

Merit Criteria

1 Safety

The US-75/W. 81st Street Interchange project is designed to improve safety and traffic flow while providing a new connection for non-vehicular traffic that currently does not exist today. Converting the US-75/W. 81st Street interchange to a diverging diamond interchange (DDI) will reduce left turning conflicts, minimize queues through the innovative design, and provide safer accommodations for pedestrians and cyclists. **Figure 2** on the next page presents an overall issues map.

A lack of connected sidewalks and safe accommodations for pedestrians and bicyclists throughout the project area restricts travel for non-motorist users attempting to safely cross the highway. The current design of the highway creates a physical barrier for non-motorist users and a lack of connection within the area. One bicycle-involved collision at the interchange resulted in injury. The lack of shoulders also creates a confined area for vehicles, leading to additional crash exposure. The Project will protect non-motorized travelers from safety risks by providing a universally accessible 12-foot-wide multi-use path through the DDI. This path will allow pedestrians and bicyclists to safely cross US-75 without conflicting with vehicular traffic. Traffic signals at the DDI will include push-button activation and protected crossing phases for multiuse trail users. The US-75/W. 81st Street Interchange Project includes safety countermeasures outlined in the [National Roadway Safety Strategy Plan](#) including crosswalk visibility enhancements, medians and pedestrian refuge islands, and bicycle lanes.

The Project will reduce fatalities and serious injuries. Collisions in and around the interchange were investigated to understand the history of crashes occurring within the project area. Over a ten-year period, from 2012 to 2021, a total of 163 crashes occurred along US-75 and on W. 81st Street within the project area. The crashes can be attributed to the rapid growth in the area as large volumes of traffic are passing through the diamond interchange. High frequency crash locations occur at the adjacent signalized intersections on W. 81st Street at S. Olympia Avenue (830 feet east) and S. Union Avenue (1,350 feet west), and at the US-75 terminal intersections. The crash data reflected 53 collisions occurring on US-75, 76 collisions on W. 81st Street at intersections near the interchange, and 34 at the ramp terminals of US-75 and W. 81st Street. More detailed collision data is available at [US-75/81st BUILD](#).

Figure 1 reflects a heat map of the collisions that have occurred at the interchange, including on the ramps and at the ramp terminal intersections. The collisions that occurred at the signalized ramp terminals consist of right-angle and angle turning collisions which can be attributed to vehicles failing to yield, making an improper turn, or running a red light. Short storage lanes are currently provided at the ramp terminal intersections for vehicles making a left

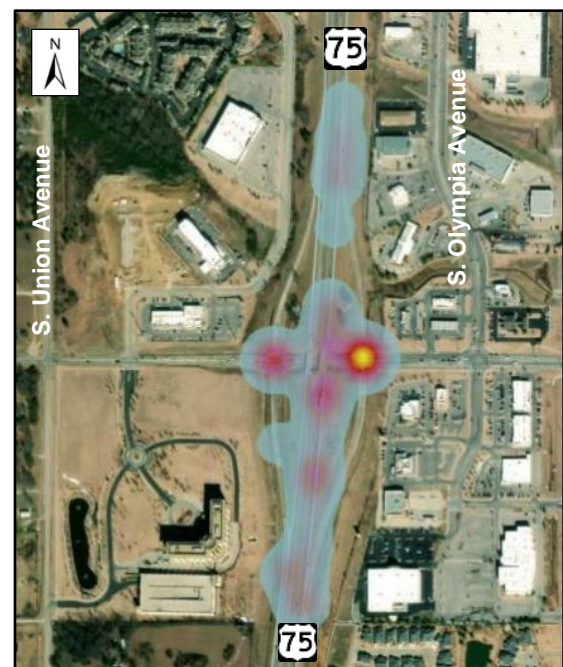


Figure 1: US-75 Collision Heat Map (2012-2021)



Figure 2: US-75/W. 81st Street Interchange Issues Map

turn maneuver. The short length of the turn lanes increases the exposure of collisions as heavy volumes access US-75. Based on the USDOT's [Diverging Diamond Information Guide \(2nd Edition\)](#), Exhibit 4-7, the proposed US-75/W. 81st Street Interchange can be expected to reduce collisions by 48%.¹ In addition, the simplified two-phase signal operation would reduce anticipated future congestion at the S. Olympia Avenue intersection by providing longer signal cycle lengths while maintaining coordination at the DDI with half cycles.

