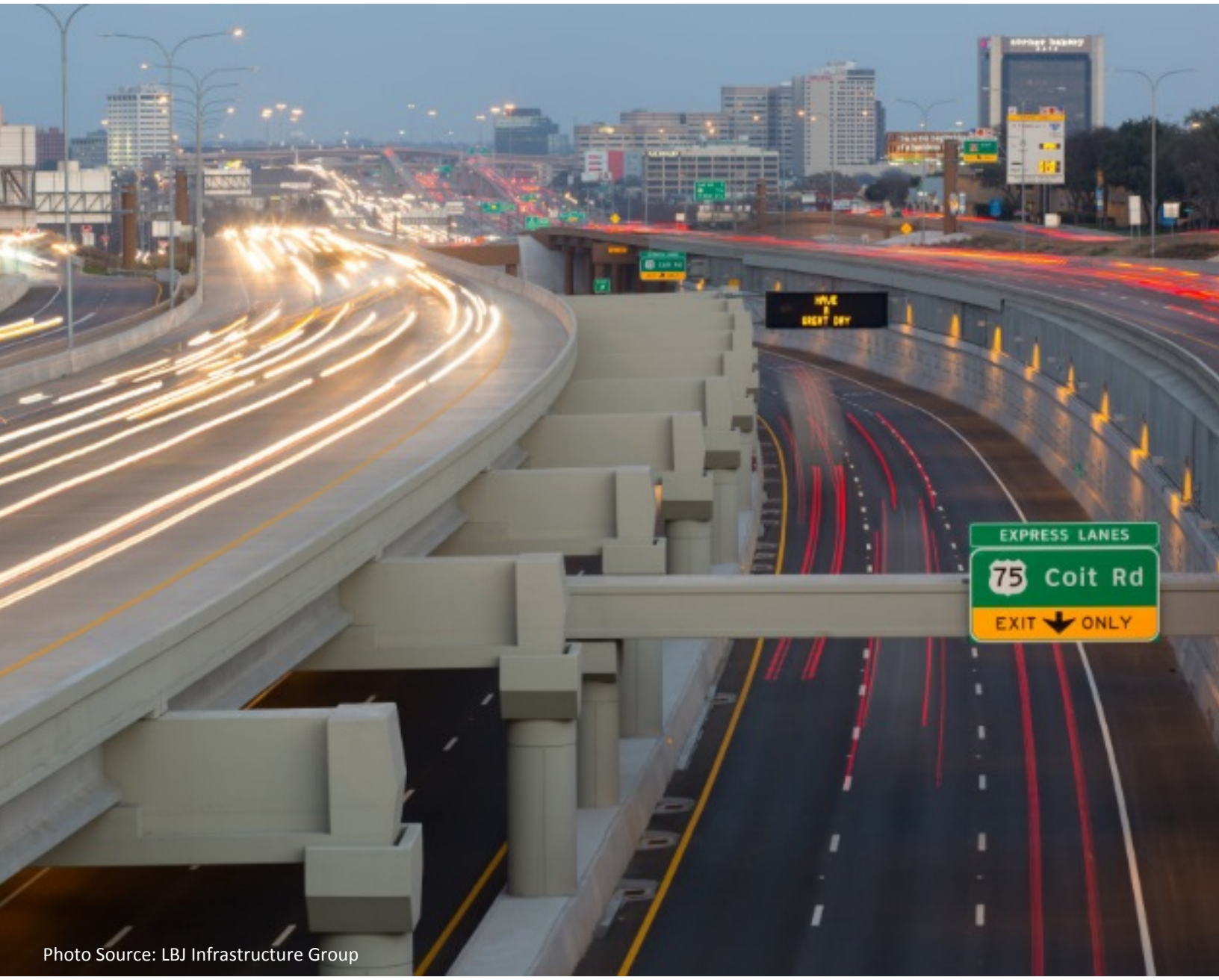

Photo Source: LBJ Infrastructure Group

IH 635 LBJ East Project

Attachment 1: Project Narrative
FY 2017 INFRA Grant Application

North Central Texas
Council of Governments

IH 635 LBJ East Project	
Was an INFRA application for this project previously submitted?	No
Previously Incurred Project Cost	$105,700,000
Future Eligible Project Cost	$1,800,000,000
Total Project Cost	$1,905,700,000
INFRA Request	$165,000,000
Total Federal Funding (including INFRA)	$899,600,000
Are matching funds restricted to a specific project component?	No
Is the project or a portion of the project currently located on the National Highway Freight Network?	Yes
Is the project or a portion of the project location on the National Highway System?	Yes
▪ Does the project add capacity to the Interstate system?	Yes
▪ Is the project in a national scenic area?	No
Do the project components include a railway-highway grade crossing or grade separation project?	Yes
▪ If so, please include the grade crossing ID	971207L, 971216K, 971217S, 971224C, 669347K, 22057M, 021601S
Do the project components include an intermodal or freight rail project, or freight project within the boundaries of a public or private freight rail, water (including ports), or intermodal facility?	No
If answered yes to either of the two component questions above, how much of the requested INFRA funds will be spent on each of these project components?	$0
State(s) in which project is located.	Texas
Small or large project?	Large
Urbanized Area in which project is located, if applicable.	Dallas - Fort Worth - Arlington
Population of Urbanized Area.	5,391,487 (2017)
Is the project currently programmed in the:	
▪ TIP	Yes – *2017-2020 TIP* http://www.nctcog.org/trans/tip/17-20/index.asp
▪ STIP	Yes – *2017-2020 STIP* http://ftp.dot.state.tx.us/pub/txdot-info/tpp/stip/2017-2020/highway.pdf
▪ MPO Long Range Transportation Plan	Yes – *Mobility 2040: The Metropolitan Transportation Plan for North Central Texas* http://www.nctcog.org/trans/mtp/2040/
▪ State Long Range Transportation Plan	Yes - *Texas Transportation Plan 2040* http://www.txdot.gov/inside-txdot/division/transportation-planning/statewide-plan/plan.html
▪ State Freight Plan	Yes – *Texas Freight Mobility Plan* http://ftp.dot.state.tx.us/pub/txdot/move-texas-freight/studies/freight-mobility/plan.pdf
If selected, would you be interested in participating in a new environmental review and permitting approach?	Yes

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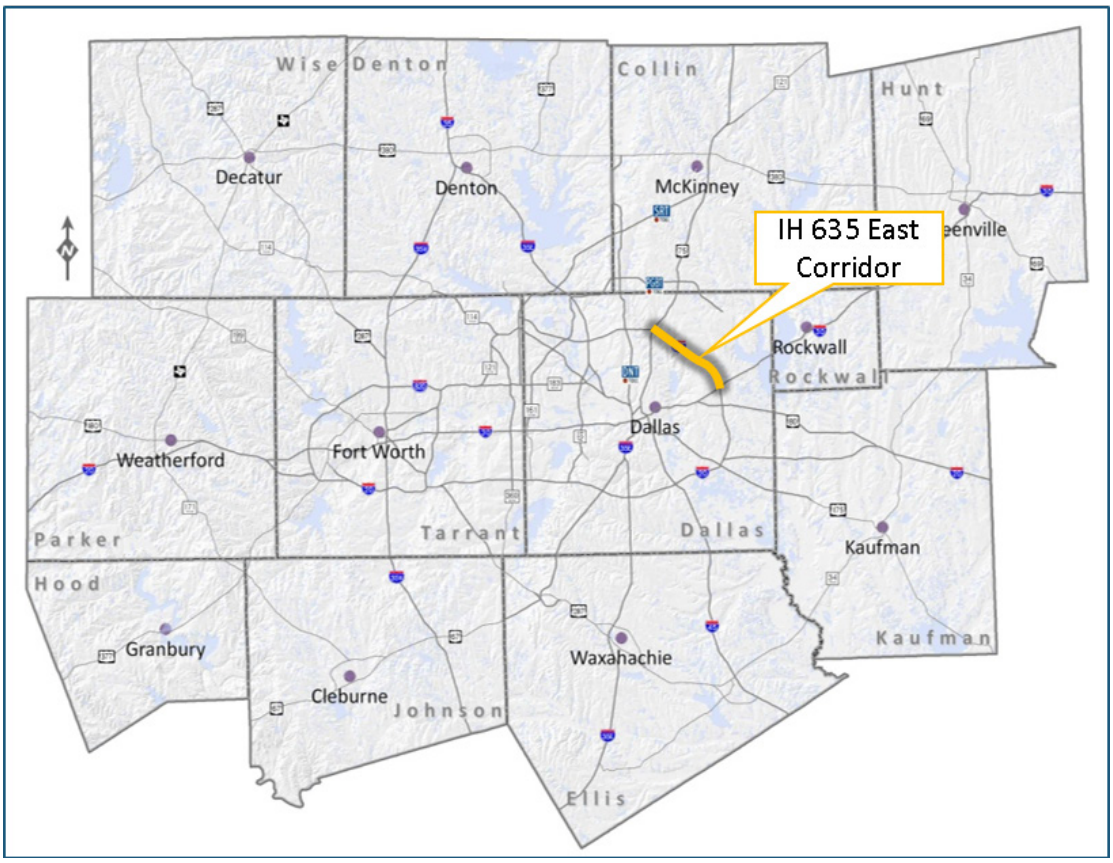
List of Other Attachments

1.0 Project Summary

The North Central Texas Council of Governments (NCTCOG), in cooperation with the Texas Department of Transportation (TxDOT), is seeking funding assistance of **$165 million** through Fiscal Year (FY) 2017 for the Infrastructure for Rebuilding America (INFRA) Discretionary Grant Program application for Interstate Highway (IH) 635 [Lyndon Baines Johnson (LBJ) Freeway] from United States (US) 75 to IH 30, a distance of 11 miles. The project is locally known as the IH 635 LBJ East Project. The IH 635 corridor serves as a major west/east and north/south transportation facility in northern and eastern Dallas County, Texas. It links IH 20, IH 30, IH 35E, US 75, US 80, and the Dallas North Tollway. Exhibit 1 displays the project area location with respect to the Dallas-Fort Worth region.

