Oklahoma Department of Transportation

OKLAHOMA Transportation

FINAL ENGINEERING REPORT

I-40/I-35 Dallas Junction Interchange
JP 30444(04)
Oklahoma County, Oklahoma

December 2023

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TABLE OF CONTENTS

APPENDICES

EXECUTIVE SUMMARY

Purpose and Background

Increasing congestion on I-35 as a result of the growth of residential and commercial development in the surrounding Oklahoma City metro area caused the Oklahoma Department of Transportation (ODOT) to initiate a preliminary engineering study to improve operations on the I-35 corridor within and adjacent to the I-40/I-35/I-235 "Dallas Junction" Interchange. The interchange intersects three of the highest volume interstate facilities in central Oklahoma City and provides direct access to the city's commercial and central business districts.

PROJECT LOCATION MAP

The I-35 corridor is a critical national corridor on the National Highway System (NHS), Strategic Highway Network (STRAHNET), and a National Highway Freight Network (NHFN). The corridor has also seen an increase in freight demand and is now designated a freight bottleneck in the ODOT Freight Transportation Plan and by the FHWA Mobility Study. The costs related to the congestion for this section of roadway are estimated to exceed over $80,000 per day, or $29 Million per year.

The I-35 bridges over the Oklahoma River currently service over 136,350 vehicles per day (2022 Average Daily Traffic ADT) with a projected growth of 60% to around 218,160 vpd in 2040. The average daily truck traffic percentage is currently 12 percent, on average there are nearly 16,000 trucks per day crossing the I-35 Northbound (NB) and Southbound (SB) bridges with an increase to over 26,000 per day in 2040.

The steadily increasing traffic volumes have led to increases in collisions and extreme delays on the interstates mainlines (I-35, I-40, & I-235) within the interchange. Over 4,371 collisions were experienced over a ten-year time span (Jan. 2012 to Jan. 2021) within the interchange, involving 1,686 injuries and 20 fatalities. 52% of those collisions were rear end collisions, typically seen when higher speed traffic moving into stopped vehicles in the travel lanes.

Interim Ramp Project

It should be recalled that during the period of the contract, the Department desired to solve an operational issue within the interchange footprint and changed Poe with finding a solution. In 2019, an interim ramp widening construction project was undertaken in conjunction with the preliminary engineering study. Increased queuing was occurring along the I-40 mainline and shoulders from two ramp connections to I-35 causing an untenable safety hazard. An immediate solution was sought to help relieve the backups on I-40.

An operational study was undertaken that focused specifically on the (1) I-40 WB to I-35 SB and (2) the I-35 NB to I-35 EB ramp movements. After completion of the operational study, PS&E plans were quickly developed that widened the two single lane ramps to two-lane ramps. To accommodate the additional ramp lanes, the I-35 river bridges (NB and SB) were restriped and the existing 4 – 12' lane typical section with 10' shoulders were reconfigured to 5 lane sections with 4' shoulders. The reduced shoulders do not meet recommended design guidelines and required a design exception.

SINGLE LANE RAMP VS. TWO LANE RAMP

Bridge Concepts

To achieve the necessary increase in capacity and improve safety, geometric enhancements were proposed for the I-35 mainline and adjacent ramps to help improve traffic operations all while taking into consideration local concerns regarding usage of the Oklahoma River. Currently, piers for the I-35 bridges are in the Oklahoma River rowing raceway. It is imperative that future bridges span over the rowing raceway.

As a result, two general design concepts were investigated in the early stages of the study:

- Concepts 1 & 2: Addition of parallel ramp Bridges along the existing I-35 mainline bridges (2 separate configurations considered)
- Concept 3: Replacing the Existing I-35 mainline bridges with widened structures

As the study progressed, Concept 3 (reconstructed mainline bridges) was proposed by the consultant and selected by ODOT as the preferred concept due to the following benefits over the parallel bridge concepts.

The benefits to Concept 3 included:

- Replacing the 37-year-old, At-Risk of being Structurally Deficient, I-35 mainline bridges within the current project, which reduces inspection and maintenance needs.
  - Concepts 1 & 2 would keep the existing aging mainline bridges in place.
- There are less proposed bridges crossing the river, which needs less long-term maintenance.
- Adding parallel bridges increases the difficulty of future mainline bridge construction.
- Concept 3 allows for implementing a bridge pier configuration that allows for upgrading the rowing race course below the bridges.

Upon this selection, next the step was to investigate the mainline bridge replacement concepts using a series of differing pier configuration options and geometric modifications. This led to the following two options:

- Concept 3 with the use of specialty long span bridges spanning bank to bank (Tied Arch and Cable-Stayed configuration)
- Concept 3 – with a three-span configuration with the primary span over a proposed rowing race course

After significant investigation and considerations ranging from geometric requirements, maintenance of traffic, constructability, right-of-way and utility constraints, substantial stakeholder input, Oklahoma River rowing course requirements, multimodal pathway enhancements, construction costs and low-chord requirements, Concept 3.4 was selected as the preferred.

Preferred Concept 3.4: Replacing the I-35 Mainline Bridges with a Traditional 3 Span Continuous Steel Plate Girder bridge that spans an 8-lane rowing course with two piers (in the river)

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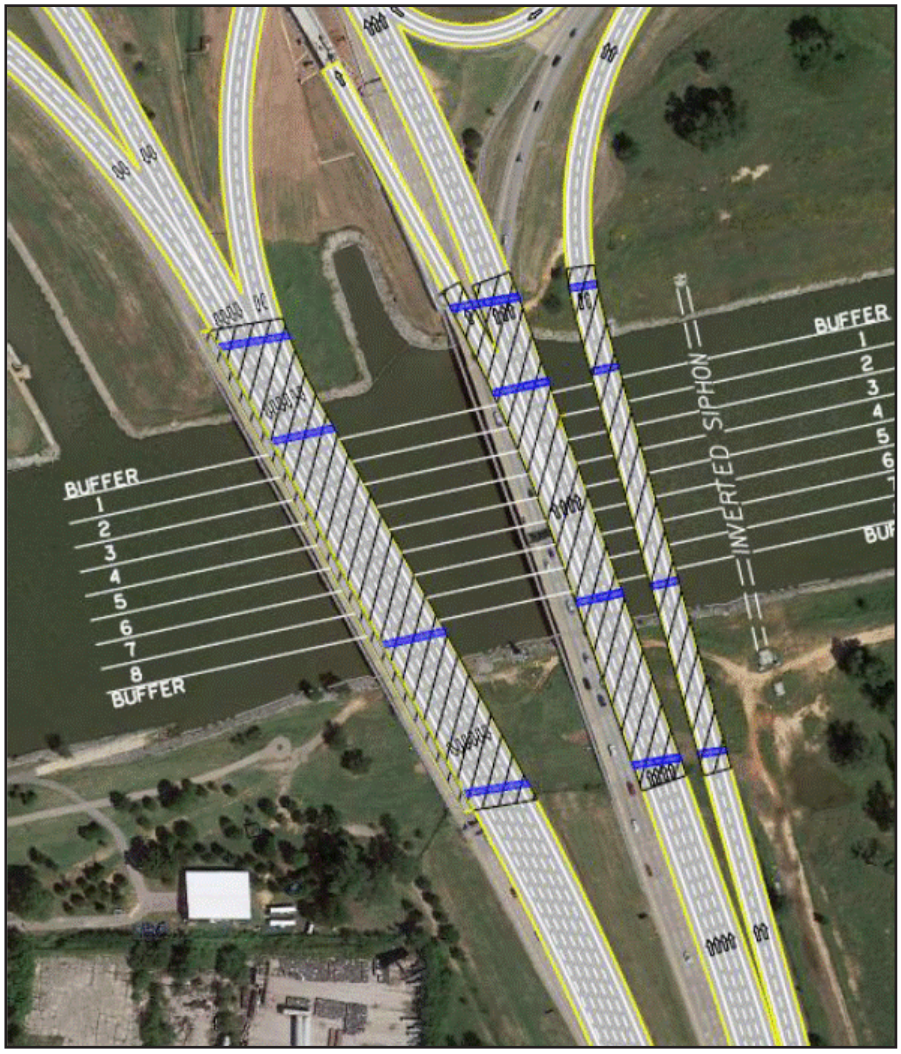
DESIGN OPTION 3.4



The Preferred Concept 3.4 includes the following:

- Construction of the two new mainline bridges on I-35 (Northbound and Southbound) and a third proposed ramp bridge.
- The mainline bridges replacements provide additional Capacity for the I-35 corridor by replacing the existing 68' I-35 northbound and southbound bridges that carry 5 lanes with new bridges to carry 6 lanes of traffic in each direction.
  - The proposed I-35 Southbound, the proposed bridge width carries a minimum of 96' of clear roadway to accommodate 6 travel lanes. Design Speed for the sections through these bridges is 60 mph.
  - For I-35 Northbound, the proposed bridge would be approximately 72' minimum clear roadway width and carry four 12' travel lanes with 12' shoulders.

- A new parallel ramp bridge with a clear roadway width of 42' would carry an additional two lanes of ramp traffic to I-40 Eastbound. TThe ramp bridge would accommodate an 8' interior shoulder and 10' outside shoulder. The ramp geometry is designed for a 45 mph design speed.

- Rehabilitation and Widening of the existing I-35 NB and SB bridges over the Burlington Northern Santa Fe (BNSF) railroad.
- Reconstruct and widen the existing I-35 roadway sections between the Oklahoma River and SW 15th. 12' wide shoulders are included for all I-35 mainline replacements.
- Continue a 4th lane through I-35 Southbound to provide relief for queuing issues occurring on I-35 and I-235 within the Dallas Junction interchange. To accommodate the widening, the slope wall at the I-35 SB Under Bridge at SE 15th will require reconstruction.
- Extension of a Double 10'x 6' bridge sized reinforced concrete box (RCB) structure between the railroad bridges and the SE 15th Street overpass.
- MSE slope walls are proposed throughout the project to minimize right of way acquisition.
- Realignment of the SE 15th Entrance ramp to I-35 NB.
- Realignment and construction of the SE 15th Street Entrance and Exit Ramps to I-35 SB
- Addition of a multimodal pathway bridge to provide a pedestrian river crossing for the Oklahoma City trails that run along the north and south banks of the river.

Traffic Capacity Analysis

In 2023, a preliminary lane capacity analysis was completed by ODOT Traffic to identify current and future lane needs within the Dallas Junction interchange. Thirty-three (33) locations within the interchange were evaluated for Level of Service (LOS) for both AM and PM peak hours for current and future traffic loads.

Three (3) different traffic scenarios were incorporated in the future lane needs and LOS analysis, including:

- 2020 Existing Traffic, Existing Geometry
- 2035 Traffic Projections, Existing Geometry,
- 2050 Traffic Projections, Existing Geometry,

The results of the study show that thirteen (13) locations were identified as areas of concerns based on 2020 design traffic, having an AM or PM peak hour of LOS D or worse.

Below is a table showing lane needs for the I-35 roadway sections to the immediate north of the Oklahoma River Bridges and the road section between the bridges and SE 15th Street.

I-35 Levels of Service

Location	Level of Service						Existing Lanes	Recommended Lanes			
	2020		2035		2050		2023	2020	2035		2050
	AM	PM	AM	PM	AM	PM		(LOS C or better in peak hours)	(LOS C or better in peak hours)	(LOS D or better in peak hours)	(LOS E or better in both peak hours)
I-35 Southbound											
North of Oklahoma River Bridges	C	E	D	F	D	F	3	5	5	4	5
Oklahoma River Bridges to SE 15th Ramps	C	D	D	E	E	F	4	5	6	5	5
I-35 Northbound											
North of Oklahoma River Bridges	E	C	F	C	F	D	3	5	6	5	5
Oklahoma River Bridges to SE 15th Ramps	D	C	F	D	F	E	4	5	6	5	5

Construction Cost Estimates

The estimated construction cost for the Concept 3.4 preferred concept is approximately $164.0 M in total excluding the proposed multimodal bridge. Costs for the multimodal bridge are estimated at $13.2 M. The construction cost estimate is in 2023 dollars and includes a 30% contingency on roadway and bridge items.

Cost Estimate breakdowns can be found in Appendix E.

Proposed I-35 Mainline Bridge Renderings

FINAL ENGINEERING REPORT

Project Description and Purpose

Due to a steady increase in traffic volumes and collisions in the I-35/I-235 corridor and within the I-35/I-40/I-235 "Dallas Junction" Interchange, the Oklahoma Department of Transportation has initiated a preliminary engineering study to investigate safety and capacity improvements on I-35. The goal of the study is to improve operations on the I-35 mainline and ramp movements to improve safety and reduce delay. To improve operations, the study has considered various geometric and structure improvements including major bridge structures and ramp realignments to support increasing capacity.

The primary improvements include modifications to the alignment of both I-35 Northbound (NB) and Southbound (SB) south of the Dallas Junction interchange with widening of the roadway and bridge facilities to accommodate additional lanes and increased shoulder widths. Realignment of ramp movements, specifically the I-35 NB to I-40 EB movement are also proposed. To accommodate the roadway widening, five existing bridge structures along I-35 between the Oklahoma River and SE 15th Street are proposed for reconstruction or rehabilitation and include additional widening. Roadway modifications on I-35 from I-40 through the SE 15th Street bridges to SE 25th Street are proposed.

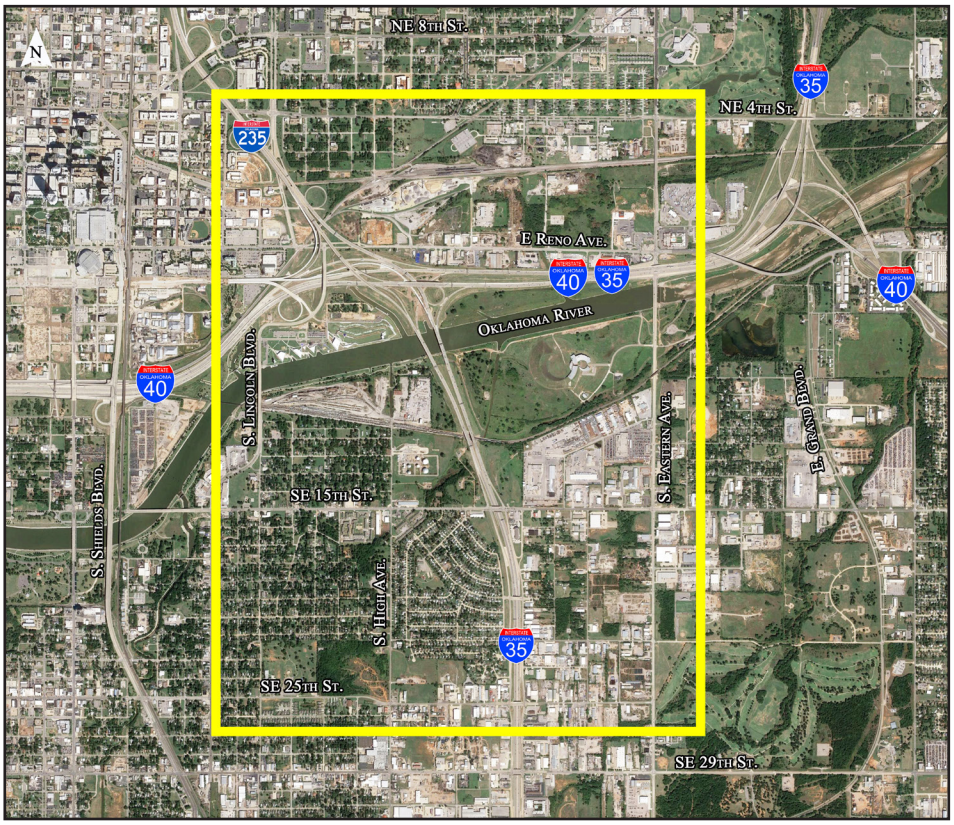
The proposed design concept includes replacing two mainline bridges on I-35 NB and SB over the Oklahoma River (National Bridge Inventory (NBI) 21356 and 21723), rehabilitating the two I-35 mainline bridges over the BNSF Railway (NBI 21335 and 21708), constructing a new I-35 ramp bridge spanning the Oklahoma River, and lengthening an existing box structure (NBI 14239) that traverses underneath I-35.

Also included as a separate facility within the project is the proposed construction of a separate "shared use" multimodal bridge that is anticipated to be located west of the I-35 southbound (SB) bridge and connect to the recently constructed Oklahoma River Trail system on both sides of the Oklahoma river. The multimodal bridge will be designed and funded in partnership with the City of Oklahoma City and conceptual design is in progress.

The roadway and bridge enhancements introduced in this study are anticipated to improve safety and mobility, reduce travel times, and increase reliability for one of the most critical commercial and business access as well as freight movement corridors in the state.

Project Location & Unique Features

PROJECT STUDY AREA



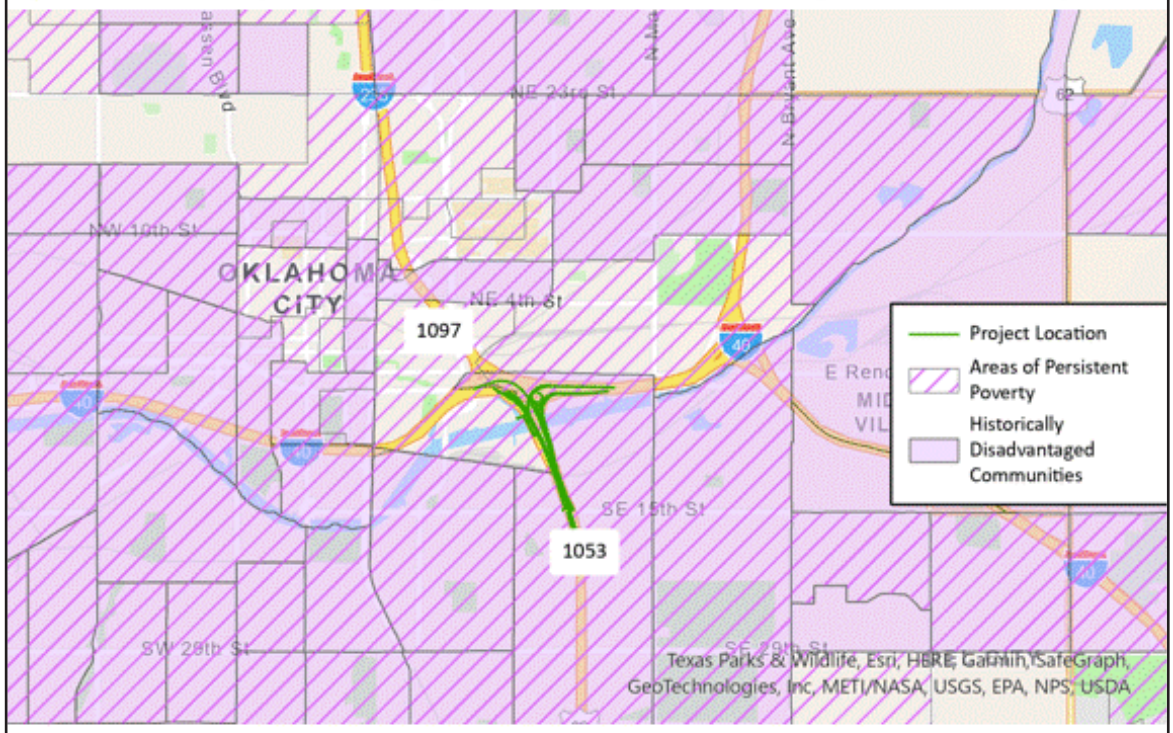
The project area is located 1.5 miles east and 0.5 miles south of downtown Oklahoma City at the intersection point of three interstate facilities. I-40 is a large urban interstate that serves as the primary east/west route through the downtown Oklahoma City central business district. I-35 is a national north/south connector running from Texas to Minnesota. Both I-40 and I-35 experience some of the heaviest travel and freight volumes in the country. Both I-40 and I -35 are critical national corridors and designated Strategic Highway Networks (STRAHNET). Both corridors are also on the National Highway Network system (NHFN).

PROJECT LOCATION AND KEY AREA

Underserved Communities and Opportunity Zones

HISTORICALLY DISADVANTAGED AREA

Figure 2: Historically Disadvantaged Communities and Areas of Persistent Poverty



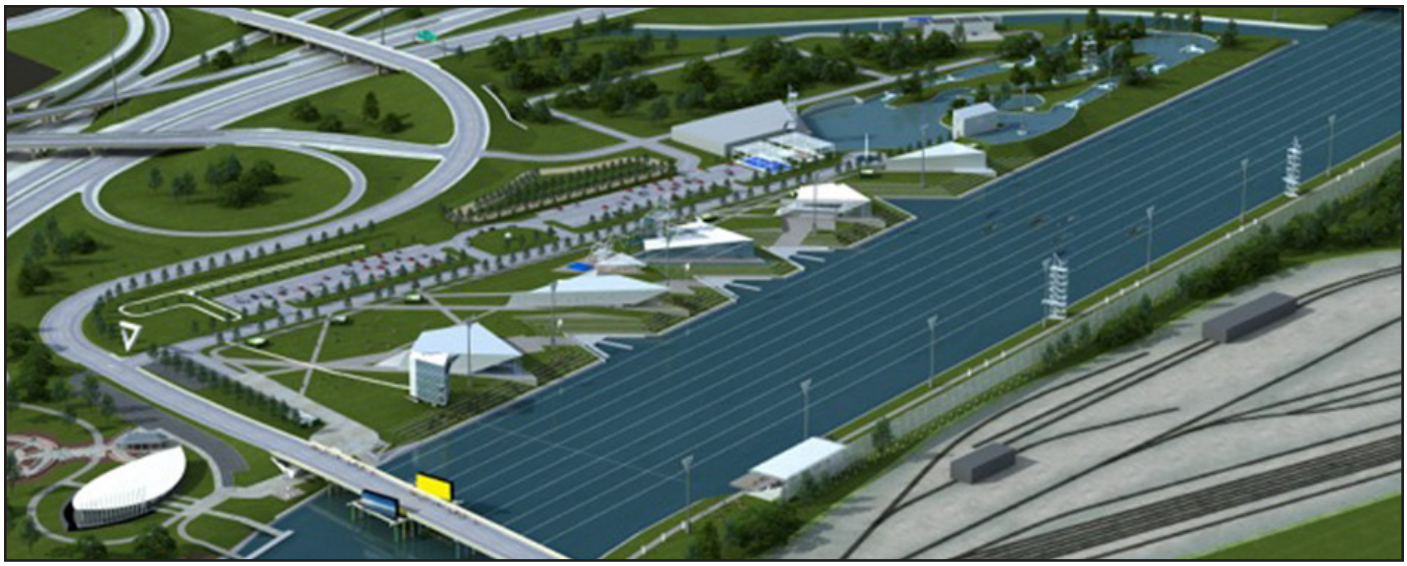
SOURCE: GRANT PROJECT VERIFICATION TOOL1 AND CLIMATE & ECONOMIC JUSTICE SCREENING TOOL2

Within the project area, the United States Department of Transportation (USDOT) has determined that multiple census tracts (Tract 1097 & 1053), specifically those close to the SE 15th interchange, are Historically Disadvantaged Communities and Areas of Persistent poverty. These areas are serviced by the I-35 interstate system and the localized street and trail networks. Improving the I-35 facilities and the adjacent trail facility are anticipated to provide transportation benefits to those affected communities.

Based on data provided by the Department of Housing and Urban Development (HUD), the project location is located within a federally designated Opportunity Zone (40109105300). The zone is also considered an Oklahoma City Empowerment Zone, which is an economic development initiative to facilitate long term revitalization of impoverished areas.

Cultural, Commercial, and Economical Project Features

ROWING DISTRICT



The project area crosses a developed section of the Oklahoma River, which is a dam-controlled river segment used for athletic and recreation purposes. This river section, known as the Riversport Adventures/Boathouse District, hosts privately funded boathouse facilities used for collegiate and professional rowing events. The U.S. Rowing National High-Performance center is located on the banks of the river section to the west of the I-35 Oklahoma River bridges, which include the University of Central Oklahoma and Devon Boathouses. This section of the river has emerged as one of the premier rowing venues in the world for competition and training.

OKANA DEVELOPMENT AREA

Directly adjacent to the project area on the east are the American Indian Cultural Center and Museum (AICCM) and the OKANA Development. The Chickasaw Nation is currently developing the $300 Million resort next to the museum which will include an 11 story, 400 room hotel, outdoor adventure lagoon, waterpark, conference center, restaurants, and Native American marketplace. The resort and museum will be a place of important cultural and economic development within the Oklahoma City metro, employing over 800 full time positions. The OKANA Development is projected to have a $97 million dollar impact on the city within one year of completion and a billion-dollar impact over the next decade.

The Oklahoma River trails were expanded in 2023 through this river section and tie into the Boathouse District and the OKANA Development. The trails are a landscaped recreational shared use pathway stretching along both the north and south banks of the river. The trails stretch 13 miles and provide pedestrian and bicycle access to many of the major districts within the city.

OKLAHOMA RIVER TRAILS

Stakeholder Engagement

Because of the cultural, commercial, and residential relevance of the project location, an extensive stakeholder coordination process was implemented early in the study process. An integral part of the project development has been the continuous discussion with the stakeholder group to arrive at a consensus bridge solution for the Oklahoma River crossing. The coordination effort took into account the needs of each of the stakeholders while considering the financial abilities of the project sponsors.

This project is unique in that it sits in a highly visible area of the city experiencing rapid urban development, the area has a cultural, commercial, and residential stakeholder base that requires partnership involvement throughout the process. ODOT has engaged the stakeholders at the project onset and forged partnerships that include the Tribal Community (First American Museum, Chickasaw Nation), local municipalities and agencies (City of OKC, Riversport Adventures, Oklahoma River Authority), community-based groups (ACOG, Oklahoma City Chamber of Commerce), and local residential groups (Capitol Hill Community).

The stakeholder engagement process followed guidance from the USDOT's "Promising Practices for Meaningful Public Involvement" to provide meaningful feedback. These shareholder meetings have provided valuable guidance in the planning and development of the bridge design concepts within the study. After receiving feedback from the stakeholder group, a preferred design alternative for the bridge was selected based on a narrowing of the concept types.

While some initial stakeholder desire centered around having a signature iconic structure that spanned the river, through meaningful discussion a consensus solution was reached that resulted in a traditional steel girder bridge that met the needs of the boating and tribal communities as well as local and state government. The traditional bridge utilized a pier configuration in the Oklahoma River to accommodate the needs of the Riversport and City of OKC and a separated multimodal bridge concept was added to connect the Oklahoma river trails on each bank of the river.

Project Timeline

- November 2015: ODOT initiated the Preliminary Engineering Study. Preliminary Survey and data gathering begins.
- August 2016: Kickoff Coordination meeting initiates between City of OKC, Oklahoma River Authority, and ODOT.
- September 2017: Interim I-35 ramp improvement study and plans developed.
- October 2017: Preliminary river bridge concepts introduced to stakeholders.
- December 2017: Stakeholder meeting to review initial bridge concept options.
- March 2018: Interim I-35 Ramp improvement project constructed with an additional lane on both the I-35 NB and SB bridges. The project utilized width from the shoulders to provide additional capacity.
- August 2018: ODOT began traffic operational analysis for bridge concepts.
- January 2019: The Oklahoma City Boulevard Exit Ramp off the I-35 NB bridge traffic opens connecting I-35 to the newly constructed OKC boulevard. ODOT begins traffic collection on the new ramp.
- September 2020: ODOT initiated a Long Span Bridge Study to evaluate specialty bridge concepts to span the Oklahoma River from bank to bank. Studies completed in March, 2021.
- October 2021: Long Span Bridge Study completed and presented to ODOT Bridge and District personnel.
- February 2022: Stakeholder Meeting #1 – ODOT presents the long span concepts with cost estimates to the stakeholder group.
- November 2022: Stakeholder Meeting #2 – Follow up meeting to discuss rowing course options and feasible bridge concepts. The addition of the multimodal bridge concept introduced.
- July 2022: BIP Planning Grant submitted for stakeholder funding initiated.
- January 2023: Bridge Aesthetic Study initiated for presentation to the stakeholders.
- February 2023: RAISE Bridge grant application submitted for multimodal bridge funding.
- May 2023: Stakeholder Meeting #3 – Meeting held with ODOT, Poe, Oklahoma City Leadership, Riversport, and the Chickasaw Nation to discuss the multimodal bridge.
- June 2023: Follow-up meeting with Oklahoma City Engineering Department to discuss potential aesthetic options for the multimodal bridge.
- August 2023: RAISE Mega Bridge grant application submitted for project funding.
- November 2023: BIP Large Bridge grant application submitted for bridge funding.

Traffic

In the southbound direction, weaving occurs where the existing 5-lane section merges to a 3-lane section under the SE 15th bridges. In the northbound direction, congestion and weaving occurs north of the bridge sections due to merging from the low-speed interstate ramps entering from both sides of the mainline at the interchange. Due to the current roadway conditions, ODOT has designated the I-35 corridor as capacity constrained and a freight bottleneck in the 2023 ODOT Freight Transportation Plan.

As documented in the 2022 National Bridge Inventory (NBI) file, the 2020 Average Daily Traffic (ADT) on both bridges is 136,350 and is projected to grow to 218,160 by 2040. Today, there are more than 16,000 trucks per day that cross the I-35 NB and SB bridges, and this will increase to over 26,000 trucks per day in 2040.

Currently, the I-35 corridor experiences daily congestion and significant delays along the mainline and at the interchange ramps. Collisions caused by traffic backing up in the through lanes are prevalent in peak and off-peak hours. Frequent collisions are also found when traffic enters the I-35 mainline from the interchange ramps due to queuing in the mainline lanes.

Based on Data provided by ODOT Traffic Division, as shown in the Level of Service (LOS) on the I-35 bridges in 2020 was LOS E and by 2035 it will be LOS F.

Travel Time Reliability

In 2022, the Level of Travel Time Reliability (LOTTR) on the I-35 NB and SB bridge segments was 1.28 and 1.74, respectively. The Truck Travel Time Reliability (TTTR) on the I-35 NB and SB bridges was 2.36 and 4.33, which is rated as poor. ODOT's TTTR Interstate target is 1.33 and the current statewide average TTTR is 1.27.

TRAFFIC VOLUMES AND CONGESTION MEASURES

Segment	2020 ADT	2040 ADT	2020 LOS	2035 LOS	2040 LOS	2022 LOTTR	2022 TTTR
I-35 NB	67,950	108,720	E	F	F	1.28	2.36
I-35 SB	68,400	109,440				1.74	4.33

Source: ODOT and 2022 National Bridge Inventory Files

Preliminary Lane Capacity Analysis

In 2023, a preliminary lane capacity analysis was completed by ODOT Traffic to identify current and future lane needs within the Dallas Junction interchange. Thirty-three (33) locations were evaluated for Level of Service (LOS) for both AM and PM peak hours for current and future traffic loads. The analysis used guidance from the Highway Capacity Manual to identify the level of service needs for design traffic volumes. A traffic volume growth rate of 1.5% was utilized to determine the future traffic projections.

Three (3) different traffic scenarios were incorporated in the future lane needs and LOS analysis, including:

- 2020 Existing Traffic, Existing Geometry
- 2035 Traffic Projections, Existing Geometry,
- 2050 Traffic Projections, Existing Geometry,

The results of the study show that thirteen (13) locations were identified as areas of concerns based on 2020 design traffic, having an AM or PM peak hour of LOS D or worse. These areas included the I-235 SB and I-35 SB as well as the I-235 NB and I-35 NB sections through the interchange and south of the Oklahoma River bridges.

For I-35 SB, the heaviest volumes are experienced in the PM peak hours. To meet a LOS of C or better for both peak hour time periods, 5-lanes are required on I-35 south of the Oklahoma River bridges through SE 15th Street. The current LOS is C/D for the existing 4-lane configuration. For 2050 traffic volumes, the LOS is E/F for the existing 4-lane configuration. A recommendation of 5-lane in each direction will achieve a LOS C in both peak hour time periods for the future traffic load.

On I-35 NB, the traffic volumes are similar but the congestion primarily occurs in the AM Peak hour. To meet a LOS of C or better for both peak hour time periods, a recommendation of 5-lanes is needed along I-35 NB between the Oklahoma River bridges through SE 15th Street. The current LOS is D/C for the existing 4-lane configuration. For 2050 traffic volumes, the LOS is F/E with a recommendation of 5-lane in each direction to achieve a LOS C in both peak hour time periods.

While the I-35 SB direction has similar traffic volumes, the reliability performance is worse than that of I-35 NB in the PM peak hour. This is due to the geometric configurations of these segments. First, the segments of I-35 south of the Oklahoma River are characterized by lane drops within a tight interchange spacing. The distance between the merge points of the I-40/I-35 system interchange and the SE 15th Street interchange is approximately half a mile.

I-35 and SE 15 th Existing Ramp Spacings			
Entrance	Exit	Spacing ft.	AASHTO Minimum Spacing ft.
I-35 Northbound			
SE 15th ST. Ent. Ramp	I-35 NB to I-40 EB Ramp	2890'	1600'
I-35 SB			
I-35 NB to I-40 EB Ramp	SE 15th ST. Exit Ramp	2500'	1600'

* Spacing is From Painted Nose to Painted Nose

** AASHTO 2004 Policy Exhibit 10-68

Prior to the interim ramp widening, in the southbound direction, a single lane from westbound I-40 and a single lane from I-40 EB merged with the two mainline lanes of I-35/I-235 on the river bridge. A total of four lanes crossed the river bridges. South of the bridges, the left lane drops at the SE 15th exit, narrowing the capacity from 4-lanes to three (3) under the existing SE 15th street bridge.

The merging of travel lanes from the inside and outside lanes in the I-35 SB direction leads to traffic stopping and weaving. This exacerbates queuing along I-35 and I-235 north of the bridges, as shown in the I-35 PM peak hour data. That section of I-35 SB north of the river bridges experiences a 2020 LOS of E/F.

I-35 Levels of Service											
Location	Level of Service						Existing Lanes	Recommended Lanes			
	2020		2035		2050		2023	2020	2035		2050
	AM	PM	AM	PM	AM	PM		(LOS C or better in peak hours)	(LOS C or better in peak hours)	(LOS D or better in peak hours)	(LOS E or better in both peak hours)
I-35 Southbound											
North of Oklahoma River Bridges	C	E	D	F	D	F	3	5	5	4	5
Oklahoma River Bridges to SE 15th Ramps	C	D	D	E	E	F	4	5	6	5	5
I-35 Northbound											
North of Oklahoma River Bridges	E	C	F	C	F	D	3	5	6	5	5
Oklahoma River Bridges to SE 15th Ramps	D	C	F	D	F	E	4	5	6	5	5

Interim Bridge Widening – Improved LOS

In 2018, ODOT restriped the NB and SB I-35 river bridges to add a 5th mainline travel lane across the bridge to accommodate adding a second lane to two of the single lane I-40 ramps. The addition of the lanes helped reduce traffic backups occurring on the I-40 mainline, but reduced the shoulder widths on the river bridges to accommodate for the added lane.

The 2020 capacity analysis shows that the I-40 segments adjacent to the expanded ramps that were previously queuing are now experiencing higher levels of service. The I-40 WB to I-35 SB ramp is experiencing an LOS of B (AM Peak) and A (PM Peak) and the adjoining section of I-40 has an LOS of C.

The I-35 NB to I-40 EB ramp experiences an LOS A (AM Peak) and LOS B (PM Peak) and the adjoining section of I-40 EB has an LOS of A (AM Peak) and C (PM Peak).

The results of the preliminary lane capacity analysis can be found in Appendix A.

Collisions

Due to the large traffic volumes and sudden changes in speed caused by traffic queuing south of the interchange, collision rates within the Dallas Junction interchange are high. Collision data was obtained from the ODOT Highway System Collision Listing Data to determine the nature and frequency of collisions along the interstates and ramps. Collision history was evaluated for the entire interchange area, extending 2 miles north of the bridges and 1.5 miles south of the bridges along I-35, 0.75 miles north of the interchange along I-235, 1.25 miles west of the interchange along I-40, and 1 mile west of the interchange along Oklahoma City Blvd. The collision information was collected and analyzed over a 10-year period from January 1, 2012, to December 31, 2021.

For the I-35/I-40 interchange collision frequency, a total of 4,371 collisions were recorded involving 1,130 injured persons and 20 fatalities. This is the equivalent of 1.2 collisions per day over 10 years. Of those injuries, 110 were of sufficient severity that the injured person was incapacitated. The collisions can be broken down as follows:

The most prevalent collision type within the interchange was rear-end (front to rear) collisions, accounting for over half (2,305 of the 4,371 total) of all collisions. This is a scenario that is commonly observed with congested roadways where stopped traffic occurs in the driving lanes and sudden deceleration from vehicles traveling at higher rates of speed is required. The limited bridge travel lane capacity, reduced shoulders, and merging of travel lanes directly south lead to conditions that experience traffic stopping and weaving. This further exacerbates the queuing along the highway. Restriping the bridges to add a travel lane in the Spring of 2018 helped reduce the backup on the I-40 to I-35 ramps; however, it narrowed the shoulders of the bridges, making them at-risk of being considered functionally obsolete.

The proposed replacement bridges for I-35 NB and SB would have width to carry 6-lanes each as well as adequate shoulder widths. This would allow for the I-35 NB bridge to have a dedicated lane for I-40 WB and the I-35 SB bridge to have an additional lane from I-40 WB. South of the I-35 SB bridge, the proposed roadway would narrow to 4-lanes instead of 3, which is an additional lane from the current configuration. The additional lane should help reduce the number of rear-end collisions by reducing the backup at the interchange during peak hours which, in turn, increases the capacity of the interchange. The addition of a I-35 SB through-lane would lessen some of the weave movements in close proximity to each other which occur today.

The next most common collision type found was Sideswipe Same Direction at nearly 25 percent. The reduction of the 5-lanes at the bridge to 3-lanes to the south causes a weaving movement on both sides of the roadway for I-35 SB and causes a significant number of sideswipe collisions as drivers seek to merge. The I-35 bridge replacement would provide an additional lane and would eliminate the weaving movement on the inside of the roadway and help reduce the number of sideswipe collisions.

Additionally, the I-35 bridge replacement would restore the inside and outside shoulders to adequate widths. Full shoulders are important for the safety of a bridge because they allow for broken-down cars to pull off to the shoulder rather than blocking a lane of traffic. The shoulders also permit emergency vehicles to bypass stopped traffic to access the scene of a crash or incident more quickly, allowing injured persons to receive medical attention sooner.

I-35/I-40 INTERCHANGE COLLISIONS

Type of Collision	Fatality	Injury	Property Damage	Total
Rear-End	3	646	1,656	2,305
Head-On	4	4	1	9
Right Angle	1	64	81	146
Angle Turning	1	54	149	204
Other Angle		1	3	4
Sideswipe Same Direction	1	137	934	1,072
Sideswipe Opposite Direction	1	5	4	10
Fixed Object	6	143	226	375
Pedestrian	2	6		8
Pedal Cycle		1		1
Animal			1	1
Overturn/Rollover	1	38	23	62
Other Single Vehicle Crash		7	29	36
Other		24	114	138
Total	20	1,130	3,221	4,371

*includes incapacitating, non-incapacitating, and possible injuries
PD = Property Damage

Crash Reduction

The FHWA Desktop Reference for Crash Reduction Factors was used to determine how each of the proposed safety improvements would impact the collision rates. When multiple collision rates were given for the same improvement, the median value is represented here:

- Replacing the bridges has the highest crash reduction factor (CRF) of the design improvements. The CRF for bridge replacement is 45, correlating to a reduction in the rate of collisions of 45 percent for all types of collisions.
- The CRF factor for increasing the number of travel lanes has a CRF of 25. This indicates it would further reduce the rate of collisions by approximately 25 percent for all types of collisions.
  - However, increasing the number of lanes has a greater impact on rear-end and sideswipe collisions, reducing them by approximately 40 percent and 35 percent respectively. As shown in the Collision Rates Table, these are the two most common accident types making up over 75 percent of the total collisions found on the roadway extent.
  - This would further reduce the rate of collisions by increasing the CRF from the initial 25 percent to 35 percent reduction due to the lane increase.
- Widening the shoulders from 4' to 12' will result in a CRF of 20. This correlates to an additional reduction of collisions by 20 percent.

Combining the Crash Reduction Factors results in a total reduction in crashes; it is anticipated that a total collision reduction of between 45 percent (bridge) and 48 percent (roadway) should occur through the Project extents.

In summary, the I-35 bridge replacement and roadway improvements would help enhance safety and operation, protecting motorized travelers by reducing the number of accidents in the I-35/I-40 interchange area by almost 50 percent.

Existing Conditions

Existing Roadway Data

I-35 at the Oklahoma River was designed as an 8-lane (four lanes in each direction) facility with 10' inside and outside shoulders. I-40 transitioning to I-35/I40 is also an 8-lane facility. It has 4-lanes westbound with one lane transitioning to I-35 southbound and three continuing west toward the I-40/I-44 "K" interchange. Four lanes travel eastbound from the I-40/I-44 "K" interchange and an additional lane is picked up from I-235 southbound and continues as 5-lanes outside the study area. A 10' shoulder, both inside and outside, is maintained throughout the mainline.

I-235 is a 6-lane facility (three lanes in each direction). On the south, a 4th lane merges from the on ramp from Lincoln Boulevard, which then diverges to I-40 westbound and another lane diverges to the right and East on the I-35/I40, leaving two 12' lanes travelling directly south to the I-35. These lanes are joined by a single I-40 southbound lane from the west. Travelling north on I-235, an off ramp to I-40 west diverges from the mainline, which consists of three 12' lanes. A single lane from I-35/I-40 merges the mainline and it continues as a 4-lane highway to the off ramp to Sheridan Drive. The northbound I-235 then continues as 3-lanes outside the study area.

The results of the analysis show that under existing traffic conditions, many areas in the corridor are over capacity or approaching capacity. Many of the intersections near the I-35 mainline are experiencing levels of service of "E" or below in the a.m. and p.m. peak hours. Most of the traffic movements through the corridor at the bridges or to the south are experiencing levels of service "F" under traffic volumes.

For I-35 SB, the existing configuration is a five-lane facility south of the bridges and is recommended to be a minimum of four lanes as a part of each of the design concepts. One lane is dropped on the SB movement at the SE 15th Street exit. At the 15th Street bridge, 3-lanes are anticipated to go through until a final lane drop occurs at the SE 25th Street exit.

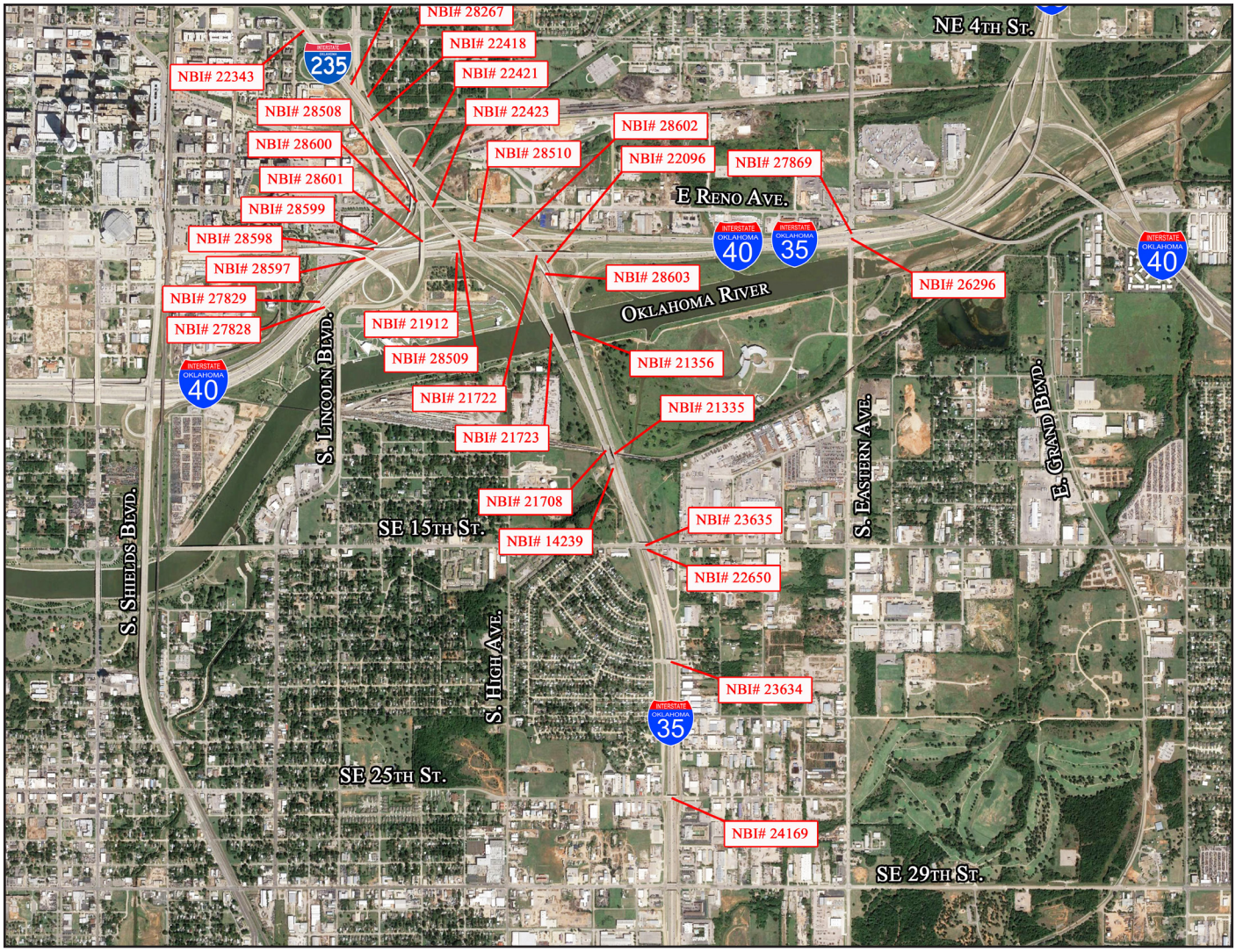
SE 15th Street is a four-lane facility consisting of 12-foot inside lanes and 14-foot outside lanes. There are also 12-foot right-turning lanes in both directions on the bridge over I-35, making it a six-lane facility in this localized area. The right-turn lanes extend approximately, 75-foot beyond the bridge for SE 15th Street-to-I35 NB movements to the west of the bridge, and 50-foot to the east of the bridge for SE 15th Street-to-I-35 SB movement. There is an 8" barrier curb on both sides of the bridge.

See Appendix O for Existing Typical Sections.

Existing Bridge Data

There are thirty-one (31) bridges within the overall study area of the project which includes the interchange area from I-235 on the north to I-35 to SE 25th St. on the south. Five (5) bridges scheduled for replacement, rehabilitation, or modification with the proposed concept.

BRIDGE LOCATIONS



The bridges were primarily constructed in the 1950's and then upgraded in the mid 1980's when the Dallas Junction interchange was expanded with the widening of I-35 to the configurations found today. The bridge types are typically plate girder bridges and most are skewed due to the geometry of the mainlines and ramps within the interchanges.

The bridges are all nearing the end of their design life's and showing signs of deterioration. Bridge ratings for the bridges found within the interchange typically range from 5-7 and most have had rehabilitation efforts within the last decade. The bridges shown within the interchange experience some of the heaviest volumes within the Oklahoma metro area.

The five (5) primary bridges being impacted within the project-35 S are the following:

- I-35 Northbound Bridge over the Oklahoma River (NBI# 21356))
- I-35 Southbound Bridge over the Oklahoma River (NBI# 21723)
- I-35 Northbound over the BNSW/SWC Railroad (NBI# 21335)
- I-35 Southbound over the BNSF/SWC over the Railroad (NBI# 21708)
- Double 10'x 6'x 250' Lg. Skewed RCB (NBI# 14239)

BRIDGE DATA

NBI	Location	Year Built	(2020) Veh. Per Day	Roadway Width (Ft.)	Deck/Sub/Super Rating	Clearance (Ft.)	FO/SD
21723	I-35 SB (OK River)	1987	68,400	68	5/5/5		No
21356	I-35 NB (OK River)	1986	67,950	68	5/5/5		No
21708	I-35 SB (BNSF RR)	1987	68,400	68	6/7/5	23' 1"	No
21335	I-35 NB (BNSF RR)	1986	67,950	68	7/7/5	23' 1"	No (*Reduced Shldr. Width)
14239	I-35 RCB (Doub. 10'x 6' RCB)	1959	136,350	NA	Culvert Rating 7 Sufficiency Rating - 83		No (*Reduced Shldr. Width)

Existing bridge information within the interchange study area of this project are found in the Appendix M.

State of Repair for Project Bridges

The I-35 NB and SB (NBI - (NB) 21356 and (SB) 21723) Bridges over the Oklahoma River are 802' long x 70' wide bridges that utilize eight (8) spans of approximate 100' lengths to cross the Oklahoma river. The bridges are composed of skewed (approx. 74 degrees) Prestressed Concrete (PC) Beams. The bridges were originally designed for a 68' clear roadway section to hold 4- lanes that are 12' wide with 10' inside and outside shoulders. The bridges were re-striped in 2018 for an interim ramp widening project to meet 5-lanes of 12' width with 4' shoulders.

Based on the 2022 National Bridge Inventory, the condition rating of both the I-35 NB and SB bridges over the Oklahoma River have a deck, superstructure, and substructure rating of 5 (Fair condition) and does not meet current design standards due to the shoulder widths. Due to the existing condition of both bridges, they are both at risk of becoming Structurally Deficient (SD) over the next two-year inspection cycle. The last bridge inspection occurred in July 2022. ODOT is on a 2-year inspection cycle so the bridge deck, superstructure, and substructure will be scheduled for inspection again in July 2024.

As noted in the Traffic Information, the 2020 ADT on both bridges is 136,350, and ADT is projected to grow to 248,160 by 2040. The average daily truck traffic is currently 12 percent so on average there are nearly 13, 600 trucks per day that cross the I-35 NB and SB bridges. Replacing both bridges will address ODOT's goal to reduce the number of bridges that do not meet current geometric design standards and traffic requirements. Since both bridges are at risk of becoming SD over the next inspection cycle, replacing the bridges would also address ODOT's goal to reduce the number of bridges at risk of falling into SD condition.

The I-35 SB Bridge (NBI 21708) over the BNSF railroad is a three span (75'-100-75') PC Beam bridge skewed 60 degrees. The bridge has an overall length of 250' with a 70' total deck width. The clearance is approximately 23' 1" over the existing rail line, which does not meet the ODOT recommended 23' 9" guidelines over the railroad. The bridge has a substructure rating of 6, superstructure rating of 7, and a substructure rating of 5. The total width of the bridge allows for a 68' clear roadway.

The I-35 NB Bridge over the BNSF/SLWC railroad is also a three span (75'-100-75') PC Beam bridge skewed 60 degrees. Similar to the southbound bridge, the clearance is approximately 23' 1" over the existing rail line. The bridge has a substructure rating of 7, superstructure rating of 7, and a substructure rating of 5. The total width of the bridge allows for a 68' clear roadway.

A 60-degree skewed double cell 2-10' x 6' Bridge sized Reinforced Concrete Box (RCB) drainage structure (NBI 14239) is located just south of the railroad bridges used to drain an existing railroad ditch that crosses under I-35. The box is approximately 250' long to accommodate 8 total driving lanes with a total roadway width of 136'. The box structure is approximately 22.6 in total width. The RCB currently has a fill height of 36'. The structure has a current culvert rating of 7 and a structural rating of 7.

Design Concept Development

Design Criteria

Design Criteria for the proposed features of this project are in accordance with the ODOT Roadway Design Manual and the 2018 AASHTO Geometric Design of Highways and Streets (Green book).

The following design criteria were utilized for the proposed design elements on the project:

Design Element	I-35 Mainline	Ramps
Criteria Reference	Table 12-1 ODOT Roadway Design Manaul	2018 Green Book
Design Speed (mph)	60 mph	40mph/60mph
Lane Width (ft)	12'	15' Single/ 12' Double
Shoulder Width (ft)	12'	4' Curbed/ 8' Non Curbed
Superelevation Max	Normal Crown - 2%	6%
Clear Zone (ft)	30'	30'

Evolution of the Oklahoma River Bridge Design Concepts

Three general designs were introduced at the onset of the study and through the stakeholder coordination process, variations of those concepts were introduced to meet the differing goals of the stakeholder groups. The project history in Appendix L provides a detailed account of how and why the bridge concepts were developed over the study history.

The study investigated using a five or six lane roadway section on I-35 in both the northbound and southbound direction. The existing I-35 section was four lanes across the bridges that accommodated two single lane ramps from I-40 and 2-lanes of I-235.

To accommodate the additional lanes, two general design options for increasing the capacity over the river were investigated:

1) utilize parallel bridges to carry additional lanes while leaving the existing 4-lane mainline bridges in place
2) or replace the existing mainline bridges with additional width.

Design Concepts

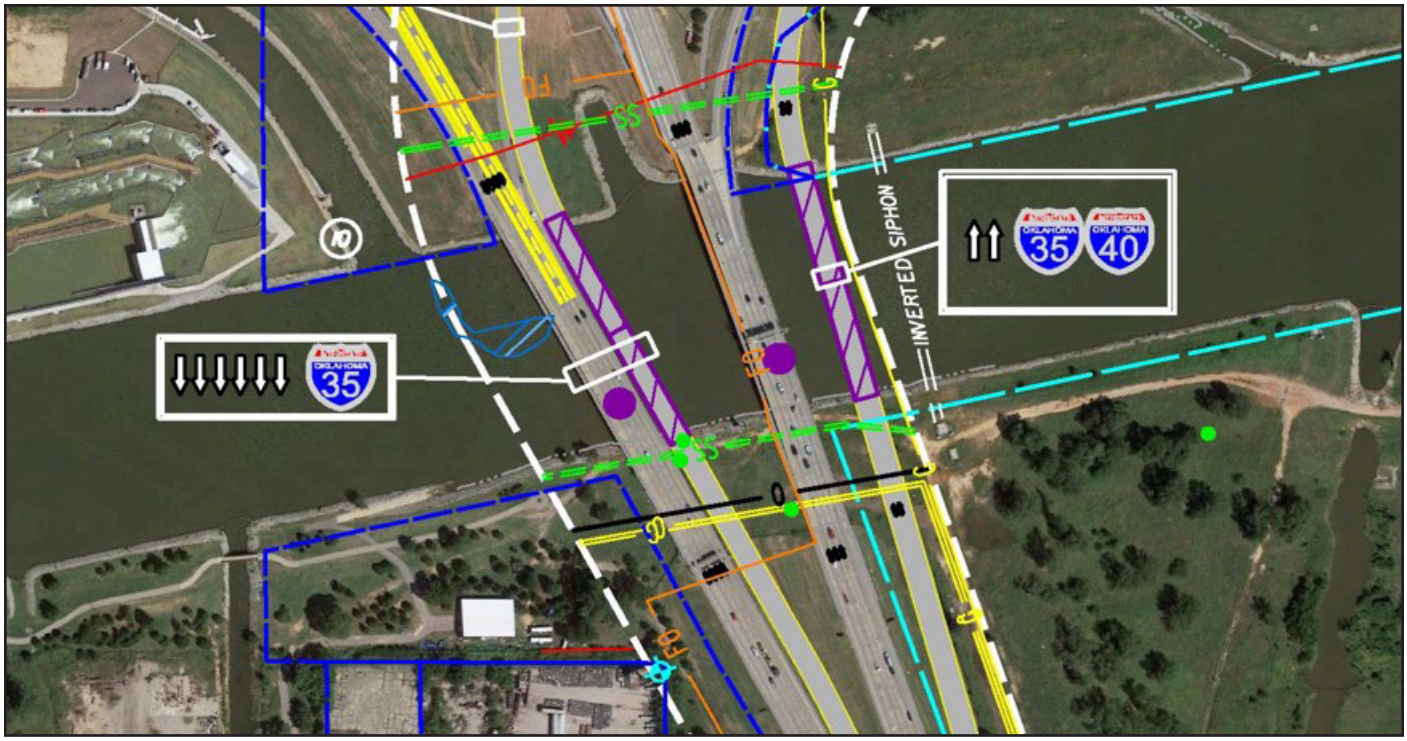
The original three study concepts developed for the capacity options included at the initial onset of the study were:

1. Concepts 1 & 2: Adding parallel bridges along the I-35 mainline bridges that carried two travel lanes

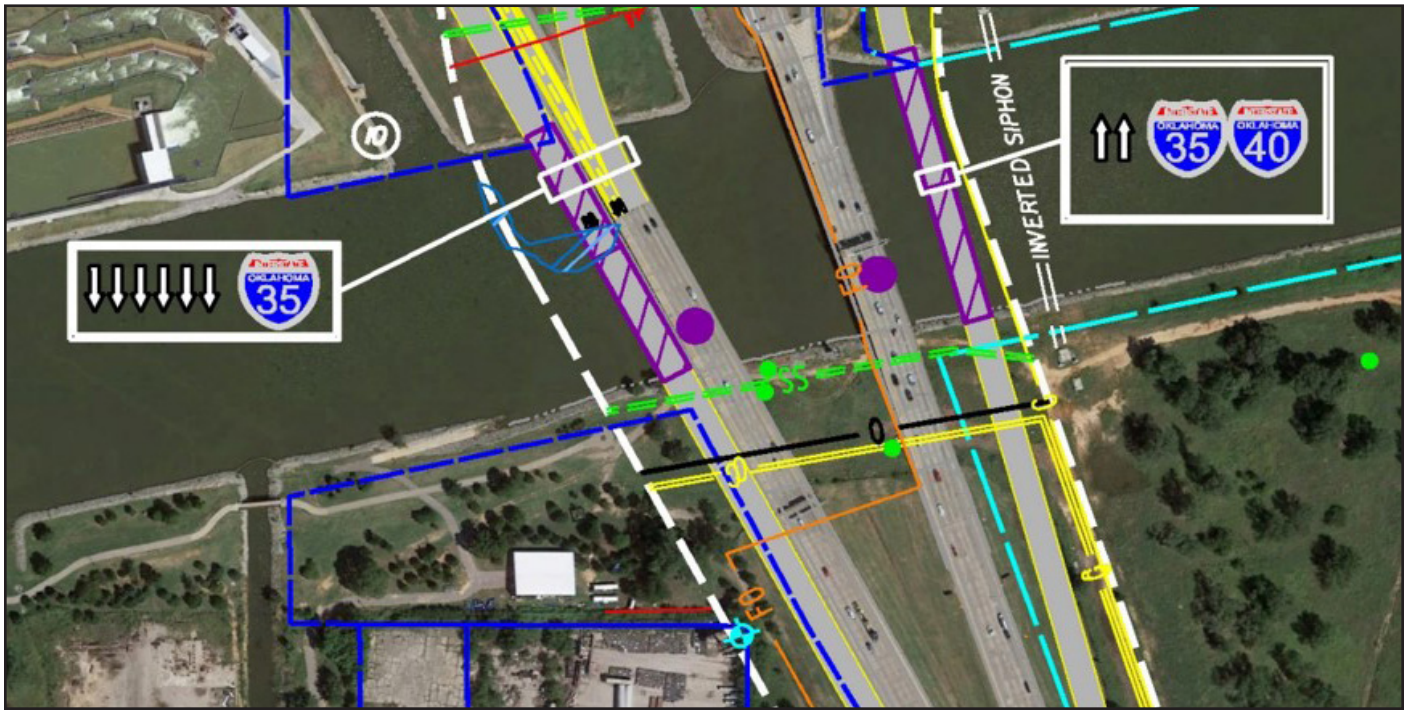
- 2 different configurations were developed that carried different ramp movements for I-35 Southbound
  - i. Concept 1 carried two lanes from the I-40 WB to I-35 SB on a parallel bridge offset to the east of the I-35 SB mainline bridge
  - ii. Concept 2 carried two lanes from I-235 SB on a parallel bridge offset to the west of the I-35 SB mainline bridge

2. Concept 3: Replacing the existing I-35 Northbound and Southbound mainline bridges with widened structures.

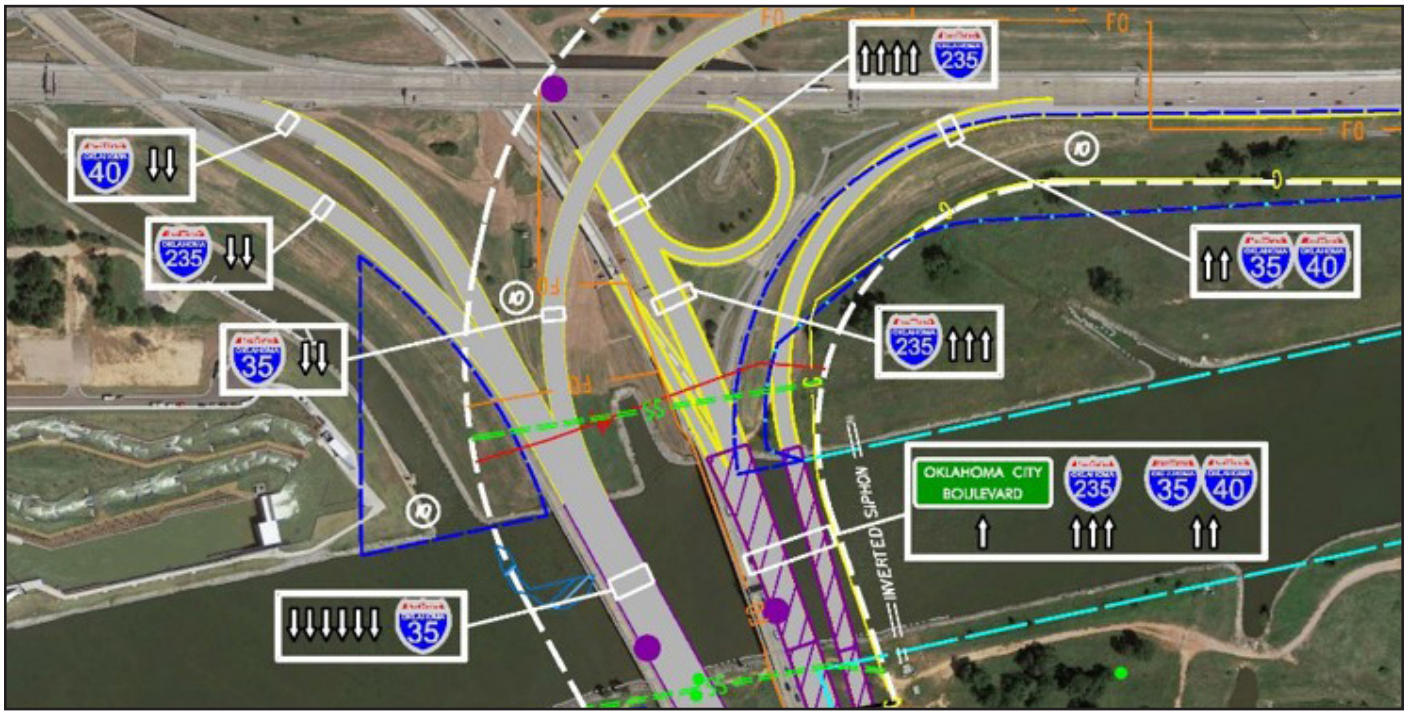
CONCEPT 1



CONCEPT 2



CONCEPT 3



Through extensive stakeholder discussion, Concept 3 was then advanced for further investigation for the following reasons:

- To avoid adding two additional ramp bridges in the river next to the existing mainline bridges.
  - The parallel bridges would require additional maintenance needs and could impact the future construction of new mainline bridges.
- The mainline bridges are aging and at-risk of being structurally deficient. Concepts 1 & 2 would keep the existing aging mainline bridges in place through the project.
- Concept 3 could implement a pier configuration needed to meet the spans required for upgrading the rowing race course.