2 Environmental Sustainability

As a function of the decrease in vehicle delay at the US-75/W. 81st Street interchange and the reduction in idling time at intersections, the Project will reduce transportation-related air pollution and greenhouse gas emissions in the surrounding community. Without the project, carbon dioxide and nitrogen oxide emissions are anticipated to increase by 144% on average by 2046. The Project is expected to reduce carbon dioxide and nitrogen oxide emissions by 29% over the No Build scenario, improving air quality in the community. The Project area currently experiences high levels of airborne PM_{2.5} and ozone. The Project will reduce exposure to elevated levels of air pollution. The Benefit Cost Analysis (BCA) Technical Memorandum included with this application includes more detail on the emissions reductions anticipated by the project.

The US-75/W. 81st Street Interchange Project will reduce CO2 and NOx emissions by 29% over the No Build

The US-75/W. 81st Street Interchange project employs an innovative, transportation-efficient design that allows the interchange to be constructed entirely within ODOT right-of-way, essentially within the same footprint as the existing interchange. A small amount of right-of-way adjacent to W. 81st Street will be required to construct the multi-use trails; however, retaining walls will be used to minimize the necessary right-of-way. Temporary lanes and bridges will be used to maintain traffic while the new bridges are constructed. By limiting the footprint of the project, ODOT will avoid adverse environmental impacts to water quality, wetlands, and endangered species. The NEPA document completed for the project in 2018 did not identify any significant impacts to environmental resources. Seasonal restrictions will be used to avoid impacts to northern long-eared bat and migratory bird habitat (i.e., the existing bridges on W. 81st Street and a few trees within the existing right-of-way). No streams or wetlands will be affected. Stormwater will be controlled during construction as dictated by the Oklahoma Department of Environmental Quality (ODEQ) stormwater construction general permit (OKR10), which the construction contractor will be required to obtain.

The City of Tulsa is a leader in promoting resiliency and disaster preparedness in its infrastructure development. In 2022, **Tulsa received a Class 1 rating from FEMA's Community Rating System (CRS), one of only two cities in the nation with this top rating**. One of most impactful resiliency policies implemented by the City of Tulsa is the requirement that all new or improved city streets be designed to accommodate the 100-year storm², a much larger storm event than

¹ CMF of 0.52 for DDI conversions from interchanges with two signalized intersections with a 40 mph cross street and widening from 2 to 4 lanes with zero lane drops.

² The 100-year storm refers to the estimated probability of a storm event occurring in a given year. A 100-year event has a 1 percent chance of occurring in any given year.

normally required by municipal roadways. Construction may not cause a rise in base flood elevations within mapped floodplains. This design standard will apply to the W. 81st Street improvements, thereby improving the durability of at-risk infrastructure to extreme weather events. The project will include a new enclosed storm drain system capable of carrying the 100-year storm event, resulting in improved stormwater management.

The City of Tulsa requires all street drainage systems to be designed to accommodate the 100-year storm event

3 Quality of Life

The US-75/W. 81st Street Interchange Project will increase affordable transportation choices and improve access to daily destinations like jobs, grocery stores, and other vital services. While not an Area of Persistent Poverty, there are multiple indicators that suggest this area is low- income. In 2020, the mean income for Census Tract 67.13 west of US-75 was \$32,009³ as compared to \$58,863 for Tulsa County and \$53,840 for the state of Oklahoma. The Project area is among the most lacking in Tulsa for daily needs (**Figure 3**), defined as distance to schools, healthcare, social services, and healthy food sources, among others⁴.

The Project will increase affordable transportation choices. Residents living in the project area spend 24% of their income on transportation costs, according to the Housing and Transportation Affordability Index⁵. Transportation costs are considered affordable if they are 15% or less of household income, indicating residents in the project area are spending an elevated amount of their income on transportation.