Exhibit 1 – Dallas-Fort Worth Metropolitan Planning Area



Currently, IH 635 has four general purpose lanes and one interim express/high-occupant vehicle (HOV) managed lane in each direction with discontinuous frontage roads (see Exhibit 2). The proposed improvements from east of US 75 to north of IH 30 will reconstruct and widen the roadway to five general-purpose lanes, two dynamically tolled managed lanes, and two to three frontage road lanes in each direction as shown in Exhibit 3. Near IH 30, the managed lanes will be reduced to one in each direction to provide lane balance transitions. The proposed project will also reconstruct ramps, frontage roads, cross street bridges, and cross streets. Continuous sidewalks and shared-use lanes for bicycles will be provided along the proposed frontage roads

and cross streets. The proposed project will also include the reconstruction of the IH 635/IH 30 direct connecting interchange and some improvements to IH 30. A visualization of the future IH 635 East corridor can be viewed at https://youtu.be/xrfjYc-Ubr0.

Exhibit 2 – Existing IH 635 Typical Section

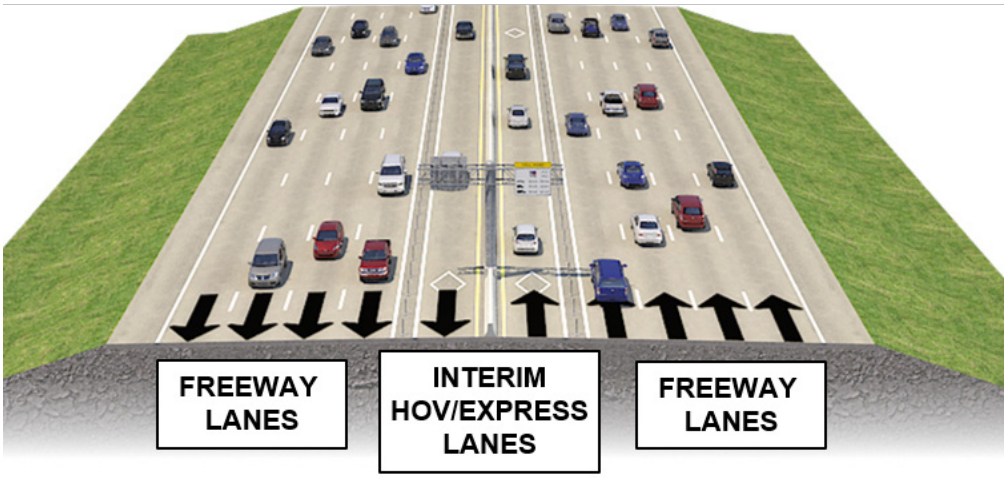


Exhibit 3 – Proposed Typical Section

The need and purpose of the proposed improvements to IH 635 are to:

- Provide traffic congestion relief in the IH 635 corridor and surrounding arterial street system
- Provide a continuous frontage road system to maintain local access and provide an alternate route during incidents
- Improve safety
- Provide balanced and improved access by modifying ramps to meet future conditions
- Provide improved cross street/frontage road intersections
- Incorporate dynamic pricing (value pricing) into the corridor to improve traffic management
- Improve operations to the major interchanges at US 75 and IH 30
- Replace the existing facility, which is more than 45 years old and has exceeded its design life

1.1 Project History

IH 635 was constructed in the late 1960s and early 1970s to serve as an outer loop freeway and provide mobility for the rapidly growing North Dallas, Garland, and Mesquite areas. At the time of initial construction of the IH 635 facility, residential and commercial developments were just approaching the IH 635 corridor from the south. The original facility was constructed with eight freeway lanes in anticipation of the continuing growth. However, what was considered aggressive planning at the time proved to be insufficient to handle the demand placed on the facility. The growth in the corridor led to fully developed surrounding land uses by the mid-1980s.

The planning for the IH 635 LBJ East Project was initiated in 2001 and received environmental and design approvals in 2003. TxDOT began purchasing right-of-way but because of funding constraints, did not have funding for construction. In 2014, with reconstruction/widening of IH 635 to the west (from IH 35E to US 75) nearing completion and more available funding, the previous approvals for IH 635 LBJ East were reevaluated to account for updated regional demographics and traffic projections, and to consider various locally-requested design changes, including changes to the configuration various cross streets and operation of the managed lanes.

As an interim measure, to help reduce congestion in the corridor and improve air quality, TxDOT restriped the corridor to add an HOV lane in each direction in 2008. In 2016, the operation of these HOV lanes were converted to express/HOV lanes to allow single-occupant vehicles to pay a toll to use the lane to help reduce congestion.

1.2 Costs

The cost to complete the IH 635 LBJ East Project is estimated to be $1.8 billion (2017 dollars) as shown in Exhibit 4. To date, TxDOT has spent approximately $14.3 million on engineering, $67.4 million on right-of-way, and $24.0 million for noise wall construction (mitigation) for a total of $105.7 million. The total project cost is over $1.9 billion.

Exhibit 4 – IH 635 LBJ East Cost to Complete Estimate

Cost Category	Total Cost	Funding Source	
		Federal (Percent)	Non-Federal (Percent)
Design/Engineering	$90,700,000	0%	100%
Utility Relocation	$41,500,000	90%	10%
Right-of-Way	$74,000,000	90%	10%
Construction	$1,593,800,000	44%	37%
TOTAL PROJECT COST	**$1,800,000,000**		

1.3 Targeted Transportation Challenges

The IH 635 LBJ East Project creates a unique opportunity for the Dallas-Fort Worth region to implement an innovative and efficient means for addressing urban transportation needs while balancing costs and impacts to the community and to the environment. The project is anticipated to significantly help relieve congestion; enhance mobility, connectivity, and reliability; improve regional air quality; and improve safety along the IH 635 corridor.

1.3.1 Relieving Congestion

According to the 2017 edition of the Texas "100 Most Congested Road Sections" list, IH 635 from US 75 to State Highway (SH) 78 ranked as the 20th most congested roadway for all vehicles and 32nd worst for truck congestion. The section from SH 78 to US 80 ranks at the 11th worst for all vehicles and 22nd for trucks. Exhibit 5 lists the annual hours of delay and cost of congestion for all vehicles and trucks.

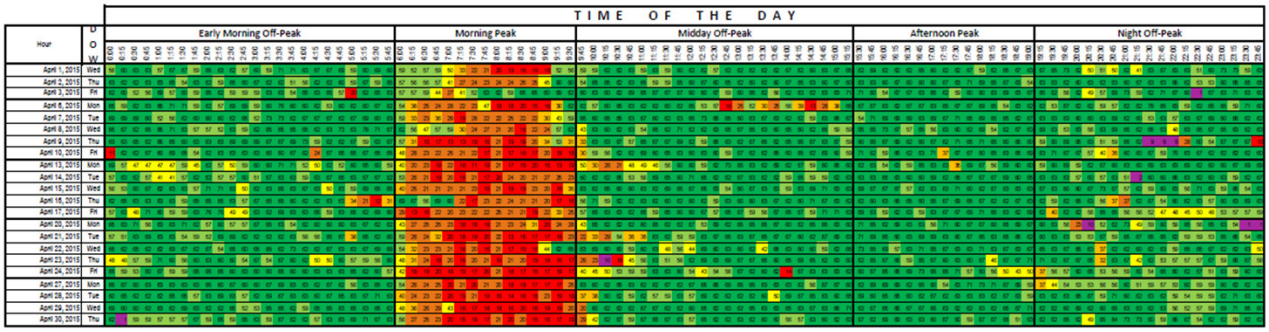
Exhibit 5 – Congestion Rankings

Measure	US 75 to SH 78	SH 78 to US 80
2017 Overall Rank	20	32
2017 Rank – Truck Delay	11	22
Annual Hours of Delay (person-hours)	3,086,278	2,249,644
Annual Hours of Truck Delay (person-hours)	222,210	161,521
Annual Congestion Cost ($)	$63.2 million	$11.1 million
Annual Truck Congestion Cost ($)	$46.0 million	$8.1 million

Source: Texas Transportation Institute, 2017

Additionally, NCTCOG used speed data from the Federal Highway Administration (FHWA) to create speed thermal maps to evaluate the current speeds, duration of peak periods, and delay on area roadways by time of day. Exhibit 6 shows the speeds for the northbound IH 635 general purpose lanes at Skillman Avenue in April 2015. The morning peak period is from 6:15 am to 9:30 am on most weekdays.

Exhibit 6 – Speed Thermal for Northbound IH 635 at Skillman Avenue (April 2015 Data)



Legend: Purple (1-10 mph), Red (11-20 mph), Orange (21-30 mph), Gold (31-40 mph), Yellow (41-50 mph), Light Green (51-60 mph), Dark Green (61-70 mph)

The additional general purpose lanes, managed lanes, and ramp improvements will help relieve congestion by adding capacity and improving operations. The continuous frontage roads will provide a parallel corridor to improve connectivity between cross streets, help facilitate local

trips, and provide an alternate route during incidents and accidents along the general purpose lanes.

