Transportation Management Area (TMA). This Project has been a part of the Regional Transportation Plan (RTP), currently the Connected 2045, and the MPO Congestion Management System Process for over a decade. INCOG will include the Project in the current Transportation Improvement Program (TIP). INCOG has served as the primary planning partner for the BRT corridors, and will continue to be an implementation partner as the current planning arm for the City of Tulsa. INCOG is also a funding partner for the Project.

**Others/Supporting Agencies:** The wide range of support from local, state, and federal officials, as well as private sector partners, is evident in the letters of support for the BUILD Project provided in **Appendix B**. The major project supporters include:

- » US Senator Jim Inhofe
- » Oklahoma Department of Transportation (ODOT)
- » Accessible Transportation Coalition
- » Downtown Coordinating Council
- » Hillcrest Medical Center
- » Lobeck Taylor Family Foundation
- » The Center for Individuals with Physical Challenges
- » City of Tulsa - Transportation Advisory Board
- » Tulsa Regional Chamber
- » Tulsa City - County Library
- » Tulsa Community Foundation
- » Tulsa Housing Authority
- » Kendall Whittier Elementary School
- » Tulsa Public Schools
- » University of Tulsa



## 5. GRANT FUNDS, SOURCES AND USES OF PROJECT FUNDS

The City of Tulsa is requesting \$6.5 million of the Project's total costs from BUILD funding, to supplement local, state, and federal funding sources from the City of Tulsa, MTTA, and INCOG. Receipt of a \$6.5 million BUILD grant provides the following beneficial outcomes:

- » **Technology upgrades at intersections** – \$6.5 million in BUILD grant funds will allow the City of Tulsa to implement the Project and achieve a true arterial traffic and transit management.
- » **Maximizes the impact of BRT investments** – By improving real-time bus information, as well as shortening transit travel times, this Project not only increases ridership but also improves the rider experience above and beyond the planned BRT improvements already under way.
- » **Provides a step forward to smart corridors and a smart city** – With this investment from the federal government, the City of Tulsa will be one step closer to creating a smart city, which includes realizing a vision of zero traffic fatalities by 2045. The City of Tulsa aims to be an innovation model for how a growing economy uses data to effectively manage, grow, and sustain a high-performance transportation system that is inclusive to all users.

### 5.1. Eligible Project Costs

**Table 3** shows the breakdown of federal funds and non-federal funds that contribute to the total project sources as well as the remaining \$2.5 million, or 28 percent, will be provided through a combination of local funds. Another \$0.5 Million is available from the regional Congestion Mitigation and Air Quality funding for capital expense to improve traffic and safety in these corridors. To date, no funds have been expended on this proposed LINK Tulsa Project. The BUILD funds will be used exclusively for implementation of the Project elements as shown in **Table 4**. All Project costs shown are shown in 2018 dollars.

### 5.2. Capital Sources of Funds

**Federal Funds:** a total of \$7.0 million in federal funds will go towards this Project.

- » **BUILD Funds:** \$6,500,000 (68 percent of total funding)
- » **INCOG (CMAQ):** INCOG is committing \$500,000 of Congestion Mitigation and Air Quality Improvement (CMAQ) funds. These federal funds will be leveraged as a resource for the LINK Tulsa Project by INCOG.

**Non-Federal (Local) Funds:** a total of \$2.5 million from local sources will supplement the total project cost:

- » **MTTA (Vision Tulsa):** \$1.5 million of the local match will be funded by MTTA through the 2016 voter approved Vision Tulsa funding initiative, providing a permanent, dedicated tax for transportation. The package will generate an estimated \$57 million of funding for transit over the next 15 years.
- » **City of Tulsa (2016 Sales Tax):** \$1 million of the local match will be funded by the voter approved transportation funding (referenced above) that will be utilized for traffic operations and street maintenance. This dedicated capital improvement funding will provide the match to accelerate deployment and complete gaps in coverage for fiber/broadband. Without the BUILD grant, it would take five additional years to connect all traffic signals with improved video and broadband in these two corridors.



**Appendix B** contains letters of financial commitment from both MTTA, the City of Tulsa and INCOG.

TABLE 3. Project Capital Budget Summary by Source (2018\$ Millions)

	Funding Source	Total Funding Amount (\$ millions)	Percent of Total
<b>Federal Funds</b>	BUILD	\$6.5	74%
	INCOG (CMAQ)*	\$0.5	
<b>Non-Federal Funds</b>	MTTA (Vision Tulsa)	\$1.5	26%
	City of Tulsa (Vision Tulsa)	\$1.0	
<b>Total Project Cost</b>		<b>\$9.5</b>	

\*INCOG is committed to leveraging limited federal resource, CMAQ, to the LINK Project.

### 5.3. Capital Uses of Funds

As described in Section 5.2, the federal and non-federal funds will cover Project costs as listed in **Table 4**.