After Concept 3 was deemed the preferred option, the study then progressed by investigating three pier spacing configurations:

1) Single span across the river from bank to bank with "No Piers" in the river– using an approximate 520' primary span over the river (Designated as 3.1 & 3.3)
2) A two-span bridge with a single pier centered in the river – A bridge configuration of 2 – 250' spans that included a pier centered in the river center and abutments on each river bank (Designated as 3.2)
3) A three-span bridge with two piers in the river with the primary span over a proposed 8- lane Class A rowing course including buffer zones – approximate 350' span (Designated 3.4 & 3.5)

Concept 3.1 –"No Pier in River" Concepts

The results of the study found that spanning the river from bank-to-bank required specialty long span structures. The 500+' span made the use of a more traditional steel beam bridge inefficient and difficult to construct. Preliminary analysis of the more traditional steel girder setup led to impractical bridge composite depths of over 20' in height. Structural members of this size can and cause extensive difficulties in fabrication, hauling, and placement.

A vertical profile was developed to determine if it was feasible to provide adequate clearance between the river surface and the bottom chord of the 20' tall beam structure while tying into the existing north abutment elevation. It was determined that it was unfeasible for a structure requiring that beam depth to be constructed without reconstructing significant portions of the interchange.

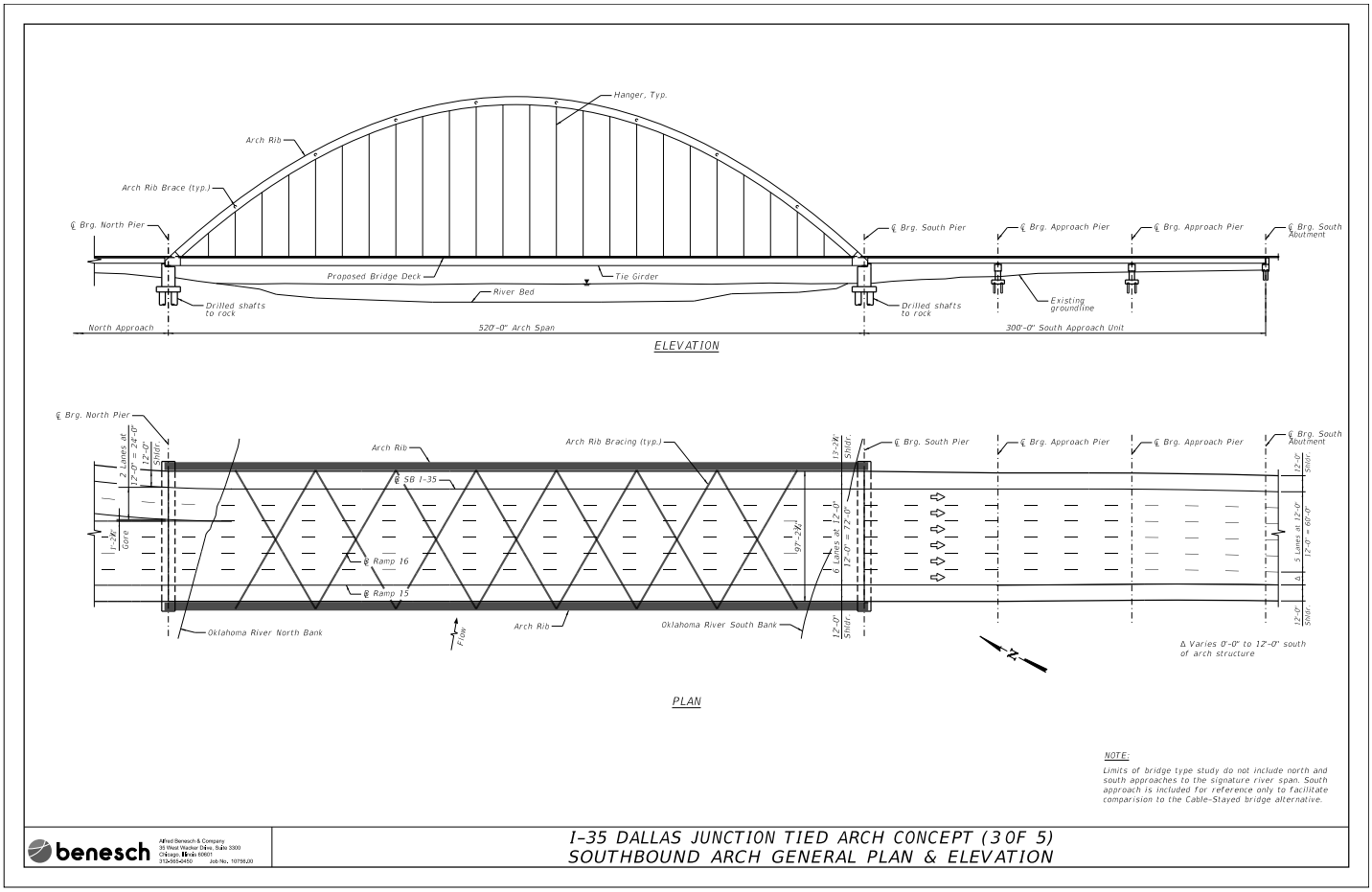
Concept 3.3 Long Span Specialty Bridge Study

Once a traditional bridge structure was deemed impractical to accommodate a "no-pier' in the river pier solution, specialty long span bridge structures were then considered. Two specialty bridges were identified for use based on the span lengths required to clear the river and tie in at the north bridge abutments. A Long Span Bridge Study was undertaken to identify the feasibility of the bridge types and determine costs and constructability issues for each bridge type.

The two long span specialty bridges identified for investigation within the Long Span Bridge Report were a tied arch and cable stayed bridges. The bridges were selected in regards to the span length needed to clear the river. The geometry for the I-35 NB ramp to I-40 EB ramp was modified so that the proposed specialty bridge structure could carry the ramp lanes next to the mainline travel lanes. Each of the proposed bridges were over 100' wide and spanned the 500' river bank to bank.

Although there was some initial positive feedback from the stakeholders for use of the specialty structures, concerns with high project costs and maintenance and construction complexities lead to identifying other solutions.

TIED ARCH GPE FROM BENESCH REPORT



A copy of the Long Span Bridge Study can be found in Appendix J.

Single Pier in River Concept

The two span (single pier in the river) configuration lowered the required beam depth and reduced constructability complications found with the single span configuration, but required the pier location to be centered within the proposed rowing course lanes. According to World Rowing regulations, no obstructions are allowed to be located within the racing lanes or a 5-meter perimeter on the outside of the race lanes. Since the pier location would restrict the ability to utilize the rowing course, this configuration was determined to be not feasible.

Two Piers In River to Span the Race Course – Preferred Solution

After the single and two span configurations were deemed not feasiblel, a two-pier configuration that using a three span continuous plate girder steel beam bridge was investigated. A continuous bridge was identified due to the ability to reduce the section depth of the primary span over the rowing course than if simple supported spans were used.

The three span continuous bridge utilizes a traditional steel girder beam setup with the primary span over a proposed race course. This type of bridge utilizes construction and maintenance practices that are more conventional than the specialty bridge types. Due to the economic, construction, and maintenance benefits, this bridge type and configuration was deemed the most prudent structure to move forward with development.

The three span continuous configurations required a 12' beam depth (13' composite) bridge section that ties at the location of the existing north abutment. The north abutment tie allows for minimal impacts to the other roadway segments withing the interchange. Vertical profiles were investigated with this bridge to ensure adequate river clearances.

Considerations for Upgrading the Oklahoma River to accommodate Class A Racing

According to World Rowing (FISA) regulations, requirements for Class A rowing racecourse include:

- Course must have 6-8 rowing lanes with 8 being the preferred.
- Waterway must be a minimum of 3 meters deep.
- There must be a 5-meter perimeter around the course with no obstructions within the perimeter.
- A minimum of 14' of vertical clearance is needed over the normal water surface elevation to allow for motorized boat traffic. (Non-regulation-requested by Riversport)

Two different pier configurations were looked at in accordance that met a preferred and minimum race course configuration:

- Concept 3.4 – Used a primary span based on a Class A sized 7 or 8 rowing lane courses depending on the chosen rowing lane widths. The 7-lane rowing course allowed for 13-meter rowing lane widths while the 8-lane course accommodated 12-meter widths.
- Concept 3.5 - Similar to Concept 3.4, it would replace the I-35 Mainline Bridges with a Traditional Bridge with two piers in the river, but the primary span would be reduced to accommodate the minimum number of lanes allowed (6) for a Class A course per rowing regulations.

Preferred Design Concept 3.4

Concept 3.4 was deemed the most practical solution due to constructability, maintenance and economic reasons while still meeting stakeholder needs. Although similar bridge types, Concept 3.4 was preferred over 3.5 due to meeting the preferred amount of rowing lanes which gives the most flexibility in usage of the course.

Proposed Bridge Features

The preferred Concept 3.4 includes the following design features:

- I-35 NB and SB bridges over the river and the I-35 NB ramp bridge to I-40 EB will utilize a three-span configuration on plate girder steel beams.
  - The two I-35 bridges will be approximately 820' long with a primary span extending approximately 350'.
  - Primary spans will be incorporated into the design to provide the necessary spacing to accommodate an 8 lane Class A rowing course. The primary span will include width for eight 12-meter lanes with a 5-meter buffer between the outer lanes and the piers.
  - A minimum of 14' vertical clearance was provided over the normal water surface elevation to allow for motorized boat traffic.
  - Bridge width for I-35 SB will be 96' to accommodate 6 lanes with 12' shoulders.
  - Bridge Width for I-35 NB will be approximately 72' wide (4 lanes with 12' shoulders).
  - 100 Year Storm Flood elevations were evaluated with the proposed bridges to ensure storm water elevations did not encroach on the bridge structure.
  - Both the NB and SB bridge horizontal and vertical geometries were tied as close as possible to the north abutments to reduce impacts to the interchange.
- A new I-35 NB to I-40 ramp bridge is proposed on an offset alignment east of the I-35 NB bridge.
  - Bridge widths for the parallel ramp bridge will be 42' to accommodate 2-lanes with 8' inside shoulders and 10' outside shoulders.
- Widening and deck and superstructure rehabilitation is included for the I-35 NB and SB bridges over the BNSF Railroad.
  - The current bridges are three span PC beam bridges that extend over three existing rail lines. It's anticipated that an additional beam line is needed to accommodate the wider bridge deck.
  - Rehabilitation efforts anticipated include joint rehabilitation, deck replacement, patching areas of spalling on the substructure as well as other efforts.
- Extension of a Two Cell 10'x 6' Reinforced Concrete Box in both the upstream and downstream end sections are anticipated. Total anticipated extension is approximately 20' per side.
  - Construction of new headwalls, wingwalls, aprons, and curtain walls will be included with the barrel extensions.
  - The RCB structure is currently rated as a 7, some minimal rehabilitation measures may also be included.
- Modifications to slope walls under the 15th Street and Carter Drive bridges are anticipated to accommodate a widened I-35 SB roadway section

See Appendix C for the Preferred Concept Bridge GP&E's.

Retaining Wall Improvements

Mechanically Stabilized Earth (MSE) walls were located along the exterior perimeter of both the I-35 NB and SB mainlines to assist in minimizing the amount of right-of-way acquisition required for the project. Also, MSE walls will be used to tie to the I-35 river bridge's vertical abutments so the alignment of the existing Oklahoma River trail crossing underneath will not require extensive alteration. At SE 15th, existing retaining walls between the I-35 SB entrance and exit ramps will require reconstruction due to ramp realignment.

A total retaining wall length of 5720' with an overall retaining wall cost of approximately $4.2M was determined.

Retaining wall locations were identified and tabled in Appendix D.

Multimodal Bridge and Ramps
Since the I-35 river bridge the stakeholder meetings in 2021 and 2022, ODOT and its local partners and community stakeholders have emphasized broadening the project's scope beyond replacing and rehabilitating the I-35 bridges and roadways to address local and non-motorized transportation challenges.

Currently, the Oklahoma River is a barrier for local residents to access jobs, healthcare, shopping, and events on the Oklahoma River. According to US Census data, over 20% of households near the project area do not have access to a vehicle. As a result, the project includes a separate multimodal bridge that reflect priorities in Oklahoma City's regional transportation plans.

To connect the multimodal bridge to the Oklahoma River Trail system, ADA-compliant ramps will branch off the existing Oklahoma River trail to provide pedestrians and cyclists access to the multimodal bridge. Vertical abutments will be used at the north bank for each bridge to allow adequate clearance and spacing for the trail to run under the bridge. MSE walls will be used to tie to the vertical abutments so that the alignment of the existing trail will not require extensive alteration.

It's anticipated that handrailing will be used along the extent of the paths under the bridges on both banks of the river to deter pedestrians from straying toward the I-35 traffic. Lighting and other aesthetic enhancements will be provided on the multimodal bridge and along the trail pathway to enhance the user experience and provide additional safety.

The multimodal trail will be developed using a coordinated partnership between the stakeholder groups.

Roadway Improvements

I-35 Mainline Improvements
The existing I-35 section is a full access-controlled 10-lane facility that narrows to a 6-lane facility by SE 15th Street. The roadway has a varying width open median that closes at the I-35 SB exit ramp's physical gore southward. The closed median width is approximately 24' wide with a median barrier separating the lanes. Both I-35 NB and SB carries five 12' lanes with 10' outside shoulders that then taper to 3 lanes between the river and SE 15th street.

The pavement is a Dowell Jointed PC Concrete section through the northern extent of the project. At the SE 15 Street exit physical nose, the pavement then transitions to Continuously Reinforced Concrete Pavement through the remainder of the southern extent.

The proposed improvements to the roadway include new paving from the I-40 ramp tie ins to I-35 to SE 25th St. Also included are widening of the existing 10' shoulders to 12' Updated signage and pavement markings are also anticipated.

Dallas Junction Proposed Roadway Design							
Design Element	**I-35 SB**	**I-35 NB**	**I-35 NB to I-40 EB Parallel Ramp**	**Oklahoma Boulevard Ramp**	**I-235 SB to I-35 SB**	**I-40 EB to I-35 SB Parallel Ramp**	**I-40 WB to I-35 SB Parallel Ramp**
Criteria Reference							
Design Speed (mph)	60 mph	60 mph	45 mph	45 mph	60 mph	50 mph	45 mph
Exist Design Speed (mph)	60 mph	60 mph	45 mph	45 mph	60 mph	50 mph	50mph
Number of Travel Lanes	6	4	2	1	2	2 (1 Optional)	2
Lane Width (ft)	12'	12'	12'	15'	12'	12' (15' Optional)	12'
Shoulder Width (ft)	12'	12'	8' Inside/10' Outside	4' Inside/10' Outside	10'	4' Inside/8' Outside	4' Inside/10' Outside
Superelevation Max	6%	6%	6%	6%	6%	6%	6%
Normal Crown	2%	2%	2%	2%	2%	2%	2%
Clear Zone (ft)	30'	30'	30'	30'	30'	30'	30'

Fourth Lane through SE 15th Street Lane Drop

The preferred design concept projects an additional 4th lane through the SE 15th Street bridges. The I-35 corridor is currently three lanes from SE 15th to the Crossroads Interchange.

To accommodate the additional width needed for the lane through SE 15th St., modifications to the slope wall under the SE 15th Street bridge will be required. A typical section was developed to show the reconstruction efforts:

See Appendix C for SE 15th Street Typical.

The 4th lane is proposed to be ended south of the SE 15th Street bridge to meet the existing I-35 three lane section. Due to the close proximity of the ramps and bridge structures, three options are presented to account for the lane drop:

1. Keep 4-lanes through the SE 15th Street and drop one lane at the SE 25th St. exit. This option utilizes a taper ramp for the SE 15th Street Entrance ramp directly into the outside I-35 SB mainline. Motorists in the I-35 SB outside lane would need to merge one lane to stay on the I-35 through movement in close proximity to where the 15th Street entrance ramp would be tying to the mainline.

   This option has concerns with weaving due to the close proximity of the SE 25th Steet Exit Ramp (less than 975' between painted gores). Currently an auxiliary lane exists between the two ramps that would be removed to provide room for the fourth lane width.

2. Keep 4 lanes through the 15th Street overpass and close the SE 15th Street Entrance Ramp. An outside lane drop would occur at the 25th Street Exit ramp. Vehicles wanting to enter I-35 SB from SE 15th would need to travel south on the existing I-35 Service Road to the SE 25th Street Entrance ramp.

3. Keep 4-lanes through 15th Street and with an auxiliary lane (5th lane) under the Carter Drive bridge and drop the 5th lane at the SE 25th Street Exit ramp. Add a merging taper to the outside lane of the SE 25th Street to taper in the outside fourth lane to three. The merging taper could accommodate a 70-mph taper (840") and taper out prior to the SE 29th Street overpass.

   This option would require similar modifications under the Carter Drive bridge as those to the 15th street bridge. Currently, the roadway section at Carter Drive bridge is 77' wide from retaining wall face to center of median barrier. The outside shoulder is 10' to a curb with an additional 8' to the face of barrier. This would require reducing the outside shoulder to approximately 4' with a barrier placed at the face of retaining wall or reconfiguring the lanes to utilize some of the inside shoulder.

5 lanes from I-35 Southbound River Bridge to SE 15th Street

Due to concerns with the weaving on I-35 Southbound, one discussion point has been to keep 5-lanes across the I-35 SB bridge and dropping one lane at the SE 15th Street exit ramp. The mainline would then continue four lanes southward through the SE 15th Street bridge. This would eliminate one of the merging movements that currently exist on I-35 SB between the river bridges and SE 15th St. Currently, the roadway tapers from 5 lanes to 3, with the tapers occurring on both the outside and inside lanes.

One concept would be to reconstruct the I-35 SB bridge to accommodate the width for six lanes but stripe only five lanes across the bridge. This option includes widening the I-40 EB to I-35 SB ramp for a future two lane width but striping out only a single lane.

The striping configuration for the bridge can be found in Appendix C.

Utilities

Utility information was obtained and provided during the reconnaissance phase of the project and surface located during the survey phase of the project. The utility companies and descriptions of facilities located in the project area are listed in Appendix F. Based on the surveyed location of the of those facilities, the utility tables indicate whether the utility is anticipated to be impacted by the project.

There were 17 utilities identified to be impacted by the project, including Fiber Optic, High Pressure Gas Lines, Sanitary Sewer and Water mains, and Overhead Electric. Multiple billboards and trade fixture information sites are also located within the I-35 and I-40 corridor. Potential utility relocations were identified for the concepts and noted in the utility tables and Right-of-Way and Utility Maps.

See Appendix F for Utility Impact tables and map locations.

Drainage and Hydraulics

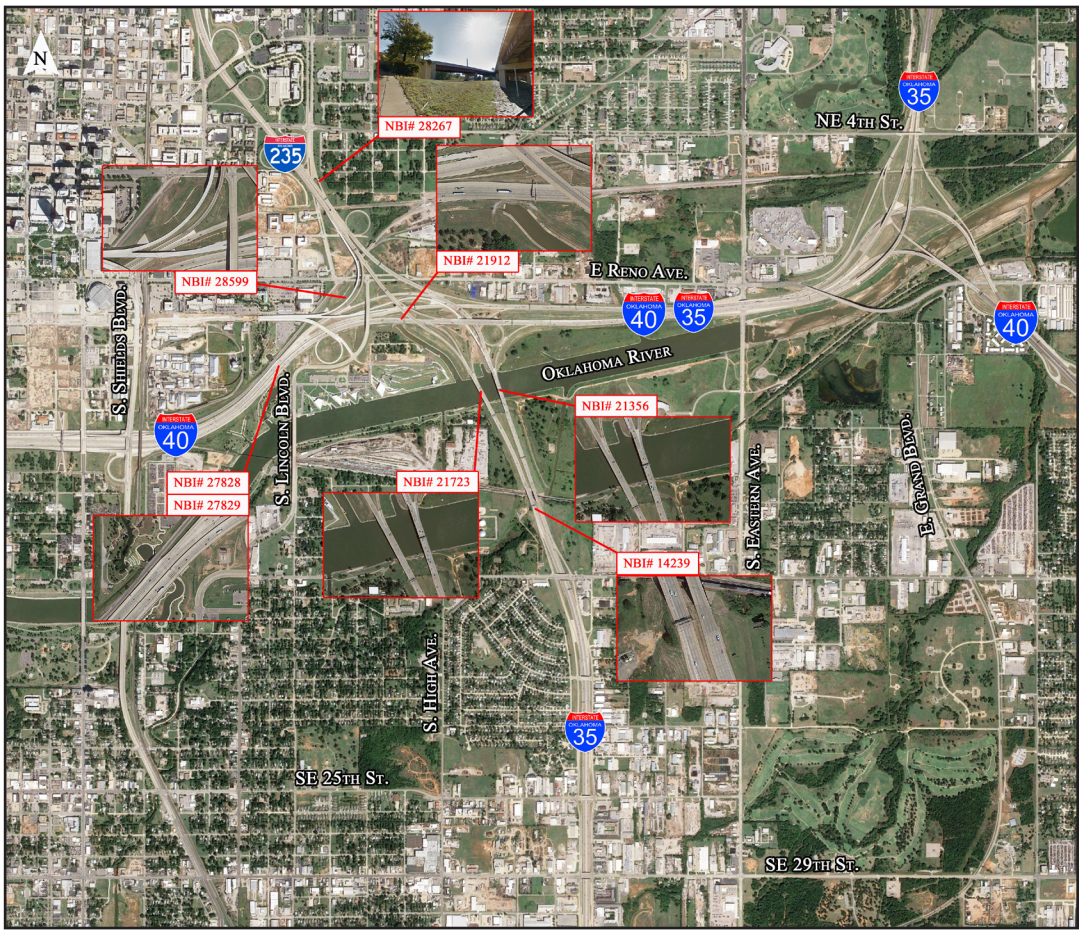
Existing interchange drainage for the most part is carried in open ditches and cross drain piping and RCB structures. In general, storm water runoff flows toward the Oklahoma River, in the approximate center of the study area.

Approximately 0.25 miles south of I-35 at the Oklahoma River, a drainage ditch approaches I-35 from the west. The drainage ditch is a designated blueline, but stops prior to reaching the project area. It crosses under I-35 via culvert (NBI # 14239) and continues northeast to the Oklahoma River, where it outfalls. There is also a large canal that runs parallel to the I-35 SB to the immediate north of the Oklahoma River, where it outfalls. There are two local drainage ditches on the north bank of the Oklahoma River, where they outfall, approximately 250-foot and 750-foot west of I-35.

There are 2 primary drainage areas associated within the study area, particularly associated with two bridges, that are identified in the reconnaissance report:

- NBI 21356 & NBI 21723: 6,468,736 Acres (10,107.4 sq. miles) with an additional NRCS Controlled Area of 8,576 Acres (13.4 sq. miles) for a total drainage area of 6,640,160 Acres (10,094.0 sq. miles).

DRAINAGE LOCATIONS



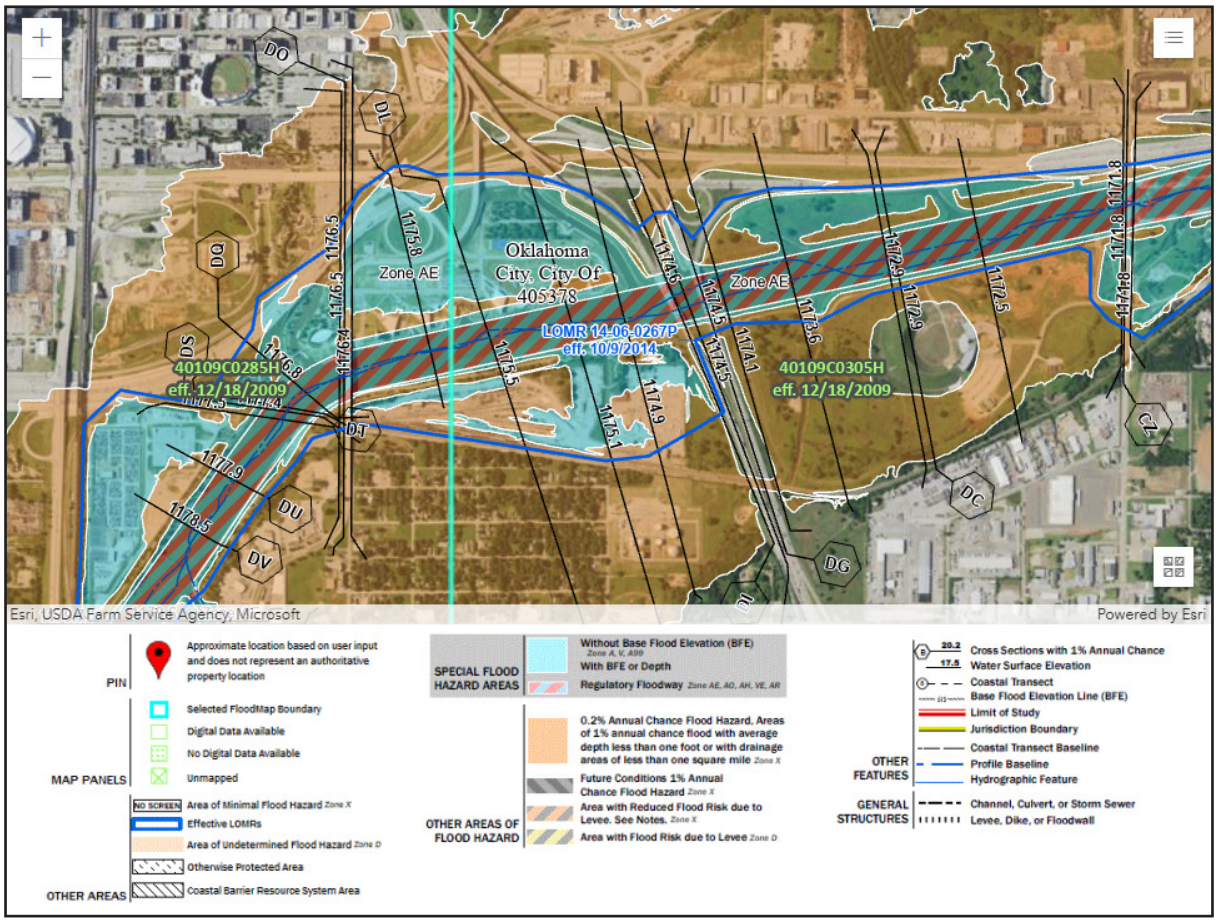
See Appendix I for Hydraulic Data.

A hydraulic study of the Oklahoma River is in progress. The Oklahoma River is a controlled facility with a dam and lock system. The normal water elevations at each dam location were provided by the City of Oklahoma City River Authority and a normal water elevation under the Oklahoma River bridges determined. The normal water elevation was utilized to determine vertical clearance information at the bridges.

Water surface elevations for a 100-Year Storm rise were also used to verify bridge beam clearance. The water elevations were determined from FEMA flood plain maps and verified by the hydraulics engineer as part of the study. The Oklahoma River is a regulatory floodway with a Zone AE designation. The flood boundary extends to the areas between I-40 north of the riverbanks and sections of the study area west of I-35 between SE 15th and the river. The area has an effective letter of map revision (LOMR) to revise the flood elevations.

Dam locations on the river are found downstream of the project site at Eastern Ave. approximately 0.85 mile east of the project site (Dam OK 2 22 89) and 1.8 miles upstream west of the Walker Ave. bridge (Dam OK 3 02 64).

FEMA FLOODPLAIN MAP



Environmental Impacts

A reconnaissance level environmental research effort was conducted for the project area. The majority of the proposed improvements would remain in the existing I-35 right-of-way but would require construction efforts within the Oklahoma River. The potential for impacts for environmental resources is high. The widening of the bridges in the Oklahoma river would require additional drilling within the river. There is a potential for fill to be required within the ordinary high-water mark of the river, which would require a Section 404 permit from the US Army Corps of Engineers.

Cultural Resources
No eligible National Register of Historic Places (NRHP) structures or properties have been identified within the project area.

A public trail system (Oklahoma River Trails) has been extended under the Oklahoma River bridges and are the only designated public recreation facilities within the study area.

There were no military, Oklahoma Turnpike Authority (OTA), parcels within the study area.

Tribal Property
There are two parcels within the study area designated as tribal ownership. The parcel's ownership is affiliated with the Chickasaw Nation (156 Ac.) and hold the American Indian Cultural Center and Museum. The parcel is adjacent to the I-35 NB roadway on the east, stretching from the Oklahoma River to SE 15th Street.

Archaeological Sites
No archaeological sites were identified within the project action area.

Cemeteries
No cemetery sites were identified within the project action area

Potentially Jurisdictional Streams and Wetland Areas
Based on desktop research, two potential jurisdictional wetland areas are identified through the reconnaissance report, US Fish and Wildlife Service, and US Geological Survey data.
Using visual assessment and the National Wildlife Inventory maps, the following features were observed within the project area.

- Oklahoma River (North Canadian River)
- One (1) mapped intermittent stream
  - Blueline stream crossing I-40 between Dallas Junction and Eastern Ave.
- Three Unmapped, potentially jurisdictional features in the following locations
  - SW Quarter of Sec. 2, Township 11 North, Range 3 West
  - NW Quarter of Sec. 2, Township 11 North, Range 3 West
  - NE Quarter of Sec. 2, Township 11 North, Range 3 West
- Riverine Wetland System (R2USC) within the Oklahoma River. This feature is associated with a sandbar within the channel.

The wetland areas in closest proximity to the project area are outside of the existing right-of-way at the upstream and downstream end of the Double 10'x6' RCB structure. The project is not anticipated to impact either of the wetland areas. The wetland areas can be found in the environmental maps found in Appendix H.

Hazardous Waste and Petroleum Storage Tank Facilities
There are several sites within close proximity to the I-35 corridor known to store hazardous materials. There are heavy industrial areas around Reno Ave. north of I-40, Eastern Ave. east of I-35, and the areas west of I-35 and north of SE 15th street. No soil or groundwater testing were conducted to date. Hazardous waste data was delivered from the reconnaissance report from OCC, EPA, and ODEQ records.

However, because minimal right-of-way acquisition is anticipated, impacts to these sites will be avoided.
Other sites are known to have (now or in the past) underground petroleum storage tanks, some of which had documented releases. These sites have a greater potential to affect the project, as underground mitigation could migrate within the right-of-way.

The sites include the following:

- Hazardous Sites – Fourth Street Abandoned Refinery, 200 Block NE 4th
- Hazardous Sites – Consolidated Freightways, 1400 SE Skyline Dr.
- LUST (Leaking Underground Storage Tanks) Sites – 18 in Study Area
  - 9 off of E. Reno Ave.
  - 8 Sites off of SE 15th & Skyline Drive East of I-35
- UST (Underground Storage Tanks) – 19 in Study Area

Environmental Information is included in Appendix H.

Impaired Waters
The Oklahoma River (North Canadian River) is the only impaired waterbody found within the project area. The waterbody was identified as containing DO (dissolved oxygen) and Enterococci bacteria in a 2020 303d Waterbody study. A total maximum daily load (TMDL) was completed in 2014. All waters within the project study area drain directly into the Oklahoma River.

No sensitive waters for Federal and State listed species are located within Oklahoma County.

Listed Species, Migratory Birds and Critical Habitat
The following species are listed for Oklahoma County according to the US Fish and Wildlife Service and the Oklahoma National Heritage Inventory.

- Piping Plover (Threatened) - None in Study Area
- Whooping Crane (Endangered) – None in Study Area
- Interior Least Tern (Endangered) – None in Study Area
- Arkansas River Shiner (Threatened) – None in Study Area

The report to date shows that there is little impact anticipated by the project on the above species. According to the Oklahoma National Heritage Inventory, no documented occurrences of federally listed species have been recorded within the project study area or immediate vicinity.

Environmental Permits and Reviews

ODOT will apply for NEPA approval from FHWA Oklahoma Division to construct the Project once preliminary plans have been approved tentatively scheduled for Spring 2025.

For this project, a Documented Categorical Exclusion (DCE) is the anticipated level of analysis to obtain environmental clearance for this Project. A Section 4F statement will be required for the multimodal bridge since it connects to existing trails, but since it is an enhancement to those facilities ODOT is not anticipating any conflicts with this improvement. The NEPA documents are anticipated to include a biological assessment, a cultural resources survey, an initial site assessment for hazardous waste, a detailed noise study, and a socioeconomic and environmental justice review.

Access Justification Report (AJR)
The project is modifying access in an interstate-to-interstate system interchange; therefore, an AJR is anticipated to be required. ODOT has extensive experience working with FHWA on these types of documents. If required, the AJR process would initiate at 30 percent Preliminary Design stage and be completed before the 60 percent Preliminary Design Plan submittal.

Section 404 Permitting
The project is anticipated to require Section 404 permitting. Permits for this project are expected to fall under Nationwide Permit 14. The United State Army Corps of Engineers (USACE) is familiar with ODOT's efforts and expectations within the I-35 and I-40 corridors. ODOT has agency liaisons in place at the USACE, which accelerate and improve the consistency of permitting reviews.

Right-of-Way Acquisition and Relocation Plan
Relocations will not be required for this Project. The right-of-way acquisitions are identified in the appendices. All right-of-way acquisitions will be completed according to the Uniform Relocation Act and applicable regulations.

Public Engagement

ODOT has performed preliminary stakeholder engagement in the early concept development for this Project. ODOT initially presented the project to key stakeholders in 2016 and then reinitiated stakeholder engagement in 2022 as part of the preliminary engineering study. The 2016 meeting presented three I-35 bridge concepts for spanning the Oklahoma River. After years of concept development, two additional stakeholder meetings were held in 2022 to confirm the feasibility of the concepts and receive feedback. Follow up stakeholder meetings were conducted in 2023 to finalize the bridge aesthetics and discuss funding partnerships with the City of Oklahoma City. The public engagement will follow the ODOT Public Involvement Plan (PIP) and include features of meaningful public involvement identified in U.S. DOT's Promising Practices for Meaningful Public Involvement in Transportation Decision-making.

State and Local Approvals

The Project is currently programmed in ODOT's Eight-Year Construction Work Plan and construction is scheduled in 2028 (JP Number 30444(04)). Preliminary meetings with the City of Oklahoma City have been held to review the bridge concepts and funding commitments. The Project has widespread community support.

Right-of-Way Impacts

The limits of the grading for each concept's proposed improvements were designed to minimize right of way acquisition. Right-of-Way acquisition is anticipated along the I-35 corridor for each of the build concepts, specifically along the I-35 Northbound interchange to I-40 EB. The maximum anticipated right-of-way acquisition for Concept 3.4 is 5.8 Ac.

Anticipated areas of acquisition for each of the concepts have been identified and shown on maps found within Appendix I. There are a number of utilities located within the project limit which may be relocated outside of the existing right-of-way that will require easements.

Suggested Sequence of Construction and Maintenance of Traffic

Each of the alternatives were evaluated for constructability issues and durations. Each concept consisted of constructing an interstate facility over the Oklahoma River extending through the SE 25th Street entrance ramp.

In general, the suggested sequence of construction will leave traffic on existing mainline lanes for as long as possible. Bridge sections and interchange ramps will be constructed pieces at a time. Temporary widening or low speed ramp detours will be required to construct the ramps in phases, allowing for minimal closure time. Short-term ramp closures will typically be needed at ramp tie-ins to the mainline.

Long term closure times are anticipated to reconstruct the ramp tie-in for the Oklahoma City Boulevard ramp.

Construction of the bridges and the I-35 mainline will be accomplished with significant impact to existing traffic. The phasing developed utilizes two (2) lanes of traffic being maintained on the mainline throughout the project. It's anticipated that four construction phases will be needed to construct the Oklahoma River bridges.

The maintenance of traffic and bridge phasing drawings are illustrated in Appendix G.

An approximate construction duration for each bridge was determined for each bridge to determine an approximate project length.

The approximate construction durations for each section are shown below. The construction days were determined by using production rate charts separately for each bridge structure. The general phasing of the bridges is shown independently but all of the I-35 bridges can be built concurrently.

- I-35 NB Bridge Construction – 515 Days
- I-35 SB Bridge Construction – 735 Days
- I-35 NB Ramp to I-40 EB River Bridge – 310 days

Cost Estimates

Cost estimates were completed for each of the design concepts. For the purposes of this report, the cost estimate included is for the preferred option only.

The preferred design concept cost estimate breakdown can be found in the Appendix E.

APPENDIX A -
Traffic Analysis

OKLAHOMA Transportation

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I-35/I-40/I-235 Dallas Junction OKC Preliminary Lane Capacity Analysis

Summary

Thirty-three (33) points throughout the subject interchange were analyzed for lane capacity using equation 12-9 from the Highway Capacity Manual (HCM) and evaluated based on Level of Service (LOS) according to Exhibit 12-37 from the HCM during the AM and PM peak hours. The number of lanes of each segment includes auxiliary lanes or lanes that exit downstream of the segment for simplicity, so results may be slightly generous compared to a more in-depth analysis. Additionally, each segment was analyzed individually in a vacuum, so queueing and congestion impacts on upstream segments are not accounted for. An annual growth rate of 1.5% was used to determine 2035 and 2050 design traffic volumes. Results for each design year are presented in list and table format.

The thirteen (13) locations identified in the 2020 & 2050 analyses should be considered higher priority for lane modifications while the additional five identified in the 2035 analysis should be considered lower priority. Lane recommendations are based on preliminary data only and should be analyzed further before commitment to design.

The following is a list of each of the 33 analyzed points and their descriptions. Point L was omitted because it is not located on a highway or ramp.

- Point A: I-235 SB Mainline north of the interchange
- Point B: I-235 SB Mainline immediately after the OKC Blvd. exit and before the I-40 WB exit
- Point C: I-235 SB ramp to OKC Boulevard
- Point D: I-235 SB Mainline after the I-40 WB exit and before the I-40 EB exit
- Point E: I-235 SB to I-40 WB ramp
- Point F: I-35 NB to I-40 WB ramp
- Point G: I-40 WB Mainline before the SB I-235/NB I-35 on ramp
- Point H: I-40 WB Mainline west of the interchange
- Point J: I-40 EB Mainline west of the interchange
- Point K: OKC Boulevard ramp onto I-40 EB
- Point M: I-40 EB Mainline before the I-35 SB off ramp
- Point N: I-40 EB Mainline after the I-35 SB off ramp and before the I-235 SB on ramp
- Point O: I-235 SB Mainline before the I-40 EB on ramp
- Point P: I-40 EB to I-35 SB Ramp
- Point Q: I-235 SB Mainline after the I-40 EB on ramp and before the I-35 SB/I-40 WB ramp
- Point R: I-35 SB Mainline south of the interchange
- Point S: I-35 NB Mainline south of the interchange

- Point T: I-40 WB to I-35 SB ramp
- Point U: I-235 NB Mainline after the I-35 NB/I-40 EB exit
- Point V: I-35 NB to I-40 WB ramp
- Point W: I-35 NB to I-40 EB ramp
- Point X: I-40 EB Mainline after the I-235 NB off ramp and before the I-35 NB on ramp
- Point Y: I-40 EB Mainline east of the interchange
- Point Z: I-40 WB Mainline east of the interchange
- Point AA: I-40 EB to I-235 NB ramp
- Point AB: I-40 EB Mainline after the I-235 SB on ramp and before the I-235 NB off ramp
- Point AC: I-40 WB Mainline after the I-35 SB off ramp
- Point AD: I-235 NB Mainline after the I-40 EB on ramp and before the I-40 WB exit
- Point AE: I-40 WB to I-235 NB Ramp
- Point AF: I-235 NB Mainline after the I-40 WB exit and before the I-40 WB on ramp
- Point AG: I-235 SB to I-40 EB Ramp
- Point AH: I-40 WB off ramp to OKC Boulevard
- Point AJ: I-235 NB Mainline north of the interchange

2020 Design Traffic

The following points on the I-35/I-40/I-235 Dallas Junction in Oklahoma City were marked as areas of concern based on 2020 design traffic data, having either an AM or PM peak hour LOS D or worse. Lane recommendations are provided based on the number of lanes needed to obtain **LOS C** or better for both AM and PM peak hours. These results are summarized in Table 1 in the Analysis Results Summary.

- Point A: I-235 SB Mainline north of the interchange
  - LOS C/E
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 6
- Point B: I-235 SB Mainline immediately after the OKC Blvd. exit and before the I-40 WB exit
  - LOS C/E
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 6
- Point D: I-235 SB Mainline after the I-40 WB exit and before the I-40 EB exit
  - LOS C/E
  - 3 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 5
- Point E: I-235 SB to I-40 WB ramp
  - LOS B/D
  - 1 lane existing
  - Number of lanes required to obtain LOS C or better for both peaks: 2
- Point O: I-235 SB Mainline before the I-40 EB on ramp

  - LOS C/F
  - 2 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 4
- Point Q: I-235 SB Mainline after the I-40 EB on ramp and before the I-35 SB/I-40 WB ramp
  - LOS C/E
  - 3 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 5
- Point R: I-35 SB Mainline south of the interchange
  - LOS C/D
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 5
- Point S: I-35 NB Mainline south of the interchange
  - LOS D/C
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 5
- Point U: I-235 NB Mainline after the I-35 NB/I-40 EB exit
  - LOS E/C
  - 3 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 5
- Point AA: I-40 EB to I-235 NB ramp
  - LOS D/B
  - 1 lane existing
  - Number of lanes required to obtain LOS C or better for both peaks: 2
- Point AD: I-235 NB Mainline after the I-40 EB on ramp and before the I-40 WB exit
  - LOS E/B
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 6
- Point AF: I-235 NB Mainline after the I-40 WB exit and before the I-40 WB on ramp
  - LOS F/B
  - 3 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 5
- Point AJ: I-235 NB Mainline north of the interchange
  - LOS E/C
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 6

2035 Design Traffic

The following points on the I-35/I-40/I-235 Dallas Junction in Oklahoma City were marked as areas of concern based on 2035 design traffic data, having either an AM or PM peak hour LOS D or worse. Lane recommendations are provided based on the number of lanes needed to obtain **LOS C** or better or to maintain **LOS D** or better for

both AM and PM peak hours. Highlighted items are newly identified problem points compared to the 2020 analysis; these additional points are considered lower priority. These results are summarized in Table 2 in the Analysis Results Summary.

- Point A: I-235 SB Mainline north of the interchange
  - LOS C/F
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 7
  - Number of lanes required to obtain LOS D or better for both peaks: 6
- Point B: I-235 SB Mainline immediately after the OKC Blvd. exit and before the I-40 WB exit
  - LOS C/F
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 7
  - Number of lanes required to obtain LOS D or better for both peaks: 6
- Point D: I-235 SB Mainline after the I-40 WB exit and before the I-40 EB exit
  - LOS C/F
  - 3 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 5
  - Number of lanes required to obtain LOS D or better for both peaks: 4
- Point E: I-235 SB to I-40 WB ramp
  - LOS B/E
  - 1 lane existing
  - Number of lanes required to obtain LOS C or better for both peaks: 2
  - Number of lanes required to obtain LOS D or better for both peaks: 2
- Point J: I-40 EB Mainline west of the interchange
  - LOS C/D
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 5
  - Number of lanes required to obtain LOS D or better for both peaks: 4
- Point O: I-235 SB Mainline before the I-40 EB on ramp
  - LOS C/F
  - 2 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 4
  - Number of lanes required to obtain LOS D or better for both peaks: 4
- Point P: I-40 EB to I-35 SB Ramp
  - LOS C/D
  - 1 lane existing
  - Number of lanes required to obtain LOS C or better for both peaks: 2
  - Number of lanes required to obtain LOS D or better for both peaks: 1
- Point Q: I-235 SB Mainline after the I-40 EB on ramp and before the I-35 SB/I-40 WB ramp
  - LOS C/E
  - 3 lanes existing

  - Number of lanes required to obtain LOS C or better for both peaks: 5
  - Number of lanes required to obtain LOS D or better for both peaks: 4
- Point R: I-35 SB Mainline south of the interchange
  - LOS C/D
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 6
  - Number of lanes required to obtain LOS D or better for both peaks: 5
- Point S: I-35 NB Mainline south of the interchange
  - LOS D/C
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 6
  - Number of lanes required to obtain LOS D or better for both peaks: 5
- Point U: I-235 NB Mainline after the I-35 NB/I-40 EB exit
  - LOS E/C
  - 3 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 6
  - Number of lanes required to obtain LOS D or better for both peaks: 5
- Point Z: I-40 WB Mainline east of the interchange
  - LOS D/C
  - 5 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 6
  - Number of lanes required to obtain LOS D or better for both peaks: 5
- Point AA: I-40 EB to I-235 NB ramp
  - LOS D/B
  - 1 lane existing
  - Number of lanes required to obtain LOS C or better for both peaks: 2
  - Number of lanes required to obtain LOS D or better for both peaks: 2
- Point AD: I-235 NB Mainline after the I-40 EB on ramp and before the I-40 WB exit
  - LOS E/B
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 7
  - Number of lanes required to obtain LOS D or better for both peaks: 6
- Point AE: I-40 WB to I-235 NB Ramp
  - LOS D/C
  - 1 lane existing
  - Number of lanes required to obtain LOS C or better for both peaks: 2
  - Number of lanes required to obtain LOS D or better for both peaks: 1
- Point AF: I-235 NB Mainline after the I-40 WB exit and before the I-40 WB on ramp
  - LOS F/B
  - 3 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 6

  - Number of lanes required to obtain LOS D or better for both peaks: 5
- Point AG: I-235 SB to I-40 EB Ramp
  - LOS C/D
  - 1 lane existing
  - Number of lanes required to obtain LOS C or better for both peaks: 2
  - Number of lanes required to obtain LOS D or better for both peaks: 1
- Point AJ: I-235 NB Mainline north of the interchange
  - LOS E/C
  - 4 lanes existing
  - Number of lanes required to obtain LOS C or better for both peaks: 7
  - Number of lanes required to obtain LOS D or better for both peaks: 6

2050 Design Traffic

The following points on the I-35/I-40/I-235 Dallas Junction in Oklahoma City were marked as areas of concern based on 2050 design traffic data, having either an AM or PM peak hour LOS F. Lane recommendations are provided based on the number of lanes needed to obtain **LOS E** or better for both AM and PM peak hours. These are the same points identified in the 2020 analysis. These results are summarized in Table 3 in Analysis Results Summary.

- Point A: I-235 SB Mainline north of the interchange
  - LOS D/F
  - 4 lanes existing
  - Number of lanes required to obtain LOS E or better for both peaks: 6
- Point B: I-235 SB Mainline immediately after the OKC Blvd. exit and before the I-40 WB exit
  - LOS D/F
  - 4 lanes existing
  - Number of lanes required to obtain LOS E or better for both peaks: 6
- Point D: I-235 SB Mainline after the I-40 WB exit and before the I-40 EB exit
  - LOS D/F
  - 3 lanes existing
  - Number of lanes required to obtain LOS E or better for both peaks: 5
- Point E: I-235 SB to I-40 WB ramp
  - LOS C/F
  - 1 lane existing
  - Number of lanes required to obtain LOS E or better for both peaks: 2
- Point O: I-235 SB Mainline before the I-40 EB on ramp
  - LOS E/F
  - 2 lanes existing
  - Number of lanes required to obtain LOS E or better for both peaks: 4
- Point Q: I-235 SB Mainline after the I-40 EB on ramp and before the I-35 SB/I-40 WB ramp

  - LOS D/F
  - 3 lanes existing
  - Number of lanes required to obtain LOS E or better for both peaks: 5
- Point R: I-35 SB Mainline south of the interchange
  - LOS E/F
  - 4 lanes existing
  - Number of lanes required to obtain LOS E or better for both peaks: 5
- Point S: I-35 NB Mainline south of the interchange
  - LOS F/E
  - 4 lanes existing
  - Number of lanes required to obtain LOS E or better for both peaks: 5
- Point U: I-235 NB Mainline after the I-35 NB/I-40 EB exit
  - LOS F/D
  - 3 lanes existing
  - Number of lanes required to obtain LOS E or better for both peaks: 5
- Point AA: I-40 EB to I-235 NB ramp
  - LOS F/C
  - 1 lane existing
  - Number of lanes required to obtain LOS E or better for both peaks: 2
- Point AD: I-235 NB Mainline after the I-40 EB on ramp and before the I-40 WB exit
  - LOS F/D
  - 4 lanes existing
  - Number of lanes required to obtain LOS E or better for both peaks: 6
- Point AF: I-235 NB Mainline after the I-40 WB exit and before the I-40 WB on ramp
  - LOS F/C
  - 3 lanes existing
  - Number of lanes required to obtain LOS E or better for both peaks: 5
- Point AJ: I-235 NB Mainline north of the interchange
  - LOS F/E
  - 4 lanes existing
  - Number of lanes required to obtain LOS E or better for both peaks: 6

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Analysis Results Summary

Table 1: 2020 Lane Capacity Analysis

Point	Existing Lanes	AM LOS	PM LOS	Lanes Needed for LOS C or better
A	4	C	E	6
B	4	C	E	6
C	1	A	A	
D	3	C	E	5
E	1	B	D	2
F	2	B	B	
G	3	B	B	
H	6	B	B	
J	4	C	C	
K	1	A	A	
L	3	D	F	
M	5	B	C	
N	4	B	C	
O	2	C	F	4
P	1	C	C	
Q	3	C	E	5
R	4	C	D	5
S	4	D	C	5
T	2	B	A	
U	3	E	C	5
V	1	A	A	
W	2	A	B	
X	5	A	B	
Y	6	A	C	
Z	5	C	C	
AA	1	D	B	2
AB	6	B	B	
AC	3	C	C	
AD	4	E	B	6
AE	1	C	B	
AF	3	F	B	5
AG	1	B	C	
AH	1	A	A	
AJ	4	E	C	6

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Table 2: 2035 Lane Capacity Analysis

Point	Existing Lanes	AM LOS	PM LOS	Lanes Needed for LOS C or better	Lanes Needed for LOS D or better
A	4	C	F	7	6
B	4	C	F	7	6
C	1	A	A		
D	3	C	F	5	4
E	1	B	E	2	2
F	2	B	B		
G	3	C	C		
H	6	B	C		
J	4	C	D	5	4
K	1	A	B		
L	3	F	F		
M	5	C	C		
N	4	C	C		
O	2	D	F	4	4
P	1	C	D	2	1
Q	3	D	F	5	4
R	4	D	E	6	5
S	4	F	D	6	5
T	2	B	A		
U	3	F	C	6	5
V	1	A	A		
W	2	A	B		
X	5	B	C		
Y	6	B	C		
Z	5	D	C	6	5
AA	1	F	B	2	2
AB	6	B	C		
AC	3	C	C		
AD	4	F	C	7	6
AE	1	D	C	2	1
AF	3	F	C	6	5
AG	1	C	D	2	1
AH	1	B	A		
AJ	4	F	D	7	6

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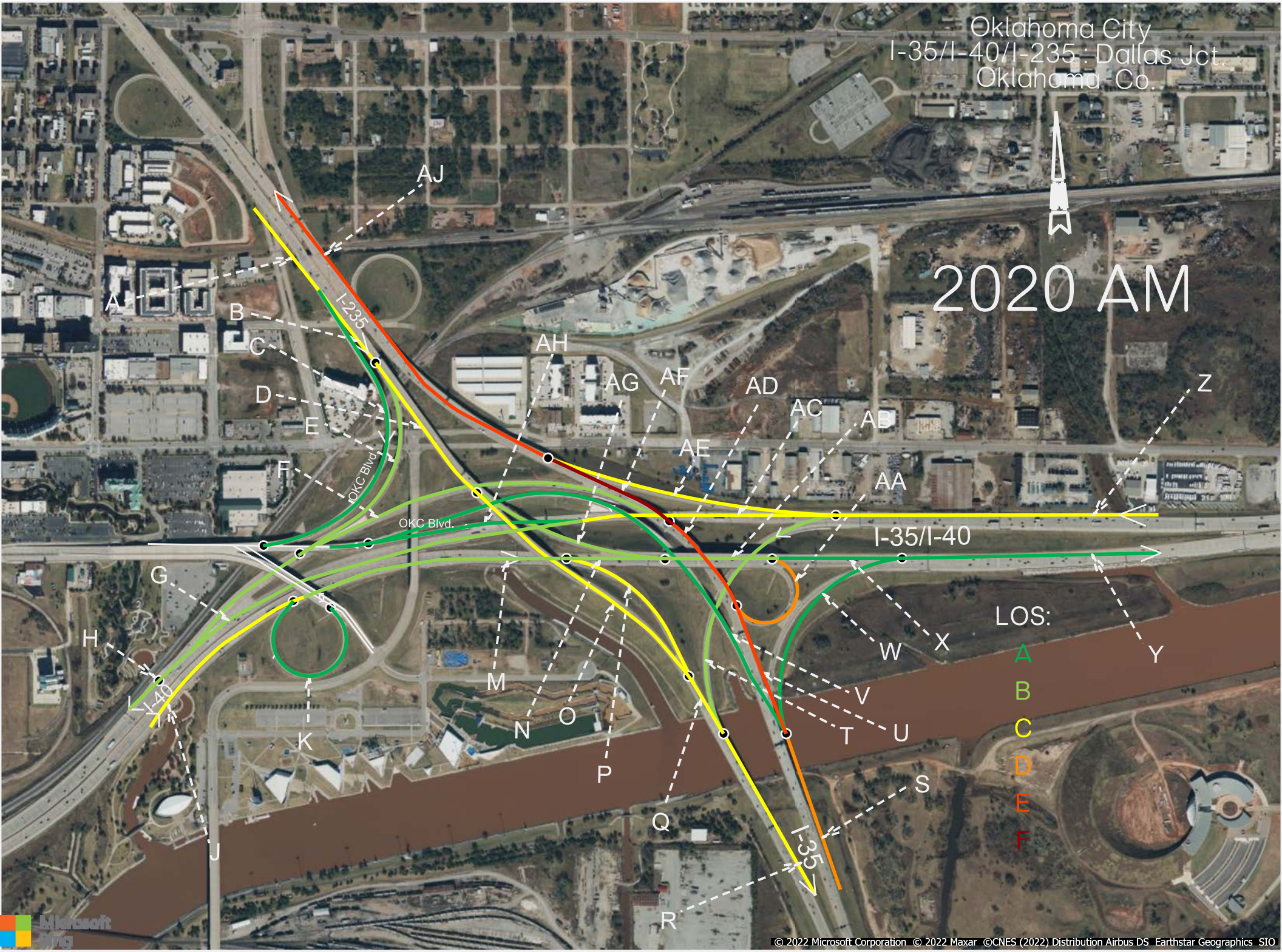
Table 3: 2050 Lane Capacity Analysis

Point	Existing Lanes	AM LOS	PM LOS	Lanes Needed for LOS E or better
A	4	D	F	6
B	4	D	F	6
C	1	A	A	
D	3	D	F	5
E	1	C	F	2
F	2	B	B	
G	3	C	D	
H	6	C	D	
J	4	D	E	
K	1	A	B	
L	3	F	F	
M	5	C	D	
N	4	C	D	
O	2	E	F	4
P	1	D	E	
Q	3	D	F	5
R	4	E	F	5
S	4	F	E	5
T	2	C	B	
U	3	F	D	5
V	1	A	A	
W	2	A	C	
X	5	B	D	
Y	6	B	D	
Z	5	E	D	
AA	1	F	C	2
AB	6	C	C	
AC	3	D	D	
AD	4	F	D	6
AE	1	E	D	
AF	3	F	C	5
AG	1	C	E	
AH	1	B	A	
AJ	4	F	E	6