1.3.2 Enhancing Mobility, Connectivity, and Reliability

Managed lanes are a vital component of the regional long-range transportation plan (*Mobility 2040*, http://www.nctcog.org/trans/mtp/2040/). This type of lane provides a more efficient use of roadways and is a more appropriate response to growing environmental and fiscal constraints in addressing transportation needs. Managed lanes improve traffic operations and maximize the efficiency of a roadway through active management of the lanes, which 1) make higher speed reliable travel available to all corridor users; 2) create opportunities to examine operation and pricing strategies for the region; and 3) create revenue generation to pay for ongoing corridor operation and maintenance needs. The six managed lanes on LBJ Express (IH 635 from IH 35E to US 75) opened to traffic in December 2015. The four proposed managed lanes on IH 635 LBJ East will connect to and extend the system. Exhibit 7 shows the managed lanes currently operating in the Dallas-Fort Worth region.

Exhibit 7 – Dallas-Fort Worth Managed Lane (TEXpress) System

As a comparison, the LBJ Express Project (IH 635 from IH 35E to US 75) is one of the most critical projects completed in north Texas in recent decades and opened to traffic in 2015. LBJ Express is one of the most travelled corridors in the state accommodating nearly 500,000 trips daily and providing access and connectivity between other major transportation corridors. Currently, this section of IH 635 LBJ carries approximately 25 percent more vehicles than it did prior to its recent construction with peak period speeds more than 50 percent higher than before implementation, resulting in 60 percent less congestion. The managed lanes operate at a speed near 70 mph even during the peak periods, with a third of its users being new to the lanes each month. The managed lanes provide a reliable travel option in an extremely high demand corridor at a reasonable cost for users. Almost all commuters (98 percent) only use the lanes when time savings and reliability are important for that trip, with an average toll bill of approximately $10 monthly.

1.3.3 Improving Air Quality

Ten counties in the Dallas-Fort Worth area are classified as nonattainment for ozone. While regional air quality has improved, the region still does not meet the federal standard. Failure to meet federal standards for air quality could result in additional emission control requirements that negatively affect local businesses. Transportation is a significant source of air pollutants. Planned transportation improvements must not degrade air quality and must pass air quality conformity requirements. Efforts to address air pollution include reducing the number of miles that vehicles travel by expanding transit, bicycle/pedestrian facilities, travel reduction programs; reducing emissions-causing congestion; and public education campaigns.

The IH 635 LBJ East Project will improve access to two existing Dallas Area Rapid Transit (DART) park-and-ride facilities along the corridor near US 75/TI Boulevard and on the north/east side of IH 635 between Skillman Street and Miller Road. Additionally, the project includes wide outside lanes along the frontage roads and cross streets that can be shared by vehicles and bicyclists. Continuous Americans with Disability compliant sidewalks and crosswalks will be along the frontage roads and cross streets. The project design also accommodates future grade separated trail crossings near the DART rail station, Kansas City Southern (KCS) railroad crossing, and Long Branch Creek.

1.3.4 Enhancing Safety

A total of 6,107 crashes were recorded along IH 635 between 2010 and 2015 and 398 crashes on IH 30 (see Exhibit 8). Of the total recorded crashes on both roadways, there were 63 fatality crashes and 2,874 injury crashes. The most common types of crashes on IH 635 were rear-end vehicle (37.2 percent) and angle/sideswipe (33.1 percent). The average annual crash rate for IH 635 is 60 percent higher than the statewide average annual crash rate for similar urban interstates in Texas in the same period. The average annual crash rate for the portion of IH 30 within the IH 635 LBJ East study area was 60 percent lower than the statewide average. However, IH 30 had a higher percentage of fatality and incapacitating injury crashes compared to IH 635.

Exhibit 8 – Crash Data (2010 to 2015) Analysis

	IH 635	IH 30
Total Crashes	6,107	398
Severity		
Fatality	50 (0.8%)	13 (3.3%)
Injury	2,637 (43.2%)	237 (59.5%)
Non-Injury	3,331 (54.5%)	114 (36.2%)
No Information	89 (1.5%)	4 (1.0%)
Crash Type		
Single Vehicle	1,494 (24.5%)	177 (44.5%)
Rear End	2,273 (37.2%)	152 (38.2%)
Angle/Sideswipe	2,024 (33.1%)	61 (15.3%)
Head On	316 (5.2%)	8 (2.0%)
Crash Rate (per 100 million Vehicle Miles Traveled)	174.72	106.90

Much of the original IH 635 facility remains unimproved and predates various current-day design standards. Throughout the majority of the corridor, the inside shoulder widths are substandard and some bridges do not have adequate vertical clearance. To help reduce future crashes, the proposed IH 635 improvements will reconstruct IH 635 to current design standards

(e.g., lane widths, shoulder widths, horizontal and vertical alignments, acceleration and deceleration lengths, sight distances), lessen weaving conflicts, and provide on-street bike accommodations and pedestrian accommodations (sidewalks) on frontage roads and cross streets.

1.3.5 Enhancing Economic Competitiveness

As the fourth largest metropolitan area in the US, the Dallas-Fort Worth region is responsible for one-third of the Gross Domestic Product of the State of Texas. The North Central Texas region is centrally located within the lower 48 states which allows the region to serve as a primary distribution center, or inland port, for the southwestern US and the nation. Trucks leaving the region can reach the majority of the country within 72 hours. The region is also at a crossroads of the east west rail from the ports of Los Angeles/Long Beach to the eastern US and the north-south rail lines from Mexico and the Port of Houston to the Upper Midwest.

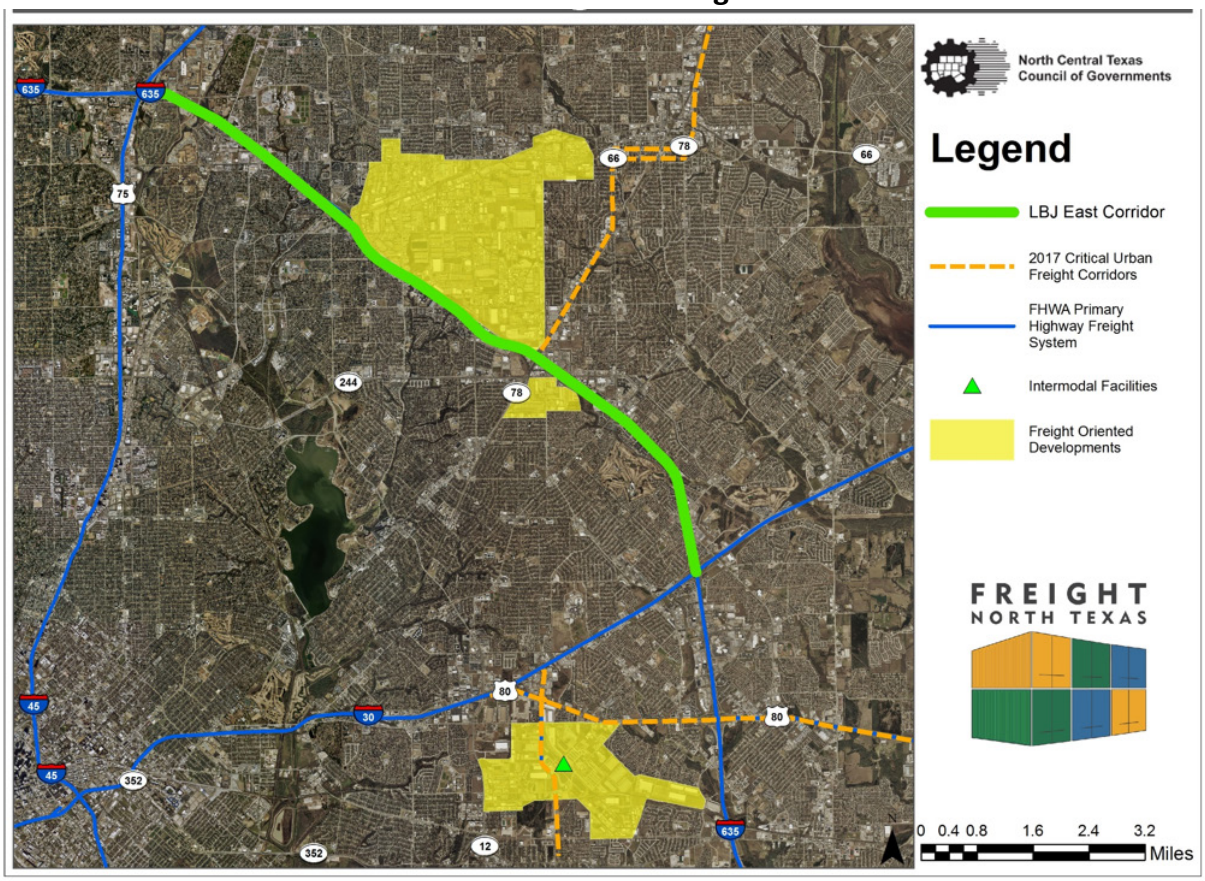
Transporting freight is a key component of the regional economy. Over 317,000[1] tons of freight move to and from the region in a single year and of this tonnage over 249,000 tons or 78 percent of the total is moved by trucks. Moving this much freight through the region requires a well-developed highway system. A key component to this system is freight movement on IH 635. One example of this is the just-in-time delivery of parts from manufacturers along IH 635 being delivered to the General Motors Assembly Plant in Arlington, Texas.