The addition of 12' multiuse trails along both sides of W. 81st Street and their connection across US-75 will improve

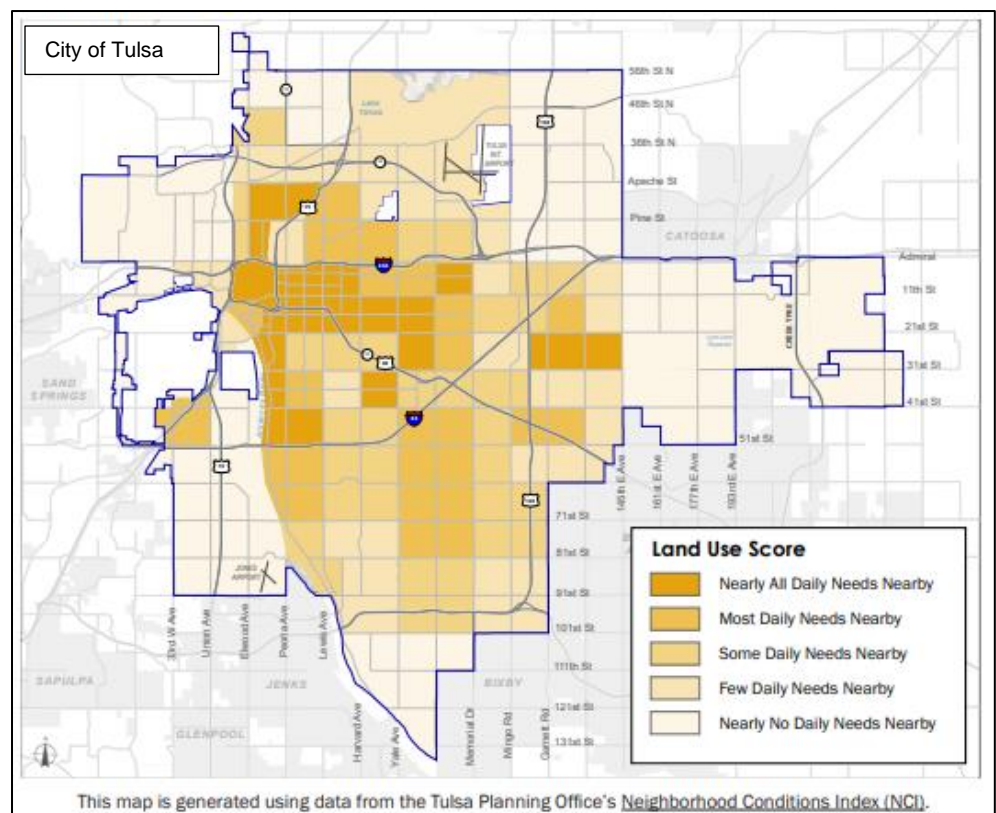


Figure 3: Land Use Scores in Tulsa

³ US Census Bureau 2020, S1902 Mean Income
<https://data.census.gov/table?q=74132&g=1400000US40143006713&tid=ACSST5Y2021.S1902>

⁴ Planitulsa, INCOG/Tulsa Planning Office, 2023. [Future Land Use Section](#)

⁵ The Housing + Transportation Affordability Index [H+T Map | H+T Index \(cnt.org\)](#)

access to job centers such as Tulsa Hills, as well as vital services and amenities including Daniel Webster High School, Oklahoma State University Medical Center, the Department of Human Services, Tulsa Community College, Tulsa Technology Center, the Oklahoma Aquarium, Page Belcher Golf Course, and Bales Baseball Park. US-75 also provides access to downtown Tulsa, which offers jobs and government services.