Note: Lanes Needed values are identical to Table 1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Oklahoma Co.
2020 AM
A
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AJ
I-235
OKC Blvd.
OKC Blvd.
I-35/I-40
I-40
I-35
LOS:
A
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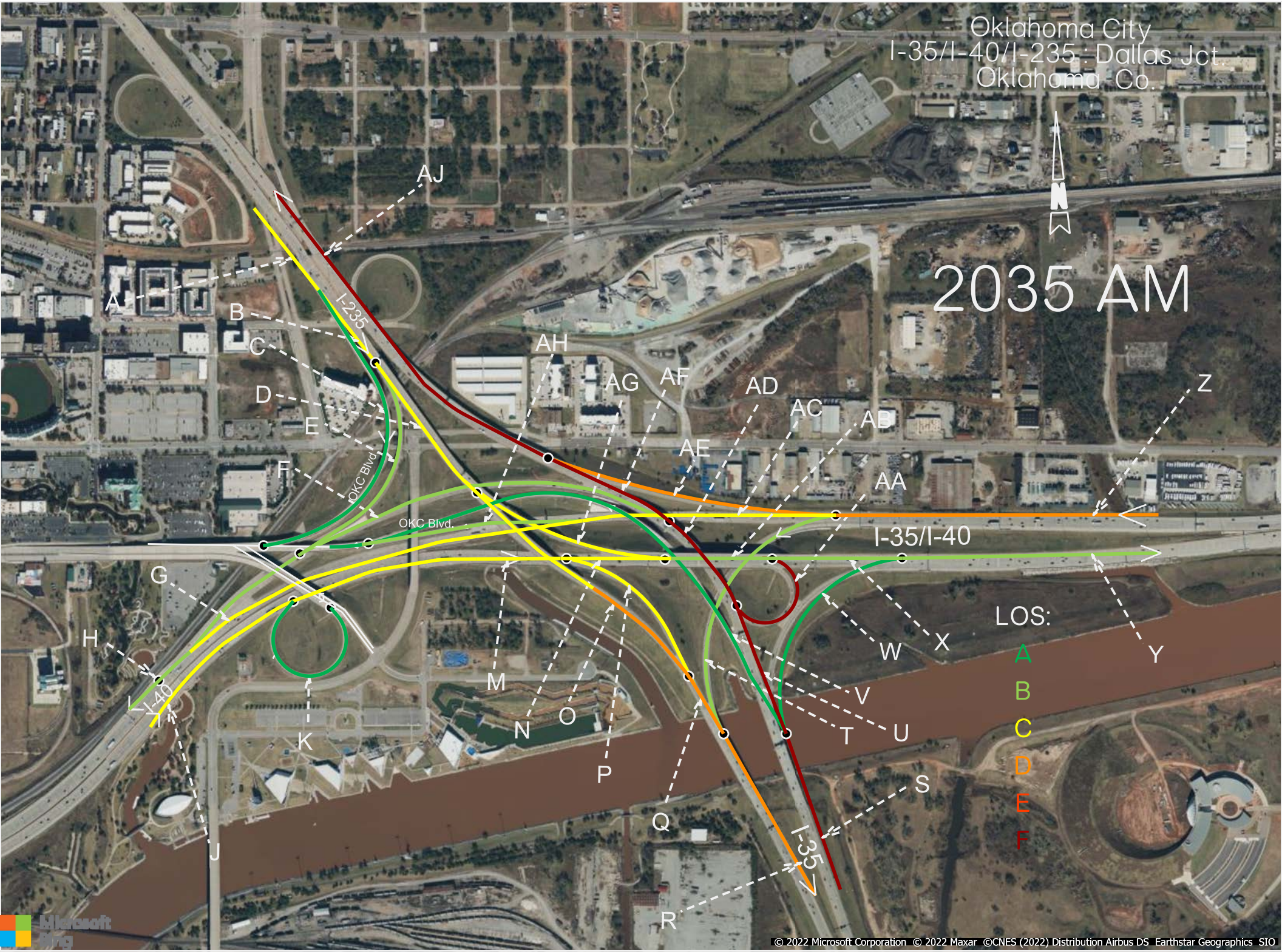
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I-35/I-40/I-235: Dallas Jct.
Oklahoma Co.
2035 AM
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OKC Blvd.
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LOS:
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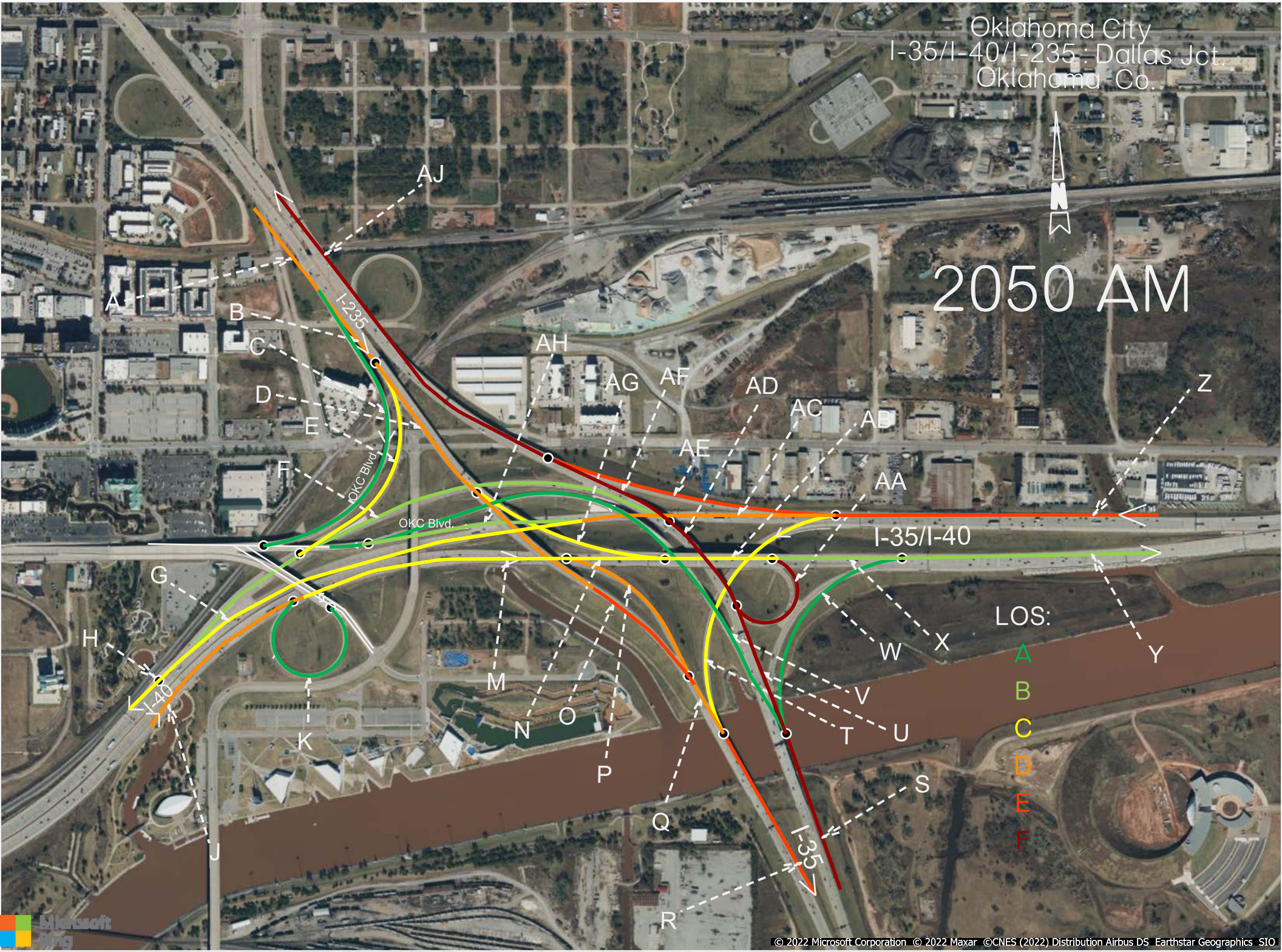
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I-35/I-40/I-235: Dallas Jct.
Oklahoma Co.
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OKC Blvd.
OKC Blvd.
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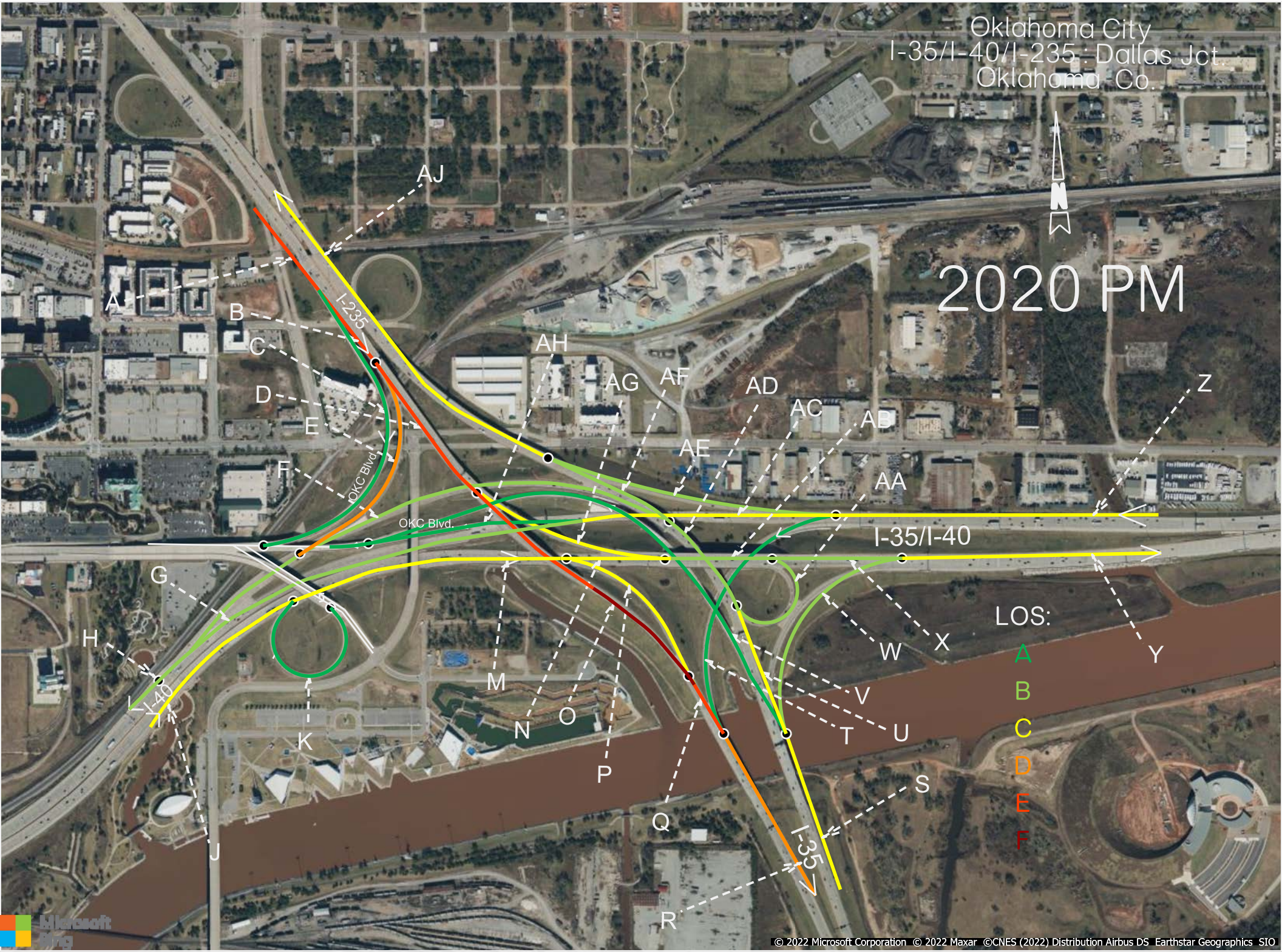
Oklahoma City
I-35/I-40/I-235: Dallas Jct.
Oklahoma Co.
2020 PM
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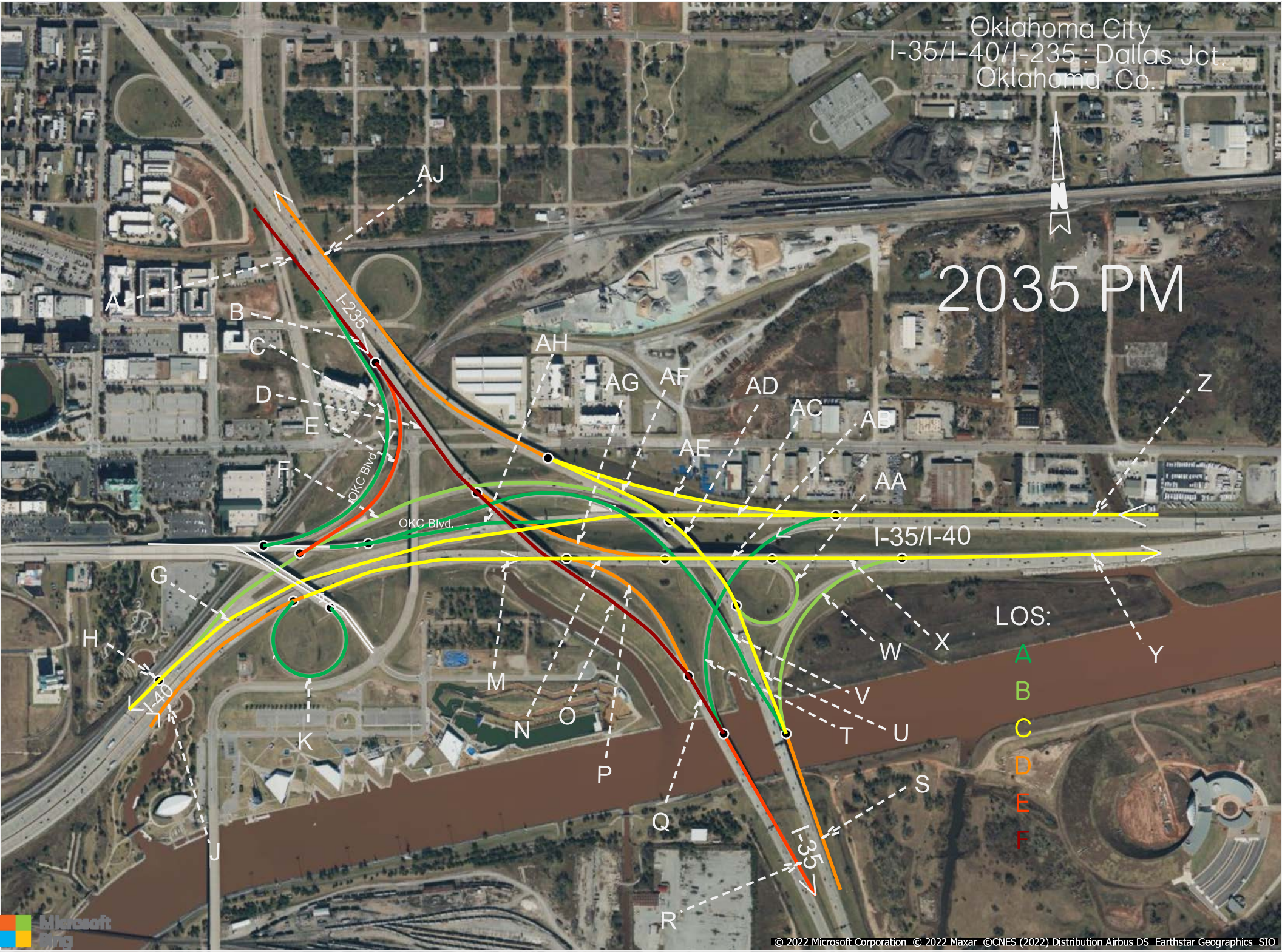
Oklahoma City
I-35/I-40/I-235: Dallas Jct.
Oklahoma Co.
2035 PM
N
I-235
OKC Blvd.
OKC Blvd.
I-35/I-40
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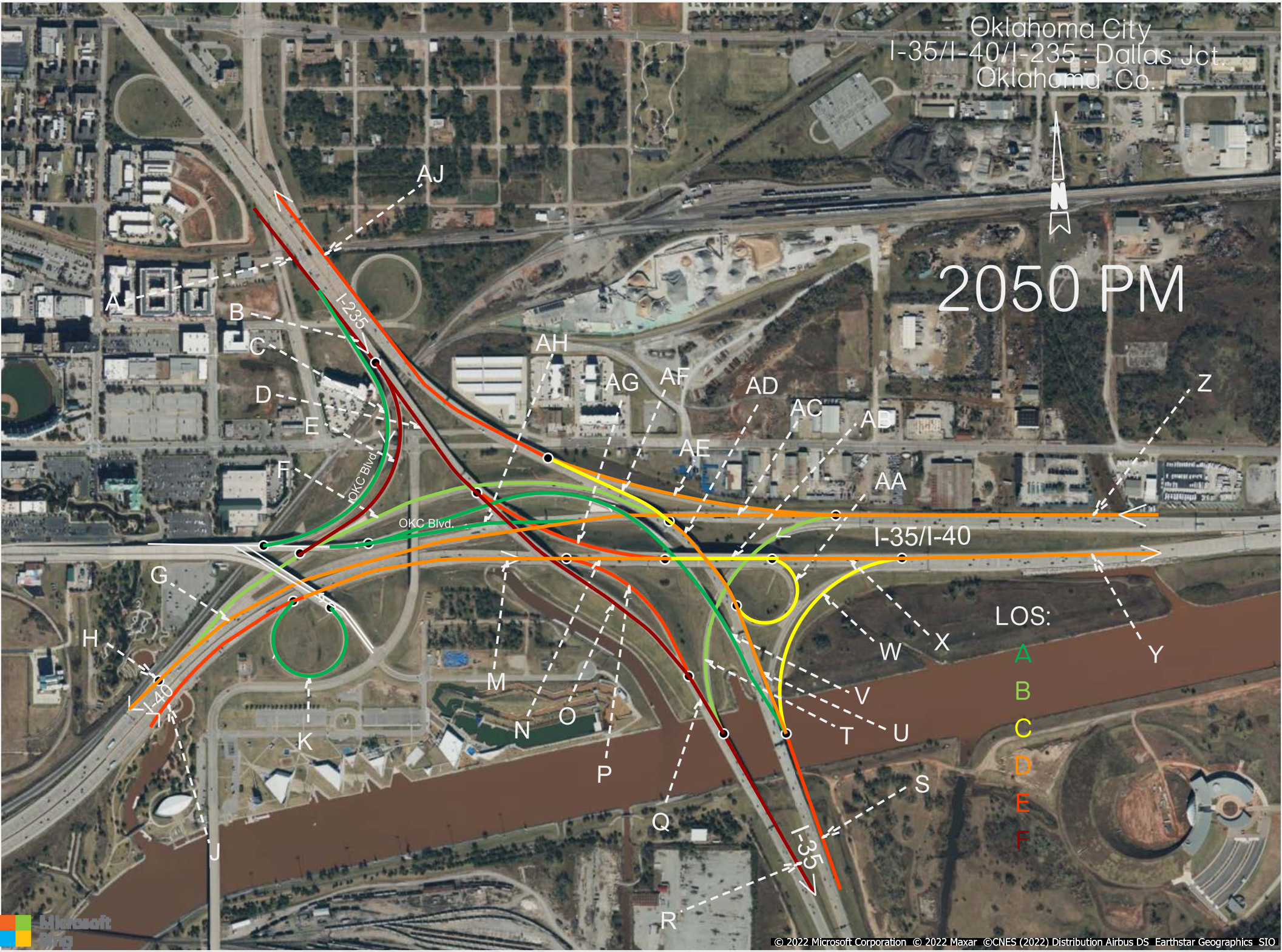
Oklahoma City
I-35/I-40/I-235: Dallas Jct.
Oklahoma Co.
2050 PM
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I-40
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OKC Blvd.
I-35/I-40
LOS:
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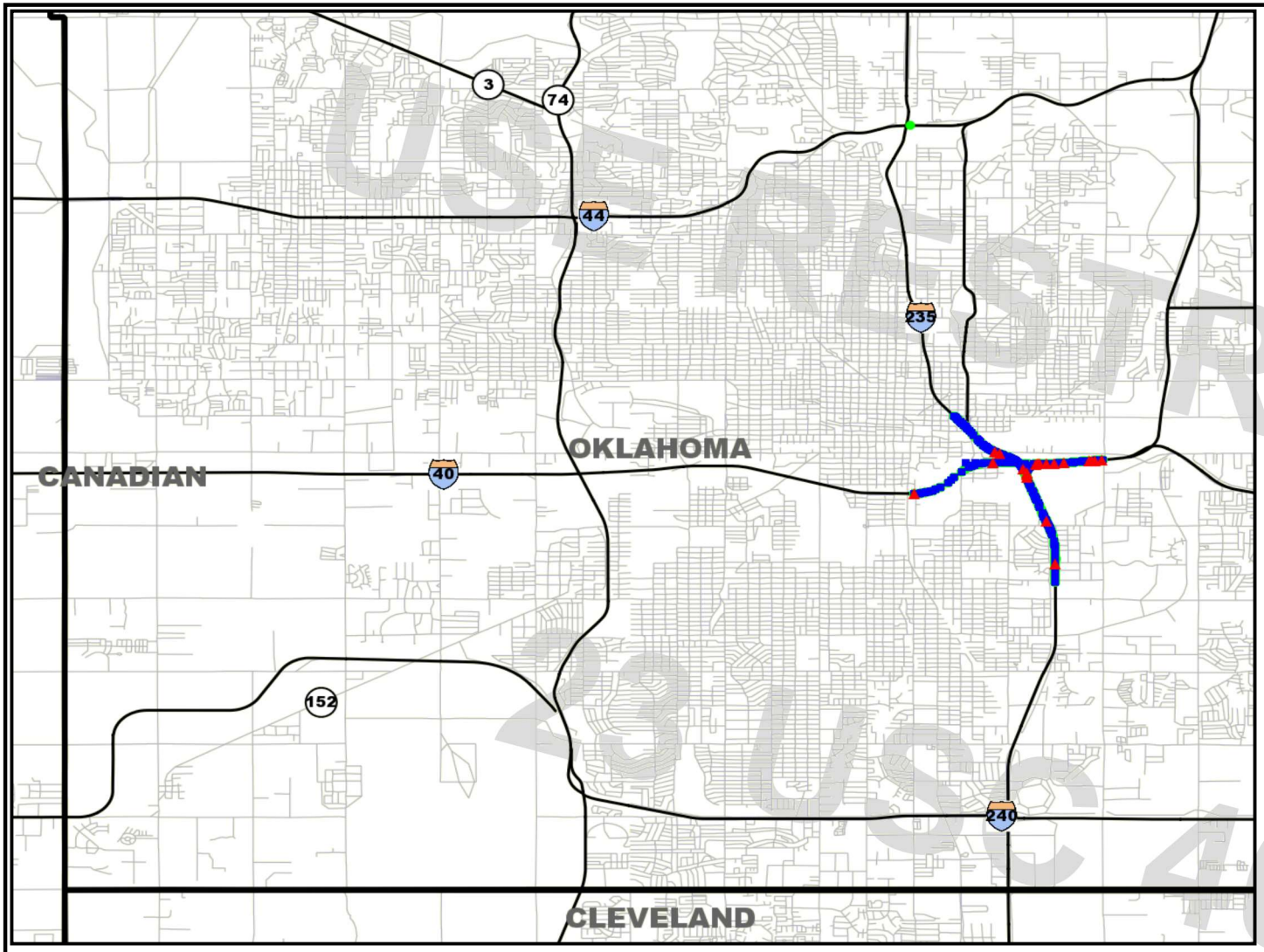
APPENDIX B -
Safety and Detour



Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 07/08/2022
by Hunter McComack

Study Map & Totals

Legend

- Fatality
- Injury
- Property Damage

N
W E
S

Remarks:

NONE

Date Range: 01-01-2012 thru 12-31-2021

	2012						2013						2014					
	Fat	SRS Inj	Non-Incap Inj	Poss Inj	PD	Tot	Fat	SRS Inj	Non-Incap Inj	Poss Inj	PD	Tot	Fat	SRS Inj	Non-Incap Inj	Poss Inj	PD	Tot
Collisions	2	30	46	77	278	433	2	9	43	62	303	419	1	8	30	72	299	410
Persons	6	38	71	138		253	2	10	59	107		178	1	11	39	119		170

STUDY TOTALS (CONT.)

Date Range: 01-01-2012 Thru 12-31-2021

Program Provided by:
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(405) 522-0985
Created: 07/08/2022 by Hunter McComack

	2015						2016						2017					
	Fat	SRS Inj	Non-Incap Inj	Poss Inj	PD	Tot	Fat	SRS Inj	Non-Incap Inj	Poss Inj	PD	Tot	Fat	SRS Inj	Non-Incap Inj	Poss Inj	PD	Tot
Collisions	2	10	33	94	408	547	1	2	30	88	351	472		6	21	75	350	452
Persons	2	11	41	131		185	1	4	41	125		171		6	27	126		159

	2018						2019						2020					
	Fat	SRS Inj	Non-Incap Inj	Poss Inj	PD	Tot	Fat	SRS Inj	Non-Incap Inj	Poss Inj	PD	Tot	Fat	SRS Inj	Non-Incap Inj	Poss Inj	PD	Tot
Collisions	2	11	22	76	306	417	2	7	20	54	329	412	1	3	21	51	235	311
Persons	2	12	32	116		162	2	7	26	87		122	1	4	25	85		115

	2021*					
	Fat	SRS Inj	Non-Incap Inj	Poss Inj	PD	Tot
Collisions	7	6	33	90	362	498
Persons	7	7	58	123		195

* DENOTES A YEAR FOR WHICH DATA MAY BE INCOMPLETE.

	Study Total					
	Fatality	Suspected Serious Injury	Non-Incapacitating Injury	Possible Injury	Property Damage	Total
Collisions	20	92	299	739	3221	4371
Persons	24	110	419	1157		1710

STUDY TOTALS - BY CITY AND HWY CLASS

Date Range: 01-01-2012 Thru 12-31-2021

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 07/08/2022 by Hunter McComack

STUDY TOTALS

	HIGHWAY COLLISIONS				CITY STREET COLLISIONS				COUNTY ROAD COLLISIONS				TOTAL COLLISIONS			
Year	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
2012	2	153	278	433									2	153	278	433
2013	2	114	303	419									2	114	303	419
2014	1	110	299	410									1	110	299	410
2015	2	137	408	547									2	137	408	547
2016	1	120	351	472									1	120	351	472
2017		102	350	452										102	350	452
2018	2	109	306	417									2	109	306	417
2019	2	81	329	412									2	81	329	412
2020	1	75	235	311									1	75	235	311
2021 *	7	129	362	498									7	129	362	498
Total:	20	1130	3221	4371				0				0	20	1130	3221	4371

*** DENOTES A YEAR FOR WHICH DATA MAY BE INCOMPLETE.**

County: (55) OKLAHOMA

	HIGHWAY COLLISIONS				CITY STREET COLLISIONS				COUNTY ROAD COLLISIONS				TOTAL COLLISIONS			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
(70) OKLA. CITY	20	1130	3221	4371									20	1130	3221	4371

*** INCLUDES SUSPECTED SERIOUS, NON-INCAPACITATING, AND POSSIBLE INJURIES.**

TABULATION OF COLLISIONS

Date Range: 01-01-2012 Thru 12-31-2021

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 07/08/2022 by Hunter McComack

Collisions By Type Of Collision

Type Of Collision	2012				2013				2014				2015				2016			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
Rear-End (front-to-rear)	1	82	163	246		65	173	238		64	167	231		81	239	320		73	188	261
Head-On (front-to-front)		1		1									1			1	1	1		2
Right Angle (front-to-side)		10	14	24	1	13	8	22		9	13	22		5	17	22		4	6	10
Angle Turning		7	12	19		2	19	21		7	27	34		6	20	26		5	20	25
Other Angle																				
Sideswipe Same Direction		16	60	76		12	69	81		11	63	74		17	84	101		14	97	111
Sideswipe Opposite Direction					1			1		1		1			3	3		1		1
Fixed Object	1	30	16	47		14	25	39	1	15	17	33		16	20	36		13	24	37
Pedestrian		1		1		1		1												
Pedal Cycle																				
Animal																				
Overturn/Rollover		4	4	8		5	3	8		3		3	1	4	3	8		5	4	9
Vehicle-Train																				
Other Single Vehicle Crash		1	1	2			1	1			1	1		4	6	10			6	6
Other		1	8	9		2	5	7			11	11		4	16	20		4	6	10
Total	2	153	278	433	2	114	303	419	1	110	299	410	2	137	408	547	1	120	351	472
Percent		3.5	6.4	9.9		2.6	6.9	9.6		2.5	6.8	9.4		3.1	9.3	12.5		2.7	8.0	10.8

Collisions By Type Of Collision

Type Of Collision	2017				2018				2019				2020				2021*			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
Rear-End (front-to-rear)		64	182	246		68	163	231	1	42	141	184		41	82	123	1	66	158	225
Head-On (front-to-front)						1		1		1	1	2					2			2
Right Angle (front-to-side)		5	9	14		7	3	10		4	3	7		2	1	3		5	7	12
Angle Turning		8	14	22		7	12	19		3	10	13		1	4	5	1	8	11	20
Other Angle			1	1							1	1						1	1	2
Sideswipe Same Direction		11	103	114	1	12	95	108		13	123	136		13	97	110		18	143	161
Sideswipe Opposite Direction										1	1	2						2		2
Fixed Object		7	25	32	1	9	13	23	1	8	27	36	1	12	31	44	1	19	28	48
Pedestrian		2		2													2	2		4
Pedal Cycle		1		1																
Animal			1	1																
Overturn/Rollover		3	3	6		2	1	3		6	2	8		2	2	4		4	1	5
Vehicle-Train																				
Other Single Vehicle Crash			1	1			5	5		1	3	4			1	1		1	4	5
Other		1	11	12		3	14	17		2	17	19		4	17	21		3	9	12
Total		102	350	452	2	109	306	417	2	81	329	412	1	75	235	311	7	129	362	498
Percent		2.3	8.0	10.3		2.5	7.0	9.5		1.9	7.5	9.4		1.7	5.4	7.1	0.2	3.0	8.3	11.4

*** INCLUDES SUSPECTED SERIOUS, NON-INCAPACITATING, AND POSSIBLE INJURIES.**

Program Provided by:
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Collision Analysis and Safety Branch
(405) 522-0985
Created: 07/08/2022 by Hunter McComack

TABULATION OF COLLISIONS

Date Range: 01-01-2012 Thru 12-31-2021

Collisions By Type Of Collision

Type Of Collision	Total				
	Fat	Inj *	PD	Tot	Pct
Rear-End (front-to-rear)	3	646	1656	2305	52.7
Head-On (front-to-front)	4	4	1	9	0.2
Right Angle (front-to-side)	1	64	81	146	3.3
Angle Turning	1	54	149	204	4.7
Other Angle		1	3	4	0.1
Sideswipe Same Direction	1	137	934	1072	24.5
Sideswipe Opposite Direction	1	5	4	10	0.2
Fixed Object	6	143	226	375	8.6
Pedestrian	2	6		8	0.2
Pedal Cycle		1		1	
Animal			1	1	
Overturn/Rollover	1	38	23	62	1.4
Vehicle-Train					
Other Single Vehicle Crash		7	29	36	0.8
Other		24	114	138	3.2
Total	20	1130	3221	4371	100
Percent	0.5	25.9	73.7	100	

* INCLUDES SUSPECTED SERIOUS, NON-INCAPACITATING, AND POSSIBLE INJURIES.

TABULATION OF COLLISIONS

Date Range: 01-01-2012 Thru 12-31-2021

Program Provided by:
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Collision Analysis and Safety Branch
(405) 522-0985
Created: 07/08/2022 by Hunter McComack

Units By Unit Type

Unit Type	2012				2013				2014				2015				2016			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
Train																				
Pedestrian		1		1		3		3						1		1				
Animal																				
Pedal Cycle																				
Parked Vehicle		4		4			1	1		1	3	4		3	3	6		2		2
CMV	1	13	32	46		7	30	37		12	33	45	1	19	52	72		16	37	53
Other Single Vehicle	1	35	19	55		19	27	46	1	17	18	36	1	26	30	57		19	31	50
Other Multi-Vehicle	1	283	540	824	5	231	569	805		219	572	791	1	234	786	1021	2	230	640	872
Total	3	336	591	930	5	260	627	892	1	249	626	876	3	283	871	1157	2	267	708	977
Percent		3.7	6.5	10.2	0.1	2.8	6.8	9.7		2.7	6.8	9.6		3.1	9.5	12.6		2.9	7.7	10.7

Units By Unit Type

Unit Type	2017				2018				2019				2020				2021*			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
Train																				
Pedestrian		2		2													2	2		4
Animal																				
Pedal Cycle		1		1																
Parked Vehicle		2		2	1		1	2		1	2	3		1	3	4		1		1
CMV		3	51	54	1	13	51	65		14	40	54		9	46	55	3	11	42	56
Other Single Vehicle		12	29	41		12	20	32	1	13	28	42	1	13	31	45	1	24	33	58
Other Multi-Vehicle		216	650	866	2	222	567	791	2	135	618	755		143	383	526	15	222	629	866
Total		236	730	966	4	247	639	890	3	163	688	854	1	166	463	630	21	260	704	985
Percent		2.6	8.0	10.5		2.7	7.0	9.7		1.8	7.5	9.3		1.8	5.1	6.9	0.2	2.8	7.7	10.8

*** INCLUDES SUSPECTED SERIOUS, NON-INCAPACITATING, AND POSSIBLE INJURIES.**

TABULATION OF COLLISIONS

Date Range: 01-01-2012 Thru 12-31-2021

Program Provided by:
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Collision Analysis and Safety Branch
(405) 522-0985
Created: 07/08/2022 by Hunter McComack

Units By Unit Type

Unit Type	Total				
	Fat	Inj *	PD	Tot	Pct
Train					
Pedestrian	2	9		11	0.1
Animal					
Pedal Cycle		1		1	
Parked Vehicle	1	15	13	29	0.3
CMV	6	117	414	537	5.9
Other Single Vehicle	6	190	266	462	5.0
Other Multi-Vehicle	28	2135	5954	8117	88.6
Total	43	2467	6647	9157	100
Percent	0.5	26.9	72.6	100	

*** INCLUDES SUSPECTED SERIOUS, NON-INCAPACITATING, AND POSSIBLE INJURIES.**

TABULATION OF COLLISIONS

Date Range: 01-01-2012 Thru 12-31-2021

Program Provided by:
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Vehicles By Vehicle Type

Vehice Type	2012				2013				2014				2015				2016			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
Passenger Vehicle-2 Door	1	25	56	82		12	53	65		10	44	54		6	54	60	1	6	39	46
Passenger Vehicle-4 Door		85	283	368	1	51	314	366		68	287	355	1	79	416	496		66	315	381
Passenger Vehicle-Convertible			3	3			6	6			2	2			3	3				
Pickup Truck	1	20	151	172		35	159	194		16	177	193		24	196	220		25	190	215
Single-Unit Truck (2 axles)			6	6		1	5	6			14	14			5	5			9	9
Single-Unit Truck (3 or more axles)			4	4			2	2			3	3			4	4			6	6
School Bus										1	2	3		1		1				
Truck/Trailer			2	2			6	6			3	3			13	13		1	18	19
Truck-Tractor (bobtail)			2	2			1	1			2	2			5	5				
Truck-Tractor/Semi-Trailer		1	36	37			25	25		2	23	25		3	48	51		2	29	31
Truck-Tractor/Double			1	1							1	1							1	1
Truck-Tractor/Triple																				
Bus/Large Van (9-15 seats)															1	1				
Bus (16+ seats)			1	1										1		1				
Motorcycle		10	1	11		3	2	5		4	2	6	1	8	5	14		3		3
Motor Scooter/Moped																				
Motor Home						1	1	2			1	1			5	5			1	1
Farm Machinery															1	1				
ATV																				
Sport Utility Vehicle (SUV)		47	139	186	1	32	138	171	1	27	135	163		27	189	216		34	184	218
Passenger Van		11	28	39		3	23	26		3	24	27		4	35	39		5	26	31
Truck More Than 10,000 lbs.							3	3											2	2
Van (10,000 lbs. or less)		1	4	5		2	5	7		1	6	7		1	5	6		1	5	6
Other		1	9	10			4	4		2	15	17			15	15			8	8
Total	2	201	726	929	2	140	747	889	1	134	741	876	2	154	1000	1156	1	143	833	977
Percent		2.2	7.9	10.2		1.5	8.2	9.7		1.5	8.1	9.6		1.7	10.9	12.6		1.6	9.1	10.7

*** INCLUDES SUSPECTED SERIOUS, NON-INCAPACITATING, AND POSSIBLE INJURIES.**

TABULATION OF COLLISIONS

Date Range: 01-01-2012 Thru 12-31-2021

Program Provided by:
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Vehicles By Vehicle Type

Vehice Type	2017				2018				2019				2020				2021*			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
Passenger Vehicle-2 Door		9	46	55		13	42	55		10	36	46		5	22	27		7	23	30
Passenger Vehicle-4 Door		63	345	408	1	57	266	324	1	43	300	344		42	204	246	3	84	322	409
Passenger Vehicle-Convertible			4	4		1	1	2									1	1	3	5
Pickup Truck		14	188	202		16	167	183		12	163	175		20	104	124		18	167	185
Single-Unit Truck (2 axles)			13	13		1	9	10			5	5			7	7		3	4	7
Single-Unit Truck (3 or more axles)			3	3		1	5	6			5	5			2	2			5	5
School Bus											1	1								
Truck/Trailer			14	14		1	7	8		1	6	7			12	12			16	16
Truck-Tractor (bobtail)			2	2			4	4		1	1	2		1	2	3			2	2
Truck-Tractor/Semi-Trailer			33	33		1	43	44			40	40		2	31	33			28	28
Truck-Tractor/Double							1	1			2	2								
Truck-Tractor/Triple																				
Bus/Large Van (9-15 seats)			1	1											1	1				
Bus (16+ seats)															2	2			1	1
Motorcycle		5	2	7		1		1		4	1	5		1	2	3	1	2	4	7
Motor Scooter/Moped										1		1		1		1				
Motor Home							2	2											2	2
Farm Machinery											1	1								
ATV																				
Sport Utility Vehicle (SUV)		26	152	178	1	34	157	192	1	23	159	183	1	14	108	123		36	198	234
Passenger Van		6	22	28		5	26	31		1	21	22		5	20	25		6	16	22
Truck More Than 10,000 lbs.			1	1			1	1			2	2			2	2			3	3
Van (10,000 lbs. or less)		1	3	4		1	13	14			4	4			4	4			9	9
Other			10	10			12	12			9	9			15	15			16	16
Total		124	839	963	2	132	756	890	2	96	756	854	1	91	538	630	5	157	819	981
Percent		1.4	9.2	10.5		1.4	8.3	9.7		1.0	8.3	9.3		1.0	5.9	6.9	0.1	1.7	9.0	10.7

*** INCLUDES SUSPECTED SERIOUS, NON-INCAPACITATING, AND POSSIBLE INJURIES.**

TABULATION OF COLLISIONS

Date Range: 01-01-2012 Thru 12-31-2021

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 07/08/2022 by Hunter McComack

Vehicles By Vehicle Type

Vehice Type	Total				
	Fat	Inj *	PD	Tot	Pct
Passenger Vehicle-2 Door	2	103	415	520	5.7
Passenger Vehicle-4 Door	7	638	3052	3697	40.4
Passenger Vehicle-Convertible	1	2	22	25	0.3
Pickup Truck	1	200	1662	1863	20.4
Single-Unit Truck (2 axles)		5	77	82	0.9
Single-Unit Truck (3 or more axles)		1	39	40	0.4
School Bus		2	3	5	0.1
Truck/Trailer		3	97	100	1.1
Truck-Tractor (bobtail)		2	21	23	0.3
Truck-Tractor/Semi-Trailer		11	336	347	3.8
Truck-Tractor/Double			6	6	0.1
Truck-Tractor/Triple					
Bus/Large Van (9-15 seats)			3	3	
Bus (16+ seats)		1	4	5	0.1
Motorcycle	2	41	19	62	0.7
Motor Scooter/Moped		2		2	
Motor Home		1	12	13	0.1
Farm Machinery			2	2	
ATV					
Sport Utility Vehicle (SUV)	5	300	1559	1864	20.4
Passenger Van		49	241	290	3.2
Truck More Than 10,000 lbs.			14	14	0.2
Van (10,000 lbs. or less)		8	58	66	0.7
Other		3	113	116	1.3
Total	18	1372	7755	9145	100
Percent	0.2	15.0	84.8	100	

*** INCLUDES SUSPECTED SERIOUS, NON-INCAPACITATING, AND POSSIBLE INJURIES.**

TABULATION OF COLLISIONS

Date Range: 01-01-2012 Thru 12-31-2021

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 07/08/2022 by Hunter McComack

Day And Time Of Occurrence Of Collisions

Day	Hour Of The Day																								
	AM												PM												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	Tot	Pcnt
Sunday	15	14	9	5	5	3	8	4	15	10	12	25	26	31	31	29	28	27	17	13	12	6	5	19	369	8.4
Monday	3	5	4	3	6	27	76	65	21	21	24	27	27	29	42	65	67	32	16	7	7	5	2	6	587	13.4
Tuesday	5	8	1		7	35	82	91	33	17	37	36	25	32	51	86	82	37	14	9	7	7	8	11	721	16.5
Wednesday	8	4	1	4	5	32	72	88	26	18	24	33	22	35	51	73	85	43	14	12	9	10	8	6	684	15.6
Thursday	4	8	5	6	4	18	69	71	23	26	22	28	20	27	61	88	92	38	16	9	12	13	8	12	680	15.6
Friday	5	9	1	5	3	19	70	46	30	25	41	51	44	57	87	112	118	40	31	13	19	19	14	17	877	20.1
Saturday	10	14	7	4	1	6	11	12	11	28	32	40	29	32	32	36	28	30	19	19	18	12	9	12	453	10.4
	Early Morning - Sunrise						Morning Peak			Mid Morning/Afternoon						PM Peak			Evening - Late Night						Tot	100
Total	338						924			1368						1236			505						4371	
Percent	7.7						21.1			31.3						28.3			11.6						100	

Roadway/Lighting

Roadway Conditions	Lighting Conditions					Total	Percent
	Daylight	Darkness	Twilight	Lighted	Unknown		
Dry	3102	89	118	525	1	3835	87.7
Wet (Water)	279	30	10	70	1	390	8.9
Ice, Snow, or Slush	59	6	2	51		118	2.7
Mud, Dirt, Gravel, or Sand							
Other	22	1		4	1	28	0.6
Total	3462	126	130	650	3	4371	100
Percent	79.2	2.9	3.0	14.9	0.1	100	

Weather Conditions

Weather Conditions	Total	Percent
Clear	2762	63.2
Clouds Present	1152	26.4
Raining/Fog	340	7.8
Snowing/Sleet/Hail	98	2.2
Other	19	0.4
Total	4371	100

TABULATION OF COLLISIONS

Date Range: 01-01-2012 Thru 12-31-2021

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 07/08/2022 by Hunter McComack

Drivers By Driver Conditions

Unsafe/Unlawful	Apparently Normal			Alcohol Involved						Sleep Suspected			Drug Use Indicated			Unknown Condition			Total				
				Ability Impaired			Odor Detected																
	Fat	Inj *	PD	Fat	Inj *	PD	Fat	Inj *	PD	Fat	Inj *	PD	Fat	Inj *	PD	Fat	Inj *	PD	Fat	Inj *	PD	Total	Pcnt
Failed to Yield	2		1													1		1	3		2	5	0.1
Failed to Stop		35	57	1	2									1		1	6	21	2	44	78	124	1.4
Failed to Signal		44	68			1		1	1			1		1			3	19		49	90	139	1.5
Improper Turn		18	68									1					2	12		20	81	101	1.1
Improper Start			2														1	1		1	3	4	
Improper Stop		3	4														2	2		5	6	11	0.1
Improper Backing		2	3			1												2		2	6	8	0.1
Improper Parking			2														1	1		1	3	4	
Improper Passing		1	9															7		1	16	17	0.2
Improper Lane Change		93	663		2	4		2				1		1	3	1	10	165	1	108	836	945	10.4
Left of Center			2												1						3	3	
Following Too Close		461	1154		2	2			3		1			1	2		29	109		494	1270	1764	19.4
Unsafe Speed		184	246		4	4	1	2	3		1			1		2	13	39	3	205	292	500	5.5
DWI		4	4	2	23	37		4	5					11	11	1		1	3	42	58	103	1.1
Inattention	1	93	227		1			3	2		8	19			1	1	16	14	2	121	263	386	4.2
Negligent Driving		12	53			1		1				3					2	29		15	86	101	1.1
Defective Vehicle		19	43														2	3		21	46	67	0.7
Wrong Way			1		2											3	1	4	3	3	5	11	0.1
No Improper Action	19	1234	3266		4	6		2	4					1	1	1	30	72	20	1271	3349	4640	50.9
Other		29	108					2								3	6	33	3	37	141	181	2.0
Total	22	2232	5981	3	40	56	1	17	18		10	25		17	19	14	124	535	40	2440	6634	9114	100
Percent	0.2	24.5	65.6		0.4	0.6		0.2	0.2		0.1	0.3		0.2	0.2	0.2	1.4	5.9	0.4	26.8	72.8	100	

Severities Indicate Highest Severity in Collision

Collisions By Special Feature

Special Feature	Total			
	Fat	Inj *	PD	Tot
Bridge	1	12	39	52
Work Zone	4	62	164	230
Cross Median		4	3	7
Train Collision				

*** INCLUDES SUSPECTED SERIOUS, NON-INCAPACITATING, AND POSSIBLE INJURIES.**

STUDY CRITERIA

Date Range: 01-01-2012 Thru 12-31-2021

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 07/08/2022 by Hunter McComack

ROADWAY / REGION

	QUERY OVER	SELECTIONS
1	Control Section	County: 55, Control Section: 69, CS Query On: range, Mile Start: 09.01, Mile End: 10.45
2	Control Section	County: 55, Control Section: 15, CS Query On: range, Mile Start: 4.31, Mile End: 6.71
3	Control Section	County: 55, Control Section: 42, CS Query On: range, Mile Start: 00.00, Mile End: 01.20

DATE

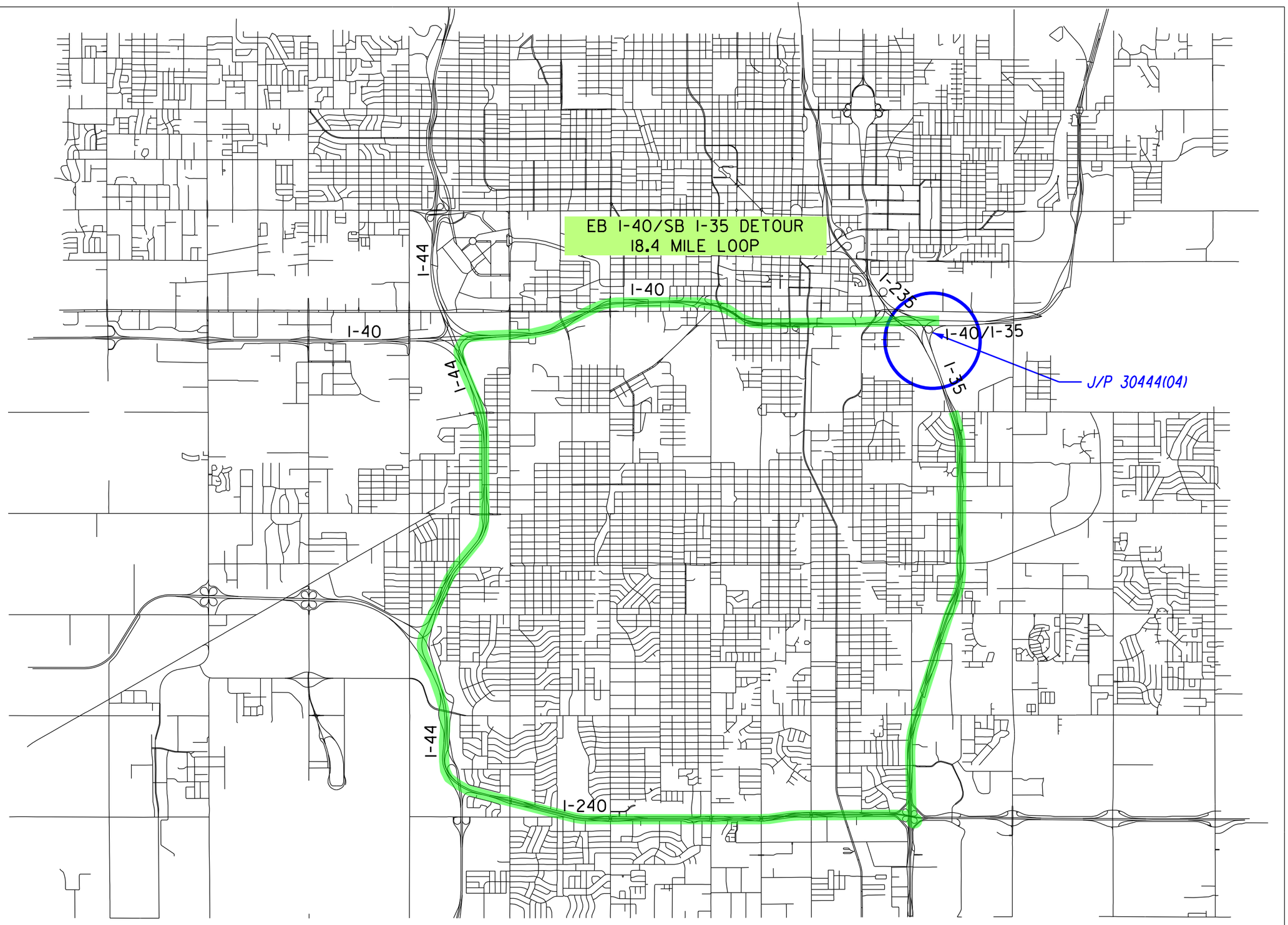
Date Range	01-01-2012 to 12-31-2021

FILTER COLLISIONS

Roadway Type	All Collision Data
Incl. Crashes Assoc. w/ Int.	Unchecked
Environment Fields	

REPORT SECTIONS

Collision Map & Study Totals	(Included)
Collision Analysis Tables	(Included)
- Totals By City, Hwy Class	Checked
- Other Analysis Tables	Checked
Collision Diagram	(Included)
Query Criteria	(Included)



1.0 MILES

SCHEMMER
ARCHITECTS | ENGINEERS | PLANNERS

DETOUR MAP
I-35: ADD ADDITIONAL RAMPS FOR I-35
NB & SB AT
THE I-40/I-35 JCT
Division 4 - Oklahoma County
J/P 30444(04)
Sht 6 of 6

APPENDIX C -
Preferred Design Concept 3.4

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.4 / 8 ROWING LANES
COMPLETE CONSTRUCTION

APPENDIX C

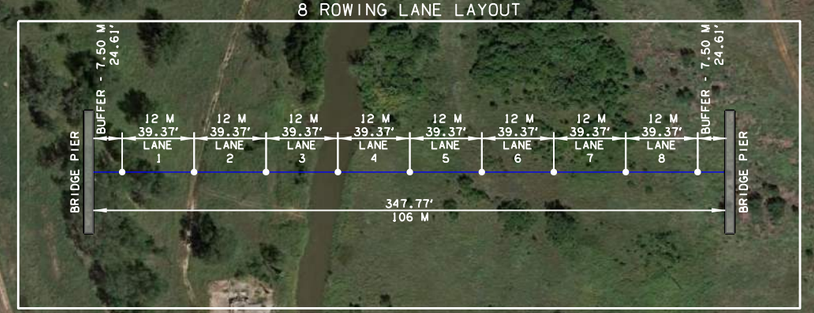
NOT TO SCALE

BUFFER
1
2
3
4
5
6
7
8
BUFFER

INVERTED SIPHON

BUFFER
1
2
3
4
5
6
7
8
BUFFER

8 ROWING LANE LAYOUT



PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

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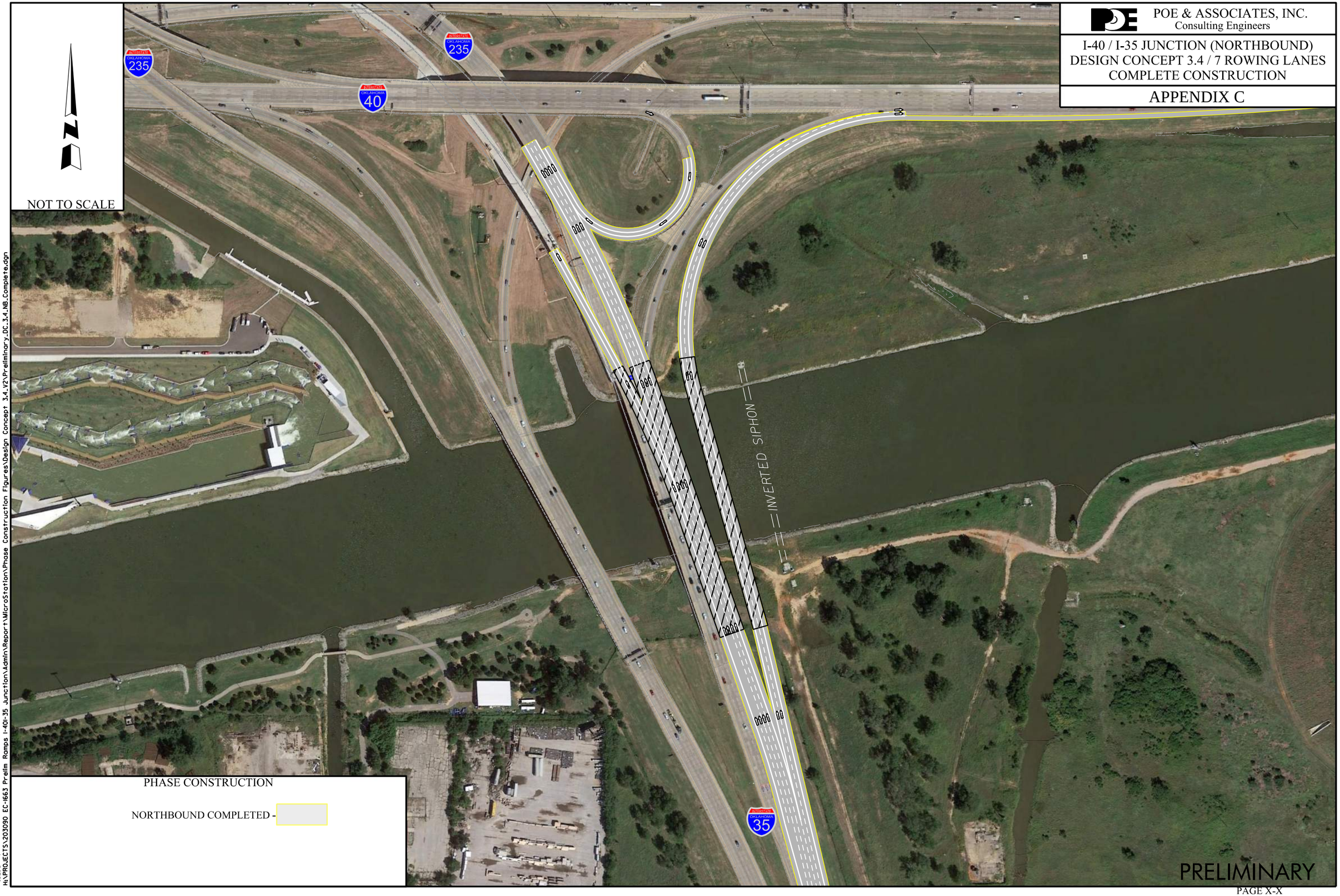
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
COMPLETE CONSTRUCTION

APPENDIX C

NOT TO SCALE



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PRELIMINARY

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POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
COMPLETE CONSTRUCTION

APPENDIX C

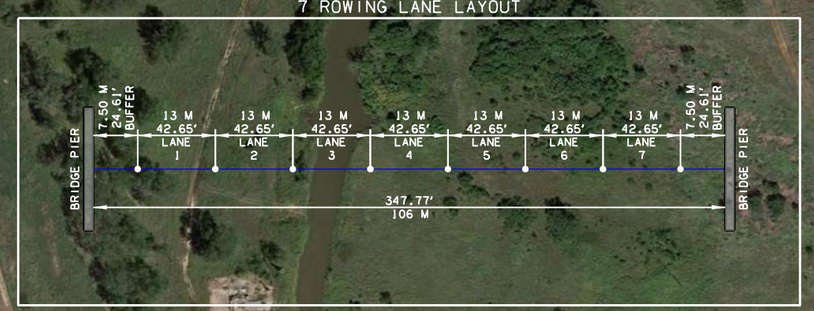
NOT TO SCALE

BUFFER
1
2
3
4
5
6
7
BUFFER

INVERTED SIPHON

BUFFER
1
2
3
4
5
6
7
BUFFER

7 ROWING LANE LAYOUT



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PRELIMINARY

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POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
PROFILE - NORTHBOUND I-35

APPENDIX C

NORTHBOUND BRIDGE
CONST. 3 SPAN - 265' - 360' - 150'
12' BEAM HEIGHT / 13' COMPOSITE

PI STA. 316+04.10 ~ ℄ RAMP 3
PI STA. 316+01.13 ~ ℄ RAMP 3
PC STA. 314+49.65 ~ ℄ RAMP 3
GORE STATION 313+38.05
PC STA. 314+54.17 ~ ℄ NB I-235
PC STA. 320+52.33 ~ ℄ NB I-235
PI STA. 322+02.26 ~ ℄ NB I-235
PT STA. 323+51.43 ~ ℄ NB I-235
PT STA. 317+53.76 ~ ℄ NB I-235
PC STA. 317+52.33 ~ ℄ RAMP 3
PC STA. 326+30.41 ~ ℄ RAMP 3
PI STA. 326+88.62 ~ ℄ RAMP 3
PT STA. 327+46.81 ~ ℄ RAMP 3
POB STA. 329+00.15 ~ ℄ RAMP S
PC STA. 330+01.85 ~ ℄ RAMP S
PI STA. 332+74.60 ~ ℄ RAMP 3
PC STA. 334+08.00 ~ ℄ NB I-215
PI STA. 335+46.15 ~ ℄ RAMP S
PI STA. 337+09.54
PI STA. 338+31.85
PCC STA. 337+09.61 ~ LINE 10
PI STA. 339+98.49 ~ ℄ RAMP S
PCC STA. 339+98.49 ~ ℄ RAMP S
PI STA. 339+51.97 ~ LINE 10
PI STA. 340+51.47 ~ ℄ NB I-235
GORE STATION 339+97.64
℄ RAMP 3
℄ NB I-235
℄ RAMPS
INVERTED SIPHON
OKLAHOMA
RIVER

100' 0 100' 200'
SCALE

℄ NB I-235
℄ RAMP S
℄ LINE 3
12'-0" SHLDR
6'-0" SHLDR
VAR.
24'-0" RAMP S
48'-0" NB I-235
42'-0" LINE 3
TYPICAL SECTION ACROSS BRIDGE

PVI STA. 313+00.00 ~ ℄ NB I-235
ELEV.= 1208.18 ~ ℄ NB I-235
PVC STA. 313+22.36 ~ ℄ NB I-235
ELEV.= 1207.91
-1.21%
PVI STA. 315+22.36 ~ ℄ NB I-235
ELEV.= 1205.48 ~ ℄ NB I-235
-2.67%
400.00' VC
K= 274.05
DESIGN SPEED = 70 MPH
PVT STA. 317+22.36 ~ ℄ NB I-235
ELEV.= 1200.14
PVC STA. 318+47.09 ~ ℄ NB I-235
ELEV.= 1196.80
700.00' VC
K= 200.95
DESIGN SPEED = 70 MPH
PVT STA. 325+47.09 ~ ℄ NB I-235
ELEV.= 1190.29
-2.67%
0.81%
PVI STA. 321+97.09 ~ ℄ NB I-235
ELEV.= 1187.45
LOW POINT STA. 323+84.17 ~ ℄ NB I-235
ELEV.= 1189.63
1178.51 LOW BEAM ELEV.
14' ABOVE NORMAL POOL ELEVATION
1175.10
100 YEAR WATER ELEVATION
2'-10"
14' ABOVE NORMAL POOL
CLEARANCE
6'-2"
100 YEAR FLOOD
CLEARANCE
EXISTING GROUND
℄ NB I-235
1164.51 CALCULATED
NORMAL WATER SURFACE ELEVATION
14'-0"
CLEARANCE
ESTIMATED BRIDGE LOCATION
ESTIMATED PIER LOCATION
ESTIMATED PIER LOCATION
ESTIMATED BRIDGE LOCATION
PROPOSED
℄ NB I-235
PROPOSED
RAMP S
13'-0"
PROPOSED
COMPOSITE
DEPTH
EXISTING GROUND
RAMP S
PVI STA. 338+82.18 ~ ℄ NB I-235
ELEV.= 1201.11
HIGH POINT STA. 339+70.14
ELEV.= 1200.91 ~ ℄ NB I-235
PVI STA. 340+71.32 ~ ℄ NB I-235
ELEV.= 1200.77
0.81%
-0.18%
PVC STA. 337+44.68 ~ ℄ NB I-235
ELEV.= 1200.00
275.00' VC
K= 278.08
DESIGN SPEED = 70 MPH
PVT STA. 340+19.68 ~ ℄ NB I-235
ELEV.= 1200.87

PRELIMINARY

$DATE$ $TIME$
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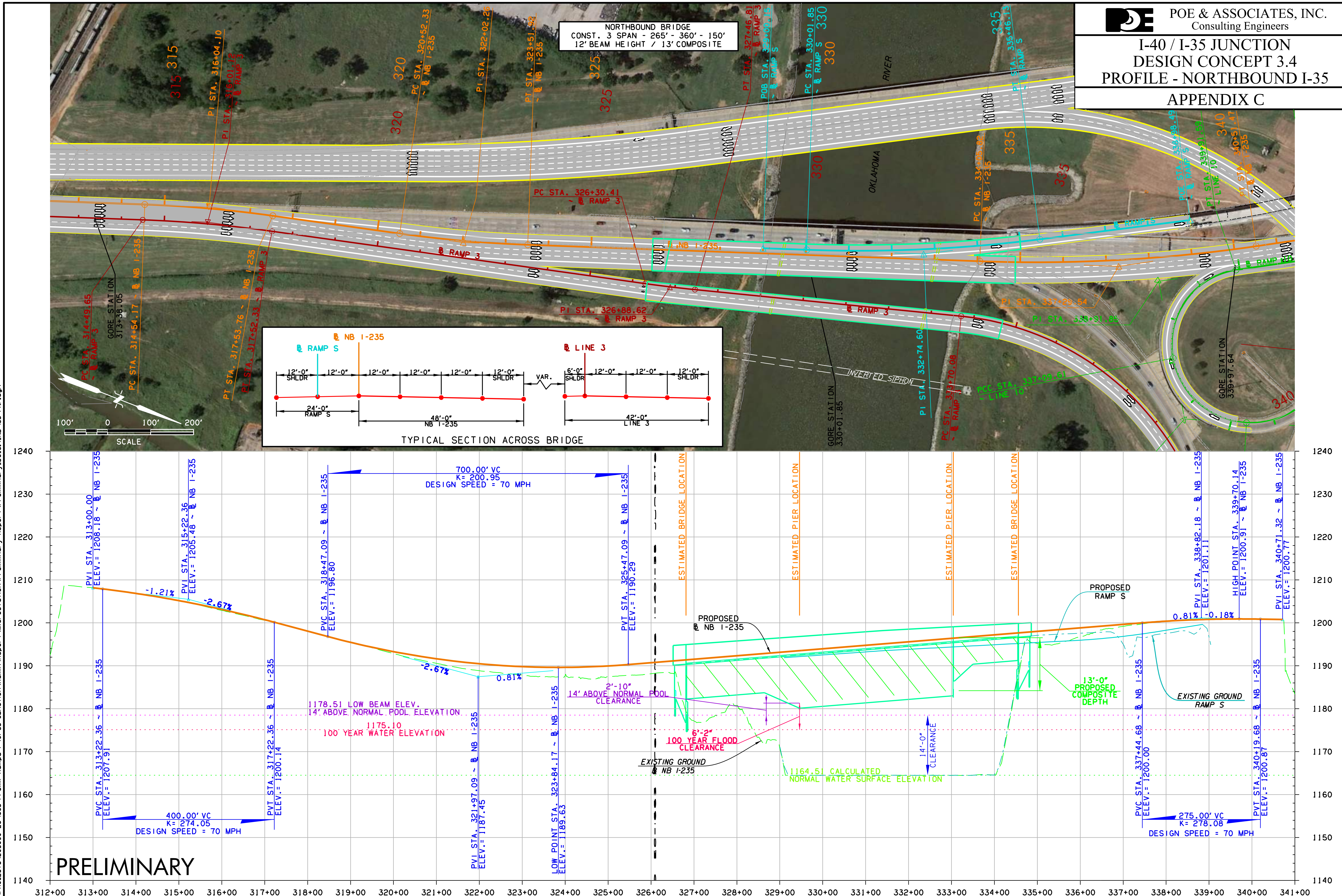
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
PROFILE - NORTHBOUND I-35