There are over 16,000 trucks that go through the IH 635 corridor a day, which is almost 10 percent of all traffic[2]. This corridor has several freight attributes located along or near it. The IH 635 corridor is part of the Federal National Freight Highway System (NFHS). Several of the Critical Urban Freight Corridors (CUFCs) in the region connect to or are near IH 635. These CUFCs include SH 78, which connects the KCS Intermodal Facility in Wylie to the NFHS and Big Town Boulevard and US 80 both of which connect Freight Oriented Developments (FOD) and the Union Pacific Mesquite Intermodal Facility to the NFHS. Exhibit 9 shows the location of these FODs in relation to the project. The freight developments in the area includes:

- Northgate Business Park, which is one of the largest FODs in the region. This FOD has several major distribution operations including Plastipak, Fossil, Sears Logistics Services, PETCO, Prime Distribution Services, and UPS.
- Casa Linda Industrial District (which includes a KCS Rail Facility) with major freight-oriented businesses including Texas Cartage, KCS, YRC Freight, and US Ink. Eastpoint Business Center has Coca-Cola and Ameri Cold Logistics as major freight-oriented businesses.
- Skyline Industrial. Major freight-oriented businesses in this FOD include UPS, FS Alloys, and Hayes Company.

[1] All tonnage numbers come from FHWA FAF4.
[2] Traffic information taken from TxDOT Planning Map: http://www.txdot.gov/apps/statewide_mapping/StatewidePlanningMap.html

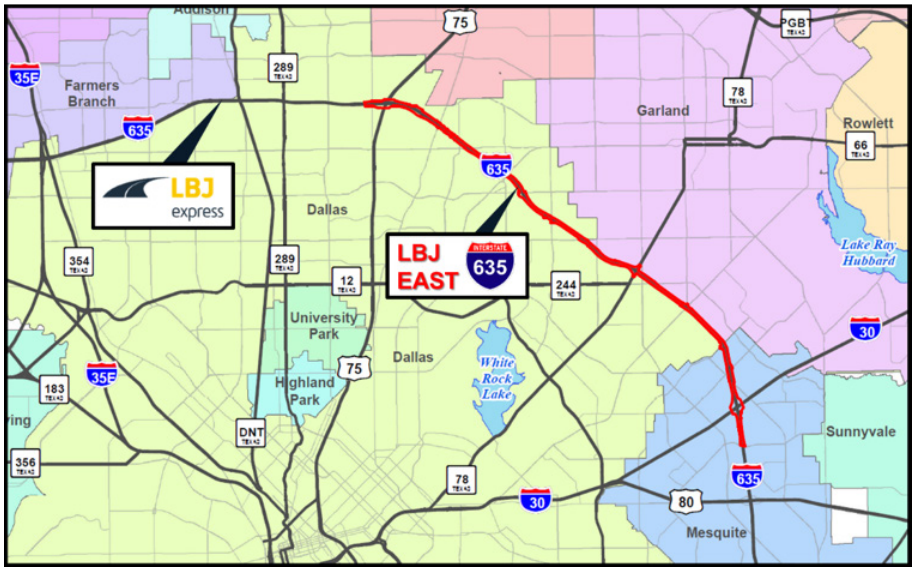
Exhibit 9 – IH 635 LBJ East Freight Features



2.0 Project Location

The IH 635 LBJ East Project is located in the northeast portion of Dallas County and is within the cities of Dallas, Garland and Mesquite, which is within the US Census-designated Dallas-Fort Worth-Arlington Urbanized Area. The project also includes IH 30 from west of Gus Thomasson Road to east of Galloway Avenue. Exhibit 10 shows the limits of the project. This project will tie into the recently reconstructed section of IH 635 LBJ to the west (from IH 35E to US 75, known as LBJ Express) that was opened to traffic in 2015.

Exhibit 10 - Project Location Map



The Dallas-Fort Worth metropolitan area is one of the fastest growing areas in the country. The population of the North Central Texas region has increased from 2.4 million in 1970 to over 7.2 million in 2017, an increase of 200 percent. A significant part of this growth has occurred in the project area of northern and eastern Dallas County. Exhibit 11 highlights both the past trends and future forecasts for population growth within the adjoining cities along IH 635, Dallas County, and the 12-county NCTCOG Metropolitan Planning Area (MPA). While forecasted city populations are expected to slow as they approach build out within their jurisdictions, growth elsewhere in the region (particularly in Dallas County) and the strong economic draw of the area will continue to attract significant traffic surges over time.

Exhibit 11 – Population Trends and Forecasts for Project-Related Locations

Location	1980 Census	1990 Census	2000 Census	2010 Census	2040 Forecast	Growth 2010-2040
Dallas	904,078	1,006,877	1,188,580	1,198,816	1,531,680	27%
Garland	138,857	180,650	215,768	226,876	243,522	7%
Mesquite	67,053	101,484	124,523	139,824	186,335	33%
Dallas County	1,556,390	1,852,810	2,218,899	2,368,139	3,107,541	31%
NCTCOG 12-County MPA	3,116,152	4,111,750	5,309,277	6,539,950	10,676,844	63%

The 2017 population within one-mile of the corridor is almost 150,800. This is predicted to increase to over 180,000 by 2040, a growth of over 19 percent. The employment within one-mile of the corridor is forecasted to grow from almost 149,800 in 2017 to 241,100 in 2040 or over 60 percent. Exhibit 12 shows existing average daily traffic counts and future traffic projections for the freeway segments within the project area. The projected high traffic growth for IH 635 LBJ East is attributed to forecasted population increases for both adjacent cities and the North Central Texas region at-large. The additional roadway capacity included as part of the IH 635 LBJ East Project is needed to facilitate traffic generated by rapid population and employment growth in the cities of Dallas, Garland, and Mesquite.

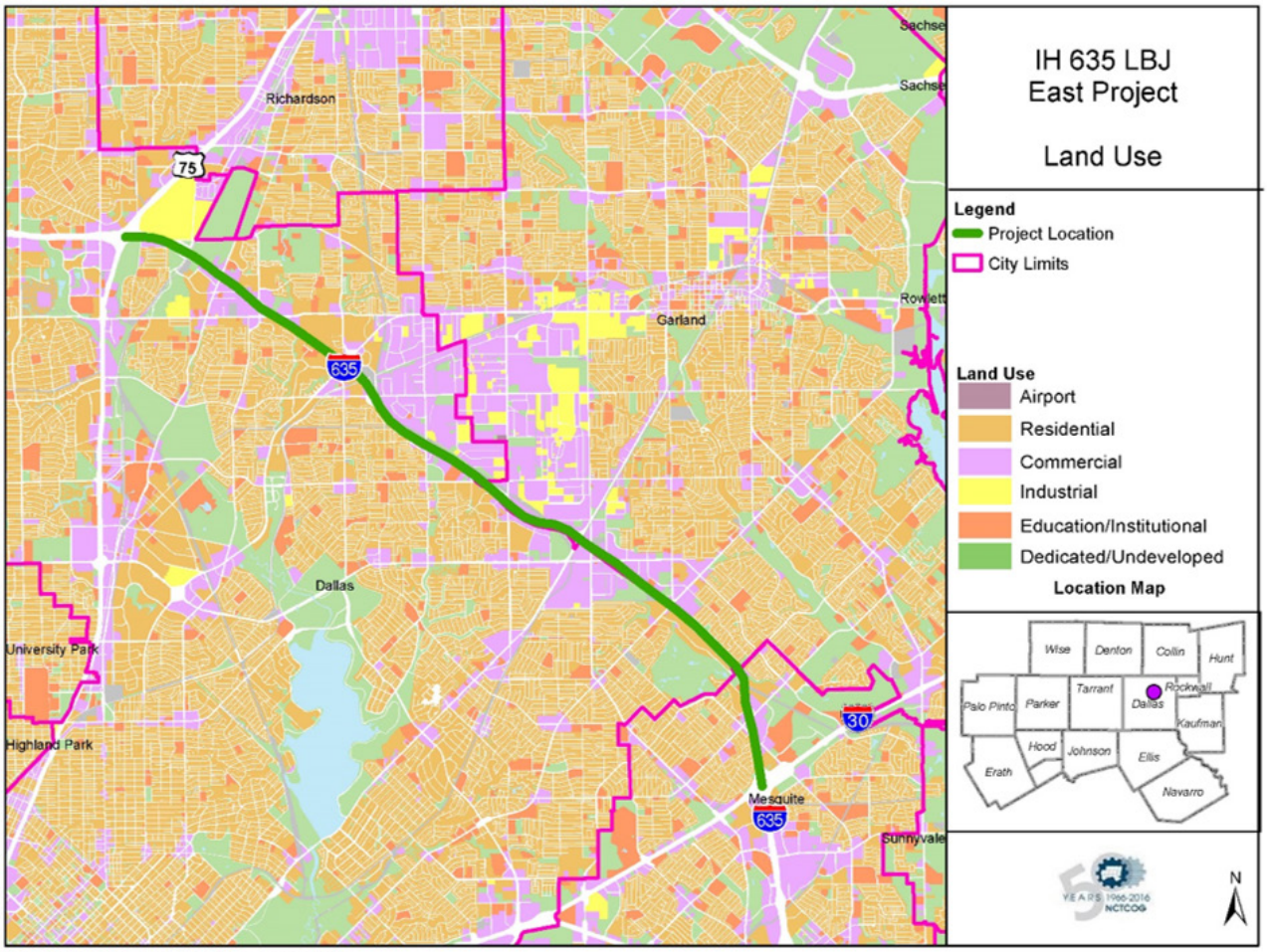
Exhibit 12 – Current and Future Daily Traffic Volumes

Location	2017 Traffic Volumes	2040 Traffic Volumes	Change	Percent Change
IH 635 (US 75 to Royal Lane/Miller Road)	225,700	267,000	41,300	18%
IH 635 (Royal Lane/Miller Road to SH 78)	218,400	239,600	21,200	10%
IH 635 (SH 78 to IH 30)	230,300	252,000	21,700	9%