TABLE 4. Project Capital Budget Summary by Use (2018 \$ Millions)

Funding Use	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Total
Engineering Design & Specs	-	\$0.25	\$0.25	-	-	-	<b>\$0.50</b>
Broadband/Fiber Install	-	-	\$0.50	\$0.50	\$0.50	\$1.00	<b>\$2.50</b>
Network Switches Upgrades	-	-	-	\$0.50	-	-	<b>\$0.50</b>
Transit Signal Priority (TSP)	-	\$0.10	\$0.20	-	-	-	<b>\$0.30</b>
Transit Technology Upgrades	-	-	\$0.30	\$0.30	\$0.50	\$1.20	<b>\$2.30</b>
Dynamic Message Signs	-	\$0.10	\$0.30	-	-	-	<b>\$0.40</b>
Traffic Engineering	-	\$0.50	\$0.50	\$0.50	\$0.50	\$1.00	<b>\$3.00</b>
<b>Total Project Funding Uses</b>	-	<b>\$0.95</b>	<b>\$2.05</b>	<b>\$1.80</b>	<b>\$1.50</b>	<b>\$3.20</b>	<b>\$9.50</b>

### 5.4. Operating Sources and Uses

After installation, annual operations and maintenance (O&M) and replacement/repair costs for the Project are estimated at an annualized average of \$495,000. The detailed costs for each corridor are broken out by year for each Project element in the Benefit-Cost Analysis (BCA), including replacement cycles and unit costs.

**Operating and Maintenance Source:** The City of Tulsa voters approved a permanent tax toward transit and traffic operations in 2016.

The transit elements of the Project include dynamic message signs on Route 66/21<sup>st</sup> Street; these assets will be operated and maintained by MTTA. The City of Tulsa will own all remaining elements, and will be responsible for operating and maintaining them as part of the Tulsa TMC.

The Project is expected to provide efficiencies in transit operations by reducing the travel time needed for a BRT vehicle to complete its route.





## 6. MERIT CRITERIA

In accordance with the United States Department of Transportation’s (USDOT) BUILD Notice of Funding Opportunity (NOFO), a description of the Project’s quantitative and qualitative benefits are described below.

### 6.1. Safety

The LINK Tulsa Project will foster a safe transit, automobile traffic, and pedestrian system for the movement of all residents, commuters, and visitors. It will reduce the number of accidents, injuries, and fatalities by synchronizing signals, and improving pedestrian crossings.

Data for the Project area was provided by ODOT’s Traffic Engineering Division, Collision Analysis and Safety Branch. The Project area data was reviewed over a five-year period (2012 to 2016). The analysis recorded a total of 20 fatal collisions including 7 pedestrian fatalities, 1,189 injury collisions, and 1,657 property damage collisions. Research into causes indicated that most of these crashes and injuries are due to drivers following too closely, combined with unpredictable wait times, variability in driving speeds, following too closely in anticipation of a signal turning red, speeding through amber cycles, and other preventable factors. Simply reducing the variability in driving conditions will by itself result in significant safety, as motorists will have more predictable wait times at each of the intersections.

TABLE 5. Peoria Ave. and Route 66 Crashes, by Type and Severity (2012 - 2016)

	Fatality Collision	Injury Collision	Property Damage	Total
Rear-End (front-to-rear)	0	317	511	828
Head-On (front-to-front)	2	13	5	20
Right Angle (front-to-side)	3	223	254	480
Angle Turning	4	418	464	886
Other Angle	0	5	11	16
Sideswipe Same Direction	0	40	218	258
Sideswipe Opposite Direction	0	12	37	49
Fixed Object	4	46	62	112
Pedestrian	7	55	1	63
Pedal Cycle	0	16	2	18
Animal	0	1	1	2
Overturn/Rollover	0	1	0	1
Other Single Vehicle Crash	0	16	10	26
Other	0	26	81	107
<b>Total</b>	<b>20</b>	<b>1189</b>	<b>1657</b>	<b>2866</b>
<b>Percent</b>	<b>0.7%</b>	<b>41.5%</b>	<b>57.8%</b>	

Importantly, Peoria Avenue and Route 66 have the highest pedestrian usage in the city, and consequently the highest number of pedestrian incidents. Both these corridors will benefit from improvements suggested to develop cohesive sidewalks and crossings at the proposed BRT stops, and install ADA accessible countdown heads at traffic signals.



TABLE 6. Pedestrian Crashes along both Corridors

Total # of Crashes Involving Pedestrians	63
Total # of Injury Crashes Involving Pedestrians	55
Total # of Fatality Crashes Involving Pedestrians	7

The Project elements include **upgrades to the sidewalk infrastructure and installation of communication technology to inform transit riders and decrease wait times. The upgrades include improving sidewalks within 300 feet of each station, and include dynamic message signs and signals.** With this new technology, the corridors will be able to provide riders with real-time information. With the proposed **Transit Signal Priority (TSP)**, the corridor will experience less delay at signals, and therefore provide a faster and more reliable service for riders. Additionally, the **Project allows immediate, tailored response to traffic and weather situations**, including: flow rate, speed adjustments, and early response to accidents and detection of pedestrians.

According to traffic safety analysis performed by INCOG, Crash reduction measures **including signal upgrades, TMC monitoring via video, ADA improvements**, and general visibility along the corridors for all users are projected to improve safety at both day and night times. Improved pedestrian connections and crossings not only improve the safety of all users, but enhance passenger wayfinding. In addition to pedestrian and ADA safety improvements, the BUILD grant will also improve vehicular and bus safety. According to a number of studies, implementing signal coordination results in a reduction of accidents corridor-wide ranging from 6.7 percent to 52 percent. The BCA used the conservative assumption of a 6.7 percent decrease in accidents. Due to the high number of accidents along these two corridors, the 6.7 percent decrease led to a benefit of \$36.6 million over 30 years, by avoiding approximately 29 accidents per year, including an estimated 12 injuries. Again, this counts only the benefit of signal timing optimization, and not any other benefits for pedestrian crossing treatments and other safety improvements.