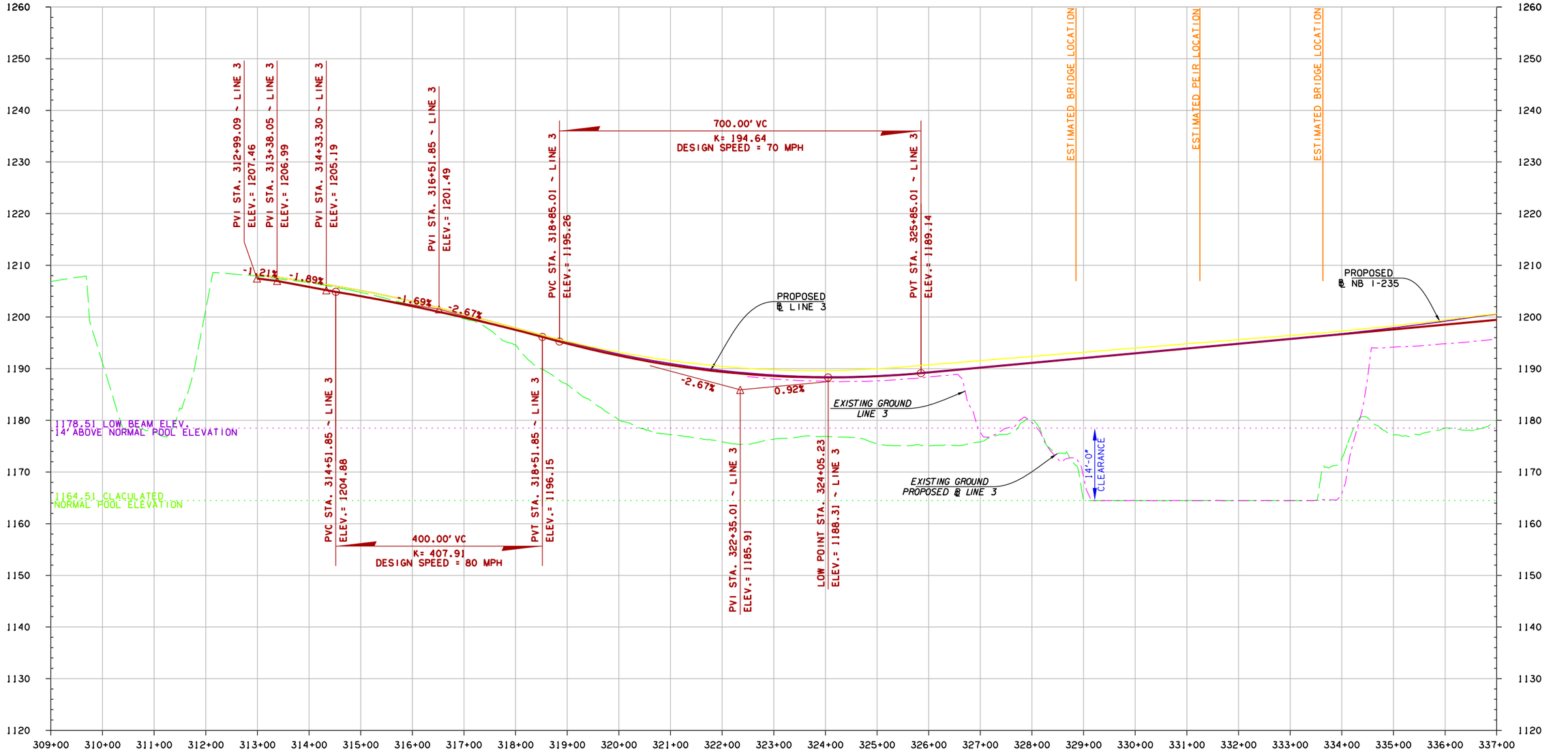
APPENDIX C



POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
PROFILE - LINE 3 - 1 of 2

APPENDIX C



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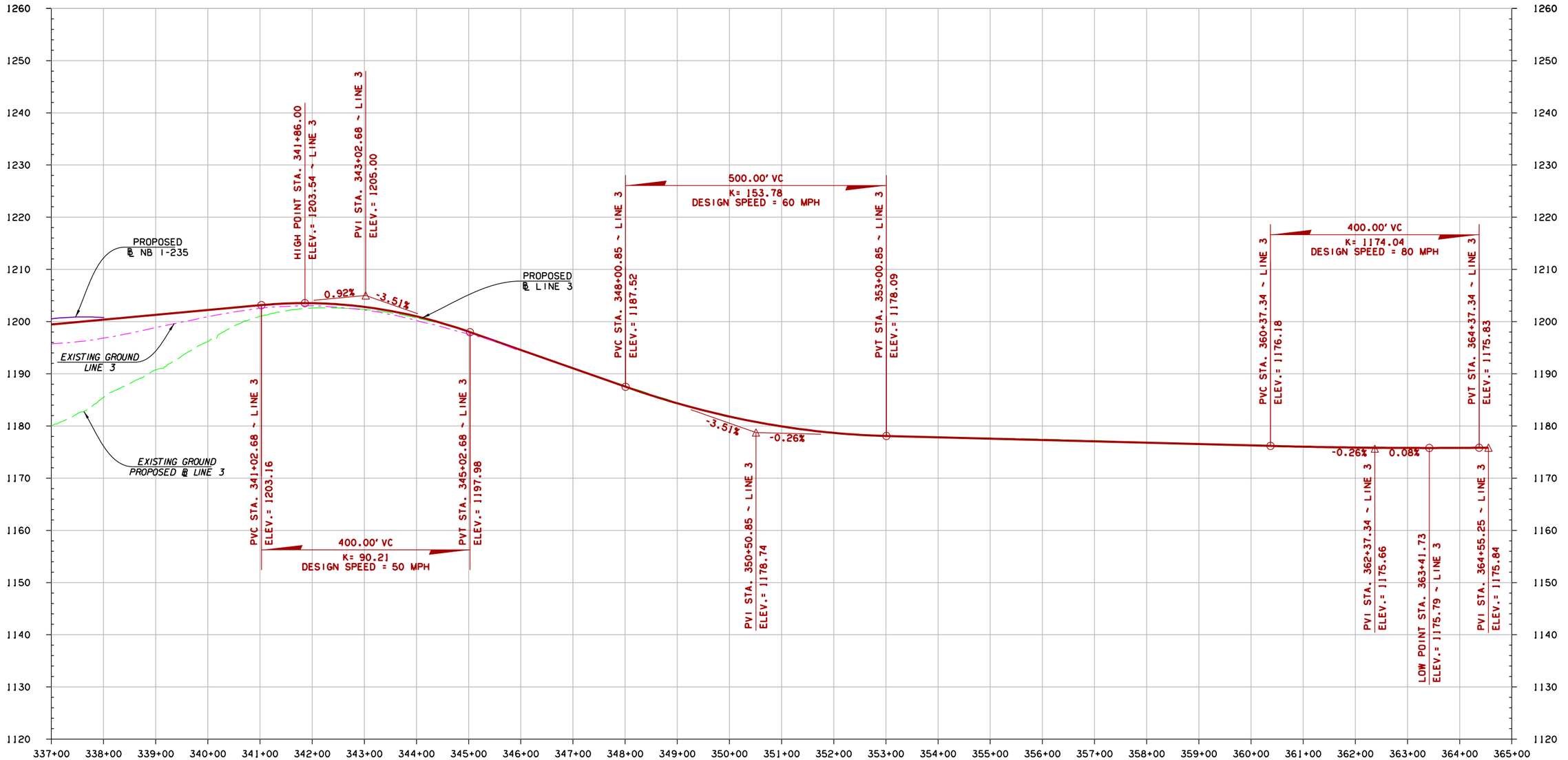
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
PROFILE - LINE 3 - 2 of 2

APPENDIX C



PRELIMINARY

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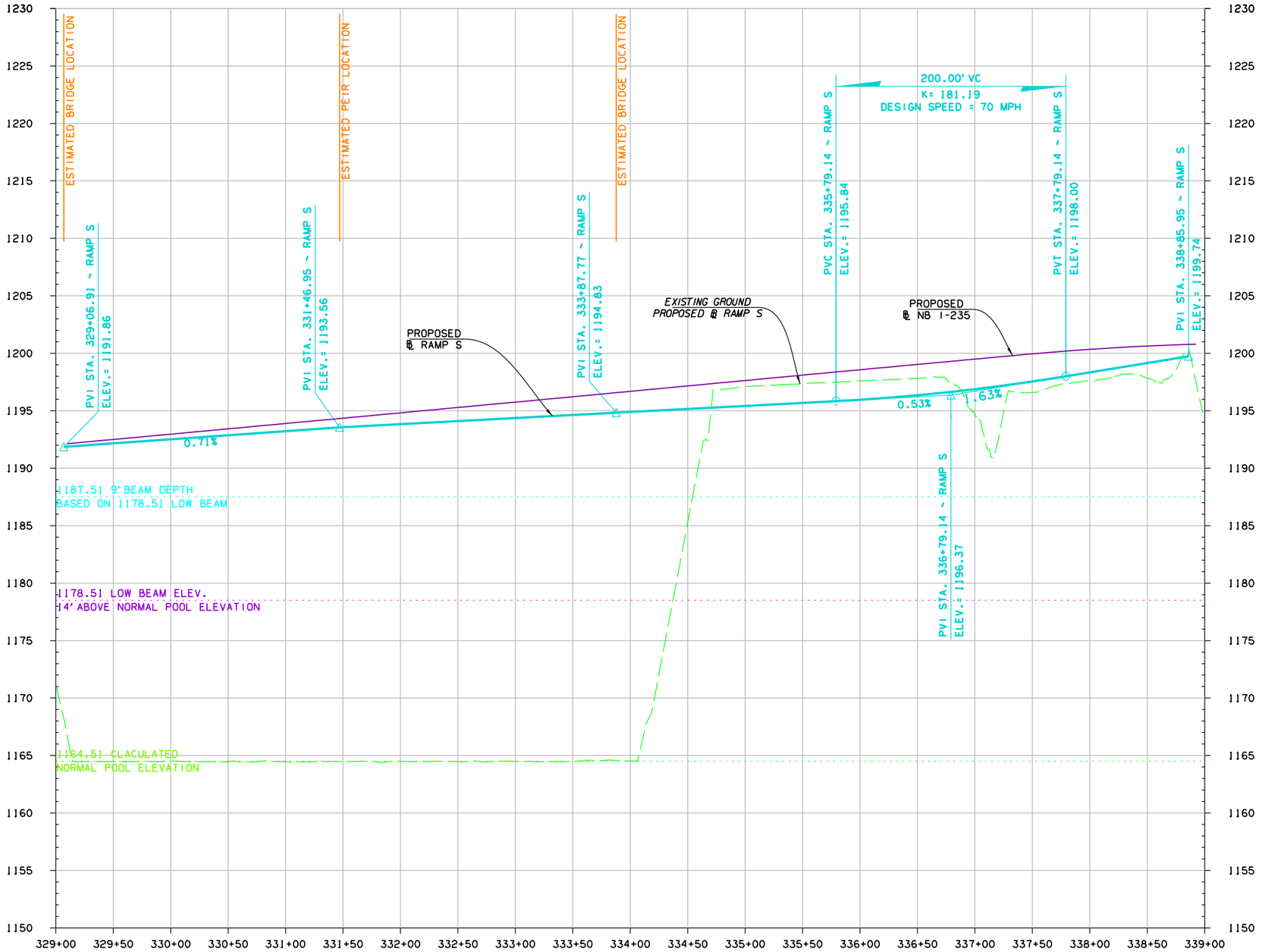
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
PROFILE - RAMP S

APPENDIX C



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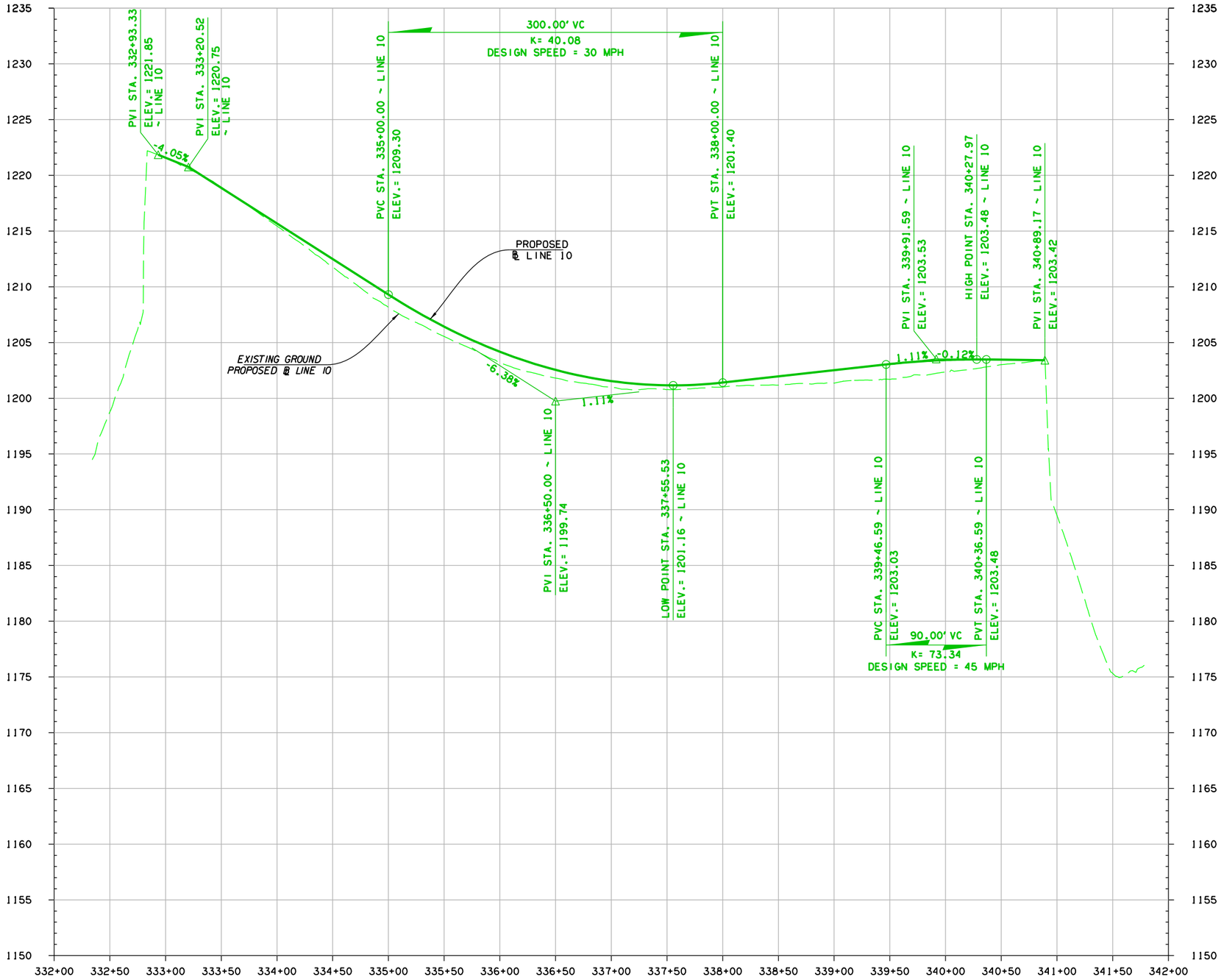
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
PROFILE - LINE 10

APPENDIX C



LINE	SURFACE	OFFSET
	Existing*Lidar0.00	

PRELIMINARY

$DATE$ $TIME$
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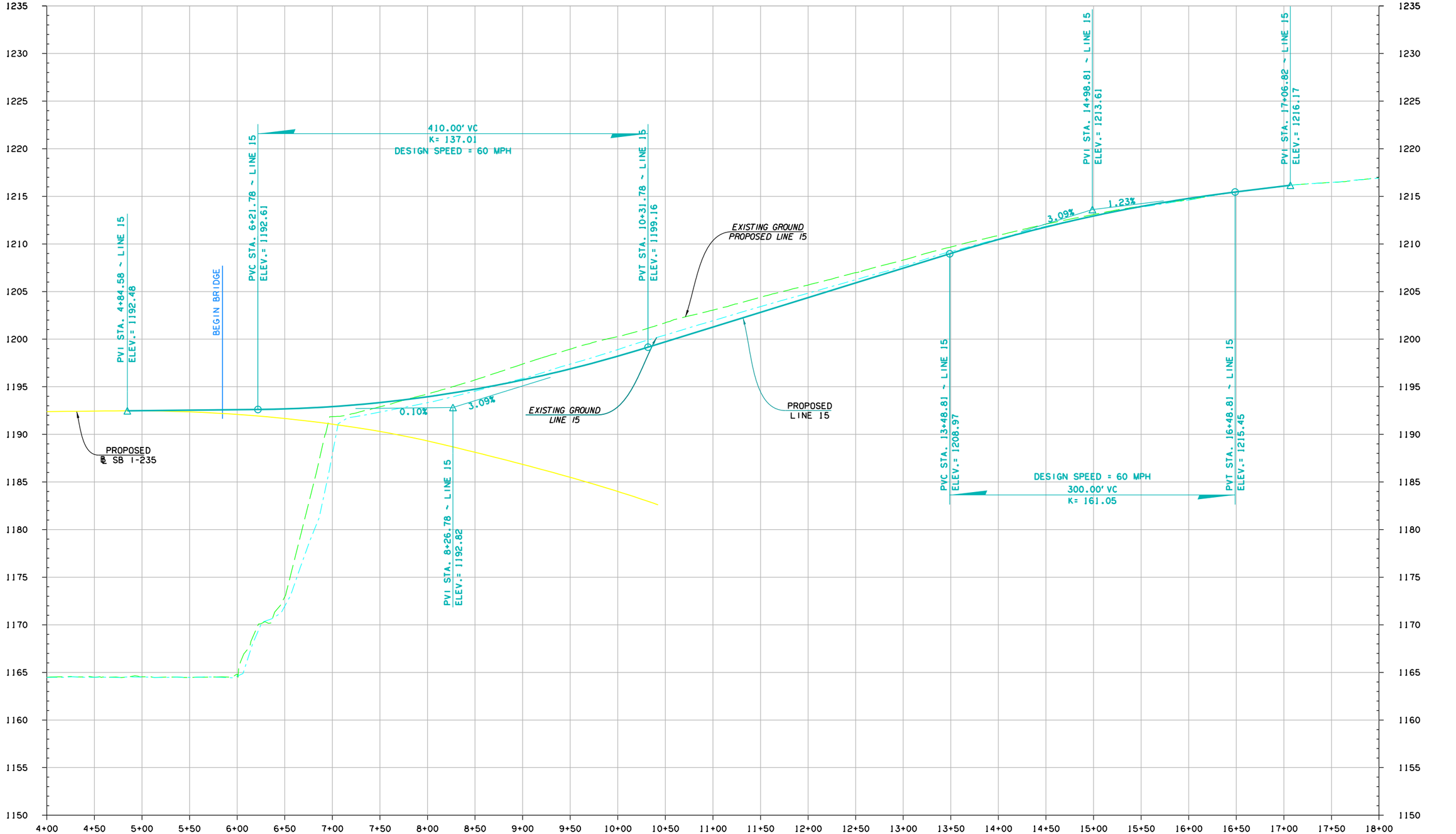
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
PROFILE - LINE 15

APPENDIX C



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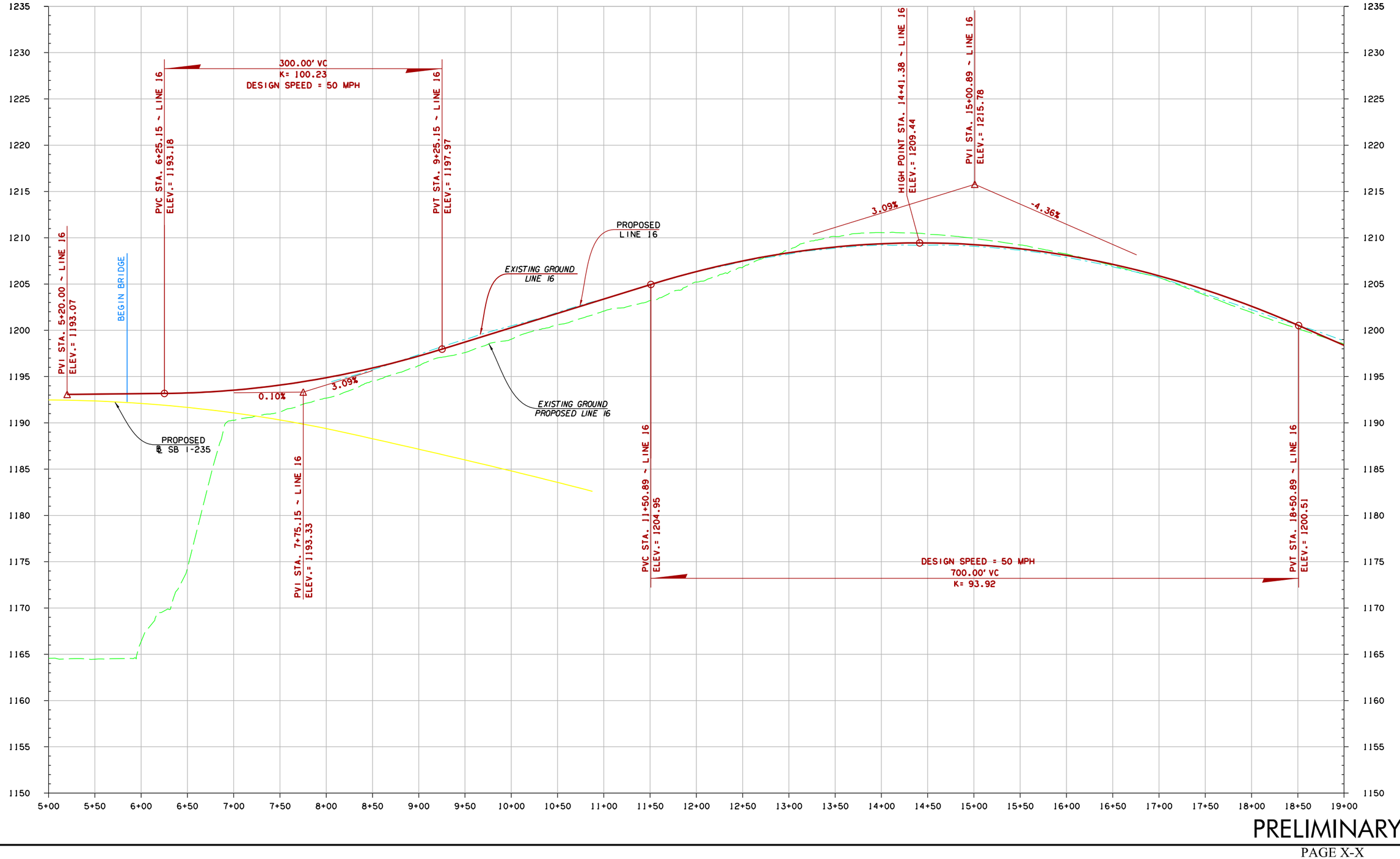
PRELIMINARY

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
PROFILE - LINE 16

APPENDIX C



PRELIMINARY

$DATE$ $TIME$
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POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
SE 15th STREET
DESIGN CONCEPT 3.4-OPTION 1

APPENDIX C

NOT TO SCALE

PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

2/16/31 PM
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POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
SE 15th STREET
DESIGN CONCEPT 3.4-OPTION 2

APPENDIX C

NOT TO SCALE

S.E. 15th STREET

S I-35 SERVICE RD.

CARTER DRIVE

EASTERN AVENUE

S.E. 25th STREET

PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
SE 15th STREET
DESIGN CONCEPT 3.4-OPTION 3

APPENDIX C

NOT TO SCALE

PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

9:19:54 AM
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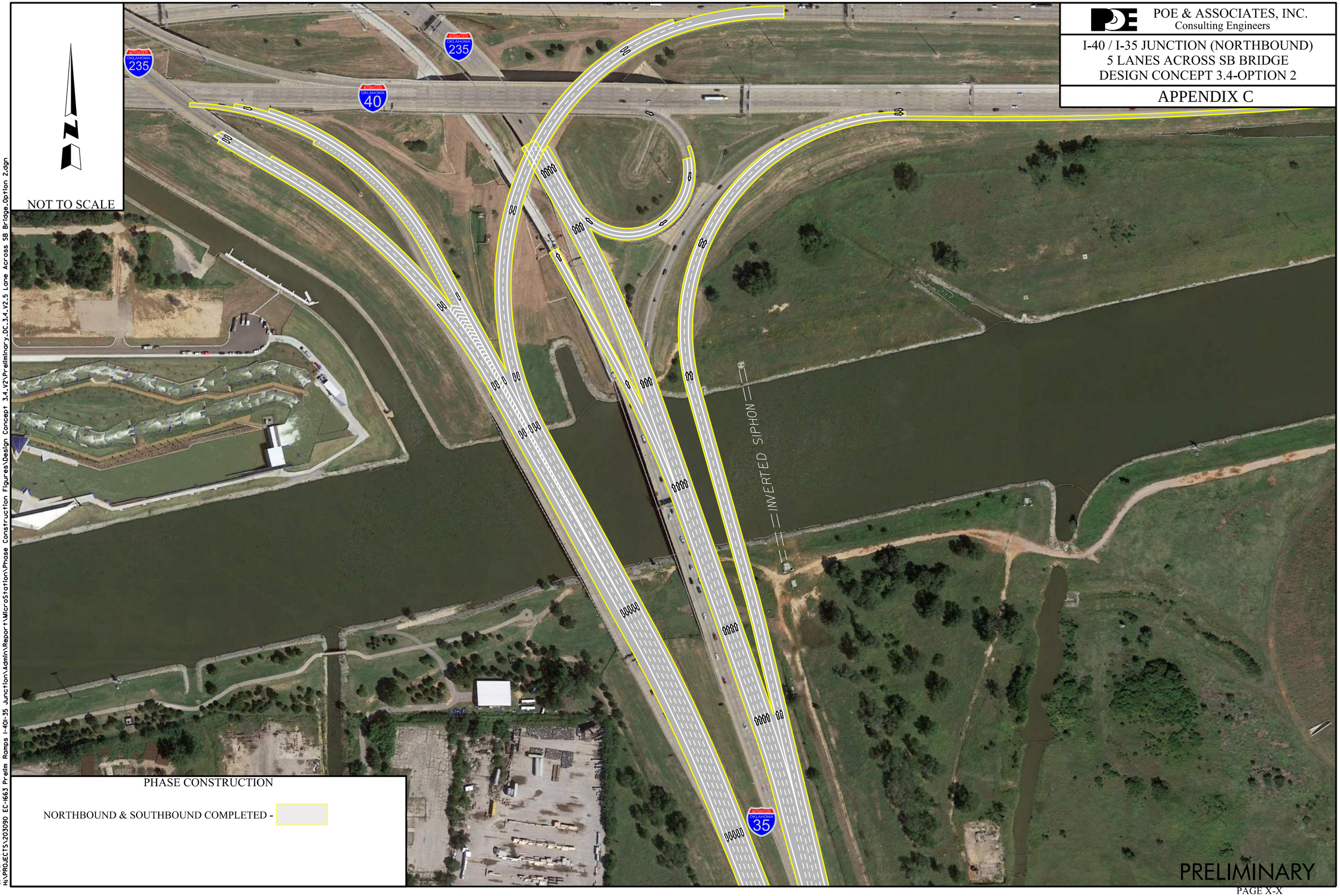
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
5 LANES ACROSS SB BRIDGE
DESIGN CONCEPT 3.4-OPTION 2

APPENDIX C

NOT TO SCALE



PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

8:47:9 AM
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POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
PLAN/ELEVATION - NB I-35

APPENDIX C

NORTHBOUND BRIDGE
CONST. 3 SPAN - 265' - 360' - 150'
12' BEAM HEIGHT / 13' COMPOSITE

30' 0 30' 60'

OKLAHOMA RIVER

6 RACING LANES: 5.00 m (16.41') BUFFER; 12 m (39.37') LANE 1; 12 m (39.37') LANE 2; 12 m (39.37') LANE 3; 12 m (39.37') LANE 4; 12 m (39.37') LANE 5; 12 m (39.37') LANE 6; 12 m (39.37') LANE 7; 12 m (39.37') LANE 8; 5.00 m (16.41') BUFFER

330

335

72'-0" CLEAR ROADWAY

℄ NORTHBOUND I-235

7.50 m (24.61') BUFFER; 13 m (42.65') LANE 1; 13 m (42.65') LANE 2; 13 m (42.65') LANE 3; 13 m (42.65') LANE 4; 13 m (42.65') LANE 5; 13 m (42.65') LANE 6; 13 m (42.65') LANE 7; 7.50 m (24.61') BUFFER; 7 RACING LANES

42'-0" CLR ROADWAY

℄ N.B. I-35

330

347.77' = 106 m

352.77' = 107.52 m

PLAN

72'-0" CLEAR ROADWAY
PROP ℄ NB I-235

42'-0" CLEAR ROADWAY
PROP ℄ NB I-35

PROPOSED SECTION

1240
1220
1200
1180
1160
1140

3:1 (NORM.) RIP-RAP

PROPOSED GROUND ℄ NB I-235

EXISTING GROUND ℄ NB I-235

14' MIN

1175.10 100 YEAR FLOOD ELEV.

BUFFER LANE 1 LANE 2 LANE 3 LANE 4 LANE 5 LANE 6 LANE 7 BUFFER

1164.51 CALCULATED NORMAL WATER SURFACE ELEVATION

PROPOSED ℄ NB I-235

EST. FOUNDATION LINE

327+00 330+00 335+00

ELEVATION

PRELIMINARY

$DATE$ $TIME$
H:\PROJECTS\203090 EC-1663 Prelim Ramps I-40-35 Junction\Admin\Report\Bridge\Preliminary_3.4_NB_GPE.dgn

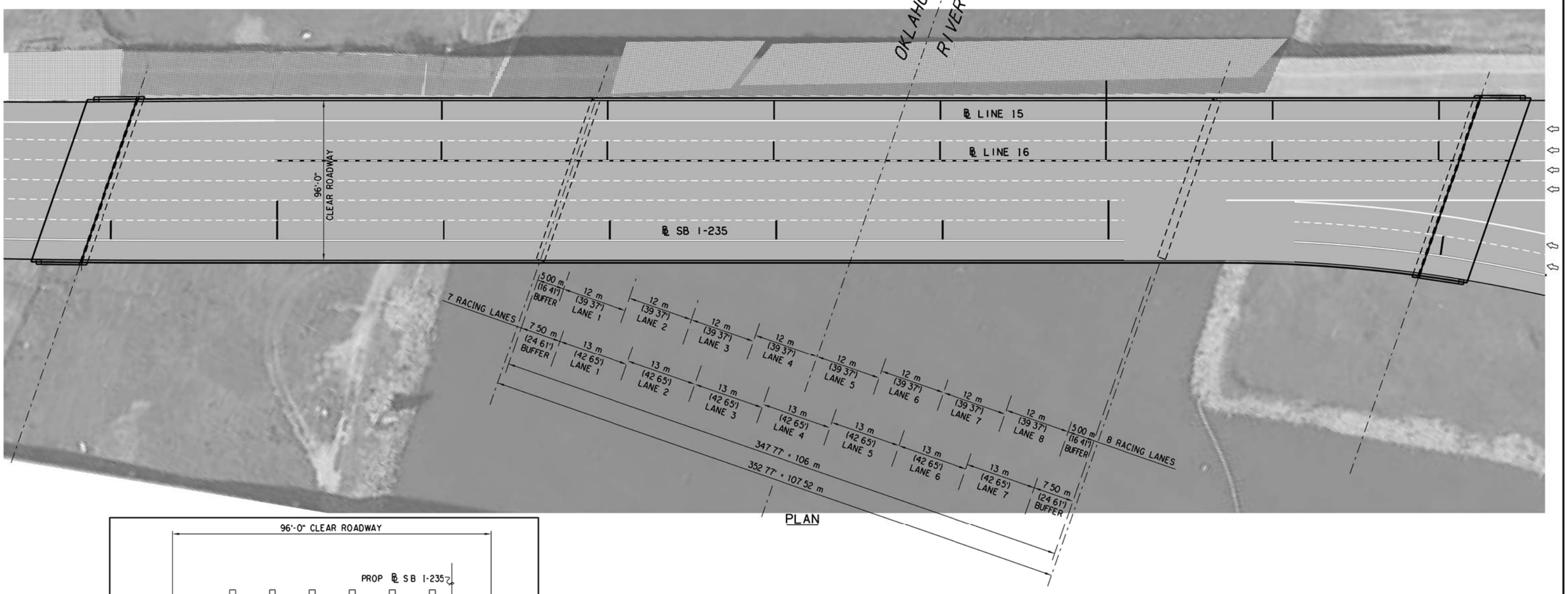
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
PLAN/ELEVATION - SB I-35

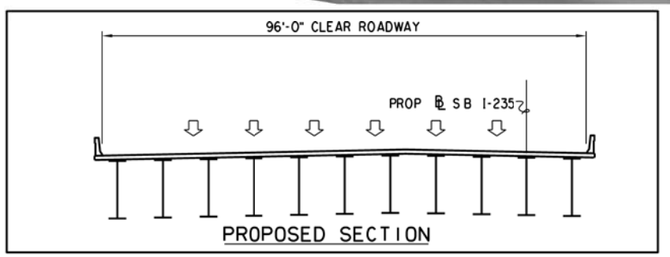
APPENDIX C

SOUTHBOUND BRIDGE
CONST. 3 SPAN - 275' - 375' - 135'
12' BEAM HEIGHT / 13' COMPOSITE

30' 0 30' 60'



PLAN



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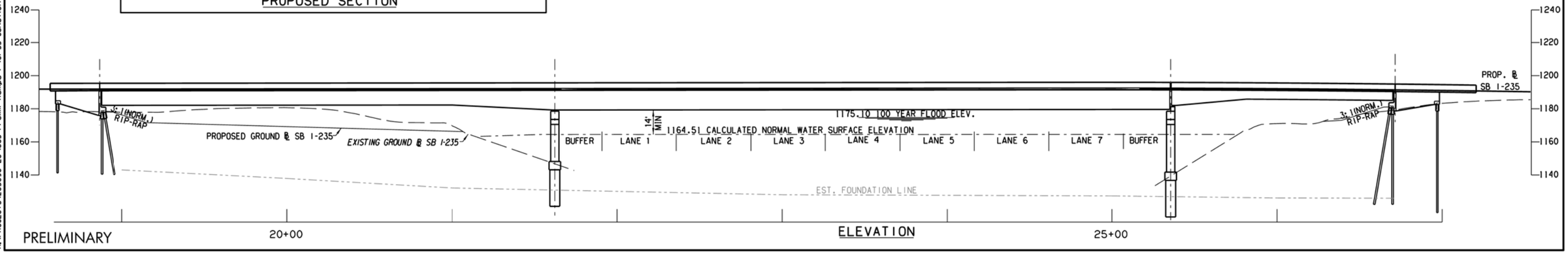

ELEVATION

PRELIMINARY

$DATE$ $TIME$
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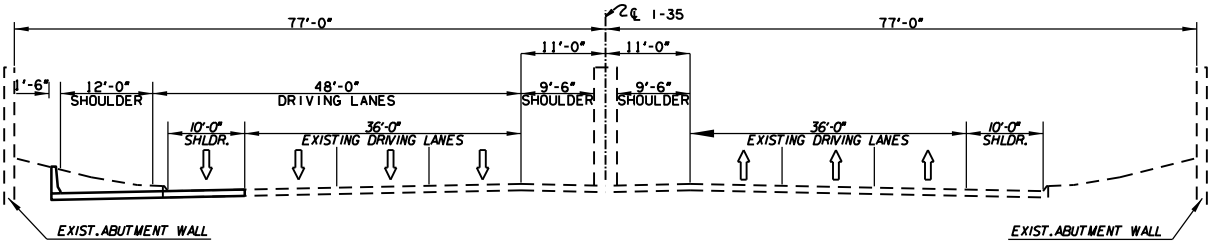

TYPICAL SECTION I-35 @ S.E.15TH ST.

PRELIMINARY

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
TYPICAL SECTION I-35 @ S.E. 15TH STREET

APPENDIX C

8:33:37 AM
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APPENDIX D - Retaining Walls

APPENDIX D

PREFERRED DESIGN CONCEPT 3.4								
MSE WALL	BEGINNING STATION	ENDING STATION	LOCATION	LENGTH OF WALL	Avg. Height FEET	TOTAL SQ. YD.	UNIT COST/SY	TOTAL COST
SB1	18+40	20+80	I-35 S.B. O.S.	240	8	213	$825.00	$176,000.00
SB2	25+80	34+90	I-35 S.B. TO 15TH ST. O.S.	980	8	871	$825.00	$718,666.67
SB3	26+10	31+70	I-35 S.B. O.S.	560	8	498	$825.00	$410,666.67
SB4	64+10	68+10	I-40 W.B. TO I-35 S.B. I.S.	400	8	356	$825.00	$293,333.33
SB5	7+60	18+80	I-235 S.B. O.S.	1100	8	978	$825.00	$806,666.67
NB1	312+10	326+40	I-35 N.B. TO I-40 E.B. O.S.	1430	8	1271	$825.00	$1,048,666.67
NB2	334+60	341+20	I-35 N.B. TO I-40 E.B. O.S.	610	8	542	$825.00	$447,333.33
NB3	335+00	339+00	I-35 N.B. TO OKC BLVD. I.S.	400	8	356	$825.00	$293,333.33
						TOTAL		$4,194,666.67

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
RETAINING WALL LOCATIONS

APPENDIX D

NOT TO SCALE

PROPOSED RETAINING WALL LOCATION

PROPOSED SLOPE WALL LOCATION

PROPOSED SLOPE WALL LOCATION

PROPOSED RETAINING WALL LOCATION

PROPOSED RETAINING WALL LOCATION

PROPOSED RETAINING WALL LOCATION

INVERTED SIPHON

PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
SE 15th STREET
RETAINING WALL LOCATIONS

APPENDIX D

NOT TO SCALE

PROPOSED RETAINING WALL LOCATION

PROPOSED RETAINING WALL LOCATION

PROPOSED SLOPE WALL LOCATION

S.E. 15th STREET

S I-35 SERVICE RD.

CARTER DRIVE

EASTERN AVENUE

S.E. 25th STREET

INTERSTATE OKLAHOMA 35

PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

APPENDIX E -
Construction Cost Estimates

Compiled on 10/31/2023/2023

Cost Estimate (Q4 2023 Dollars)	
Item	**Cost**
Roadway	
Construction	$26,450,000
Other Items (Traffic Control, Striping, Etc.)	$5,050,000
Contigency (30%)	$9,450,000
Roadway Total	**$40,950,000**
Bridge	
I-35 SB over Oklahoma River	$42,660,000
I-35 NB over Oklahoma River	$30,510,000
I-35 Ramp over Oklahoma River	$18,630,000
Double 10'x10'RCB Extension	$270,000
I-35 over Stillwater RR Bridge Rehab	$2,520,000
Contigency (30%)	$28,377,000
Bridge Total	**$122,967,000**
Project Total (Exclude MM Ped Bridge)	**$163,917,000**
Multi-Modal Pedestrian Bridge	
Pedestrian Bridge over Oklahoma River	$13,400,000
Total	**$13,400,000**
Grand Total	**$177,317,000**

Dallas Junction

PRELIMINARY COST ESTIMATE (Q4 2023 Dollars)

10-31-2023

& ASSOCIATES, INC.

Major Items							
Roadway							
Payitem			Quantity		Price per Unit		Total
202(D)	0184	Unclassified Borrow	13,690	CY	$ 12.00	$	170,000.00
303(A)	2100	Aggregate Base Type A	30,380	CY	$ 67.50	$	2,060,000.00
307(K)	4300	Stabilized Subgrade	144,410	SY	$ 7.00	$	1,020,000.00
317	4270	Cement Treated Base	128,960	SY	$ 19.00	$	2,460,000.00
325	5271	Separator Fabric	144,410	SY	$ 2.00	$	290,000.00
408	5774	Prime Coat	80,080	GAL	$ 4.50	$	370,000.00
414(B)	5725	Dowel Jointed P.C.C. Pvt. (Placement)	121,000	SY	$ 28.00	$	3,390,000.00
414(G)	5275	P.C. Concrete for Pavement	40,340	CY	$ 195.00	$	7,870,000.00
					Roadway Total:	$	17,630,000.00
Earthwork							
		Preliminary Earthwork Estimate (50%)				$	8,820,000.00
					Earthwork Totals:	$	8,820,000.00
Bridge							
		I-35 SB over Oklahoma River					$42,660,000.00
		I-35 NB over Oklahoma River					$30,510,000.00
		I-35 Ramp over Oklahoma River					$18,630,000.00
		I-35 over Stillwater RR Bridge Rehab (NB & SB)				$	2,520,000.00
		Double 10'x10'RCB Extension				$	270,000.00
					Bridge Totals:	$	94,590,000.00
					Major Items Total:	$	121,040,000.00
						$	26,450,000.00
Minor Items							
		Erosion Control				$	490,000.00
		Clearing & Grubbing & Removals				$	470,000.00
		Misc. Pipe Underdrain, Guardrail, Etc.				$	350,000.00
		Construction Traffic Control				$	1,290,000.00
		Storm Sewer, Drainage				$	1,050,000.00
		Traffic Control				$	700,000.00
		Signing & Marking				$	700,000.00
					Minor Items Total:	$	5,050,000.00
					Major Items + Minor Items Total:	$	126,090,000.00
					30% Contengency	$	37,827,000.00
					Grand Total:	$	163,917,000.00

Bridge Cost Estimates (Q4 2023 Unit Price)

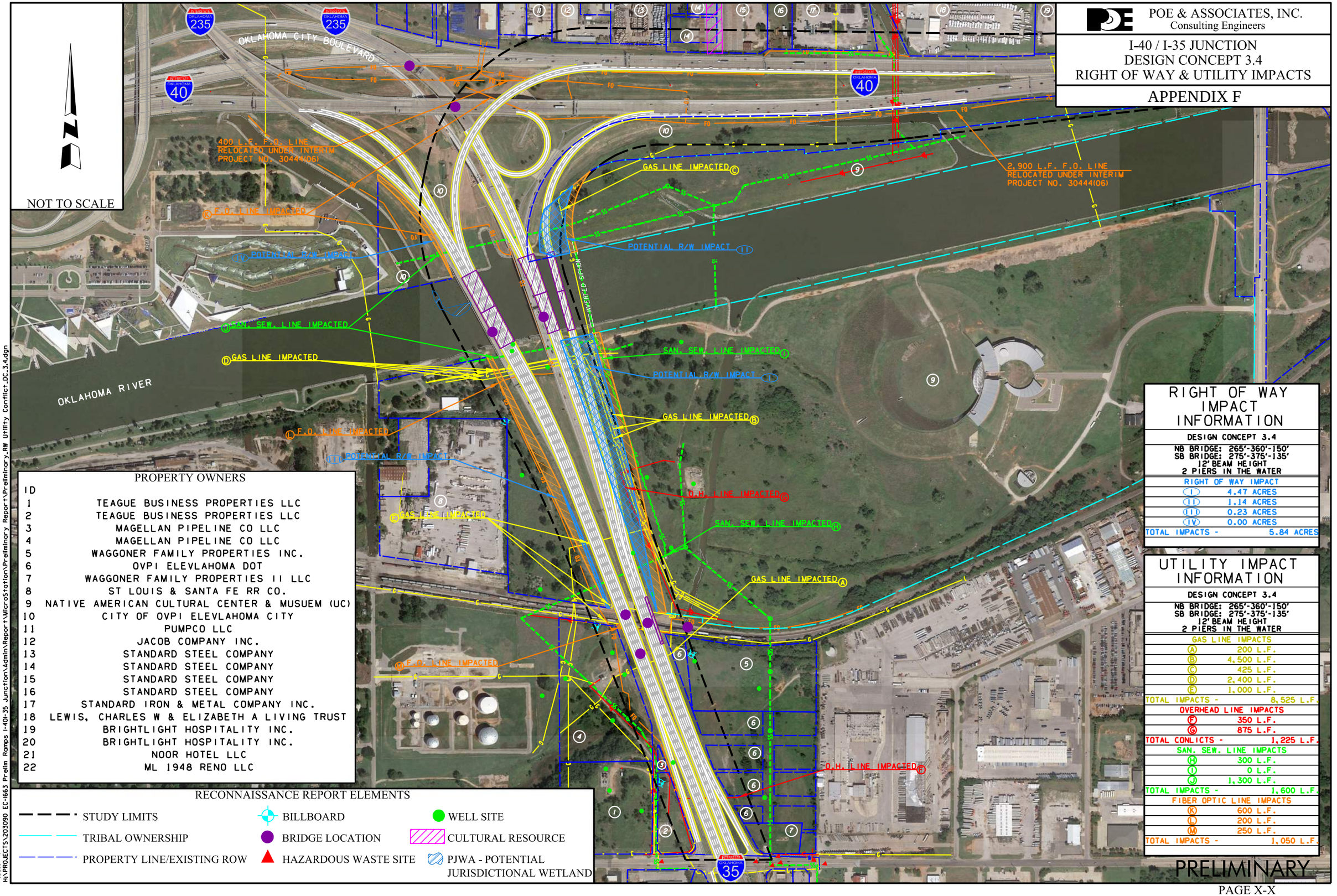
I-35 SB OVER OKLAHOMA RIVER					
ITEM NO.	**DESCRIPTION**	**UNIT**	**QUANT**	**UNIT COST**	**TOTAL COST**
504 (A)	APPROACH SLAB	SY	660	$315.00	$210,000.00
504 (E)	42" F-SHAPED PARAPET	LF	1,700	$130.00	$230,000.00
506 (A)	STRUCTURAL STEEL	LB	12,500,000	$2.91	$36,380,000.00
507 (A)	STAINLESS STEEL FIXED BEARING ASSEMBLY	EA	55	$3,500.00	$200,000.00
507 (B)	STAINLESS STEEL EXPANSION BEARING ASSEMBLY	EA			
509 (A)	CLASS AA CONCRETE	CY	2,350	$860.00	$2,030,000.00
509 (B)	CLASS A CONCRETE	CY	1,300	$900.00	$1,170,000.00
511 (B)	EPOXY COATED REINFORCING STEEL	LB	800,000	$1.90	$1,520,000.00
516 (A)	DRILLED SHAFTS 72" DIAMETER	LF	400	$2,000.00	$800,000.00
601 (B)	TYPE I-A PLAIN RIPRAP	TON	1,500	$80.00	$120,000.00
	CONSTRUCTION TOTAL				$42,660,000.00
	10% CONTINGENCY				$4,266,000.00
	BRIDGE TOTAL				**$46,926,000.00**

I-35 NB OVER OKLAHOMA RIVER					
ITEM NO.	**DESCRIPTION**	**UNIT**	**QUANT**	**UNIT COST**	**TOTAL COST**
504 (A)	APPROACH SLAB	SY	650	$315.00	$210,000.00
504 (E)	42" F-SHAPED PARAPET	LF	1,650	$130.00	$220,000.00
506 (A)	STRUCTURAL STEEL	LB	8,750,000	$2.90	$25,380,000.00
507 (A)	STAINLESS STEEL FIXED BEARING ASSEMBLY	EA	45	$3,500.00	$160,000.00
507 (B)	STAINLESS STEEL EXPANSION BEARING ASSEMBLY	EA			
509 (A)	CLASS AA CONCRETE	CY	2,000	$860.00	$1,720,000.00
509 (B)	CLASS A CONCRETE	CY	950	$900.00	$860,000.00
511 (B)	EPOXY COATED REINFORCING STEEL	LB	650,000	$1.90	$1,240,000.00
516 (A)	DRILLED SHAFTS 72" DIAMETER	LF	300	$2,000.00	$600,000.00
601 (B)	TYPE I-A PLAIN RIPRAP	TON	1,400	$80.00	$120,000.00
	CONSTRUCTION TOTAL				$30,510,000.00
	10% CONTINGENCY				$3,051,000.00
	BRIDGE TOTAL				**$33,561,000.00**

I-35 RAMP OVER OKLAHOMA RIVER					
ITEM NO.	**DESCRIPTION**	**UNIT**	**QUANT**	**UNIT COST**	**TOTAL COST**
504 (A)	APPROACH SLAB	SY	300	$315.00	$100,000.00
504 (E)	42" F-SHAPED PARAPET	LF	1,650	$130.00	$220,000.00
506 (A)	STRUCTURAL STEEL	LB	5,400,000	$2.90	$15,660,000.00
507 (A)	STAINLESS STEEL FIXED BEARING ASSEMBLY	EA	25	$3,500.00	$90,000.00
507 (B)	STAINLESS STEEL EXPANSION BEARING ASSEMBLY	EA			
509 (A)	CLASS AA CONCRETE	CY	1,000	$860.00	$860,000.00
509 (B)	CLASS A CONCRETE	CY	550	$900.00	$500,000.00
511 (B)	EPOXY COATED REINFORCING STEEL	LB	350,000	$2.00	$700,000.00
516 (A)	DRILLED SHAFTS 72" DIAMETER	LF	200	$2,000.00	$400,000.00
601 (B)	TYPE I-A PLAIN RIPRAP	TON	1,200	$80.00	$100,000.00
	CONSTRUCTION TOTAL				$18,630,000.00
	10% CONTINGENCY				$1,863,000.00
	BRIDGE TOTAL				**$20,493,000.00**

PED BRIDGE OVER OKLAHOMA RIVER					
ITEM NO.	**DESCRIPTION**	**UNIT**	**QUANT**	**UNIT COST**	**TOTAL COST**
504 (A)	APPROACH SLAB	SY	150	$315.00	$47,250.00
504 (E)	CONCRETE PARAPET	LF	1,700	$130.00	$221,000.00
506 (A)	STRUCTURAL STEEL	LB	2,300,000	$3.00	$6,900,000.00
507 (A)	STAINLESS STEEL FIXED BEARING ASSEMBLY	EA	10	$3,500.00	$35,000.00
507 (B)	STAINLESS STEEL EXPANSION BEARING ASSEMBLY	EA			
509 (A)	CLASS AA CONCRETE	CY	520	$850.00	$442,000.00
509 (B)	CLASS A CONCRETE	CY	300	$895.00	$268,500.00
511 (B)	EPOXY COATED REINFORCING STEEL	LB	205,000	$1.90	$389,500.00
516 (A)	DRILLED SHAFTS 72" DIAMETER	LF	100	$2,000.00	$200,000.00
601 (B)	TYPE I-A PLAIN RIPRAP	TON	600	$80.00	$48,000.00
	CONSTRUCTION TOTAL				$8,551,250.00
	10% CONTINGENCY				$855,125.00
	CITY OF OKC MAPS 4 AESTHETICS ETC.				$4,000,000.00
	BRIDGE TOTAL				**$13,406,375.00**
510(D)	MSE RETAINING WALL (NORTH BANK)	SY	4,000	$850.00	$3,400,000.00
	MULTIMODAL TRAIL (NORTH BANK)	LF	2,000	$122.00	$244,000.00
	MULTIMODAL RAMP (NORTH BANK)	LF	500	$1,300.00	$650,000.00
	MULTIMODAL TRAIL (SOUTH BANK)	LF	800	$122.00	$97,600.00
	MULTIMODAL RAMP (SOUTH BANK)	LF	500	$1,300.00	$650,000.00
	MULTIMODAL TRAIL (SOUTH BANK OKANA EXTENSION)	LF	900	$122.00	$109,800.00
504(F)	HANDRAILING	LF	2,800	$30.00	$84,000.00
	CONSTRUCTION TOTAL				$5,235,400.00
	30% CONTINGENCY				$1,570,620.00
	TRAIL TOTAL				**$6,806,020.00**
	BRIDGE & TRAIL TOTAL				

APPENDIX F -
Right-of-Way and Utility Impacts



PROPERTY OWNERS

ID	
1	TEAGUE BUSINESS PROPERTIES LLC
2	TEAGUE BUSINESS PROPERTIES LLC
3	MAGELLAN PIPELINE CO LLC
4	MAGELLAN PIPELINE CO LLC
5	WAGGONER FAMILY PROPERTIES INC.
6	OVPI ELEVLAHOMA DOT
7	WAGGONER FAMILY PROPERTIES II LLC
8	ST LOUIS & SANTA FE RR CO.
9	NATIVE AMERICAN CULTURAL CENTER & MUSUEM (UC)
10	CITY OF OVPI ELEVLAHOMA CITY
11	PUMPCO LLC
12	JACOB COMPANY INC.
13	STANDARD STEEL COMPANY
14	STANDARD STEEL COMPANY
15	STANDARD STEEL COMPANY
16	STANDARD STEEL COMPANY
17	STANDARD IRON & METAL COMPANY INC.
18	LEWIS, CHARLES W & ELIZABETH A LIVING TRUST
19	BRIGHTLIGHT HOSPITALITY INC.
20	BRIGHTLIGHT HOSPITALITY INC.
21	NOOR HOTEL LLC
22	ML 1948 RENO LLC

RECONNAISSANCE REPORT ELEMENTS

- STUDY LIMITS
- TRIBAL OWNERSHIP
- PROPERTY LINE/EXISTING ROW
- BILLBOARD
- BRIDGE LOCATION
- HAZARDOUS WASTE SITE
- WELL SITE
- CULTURAL RESOURCE
- PJWA - POTENTIAL JURISDICTIONAL WETLAND

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
RIGHT OF WAY & UTILITY IMPACTS

APPENDIX F

RIGHT OF WAY IMPACT INFORMATION

DESIGN CONCEPT 3.4

NB BRIDGE: 265'-360'-150'
SB BRIDGE: 275'-375'-135'
12' BEAM HEIGHT
2 PIERS IN THE WATER

RIGHT OF WAY IMPACT	
(I)	4.47 ACRES
(II)	1.14 ACRES
(III)	0.23 ACRES
(IV)	0.00 ACRES
TOTAL IMPACTS -	5.84 ACRES

UTILITY IMPACT INFORMATION

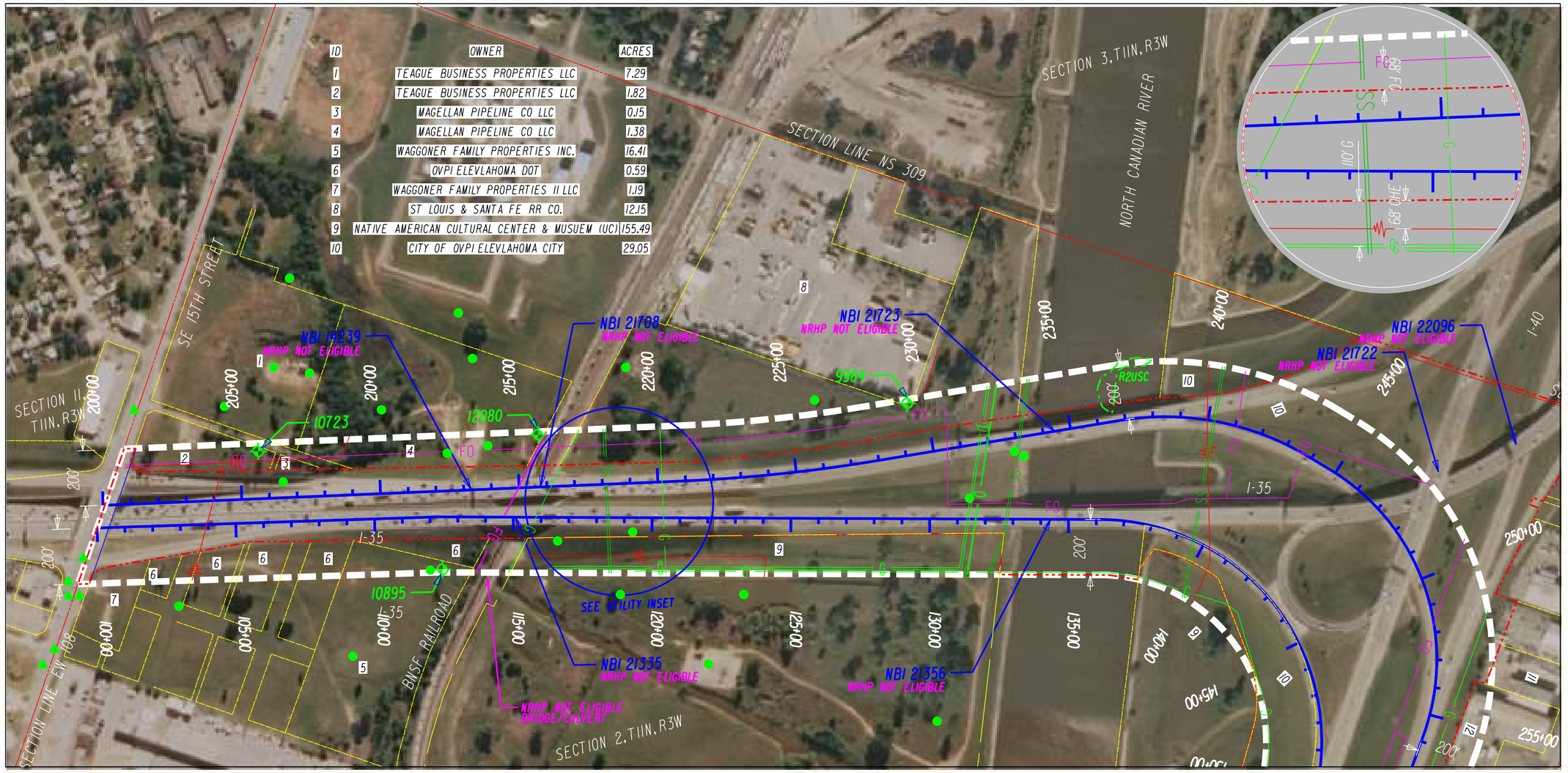
DESIGN CONCEPT 3.4

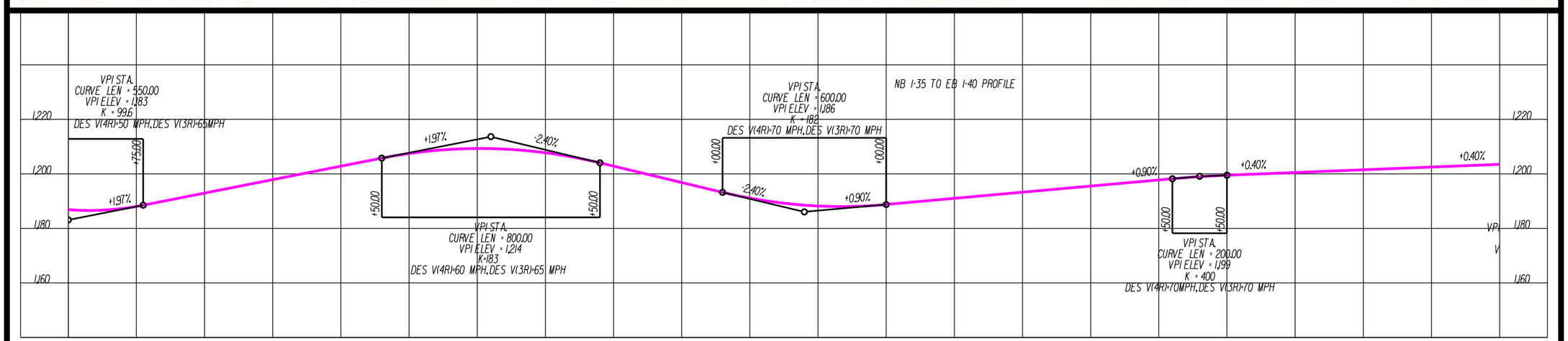
NB BRIDGE: 265'-360'-150'
SB BRIDGE: 275'-375'-135'
12' BEAM HEIGHT
2 PIERS IN THE WATER

GAS LINE IMPACTS	
(A)	200 L.F.
(B)	4,500 L.F.
(C)	425 L.F.
(D)	2,400 L.F.
(E)	1,000 L.F.
TOTAL IMPACTS -	8,525 L.F.
OVERHEAD LINE IMPACTS	
(F)	350 L.F.
(G)	875 L.F.
TOTAL CONLICTS -	1,225 L.F.
SAN. SEW. LINE IMPACTS	
(H)	300 L.F.
(I)	0 L.F.
(J)	1,300 L.F.
TOTAL IMPACTS -	1,600 L.F.
FIBER OPTIC LINE IMPACTS	
(K)	600 L.F.
(L)	200 L.F.
(M)	250 L.F.
TOTAL IMPACTS -	1,050 L.F.