Source: NCTCOG travel demand model

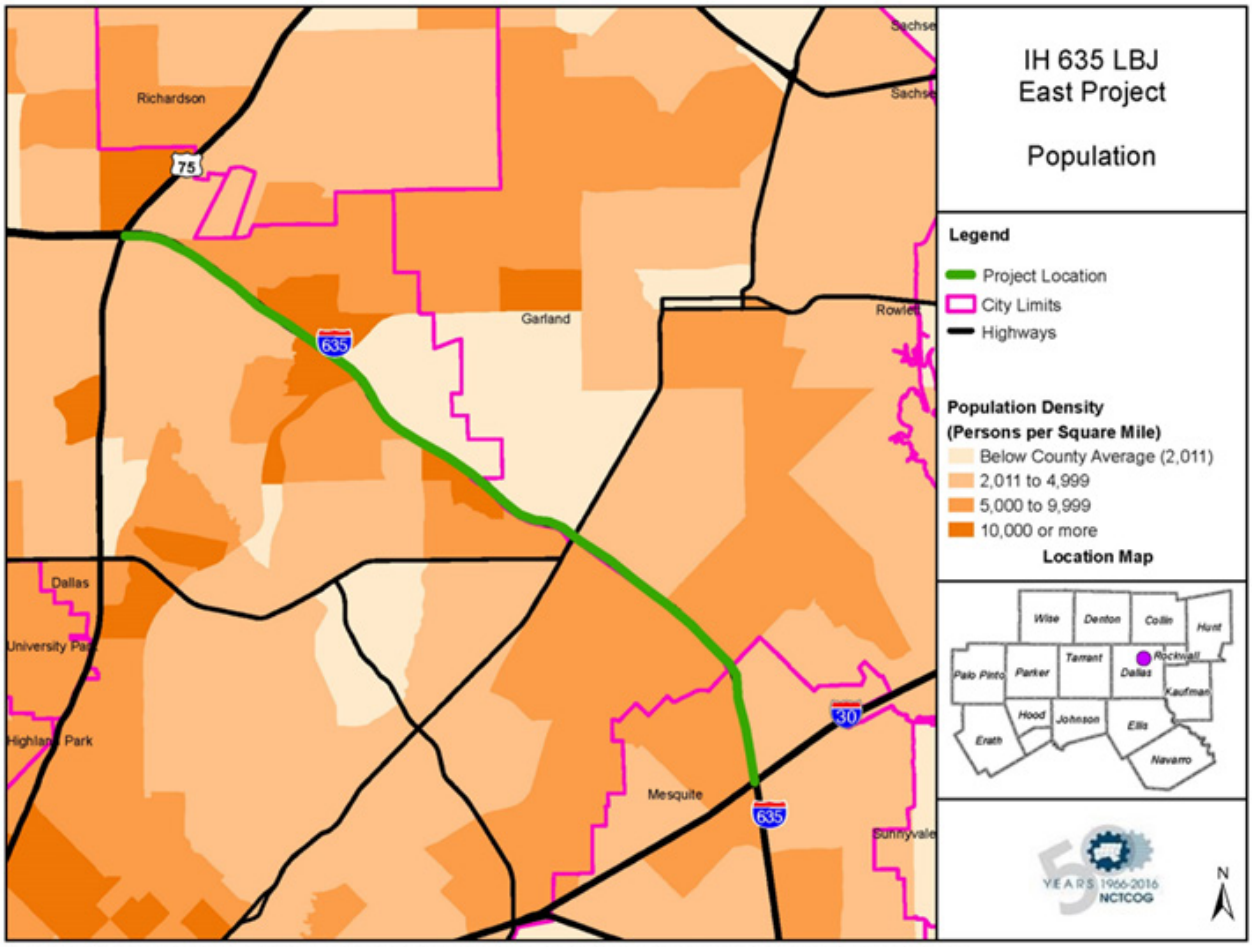
The type, intensity, distribution, and availability of specific land uses is an important determinant for identifying travel demand characteristics and prioritizing transportation needs. Exhibit 13 shows the land use in the project area. The overall intensity and distribution of residential and commercial development is further reflected in Exhibit 14, which highlights population density. While population density is a key indicator of transportation needs in most other cases, movements around IH 635 are governed more by it being one of the most concentrated industrial and commercial employment centers in the Dallas-Fort Worth region.

Exhibit 13 – Existing Project Area Land Use



Map Date: October 2017 Source: NCTCOG

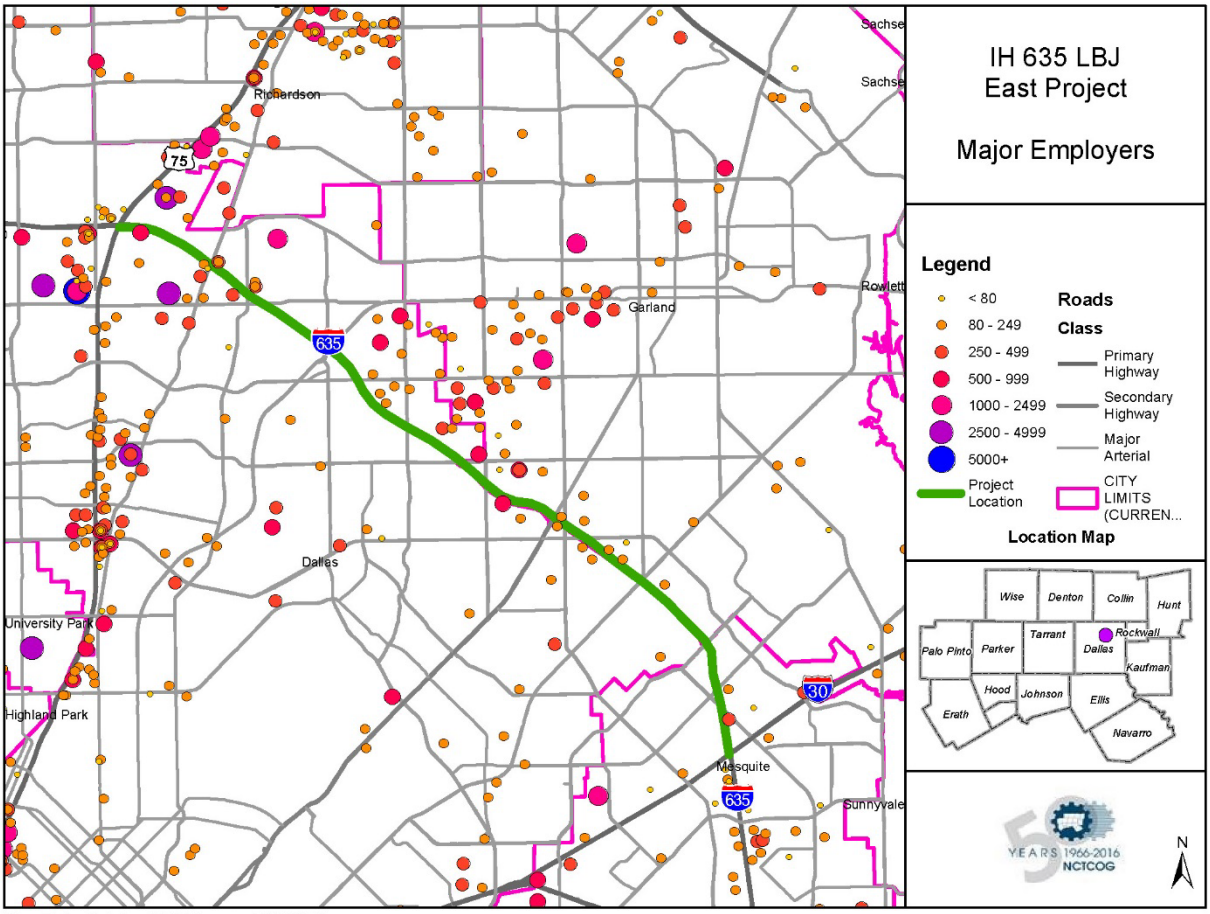
Exhibit 14 – Existing Project Area Population Density



Map Date: October 2017 Source: US Census Bureau (American Community Survey 2010-2015 5-Year Data by Census Tract)

Exhibit 15 displays the size and location of major employers in the vicinity of IH 635. The map shows the largest clusters of employers closest to the project location occur near the IH 635 and US 75 interchange and north of the project near its intersection with Royal Lane/Miller Road.

Exhibit 15 – Project Area Major Employers



Map Date: October 2017 Source: NCTCOG

3.0 Project Parties

3.1 NCTCOG (Submitting Agency)

NCTCOG is a voluntary association of cities, counties, school districts, and special districts established in January 1966 to assist local governments in planning for common needs, cooperating for mutual benefit, and coordinating for sound regional development.
Since 1974, NCTCOG has served as the Metropolitan Planning Organization (MPO) for the 12-county Dallas-Fort Worth MPA. The NCTCOG Transportation Department is responsible for the regional planning process for all transportation modes. The department provides technical support and staff assistance to the Regional Transportation Council (RTC) and its technical committees, which comprise the MPO policy-making structure. The department also provides technical aid to local governments and transportation providers in planning, coordinating, and implementing transportation decisions.

3.2 Texas Department of Transportation (Roadway Implementation)

The Texas Legislature originally established TxDOT in 1917 as the Texas Highway Department. TxDOT has a workforce of more than 12,000 employees is made up of engineers,

administrators, designers, environmental professionals, accountants, maintenance workers, and many other professionals. Headquartered in Austin, TxDOT is made up of 25 district offices and 21 divisions. This project is located in the Dallas District which plans, designs, builds, operates, and maintains the state transportation system in the following counties: Collin, Dallas, Denton, Ellis, Kaufman, Navarro, and Rockwall.