IMAGE 1. Incident on E 21st and S Sheridan Rd.



Police work the scene of a fatal auto-pedestrian incident near the intersection of East 21st Street and South 68th East. Buy Now Avenue. Paris Burris/Tulsa World

IMAGE 2. Pedestrian Crash Location



**Substantial system performance improvements are expected due to these technology advancements, which will improve travel speeds, travel time reliability, and vehicle throughput. Performance measures will include reduction in the number and severity of crashes, user perception of transit travel reliability and system efficiency, and mode shift to transit.**

<sup>1</sup> Two sources: An FHWA Study [https://safety.fhwa.dot.gov/intersection/other\\_topics/fhwasa08008/sa4\\_Signal\\_Coordination.pdf](https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa08008/sa4_Signal_Coordination.pdf), and a recent study in the Journal of Traffic and Transportation Engineering, which found that signal coordination resulted in total crashes decreasing by 21 percent and injury crashes by 52 percent.



## 6.2. State of Good Repair

The LINK Tulsa Project **will improve antiquated signals, timing plans, remove ADA impediments, install pedestrian countdown heads that are needed for the existing conditions of Peoria Avenue and Route 66 corridors, and reduce overall life-cycle costs.** The Project will improve the condition and resilience of both corridors by providing new technology to better manage the transit systems.

The fiber/broadband connection in these two vital corridors will enable the TMC to address critical safety, and traffic flow issues. The fiber backbone built along these two arterials will also enable several city facilities to connect to the network at the City Hall of Tulsa as well as the 9-1-1 center, thereby increasing safety and security for the City of Tulsa.

MTTA owns and operates 62 fixed-route transit buses and 60 bus stations/stops. Currently, many of the buses and stations have no visible signage, little lighting, poor ADA access, and no off-board amenities (Image 3 illustrates proposed new bus stops along the corridors). These new stations are currently being implemented with local funds.

Without the BUILD grant, the full realization of the benefits envisioned from the BRT alone will be delayed or may not materialize to the full extent envisioned. The Project improves the efficiency of the regional Tulsa transit system, and is consistent with relevant plans to maintain transportation facilities or systems in state of good repair and address vulnerabilities, based on the transit asset management for Tulsa Transit. The Project is consistent with the local and regional multi-modal and environmental objectives. The Project supports conclusions and recommendations for enhanced transit services in the region. City of Tulsa voters voted in 2016 to operate and maintain transit and provided for a sustainable traffic operation via dedicated sales tax. That funding is expected to cover the expenses for these two important corridors.

IMAGE 3. Lack of sidewalks



If the Project elements are left unimplemented or unimproved, the condition of the asset will threaten future transportation network efficiency, as well as the accessibility and mobility of people. The corridors will continue to operate inefficiently, with time delays, and in a comparatively unsafe manner for riders and pedestrians.

## 6.3. Economic Competitiveness

The LINK Tulsa Project advances economic development in the region, **providing reliable access to employment centers, improving long-term efficiency of the movement of commuters, and resulting in long-term job creation.** Specifically, the Project provides more efficient movement for commuters and pedestrians, improved local and regional user connectivity, and continues the expansion of private economic development.

Both Peoria Avenue and Route 66 corridors are home to more people and jobs than any other corridor in the city. Over the last decade, Tulsa has seen a resurgence in downtown employment and greater housing density within these corridors. The opportunity to connect those jobs and





stimulate more density into the corridor is made possible through the changes in the City's zoning code which allows for mixed-used development and a reduction in parking requirements. Changing these policies, allows the City to attract more dense development and gives developers flexibility to reduce their required parking and rely on transit for a portion of their patron's and residents' trips.

As noted above, a survey by the Tulsa Regional Chamber found that 93 percent of businesses in the city cite lack of access to workforce as a barrier for growth. Tulsa is seeking to maximize every opportunity to utilize the full potential of its people by providing reliable access to opportunities. With the new BRT corridors, Peoria Avenue and Route 66, Tulsa is addressing some of the barriers faced by its citizens. Tulsa remains predominantly auto-centric, with the majority of workers utilizing cars as their primary source of transportation.

However, of those commuting by public transportation, 48 percent have no available vehicle; , 32 percent face travel times more than an hour, and 55 percent face travel times more than 45 minutes.

The City is committed to providing transportation alternatives with local funds, dedicated to transit and traffic engineering. The Vision package, overwhelmingly approved by the City voters, is a testament to the will of the people to provide an integrated transportation network of choices including bike, walk, bus and drive modes. This is the next frontier for Tulsa as an economic driver.

The City of Tulsa is also focused on linking rural residents to Tulsa's downtown by working with the Cherokee Nation and Creek Nation. The Cherokee Nation enterprises and the Hard Rock casino provide employment on the outskirts of the City of Tulsa, and provide transit linkages from these enterprises to several rural counties with rural public transportation. **The Route 66 route long-term plans call for providing a Park & Ride facility at the Casino, with a shuttle service to connect to the Route 66 BRT and to other major regional facilities.**

Tulsa Regional Chamber's Regional Workforce Analysis Project recommends investing regional work- and education-based transportation and mobility options for residents in an effort to unlock portions of the working age population that currently face significant transportation barriers, and also to attract and retain those workers seeking greater public transit options. Nearly 80 percent of residents along the Project corridors (Peoria Avenue and Route 66) are of working age, reflecting a high need for efficient and reliable public transportation.