PRELIMINARY

ID	OWNER	ACRES
1	TEAGUE BUSINESS PROPERTIES LLC	7.29
2	TEAGUE BUSINESS PROPERTIES LLC	1.82
3	MAGELLAN PIPELINE CO LLC	0.15
4	MAGELLAN PIPELINE CO LLC	1.38
5	WAGGONER FAMILY PROPERTIES INC.	16.41
6	OVPI ELEVLAHOMA DOT	0.59
7	WAGGONER FAMILY PROPERTIES II LLC	1.19
8	ST LOUIS & SANTA FE RR CO.	12.15
9	NATIVE AMERICAN CULTURAL CENTER & MUSUEM (UC)	155.49
10	CITY OF OVPI ELEVLAHOMA CITY	29.05





LEGEND

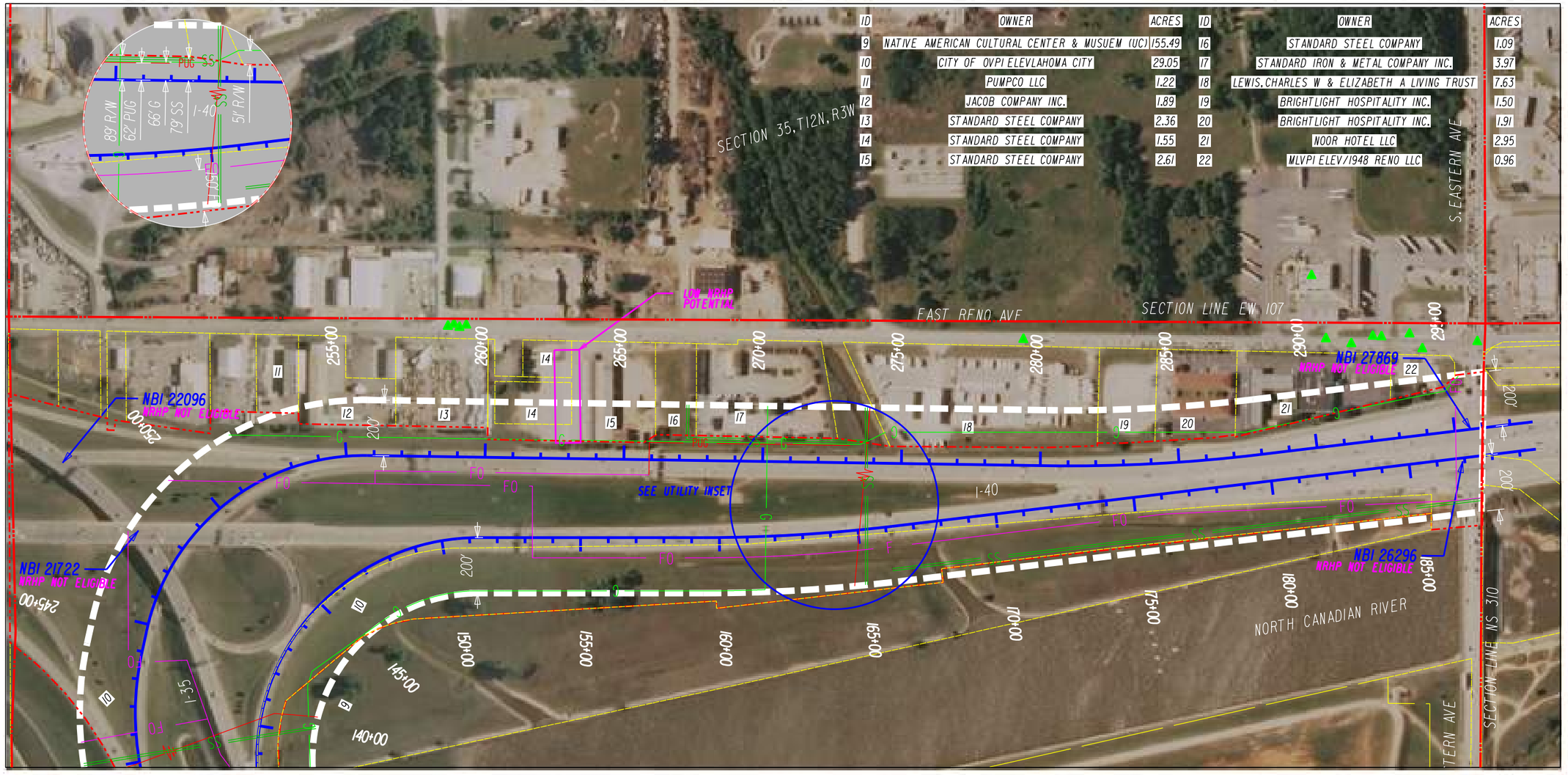
- STUDY LIMITS
- SECTION LINE
- PROJECT CENTERLINE
- TRIBAL OWNERSHIP
- PROPERTY LINE
- PROPERTY ID
- EXISTING ROW
- FO — FIBER OPTIC
- O — PETROLEUM PIPELINE
- TVUG — UNDERGROUND TELEVISION (NONE LOCATED IN PROJECT LIMITS)
- SS — SANITARY SEWER
- G — GAS
- PUG — UNDERGROUND POWER
- OVERHEAD POWER
- TUG — UNDERGROUND TELEPHONE (NONE LOCATED IN PROJECT LIMITS)
- T — OVERHEAD TELEPHONE (NONE LOCATED IN PROJECT LIMITS)
- W — WATER LINE
- CULTURAL RESOURCE
- PJWA - POTENTIAL JURISDICTIONAL WETLAND
- HAZARDOUS WASTE SITE
- WELL SITE
- BILLBOARD

STATIONS & PROFILE BASED ON PROJECT FAP FBIY-35-3(279)126, SHTS 18, 19, 22 AND FAP --351(3), SHT 34

0 200 400
SCALE

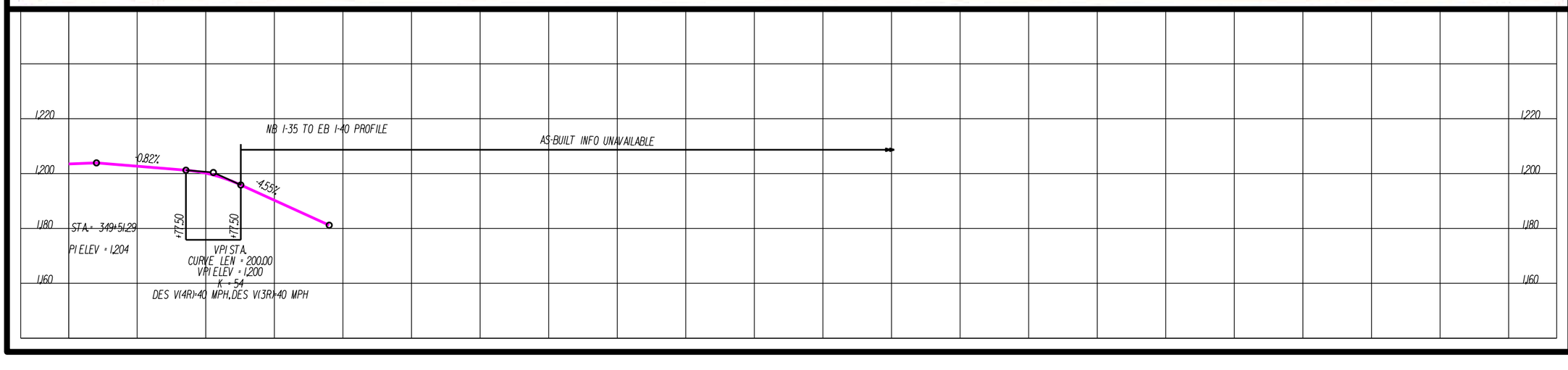
SCHEMMER
ARCHITECTS | ENGINEERS | PLANNERS

STUDY AREA LOCATION
I-35: ADD ADDITIONAL RAMPS FOR I-35 NB AND SB AT I-40/I-35 JCT
DIVISION 4, OKLAHOMA COUNTY
JP 30444(04)
SHT 4 OF 6



ID	OWNER	ACRES
9	NATIVE AMERICAN CULTURAL CENTER & MUSUEM (UC)	155.49
10	CITY OF OVPI ELEVLAHOMA CITY	29.05
11	PUMPCO LLC	1.22
12	JACOB COMPANY INC.	1.89
13	STANDARD STEEL COMPANY	2.36
14	STANDARD STEEL COMPANY	1.55
15	STANDARD STEEL COMPANY	2.61

ID	OWNER	ACRES
16	STANDARD STEEL COMPANY	1.09
17	STANDARD IRON & METAL COMPANY INC.	3.97
18	LEWIS, CHARLES W & ELIZABETH A LIVING TRUST	7.63
19	BRIGHTLIGHT HOSPITALITY INC.	1.50
20	BRIGHTLIGHT HOSPITALITY INC.	1.91
21	NOOR HOTEL LLC	2.95
22	MLVPI ELEV/1948 RENO LLC	0.96



LEGEND

- STUDY LIMITS
- SECTION LINE
- PROJECT CENTERLINE
- TRIBAL OWNERSHIP
- PROPERTY LINE
- PROPERTY ID
- EXISTING ROW
- FO — FIBER OPTIC
- O — PETROLEUM PIPELINE
- TVUG — UNDERGROUND TELEVISION (NONE LOCATED IN PROJECT LIMITS)
- SS — SANITARY SEWER
- G — GAS
- PUG — UNDERGROUND POWER
- OVERHEAD POWER
- TUG — UNDERGROUND TELEPHONE (NONE LOCATED IN PROJECT LIMITS)
- T — OVERHEAD TELEPHONE (NONE LOCATED IN PROJECT LIMITS)
- W — WATER LINE
- CULTURAL RESOURCE
- PJWA - POTENTIAL JURISDICTIONAL WETLAND
- HAZARDOUS WASTE SITE
- WELL SITE
- BILLBOARD

STATIONS & PROFILE BASED ON PROJECT FAP FBIY-35-3(279)126, SHTS 18, 19, 22 AND FAP --351(3), SHT 34

0 200 400
SCALE

SCHEMMER
ARCHITECTS | ENGINEERS | PLANNERS

STUDY AREA LOCATION
I-35: ADD ADDITIONAL RAMPS FOR I-35 NB AND SB AT I-40/I-35 JCT
DIVISION 4, OKLAHOMA COUNTY
JP 30444(04)
SHT 5 OF 6

I-35/I-40/I-235 Dallas Junction Utilities				
Owners	Type	Size/Material	Location	Anticipate Impact (Y/N)
ODOT Fiber	Communication Fiber Optic	Fiber in 1 1/4" Conduit - 144 Count	Crosses I-35 at Sta. 295+00	No
ODOT Fiber	Electric	Unknown Size - Service to Sign	Crosses I-40 WB then turns east, parallels interstate on north side approximately 60' North of CL	Yes
Chickasaw Telecom/ Indian Nations	Communication Fiber Optic	Fiber in 1 1/4" Conduit - 96 Count	Crosses I-35 SB at Sta. 215+00 heads E/W along the RR ROW	Yes
OG&E	Electric	OH Electric - 3 wire trans/ 4 wire distribution	Line runs north along I-35 SB from Sta. 200+75 - 204+00 (175' Lt.), Crosses at 204+00	Yes
OG&E	Electric	OH Electric - 4 wire 3 phase	Line runs north from the Sta. 204+00 crossing to Sta. 208+50	Yes
OG&E	Electric	OH Electric - 4 wire 3 phase	Line runs north along I-35 NB from the Sta.115+50 crossing to Sta. 124+00 (150' E of CL Suvey)	Yes
OG&E	Electric	OH Electric - 6 wire transmission	Line crosses I-35 at app. NB station 138+75 in E/W direction	Yes
OG&E	Electric	OH Electric - 3 wire transmission	Line crosses I-40 WB at Sta. 273+75 then heads N/S	No
ONG	Gas	Unknown Size	Lines runs along north side of I-40 WB approx. 50' north of I-40	No
Magellan Midstream	Gas	8" Steel	Line crosses I-35 at app. SB station 216+25 in E/W direction along North side of RR	Yes
Magellan Midstream	Gas	6" Steel	Line runs north along I-35 NB from Sta. 116+50 to 131+25 (175' Rt.)	Yes
Superior Pipeline	Gas	10" Steel	Line crosses I-35 at app. NB station 131+50 in E/W direction	Yes
Phillips 66	Gas - Jet Fuel	4" Steel	Line runs north along I-35 NB from Sta. 116+50 to 131+25 (185' Rt.)	Yes
Plains Petroleum	Petroleum	6" Steel	Line crosses I-35 at app. NB station 131+50 in E/W direction	Yes
DCP Midstream	Gas	10" Steel	Line crosses I-35 at app. SB station 220+25 in E/W direction	Yes
DCP Midstream	Gas	12" Steel	Line runs north along east side of I-35 and E along I-40 EB (App. 195' South of Interstate)	Yes
City of OKC	Water	Unknown Size - Main Water line	Line crosses I-35 at app. SB station 100+50 in E/W direction	Yes
City of OKC	Sewer	54" San Sewer Main	Line crosses I-35 at app. SB station 218+25 in E/W direction	Yes

City of OKC	Sewer	42" San Sewer Main	Line crosses I-35 at app. SB station 233+25 in E/W direction	Yes
City of OKC	Sewer	48" San Sewer Main	Line crosses I-35 at app. SB station 240+25 in E/W direction	Yes
City of OKC	Sewer	24" San Sewer	Line heads S then E along north side of I-40 WB from 267+25 to 273+75 (75' Lt.)	No
City of OKC	Sewer	24" San Sewer	Line Crosses I-40 at app. I-40 WB Sta. 273+75 and extends N/S	No
City of OKC	Sewer	48" San Sewer	Line parallels I-40 EB along the South from Sta. 166+00 to 187+50 (160' Rt.)	No

Design Concept 3.4 Right of Way Impacts				
I-35				
Area of Impact	**Applebee's (Best Location, LLC)**	**Land Use Type**	**Parcels Impacted**	**Approx. Area Impacted (Ac.)**
South of I-40, West of I-35	Teague Business Properties LLC	Commercial	0	0.00
	Teague Business Properties LLC	Residential	0	0.00
	Magellan Pipeline Company LLC	Public Service	0	0.00
	St Louis & Santa Fe RR Co.	Public Service	0	0.00
	City of Oklahoma City		2	0.23
South of I-40, East of I-35	Waggoner Family Properties Inc.	Industrial	0	0.00
	OVPI Elevlahoma DOT	Industrial	0	0.00
	Waggoner Family Properties II Inc.	Commercial	0	0.00
	Naative American Cultural Center & Musuem (UC)	Commercial	2	5.61
Potential Total Acquisition			4	5.84

OKLAHOMA DEPARTMENT OF TRANSPORTATION
EC-1405D – TASK 01
I-35: ADD ADDITIONAL RAMPS FOR I-35 NB & SB AT THE I-40/I-35 JCT.
NBI 14239, 21335, 21356, 21708, 21722, 21723, 22096, 23635, 26296, 27869
OKLAHOMA COUNTY
J/P 30444(04)

SECTION 03 – PROPERTY IDENTIFICATION

3.1 Property Ownership. The following properties were identified as being within the study area:

Map Parcel #	Parcel #	Ownership	Acres	Land Use	Relo Y or N	Exhibit Page #
1	R142971015	Teague Business Properties LLC ATTN: Frances Ann Teague Waggoner 8125 S. I-35 Service Rd. Oklahoma City, OK 73149	7.2904	Comm.	N	1-2
2	R142975105	Teague Business Properties LLC ATTN: Frances Ann Teague Waggoner 8125 S. I-35 Service Rd. Oklahoma City, OK 73149	1.8200	Res.	N	3-4
3	R146463005	Magellan Pipeline Company LLC Attn: Property Tax P.O. Box 22186 Tulsa, OK 74121	0.1528	Public Service	N	5-6
4	R142975005	Magellan Pipeline Company LLC Attn: Property Tax P.O. Box 22186 Tulsa, OK 74121	1.3800	Public Service	N	7-8
5	R142971055	Waggoner Family Properties Inc. P.O. Box 1516 Billings, MT 59103	16.4125	Industrial	N	9-10
6	R142976010	State of Oklahoma Dept. of Transportation	0.5897	Exempt	N	11-12
7	R142971045	Waggoner Family Properties II Inc. P.O. Box 1516 Billings, MT 59103	1.1949	Comm.	N	13-14
8	R131721925	St. Louis & Santa Fe RR Co. 503 Frisco Bldg St. Louis, MO 63104	12.1456	Public Service	N	15
9	R131722000	Native American Cultural Center and Museum (UC) P.O. Box 26980 Oklahoma City, OK 73126	155.4900	Exempt	N	16-17
10	R168611055	City of Oklahoma City	29.0500	Exempt	N	18

11	R131721395	Pumpco LLC P.O. Box 892230 Oklahoma City, OK 73189	1.2154	Industrial	N	19-20
12	R131721377	Jacob Company Inc. 727 SW 23rd St. Oklahoma City, OK 73109	1.8850	Industrial	N	21-22
13	R027881500	Standard Steel Company P.O. Box 302 Oklahoma City, OK 73101	2.3640	Comm.	N	23-24
14	R027857200	Standard Steel Company P.O. Box 302 Oklahoma City, OK 73101	1.5496	Industrial	Y	25-26
15	R027883000	Standard Steel Company 1400 E. Reno Ave. Oklahoma City, OK 73117	2.6126	Industrial	N	27-28
16	R027884500	Standard Steel Company P.O. Box 302 Oklahoma City, OK 73101	1.0938	Comm.	N	29-30
17	R027886000	Standard Iron & Metal Company Inc. P.O. Box 302 Oklahoma City, OK 73101	3.9680	Industrial	N	31-32
18	R142970295	Lewis, Charles W & Elizabeth A Living Trust 1600 E. Reno Ave. Oklahoma City, OK 73117	7.6292	Comm.	Y	33-34
19	R142970286	Brightlight Hospitality Inc. 1750 E. Reno Ave. Oklahoma City, OK 73117	1.4949	Comm.	Y	35-36
20	R142970283	Brightlight Hospitality Inc. 1750 E. Reno Ave. Oklahoma City, OK 73117	1.9135	Comm.	Y	37-38
21	R142970280	Noor Hotel LLC 1800 E. Reno Oklahoma City, OK 73117	2.9527	Comm.	Y	39-40
22	R142970285	MLK/1948 Reno LLC 3200 Canyon Rd. Oklahoma City, OK 73120	0.9626	Comm.	Y	41-42

3.1.02 Potential Business and Residential Relocations.

Residential/Single Family = 0

Business/Comm. = 6

P.12 Jacob Company Inc., Storage Warehouse
Building size = 15,000sf

P.14 Standard Steel Company, Industrial Light Manufacturing
Building size = 20,300sf

P.18 Standard Steel Company
Automotive Center
Building size = 5,040sf
Service Garage
Building size = 8,550sf

P.20 Brightlight Hospitality Inc., Econo Lodge Inns and Suites Near Bricktown
Building size = 38,582sf

P.21 Noor Hotel LLC, Quality Inn
Building size = 46,194sf

P.22 MLK/1948 Reno LLC, Greyhound, Restaurant
Building size = 6,516sf

3.2 Indian Ownership. There are no Indian Ownerships within the study area.

3.3 Tribal Ownership. There is one parcel within the study area.

P.9 Native American Cultural Center and Museum (UC), American Indian Cultural Center and Museum (UC)

3.4 Identify any Military Properties within the study area. There are no Military Properties located in project area.

3.5 Oklahoma Turnpike Authority (OTA) Properties. There were no OTA properties identified within the study area.

3.6 Public Parks and Recreational Areas. According to www.nps.gov there were no public parks or recreational areas identified within the study area.

3.7 Identify any Wildlife and Waterfowl Refuges. There are no wildlife or waterfowl refuges in the study area.

3.8 Identify any cemeteries. There were no cemeteries identified within the study area.

3.9 Airports. There were no airports located in the study area.

3.10 Wetland Restoration Program (WRP) sites. According to the National Resources Conservation Service there are no WRP sites within the project area.

NRCS
Natural Resources Conservation Services
USDA
4850 N Lincoln Blvd, Suite B
OKC, OK 73105

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
DESIGN CONCEPT 3.4
POTENTIAL R/W IMPACTS

APPENDIX F

NOT TO SCALE

PROPOSED RETAINING WALL LOCATION

PROPOSED SLOPE WALL LOCATION

PROPOSED SLOPE WALL LOCATION

PROPOSED RETAINING WALL LOCATION

POTENTIAL R/W IMPACT

PROPOSED RETAINING WALL LOCATION

INVERTED SIPHON

POTENTIAL R/W IMPACT

POTENTIAL R/W IMPACT

PROPOSED RETAINING WALL LOCATION

POTENTIAL R/W IMPACT

PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION
SE 15th STREET
POTENTIAL R/W IMPACTS

APPENDIX F

NOT TO SCALE

PROPOSED RETAINING WALL LOCATION

POTENTIAL R/W IMPACT

PROPOSED RETAINING WALL LOCATION

PROPOSED SLOPE WALL LOCATION

S.E. 15th STREET

I-35 SERVICE RD.

CARTER DRIVE

EASTERN AVENUE

S.E. 25th STREET

INTERSTATE OKLAHOMA 35

PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

APPENDIX G -
Maintenance of Traffic

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.4 /7 ROWING lANES
PHASE I

APPENDIX G

NOT TO SCALE

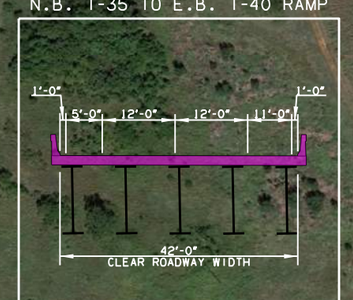
N

PHASE I

STEP 1: SHIFT TRAFFIC.
STEP 2: CONSTRUCT N.B. I-35 TO E.B. I-40 RAMP AND BRIDGE.
CONSTRUCT INSIDE SHOULDER OF E.B. I-40 TO N.B. I-235.

INVERTED SIPHON

N.B. I-35 TO E.B. I-40 RAMP



PHASE CONSTRUCTION

NORTHBOUND PHASE I -

PRELIMINARY

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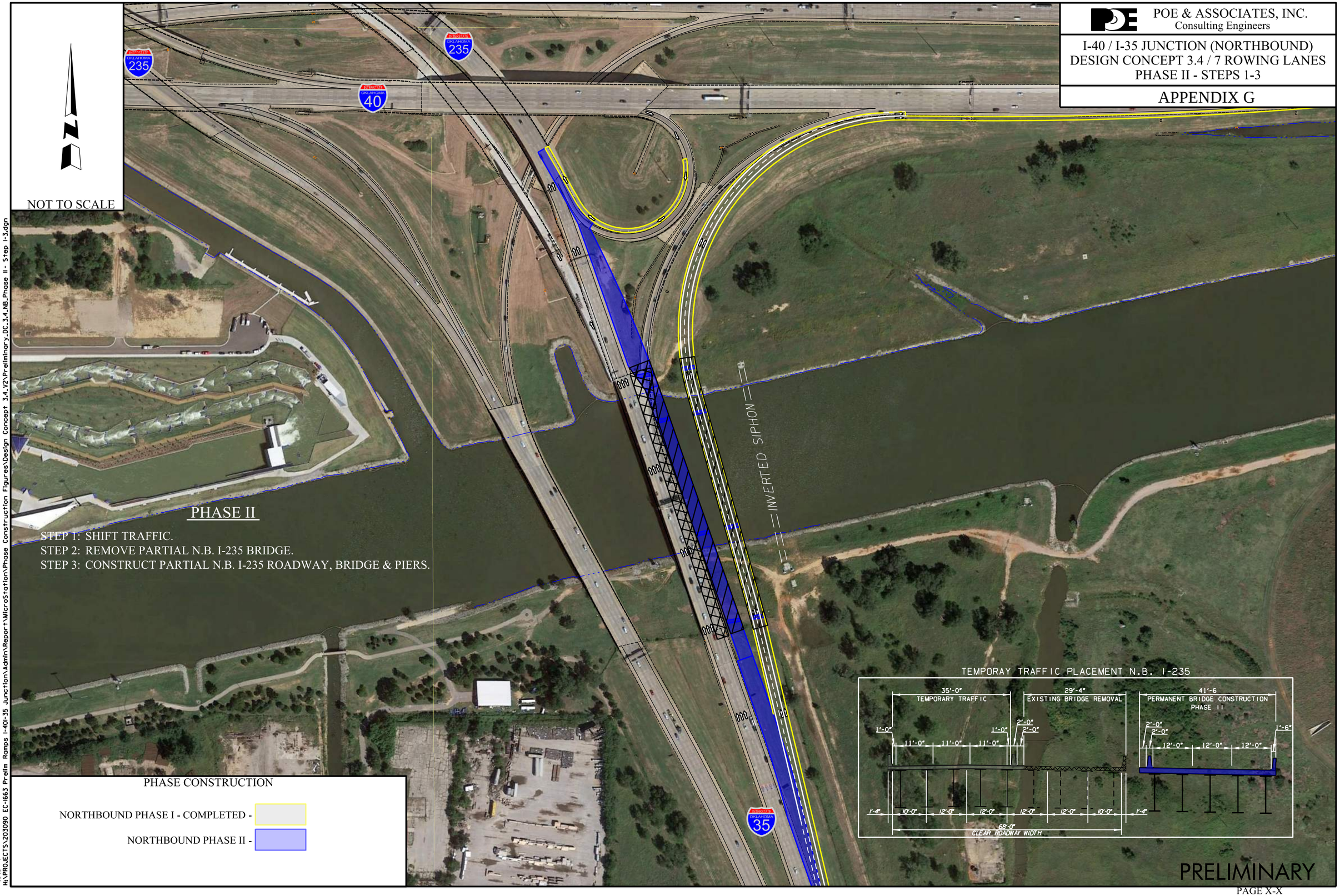
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
PHASE II - STEPS 1-3

APPENDIX G

NOT TO SCALE



PHASE II

STEP 1: SHIFT TRAFFIC.
STEP 2: REMOVE PARTIAL N.B. I-235 BRIDGE.
STEP 3: CONSTRUCT PARTIAL N.B. I-235 ROADWAY, BRIDGE & PIERS.

PHASE CONSTRUCTION

NORTHBOUND PHASE I - COMPLETED -

NORTHBOUND PHASE II -

PRELIMINARY

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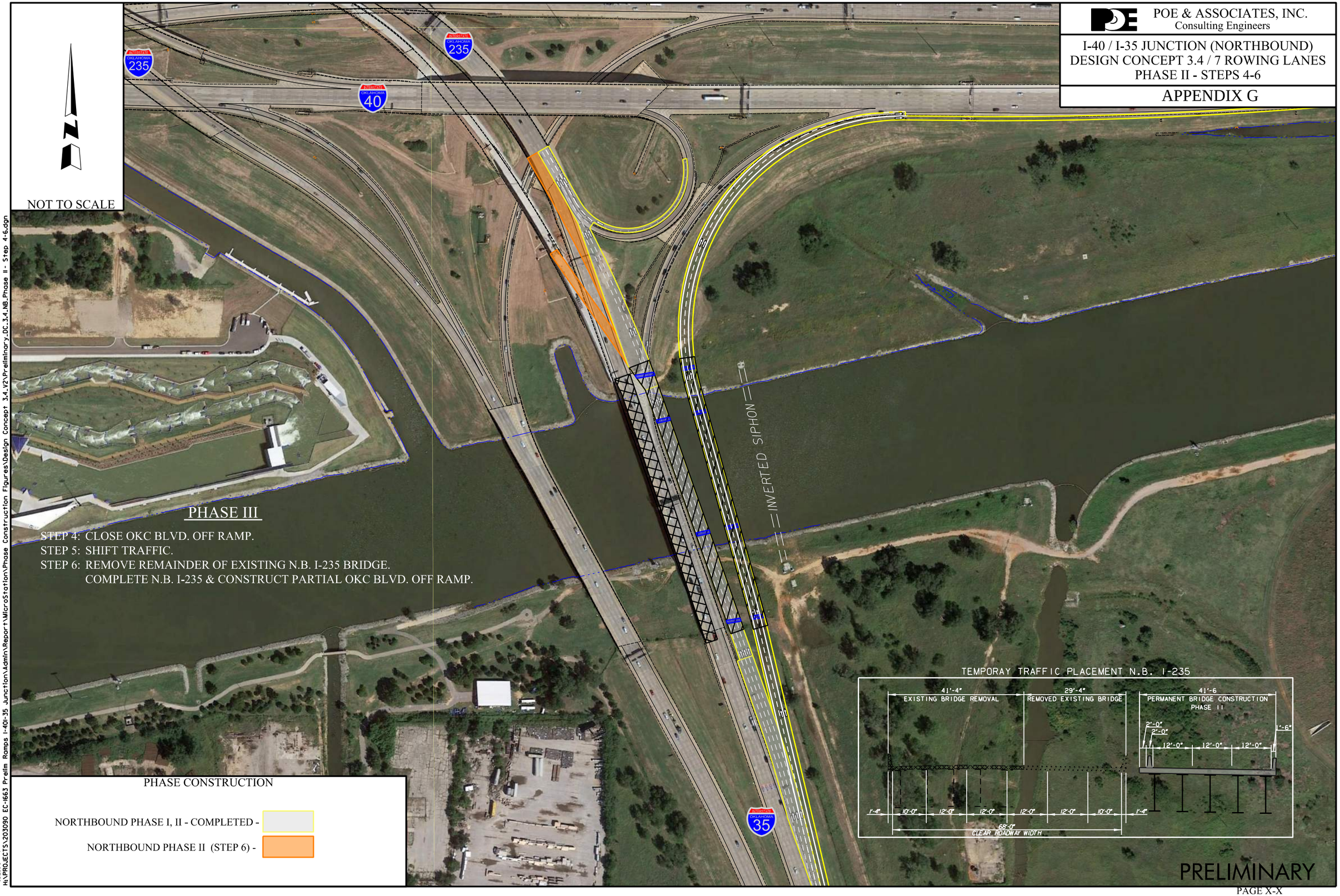
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
PHASE II - STEPS 4-6

APPENDIX G

NOT TO SCALE



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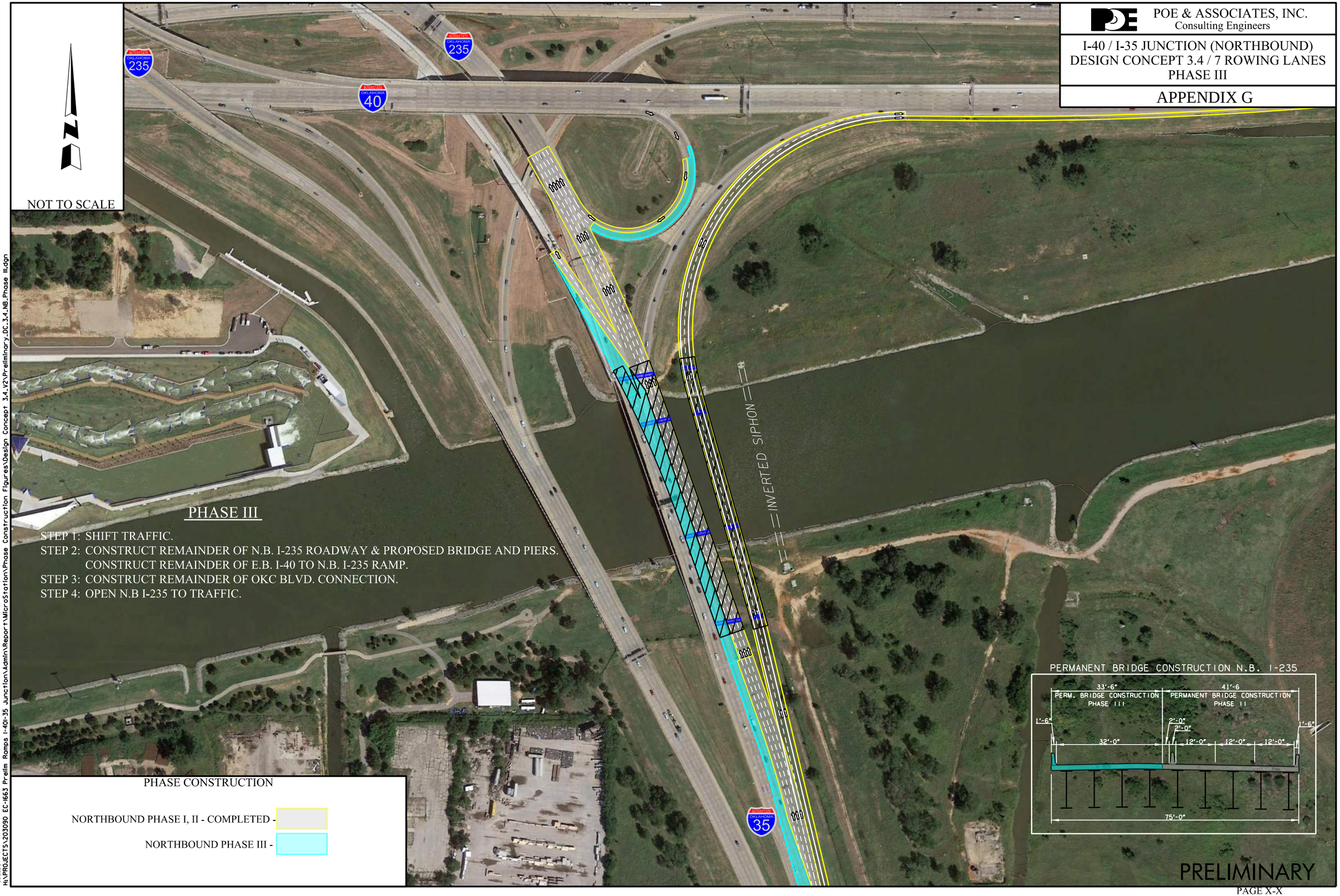
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
PHASE III

APPENDIX G

NOT TO SCALE

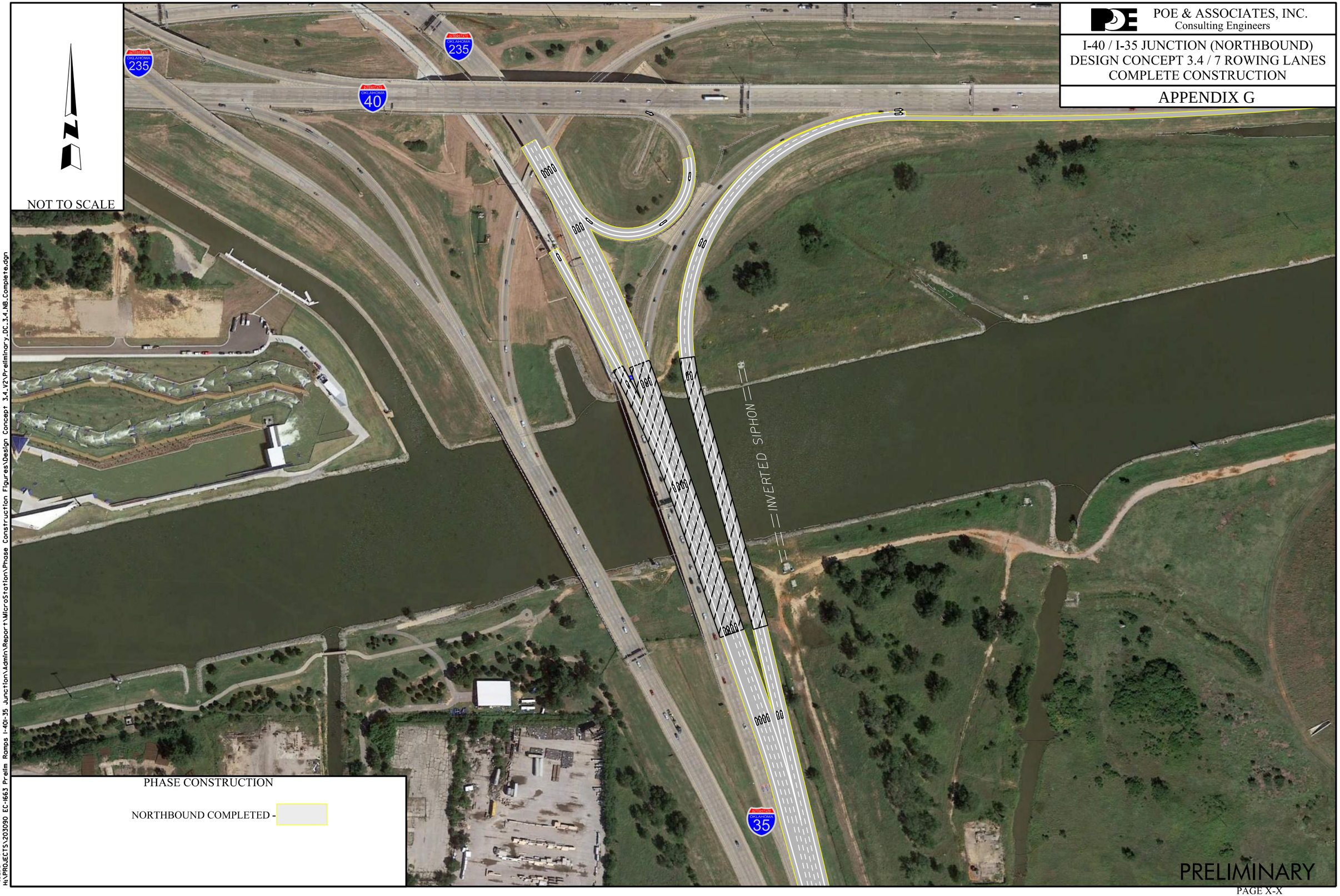


POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
COMPLETE CONSTRUCTION

APPENDIX G

NOT TO SCALE



PHASE CONSTRUCTION

NORTHBOUND COMPLETED -

PRELIMINARY

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POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (SOUTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
PHASE I - STEPS 1-4

APPENDIX G

NOT TO SCALE

INTERSTATE OKLAHOMA 235

INTERSTATE OKLAHOMA 40

INTERSTATE OKLAHOMA 35

— — — INVERTED SIPHON — — —

PHASE I

STEP 1: REDUCE E.B. I-40 OFF RAMP & W.B. I-40 OFF RAMP TO ONE LANE.
STEP 2: CONST. PARTIAL PERM. E.B. I-40 OFF RAMP. (BLUE)
STEP 3: CONST. TEMP. W.B. I-40 OFF RAMP. (YELLOW)
STEP 4: CONST. PARTIAL SOUTHERN I-35 CONNECTION. (RED)

PHASE CONSTRUCTION
NORTHBOUND COMPLETED -
S.B. I-235 PHASE I (STEP 2) -
E.B. I-40 OFF-RAMP PHASE I (STEP 3) [TEMPORARY] -
S.B. I-35 PHASE I (STEP 4) -

PRELIMINARY

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (SOUTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
PHASE I - STEPS 5-7

APPENDIX G

NOT TO SCALE

N

INTERSTATE OKLAHOMA 235

INTERSTATE OKLAHOMA 40

INTERSTATE OKLAHOMA 35

— — — INVERTED SIPHON — — —

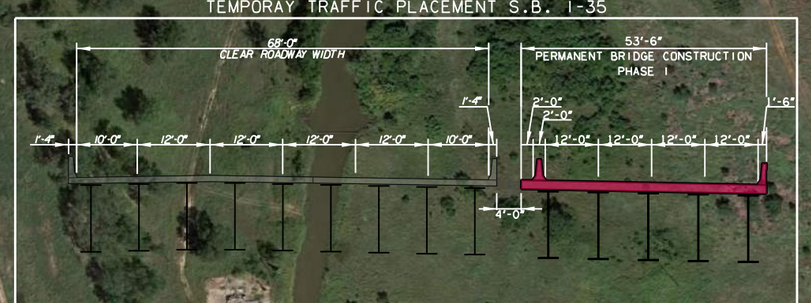
PHASE I

STEP 5: SHIFT TRAFFIC TO TEMP. WB-140 OFF RAMP.

STEP 6: CONSTRUCT PARTIAL S.B. I-235 BRIDGE AND PIERS.
CONSTRUCT PARTIAL W.B. I-40 OFF RAMP. (RED)

STEP 7: SHIFT W.B. I-40 TRAFFIC TO PARTIAL OFF RAMP AND BRIDGE.
REMOVE TEMP. RAMP.

TEMPORAY TRAFFIC PLACEMENT S.B. I-35



PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

W.B OFF RAMP & TEMP. S.B. I-35 BRIDGE PHASE I (STEP 6) -

PRELIMINARY

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POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (SOUTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
PHASE I - STEP 8 & 9

APPENDIX G

NOT TO SCALE

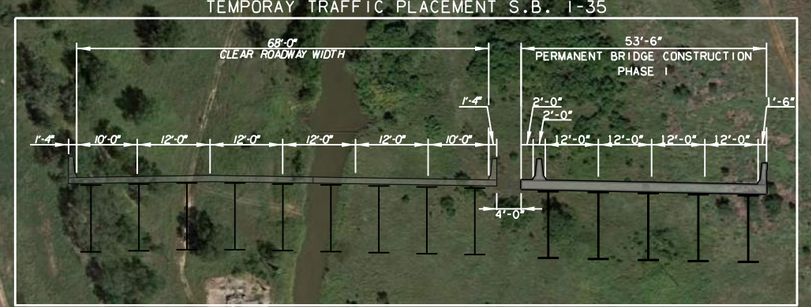
PHASE I

STEP 8: CONST. TEMP. WIDENING ON RAMPS. (GREEN)
SHIFT TRAFFIC TO TEMP. WIDENING.
SHIFT W.B. I-40 OFF RAMP TRAFFIC TO TEMP. BRIDGE.

STEP 9: CONST. PARTIAL PERM. RAMPS. (ORANGE)
SHIFT TRAFFIC TO PERM. RAMPS & REMOVE TEMP. WIDENING.

INVERTED SIPHON

TEMPORAY TRAFFIC PLACEMENT S.B. I-35



PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

S.B. I-235 & E.B. OFF RAMP PHASE I (STEP 8) [TEMPORARY] -

S.B. I-235 & E.B. I-40 OFF RAMP PHASE I (STEP 9) -

PRELIMINARY

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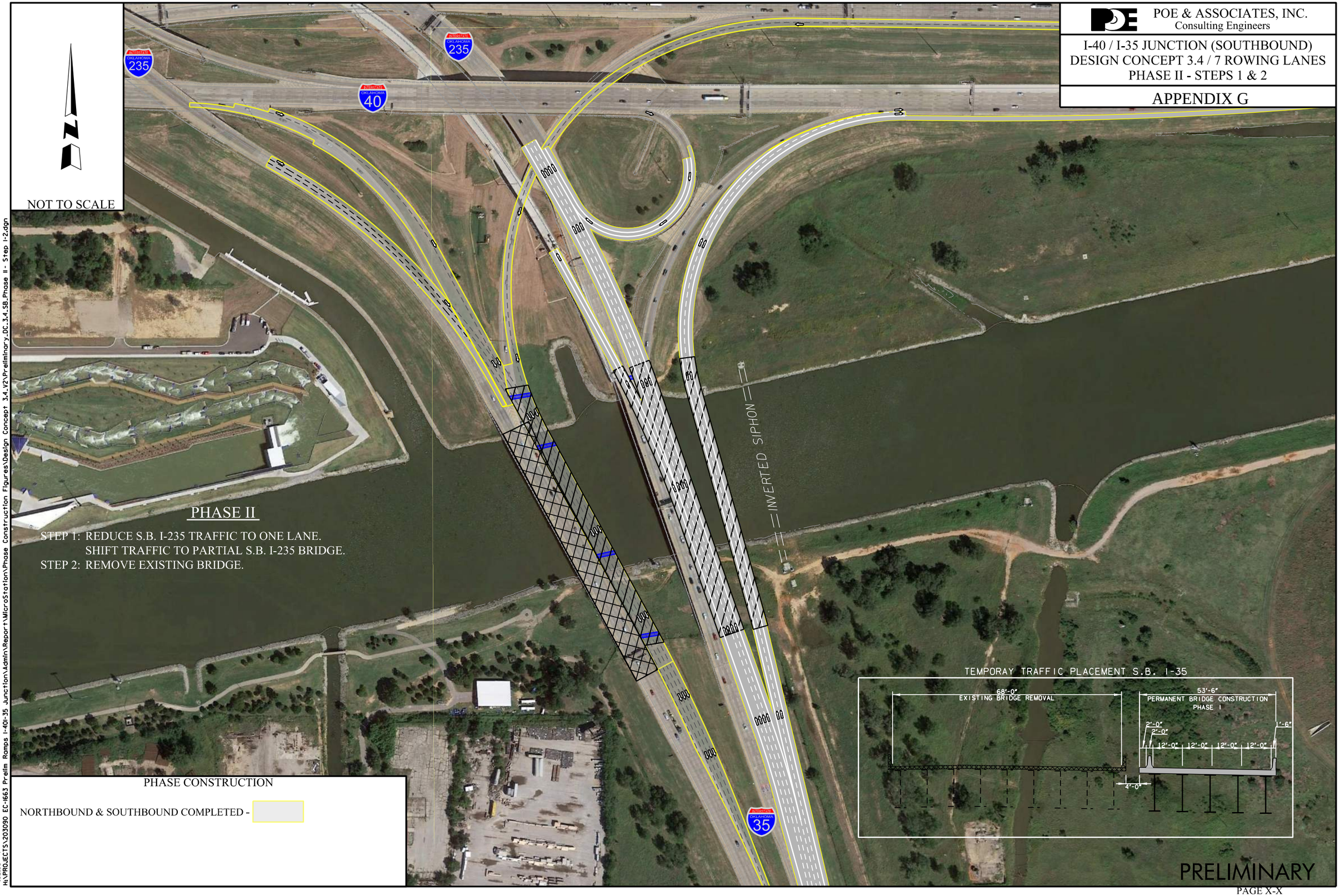
POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (SOUTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
PHASE II - STEPS 1 & 2

APPENDIX G

NOT TO SCALE



PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

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POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (SOUTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
PHASE II - STEP 3 & 4

APPENDIX G

NOT TO SCALE

N

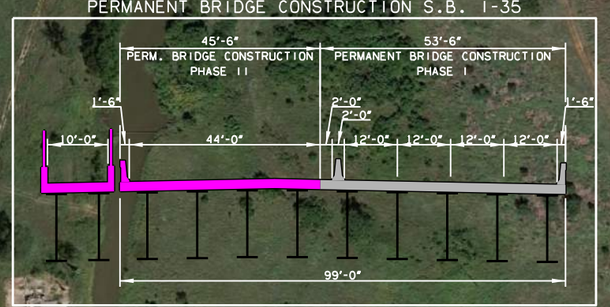
PHASE II

STEP 3: CONSTRUCT REMAINDER OF S.B. I-35 BRIDGE & PIERS.
CONSTRUCT REMAINING SOUTHERN & NORTHERN
CONNECTIONS OUTSIDE CONSTRUCTION BARRIER.

STEP 4: OPEN TO TRAFFIC.

— — — INVERTED SIPHON — — —

PERMANENT BRIDGE CONSTRUCTION S.B. I-35



PHASE CONSTRUCTION

NORTHBOUND COMPLETED -

S.B. I-35/I-235 PHASE II -

PRELIMINARY

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POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.4 / 7 ROWING LANES
COMPLETE CONSTRUCTION

APPENDIX G

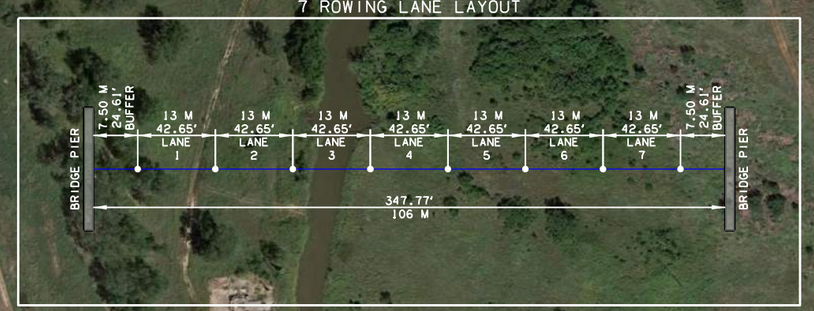
NOT TO SCALE

BUFFER
1
2
3
4
5
6
7
BUFFER

INVERTED SIPHON

BUFFER
1
2
3
4
5
6
7
BUFFER

7 ROWING LANE LAYOUT



PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

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POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.4 / 8 ROWING LANES
COMPLETE CONSTRUCTION

APPENDIX G

NOT TO SCALE

BUFFER
1
2
3
4
5
6
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8
BUFFER

INVERTED SIPHON

BUFFER
1
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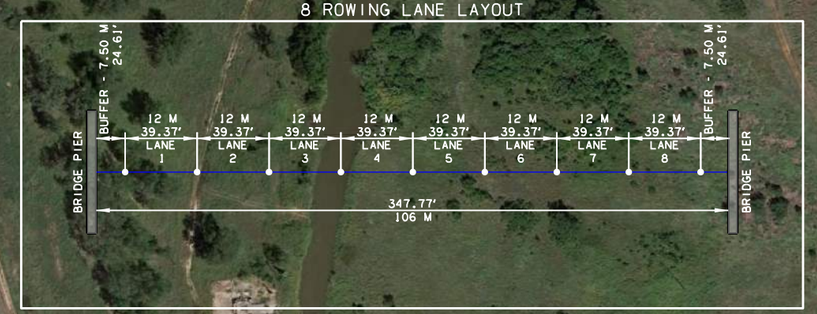
8
BUFFER

8 ROWING LANE LAYOUT



PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

4:32:45 PM
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APPENDIX H - Environmental Information

OKLAHOMA DEPARTMENT OF TRANSPORTATION
EC-1405D – TASK 01
I-35: ADD ADDITIONAL RAMPS FOR I-35 NB & SB AT THE I-40/I-35 JCT.
NBI 14239, 21335, 21356, 21708, 21722, 21723, 22096, 23635, 26296, 27869
OKLAHOMA COUNTY
J/P 30444(04)

SECTION 07 – CULTURAL RESOURCES

A cultural resource reconnaissance review was conducted by Oklahoma Department of Transportation Cultural Resources Program. The report is included herein.

ODOT CULTURAL RESOURCES PROGRAM
PROJECT RECONNAISSANCE REVIEW

County:	Oklahoma	**JP No:**	30444(04)
Project No:	Unassigned	**Date of Field Reconnaissance:**	25 February 2014
Preparer:	M. McKay	**Report Date:**	26 February 2014

Project Description: Modifications to bridges and alignment along the I-40 / I-35 interchange (the Dallas Junction) in OKC, OK., extending NE to SW from the MLK Blvd. intersection to the SE 15th St. intersection.

Definition of Project Area: Approximately 1.5 miles long extending 200 feet from the existing centerlines of each roadway, whether north-, south-, east-, or westbound.

1 File Review - the preparer completed a desktop review of the following files:

☒ State Archaeological Site Files at Oklahoma Archeological Survey (OAS)
USGS Quadrangle(s): Midwest City (1956; photorev. 1969 & 1975)

☒ SHPO's NRHP list and Determination of Eligibility (DOE) list

☒ Thematic or other inventory-based Oklahoma Historic Resource Reviews (listed below):

1) Oklahoma Historic Bridge Survey: Spans of Time (June, 1993) -- http://www.okladot.state.ok.us/hqdiv/p-r-div/spansoftime/index.htm

2) Oklahoma Historic Bridge Survey: Reevaluation of Spans of Time (May, 2007) -- http://www.okladot.state.ok.us/hqdiv/p-r-div/spansoftime/pdfs/survey-phase1.pdf

3) Oklahoma Landmarks Inventory (OLI) -- http://www.ocgi.okstate.edu/shpo/

4) ODOT Tribal Liaison's Database Concerning Potential Culturally Sensitive Areas

☒ Photographic and Mapped Resources (listed below):

1) General Land Office (GLO) survey map (1873) -- http://www.glorecords.blm.gov/

2) Moore 15 minute topographic map (1892)

3) Purcell 30 minute topographic map (1898)

4) USDA Soil Conservation service (SCS) Soils Map (1906)

5) Crutcho Creek 7.5 minute topographic map (1934)

6) General Highway Map (GHM) of Oklahoma County (1936) -- http://figshare.com/articles/1936_1940_General_Highway_Maps_for_Counties_in_Oklahoma/812606

7) USDA SCS Aerial Imagery (1940; 1951)

8) Google Earth Timeline (1995 - 2012)

A. Results of File Review - based on the file review, the preparer identified the following 45-year-old or older properties or conditions documented as existing within the reconnaissance area:

Bridge(s) in Reconnaissance Area:

X There are bridges identified within reconnaissance area

ODOT No.	NBI No.	Const. Date	Bridge Type	NRHP Status
55N3100E1070001	26128	1996	Pre-stressed Concrete Beam	Program Comment
5515 0671SX	26296	2000	Pre-stressed Concrete Beam	Program Comment
5515 0671NX	27869	2000	Pre-stressed Concrete Beam	Program Comment
5515 0585WRX	22096	1988	Steel Stringer	Program Comment
5569 1022X	21722	1987	Steel Stringer	Program Comment
5515 0566EX	21356	1986	Pre-stressed Concrete Beam	Program Comment
5515 0566WX	21723	1987	Pre-stressed Concrete Beam	Program Comment
5515 0534EX	21335	1986	Pre-stressed Concrete Beam	Program Comment
5515 0534WX	21708	1987	Pre-stressed Concrete Beam	Program Comment
5515 0526X	14239	1959	Concrete Culvert	Program Comment
5515 0506X	23635	1994	Steel Stringer	Program Comment

Comments: In accordance with the February 2005 ACHP Section 106 Exemption regarding effects to the Interstate Highway System, these bridges do not require documenting and review.

SHPO NRHP/DOE listed Properties in Reconnaissance Area:

X There are no previously listed NRHP or DOE properties located within the reconnaissance area

Comments: There are no documented historic properties located within the study area based upon review of NRHP and NRHP-eligible properties or thematic surveys collected within SHPO databases.

Archaeological Sites in Reconnaissance Area as mapped at the OAS:

☒ There are no sites mapped within the reconnaissance area

Comments: There are no mapped archaeological sites located within the study area based upon review of the Oklahoma Archaeological Survey's (OAS) site files.

B. Based on the file review, the preparer identified the potential for the following 45-year-old or older properties or conditions to exist within the reconnaissance area:

X The preparer identified the potential presence of the following 45 year old or older properties

in the reconnaissance area

Source: ☐ GLO map ☒ OAS map ☒ Aerial photograph ☒ Other

Property Type: ☐ Prehistoric site ☐ 19th Century site ☒ 20th century site ☐ Other

Comments: Based upon comparisons with georeferenced maps and aerial imagery (see above), there may be two 45-year-old or older buildings located within the NW portion of the recon corridor north of existing I-40 centerline between I-40 and Reno Avenue.

C. Based on the file review, the preparer identified the following cultural resources surveys or studies previously conducted within the reconnaissance area:

Comments: Although this portion of the Dallas Junction was likely to have been surveyed as part of USACE permitting for Oklahoma River construction and for tie-in of the recent Crosstown Expressway project, no mapped cultural resources are identified within the recon corridor as determined through comparisons with reference databases (see above).

---

2 Reconnaissance or windshield survey

X The preparer completed a windshield review of the reconnaissance area and has made the following observations

Bridge(s) in Reconnaissance Area:

X The preparer did not observe additional bridges in the reconnaissance area

Comments: The existing bridges are exempt from documenting according to the February 2005 ACHP Section 106 Exemption regarding effects to the Interstate Highway System.

The study area also includes a large, two-box concrete culvert and a railway culvert comprised of (4) large corrugated metal drainpipes (CGMP). These drainage structures have no associated NBI data since they are less than 20 feet in length and will not need to be documented.

Properties in the Reconnaissance Area that appear to be 45 Years Old or Older:

X The preparer observed the following 45-year-old or older properties in the reconnaissance area (see mapped locations below)

#	Property Type	Description	Location within reconnaissance area
1	Building	Large metal-clad commercial building noted on georeferenced maps; **low NRHP potential.**	Central portion of the recon corridor, north of existing I-40 centerline.

Comments: Although this building is considered to have low potential for being determined eligible for inclusion in the NRHP, it will need to be documented

then reviewed by SHPO to assess its NRHP eligibility, however; this will not hinder or delay project development or delivery.

Possible Archaeological Sites Observed:

X The preparer did not observe potential archaeological sites in the reconnaissance area

Comments: No possible archaeological sites remnant to the previous presence of properties 45-years-old or older were noted within the reconnaissance area during windshield scoping.

Areas Potentially Supporting Prehistoric Archaeological Sites:

Comments: Based on the landforms present within the reconnaissance corridor, the archaeological sensitivity of the area, the level of landscape disturbance, and the types of sites mapped on the USGS quadrangle at the OAS, there is very limited liklihood of prehistoric archaeological sites existing within the recon corridor.

Additional Comments: The recon corridor has been extensively disturbed by past highway and city street improvements and by recent commercial development so the liklihood of intact cultural deposits existing within the recon corridor is extremely limited.

Additionally, since the bridges and culverts included within this proposed project area are exempted from documenting and review under the February 2005 Program Comment, it's unlikely that this project would be subjected to a full cultural resources survey and would likely be relegated to screened review alone, further expediting project delivery.

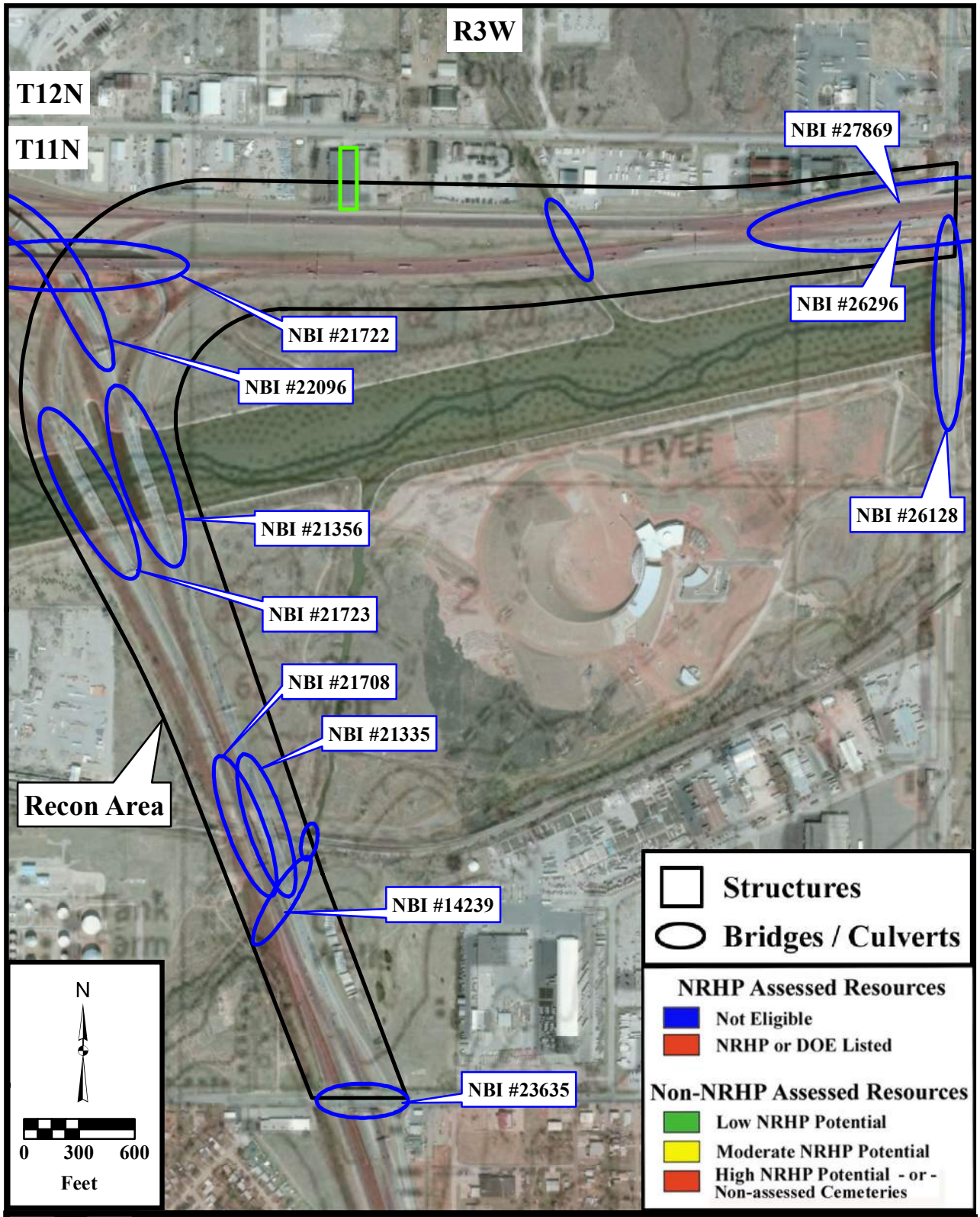

Figure 1. General reconnaissance area for the Oklahoma County Project JP 30444(04); Bridge replacements and alignment modifications at the I-40 / I-35 (Dallas) Junction between MLK Blvd. and SE 15th St.; T11N, R3W, Section 2.

Orthophoto Source: Midwest City (1956; photorev. 1969 & 1975) USGS 7.5 minute Quadrangle Data.

OKLAHOMA DEPARTMENT OF TRANSPORTATION
EC-1405D – TASK 01
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OKLAHOMA COUNTY
J/P 30444(04)

SECTION 08 – HAZARDOUS WASTE/LUST SITES

Enercon Services, Inc. performed a hazardous waste/LUST site assessment. Their report is included herein.