4.0 Grant Funds, Sources, and Uses of Project Funds

Exhibit 4 details the estimated project costs to complete the project IH 635 LBJ East project (in 2017 dollars). Exhibit 16 details the project funding sources. The amount of this FY2017 INFRA Grant request is **$165 million**, designated for use for construction. To date, TxDOT has spent approximately $14.3 million on engineering, $67.4 million on right-of-way, and $24.0 million for noise wall construction (mitigation) for a total of $105.7 million. The IH 635 LBJ East Project is proposed to be built with **50 percent federal funds and 50 percent state funds**.

Exhibit 16 – IH 635 LBJ East Project Funding Summary

Funding Source	Type	Funding Amount	Percent
State	TxDOT Engineering Funding	$90,000,000	5.00%
State	TxDOT Right-of-Way Funding	$7,400,000	0.41%
State/MPO	TxDOT/MPO Funding (Category 2, Category 4, Category 12)	$783,000,000	43.50%
MPO	State Match to CMAQ	$20,000,000	1.11%
Total of Non-Federal Funding Sources		**$900,400,000**	**50.00%**
Federal	TxDOT/MPO Funding (Category 2, Category 4, Category 12)	$588,000,000	32.67%
Federal	CMAQ Federal Share	$80,000,000	4.44%
Federal	TxDOT Right-of-Way Funding	$66,600,000	3.70%
Federal	INFRA Grant	165,000,000	9.17%
Total of Federal Funding Sources		**$899,600,000**	**50.00%**
TOTAL PROJECT FUNDING		**$1,800,000,000**	**100.00%**

5.0 Merit Criteria

5.1 Criterion #1: Support for National or Regional Vitality

As an interstate highway, IH 635 LBJ East is part of a national and regional system that is critical to the goods movement logistics chain, as well as commuter-oriented personal travel. The improvements to IH 635 are essential in impacting mobility, reliability, vitality, connectivity, safety, and economic value. With the improvements to this section of IH 635, the interstate will be improved from Dallas-Fort Worth International Airport to IH 20. This will enhance the logistics chain for goods movement throughout the entire North Texas region and the state of Texas, and improve access to jobs in the rapidly growing areas of Dallas County.

The current levels of congestion can cause residents to have limited access to job opportunities and employers are denied full access to the pool of job skills and talents within the region. Limited mobility also results in increasing amounts of unproductive time spent moving people and goods from one point to another. Economic costs associated with traffic congestion have a direct effect on the competitiveness of the area and its ability to create and sustain long-term employment. The availability of jobs will increase in the area as a result of real benefits to companies' bottom lines from increased delivery speeds and reductions in congestion. These cost savings can be used by businesses to create additional jobs in distribution centers, manufacturing, office work, and retail employment sectors.

In addition to mobility and reliability benefits, the IH 635 LBJ East Project will promote the short- and long-term creation and/or preservation of jobs in the region. During construction, this $1.8 billion project will generate both direct employment (employment associated with the construction of IH 635 LBJ East) and indirect employment (basic, retail, and service jobs that are generated by the purchases of goods and services by the public and private entities and their employees which developed as a result of construction).

With the addition of continuous frontage roads and improved, safer local access, local jurisdictions expect greater increases in commercial development under the IH 635 LBJ East Project as compared to the no-build alternative. Increases in developed land, particularly commercial and industrial land use, will enhance the economic base of the area by providing jobs, income, and tax revenues. Expected residential growth will also provide local demand for consumer services.

5.1.1 Benefit-Cost Analysis Results

The benefits described in previous sections were monetized. The project benefits documented in the Benefit-Cost Analysis (BCA) are shown in Exhibit 17. The present value of the IH 635 LBJ East Project cost and its benefits in 2016 dollars is shown in Exhibit 18. Applied to a remaining project cost of $1.8 billion, a substantial net benefit is achieved for both discounting scenarios. Based on a 20-year analysis period, the overall effect of this transportation investment will result in a positive net benefit of approximately $1.69 billion at three percent and $447 million at seven percent, after subtracting out the residual construction and maintenance and operating costs of the project. The calculations used to determine these totals are discussed in more detail in Attachment 2.

Exhibit 17 – Total Project Benefits

Benefit Category	Benefits	
	7% Discount Rate	3% Discount Rate
Time Savings Benefits	$1,345,884,000	$2,406,473,000
Crash Reduction Benefits	$360,978,000	$645,438,000
Air Quality Emission Benefits	$1,249,000	$2,233,000

Exhibit 18 – Net Project Benefits

Discount Rate	Present Value of Total Project Costs (2016 Dollars)	Present Value of Total Benefits (2016 Dollars)	Cost/ Benefit Ratio
7%	$1,261,259,000	$1,708,110,000	**1.35**
3%	$1,362,143,000	$3,054,143,000	**2.24**

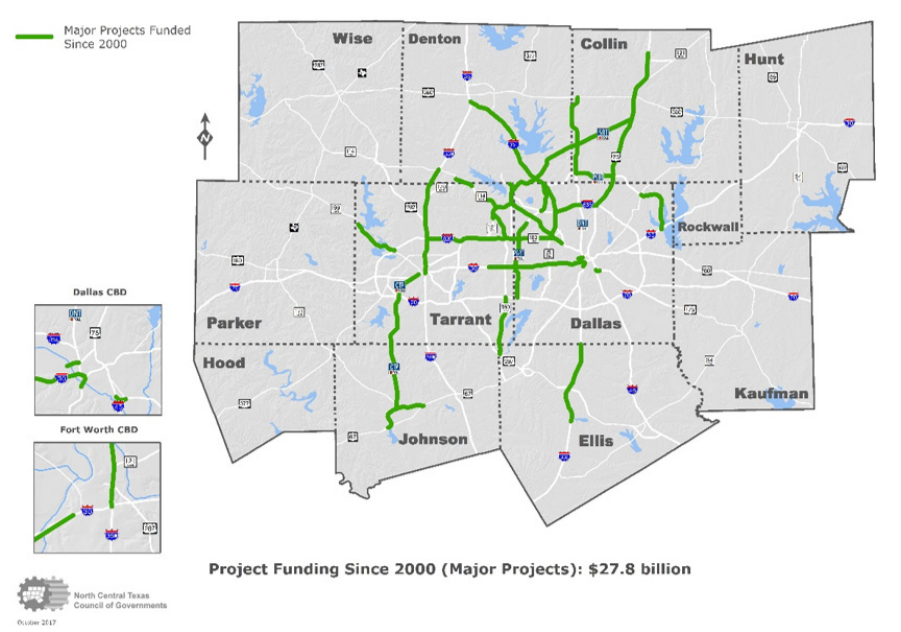
The overall net effect of this transportation investment will result in a positive return on investment of **224 percent ($1.71 billion/$1.26 billion)** and **135 percent ($1.71 billion/ $1.26 billion)**, after discounting at three percent and seven percent, respectively. Though only based on a 20-year period of analysis, the results of this BCA clearly indicate that the IH 635 LBJ East Project will provide a lifetime of regional benefits for travelers.

5.2 Criterion #2: Leveraging of Federal Funds

As shown in Exhibit 16, the IH 635 LBJ East Project is proposed to be built with 50 percent federal funds and 50 percent state funds by leveraging multiple types of funding sources such as Congestion Mitigation Air Quality (CMAQ) funds. CMAQ funds are often used by MPOs for smaller projects to reduce nitrogen oxide and volatile organic compounds for conformity purposes for near-term milestones. This project helps accomplish that goal as well as leverages CMAQ funds on a major project. Accomplishing short-term air quality benefits with long-term regional and national vitality benefits is an innovative leveraging element. This project uses $100 million in CMAQ/state funds.

Over the past 17 years, Dallas-Fort Worth has leverage over $27.8 billion dollars in federal, state, regional, and private sector funds to build major roadway projects. Exhibit 19 demonstrates the implementation of projects using partnership driven innovative leveraging elements. For example, on the LBJ Express Project (IH 35E to US 75) the private sector provided roughly four-fifths of the total financing for the project or approximately $2.21 billion of the total $2.7 billion needed. The innovative public-private partnership enables

Exhibit 19 – Funded Major Roadway Projects Since 2000



taxpayers to leverage $490 million in public funds to receive more than four times the value in infrastructure enhancements and traffic relief.

NCTCOG and TxDOT evaluated the IH 635 LBJ East Project for private financing. It was estimated that the project could bring up to $500 million from the private sector. However, authority to enter into such in an agreement was not granted by the Texas Legislature during the past two legislative sessions.

To ensure long-term operations, the public sector (NCTCOG and TxDOT) will retain ownership of the revenue stream from the tolled managed lanes, which will be used to operate, maintain, and rehabilitate the corridor. Once this revenue is established, tolls will then be charged for the sole purpose of maintaining speeds during the congested times of day. This is a very different financial model than a proposal which transfers the revenue risk to the private sector.

5.3 Criterion #3: Potential for Innovation

5.3.1 Innovation Area #1: Environmental Review and Permitting

TxDOT and NCTCOG have taken advantage of two innovative federal programs to streamline the environmental review and permitting process to get projects built faster. These programs help expedite the review of projects but do not allow the permitting, approval processes, and/or regulations to be circumvented or bypassed.