The corridors encompass a large area of Tulsa and specifically, Tulsa's employment centers, entertainment areas, educational institutions, and hospitals, including the following recent and planned development sites are located within 10-minute walk of the Project corridors, in addition to existing sites listed in **Table 7**.

- » The Mother Road Market, **a new private investment** with mixed-use development center, at 11th and Lewis
- » A private investment in parks of nearly \$300 million, A Gathering Place for Tulsa, opening in September 2018, just a half-mile from Peoria Avenue

IMAGE 4. Proposed New Bus Stop











- » Fuel 66 opened in 2016, providing a venue for local food-trucks with a permanent bar and patio seating
- » A \$12 million expansion of the Center for Individuals with Physical Challenges
- » Development plans for the East Tulsa Multicultural District, including a redesign of the International Bus Station where two daily international buses to Mexico City depart

In addition to the increasing economic development and community revitalization efforts across the City of Tulsa, the City aims to improve access to all jobs, education, and training through reliable public transportation. **Table 7** illustrates the breadth of economic productivity within half a mile of the corridors, demonstrating the need for improved mobility.

TABLE 7. Major Activity Centers within the Project Limits

(within half mile)	Both Corridors (Peoria Avenue and Route 66)
<b>Jobs</b>	<b>45,783</b>
<b>Residents</b>	<b>98,538</b>
<b>Employment Centers</b> 	CityPlex Towers, Yale Shopping Center (Retail/Grocery), AT&T Call Center, Eastgate Metroplex, Tulsa State Fair Grounds, National Post Office and Employment Center, East Tulsa Multicultural District, Denver Avenue Station. Oklahoma State University Medical Center’s Center For Diabetes Education, Oklahoma State University-Tulsa
<b>Educational institutions</b> 	Oklahoma State University Medical Center’s Center For Diabetes Education, Oklahoma State University-Tulsa, Tulsa Community College, University of Tulsa, Nathan Hale High School, East Central Junior High, Tulsa Welding School, Tulsa Technology Center, Oral Roberts University, Booker T. Washington High School, KIPP Tulsa Preparatory School, McLain High School of Science and Technology
<b>Hospitals / Medical Care</b> 	Oklahoma State University Medical Center, Indian Health Care Resource Center, Hillcrest Medical Center, Center for Individuals with Physical Challenges, St. John Medical Center
<b>Cultural Destinations</b> 	The Gathering Place, Brookside Retail District, Pearl District, Cherry Street District, Utica Square, 18th and Boston District, Woodward Park and Tulsa Garden Center, Philbrook Museum of Art, River Spirit Casino & Resort, Mother Road Market (mixed-use development), Fuel 66 Food Truck Park

Having an efficient transportation system strengthens the competitiveness of any regional economy. This Project specifically strengthens the Tulsa metropolitan area’s economy in two ways. First, by improving transit service as a viable alternative to private vehicle use, and secondly by reducing auto travel time along two major arterials in the Tulsa metropolitan area.

Improved transit makes it easier for individuals who cannot drive, cannot afford a private auto, or who chose not to drive to get to work, school, shopping, and other opportunities. Making bus travel faster and more reliable also enables more individuals to attend school, reach medical services, and get to work, thereby increasing the overall productivity of the region’s residents, and helping the US to compete in a global economy. Quantified economic benefits are described in Section 8.



## 6.4. Environmental Protection

The LINK Tulsa Project improves the environment in two ways: **by encouraging transit use, and also by reducing the amount of time that cars, trucks, and buses spend idling waiting for a traffic signal to turn green.**

While Tulsa is currently in attainment for ground level ozone, the region is hovering on the cusp of non-attainment. Multi-modal opportunities are being expanded, including pedestrian connections, bicycle amenities, and the BRT program. The bus routes will connect numerous bike share stations, shared use trails, and bicycle lanes as shown in **Image 5**. These BRT routes, pedestrian paths, and bicycle lanes connect to many parks, green spaces, and outdoor entertainment facilities, including A Gathering Place for Tulsa and Woodward Park. This enhanced transit network will work with other initiatives to provide a host of mobility options, including bike share. Tulsa bike share launched, with 240 bicycles and 18 docking stations throughout downtown Tulsa, with planned stations along the BRT corridor routes. Studies show that transportation systems that use traffic management systems, like TSP and TMS proposed in this Project, minimize traffic congestion and help reduce emissions. Additionally, dynamic message signs showing potentially shorter transit ride times are expected to convert auto trips to transit trips, having a direct VMT reduction benefit. The benefits of reducing VMT include reduced emissions, reduced roadway wear and tear, and reduced energy consumption. More importantly, reduced VMT lowers automobile collisions resulting in fewer injuries and fatalities.

The Project's environmental benefits include:

- » Reduced idling at traffic signals, removing emissions worth over \$2 million per year, reducing fuel usage, and contributing to energy security
- » Improved transit that uses cleaner fuel (CNG)
- » Reduction of pollutants including nitrogen oxides, particulate matter, and volatile organic compounds (details in the BCA)
- » Improved bus service leading to reduction of VMT, improving air quality.