4 Mobility and Community Connectivity

One of the primary benefits of the US-75/W. 81st Street Interchange Project is an increase in system-wide connectivity with access to transit, micro-mobility, and mobility on-demand. W. 81st Street is identified as both a desired pedestrian/bicycle route and a sidewalk gap in the [INCOG GO Plan](#), the Bicycle/Pedestrian Regional Master Plan for the Tulsa Transportation Management Area (TMA) (**Figure 4**). A product of community participation and extensive data collection, the GO Plan involved the input of a steering committee, technical committee, area communities, and the general public. The Project will implement a portion of this plan to address the gaps identified in the existing network. Once complete, the W. 81st Street multi-use trails will connect to sidewalks on the east side of US-75 and to proposed improvements at the W. 81st Street and S. Union Avenue intersection by City of Tulsa. Traffic signals through the DDI will have push-button activation for users that want to cross. These new trail facilities will improve accessibility for non-motorized travelers.



Figure 4: Sidewalk Gap Map, INCOG GO Plan

South Union Avenue is designated as a Multimodal Corridor in the city's [Complete Streets Procedural Manual](#), and carries Tulsa Transit fixed route bus service (Routes 117 and 500). As shown in **Figure 5**, there is a bus stop on eastbound W. 81st Street at S. Tacoma Avenue within the project area. Currently a single sign on the grass shoulder of W. 81st Street, this stop does not connect to any existing pedestrian facilities and does not provide a safe or sheltered location for riders to wait or board the bus. **Figure 6** shows the proposed new multi-use path connection allowing riders safe access to transit service.

The addition of sidewalks will also increase access to micro-mobility. The city of Tulsa allows small vehicles such as electric scooters to park only on a sidewalk or other hard surface, within the



Figure 5: Existing Tulsa Transit Stop on W. 81st Street (facing east)

landscape/furniture zone⁶. The Project includes a 7-foot landscape zone that could be used for this purpose. Constructing a surface suitable for small vehicles, in particular on an established transit route, provides additional options for non-motorized travelers and may help complete “last mile” trips by connecting transit to specific employment or service destinations that may be beyond walking distance.