- Under the Surface Transportation Project Delivery Program (23 US Code 327), TxDOT applied for and was granted responsibility for review, consultation, and approval of National Environmental Policy Act (NEPA) documents for highway projects. This delegation eliminated a layer of governmental review and allows TxDOT to directly consult with federal resource agencies. This has led to shorter review times. Texas was the second state to assume NEPA responsibility for all levels of environmental documentation.
- Many projects require a Section 404 permit under the Clean Water Act from the US Army Corps of Engineers (USACE). The time needed to receive the permit varies by the permit type, magnitude of project impacts to wetlands and waters of the US, and complexity of the project. Section 214 of the Water Resources Development Act of 2000 allows the USACE to accept funds from non-federal public entities to give priority to the evaluation of the USACE permit applications. Under this act, NCTCOG and USACE has had a Memorandum of Agreement to fund a position at the USACE to expedite permitting for regional priority transportation projects in the Dallas-Fort Worth region since 2008. The opportunity to coordinate in advance has resulted in reductions in permitting time, mitigation costs, and impacts.

5.3.2 Innovation Area #2: Special Experimental Authorities

TxDOT will utilize the design-build method of construction on the project. Because TxDOT is familiar with and has constructed projects using this method of procurement and project delivery, it is not anticipated that a request for approval to utilize an experimental contracting mechanism such as that provided in Special Experimental Program (SEP) 14 or 15 will be sought for the project.

5.3.3 Innovation Area #3: Safety and Technology

Innovative Electronic Toll Collection (ETC) will be used along the facility allowing for the free flow of traffic without requiring vehicles to stop and pay tolls. The ETC system will be interoperable with other regional and statewide tolling networks currently in place. As mentioned in Section 1.3.2, the managed lanes will use dynamic congestion-management pricing to help manage traffic flow and provide faster, more predictable travel (see Exhibit 20). Roadside equipment will recalculate real-time prices every five minutes, 24 hours a day. As traffic levels and demand increase, the toll price will change to keep vehicles moving. Once traffic volumes drop, the price will go down. A modern congestion management dynamically-priced facility will be constructed that is focused on maintaining guaranteed speeds on the managed lanes.

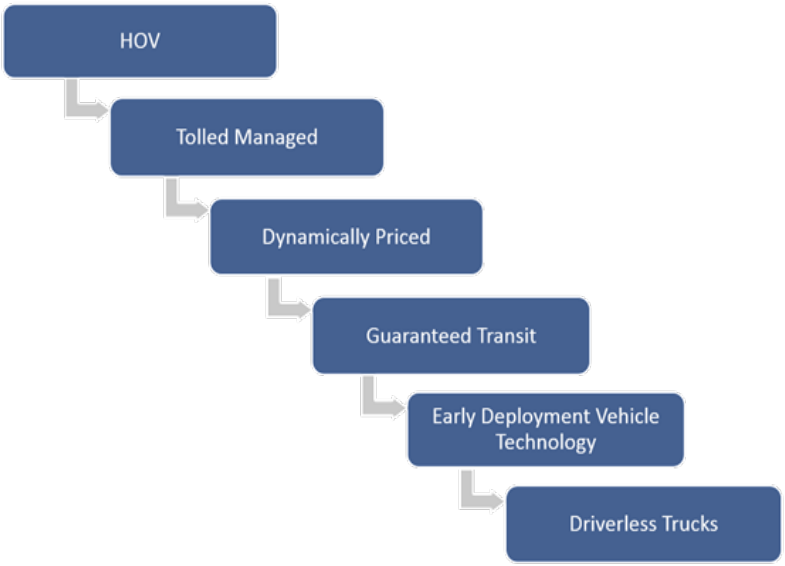
Exhibit 20 – Dynamic Pricing on Tolled Managed Lane

Source: LBJ Infrastructure Group

Intelligent Transportation System (ITS) devices are planned to be an integral part of the proposed IH 635 LBJ East Project. The type of traffic monitoring technology includes closed-circuit television cameras, vehicle detection devices, and dynamic message signs. Traffic monitoring technologies detect incidents in a timely manner to gain quicker responses from transportation and enforcement officials. The speed at which an incident is detected affects the amount of time for clearance and the amount of disruption the incident will cause to the remaining motorists.

Other technological innovations could include adaptable pavement (including shoulders) designed so that it is highly configurable to accommodate different lane types and uses over time. Managed lanes and future roadways may have to accommodate a variety of specific lane uses—e.g., a dedicated lane for trucks in platoon formation; a lane reserved for vehicles above a specified level of vehicle automation. Exhibit 21 highlights the predicted evolution of the managed lane system in the Dallas-Fort Worth region.

Exhibit 21 – Evolution of HOV and Managed Lanes



5.4 Criterion #4: Performance and Accountability

NCTCOG proposes that this INFRA Grant be based on the conditional award of design-build contractor by December 2018. If awarded INFRA funding, NCTCOG will work with TxDOT to investigate performance incentive clauses. Additionally, NCTCOG will request regular project updates from TxDOT as part of future RTC meetings. Once construction has been initiated, progress and status will be monitored through a project specific website to be developed by the contractor.

6.0 Project Readiness

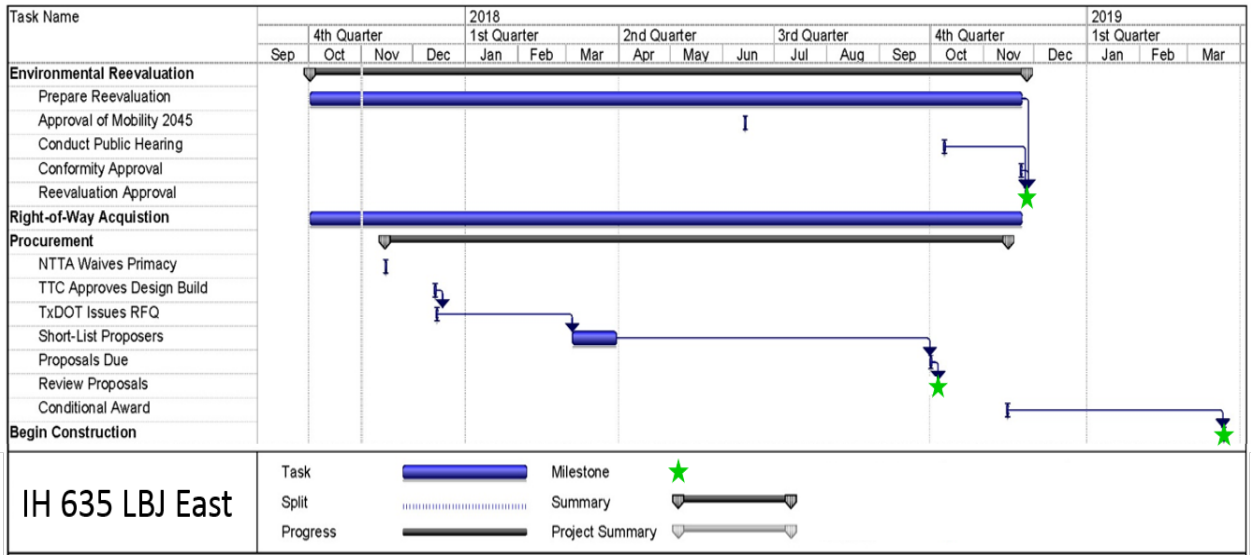
6.1 Technical Feasibility

The IH 635 LBJ East Project has been developed over a number of years, taking into account the needs of the corridor and desires of local stakeholders. A schematic (30 percent) design has been developed and approved. The planning effort included the preparation of environmental documents, public involvement, traffic analysis, and interstate access justification report. The project design received approvals from FHWA on July 21, 2017. Additionally, because the project cost estimate is over $500 million (Major Project), the project has undergone a Cost Estimate Review (CER) by FHWA, value engineering, and a draft Project Management Plan (PMP) has been prepared. Capital cost estimates included in this application were developed by performing a quantity takeoff of the schematic design. Recent TxDOT unit prices for bid items were applied to the quantities to develop the project construction cost. Construction included a 15 percent contingency with a 50 percent contingency for right-of-way acquisition and 25 percent for utility relocation. Additional items such as aesthetics, mobilization, and traffic control were estimated using a percentage of the construction cost based on TxDOT experience.

6.2 Project Schedule

The IH 635 LBJ East Project is set for an expedited delivery that will be in a position to move ahead well before the INFRA requirement of September 30, 2020, for obligation of funding and construction commencement within 18 months thereafter. The project schedule shown in Exhibit 22 indicates obligation of funding and construction beginning in early 2019. Construction is expected to take 4.5 years and the new facility would open to traffic in 2023.

Exhibit 22 – IH 635 LBJ East Project Schedule



TxDOT will make the preliminary design documents and performance requirements available to interested contractors. The design and construction will be procured under a single competitively bid contract awarded through a two-step process. The first step involves a qualifications-based screening to develop a shortlist of qualified contractor teams to provide detailed bids. The second step is a best value assessment of bids from the shortlisted teams.

All necessary activities will be complete to allow INFRA funds to be obligated sufficiently in advance of the statutory deadline and any unexpected delays will not put the funds at risk of expiring before they are obligated. The project can begin construction quickly upon obligation of INFRA funds and grant funds will be spent expeditiously once construction starts. All real property and right-of-way acquisition has and will be acquired in a timely manner in accordance with 49 Code of Federal Regulations (CFR) part 24, 23 CFR part 710, and other applicable legal requirements.

6.3 Required Approvals

6.3.1 Environmental Status and Approvals

The IH 635 Environmental Assessment (EA) received environmental clearance through a FHWA Finding of No Significant Impact (FONSI) issued on January 30, 2003. TxDOT began purchasing the right-of-way needed for the improvements in 2005. Refinements to the proposed

operations and design of the facility mandated a reevaluation of the EA, which was completed and approved on April 24, 2017. The technical reports (in three parts) supporting the reevaluation can be found at http://www.keepitmovingdallas.com/public-hearings/2017/ih-635-lbj-east-ultimate-project-from-us-75-to-ih-30. This approval allowed TxDOT to continue purchasing right-of-way and begin construction on eight noise abatement walls to help provide noise mitigation during and after construction.