## 6.5. Quality of Life

The LINK Tulsa Project increases transportation choices for individuals by making BRT service faster and more reliable, and providing real-time arrival information, and therefore making transit more attractive. This enhances connectivity for citizens to jobs, health care, and other critical destinations. As described above, this Project links nearly 100,000 residents – roughly one-third of the city's population – to employment centers, recreation opportunities and cultural destinations, which in turn will improve quality of life.

Increased reliability, frequency, and efficiency of the BRT routes provides greater mobility and flexibility for existing and future transit users. The *Economic Competitiveness* Section above includes a list of over 50 critical destinations are within the Project limits. Higher quality and more reliable transit allows Tulsa residents to move throughout the region with improved access to their daily needs. The entire Tulsa region will benefit from the enhanced BRT routes of Peoria Avenue and Route 66, including rural and ADA populations along the corridors.

Existing mode share in Tulsa is almost exclusively by private automobiles. Ninety-one percent of Tulsans use a car, truck or van to commute to work, and public transportation accounts for only one percent of commute trips. This is a result of decades of underinvestment in transit. The improved



BRT routes seek to create an appealing and effective transit service that is competitive with driving. It is estimated that once both corridors are in full service, the enhanced routes will add up to 2,500 passengers per day (weekday) system-wide. As residents switch from owning vehicles to riding the BRT system, transportation costs are reduced and households decrease their overall spending on transportation, therefore increasing their available resources to spend elsewhere.

## 6.6. Innovation

The LINK Tulsa Project uses advanced technology to improve the detection, mitigation, and documentation of safety risks with intersection alerts and signal prioritization. The Project will employ a number of innovative technologies and techniques, including:

- » Real-time arrival information (first in Oklahoma), providing reliable information for passengers
- » Transit Signal Priority (TSP), allowing buses to pre-empt traffic signals to improve operations and reduce travel time
- » Installation of fiber/broadband to connect stations and vehicles to the TMC, enhancing the safety of the system, as well as improving traffic flow

Tulsa is investing \$44million (capital), and \$6.8 million annually for operations, to upgrade transit bus service on its two most heavily used corridors to a BRT type service. BRT in the Peoria and Route 66 corridors will provide more frequent service, and improved infrastructure (stations, sidewalks, etc.) As noted in Section 6.3, policy changes are being implemented to encourage transit-oriented development to boost the utility of BRT (adding higher-density residential, commercial, and employment destinations). BRT in any form is an innovation for this region. With the **LINK Tulsa Project the benefits of Tulsa's investment in BRT & Traffic Operations are increased – not only for users of transit, but also for passenger cars and other vehicles along this corridor.** By improving the potential of BRT, this project makes the most of MTTA's investment, and encourages support for transit throughout the region.

### Innovative Technologies

Tulsa Transit has already implemented safe technologies along with GPS on all its buses. Bus drivers are now alerted by technology that is able to sense a pedestrian or a cyclist stepping in front of the bus. The agency is committed to providing these same proven tools on the BRT corridors. DMS signals with real time are another innovation.

### Innovative Project Delivery

The City of Tulsa, specifically the Information Technology, Traffic Engineering, and Engineering Services staff, is responsible for the overall transportation system, and they have worked closely with Tulsa Transit Authority on previous projects, and this project demands that there is a coordinated team approach. The proposed multi-disciplinary team with planning, engineering, technology, software and administration are a core group of individuals committed to delivering this proposed project.

In addition, a private non-profit museum adjacent to the corridor is interested in an Autonomous Vehicle that intersects with the corridor. Our design delivery process will be open-ended to accommodate such a request from the Museum.









## 7. PROJECT READINESS

Planning, preliminary engineering, environmental review, and the majority of right-of-way acquisition and utility relocation activities have been completed for Peoria Avenue, and are underway for the Route 66 BRT corridor, ensuring that the LINK Tulsa Project is ready to obligate BUILD funds ahead of the September 30, 2020 deadline for FY 2018 BUILD funds.

### 7.1. Technical Feasibility

The MTTA, the City of Tulsa, and INCOG successfully completed the Alternative Analysis for Peoria Avenue and Route 66 BRT System corridors (included at <https://www.cityoftulsa.org/BuildGrant2018>). The Federal Transit Authority (FTA) has been supportive of the public involvement and technical process. Stakeholders and regional leadership have shown enthusiasm for the transformative nature of the Project.

The preliminary engineering and NEPA study for Route 66 will be conducted as a partnership among MTTA, the City of Tulsa, and ODOT, to be completed by fall 2018. INCOG addresses in their letter of support this stated commitment to the Project from the MPO and ODOT. The Project requires little to no acquisition of right-of-way, and is anticipated to qualify for a categorical exclusion (CE). The City of Tulsa and MTTA are willing to comply with all performance management measures throughout the life of the Project.

Local partners are capable of carrying this Project through final design and implementation, and are familiar with the federal grants processes. The City of Tulsa has a history of working with Federal partners on successfully implementing federally-funded projects. City of Tulsa and Tulsa Transit will abide by all federal reporting requirements toward completing satisfactory agreement with the USDOT, and completing the project.