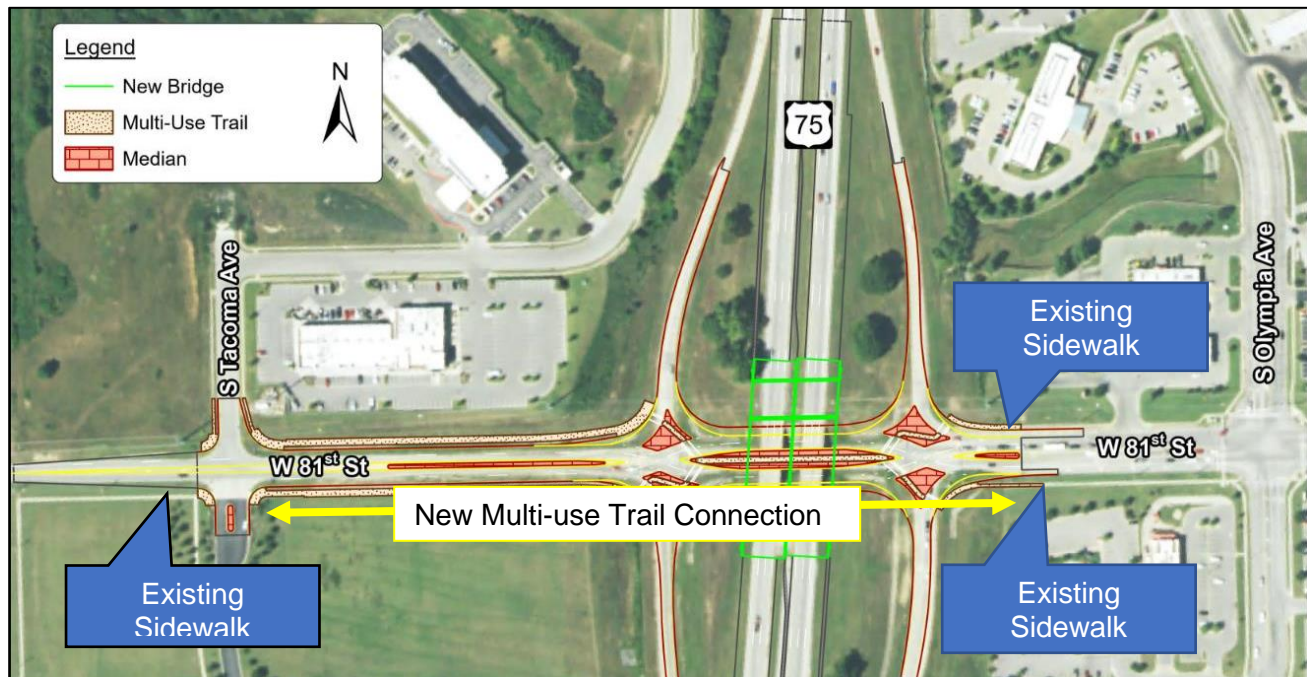


Figure 6: Proposed Connection of Existing Sidewalks on W. 81st Street

The Project will increase neighborhood connectivity and walkability, providing connections between residential areas on the west side of US-75 and shopping, entertainment, and job opportunities on the east side. The project will provide affordable access across US-75 which is currently a barrier to individuals wanting to cross but do not own a vehicle. The proposed 12'

⁶ City of Tulsa Ordinance 24019

multi-use paths plus 7' buffers will exceed ADA standards, embracing principles of universal design. The wide paths on both sides of the roadway will provide a safe and functional facility for all users.

5 Economic Competitiveness and Opportunity

Tulsa is a fast-growing center of employment within the state and region. In 2018, Tulsa-area employment grew 39 percent faster than the state and 47 percent faster than U.S. employment. Tulsa's real gross product grew 6.9 percent, while Oklahoma and the U.S. grew at 4.4 percent and 2.9 percent, respectively.⁷ As outlined in the [Regional Transportation Plan, Comprehensive Economic Development Strategy \(CEDS\)](#), and a host of other local planning documents, one of the primary goals of the City of Tulsa and INCOG is ensuring that all Tulsa residents have access to transportation, employment, and job opportunities.

The US-75/W. 81st Street Interchange project will promote long-term economic growth in the US-75 corridor. US-75 is on the National Highway System (NHS) and National Highway Freight Network (NHFN) and is among the highest volume truck freight routes in the state⁸. US-75 is included in the top 5% of freight bottlenecks in the Tulsa area and is listed as a critical freight corridor in ODOT's [Freight Transportation Plan, 2023-2030](#). As shown in **Figure 7**, the land adjacent to US-75 is designated for commercial development in the City of Tulsa's comprehensive plan ([Planitulsa](#)). The Tulsa Hills area east of US-75 is designated as a Regional Center, which demands special attention to transportation access and circulation. This area is also identified as a Major Employment Center in [Connected 2050](#), INCOG's long-range transportation plan. With an increasing focus on regional generators, it is vital that ODOT improve the US-75/W. 81st Street interchange to promote long-term economic growth. As one of two major access points to Tulsa Hills, W. 81st Street is important for incoming long-haul freight as well as local delivery and visitor trips. The DDI will ensure that the interchange continues to



Figure 7: Excerpt from City of Tulsa Land Use Plan ([Land Use Plan Map](#))

⁷ Tulsa Regional Chamber of Commerce, <https://www.tulsasfuture.com/data-and-research-tools/economic-profile>

⁸ [Oklahoma Freight Transportation Plan, 2023-2030](#)

serve the needs of this developing area by improving the movement of goods and reliable access to a major freight and visitor destinations. According to ODOT traffic count data, traffic volumes on US-75 have increased approximately 2% per year since the COVID-19 pandemic in 2020⁹. Note that in the BCA, traffic growth was modeled at 1% which is more consistent with area population growth. Assuming this growth continues at a similar rate, the DDI will reduce vehicle delay through the US-75/W. 81st Street interchange by almost half (46%) over the existing diamond, providing a Level of Service (LOS) C or better as opposed to LOS E/F conditions. Traffic modeling results are provided at [US-75/81st BUILD](#).