As approved, the project included dynamic tolling of the managed lanes from US 75 to Royal Lane/Miller Road (3.7 miles). During the public hearing held in January 2017, the attendees were in strong support of the project and for tolling the managed lane for the entire distance of the project (from US 75 to IH 30 or 11 miles) if the project could be built faster and included the reconstruction of the IH 635/IH 30 interchange. As a result, the RTC approved a policy to expedite IH 635 from US 75 to and including the IH 30 interchange (Policy P17-01) in October 2017. This policy included tolling the managed lanes from US 75 to IH 30.

To apply tolling to the section of the IH 635 managed lanes from Royal Lane/Miller Road to IH 30, a reevaluation is required. The reevaluation will be in the form of a Documented Reevaluation Checklist (DRC) (see http://ftp.dot.state.tx.us/pub/txdot-info/env/toolkit/640-02-gui.pdf). Because Dallas-Fort Worth is a nonattainment area, the critical path for the DRC is approval of the conformity determination of *Mobility 2045*, the long-range metropolitan transportation plan (MTP) for the Dallas-Fort Worth region. The extension of tolling on the managed lanes for the entire length of the corridor must be reflected in the MTP. The MTP is currently under development and is expected to be approved by the RTC in June 2018 with conformity approval by US DOT in November 2018. TxDOT is beginning work the DRC so it can be approved shortly after a positive conformity determination is received.

6.3.2 State and Local Approvals

- Because IH 635 LBJ East has a pricing component, the North Texas Tollway Authority (NTTA) has primacy for tolling the project and must waive this right. This is scheduled to occur during the November 15, 2017, NTTA Board meeting.
- TxDOT is expected to receive permission to issue a Request for Qualifications from the Texas Transportation Commission on December 14, 2017.
- Permits involving waters of the United States will be permitted under nationwide Section 404 permits. No major Section 404 (of the Clean Water Act) issues have been identified.
- A revision to the State Transportation Improvement Program/Transportation Improvement Program (STIP/TIP) will be necessary to add the INFRA Grant funding to the project. The modification will be coordinated between NCTCOG and TxDOT during a quarterly STIP/TIP modification cycle. It is anticipated that the revision would occur in August 2018 (assuming grant award in May 2018).

6.4 Project Risks and Mitigation Strategies

As mentioned in Section 6.1, the project has undergone a CER by FHWA, value engineering, and a draft PMP has been prepared. Prior to the CER, a risk workshop for IH 635 LBJ East was held

in February 2017 by TxDOT Dallas District senior management. This workshop resulted in development of a risk register for both cost and schedule, which was used during the CER. During the CER, uncertainties in the project estimate such as base variability, inflation, market conditions, and risk events were modeled by the review team to reflect the opinions of the subject matter experts interviewed. Then a Monte-Carlo simulation was used to incorporate the uncertainties into forecast curves that represent a range of costs and completion dates for the project. Based on the assumptions and risks discussed during the CER, there is a high (70 percent) confidence level for the total project costs. Exhibit 23 lists the identified risks, opportunities, chance of occurrence, impact, and potential mitigation strategies.

Exhibit 23 – Identified Risks and Opportunities

Risk/Opportunity	Chance or Occurrence	Likely Impact to Costs	Likely Impact to Schedule	Potential Mitigation Strategy
Unplanned Work (changed orders)	100%	$75 million	Unknown	Design-build should help minimize these changes
Increased Right-of-Way Costs	75%	$12 million	None	TxDOT has purchased almost 60% of the right-of-way and continues to purchase the remaining parcels
Third Party Impacts (permits, utilities, railroad, etc.)	75%	$10 million	6 months	Early coordination with all third-parties
Poor Surface Conditions	60%	$20 million	None	Design-build should help minimize these changes
Longitudinal Drainage	50%	$10 million	None	Design-build should help minimize these changes
Skillman Bridge Sequencing	100%	$2 million	None	TxDOT will include this bridge as part of the IH 635 LBJ East project. Previously, this bridge was to be a separate project.
Optimization from Design-Build	50%	$22 million saving	4 months saving	None
Reducing Retaining Wall Heights	50%	$3 million saving	None	None
Reducing TSS Controls	50%	$2 million saving	None	None
Use of Pre-Cast Bent Caps	60%		6 months saving	None

6.4.1 Potential Procurement Delays

To keep up with the tremendous population growth across the Dallas-Fort Worth region, TxDOT has used innovation project delivery methods (i.e., design-build, comprehensive development agreements) to build projects faster. In the past seven years, TxDOT has built six roadway projects in the Dallas-Fort Worth area using design-build: DFW Connector ($1.0 billion), IH 635 LBJ Express ($2.7 billion), North Tarrant Express ($2.4 billion), 35Express ($1.4 billion), Midtown Express ($850 million), and IH 30/IH 35E Horseshoe ($800 million). As a result of these projects, TxDOT has gained experience and expertise in the planning, design, procurement, and implementation of mega-projects such as the IH 635 LBJ East Project. TxDOT staff is highly capable of delivering a project of this magnitude.

6.4.2 Environmental Uncertainties

Project risks should be minimal because the proposed work is environmentally cleared, almost 60 percent of the needed right-of-way has been already acquired/purchased, and all stakeholders fully support the project.

7.0 Large/Small Project Requirements

At an estimated cost to complete of $1.8 billion, IH 635 LBJ East would be considered a large project for award. Exhibit 24 shows how the project satisfies statutory requirements enumerated at 23 US Code 117(g).

Exhibit 24 – Large Project Requirements

Statutory Requirement	How this project meets the requirement
1. Does the project generate national or regional economic, mobility, safety benefits?	Yes, by widening and reconstructing IH 635 from US 75 to IH 30, the project will relieve congestion; enhance mobility, connectivity, and reliability; improve air quality; enhance safety; and enhance economic competitiveness. See Section 1.3 (Targeted Transportation Challenges).
2. Is the project cost effective?	Yes. The overall net effect of this transportation investment will result in a positive return on investment of 224% ($1.71 billion/$1.26 billion) and 135% ($1.71 billion/ $1.26 billion), after discounting at 3% and 7%, respectively. Though only based on a 20-year period of analysis, the results of this BCA clearly indicate that the IH 635 LBJ East Project will provide a lifetime of regional benefits for travelers. The project is cost effective as shown in the benefit cost analysis summary tables in Section 5.1.1 (Cost-Benefit Analysis Results).

Statutory Requirement	How this project meets the requirement
3. Does the project contribute to one or more of the National Goals under 23 US Code 150 and shown below? ▪ Safety ▪ Infrastructure Condition ▪ Congestion Reduction ▪ System Reliability ▪ Freight Movement and Economic Vitality ▪ Environmental Sustainability ▪ Reduced project delivery delays	Yes, the project contributes to national goals. ▪ The project does result in safety improvements to the IH 635 LBJ East corridor as discussed in Section 1.3.4 (Enhancing Safety). ▪ The project will replace the pavement, bridges and road appurtenances in the IH 635 LBJ East corridor. This will result in a significant improvement to the infrastructure condition ratings in the region. ▪ The project does reduce the congestion along the IH 635 LBJ East corridor as discussed in Section 1.3.1 (Relieving Congestion). ▪ The project does make improvements to reliability of the IH 635 LBJ East corridor by including dynamically priced managed lanes as described in Section 1.3.2 (Enhancing Mobility, Connectivity, and Reliability). ▪ The project does contribute to improved freight movement and economic vitality as discussed in Section 1.3.5 (Enhancing Economic Competitiveness). The project also contributes to improved economic sustainability as discussed in Section 5.1 (Criterion #1: Support of National or Regional Vitality). ▪ The project is stated for a design-build method of delivery which will substantially reduce the total number of days that it typically takes to construct a project of this magnitude.
4. Is the project based on the results of preliminary engineering?	Yes, 30% preliminary engineering drawings have been developed and approved for the project as discussed in Section 6.1 (Technical Feasibility).
5a. With respect to non-federal financial commitments, does the project have one or more stable and dependable funding or financing sources to construct, maintain, and operate the project?	Yes, a combination of federal and state funding sources will be used to design and construct the project (see Exhibit 16). To ensure long-term operations, the public sector (NCTCOG and TxDOT) will retain ownership of the revenue stream from the IH 635 tolled managed lanes, which will be used to operate, maintain, and rehabilitate the corridor.

Statutory Requirement	How this project meets the requirement
5b. Are contingency amounts available to cover unanticipated cost increases?	Yes. Should unanticipated cost increases occur, NCTCOG and TxDOT do have federal and state revenue sources that could be used to cover the overruns. The cost estimates included a 15% contingency for construction items, 50% for right-of-way acquisition, and 25% for utility relocation.
6. Is it the case that the project cannot be easily and efficiently complete without other Federal funding or financial assistance available to the project sponsor?	The cost to complete IH 635 LBJ East Project is estimated at approximately $1.8 billion. The need for the project has resulted in an expedited schedule that will require funding that will materialized sooner than later. The INFRA grant is one of the funding sources that is available to expedite the entire project rather than building it in phases and delaying benefits.
7. Is the project reasonably expected to begin construction not later than 18 months after the date of obligation of funds for the project?	Yes. The project has been environmental cleared, almost 60% of the right-of-way has been purchased, TxDOT has begun the procurement process for a design-build contractor, and the project is programmed in the TIP/STIP. The IH 635 LBJ East Project is expected to begin construction in early 2019 as discussed in Section 6.2 (Project Schedule).