### 7.2. Project Schedule

The Project is ready for rapid implementation. The City of Tulsa and MTTA are partnered to complete the installation and improvements for this Project. MTTA working with City of Tulsa has completed the final design for Peoria BRT. Several elements of the BRT, including station construction, will be completed in 2019. The technology will be adapted to the stations, and the Peoria TSP part of the Project will be designed and implemented along with the entire LINK Project as proposed. The 11<sup>th</sup> Street project will require additional engineering to begin the BRT service, and the LINK Tulsa components will be integrated into the design and installatin process.

FIGURE 6. Operating Funding for the City of Tulsa

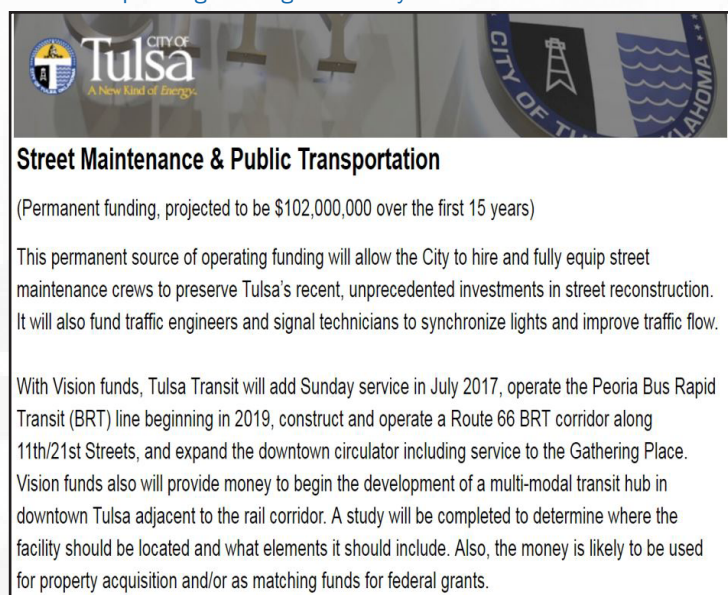




TABLE 8. Project Schedule - Project Element Construcion / Implementation

PROJECT SCHEDULE	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Engineering Design & Specs		■ →				
Broadband/Fiber Install			■ →			
Network Switches Upgrades				■ →		
Transit Signal Priority (TSP)	■ →					
Transit Technology Upgrades			■ →			
Dynamic Message Signs	■ →					
Traffic Engineering	■ →					
<b>Deployment of LINK Tulsa</b>						◆

TABLE 9. Detailed Milestone Project Schedule

PROJECT SCHEDULE	ANTICIPATED COMPLETION
State and Local Planning Approvals	January 2019
Categorical Exclusion (PA&ED Milestone)	September 2019
Final Design for Peoria Avenue BRT (PS&E Milestone)	Completed
Final Design for Route 66 BRT (PS&E Milestone)	September 2020
Construction Begins (Contract Award Milestone) *	December 2019
Construction Ends (Construction Contract Acceptance Milestone) *	December 2023

\*Assumes BUILD grant award announcement in late 2018



### 7.3. Financial Feasibility

The Peoria BRT Project budget was developed as part of the Alternatives Analysis funded by FTA. The Route 66 BRT budget is expected to follow the same local design guidelines and budget based on a preliminary analysis by Project engineers.

As noted previously, the City of Tulsa has a permanent dedicated funding source for the corridor systems, including both Peoria and Route 66 BRT corridors. The funding source was approved by voters in April 2016, and ensures continued operations funding for the Peoria BRT system.

The City of Tulsa is able to manage the BUILD grant if awarded. As proof of the City of Tulsa's financial stability, in 2014 Moody's assigned "Aa1" rating to the City of Tulsa's 2014 General Obligation (GO) Bonds. The City of Tulsa has experience managing numerous federal grants. The City's operating budget exceeds \$768 million, and the City has experience successfully managing federal grants.

The MTTA is also able to handle its responsibilities should this grant be awarded. The operator of the BRT project, MTTA, is a very stable agency with a long history of operating Tulsa's transit service with no interruption. In 2017, MTTA had a total operating budget of \$18.36 million and over 2,900,000 riders. MTTA's 2017 Financial Report is included at <https://www.cityoftulsa.org/BuildGrant2018>. MTTA is familiar with federal grant funding, as well as operating and maintaining transit equipment and facilities. In addition, the dedicated sales tax revenue from the Vision Tulsa package provides an annual \$3.4 million to be spent on public transportation for the next 15 years.

### 7.4. Required Approvals

#### Environmental Approvals

Coordination with FTA Region VI has been ongoing throughout the planning process, beginning with the consultation related to the Alternatives Analysis on Peoria and system-wide study. FTA staff has helped guide the model development process, and it is anticipated that the Route 66 BRT will proceed as a categorical exclusion (CE). No significant environmental, historic, or social impacts have been identified. The project development team, MTTA, City of Tulsa, and INCOG have consulted with ODOT and are on track to complete the NEPA process by the end of 2018. The NEPA process will be conducted with assistance from ODOT. INCOG and ODOT have the commitment and the resources required to advance through environmental clearance.

#### Legislative Approvals

The Project has received significant support from both state and local officials. **Appendix B** includes letters of support from MTTA, INCOG, and ODOT.