According to the Tulsa Regional Tourism, Tulsa sees 9.9 million annual visitors that create a \$1.87 billion annual economic impact and support over 15,000 local jobs.¹⁰ The city boasts arts and entertainment venues, museums and historical places, nightlife, shopping, and outdoor recreation opportunities. As one of the primary north-south highways through eastern Oklahoma, US-75 connects Tulsa to tourists driving from Texas, Kansas, and Nebraska and connects to Downtown Tulsa, Tulsa International Airport and Riverside Airport. Destinations such as Turkey Mountain, an urban wilderness recently upgraded with world class hiking and mountain biking trails, and the Route 66 Historical Village are within a 5-mile radius of the Project. In addition, Tulsa Hills Shopping Center is one of Tulsa's largest and busiest retail centers and is directly adjacent to the US-75/W. 81st Street interchange. The Project will facilitate tourism opportunities by enhancing access to local and regional destinations. The Project will create travel time savings and vehicle operating cost savings which will impact tourists as well as local traffic.

The benefits of improved safety and more efficient and faster movement of goods and people will accumulate over the project design life for local residents, businesses, and tourists and will serve to stimulate growth. Businesses that rely on ease of access for freight and customers will be more likely to develop in the Tulsa Hills area after implementation of the Project. Enhanced connectivity will promote greater public and private investment in land use productivity.

Additional economic competitiveness benefits flow from the Project's improved travel times. Travel time reliability increases the efficiency of movement of goods and people. The Project will reduce delay for both vehicles and pedestrians. The project will provide \$24.4 million in vehicular travel time savings over the life of the project¹¹.

***The US-75/W. 81st Street
Interchange Project will
provide \$24.4 million in
vehicular travel time savings***

Construction of the Project will also create good-paying jobs. Increasing job opportunities and improving business performance are particularly important for regional economic well-being, as Oklahoma has historically lagged other states in measures of economic well-being such as per capita and median household income. Based on multipliers provided by the Bureau of Economic Analysis' Regional Input-Output Modeling System (RIMS II)¹², the Project is projected to generate 93 jobs in construction. The RIMS II model produces multipliers specific to construction

⁹ [AADT Traffic Counts | ODOT Spotlight \(arcgis.com\)](#)

¹⁰ [Tulsa Regional Tourism, Destination Marketing | About Us \(visittulsa.com\)](#)

¹¹ See BCA Technical Memo at [US-75/81st BUILD](#). Pedestrian time travel savings not monetized.

¹² Tulsa, OK Metropolitan Area, Transportation structures and highways and streets (2232F0)

projects in the Tulsa metropolitan area. These multipliers are then applied to the anticipated construction cost of the Project¹³. The RIMS II multipliers used in this calculation are provided at [US-75/81st BUILD](#).

6 State of Good Repair

The existing bridges (NBI 16492 and NBI 16493) on US-75 over W. 81st Street were constructed in 1965, are considered in Fair condition, and are nearing the end of their useful lives. **Figures 8 and 9** show signs of spalling and cracking on NBI#16492, and **Figures 10 and 11** demonstrate spalling and cracking on a support beam and joint for NBI# 16493. Pavement on the bridge decks is currently rated in “fair” condition. See additional photos in **Figure 12**.

The US-75/W. 81st Street Interchange Project will create 93 construction jobs



Figure 8: NBI#16492, Spalling of Bridge Deck



Figure 9: NBI#16492, Spalling of the Bridge Soffit



Figure 10: NBI#16493, Spalling of Support Beam



Figure 11: NBI# 16493 Cracks on Expansion Joint

¹³ Deflated to 2019 dollars per RIMS II guidance



Figure 12: Existing US-75 Bridges over W. 81st Street



According to [FHWA's InfoBridge Database](#), both structures could fall into Poor condition by 2029 based on the condition of the decks (both bridges) and the superstructure (NBI 16492). Any kind of posting or closure of one or both bridges would cause significant traffic disruption and delay, further impacting travel times, operating costs. Both bridges are narrow and not of sufficient width to accommodate the future planned six-lane US-75. Similarly, the horizontal clearance on W. 81st Street under US-75 is not sufficient to accommodate the future planned 5-lane section. The vertical clearance on W. 81st Street is also less than desired (14' 7" vs. the standard 16' 9"). According to the inspection reports for the two bridges, the vertical and horizontal clearances are rated as 2-intolerable and require replacement. (See [US-75/81st BUILD](#) for the condition forecast report and bridge inspection reports.)