8.1 Hazardous Waste Sites

Review of a radius map report prepared by Environmental Data Resources (EDR) identified the following state and/or federal regulatory database listings indicating hazardous waste sites within the proximity of the study area using ASTM E1527-00 radius guidelines. Sites located outside the study area that may warrant additional consideration are also included:

Regulatory Database(s)	Facility Name	Address	Approximate Distance from Study Area (Feet)
Delisted NPL, CERCLIS, US ENG CONTROLS, US INST CONTROL, ROD, FINDS	Fourth Street Abandoned Refinery	2200 Block, NE 4th Street	2,100
US Brownfields, FINDS	1001 E. Reno Property	1001 E. Reno	950
RCRCA-CESQG	Interstate Metals Corporation	1101 E. Reno	0
RCRA-SQG	The Waggoners Trucking	1501 SE 15th	250

OKLAHOMA DEPARTMENT OF TRANSPORTATION
EC-1405D – TASK 01
I-35: ADD ADDITIONAL RAMPS FOR I-35 NB & SB AT THE I-40/I-25 JCT.
NBI 14239, 21335, 21356, 21708, 21722, 21723, 22096, 23635, 26296, 27869
OKLAHOMA COUNTY
J/P 30444(04)

8.2 Aboveground Storage Tanks (AST), Underground Storage Tanks (UST), Leaking Underground Storage Tank (LUST) Sites, and Oil and Gas Production Sites

Review of a radius map report prepared by Environmental Data Resources (EDR) identified the following state and/or federal regulatory database listings within the proximity of the study area using ASTM E1527-00 radius guidelines:

Regulatory Database(s)	Facility Name	Address	Approximate Distance from Study Area (Feet)
LUST, UST, HIST UST	Gary Dales 66,	1948 E. Reno	0
Regulatory Database(s)	**Facility Name**	**Address**	**Approximate Distance from Study Area (Feet)**
UST, LUST, HIST UST	Oklahoma Department of Transportation	1100 E. Reno	0
UST, LUST, HIST UST	Interstate Metals Corporation	1101 E. Reno	0
UST, LUST, HIST UST	Yellow Freight System	1600 E. Reno	0
LUST, HIST UST, UST	The Waggoners Trucking	1501 SE 15th	250
LUST, UST, HIST UST	Metro Mart	1320 SE 15th	0
LUST, UST, HIST UST	Ker McGee #121-6584	1301 SE 15th	0

No AST database listings were identified within the study area by the EDR radius map report. Visual observation identified six ASTs associated with oil and gas production in the SE/4 of the SW/4 of Section 2, Township 11 North, Range 3 West, and two ASTs in

the NE/4 of the SW/4 of Section 2, Township 11 North, Range 3 West. Two ASTs associated with oil and gas production were observed in the NW/4 of the NW/4 of Section 1, Township 11 North, Range 3 West.

According to the Oklahoma Corporation Commission, 32 well sites are located within 1/8th of a mile of the study area. OCC records and field reconnaissance indicate that three of these well sites are currently active. Plugging records are on file for 27 of the remaining wells. The current disposition of two wells which do not have plugging records but which were not identified through field reconnaissance could not be determined. See attached well records for further information.

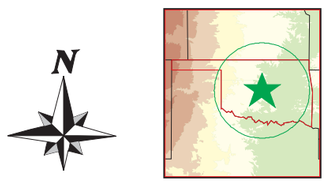
8.3 Coal Mining Operations

No coal mining operations were indicated by a review of the USGS topographic map.

EDR DataMap® Area Study

I-35/I-40

- Listed Sites
- Earthquake Epicenters (Richter 5 or greater)
- Search Boundary
- Roads
- Major Roads
- Waterways
- Railroads
- Contour Lines
- Pipelines
- Powerlines
- Fault Lines
- Water
- Superfund Sites
- Federal DOD Sites
- Indian Reservations BIA
- 100-Yr Flood Zones
- National Wetland Inventory



Oklahoma City, OK

0 1/4 1/2

Scale in Miles

EDR Environmental Data Resources Inc

APPENDIX H

I-35/I-40
Oklahoma City, OK 73117

Inquiry Number: 3824799.20s
January 08, 2014

EDR DataMap™ Area Study

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

TARGET PROPERTY INFORMATION

ADDRESS

OKLAHOMA CITY, OK 73117
OKLAHOMA CITY, OK 73117

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records within the requested search area for the following databases:

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
NPL LIENS	Federal Superfund Liens
LIENS 2	CERCLA Lien Information
CORRACTS	Corrective Action Report
RCRA-TSDF	RCRA - Treatment, Storage and Disposal
RCRA-LQG	RCRA - Large Quantity Generators
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
DOT OPS	Incident and Accident Data
US CDL	Clandestine Drug Labs
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
LUCIS	Land Use Control Information System
CONSENT	Superfund (CERCLA) Consent Decrees
UMTRA	Uranium Mill Tailings Sites
ODI	Open Dump Inventory
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
LEAD SMELTERS	Lead Smelter Sites
2020 COR ACTION	2020 Corrective Action Program List
PCB TRANSFORMER	PCB Transformer Registration Database
US HIST CDL	National Clandestine Laboratory Register

EXECUTIVE SUMMARY

FEDERAL FACILITY ..... Federal Facility Site Information listing
COAL ASH EPA ..... Coal Combustion Residues Surface Impoundments List
FEMA UST ..... Underground Storage Tank Listing
US FIN ASSUR ..... Financial Assurance Information
COAL ASH DOE ..... Steam-Electric Plant Operation Data
EPA WATCH LIST ..... EPA WATCH LIST
SCRD DRYCLEANERS ..... State Coalition for Remediation of Drycleaners Listing
PRP ..... Potentially Responsible Parties

STATE AND LOCAL RECORDS

SHWS ..... The Land Report
SWF/LF ..... Permitted Solid Waste Disposal & Processing Facilities
UIC ..... Underground Injection Wells Database Listing
INST CONTROL ..... Institutional Control Sites
DRYCLEANERS ..... Drycleaner Facility Listing
RGA HWS ..... Recovered Government Archive State Hazardous Waste Facilities List

TRIBAL RECORDS

INDIAN RESERV ..... Indian Reservations
INDIAN ODI ..... Report on the Status of Open Dumps on Indian Lands
INDIAN LUST ..... Leaking Underground Storage Tanks on Indian Land
INDIAN UST ..... Underground Storage Tanks on Indian Land
INDIAN VCP ..... Voluntary Cleanup Priority Listing

EDR PROPRIETARY RECORDS

EDR MGP ..... EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL RECORDS

Delisted NPL: The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may deleted from the NPL where no further response is appropriate.

A review of the Delisted NPL list, as provided by EDR, and dated 04/26/2013 has revealed that there is 1 Delisted NPL site within the searched area.

Site	Address	Map ID	Page
FOURTH STREET ABANDONED REFINE	***22OO BLOCK NE 4TH***	***1***	***3***

EXECUTIVE SUMMARY

CERCLIS: The Comprehensive Environmental Response, Compensation and Liability Information System contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the CERCLIS list, as provided by EDR, and dated 04/26/2013 has revealed that there are 2 CERCLIS sites within the searched area.

Site	Address	Map ID	Page
FOURTH STREET ABANDONED REFINE	***22OO BLOCK NE 4TH***	***1***	***3***
HENLEY'S SEALANT/ZONOLITE WR G	200 WISCONSIN	2	21

CERC-NFRAP: Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

A review of the CERC-NFRAP list, as provided by EDR, and dated 04/26/2013 has revealed that there are 4 CERC-NFRAP sites within the searched area.

Site	Address	Map ID	Page
POND (E RENO AVE SITE)	1001 E RENO AVE	8	34
EASTERN AVENUE SITE	1600' N OF RENO AVE & E	9	38
PARAWAS REFINERY	801 SOUTH IRVING STREET	16	64
TIME-DC TRUCKING COMPANY	1400 SE SKYLINE	18	72

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 09/10/2013 has revealed that there is 1 RCRA-SQG site within the searched area.

Site	Address	Map ID	Page
WAGGONERS TRUCKING THE	***1501 SE 15TH - SUITE A***	***19***	***77***

EXECUTIVE SUMMARY

RCRA-CESQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-CESQG list, as provided by EDR, and dated 09/10/2013 has revealed that there is 1 RCRA-CESQG site within the searched area.

Site	Address	Map ID	Page
INTERSTATE METALS C/1101 E REN	*1101 E RENO*	*12*	*55*

RCRA NonGen / NLR: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA NonGen / NLR list, as provided by EDR, and dated 09/10/2013 has revealed that there are 2 RCRA NonGen / NLR sites within the searched area.

Site	Address	Map ID	Page
BEACON WELL SERVICE INC	*1001 E RENO*	*8*	*35*
CONSOLIDATED FREIGHTWAYS	*1400 SE SKYLINE DR*	*19*	*83*

US ENG CONTROLS: A listing of sites with engineering controls in place.

A review of the US ENG CONTROLS list, as provided by EDR, and dated 06/17/2013 has revealed that there is 1 US ENG CONTROLS site within the searched area.

Site	Address	Map ID	Page
FOURTH STREET ABANDONED REFINE	*22OO BLOCK NE 4TH*	*1*	*3*

US INST CONTROL: A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

A review of the US INST CONTROL list, as provided by EDR, and dated 06/17/2013 has revealed that there is 1 US INST CONTROL site within the searched area.

Site	Address	Map ID	Page
FOURTH STREET ABANDONED REFINE	*22OO BLOCK NE 4TH*	*1*	*3*

EXECUTIVE SUMMARY

US BROWNFIELDS: The EPA's listing of Brownfields properties from the Cleanups in My Community program, which provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

A review of the US BROWNFIELDS list, as provided by EDR, and dated 09/24/2013 has revealed that there is 1 US BROWNFIELDS site within the searched area.

Site	Address	Map ID	Page
1001 E. RENO PROPERTY	***1001 E. RENO***	***11***	***48***

ROD: Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid the cleanup.

A review of the ROD list, as provided by EDR, and dated 04/26/2013 has revealed that there is 1 ROD site within the searched area.

Site	Address	Map ID	Page
FOURTH STREET ABANDONED REFINE	***22OO BLOCK NE 4TH***	***1***	***3***

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 03/08/2013 has revealed that there are 6 FINDS sites within the searched area.

Site	Address	Map ID	Page
FOURTH STREET ABANDONED REFINE	***22OO BLOCK NE 4TH***	***1***	***3***
BEACON WELL SERVICE INC	***1001 E RENO***	***8***	***35***
1001 E. RENO PROPERTY	***1001 E. RENO***	***11***	***48***
INTERSTATE METALS C/1101 E REN	***1101 E RENO***	***12***	***55***
WAGGONERS TRUCKING THE	***1501 SE 15TH - SUITE A***	***19***	***77***
CONSOLIDATED FREIGHTWAYS	***1400 SE SKYLINE DR***	***19***	***83***

US AIRS: The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

A review of the US AIRS list, as provided by EDR, and dated 10/23/2013 has revealed that there is 1

EXECUTIVE SUMMARY

US AIRS site within the searched area.

Site	Address	Map ID	Page
INTERSTATE METALS C/1101 E REN	***1101 E RENO***	***12***	***55***

STATE AND LOCAL RECORDS

SWRCY: A listing of recycling facility locations.

A review of the SWRCY list, as provided by EDR, and dated 10/21/2013 has revealed that there are 2 SWRCY sites within the searched area.

Site	Address	Map ID	Page
OILS RECOVERY	308 N. FONSHILL	3	23
DERICHEBOURG RECYCLIN	100 N BATH AVE	6	25

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Oklahoma Corporation Commission's Leaking UST list.

A review of the LUST list, as provided by EDR, and dated 11/01/2013 has revealed that there are 18 LUST sites within the searched area.

Site	Address	Map ID	Page
BRUCE RYAN NOMINEE STATUS: Closed	***100 SOUTH LOTTIE***	***4***	***24***
PETRO PSC PROPERTIES L.P. STATUS: Closed STATUS: Open	***20 S MARTIN LUTHER KING***	***7***	***26***
GARY DALES 66 STATUS: Closed	***1948 E RENO***	***9***	***36***
JJ'S #5 STATUS: Closed	***1935 E RENO***	***9***	***39***
CHECKERS TRUCK STOP INC STATUS: Closed	***1901 E RENO***	***9***	***41***
Not reported STATUS: Closed	***927 E RENO***	***10***	***47***
Not reported STATUS: Closed	***1100 E RENO***	***12***	***52***
INTERSTATE METALS CORPORATION STATUS: Closed	***1101 E RENO***	***12***	***54***
Not reported STATUS: Closed	***1600 E RENO***	***15***	***63***
MID-AMERICA CHEMICAL, INC. STATUS: Closed	***1801 SKYLINE DRIVE***	***17***	***65***
BEAVER EXPRESS LLC STATUS: Closed	***1515 SE 15TH***	***19***	***72***

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
WAGGONERS TRUCKING THE STATUS: Closed	***1501 SE 15TH - SUITE A***	***19***	***77***
CONSOLIDATED FREIGHTWAYS STATUS: Closed	***1400 SE SKYLINE DR***	***19***	***83***
SAIA MOTOR FREIGHT LINES STATUS: Closed	***1715 S SKYLINE DRIVE***	***19***	***88***
METRO MART STATUS: Closed	***1320 SE 15TH***	***20***	***92***
SUNOCO #23 STATUS: Closed	***1400 SE 15TH***	***20***	***96***
KERR MCGEE #121-6584 STATUS: Closed	***1301 SE 15TH***	***20***	***98***
CENTRAL EXPLORATION CO., INC. STATUS: Closed	***1800 S JORDAN***	***24***	***102***

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Oklahoma Corporation Commission's State UST List, List II Version.

A review of the UST list, as provided by EDR, and dated 11/05/2013 has revealed that there are 19 UST sites within the searched area.

Site	Address	Map ID	Page
W.R. GRACE & CO.	***201 N EASTERN***	***5***	***24***
PETRO PSC PROPERTIES L.P.	***20 S MARTIN LUTHER KING***	***7***	***26***
ELLSWORTH MTR FREIGHT LINES IN	***1001 E RENO***	***8***	***34***
GARY DALES 66	***1948 E RENO***	***9***	***36***
JJ'S #5	***1935 E RENO***	***9***	***39***
CHECKERS TRUCK STOP INC	***1901 E RENO***	***9***	***41***
OKLAHOMA DEPARTMENT OF TRANSPO	1100 E RENO	12	53
INTERSTATE METALS CORPORATION	***1101 E RENO***	***12***	***54***
FORMER ICX	1315 E RENO AVENUE	13	60
YELLOW FREIGHT SYSTEM, INC.	1600 E RENO	15	62
BEAVER EXPRESS LLC	***1515 SE 15TH***	***19***	***72***
WAGGONER'S TRUCKING	***1501 SE 15 STR***	***19***	***74***
CONSOLIDATED FREIGHTWAYS	***1400 SE SKYLINE DR***	***19***	***83***
SAIA MOTOR FREIGHT LINES	***1715 S SKYLINE DRIVE***	***19***	***88***
METRO MART	***1320 SE 15TH***	***20***	***92***
SUNOCO #23	***1400 SE 15TH***	***20***	***96***
KERR MCGEE #121-6584	***1301 SE 15TH***	***20***	***98***
7 ELEVEN #79	***1000 SE 15TH ST***	***23***	***101***
CENTRAL EXPLORATION CO., INC.	***1800 S JORDAN***	***24***	***102***

EXECUTIVE SUMMARY

HIST UST: This underground storage tank listing includes tank information through March 2003. This listing is no longer updated by the Oklahoma Corporation Commission.

A review of the HIST UST list, as provided by EDR, and dated 03/21/2003 has revealed that there are 21 HIST UST sites within the searched area.

Site	Address	Map ID	Page
BRUCE RYAN NOMINEE	***100 SOUTH LOTTIE***	***4***	***24***
W.R. GRACE & CO.	***201 N EASTERN***	***5***	***24***
PETRO PSC PROPERTIES L.P.	***20 S MARTIN LUTHER KING***	***7***	***26***
ELLSWORTH MTR FREIGHT LINES IN	***1001 E RENO***	***8***	***34***
GARY DALES 66	***1948 E RENO***	***9***	***36***
JJ'S #5	***1935 E RENO***	***9***	***39***
CHECKERS TRUCK STOP INC	***1901 E RENO***	***9***	***41***
Not reported	***927 E RENO***	***10***	***47***
Not reported	***1100 E RENO***	***12***	***52***
INTERSTATE METALS CORPORATION	***1101 E RENO***	***12***	***54***
FORMER ICX	1315 E RENO AVENUE	13	61
Not reported	***1600 E RENO***	***15***	***63***
BEAVER EXPRESS LLC	***1515 SE 15TH***	***19***	***72***
WAGGONERS TRUCKING THE	***1501 SE 15TH - SUITE A***	***19***	***77***
CONSOLIDATED FREIGHTWAYS	***1400 SE SKYLINE DR***	***19***	***83***
SAIA MOTOR FREIGHT LINES	***1715 S SKYLINE DRIVE***	***19***	***88***
METRO MART	***1320 SE 15TH***	***20***	***92***
SUNOCO #23	***1400 SE 15TH***	***20***	***96***
KERR MCGEE #121-6584	***1301 SE 15TH***	***20***	***98***
7 ELEVEN #79	***1000 SE 15TH ST***	***23***	***101***
CENTRAL EXPLORATION CO., INC.	***1800 S JORDAN***	***24***	***102***

LAST: The Leaking Aboveground Storage Tank database.

A review of the LAST list, as provided by EDR, and dated 11/01/2013 has revealed that there are 2 LAST sites within the searched area.

Site	Address	Map ID	Page
PETRO PSC PROPERTIES L.P. STATUS: Closed	***20 S MARTIN LUTHER KING***	***7***	***26***
MID-AMERICA CHEMICAL, INC. STATUS: Closed	***1801 SKYLINE DRIVE***	***17***	***65***

AST: The Aboveground Storage Tank database contains registered ASTs. The data come from the Oklahoma Corporation Commission's State AST List, List II Version.

A review of the AST list, as provided by EDR, and dated 11/05/2013 has revealed that there are 3 AST sites within the searched area.

Site	Address	Map ID	Page
PETRO PSC PROPERTIES L.P.	***20 S MARTIN LUTHER KING***	***7***	***26***
MID-AMERICA CHEMICAL, INC.	***1801 SKYLINE DRIVE***	***17***	***65***
WAGGONER'S TRUCKING	***1501 SE 15 STR***	***19***	***74***

EXECUTIVE SUMMARY

VCP: Voluntary Cleanup Site Inventory.

A review of the VCP list, as provided by EDR, and dated 11/07/2013 has revealed that there is 1 VCP site within the searched area.

Site	Address	Map ID	Page
METRO TOWING	1001 EAST RENO	8	33

BROWNFIELDS:

A review of the BROWNFIELDS list, as provided by EDR, and dated 09/07/2012 has revealed that there is 1 BROWNFIELDS site within the searched area.

Site	Address	Map ID	Page
OKLAHOMA CITY URBAN RENEWAL AU	SOUTH RENO AVE. & BYERS	14	61

AIRS: A listing of permitted AIRS facility locations.

A review of the AIRS list, as provided by EDR, and dated 10/09/2013 has revealed that there is 1 AIRS site within the searched area.

Site	Address	Map ID	Page
INTERSTATE METALS CORPORATION	***1101 E RENO***	***12***	***54***

TIER 2: A listing of facilities which store or manufacture hazardous materials and submit a chemical inventory report.

A review of the TIER 2 list, as provided by EDR, and dated 12/31/2011 has revealed that there are 3 TIER 2 sites within the searched area.

Site	Address	Map ID	Page
PETRO PSC PROPERTIES L.P.	***20 S MARTIN LUTHER KING***	***7***	***26***
MID-AMERICA CHEMICAL, INC.	***1801 SKYLINE DRIVE***	***17***	***65***
SAIA MOTOR FREIGHT LINES	***1715 S SKYLINE DRIVE***	***19***	***88***

OK COMPLAINT: Environmental complaints report to the Oklahoma corporation commission.

A review of the OK COMPLAINT list, as provided by EDR, and dated 09/30/2012 has revealed that there is 1 OK COMPLAINT site within the searched area.

Site	Address	Map ID	Page
MID-AMERICA CHEMICAL, INC.	***1801 SKYLINE DRIVE***	***17***	***65***

EXECUTIVE SUMMARY

RGA LUST: The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists.

A review of the RGA LUST list, as provided by EDR, has revealed that there are 20 RGA LUST sites within the searched area.

Site	Address	Map ID	Page
BRUCE RYAN NOMINEE	***100 SOUTH LOTTIE***	***4***	***24***
PETRO PSC PROPERTIES L.P.	***20 S MARTIN LUTHER KING***	***7***	***26***
GARY DALES 66	***1948 E RENO***	***9***	***36***
JJ'S #5	***1935 E RENO***	***9***	***39***
Not reported	1901 E RENO AVE	9	41
CHECKERS TRUCK STOP INC	***1901 E RENO***	***9***	***41***
Not reported	***927 E RENO***	***10***	***47***
Not reported	***1100 E RENO***	***12***	***52***
INTERSTATE METALS CORPORATION	***1101 E RENO***	***12***	***54***
Not reported	***1600 E RENO***	***15***	***63***
MID-AMERICA CHEMICAL, INC.	***1801 SKYLINE DRIVE***	***17***	***65***
BEAVER EXPRESS LLC	***1515 SE 15TH***	***19***	***72***
Not reported	1515 SE 15TH STR	19	74
WAGGONERS TRUCKING THE	***1501 SE 15TH - SUITE A***	***19***	***77***
CONSOLIDATED FREIGHTWAYS	***1400 SE SKYLINE DR***	***19***	***83***
SAIA MOTOR FREIGHT LINES	***1715 S SKYLINE DRIVE***	***19***	***88***
METRO MART	***1320 SE 15TH***	***20***	***92***
SUNOCO #23	***1400 SE 15TH***	***20***	***96***
KERR MCGEE #121-6584	***1301 SE 15TH***	***20***	***98***
CENTRAL EXPLORATION CO., INC.	***1800 S JORDAN***	***24***	***102***

EDR PROPRIETARY RECORDS

EDR US Hist Auto Stat: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Auto Stat list, as provided by EDR, has revealed that there are 19 EDR US Hist Auto Stat sites within the searched area.

Site	Address	Map ID	Page
Not reported	20 S MARTIN LUTHER KING	7	26
PETRO TRUCK FUEL STOP DIESEL S	20 MARTIN LUTHER KING	7	26
WOOLF PEARL R FILL STA	1900 RENO AVE E	9	38
SUNSHINE TRUCK STOP	1903 RENO AVE E	9	38
KINGS SKELY SERVICE	1935 RENO AVE E	9	39
TEXACO SERVICE STATION	1935 RENO AVE E	9	39
BUTTONS TEXACO	1901 RENO AVE E	9	41
PILOT TRAVEL CENTER NO GAS STA	1901 E RENO AVE	9	46
SELF AUTO REPAIR	1014 RENO AVE E	11	47
RENO GAS HOUSE FILL STA	1308 RENO AVE E	13	60

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
SAXTON SERVICE STATION GAS STA	1306 RENO AVE E	13	60
Not reported	1301 E RENO AVE	13	61
ARMSTRONG TEXACO SERVICE	1320 15TH ST SE	20	91
SUNOCO GAS STATIONS	1400 SE 15TH ST	20	94
D X SERVICE STATION	1400 15TH ST SE	20	94
EMBREE D X SERVICE	1300 15TH ST SE	20	95
FUEL AT THE FLAG NO 50 CONOCO	1300 15TH ST SE	20	95
CASEYS KERR MC GEE SERV STA	1301 15TH ST SE	20	95
SUNOCO GAS ST	1400 15TH ST SE	20	98

EDR US Hist Cleaners: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Cleaners list, as provided by EDR, has revealed that there are 3 EDR US Hist Cleaners sites within the searched area.

Site	Address	Map ID	Page
ROSEBUD COLN	1141 15TH SE	21	100
TOP 0 THE TOWN INDRY A OR	1139 15TH SE	21	101
HASTY LAUNDRY COIN	1212 15TH ST SE	22	101

EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.

OKLAHOMA DEPARTMENT OF TRANSPORTATION
EC-1405D – TASK 01
I-35: ADD ADDITIONAL RAMPS FOR I-35 NB & SB AT THE I-40/I-35 JCT.
NBI 14239, 21335, 21356, 21708, 21722, 21723, 22096, 23635, 26926, 27869
OKLAHOMA COUNTY
J/P 30444(04)

SECTION 09 – NATURAL RESOURCES\

Enercon Services conducted a natural resources review of the study area.

9.1 Threatened and Endangered Species

Federally-listed threatened and endangered species in Oklahoma County, according to the U.S. Fish and Wildlife Service (USFWS) website, are listed below:

Species	Classification	Critical Habitat
Piping Plover	Threatened	None in Study Area
Whooping Crane	Endangered	None in Study Area
Interior Least Tern	Endangered	None in Study Area
Arkansas River Shiner	Threatened	None in Study Area

None of the above species were observed within the project area during the initial site reconnaissance. The proposed project is not located within a federally listed aquatic dependent species watershed (Exhibit 9-4) or a federally listed aquatic species watershed (Exhibit 9-5). According to the Oklahoma Natural Heritage Inventory Database, no documented occurrences of federally listed species have been recorded within the project study area or the immediate vicinity.

The North Canadian River may exhibit the characteristics of suitable habitat for the Arkansas River shiner; however, based on the initial project scoping review conducted using the USFWS Information, Planning, and Conservation System (IPaC) tool, this species is considered unlikely to be impacted by the proposed project.

Depending on the water level and availability of sand bar habitat, the North Canadian River may provide suitable habitat for interior least terns and foraging habitat for migrating piping plovers and whooping cranes within the project study area and the immediate vicinity. However, due to the encroachment of the highway and adjacent development, the whooping crane is unlikely to utilize habitat within the project area.

None of the above species were observed within the project area during the initial site reconnaissance.

9.2 Potentially Jurisdictional Streams and Wetlands

Prior to site reconnaissance, Enercon Services, Inc. (ENERCON) reviewed the National Wetland Inventory (NWI) maps, USGS 7.5 Minute Topographic Map Quad Maps (Midwest City Quad), Natural Resources Conservation Services (NRCS) soil survey maps (Exhibit 9-3), aerial photography (Exhibit 9-1), and the NRCS hydric soils list for Oklahoma. The attached maps depict the NWI overlaid with the USGS map (Exhibit 9-2).

Based upon review of the above materials and the visual assessment of the study area conducted on January 9, 2014, the following features were observed within the project study area:

- The North Canadian River
- One (1) mapped intermittent stream
- Three (3) unmapped, potentially jurisdictional features in the following locations:
    - Southwest quarter of Section 2, Township 11 North, Range 3 West.
    - Northwest quarter of Section 2, Township 11 North, Range 3 West.
    - Northeast quarter of Section 2, Township 11 North, Range 3 West.
- The NWI map depicts one (1) riverine wetland system (R2USC) within the North Canadian River. This feature is likely associated with a natural sandbar within the North Canadian River channel.

It should be recognized that this survey is based on limited visual observations only and did not include the standard data collection effort to confirm all three wetlands parameters. Access to the survey corridor was limited to which may have been visible from the current ODOT right-of-way. It is understood that further studies will be conducted in the future to ensure the study area conforms to the USACE 1987 manual and Midwest Regional Supplement (August 2010).

9.3 Critical Resource Waters, Section 10 Waters, Scenic Rivers, and Protected Aquifers

Critical Resource Waters listed by the USACE as Outstanding Resource Waters or High Quality Waters do not occur within the project study. Additionally, the proposed project is not located within a Critical Resource Water watershed. None of the waters within the project study area are subject to regulation under Section 10 of the Clean Water Act.

Oklahoma Scenic Rivers are located in Adair, Cherokee, Delaware, LeFlore, McCurtain, and Sequoyah Counties. The proposed project is located in Oklahoma County; therefore, none of the streams within the project study area are listed for protection under the Oklahoma Scenic Rivers Act or the Wild and Scenic Rivers Act. The proposed project is located within the Garber-Wellington Aquifer (Exhibit 9-6).

9.4 Impaired Waters

Within the project study area, The North Canadian River is included on the Oklahoma 2012 303(d) list of impaired waters for impairments due to bacteria (*Escherichia coli*) and dissolved oxygen levels. A total maximum daily load (TMDL) is scheduled to be completed in 2014. A TMDL for *Enterococcus* bacteria and fecal coliform was established in 2010. All waters within the project study area drain directly into the North Canadian River.

9.5 Oklahoma Sensitive Waters and Watersheds for Storm Water Permit

No Sensitive Waters for Federal and State listed Species are located within Oklahoma County.

Prepared for:
Oklahoma Department of Transportation

Subject Property:

I 35 Reconstruction Additional Lanes Project
J/P #309444(04)
Section 2, T11N R3W
Oklahoma County, Oklahoma

N
W E
S

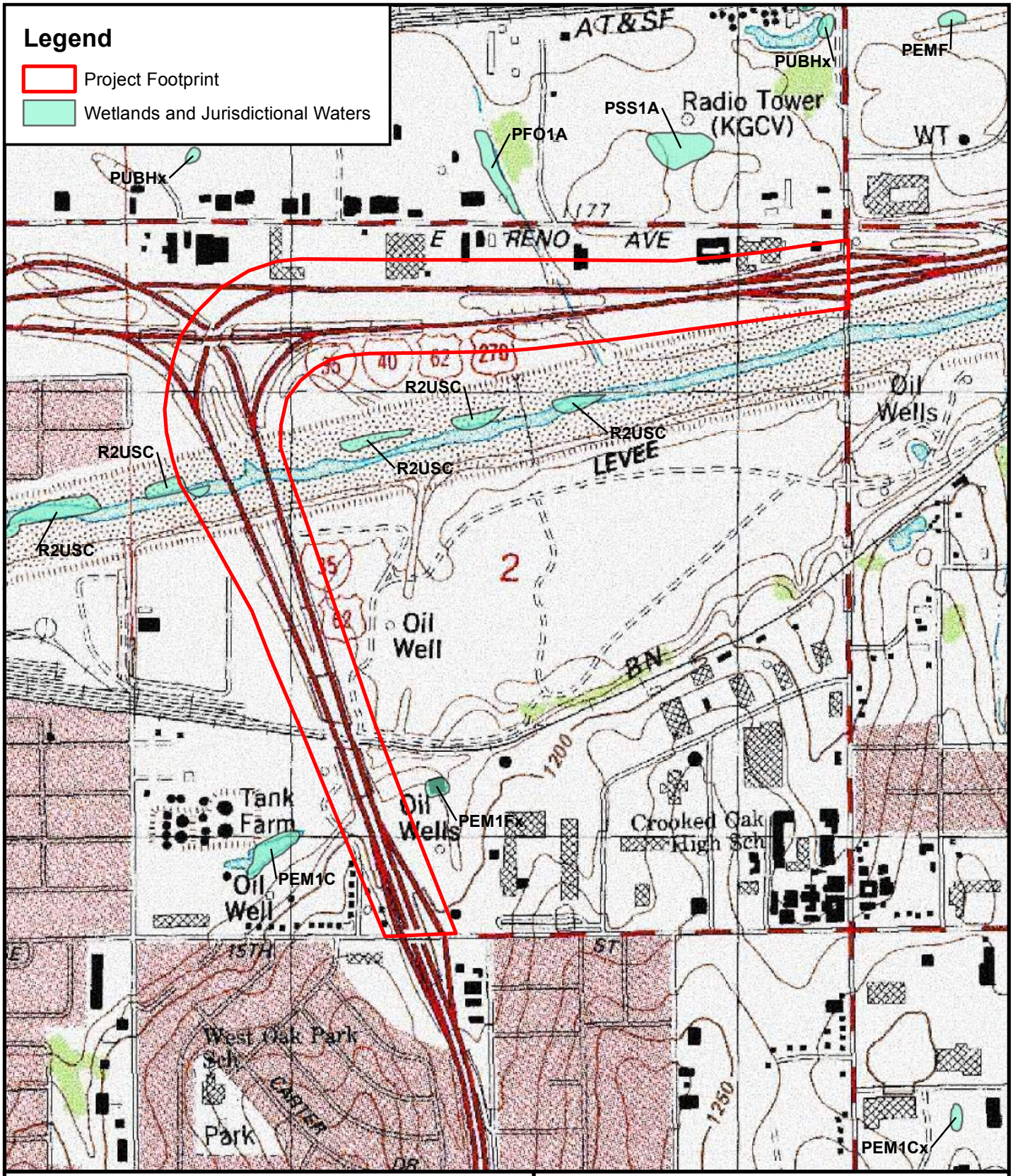
1:12,000

ENERCON

Exhibit 9-1: Aerial Photography
Source: 2013 USDA NAIP
Oklahoma County, Oklahoma

Prepared by: C. Seck; January 31, 2014

0 750 1,500 3,000 Feet



Prepared for:
Oklahoma Department of Transportation

Subject Property:

I 35 Reconstruction Additional Lanes Project
J/P #309444(04)
Section 2, T11N R3W
Oklahoma County, Oklahoma

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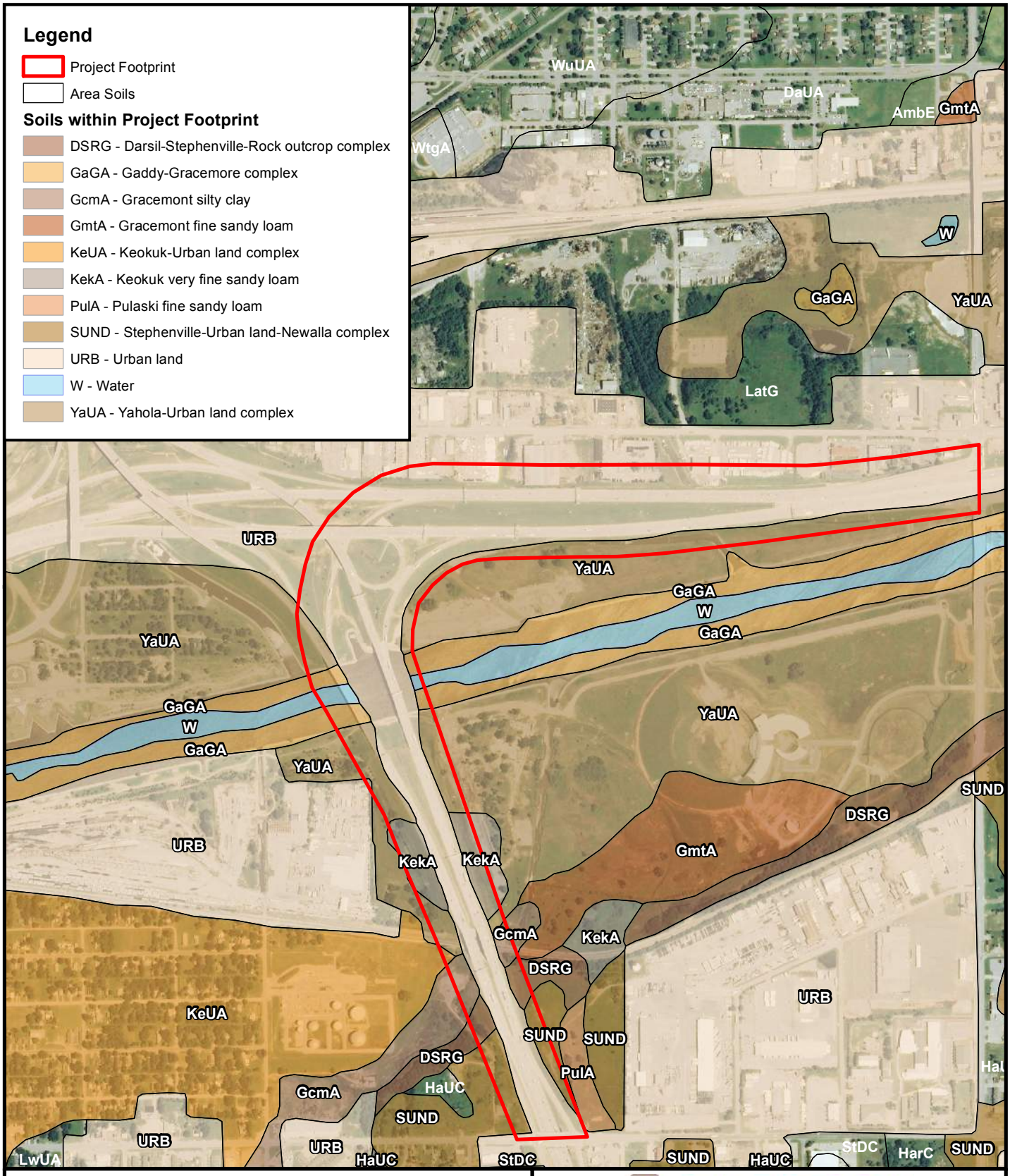
ENERCON

Exhibit 9-2: Footprint with NWI Wetlands

Source: US Fish and Wildlife Service - NWI
USGS 7.5 Minute Series - Midwest City, OK Quadrangle

Prepared by: C. Seck; January 31, 2014

Feet
0 750 1,500 3,000



Prepared for:
Oklahoma Department of Transportation

Subject Property:

I 35 Reconstruction Additional Lanes Project
J/P #309444(04)
Section 2, T11N R3W
Oklahoma County, Oklahoma

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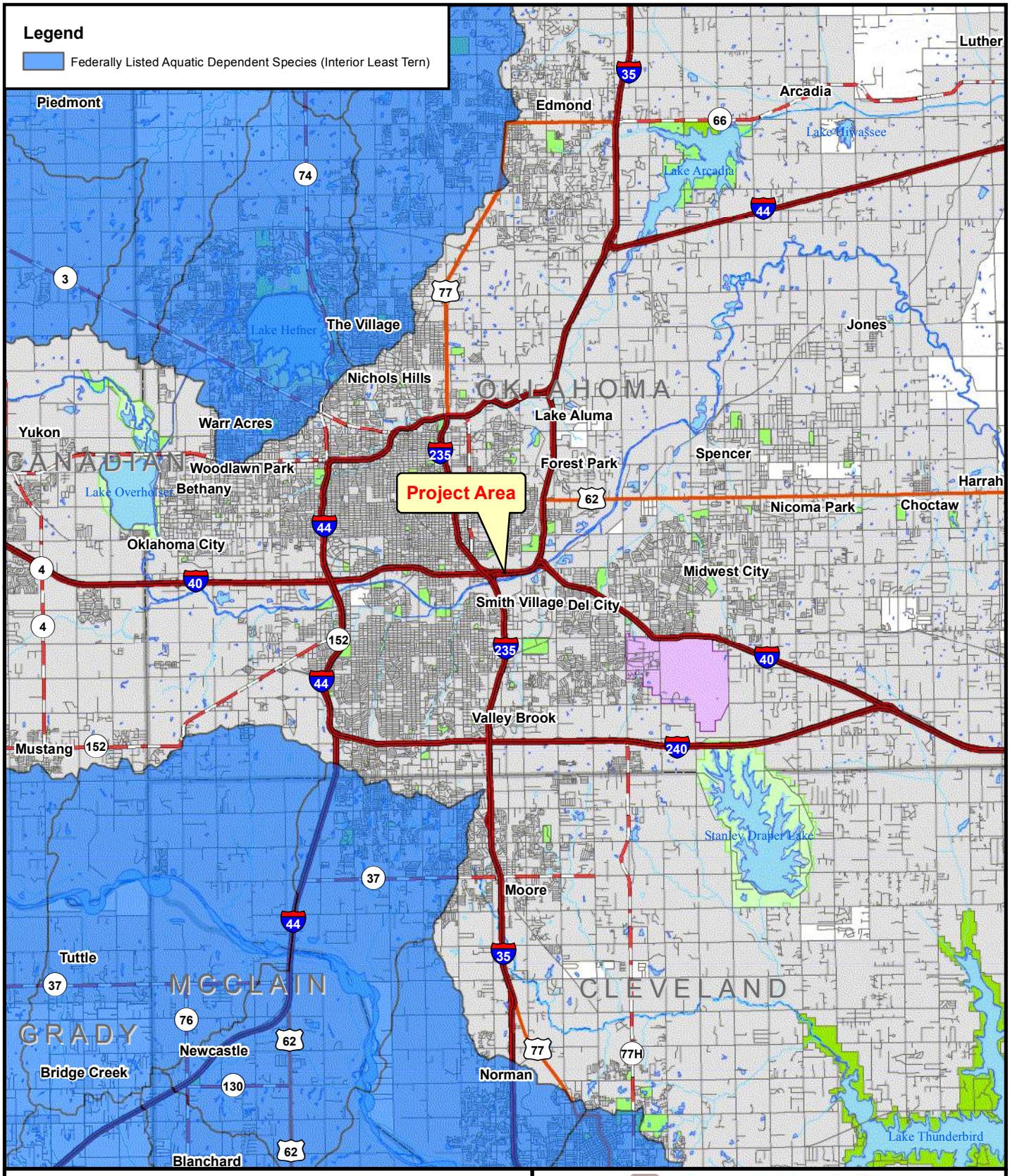
ENERCON

Exhibit 9-3: Soil Survey Map

Source: USDA NRCS Soil Survey Geographic Database
Oklahoma County, Oklahoma; 2013 USDA NAIP

Prepared by: C. Seck; January 31, 2014

0 750 1,500 3,000 Feet



Prepared for:
Oklahoma Department of Transportation

Subject Property:

I 35 Reconstruction Additional Lanes Project
J/P #309444(04)
Section 2, T11N R3W
Oklahoma County, Oklahoma

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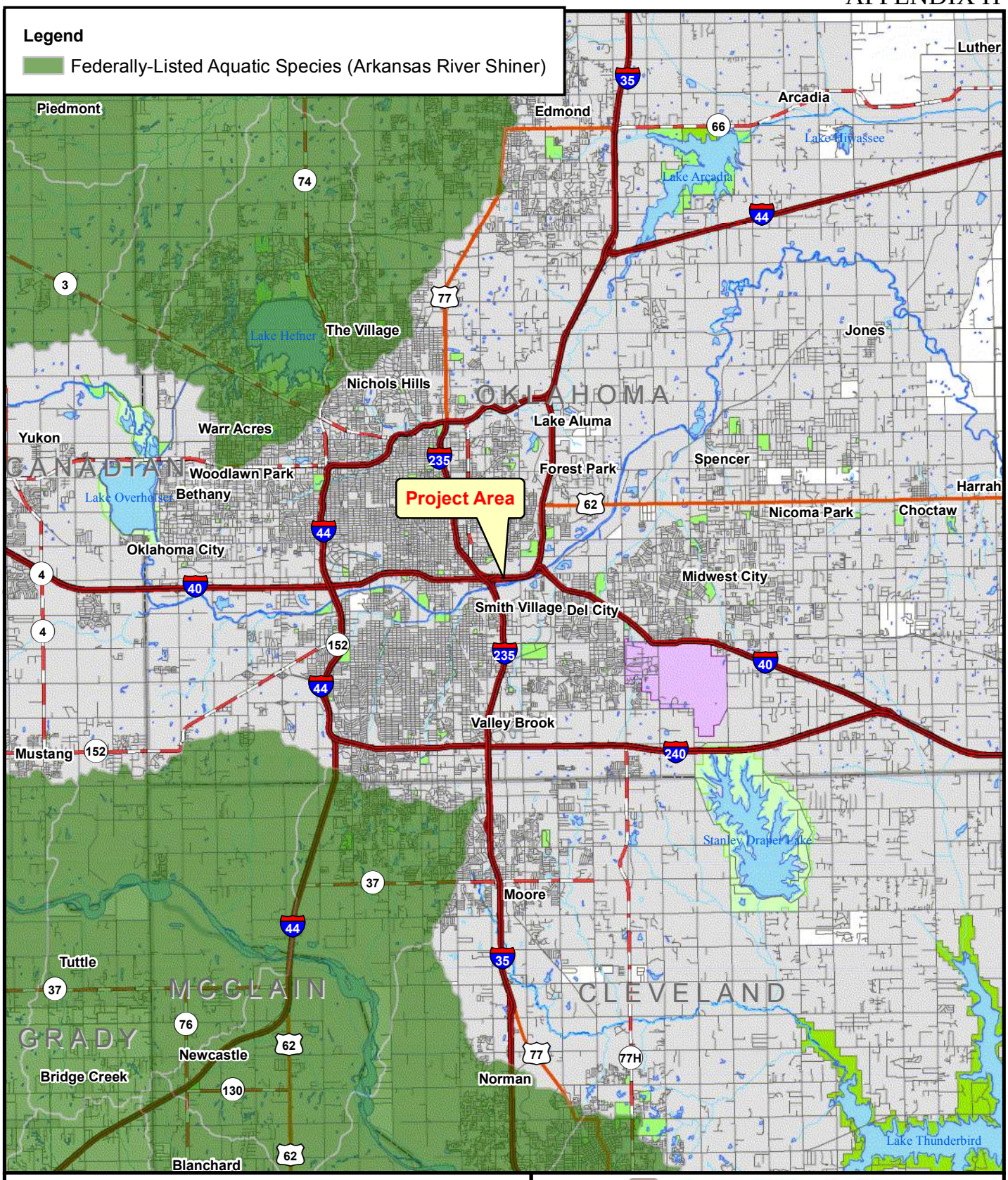
ENERCON

Exhibit 9-4: Federally-Listed Aquatic Dependent Species Watersheds Map

Source: USFWS - Oklahoma Ecological Services Field Office Federally Listed Aquatic Dependent Species Watershed of Oklahoma Map (PDF); OU

Prepared by: C. Seck; February 04, 2014

0 2.5 5 10 Miles



Prepared for:
Oklahoma Department of Transportation

Subject Property:

I 35 Reconstruction Additional Lanes Project
J/P #309444(04)
Section 2, T11N R3W
Oklahoma County, Oklahoma

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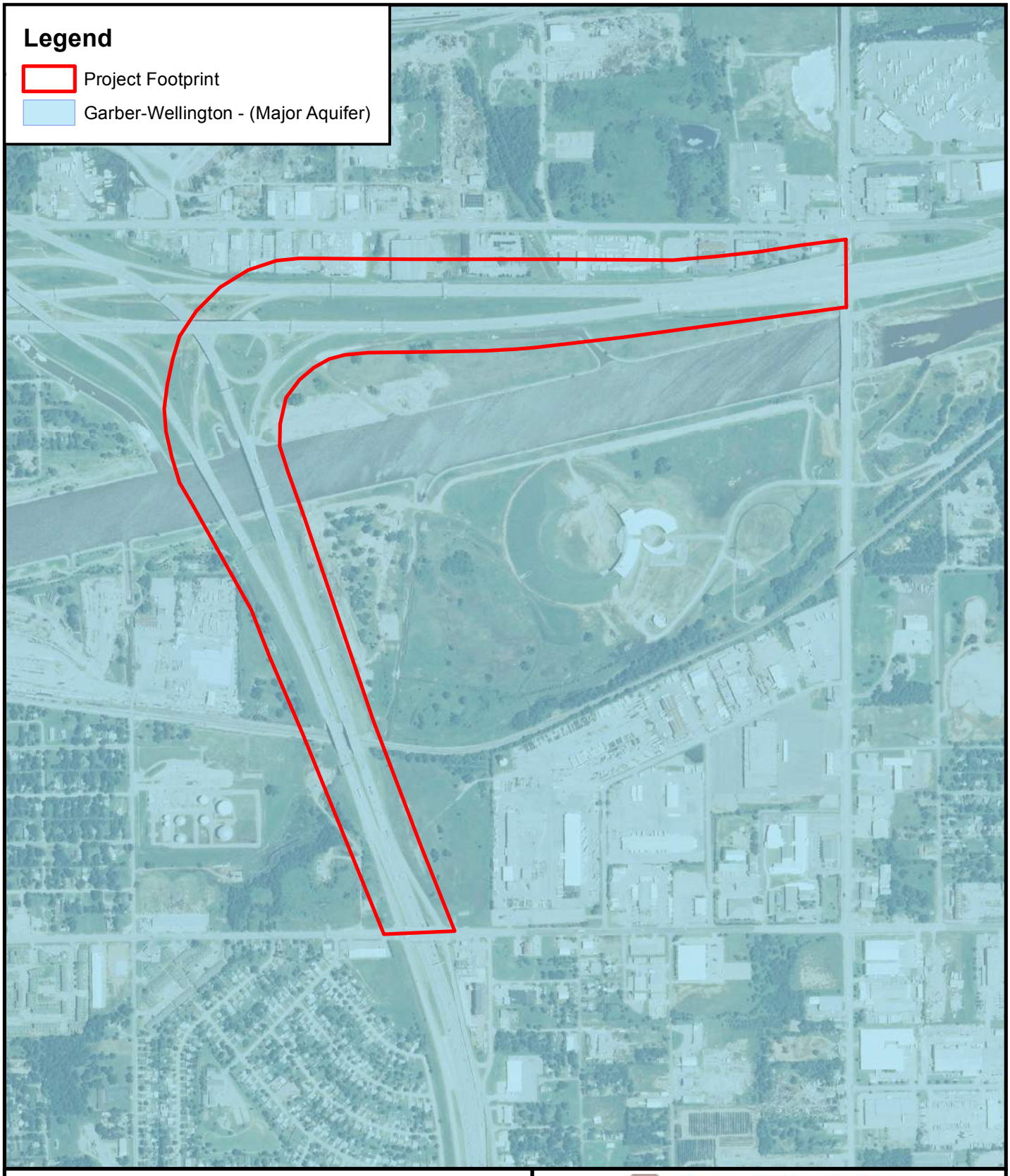
ENERCON

Exhibit 9-5: Federally-Listed Aquatic Species Watersheds Map

Source: USFWS - Oklahoma Ecological Services Field Office Federally Listed Aquatic Species Watershed of Oklahoma Map (PDF); OU

Prepared by: C. Seck; February 04, 2014

0 2.5 5 10 Miles



Prepared for:
Oklahoma Department of Transportation

Subject Property:

I 35 Reconstruction Additional Lanes Project
J/P #309444(04)
Section 2, T11N R3W
Oklahoma County, Oklahoma

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ENERCON

Exhibit 9-6: Footprint over Groundwater Aquifer Map

Source:Oklahoma Water Resources Board Aquifer Data; 2013 USDA NAIP Oklahoma County, Oklahoma

Prepared by: C. Seck; February 03, 2014

0 750 1,500 3,000 Feet

Federal Transportation Requirements Affecting State and Local Planning

ACOG Regional Active Transportation Plan (RATP): The ACOG RATP, Encompass 2045, includes the I-35 River Bridge Project, which aligns with the 2045 goals related to safety, infrastructure condition, congestion, freight movement and economic vitality, and environmental viability and resilience.

Statewide Transportation Improvement Program (STIP): The ODOT STIP incorporates the first four years of the ODOT Eight-Year CWP.

Oklahoma Freight Transportation Plan (OFTP): The 2023-2030 OFTP identifies the section of I-35 over the Oklahoma River as a truck bottleneck in proximity to identified freight generators. ODOT considered a range of factors for the allocation of federal freight formula funds for Oklahoma's freight projects including level of annual funding, corridor focus, geographic diversification, stakeholder priorities, project size, and designation of critical candidate rural freight corridors. The resulting set of 173 projects include the I-35 NB and SB bridge placements.

Long Range Transportation Plan (LRTP): The ODOT LRTP 2020-2045 is a policy document that provides a strategic direction for the development of the Oklahoma multimodal transportation system. This Project aligns with ODOT's long-range strategic direction. The Project improves system resilience and reliability and is consistent with the goals set out in ODOT's 2019-2028 Transportation Asset Management Plan (TAMP) with the intent of maintaining and preserving Oklahoma's transportation network.

National Electric Vehicle Infrastructure Plan: The Oklahoma National Electric Vehicle Infrastructure Plan was completed in August 2022. The Federal Highway Administration designated I-35 in Oklahoma as a compressed natural gas fuel corridor and electric vehicle (EV) charging corridor. This special designation is aimed at improving the mobility of passenger and commercial vehicles that run on alternative fuels.

Assessment of Project Risks and Mitigation Strategies

Potential Project risks and mitigation strategies to minimize the potential impact of the risks are summarized in the table below.

Environmental and right-of-way related risks are significantly reduced given that minimal right-of-way acquisition is required, and the Oklahoma River is a controlled waterway. Meaningful public involvement is anticipated to engage the environmental justice and disadvantaged communities affected by the Project.

ODOT and the City of Oklahoma City have committed state and local matching funds. This match will ensure ODOT can begin construction in a timely manner until grant funds are reimbursed.

Project Risk and Mitigation Strategies

Project Risk (Probability of Occurrence)	Mitigation Strategies
Cost Increases (High)	1) ODOT has included the Project in its Eight-Year Work Plan and remains committed to adjusting as needed to meet all MPDG and statutory deadlines for funding obligation and expenditure. 2) Construction estimates are complete to a 30 percent level and contain 30 percent contingency, allowing for a margin of increase.
Delays Securing Right-of-Way (Minimal)	1) Minimal Right-of-Way acquisitions are required. No relocations are anticipated. 2) Retaining Walls are needed to minimize required acquisitions.
Section 404 Permitting Delays (Moderate)	1) The Project is anticipated to fall under a Nationwide Permit. Work in the Oklahoma River will be required for the construction of the bridge piers and superstructure. 2) ODOT has a liaison in place at the USACE to accelerate and streamline approvals if needed.
Weather Related Construction Delays (Moderate)	1) ODOT collaborates closely with contractors to renegotiate project time while still meeting project commitments.

Issues with City of Oklahoma City Maintenance Agreement (Low)	1) ODOT and City of Oklahoma City have negotiated numerous maintenance agreements on previous projects and have standard language and terms.
Public Opposition (Low)	1) ODOT has initiated key stakeholder involvement through the preliminary study process. ODOT will continue to follow the features of meaningful public involvement identified in U.S. DOT's *Promising Practices for Meaningful Public Involvement in Transportation Decision-making*. 2) The Project will provide additional connectivity and mobility to the Oklahoma River Trail system, which will directly benefit the local community. 3) Stakeholder involvement participants have been extremely supportive of the Project.
Contamination from Industrial Use/Underground Storage Tanks (Moderate)	1) ODOT has a well-defined, successful approach for addressing potential contamination and Leaking Underground Storage Tanks (LUST) sites. Locations where these issues may arise are identified and included within the construction plans as "Areas of Environmental Concern" to put the contractor and their employees on alert that the potential exists for encountering contamination.
Earthquakes (Low)	1) Oklahoma's altered drilling practices have reduced the number of earthquakes in the state. All structures have seismic designs.

APPENDIX I - Hydraulics

OKLAHOMA DEPARTMENT OF TRANSPORTATION
EC-1405D – TASK 01
I-35: ADD ADDITIONAL RAMPS FOR I-35 NB & SB AT THE I-40/I-35 JCT.
NBI 14239, 21335, 21356, 21708, 21722, 21723, 22096, 23635, 26296, 27869
OKLAHOMA COUNTY
J/P 30444(04)

SECTION 06 – EXISTING BRIDGE CONDITION AND HYDROLOGICAL DATA

6.1 There are ten (10) bridges located within the Study Area. Structure Inventory and Appraisal (SI&A) sheets for these bridges were obtained from ODOT Bridge Division and are included here.

6.2 The drainage area associated with two of these bridges are as follows:

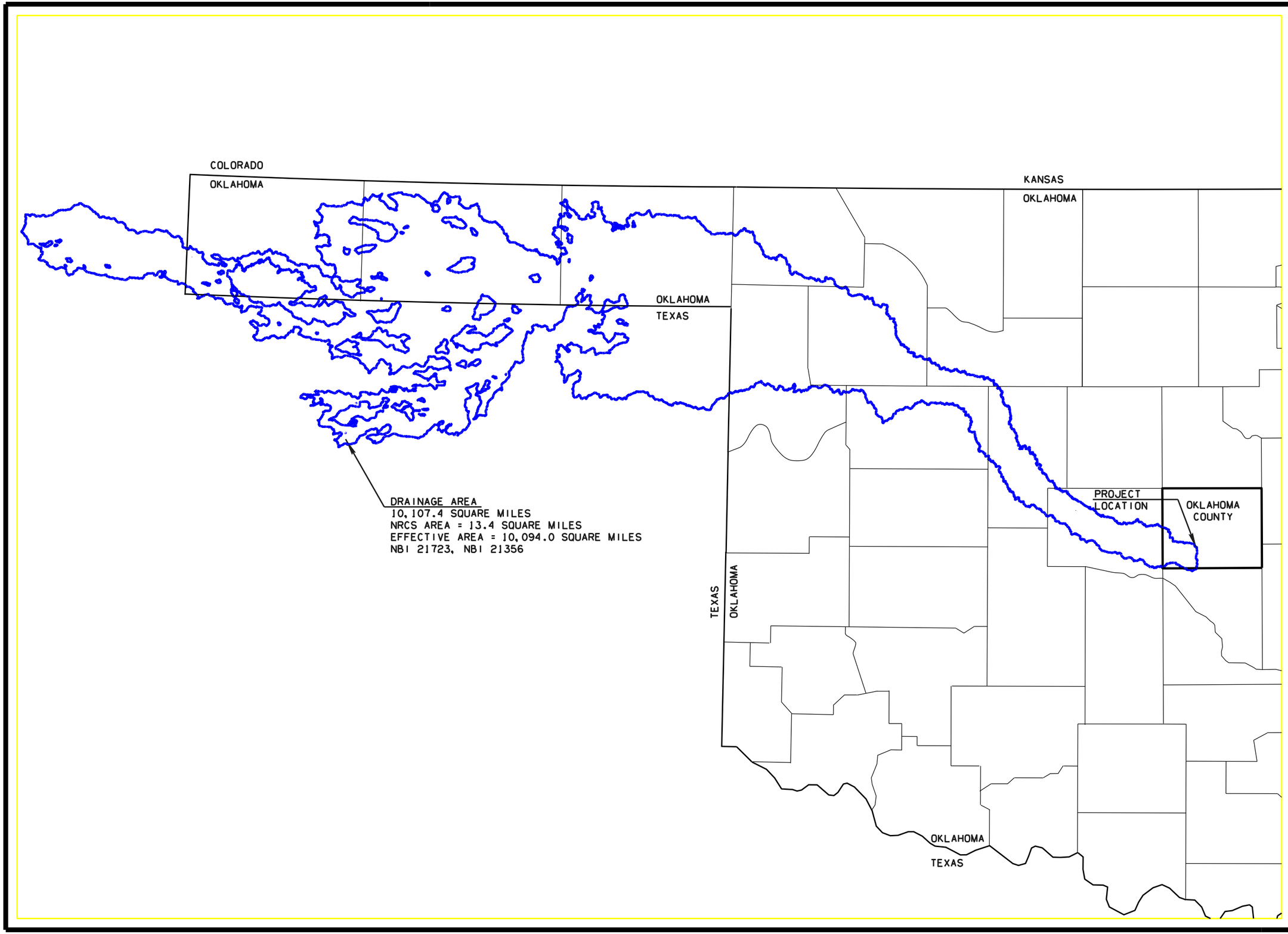
NBI 21356 & 21723

6.2.1 Total Area: 6,468,736 Acres (10,107.4 Square Miles)

6.2.2 NRCS Controlled Area: 8,576 Acres (13.4 Square Miles)

6.2.3 Effective Area: 6,640,160 Acres (10,094.0 Square Miles)

6.3 One (1) FEMA FIRMette for these bridges is included at the end of this section.



LEGEND

DRAINAGE AREA

0 72,000 144,000

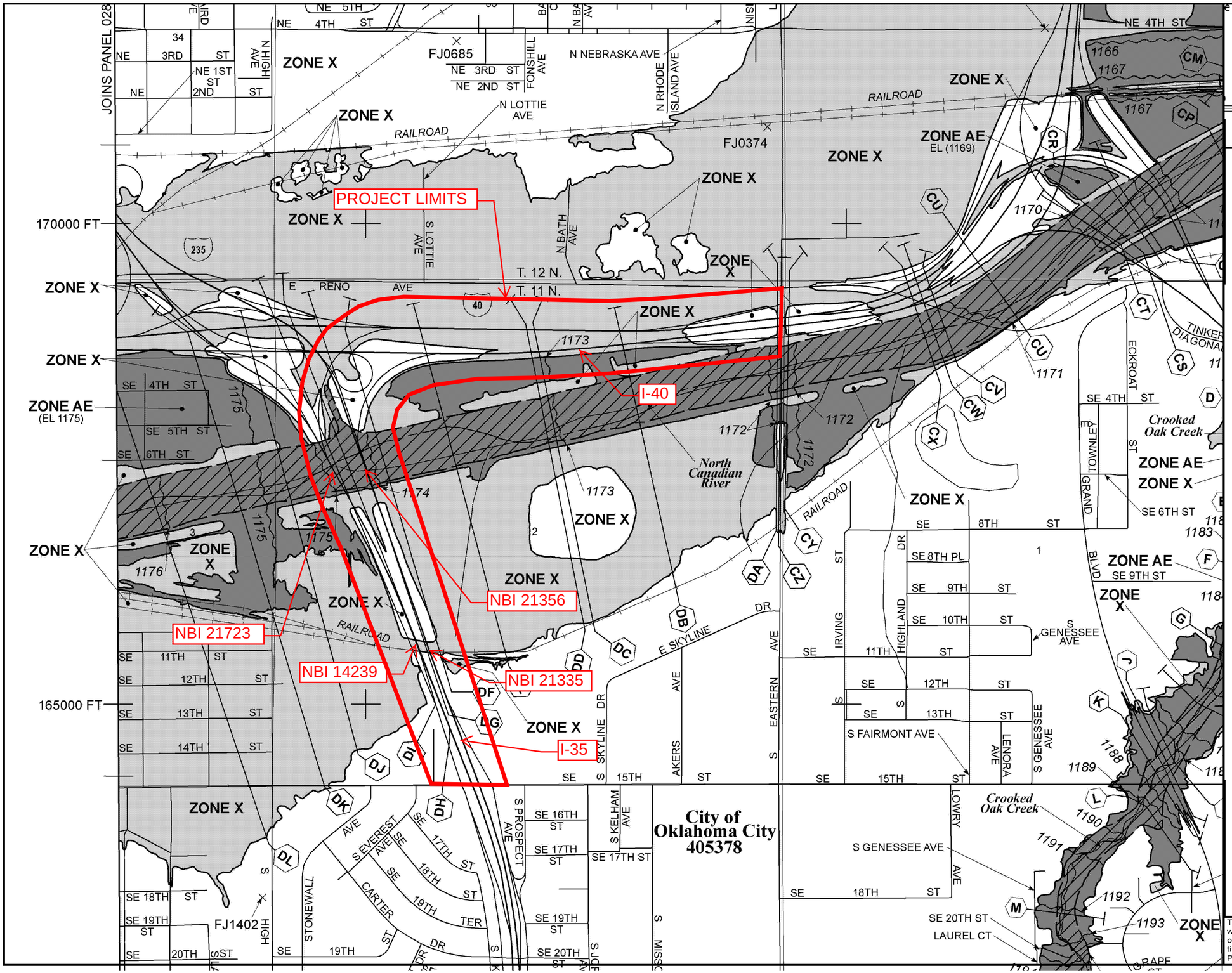
SCALE IN FEET

SCHEMMER

ARCHITECTS | ENGINEERS | PLANNERS

DRAINAGE AREA MAP

DIVISION 4, OKLAHOMA COUNTY
NBI 21723, NBI 21356
J/P 30444(04)



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MAP SCALE 1" = 1000'

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NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0305H

FIRM

FLOOD INSURANCE RATE MAP

OKLAHOMA COUNTY OKLAHOMA

AND INCORPORATED AREAS

PANEL 305 OF 370

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DEL CITY, CITY OF	400233	0305	H
FOREST PARK, TOWN OF	400379	0305	H
OKLAHOMA CITY, CITY OF	405378	0305	H
SMITH VILLAGE, TOWN OF	400549	0305	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
40109C0305H

REVISED DATE
DECEMBER 18, 2009

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX J -
Long Span Bridge Study

I-35 Bridges Over the Oklahoma River Long Span Bridge Type Study

Northbound & Southbound Bridges

Prepared for Poe & Associates

October 15, 2021

FINAL SUBMITTAL

TABLE OF CONTENTS

CONTENTS

1 INTRODUCTION

Poe & Associates, Inc. (Poe) is providing preliminary engineering services to the Oklahoma Department of Transportation (ODOT) in association with the Dallas Junction Project in Oklahoma City, OK. This project includes an assessment of viable long span signature structure types that do not require a pier in the Oklahoma River. Alfred Benesch & Company (Benesch) has been retained by Poe to complete the initial study of long span bridge types suitable for the replacement of the northbound (NB) and southbound (SB) bridges of I-35 over the Oklahoma River. This study includes a comprehensive assessment of the existing project site and geometric constraints that impact development of a viable long span bridge type. The study assesses several long span bridge types and their applicability to this river crossing location. Of the bridge types assessed, the two most suitable are carried forward for a more detailed analysis which shall include initial designs, construction feasibility considerations, and cost comparisons. The study concludes with a recommendation for bridge type to be advanced based on the assessment of site constraints, cost, and constructability for a long span river bridge at this location.