#### State and Local Planning

The Peoria BRT System was developed through FTA's Alternative Analysis process including extensive public outreach, and is included in the LRTP and RTSP. The Tulsa Metropolitan Area Planning Commission (TMAPC) passed a resolution finding the mixed-use rezoning incentive program to be in conformance with the Tulsa Comprehensive Plan, PlaniTulsa. The program allows a variety of incentives for property owners along the corridor who voluntarily opt-in and rezone their properties as mixed-zoning (TOD). The plan and resolution are located on the Project website, <https://www.cityoftulsa.org/BuildGrant2018>.



## 7.5. Assessment of Risks and Mitigation Strategies

The scope of this Project makes it unlikely that serious risks will be encountered. It only utilizes public right-of-way, and the environmental approvals would be in the form of a programmatic or Categorical Exclusion, and would not take more than 9 months. The project is entirely within the City of Tulsa, and is unlikely to result in community complaints as it is largely underground or over the air, with little disruption to surface transport, and having no visual or noise impacts. Matching funding has been approved by the Tulsa voters to support this project, additionally, the project is supported by the MPO and MTTA. There is no inter-agency conflict that would slow the implementation. The MPO has concurred in principle that this project will be added to the TIP/STIP if BUILD funding is available.

The City of Tulsa currently has an existing, operationalized Traffic Management Center that is on City Fiber network along with the City 9-1-1 system and City Hall. There is therefore no risk in having to develop system protocols, or delays anticipated in identifying a managing agency to coordinate traffic control. The City of Tulsa IT Department Director will oversee the design and implementation of Fiber and Aerial Fiber, and ensure that the design is compatible with existing infrastructure.

The primary Project risk would involve traffic restrictions during construction, as some or all of the fiber will be installed underneath existing pavement.

Public complaints regarding construction-phase impacts to individual businesses will be managed through outreach to property owners and neighborhood organizations. Further, the minimal cut-and-cover construction required for this Project will not impact any area for very long, and may be viewed as a benefit by businesses along the corridor, as affected sidewalks and streets will be in an improved condition after implementation.

One risk is reduced benefits if BRT implementation along the Route 66 corridor is cancelled or delayed (the Peoria BRT is already being let for construction). Cancellation of the Route 66 implementation is unlikely, as funding is already in place, and there are no major impacts (such as loss of on-street parking) that sometimes occur with higher-level BRT programs. Further, Route 66 is slated for installation of bike lanes connecting the core parts of the city to downtown Tulsa. Hence there is significant momentum on the part of this corridor toward completing multi-modal projects.

The LINK Tulsa Project has independent utility even in the unlikely event that the Route 66 BRT implementation does not occur. Traffic speeds and transit speeds will be increased whether BRT or existing regular buses are operating. However, the overall effectiveness of the LINK Tulsa Project in encouraging transit use will be lower if the Project is implemented alone.

Regarding schedule risks, the Project Schedule presented in Section 7.2 is a conservative schedule, allowing five full construction seasons to get the work done. While the Project could be implemented more quickly, work is being spread out to ensure that community impacts are minimized, and to allow up to 12 months for environmental approvals, should that be required. The Project will be carried out to ensure that it is completed before the September 2025 deadline for the expenditure of funds.





## 8. PROJECT COSTS AND BENEFITS

An economic benefit-cost analysis (BCA) was conducted for the Project using a model developed by WSP that follows USDOT’s 2018 *Benefit-Cost Analysis Guidance for Discretionary Grant Programs*. The analysis found that the Project will generate an estimated \$91.4 million in present-value benefits (in 2017 dollars, discounted at 7 percent), resulting in a benefit cost ratio of 7.53. As such, the Project is expected to generate economic benefits that outweigh its costs. Table 10 shows the overall results of the BCA for the LINK Tulsa Project. The BCA Technical Memorandum can be found at <https://www.cityoftulsa.org/BuildGrant2018>.

TABLE 10. Benefit-Cost Analysis Summary

Category	Undiscounted	Present Value @ 7%
<b>Costs</b>		
Capital Cost	\$9,500,000	\$7,503,669
Maintenance Cost	\$13,012,705	\$4,635,350
<b>Total Costs</b>	<b>\$22,512,705</b>	<b>\$12,139,019</b>
<b>Evaluated Benefits</b>		
Travel Time (TT) Savings	\$85,318,662	\$30,860,183
Transit TT Savings	\$8,359,567	\$2,801,411
Safety	\$105,255,375	\$36,589,439
Emissions	\$58,379,088	\$21,061,436
Residual Value	\$400,000	\$49,109
<b>Total Evaluated Benefits</b>	<b>\$257,712,691</b>	<b>\$91,361,578</b>
Net Present Value	\$235,199,986	\$79,222,559
Benefit-Cost Ratio	11.45	7.53

### Costs

The project capital cost of \$9.5 million will be expended between 2019 and 2024. Annual O&M costs for maintenance are estimated at \$495,000 annually.

### Safety

The safety benefits of reduced accidents are the largest source of benefits, accounting for 40 percent of total benefits. As noted in the safety section, these corridors have relatively high levels of accidents. There are a number of unquantified safety benefits that will occur, primarily from the improved pedestrian crossings. The quantified benefits were estimated by adding up the average annual accidents over the five-year 2012-2016 period (**Table 5**), and applying a conservative 6.7 percent accident reduction based on an FHWA study. Additional information safety benefits is in Section 6.1 above, as well as in the BCA Tech Memo, posted on the project website.