The US-75/W. 81st Street Interchange Project will restore and modernize the existing infrastructure assets that have met their useful life while maintaining as much of the existing core infrastructure as possible. The existing bridges will be replaced with new 70' wide steel bridges (**Figure 13**). These bridges will be wide enough to accommodate the future six-lane US-75 typical section and will require only restriping when the highway is widened in the future. The bridges will provide a 17' vertical clearance for W. 81st Street, sufficient to accommodate large trucks, and a 140' long center span, sufficient to accommodate the proposed diverging diamond travel lanes and multimodal crossings. The bridge piers will be protected by 54" parapet walls on both sides of W. 81st Street.

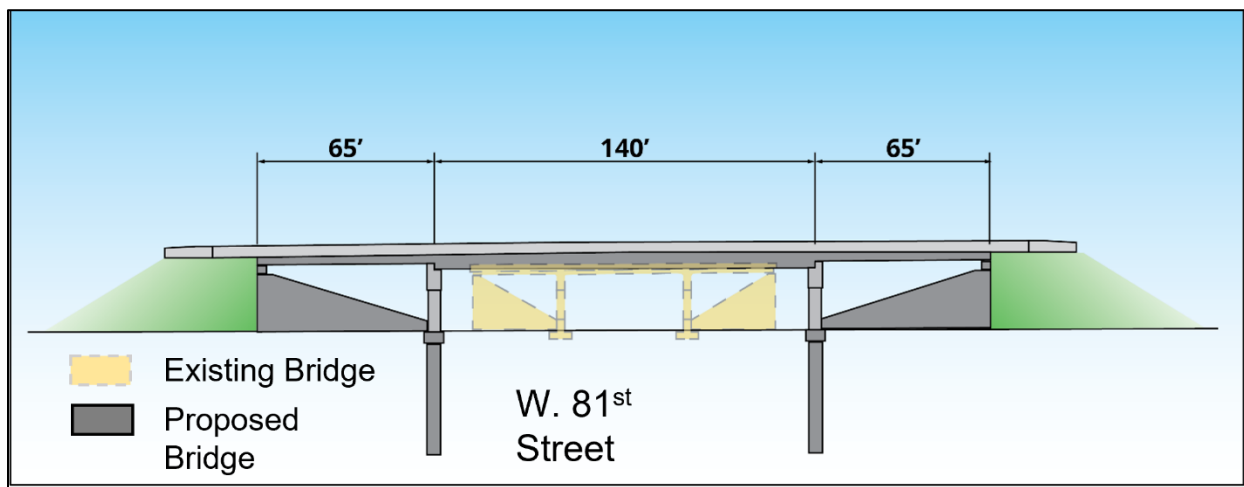


Figure 13: Existing and Proposed Bridge Elevations

The existing US-75 will remain, except for the minimum work on the mainline and ramps required to construct the new bridges and complete the DDI. The Project will prioritize improvement of the condition and safety of existing infrastructure within the existing interchange footprint. Preserving the existing mainline and ramp pavement in good condition reduces the construction burden and keeps future pavement maintenance consistent.

Table 1 on the next page shows the anticipated maintenance costs for the existing interchange (No Build) and proposed new interchange (Build) scenarios. The age and condition of the existing bridges will demand several rehabilitation efforts over the next 20 years. The DDI will reduce the maintenance burden due in large part to the improved bridge condition and clearances. All infrastructure, both existing and new, will be maintained in a state of good repair.