2 PROJECT SITE & GEOMETRIC CONSIDERATIONS

2.1 Project Location

The structures to be studied carry I-35 SB and I-35 NB over the Oklahoma River. The project site is roughly 1.5 miles east and 0.5 miles south of the Downtown Oklahoma City area. Additionally, the project site is just south of the I-35/I-40/I-235 interchange (Dallas Junction Interchange), making the proposed structures important links in the overall transportation network of the Oklahoma City Area. Key stakeholders near the project site include, but are not limited to: The Oklahoma City Boathouse District, The Native American Cultural Center, and The OKC National High Performance Center.

FIGURE 1 - PROJECT LOCATION

2.2 Existing Structures

2.2.1 Existing SB Structure

The existing I-35 SB bridge is comprised of a PPC beam superstructure and multi-column reinforced concrete piers supported on drilled shafts. The structure consists of eight spans and carries four lanes of traffic and two shoulders across the river. Of the eight spans, two are south of the river, five are over the river, and one is north of the river. The structure is 802’-6” long and varies in width from 71’-0” out to out at the south end to approximately 99’-0” out-to-out at the north end. Spans 1 and 8 are 101’-3” long and Spans 2 thru 7 are 100’-0” long. All substructure units are skewed 16° left ahead.

2.2.2 Existing NB Structure

The existing I-35 NB bridge is comprised of a PPC beam superstructure and multi-column reinforced concrete piers supported on drilled shafts. The structure consists of eight spans and carries four lanes of traffic and two shoulders across the river. Of the eight spans, two are south of the river, five are over the river, and one is north of the river. The structure is 802'-6" long and varies in width from 71'-0" out to out at the south end to approximately 114'-6" out-to-out at the north end. Spans 1 and 8 are 101'-3" long and Spans 2 thru 7 are 100'-0" long. The substructure units are not skewed.

2.3 Proposed Geometry

2.3.1 Geometric Constraints

Due to the increased importance of the Oklahoma River to the adjacent state of the art rowing facility, one of the key objectives is to remove any piers/obstacles in the river that could impede rowers. The Oklahoma River at the location of the proposed I-35 bridges is approximately 450' wide from bank-to-bank.

2.3.2 As Given Roadway Geometry

The proposed SB roadway and structure is skewed approximately 16° relative to the river while the proposed NB roadway and structure is skewed approximately 7° relative to the river. Both the SB and NB roadways will carry six 12' traffic lanes and two 12' shoulders with additional ramp tie-ins at the north end of the river crossing. See **Figure 2** below for a plan view of the as-given proposed roadway geometry, including identification of the tie-in ramps.

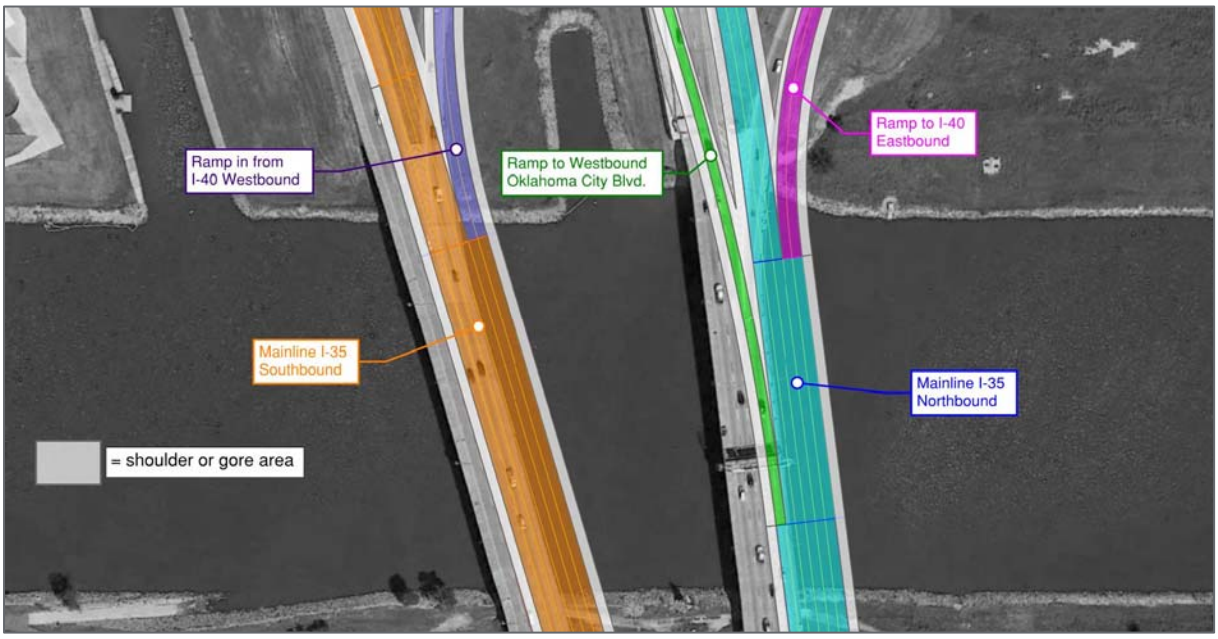

FIGURE 2 – AS-GIVEN PROPOSED ROADWAY GEOMETRY

One ramp that was closely considered within this bridge type study was the ramp from I-35 NB to I-40 EB. Three potential alignments for this ramp were developed by Poe and provided to Benesch for consideration (see **Figure 3**). The alignment shown and considered for this study for the EB I-40 off ramp was decided to be the Option 2 alignment. Option 2 was chosen as the as-given ramp alignment for this bridge type study because of significant drawbacks associated with Options 1 and 3, most notably:

- Option 1: This alignment diverges off I-35 NB near the midpoint of the river crossing, leading to a river span structure width that is not viable for the bridge types being considered.
- Option 3: The divergence point north of the river is most favorable to a long span river bridge; however, the ramp design speed required for this alignment is lower than desired.

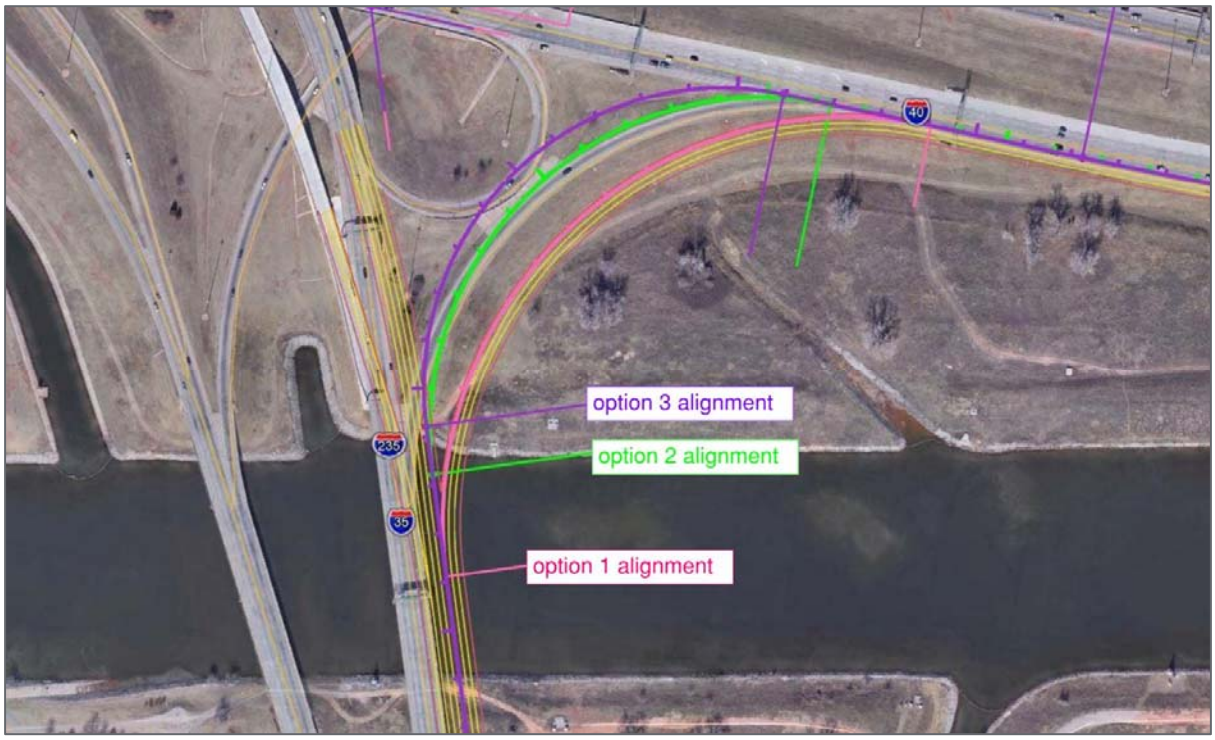

FIGURE 3 - I-40 EB OFFRAMP ALTERNATES

2.3.3 Effect of Proposed Ramp Alignments on Structure Width

Long span bridge types cannot practically accommodate a variable width of structure across their main spans; they must be overbuilt to accommodate the widest point of the roadway that will be in place on the main span. Because of this, the geometry of the ramp tie-ins at the north end of both I-35 SB and NB control the overall structure width for the river span (*i.e.* any increase in structure width at the north end for ramps will require an increase in width at the south end of span). While it would be desirable to move the north pier of the river span as far south as possible to avoid the ramp tie-ins, the location of this pier is constrained by the desire to keep the pier outside of the river.

At the I-35 SB structure, the required increase in width for the structure to span the entirety of the river is negligible (less than 2'). This is because the divergence of the ramp and mainline happens mostly north of the riverbank. However, at the I-35 NB structure, this effect is significant. Maintaining the alignment of the Oklahoma City Blvd. ramp (peeling off the northwest end of NB I-35) while keeping the north pier out of the river will require an overbuild of bridge width that exceeds 25 feet (see **Figure 4**). Accommodating the extra width on the river span would significantly increase cost along with constructability challenges due to both a larger overall bridge area and a less efficient superstructure. For the purposes of this study, it is therefore assumed that the Oklahoma City Blvd. ramp must be re-aligned (and thus reconstructed) to shift the I-35 tie-in further north beyond the limits of the river span (see **Figure 5**).

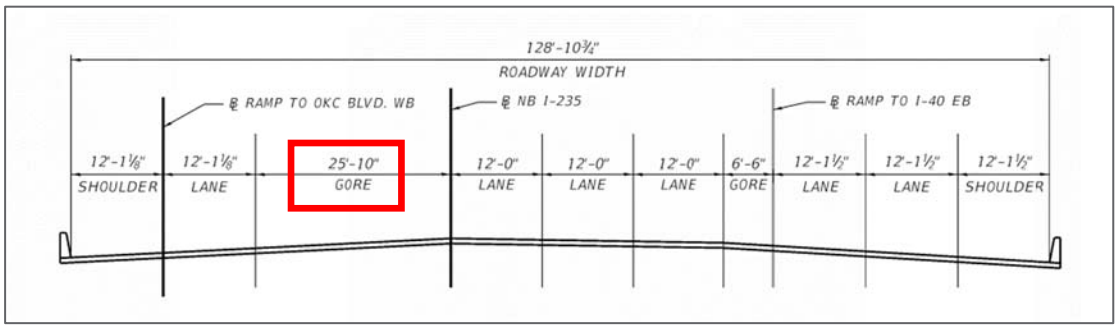

FIGURE 4 – I-35 NB ROADWAY CONFIGURATION AT NORTH PIER (AS-GIVEN)

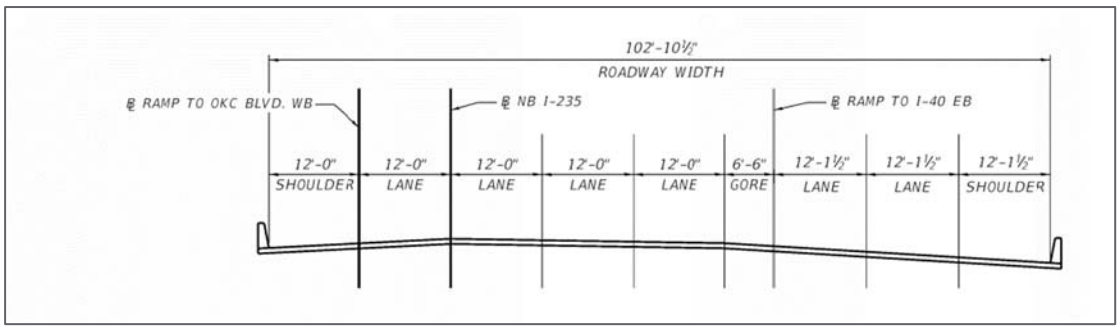

FIGURE 5 – I-35 NB ROADWAY CONFIGURATION AT NORTH PIER (SHIFTED OKC BLVD. RAMP ALIGNMENT)

3 INITIAL BRIDGE TYPE ASSESSMENT

The span lengths for I-35 NB and SB over the Oklahoma River are approximately 520 ft. Several feasible bridge types for these span lengths were considered and the findings are presented in the following sections. Feasible and optimal span length ranges for various bridge types are shown in **Figure 6** – Feasible and Optimal Span Lengths by Bridge Type.

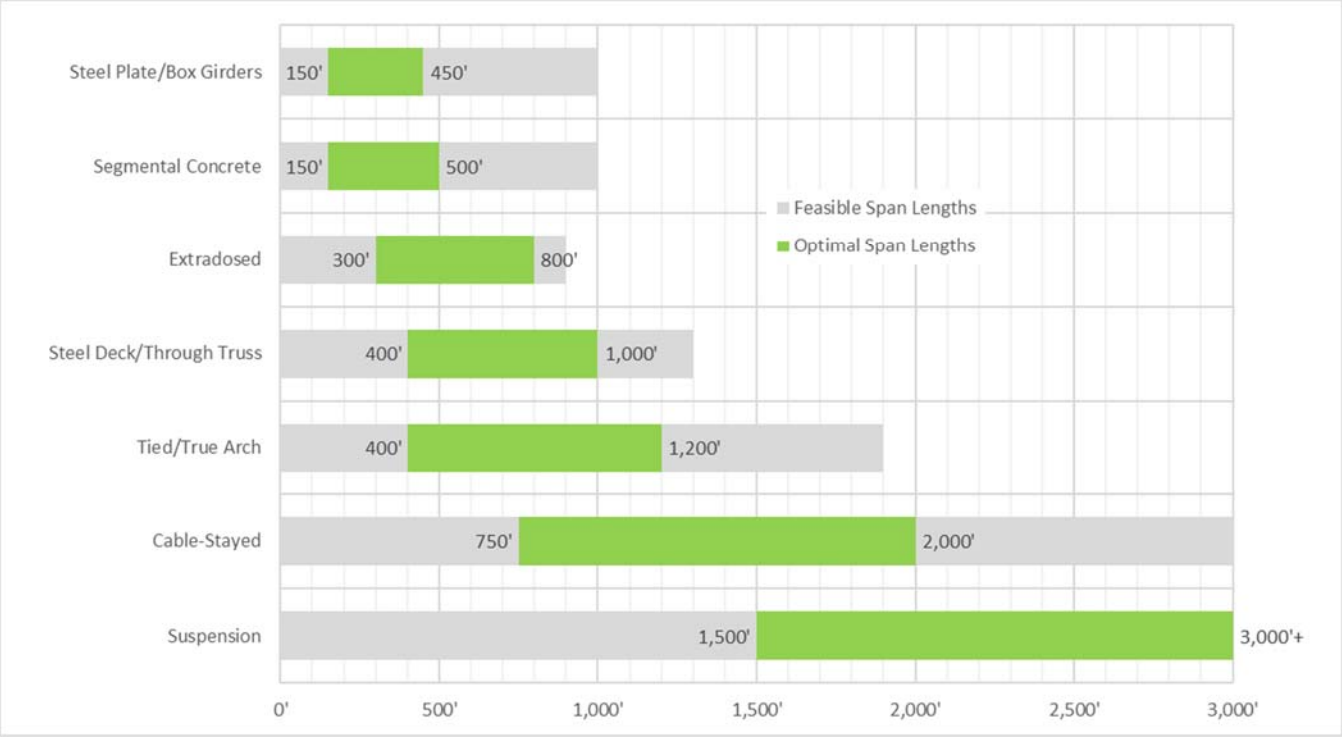

FIGURE 6 – FEASIBLE AND OPTIMAL SPAN LENGTHS BY BRIDGE TYPE

3.1 Steel Plate/Box Girders

Steel girder bridges typically consist of multiple lines of welded plate or box girders beneath a concrete deck. The multi-girder configuration eliminates any fracture-critical considerations and facilitates staging with the existing structure. Contractor bids are generally competitive as most are familiar with this type of construction.

Site constraints for I-35 NB and SB over the Oklahoma River present significant drawbacks for steel girders. The interchange ramps to the north do not allow for additional continuous spans north of the river, resulting in a highly impractical and inefficient span over the river. A vertical profile raise would also be required to accommodate an increased superstructure depth without further reducing the vertical clearance over the waterway. If minimizing temporary obstructions in the river is a priority, it should be noted that temporary shoring in the river would be required to support the various girder segments during erection.

FIGURE 7 – STEEL PLATE GIRDER BRIDGE

3.2 Segmental Concrete

Segmental concrete girders have become more popular in various parts of the country. Short segments of concrete box girders are precast off site and shipped to the project location. These segments are then hoisted by crane or gantry into position and post-tensioning is used to hold them in place. Erection proceeds piece by piece in this manner until the span is complete. Shop fabrication offers improved quality control and many bridges can be constructed using cantilever construction without additional temporary shoring. Concrete bridges also offer improved durability and reduced inspection and maintenance requirements when compared to steel.

FIGURE 8 – SEGMENTAL CONCRETE BRIDGE (GO BETWEEN BRIDGE)

Like steel girders, site constraints for I-35 NB and SB over the Oklahoma River present significant drawbacks for segmental concrete girders. The lack of additional continuous spans north of the river results in an inefficient design and hinders cantilever construction methods. Both a vertical profile raise and temporary shoring in the river would be likely.

3.3 Extradosed

Extradosed bridges are relatively uncommon, combining aspects of both cable-stayed and segmental box girder structures. Cables are attached between the box girders and short pylons extending above the level of the deck. The pylons tend to be significantly shorter than cable-stayed bridges. The hybrid structure is constructed using the methods described for segmental concrete bridges with the added step of attaching pairs of cables to the free end as segments are erected. Due to the added support from the cables, a shallower superstructure can be achieved than with segmental concrete girders alone. Proper tensioning of the cables is critical for this structure type.

As the pylons for extradosed bridges need to be tied to back spans, the inability to provide additional spans to the north hinders the feasibility of this structure type for I-35 NB and SB over the Oklahoma River. Using a single pylon at the south bank is feasible; however, the optimal span lengths presented in **Figure 6** – Feasible and Optimal Span Lengths by Bridge Type are then halved to 150 ft to 400 ft and this extradosed configuration becomes inefficient.

FIGURE 9 – EXTRADOSED BRIDGE (KWIDZYN BRIDGE)

3.4 Steel Deck/Through Truss

Truss bridges consist of a series of straight members connected with gusset plates to create a highly rigid structure. Trusses have been used for many years in highway and rail applications, although their popularity is waning. Through trusses, with the entire truss at or above the roadway, can meet the existing profile without significantly impacting vertical clearance. Conversely, deck trusses are located below the roadway and would require a significant profile raise to avoid reducing the existing vertical clearance over the river. Fabrication and transportation of components is often easier than other signature bridge types and they can be constructed using geometric control methods with no jacking or tensioning required. To facilitate staging and maintenance of traffic, the entire superstructure can be erected off alignment on shoring and moved into position via barge or lateral slide.

Trusses meet the site constraints and optimal span lengths for I-35 NB and SB over the Oklahoma River, but there are several drawbacks to consider. The bridge must be a constant width and the widened deck section for the ramps at the north end will drive up the overall bridge area. Significant inspection effort is required due to the bottom chord and various vertical and diagonal members being designated as fracture-critical.

FIGURE 10 – STEEL THROUGH TRUSS BRIDGE (ALBERT GALLATIN MEMORIAL BRIDGE)

3.5 Tied/True Arch

Tied and true arches use a curved arch rib to suspend the deck with hangers. True arches, relying upon the foundations to resist horizontal thrust at each end, were eliminated from consideration for these I-35 structures due to excessive substructure demands and tighter fabrication and erection tolerances. Tied arches are preferred for this site as the horizontal thrust is resisted by tie girders along each side of the deck. Like trusses, tied arches may be erected off alignment and moved into their final position.

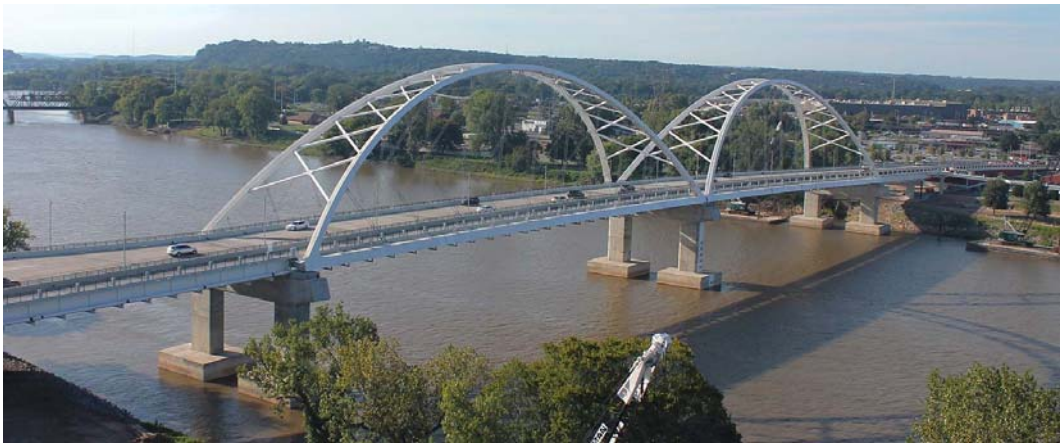

FIGURE 11 – TIED ARCH BRIDGE (BROADWAY BRIDGE)

Tied arches are very appropriate for I-35 NB and SB over the Oklahoma River. Drawbacks for arches include the same constant width limitation as trusses. Arches also carry slightly more fabrication, transportation, and erection requirements. During certain stages of construction, hangers will require jacking or tensioning to establish correct loads. The tie girders are also fracture-critical members and will carry additional inspection requirements.

3.6 Cable-Stayed

Cable-stayed bridges support the roadway using cables connected directly to tall towers. The proposed span lengths are below the optimal range for this type of structure as shown in **Figure 6**; however, the range presented assumes a tower on both sides of the main span. Cable-stayed bridges can be asymmetric with a single tower at one end of the main span. For the I-35 bridges, a single tower at the south bank would be a reasonable alternative that eliminates the need for tiedown back spans on the north side of the river. It also allows a wider deck at the north end beyond the last set of cable stays. Construction can be performed in stepwise manner without shoring, building short lengths of deck and installing pairs of cables, until the main span and back spans are complete.

Achieving the proper balance of cable forces is key for efficiency and a short back span to the south may present challenges. Tilting the tower away from the main span can help in this regard. As these bridges cannot be constructed off alignment and moved into place, careful consideration of staging and maintenance of traffic is paramount before selecting this structure type.

FIGURE 12 – CABLE-STAYED BRIDGE (FLEHE BRIDGE)

3.7 Suspension

Suspension bridges are one of the oldest long-span bridge types and are typically reserved for spans exceeding 1,500 ft. Towers are constructed from which the main catenary cables are strung. Hangers supporting the deck are attached directly to the main cables. In construction, this allows the towers and main cables to be built prior to incrementally installing the hangers and deck.

Aside from the inefficiencies at this span length, the back span required on the north side of the river is not achievable. These bridges must also be constructed in place with corresponding impacts to staging and maintenance of traffic.

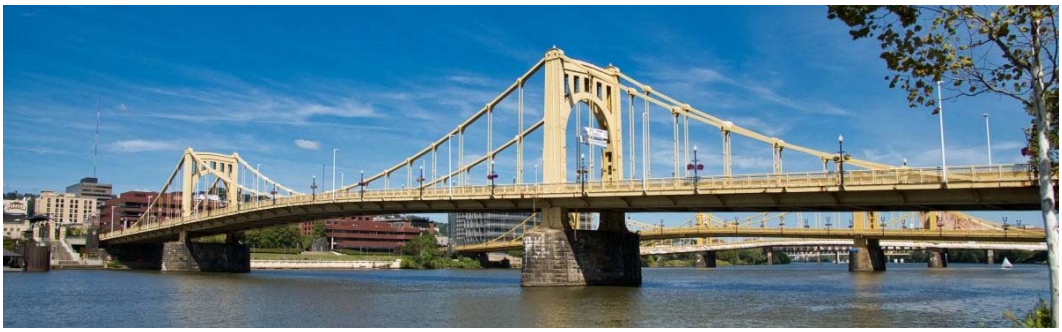

FIGURE 13 – SUSPENSION BRIDGE (ROBERTO CLEMENTE BRIDGE)

3.8 Initial Bridge Assessment Conclusions

There are several bridge types that are suitable based on span length for the proposed reconstruction of I-35 over the Oklahoma River, but only a few of these bridge types warrant further consideration based on the project constraints. Steel plate/box girders, segmental concrete, extradosed, and suspension do not fit well with the geometric constraints of the project site and/or would be highly inefficient.

Tied arches and trusses share multiple advantages and disadvantages. Similar advantages include the ability to construct these bridge types off alignment without reliance on back spans. The biggest disadvantages are the increased structure width to accommodate ramp geometry and the inclusion of fracture-critical members. For this study, a tied arch has been selected over a truss based on recent DOT trends and fewer fracture-critical members.

A cable-stayed bridge with a single tower offers a true alternative to a tied arch, with contrasting advantages and disadvantages. The cable-stayed advantages include a lack of fracture-critical members and a reduced deck footprint tied more closely to roadway geometrics. However, cable-stayed bridges must be constructed in-line which increases the duration of impacts to traffic.

Tied arch and cable-stayed bridge types for the I-35 SB and NB crossings of the Oklahoma River will be explored in more detail in the following sections.

4 TIED ARCHES

4.1 Structure Description

The curved portion of the bridge above the deck is referred to as the arch rib and it transfers the weight of the bridge and its loads primarily though axial thrust along the member. In a tied arch, tie girders running along each side of the deck resist the horizontal component of the thrust at the abutments or piers. Hangers connect the arch rib to the tie girder, which also supports the floor system and deck.

4.2 Proposed Geometry

To span the entirety of the Oklahoma River, the proposed I-35 SB and NB tied arches have been laid out with a span length of approximately 520'. This falls in the range of optimal span lengths for a tied arch bridge (see **Figure 6**). Under a uniformly distributed load, the optimal height of the arch would be 1/3rd of the total span length – approximately 170' tall. In reality, the loads that will be placed on the arch will not be uniformly distributed. For more conventional bridge loadings, the optimal arch height becomes shallower, approximately 1/5th of the span length. Many arch bridges in use today follow this span to height ratio quite closely. Consequently, the optimal arch height for both the proposed I-35 SB and NB tied arch structures is approximately 105'.

The out-to-out deck width for the proposed structure is approximately 103' for the NB structure and approximately 98' for the SB structure. As mentioned in Section 2.3.3, the out-to-out width of the deck is governed by the geometry at the north end of the structure, where ramp alignments diverge from the mainline.

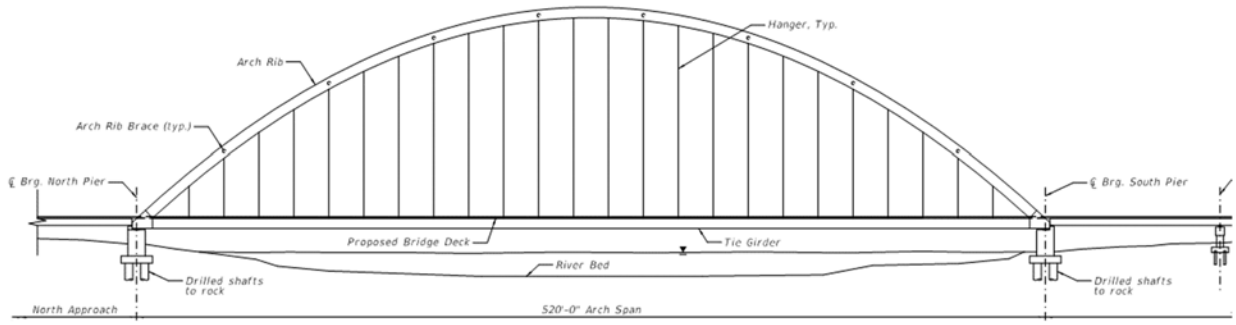

FIGURE 14 – TIED ARCH ELEVATION VIEW

4.3 Superstructure

4.3.1 Arch Ribs

The curved arch ribs span over the bridge deck and support the top end of the hangers. Loads are carried primarily through axial thrust along the ribs, but varying amounts of shear and flexure are also resisted. Flexure can be minimized through careful cambering of the arch and tie such that the final deflected shape of the arch rib closely matches the ideal thrust line.

Arches can be vertical or tilted inwards in a basket-handle configuration. Vertical arches are often simpler to design and detail but have a reduced buckling resistance, as the opposite arch ribs tends to buckle in the same shape. Lateral bracing between the arch ribs is used to improve buckling and wind resistance for both configurations.

Arch ribs are typically constructed of welded steel box sections. The interior is often detailed to allow access for fabrication, inspection, and ventilation. Hanger plates extend into the ribs and require careful detailing for proper force transfer and fatigue resistance. For typical arch bridges of similar span length and magnitude to the proposed I-35 bridges, the arch rib box sections range from 4’ to 6’ deep and 3’ to 6’ wide. Longer spans or a different aesthetic may be achieved by using round or trussed arch ribs.

FIGURE 15 – BRIDGE WITH VERTICAL ARCH RIBS (I-280)

4.3.2 Tie Girders

The tie girders run along each side of the deck and are supported by the arch hangers. One of the primary roles of the tie girders is to resist the horizontal thrust component of the arch ribs. As such, gravity loads will only induce vertical reactions on the substructure. The tie girders also frame into the floor system that supports the deck.

For a time in the 1980s and 1990s, the design community hesitated to use tied arches as total collapse would be expected if the tie girder failed. With better detailing practices and the development of tougher steels, most of these concerns have been alleviated.

The tie girder is typically a box or I-section. The depth of the box or I-girder sections for arches of similar magnitudes to the I-35 bridges are typically between 6' and 9'. Box girder sections are easier to detail with internal redundancy. This may be achieved by over-designing the tie as a built-up member of individual plates. Unlike a welded girder, fracture in one of the plates would not be expected to propagate throughout the entire tie girder. Box girders can also be detailed with internal post-tensioning strands that will carry the load if the box section fails. Spans greater than those required for this project have also been achieved using post-tensioned concrete tie girders.

4.3.3 Hangers

Hangers are used to suspend the tie girders, floor system, and deck from the arch ribs. Vertical hangers are most common. Networked hanger systems use diagonal hangers with a "trussed" appearance that can increase the efficiency of the structure.

Most modern bridges use structural strand with anchorages at each end. The bottom anchorage typically allows length adjustment during construction. Each hanger can also be detailed with two separate strands per location. This facilitates hanger replacement while the bridge is still supporting traffic and provides redundancy if failure occurs.

Hanger vibrations may be induced by wind loads. Mitigation methods, if required, typically require some type of damper system. Monitoring may be used to determine the need for mitigation and to verify the performance of those measures after installation.

FIGURE 16 – ADJUSTABLE SINGLE STRAND HANGER INSTALLATION

4.3.4 Floor System

The floor system is comprised of transverse floorbeams spanning between tie girders and longitudinal stringers between floorbeams. The transverse floorbeams are often welded plate girders and the web depth can be varied to match the cross section of the roadway. Longitudinal stringer spans are often short enough to make rolled

beams viable. The floor system and deck are not part of the primary force resisting system of the arch. Lateral bracing of the floor system is provided to facilitate construction and future deck replacement.

4.4 Substructure

Due to the limited vertical clearance under the existing bridge, a solid wall pier with pilasters beneath the arch bearings is a reasonable assumption for this site. The wall between the pilasters will support a series of girders from the approach spans. Loads on the pier will primarily be vertical as horizontal thrust from the arch is resisted by the tie. Aesthetic improvements can be made through the incorporation of concrete form liners, reveals, stain, and/or other treatments.

The proposed I-35 bridges will likely require deep foundations. Drilled shafts are one of the most common deep foundation types and can also alleviate scour concerns. Driven steel h-piles or pipe piles may also be used. Spacing can be optimized to provide more support under the arch bearings.

4.5 Constructability

4.5.1 Construct In Place

If the alignment can be adequately shifted or traffic can be fully detoured, the arch may be constructed in place. Cantilever construction, where the arch is built from both sides of the span, is most common. This can be achieved using temporary falsework in the river or back stays connected to temporary towers. The latter method requires an economical means of anchoring the back stays and balancing the induced forces.

Tolerances for fabrication and assembly of tied arches are generally tight, but not as stringent as true arches. Hangers often require tensioning at multiple stages of construction and an installation sequence may be required.

FIGURE 17 – ARCH ERECTION ON FALSEWORK (HALSTED BRIDGE)

FIGURE 18 – ARCH ERECTION WITH BACK STAYS (I-74)

4.5.2 Float In

The methods used to construct the bridge in place in Section 4.5.1 can also be used to build the superstructure on barges next to the site. Once the superstructure steel is complete, it is floated along the river to the final site and lowered into place. The deck and barriers are typically poured after the steel is supported by the permanent substructure.

FIGURE 19 – FLOAT IN ARCH PLACEMENT (BROADWAY BRIDGE)

4.5.3 Lateral Roll In

Similar to the float in method, the tied arch superstructure may be constructed on temporary bents adjacent to the final alignment. As temporary bents are likely to have more vertical capacity than barges, this may include the deck, barriers, and any other attachments to the bridge. Once the superstructure is ready, rollers are used to move the bridge laterally into position and lower it onto the permanent substructure. The outage window is usually faster than a float in because the only work afterwards consists of inspection, joint installation, and other minor tasks.

FIGURE 20 – LATERAL ROLL IN ARCH PLACEMENT (DEPOT STREET BRIDGE)

4.6 Future Inspection and Maintenance

Future inspection of a tied arch bridge will require access to the top of the arch. The interior of the arch ribs and tie girders may or may not require inspection based on the final details and requirements of the owner. Barges may be used to inspect the underside of the deck and floor system. The tie girders will likely be considered fracture-critical, regardless of whether internal redundancy has been provided. A complex inspection plan should be developed and implemented to address any structure-specific requirements.

Maintenance of a tied arch bridge is consistent with other steel bridge types. Painting is the most common maintenance item, followed by expansion joint and bearing replacements. Hanger replacement is not anticipated but can be facilitated using two strands at each hanger location.

FIGURE 21 – INSPECTION EQUIPMENT FOR UNDERSIDE OF TIED ARCH (HALSTED BRIDGE)

5 CABLE-STAYED

5.1 Structure Description

The bridge deck for a cable-stayed bridge is supported by a series of cables attached directly to tall towers at one or both ends of the span. Back spans with cables are typically used to balance the forces in the tower and create a more efficient structure. Edge girders on either side of the roadway resist the compressive forces induced by the inclination of the cables and are connected to the framing supporting the deck.

5.2 Proposed Geometry

To span the entirety of the Oklahoma River, the main spans of the I-35 SB and NB cable-stayed bridges have been laid out with a span length of approximately 520'. This falls within the feasible span length range for a cable-stayed bridge, and just under the optimal span length range (see **Figure 6**). To efficiently balance the main span, the back span length should typically be between 40% and 60% of the main span length. The proposed back span for the I-35 bridges is 300' in length. In order to keep the hangers at an appropriate incline, the minimum tower height over the deck is approximately 200'.

North of the northernmost cable-stay connection to the deck, the edge girders can be flared to accommodate a variable structure width. This can reduce the superstructure width at the north end of the span as compared to the tied arch option, as the flared girders can partially accommodate the diverging ramp alignments. The NB out-to-out deck width of the proposed cable stayed structure varies from approximately 98' to 103'. The SB out-to-out deck width of the proposed cable-stayed structure varies from approximately 97' to 99'.

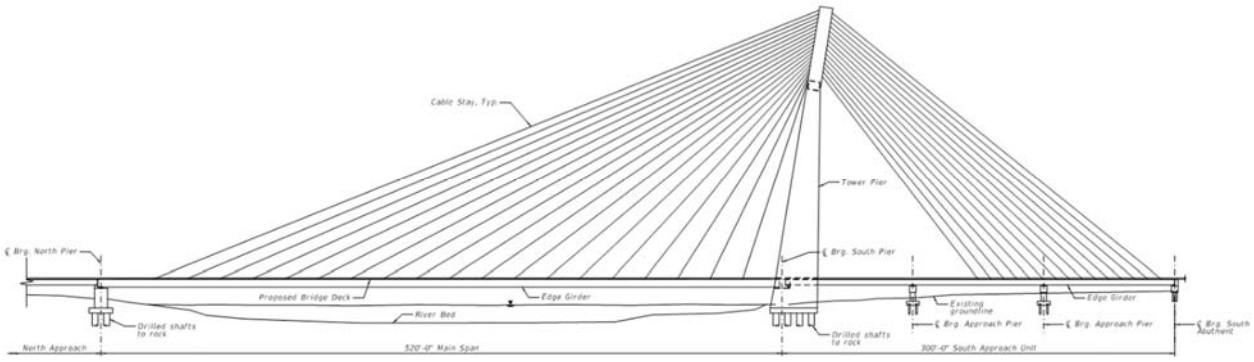

FIGURE 22 – CABLE-STAYED ELEVATION VIEW

5.3 Superstructure

5.3.1 Towers

The demands on the towers are heavily influenced by the span configuration. If a significant load imbalance occurs between the main span and the back span, the tower must resist the load in flexure. There are many ways to reduce this imbalance for dead loads when long back spans are not viable. One method is to take advantage of the weight of the tower itself. By tilting the heavy tower backwards (away from the main span), it imposes bending moments opposite the load imbalance. Alternatively, the back span can be counterweighted. This can involve concrete infill within the superstructure itself or buried cells full of soil or concrete in the approach roadway.

FIGURE 23 – CABLE-STAYED BRIDGE WITH ANGLED TOWER (ERASMUS BRIDGE)

The towers come in various configurations and are often constructed of reinforced concrete with a hollow center for material savings and inspection access. Single column, A-, inverted Y-, and H-towers are all common variants (see Figure 24 – Cable-Stayed Tower Configurations). Single column, A-, and inverted Y-towers share similar cable geometry with stays angled in both planes. This increases the detail complexity for the edge girder anchorage, induces transverse compression forces in the floor system, and may impinge on the clearance envelope of the roadway. Single column towers also resist transverse loads in flexure whereas the A- and inverted Y-towers resist some of the load axially in the legs. H-towers keep the stays in a vertical plane to alleviate the challenges associated with the other shapes but appear more utilitarian.

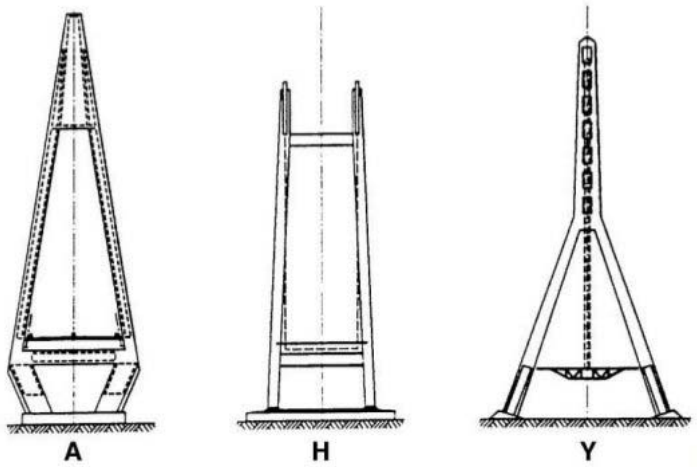

FIGURE 24 – CABLE-STAYED TOWER CONFIGURATIONS

5.3.2 Edge Girders

The edge girders run along each side of the deck and are supported by the bottom of the cable stays. They carry the horizontal component of the cable stay loads plus some degree of flexure and shear. The edge girders also frame into the floor system that supports the deck.

The edge girder is often a box girder or I-section. Unlike tie girders under tension for arches, these girders are under compression and do not have the same internal redundancy considerations. Orthotropic decks have also been used on several cable-stayed bridges, but they tend to be cost-prohibitive on shorter spans.

5.3.3 Cable Stays

The cable stays can be arranged in various patterns to achieve a particular aesthetic or optimize the forces in the tower. The cable inclination angle relative to the deck has a significant effect on the compressive forces in the edge girders and should generally be greater than 22 degrees.

Cable stays are constructed from a series of parallel prestressing strands. Often these are encased in PVC for added corrosion protection. The strands are threaded through anchorages and stressed during construction to achieve the desired loads.

Cable vibrations may be induced by wind loads. Mitigation methods, if required, typically use some type of damper system. Vibration monitoring may be used to determine the need for mitigation and to verify the performance of those measures after installation.

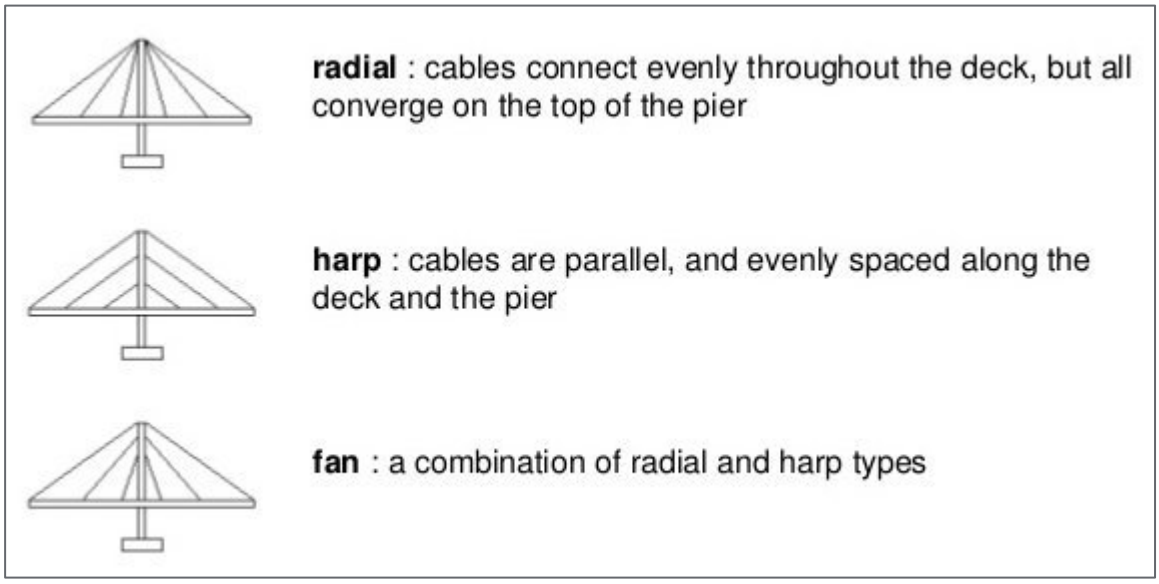

FIGURE 25 – COMMON CABLE STAY LAYOUTS

FIGURE 26 – CABLE STAY INSTALLATION

5.3.4 Floor System

The floor system is often comprised of transverse floorbeams spanning between edge girders and longitudinal stringers between floorbeams. The transverse floorbeams tend to be welded plate girders and the web depth can be varied to match the cross section of the roadway. Longitudinal stringer spans are often short enough to make rolled beams viable. Lateral bracing of the floor system is provided to facilitate construction and future deck replacement.

5.4 Substructure

The tower at the level of the bridge deck will support the floor system on both sides. Access to the interior of the tower may be provided with a door at deck or ground level. Aesthetic improvements can be made through the incorporation of concrete form liners, reveals, stain, and/or other treatments.

The proposed I-35 bridges will require deep foundations to resist any unbalanced loading. Drilled shafts are one of the most common deep foundation types and can also alleviate scour concerns. Driven steel h-piles or pipe piles may also be used.

5.5 Constructability

5.5.1 Construct In Place

Unlike arches or trusses that can be constructed off alignment and moved, a cable-stayed bridge must be constructed in place. This can have a significant effect on staging and maintenance of traffic depending on the extent of the alignment shift.

Cable-stayed bridges are traditionally built using the balanced cantilever method of construction. The tower is constructed first, followed by alternating segments of deck on each side. Pairs of cables are attached as each deck segment is erected. This approach allows the cable supported spans to be constructed without additional shoring while minimizing bending forces on the tower.

FIGURE 27 – CABLE-STAYED BRIDGE CONSTRUCTION (TEMBURONG BRIDGE)

5.6 Future Inspection and Maintenance

Future inspection of the cable ends can be performed at deck level and from the inside of the tower. The underside of the deck and floor system should be accessible from barges for this project. A complex inspection plan should be developed and implemented to address any structure specific requirements. Monitoring systems for cable stays are available to monitor structural health, load, and/or vibration.

A maintenance plan should be developed for this type of structure. Common items include painting, expansion joint repair, and bearing replacements. Cable stay protection systems must be kept functional. Cable stay replacement is not anticipated but should be considered in the design.

6 COST ASSESSMENT

The following cost assessment was developed based on a cost per square foot of bridge deck basis, and not on calculated quantities. The estimated cost per square foot for each bridge type is based on previously built/bid projects for both the tied arch and the cable-stayed option. In addition, the unit costs were developed in consideration of factors such as location, material availability/costs in the area, as well as a construction year of 2025.

6.1 Tied Arch Cost Assessment

Bridge Element	Unit Cost Per Sq. Ft.	Area of Bridge Deck (Sq. Ft.)	Total Cost
NB Structure Main Span	$ 1,200	53,500	$ 64.2 M
NB Structure Approach Unit	$ 200	29,200	$ 5.8 M
SB Structure Main Span	$ 1,200	50,600	$ 60.7 M
SB Structure Approach Unit	$ 200	28,700	$ 5.7 M

Subtotal NB Structure:	$ 70.0M
Subtotal SB Structure:	$ 66.4M
Total Cost:	**$ 136.4M**

6.2 Cable Stayed Cost Assessment

Bridge Element	Unit Cost Per Sq. Ft.	Area of Bridge Deck (Sq. Ft.)	Total Cost
NB Structure Main Span	$ 1,700	51,200	$ 87.0 M
NB Structure Approach Unit	$ 850	29,500	$ 25.1 M
SB Structure Main Span	$ 1,700	50,600	$ 86.0 M
SB Structure Approach Unit	$ 850	29,200	$ 24.8 M

Subtotal NB Structure:	$ 112.1 M
Subtotal SB Structure:	$ 110.8 M
Total Cost:	**$ 222.9 M**

7 RECOMMENDATION

Based on the work completed within this long span bridge type study, Benesch would give a preliminary recommendation to advance the tied arch bridge alternative for further evaluation. This recommendation is focused on the initial evaluation of site constraints, cost, and constructability and has been made independent of additional factors that may influence selection of a final bridge type, such as aesthetics, community input, and/or other stakeholder preferences.

8 TIED ARCH CONCEPTUAL STAGING SEQUENCE

There are a wide range of options for constructing a signature bridge crossing over the Oklahoma River, but the significant amount of traffic passing through this junction means that construction staging and maintenance of traffic will be critical to both user impacts and stakeholder acceptance. As such, the design team has developed preliminary staging concepts and exhibits for the recommended tied arch bridge type. The key objectives behind the current staging plan (see MOT and Staging Exhibits) are summarized below. Ultimately, the final staging sequence and maintenance of traffic will need to find the optimal balance of cost, function, and safety for all stakeholders.

8.1 I-35 Northbound Staging Objectives

- Complete as much work as possible without affecting existing traffic patterns.
- Use accelerated bridge construction methods to construct the arch superstructure off-alignment on temporary piers.
- Only reduce traffic from four lanes to three lanes to complete substructure work and then to lateral slide the arch superstructure into its final position.

8.2 I-35 Southbound Staging Objectives

- Complete as much work as possible without affecting existing traffic patterns.
- Use a temporary bridge to maintain four lanes of traffic during arch construction and three lanes during completion of the substructure.
- Use accelerated bridge construction methods to construct the arch superstructure off-alignment on temporary piers.
- Only reduce traffic from four lanes to three lanes to complete substructure work.
- Minimize the duration of a short-term full closure of I-35 to allow a lateral slide of the arch superstructure into its final position.

9 REFERENCES

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Figure 25 - https://www.infrastructurepc.com/analysis-design-of-cable-stayed-bridge/

Figure 26 - https://www.dywidag-formties.com/projects/2013-info-21/relief-for-noia-new-stay-cable-bridge-ensures-summer-months-without-traffic-jams/

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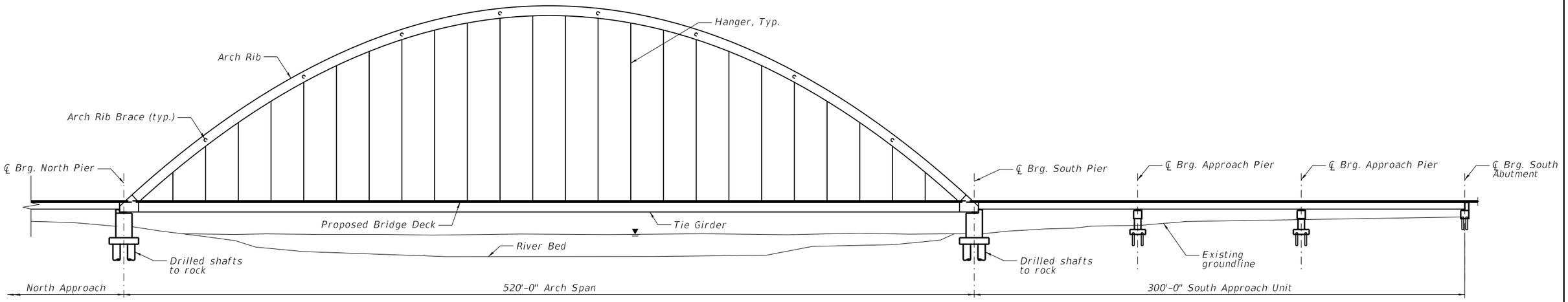
10 INITIAL PLANS, ELEVATIONS, & SECTION VIEWS



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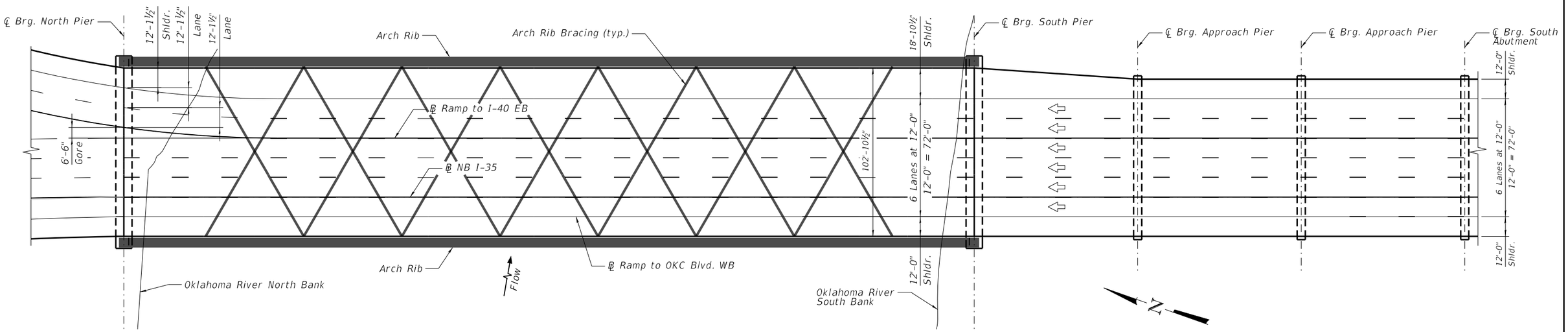

PLAN

NOTE:

Limits of bridge type study do not include north and south approaches to the signature river span. South approach is included for reference only to facilitate comparision to the Cable-Stayed bridge alternative.