### Travel Time Savings

Travel time benefits are substantial for this Project. The use of transit signal priority ensures that the largest per-trip travel time savings are for transit vehicles, amounting to 3 minutes end-to-end on the Peoria Corridor, and two minutes end-to-end for the Route 66 corridor. The average travel time (TT) savings for riders was less, as few riders take a bus route from one end to the other. The value of transit travel time savings over the 30-year analysis (discounted at 7 percent) is \$2.8 million.



Benefits for general traffic were lower per-trip, for two reasons (1) the benefit of signal coordination is less than that of signal priority, and (2) an allowance had to be made for the times when cross-street traffic is delayed by the signal priority along the corridors. The resulting value over 30 years was \$30.9 million, primarily a result of the large number of vehicles travelling these two corridors.

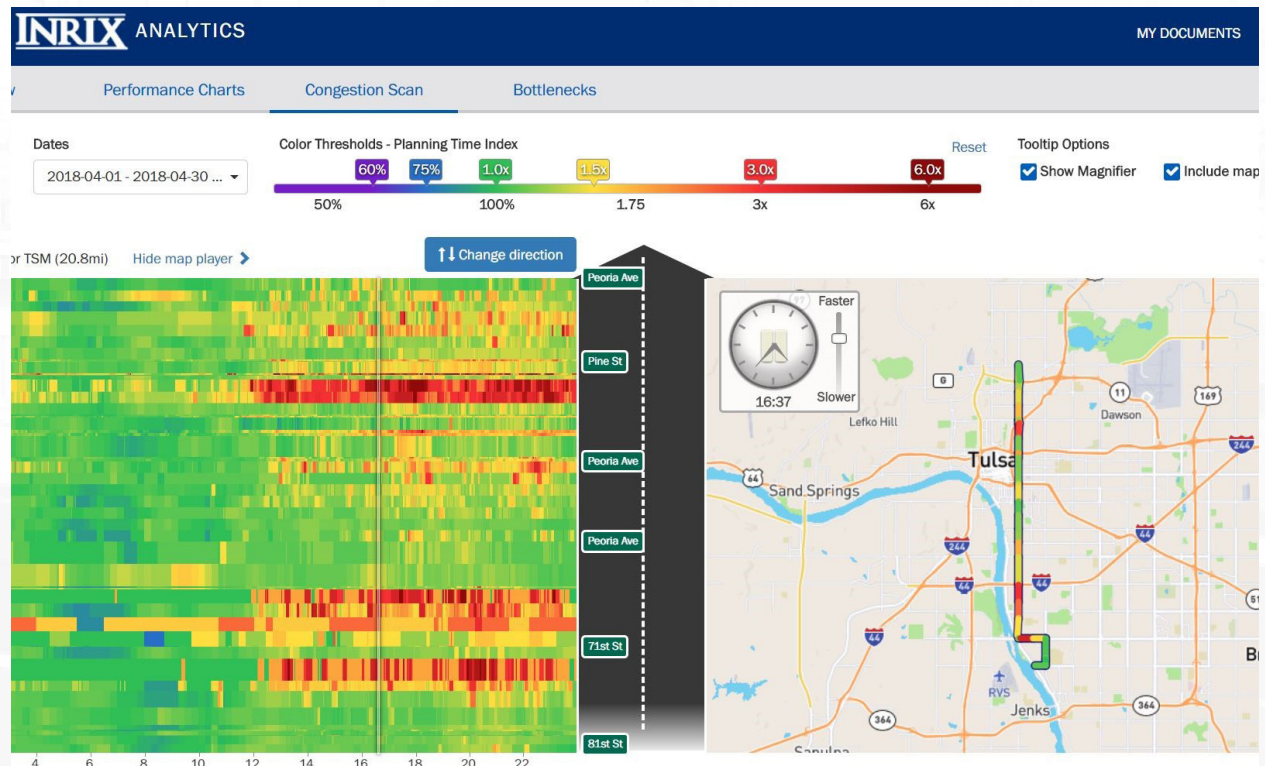
### Environmental Benefits

Because the travel time savings is largely a result of less time spent idling at intersections, waiting for the signal to turn green, there would be a substantial reduction in emissions. As with travel time savings, the benefits of reduced idling for traffic along Peoria and Route 66 were reduced to account for additional idling that might occur for cross-street traffic. The net value over the 30 years was \$21.1 million, accounting for 23 percent of the quantified benefits.

### 8.1. Summary

The LINK Tulsa Project improves safety and system performance (**Image 6** shows real-time INRIX data over a 24 hour period during weekdays) along two of Tulsa’s busiest travel corridors. Overall, the Project generates several quantifiable benefits, including safety, emissions reductions, and travel time savings for both transit and general traffic. The greatest quantified benefits derive from the reduction in accidents and the reduction in travel time. The Project also provides a number of qualitative benefits, including the connection of several Tulsa populations, improved access to jobs, more reliable travel times, and improved ride quality for future BRT users. These benefits will encourage transit use and support the many public and private investments that are planned, and underway along these two key corridors.

IMAGE 6. 24 Hour Traffic Flow Chart for the Peoria Corridor





## 9. APPENDICES

All appendices are hosted on the Project website: <https://www.cityoftulsa.org/BuildGrant2018>.

- » **Appendix A:** Benefit-Cost Analysis
- » **Appendix B:** Letters of Financial Commitment and Support