Table 1: Maintenance Costs, Build and No-Build Scenarios (2023 dollars)

Year	No-Build	BUILD		
	Maint & Rehab Costs for US-75/81st	Capital Costs	Maintenance	TOTAL
2024	-	-	-	2,546,582
2025	-	12,394,464	-	12,394,464
2026	-	12,394,464	-	12,394,464
2027	-	-	326,707	326,707
2030	1,504,718	-	-	-
2035	933,448	-	-	-
2040	-	-	-	-
2045	1,504,718	-	-	-
2050	-	-	-	-
TOTAL	\$3,942,884	\$24,788,929	\$326,707	\$27,662,217

Note: Costs in Table 1 represent future costs and do not include previously incurred costs or costs for activities assumed to be completed prior to grant award (i.e. design, environmental, right-of-way, and utility relocation).

7 Partnership and Collaboration

ODOT is collaborating with the City of Tulsa to construct this project. ODOT has completed the design and will contribute funds to construct the interchange. The City of Tulsa is funding the right-of-way acquisition necessary for the W. 81st Street widening and is contributing \$1.7 million to the project. ODOT and City of Tulsa have worked closely together throughout development of the project, coordinating on roadway, sidewalk, and drainage design. The partnership between ODOT and the City of Tulsa is longstanding and has



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resulted in the construction of several similar projects. Often ODOT will construct improvements on the city's street network to improve operations or access to state facilities. The City of Tulsa then maintains these improvements after construction. The city is relieved of the burden of construction cost and ODOT can remain focused on maintenance and preservation of the state system.

Public engagement on the US-75 corridor originally occurred as part of the Major Investment Study and EA in 2002, including a formal public hearing. ODOT requested input from tribes, and local, city, state, and federal agencies. Many changes to regulations, policies, and best practices for public involvement have occurred since that time, and ODOT intends to perform additional public outreach specific to the US-75/W. 81st Street interchange. ODOT recently completed a successful virtual public open house for another DDI in Tulsa and will continue to offer opportunities for public input.

8 Innovation

Innovative Technology

ODOT will incorporate stipulations that the contractor can make use of sensors (embedded strain gauges) to enhance inspection and serve as maturity meters in newly placed concrete. Current wireless technology allows for smart-phone connection or remote logger with cloud connections to track strength of concrete. The readings from these meters would be utilized by the contractor and ODOT to make critical real-time decisions during concrete curing. This allows for removal of concrete forms and opening to traffic earlier than conventional time constrained specifications.

Innovative Project Delivery

ODOT is implementing Advanced Digital Construction Management Systems (ACDMS) with 3D models and digital project delivery of design and information to facilitate accelerated project delivery.¹⁴ Digital delivery is new and innovative to ODOT and uses digital data to design, construct, inspect, and maintain transportation assets, enhancing efficiency, improving quality, and reducing costs across the industry. ODOT commits to providing 3D computer models of the Project as part of the contracting process. This technology will allow contractors to utilize the most recent GPS controlled equipment with Automated Machine Guidance in the construction process. Using and following the 3D model will minimize the potential for human error in establishing grades and elevations while improving efficiency in earthmoving during the construction process. These efficiencies improve quality while reducing the overall cost of construction. ODOT was recently awarded an ACDMS program grant to develop several Digital Delivery plans, manuals, and software and a pilot project for data exchange between design and construction.

The DDI design proposed at the US-75/W. 81st Street Interchange is one of several innovative interchange concepts included in FHWA's Every Day Counts (EDC) initiative.¹⁵ DDIs can cost less, use a smaller footprint, result in fewer impacts, and be faster to construct than a traditional diamond interchange. They are particularly effective at accommodating large freight vehicles and at providing safe pedestrian and bicycle accommodations. To date ODOT has completed two DDIs, one on I-40 in Elk City, and another at US-169 and US-64 in Tulsa. However, this design is still considered new and innovative within Oklahoma. ODOT continues to monitor the performance of these projects and has committed funding to support this and other innovation initiatives in its [State Planning and Research Work Program](#).

ODOT will make use of "No Excuses Bonuses" on the Project, including a substantial completion incentive of five to ten percent of the contract with internal milestones included for key project elements. The internal milestones will also have incentives associated to encourage contractor innovation in early completion of major project components including stages that open portions of the corridor to traffic.

¹⁴ [ODOT Digital Delivery](#)

¹⁵ [Every Day Counts | Federal Highway Administration \(dot.gov\)](#)