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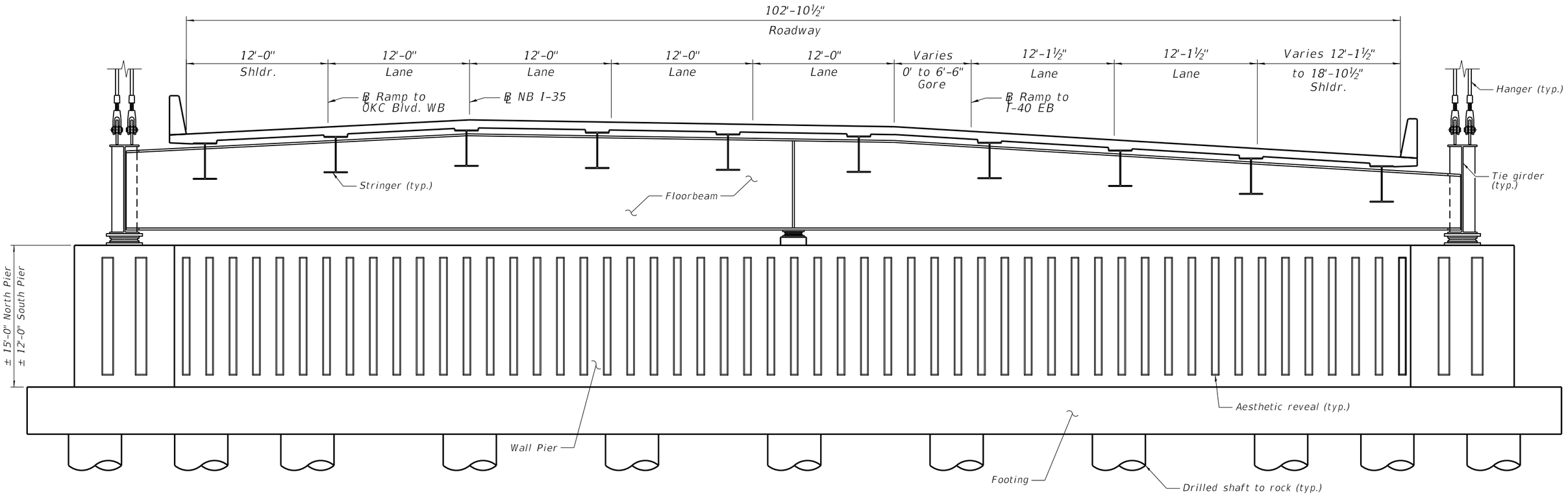
I-35 DALLAS JUNCTION TIED ARCH CONCEPT (10F 5)
NORTHBOUND ARCH GENERAL PLAN & ELEVATION



SECTION AT PIER
(Looking north)

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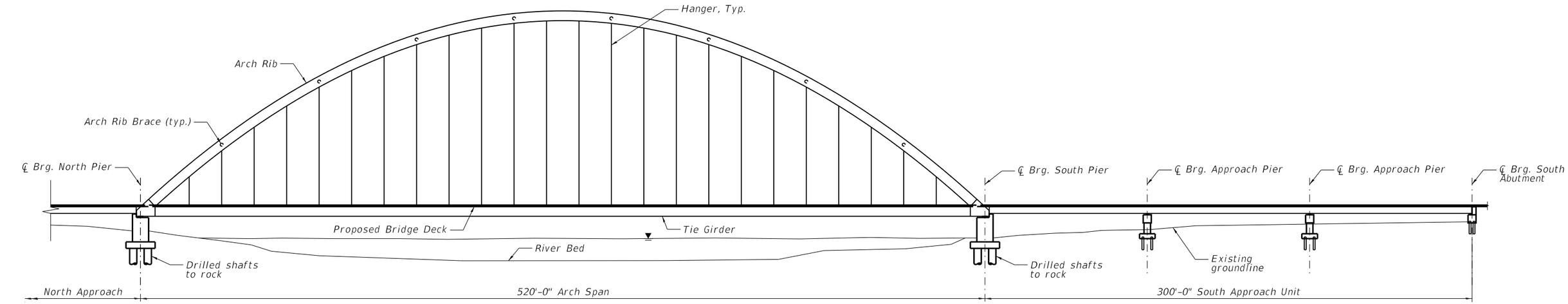
I-35 DALLAS JUNCTION TIED ARCH CONCEPT (2 0F 5)
NORTHBOUND CROSS SECTION



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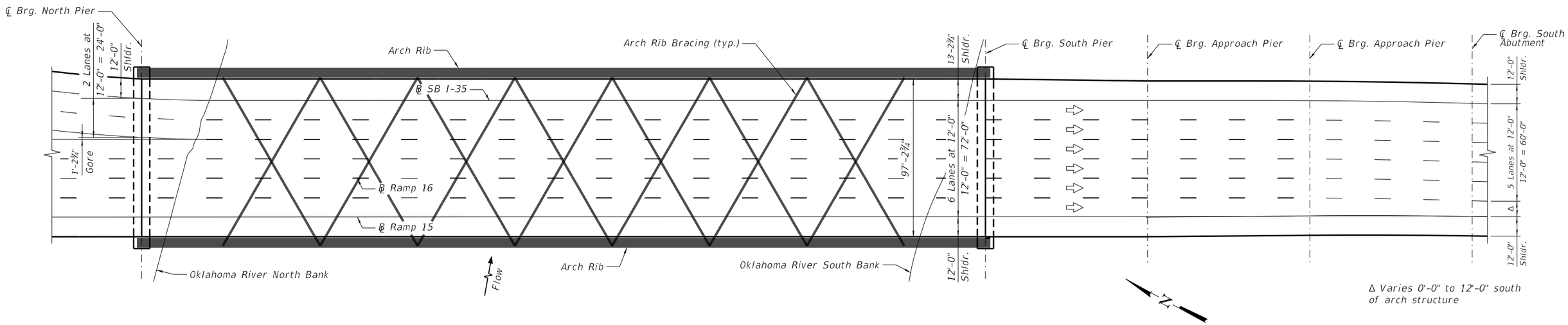

PLAN

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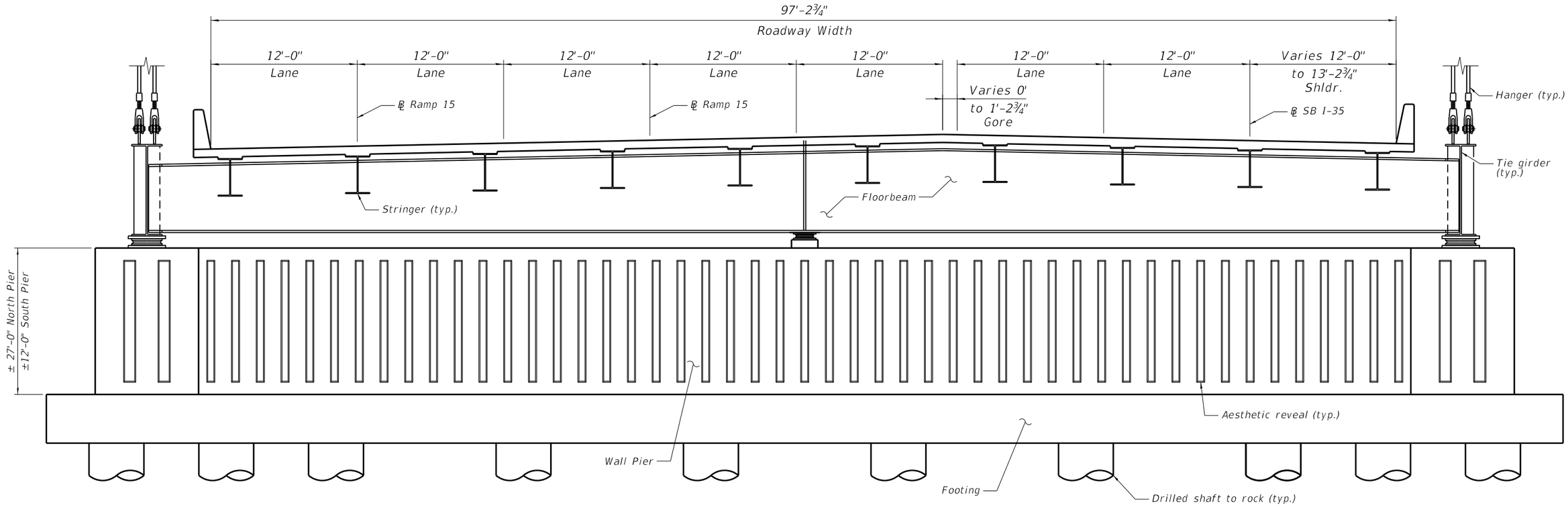
I-35 DALLAS JUNCTION TIED ARCH CONCEPT (3 OF 5)
SOUTHBOUND ARCH GENERAL PLAN & ELEVATION



SECTION AT PIER
(Looking north)

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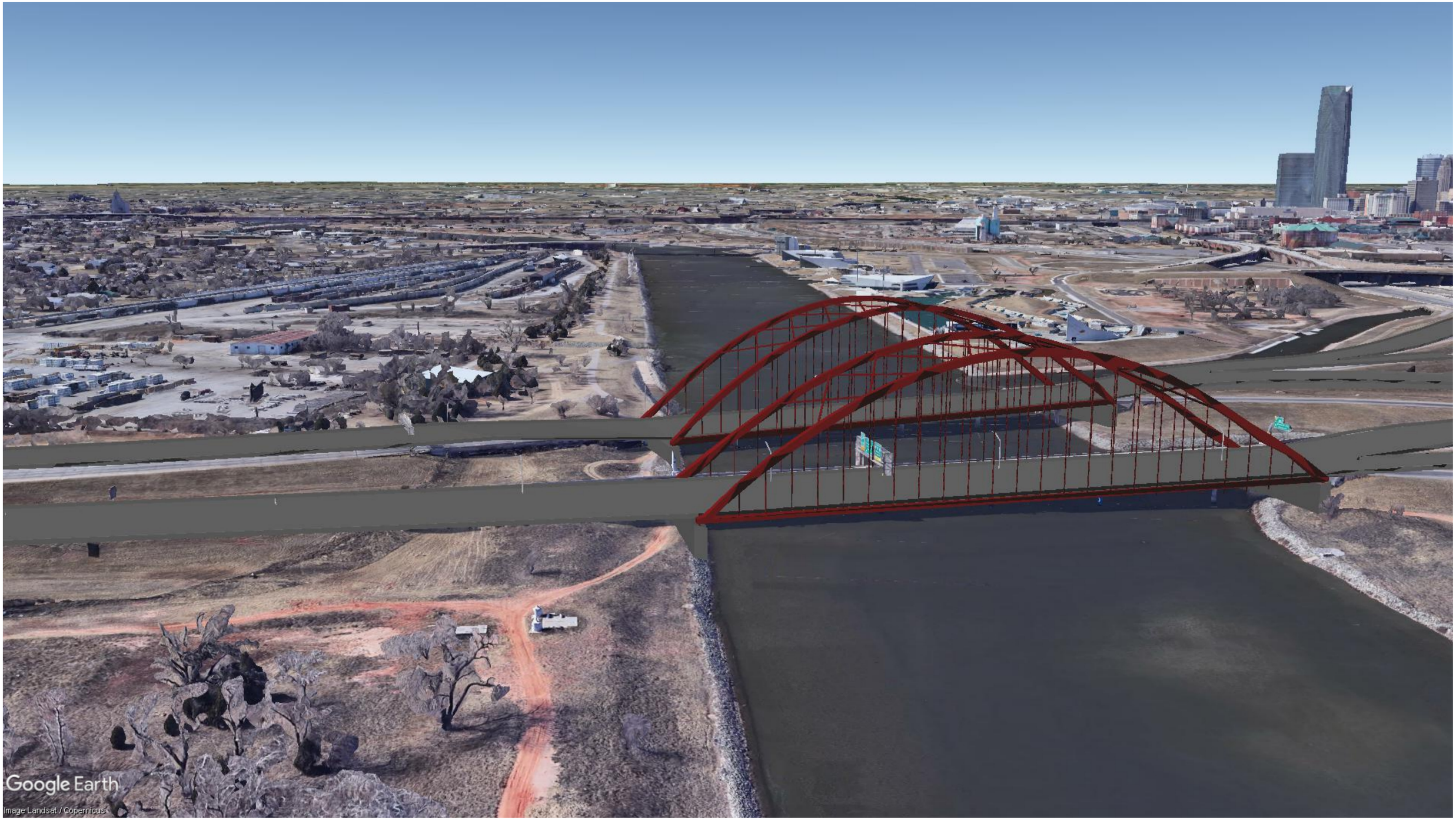
I-35 DALLAS JUNCTION TIED ARCH CONCEPT (4 0F 5)
SOUTHBOUND CROSS SECTION



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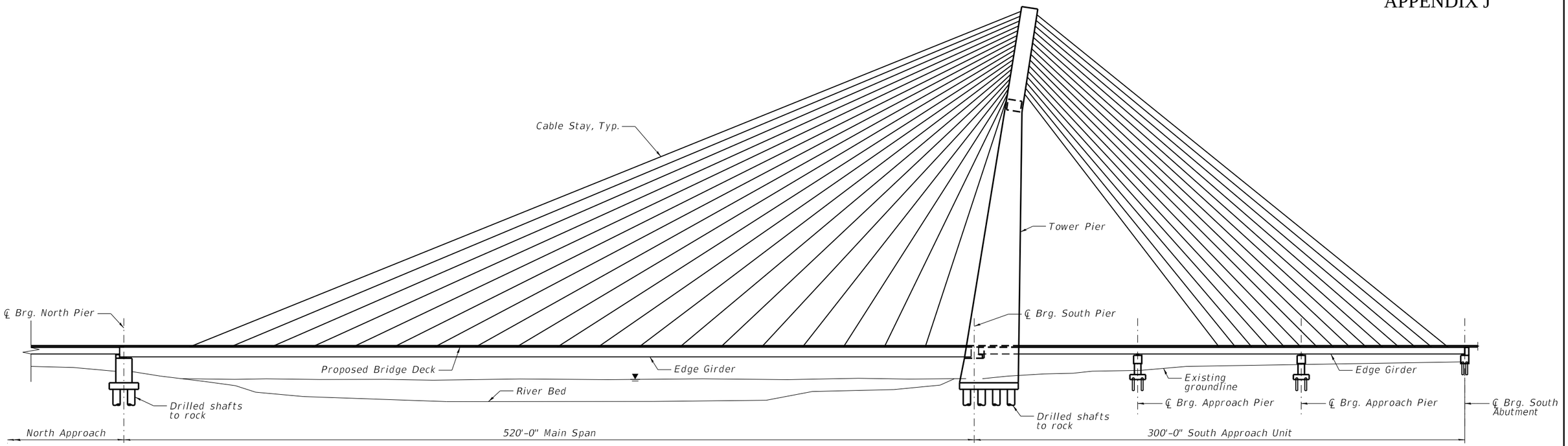
I-35 DALLAS JUNCTION TIED ARCH CONCEPT (5 OF 5)
NORTHBOUND AND SOUTHBOUND ARCHES CONCEPT RENDERING



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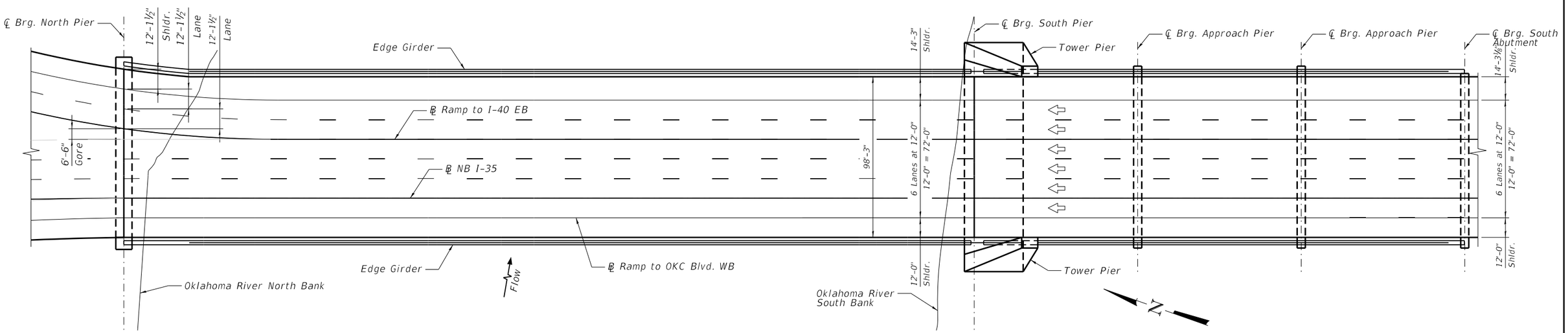

PLAN

NOTE:

Limits of bridge type study do not include north and south approaches to the signature river span.

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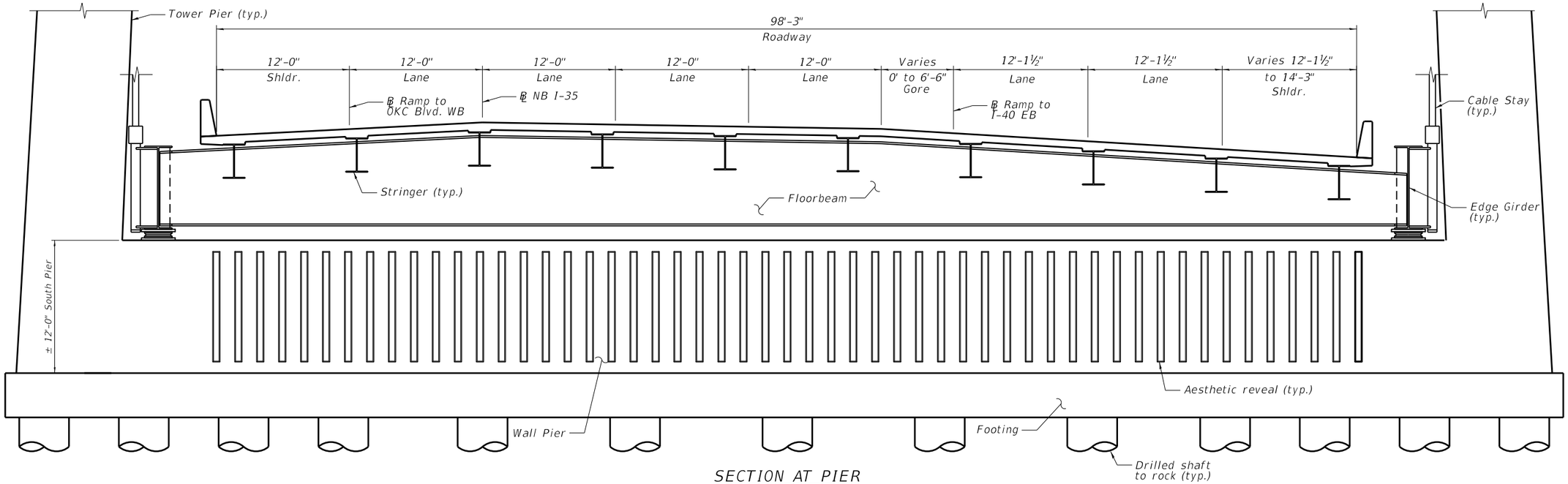
I-35 DALLAS JUNCTION CABLE-STAYED CONCEPT (1 OF 4)
NORTHBOUND GENERAL PLAN & ELEVATION



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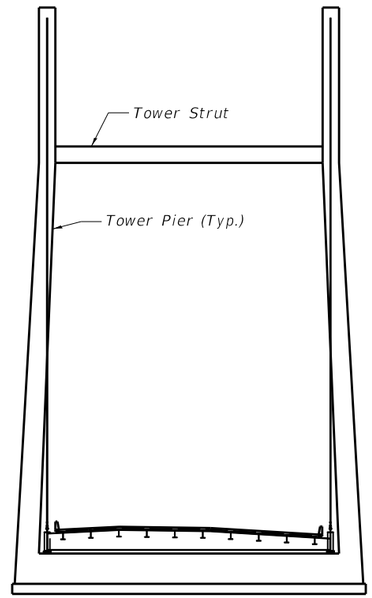
(Looking north)



SECTION AT TOWER PIER

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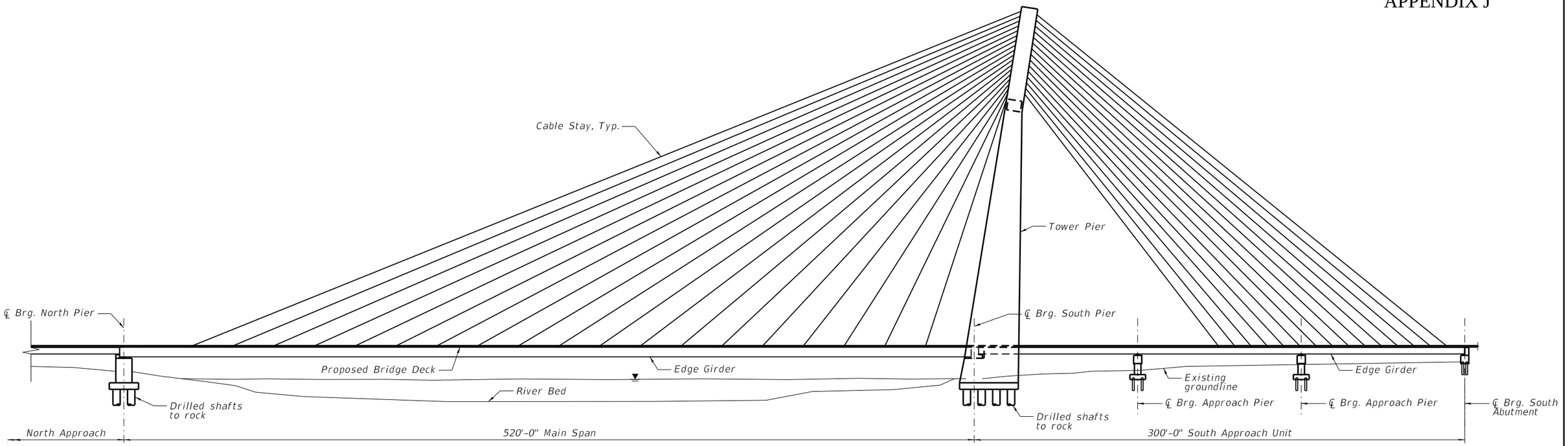
I-35 DALLAS JUNCTION CABLE-STAYED CONCEPT (2 OF 4)
NORTHBOUND CROSS SECTION



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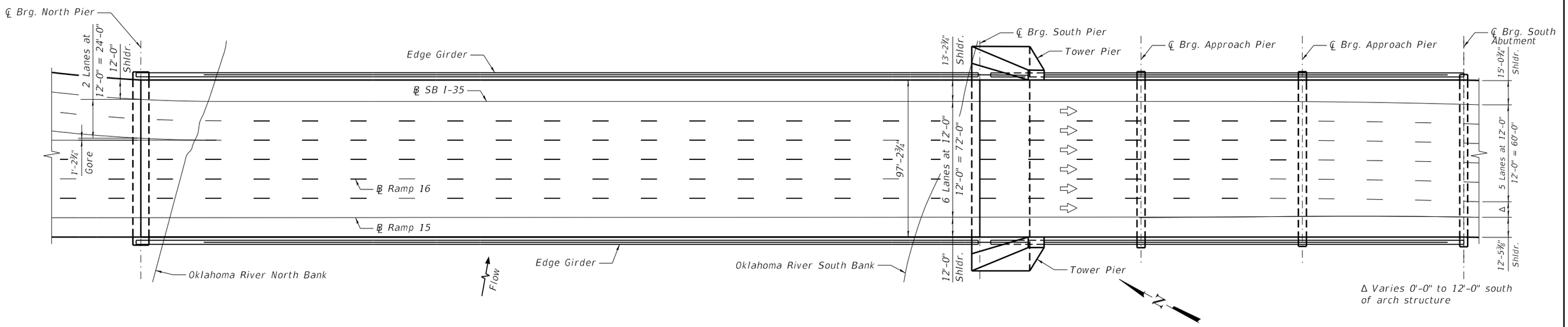

PLAN

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Limits of bridge type study do not include north and south approaches to the signature river span.

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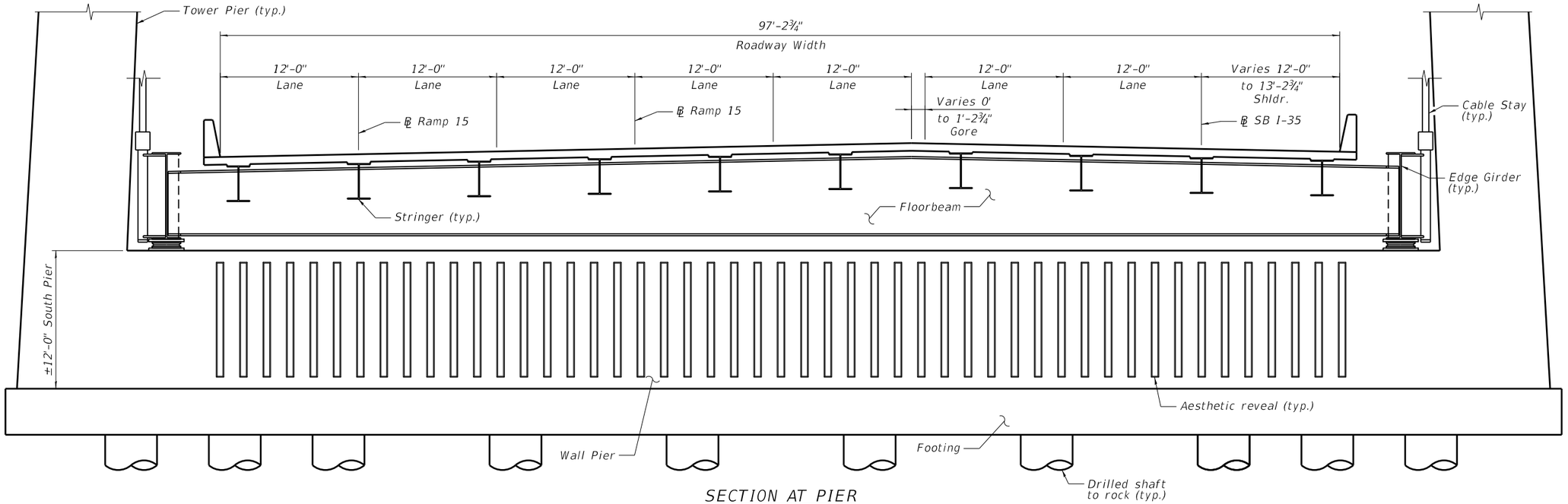
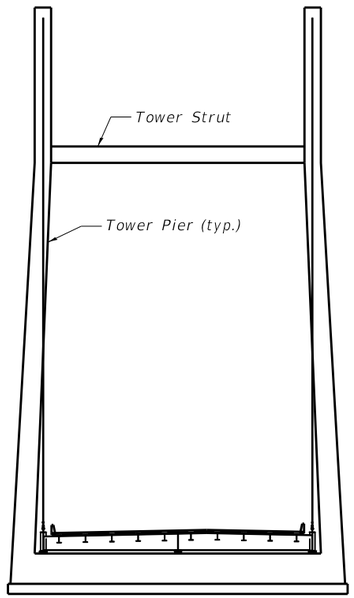
I-35 DALLAS JUNCTION CABLE-STAYED CONCEPT (3 OF 4)
SOUTHBOUND GENERAL PLAN & ELEVATION



SECTION AT PIER
(Looking north)



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I-35 DALLAS JUNCTION CABLE-STAYED CONCEPT (4 OF 4)
SOUTHBOUND CROSS SECTION

11 NORTHBOUND TIED ARCH MOT AND STAGING EXHIBITS

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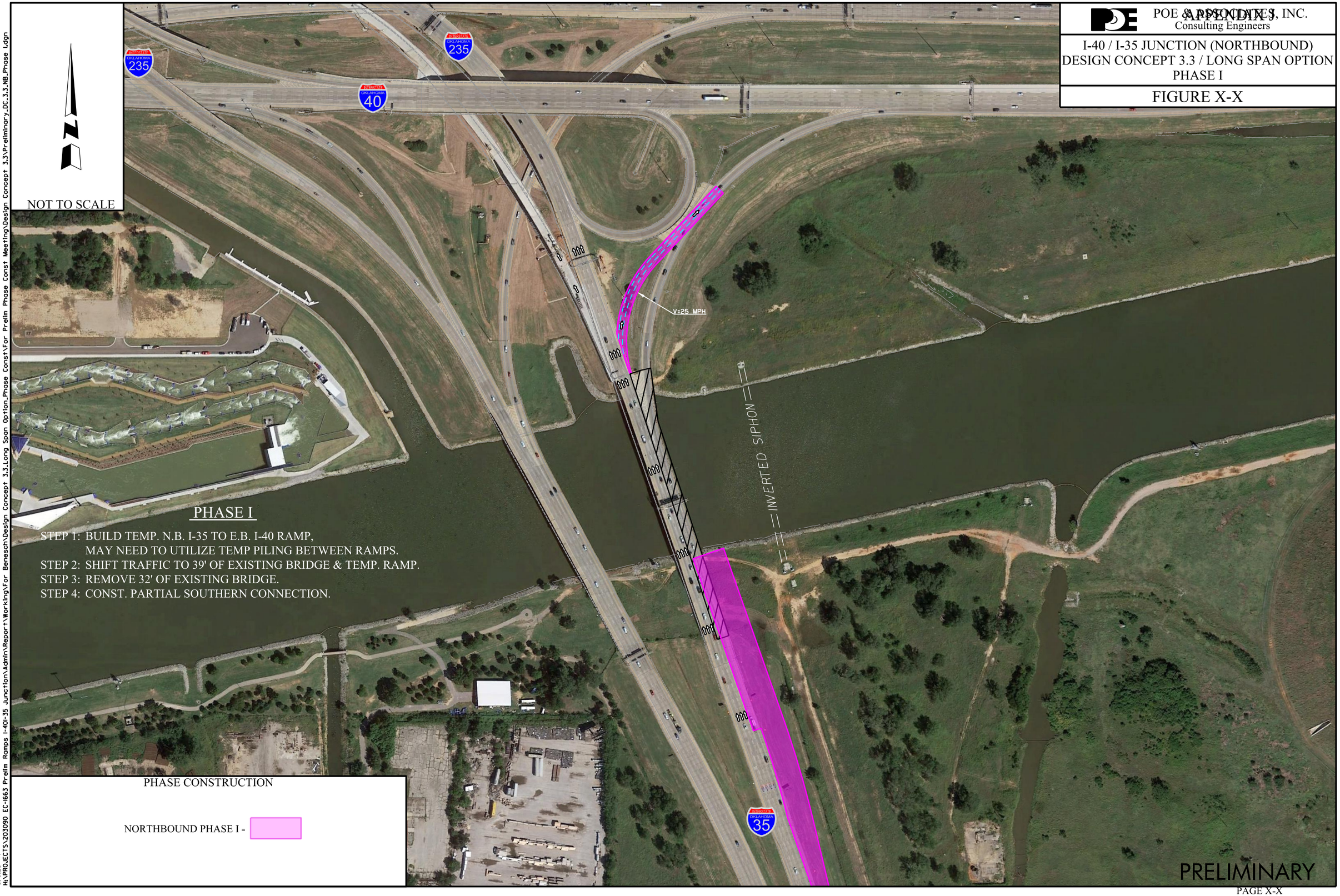
I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.3 / LONG SPAN OPTION
PHASE I

FIGURE X-X

NOT TO SCALE



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Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.3 / LONG SPAN OPTION
PHASE II

FIGURE X-X

NOT TO SCALE

PHASE II

STEP 1: CONST. PERM. PIERS FOR PROPOSED BRIDGE.
STEP 2: SLIDE PROPOSED BRIDGE INTO PLACE.
STEP 3: CONST. PARTIAL N.B. I-35 TO E.B. I-40 RAMP.

PHASE CONSTRUCTION

NORTHBOUND PHASE I - COMPLETED -

NORTHBOUND PHASE II -

INVERTED SIPHON

PRELIMINARY

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I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.3 / LONG SPAN OPTION
PHASE III

FIGURE X-X

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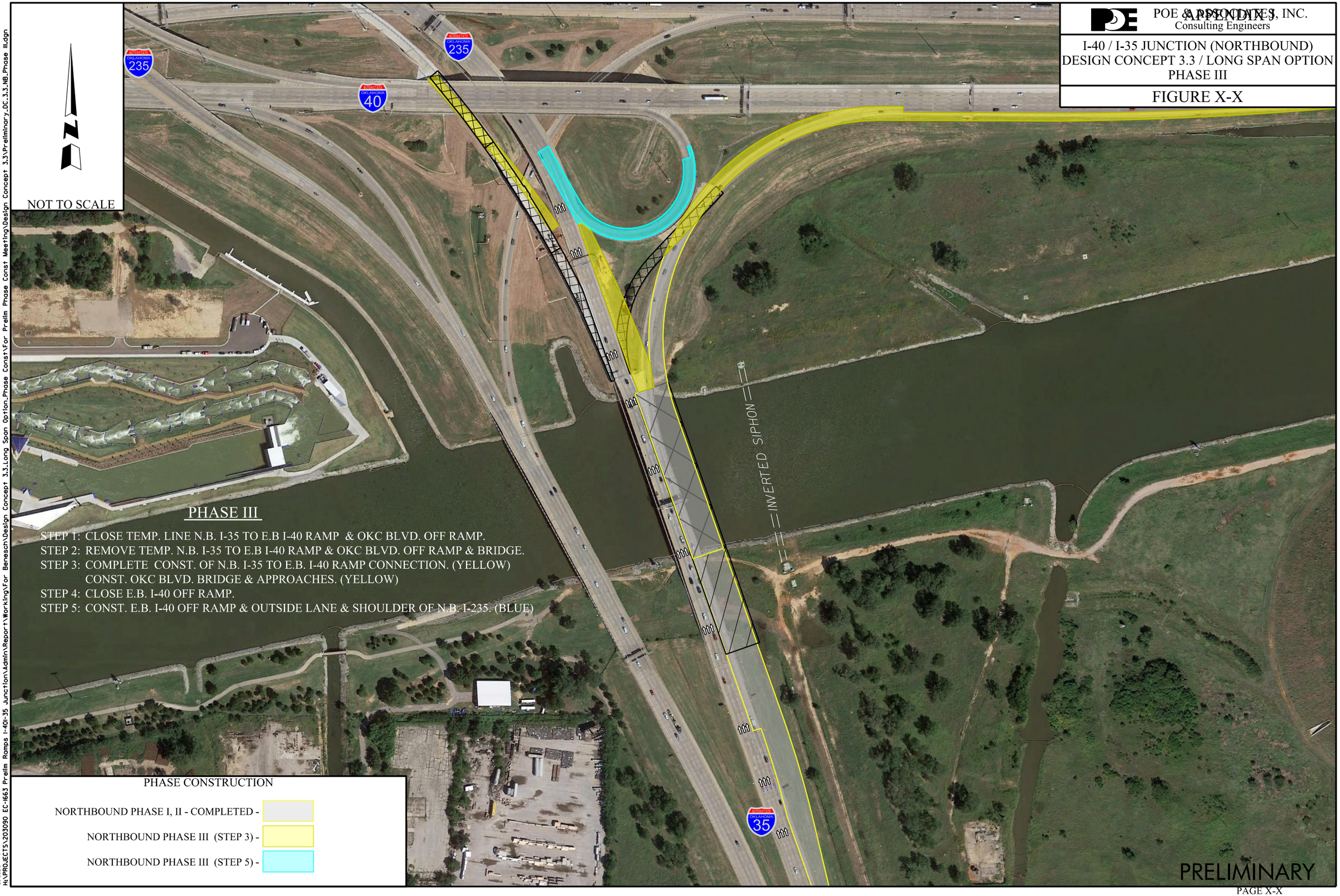

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I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.3 / LONG SPAN OPTION
PHASE IV

FIGURE X-X

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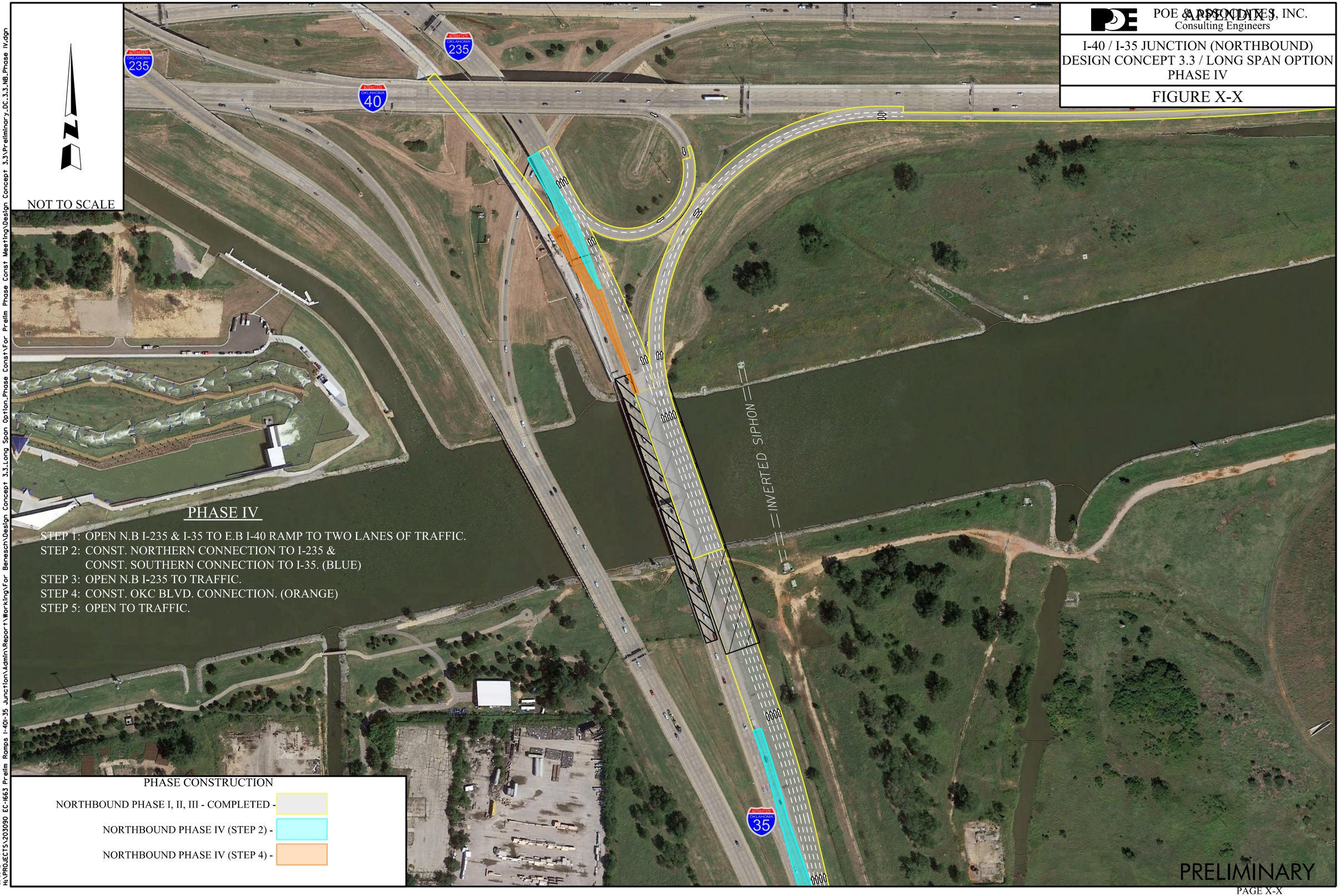

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I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.3 / LONG SPAN OPTION
COMPLETE CONSTRUCTION

FIGURE X-X

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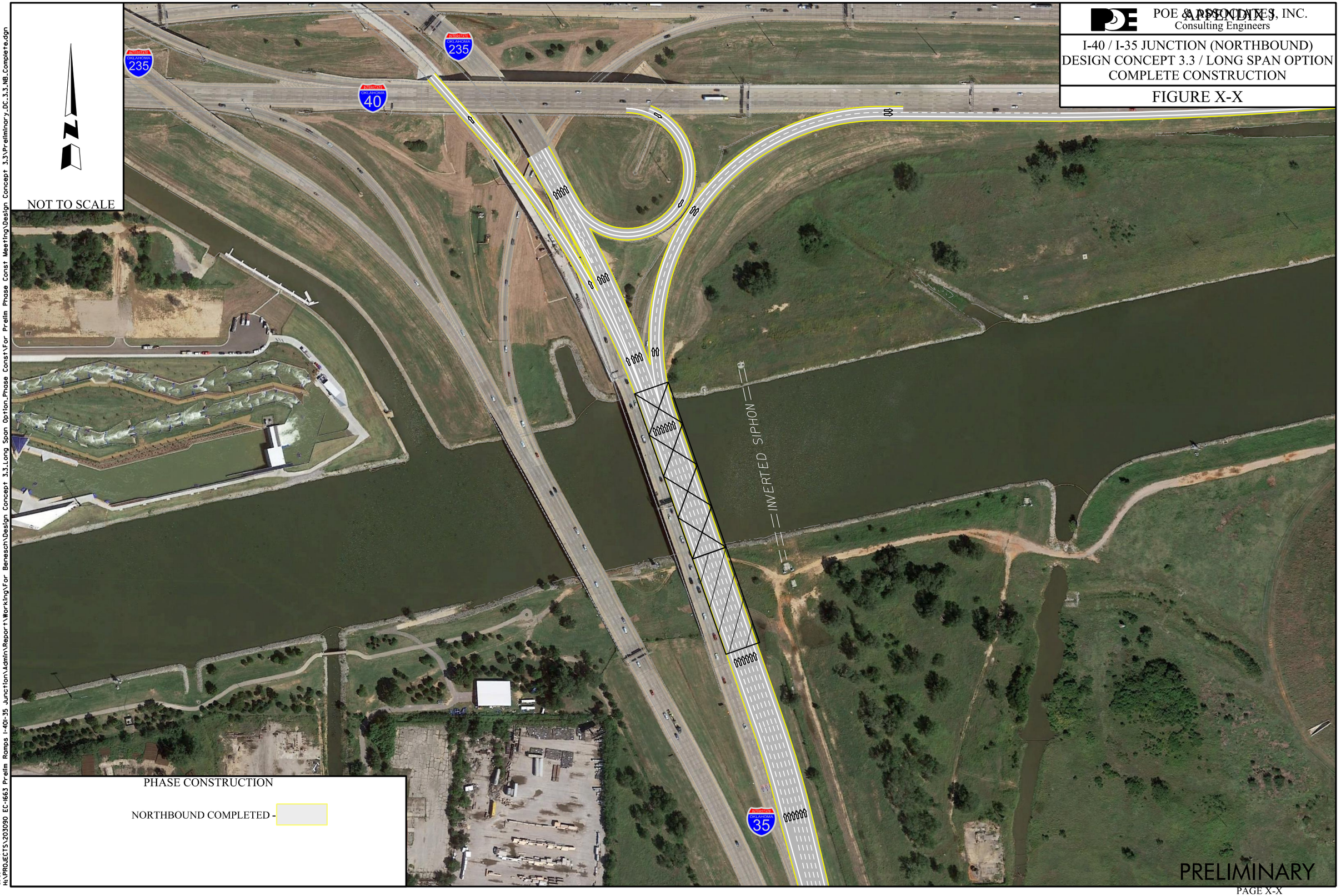

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PRELIMINARY

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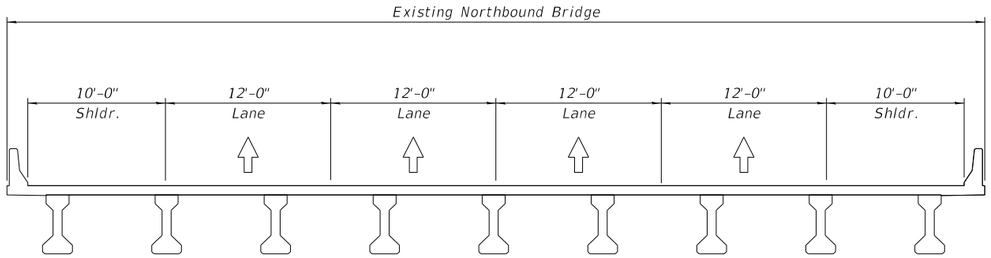

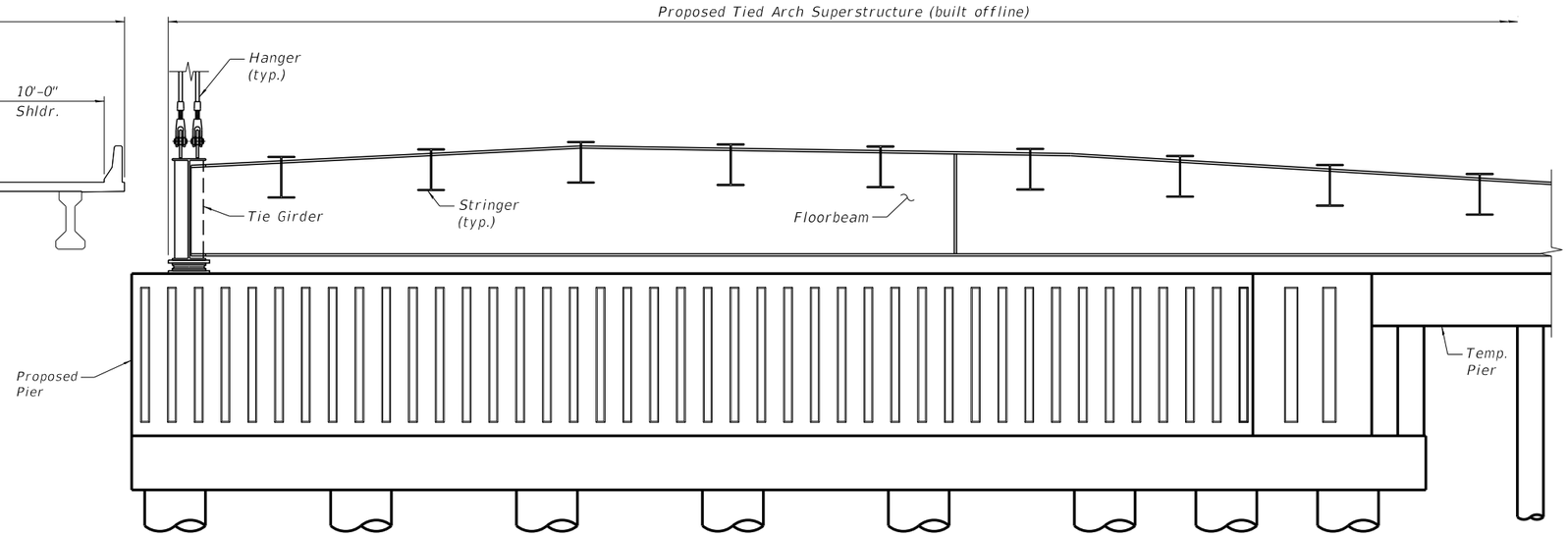

NORTHBOUND - PRE-PHASE
(Looking North)

KEY STEPS:

1. Partial width construction of proposed piers.
2. Construct temporary piers east of proposed piers to support tied arch superstructure during erection.
3. Begin tied arch superstructure construction.

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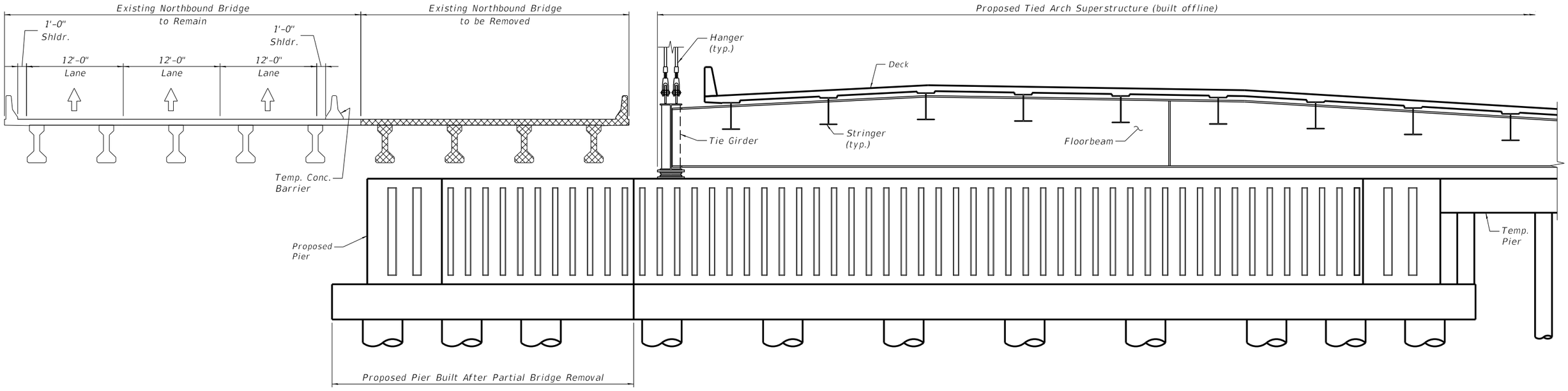
I-35 DALLAS JUNCTION TIED ARCH
NORTHBOUND STAGING CONCEPT (1 OF 4)



NORTHBOUND - PHASE I STEP 3

(Looking North)

KEY STEPS:

1. Shift traffic to west side of existing bridge.
2. Demo east side of existing bridge.
3. Complete remainder of proposed piers.
4. Complete tied arch superstructure.

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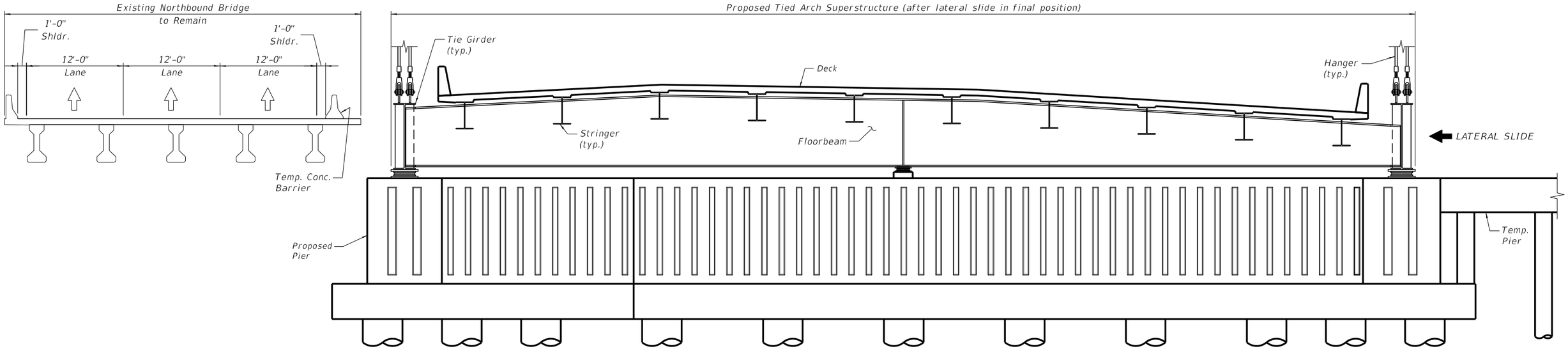
I-35 DALLAS JUNCTION TIED ARCH
NORTHBOUND STAGING CONCEPT (2 OF 4)



NORTHBOUND – PHASE II STEP 2
(Looking North)

KEY STEPS:

1. Slide tied arch superstructure west off of temporary piers into final position on proposed piers.
2. Complete approach tie ins and bridge expansion joints.

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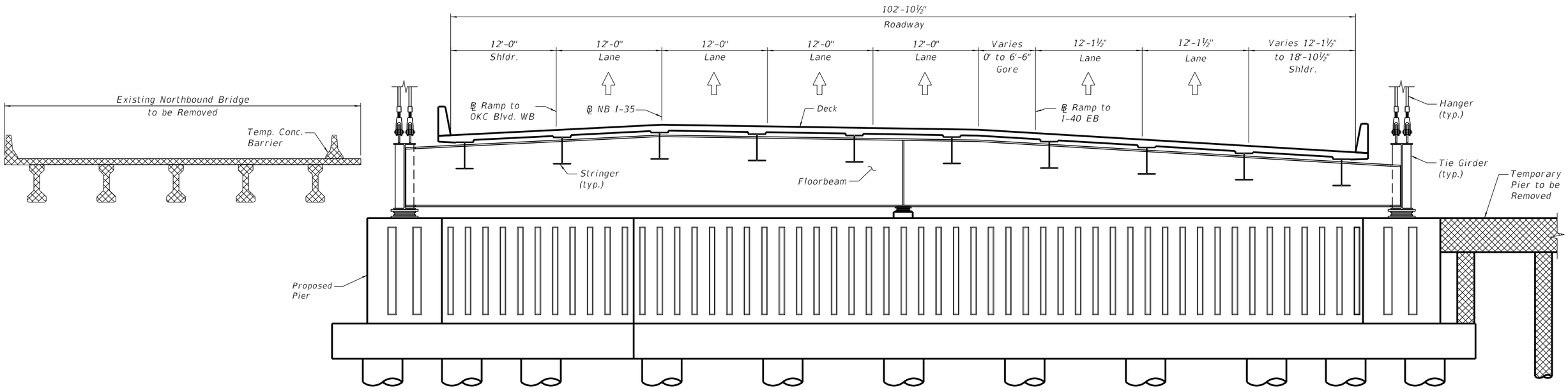
I-35 DALLAS JUNCTION TIED ARCH
NORTHBOUND STAGING CONCEPT (3 OF 4)



NORTHBOUND - PHASE IV STEP 5
(Looking North)

KEY STEPS:

1. Shift traffic to proposed bridge.
2. Demo remainder of existing bridge.
3. Remove temporary piers.

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I-35 DALLAS JUNCTION TIED ARCH
NORTHBOUND STAGING CONCEPT (4 OF 4)

12 SOUTHBOUND TIED ARCH MOT AND STAGING EXHIBITS

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Consulting Engineers

I-40 / I-35 JUNCTION (SOUTHBOUND)
DESIGN CONCEPT 3.3 / LONG SPAN OPTION
PHASE I; STEPS 1-5

APPENDIX J

NOT TO SCALE

N

— — — INVERTED SIPHON — — —

PHASE I

STEP 1: REDUCE E.B. I-40 OFF RAMP & W.B. I-40 OFF RAMP TO ONE LANE.
STEP 2: CONST. PARTIAL PERM. E.B. I-40 OFF RAMP. (BLUE)
STEP 3: CONST. TEMP. W.B. I-40 OFF RAMP. (YELLOW)
STEP 4: CONST. PARTIAL PERM. PIERS (BLUE) & TEMP. PIERS (GREEN) FOR TEMP. BRIDGE.
STEP 5: CONST. PARTIAL SOUTHERN I-35 CONNECTION. (RED)

PHASE CONSTRUCTION
NORTHBOUND COMPLETED -
S.B. I-235 PHASE I (STEP 2) -
E.B. I-40 OFF-RAMP PHASE I (STEP 3) [TEMPORARY] -
S.B. I-35 PHASE I (STEP 5) -

PRELIMINARY

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I-40 / I-35 JUNCTION (SOUTHBOUND)
DESIGN CONCEPT 3.3 / LONG SPAN OPTION
PHASE I; STEPS 6-8

APPENDIX J

NOT TO SCALE

INVERTED SIPHON

PHASE I

STEP 6: SHIFT TRAFFIC TO TEMP. WB-140 OFF RAMP.

STEP 7: CONST. TEMP. BRIDGE ON PARTIAL WIDTH PROP. PIERS AND TEMP. PIERS EAST OF EXIST. BRIDGE.
CONST. PARTIAL W.B. I-40 OFF RAMP. (RED)

STEP 8: SHIFT W.B. I-40 TRAFFIC TO PARTIAL OFF RAMP AND TEMP. BRIDGE.
REMOVE TEMP. RAMP.

PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

W.B OFF RAMP & TEMP. S.B. I-35 BRIDGE PHASE I (STEP 7) -

PRELIMINARY

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I-40 / I-35 JUNCTION (SOUTHBOUND)
DESIGN CONCEPT 3.3 / LONG SPAN OPTION
PHASE I; STEP 9 & 11

APPENDIX J

NOT TO SCALE

N

— — — INVERTED SIPHON — — —

PHASE I

STEP 9: CONST. TEMP. WIDENING ON RAMPS. (GREEN)
SHIFT TRAFFIC TO TEMP. WIDENING.
SHIFT W.B. I-40 OFF RAMP TRAFFIC TO TEMP. BRIDGE.

STEP 10: REMOVE APPROX. 33' OF EXISTING BRIDGE.
CONST. PARTIAL PERM. PIERS.
CONST. TEMP. PIERS (GREEN) FOR PROP. BRIDGE SUPERSTRUCTURE ERECTION.

STEP 11: CONST. PARTIAL PERM. RAMPS. (ORANGE)
SHIFT TRAFFIC TO PERM. RAMPS & REMOVE TEMP. WIDENING.

PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

S.B. I-235 & E.B. OFF RAMP PHASE I (STEP 9) [TEMPORARY] -

S.B. I-235 & E.B. I-40 OFF RAMP PHASE I (STEP 11) -

PRELIMINARY

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Consulting Engineers

I-40 / I-35 JUNCTION (SOUTHBOUND)
DESIGN CONCEPT 3.3 / LONG SPAN OPTION
PHASE II; STEP 1-3

APPENDIX J

NOT TO SCALE

INTERSTATE OKLAHOMA 235

INTERSTATE OKLAHOMA 40

INTERSTATE OKLAHOMA 35

— — — INVERTED SIPHON — — —

PHASE II

STEP 1: REDUCE S.B. I-235 TRAFFIC TO ONE LANE.
SHIFT TRAFFIC TO TEMP. BRIDGE.
STEP 2: REMOVE EXISTING BRIDGE.
STEP 3: CONST. REMAINING SECTIONS OF PERM. PIERS.

PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

POE & ASSOCIATES, INC.
Consulting Engineers

I-40 / I-35 JUNCTION (SOUTHBOUND)
DESIGN CONCEPT 3.3 / LONG SPAN OPTION
PHASE II; STEP 4-9

APPENDIX J

NOT TO SCALE

INVERTED SIPHON

PHASE II

STEP 4: CONST. REMAINING SOUTHERN & NORTHERN CONNECTIONS OUTSIDE CONSTRUCTION BARRIER.
STEP 5: CLOSE S.B. I-35 TO TRAFFIC.
STEP 6: REMOVE TEMP. BRIDGE & TEMP. PIERS SUPPORTING TEMP. BRIDGE..
STEP 7: SLIDE PERM. BRIDGE INTO PLACE AND REMOVE TEMP. PIERS USED FOR OFFLINE TIED ARCH SUPERSTRUCTURE ERECTION.
STEP 8: COMPLETE ROADWAY CONSTRUCTION TO PERM. BRIDGE.
STEP 9: OPEN TO TRAFFIC.

PHASE CONSTRUCTION

NORTHBOUND COMPLETED -

S.B. I-35/I-235 PHASE II -

PRELIMINARY

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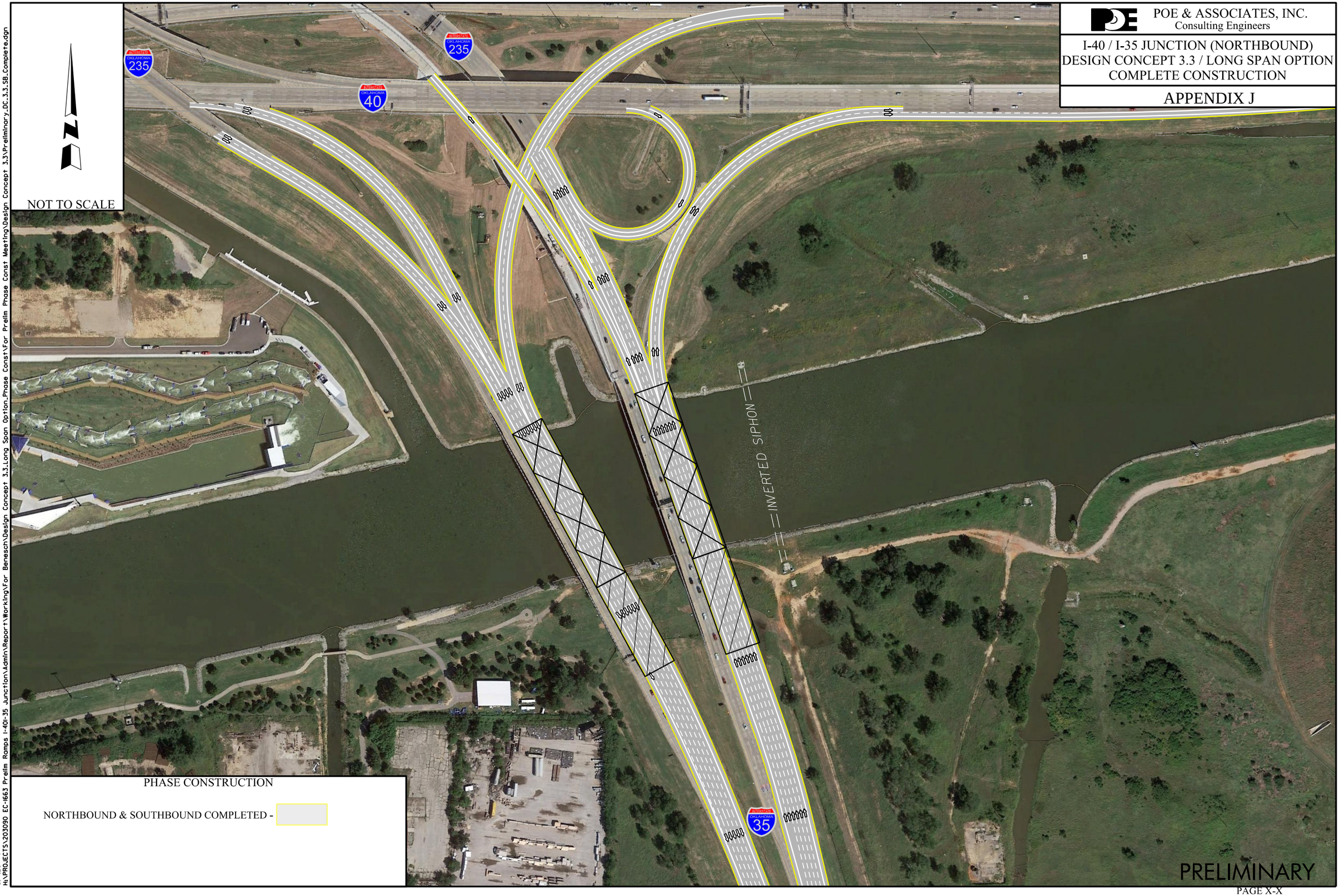
Consulting Engineers

I-40 / I-35 JUNCTION (NORTHBOUND)
DESIGN CONCEPT 3.3 / LONG SPAN OPTION
COMPLETE CONSTRUCTION

APPENDIX J

N

NOT TO SCALE



PHASE CONSTRUCTION

NORTHBOUND & SOUTHBOUND COMPLETED -

PRELIMINARY

9:17:20 AM
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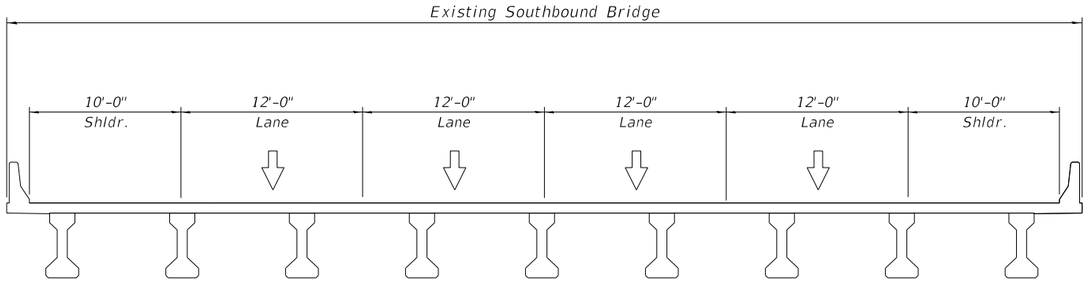

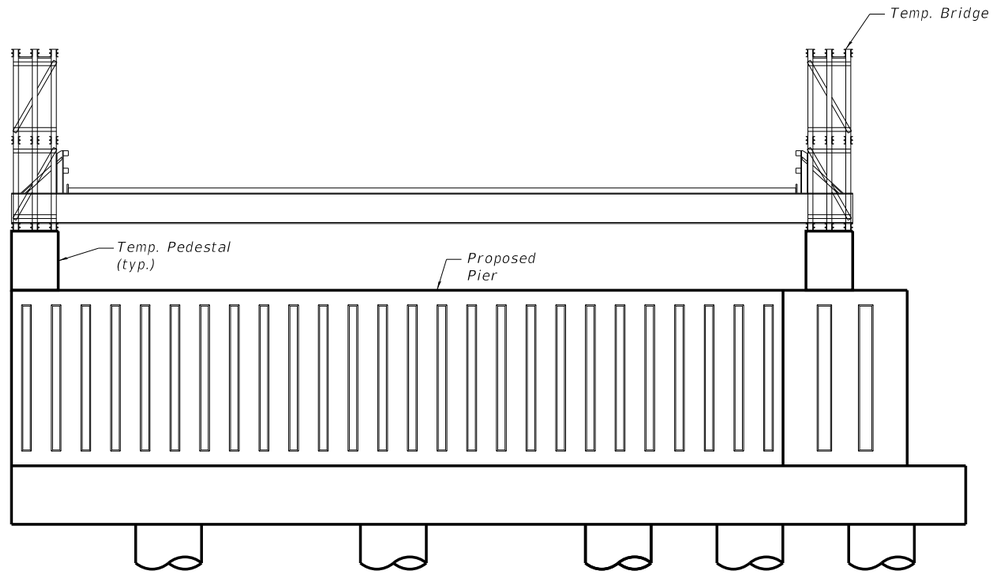

SOUTHBOUND – PRE-PHASE
(Looking North)

KEY STEPS:

1. Partial width construction of proposed piers.
2. Construction of temporary piers east of existing bridge to support temporary bridge (not pictured).
3. Construct temporary bridge supported on partial width proposed piers and temporary piers.

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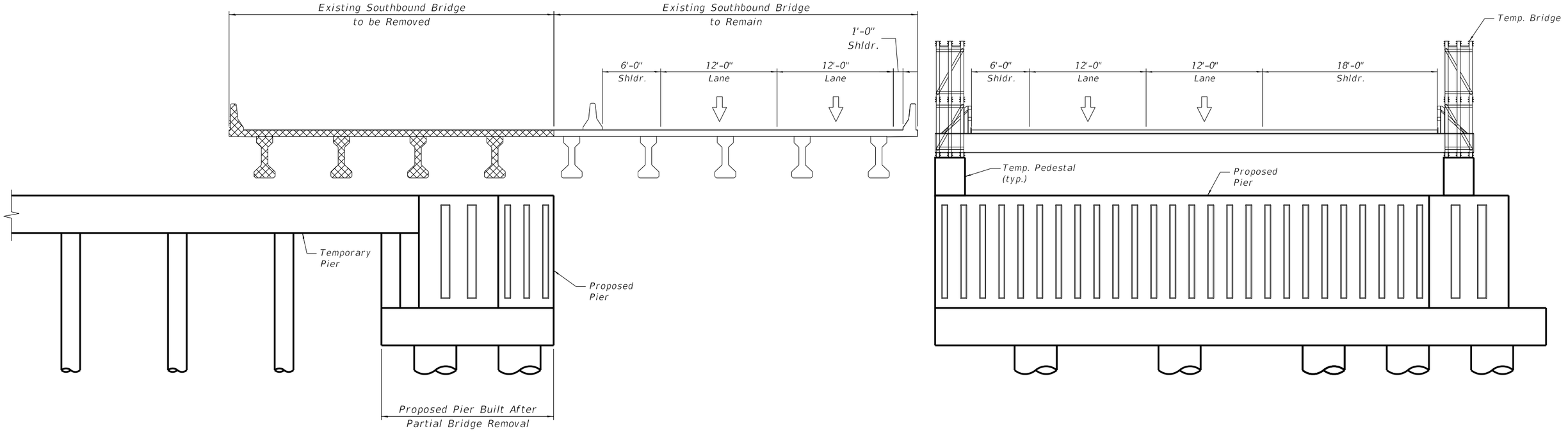
I-35 DALLAS JUNCTION TIED ARCH
SOUTHBOUND STAGING CONCEPT (1 OF 6)



SOUTHBOUND – PHASE I STEP 10
(Looking North)

KEY STEPS:

1. Shift two lanes of traffic to east side of existing bridge and two lanes of traffic to temporary bridge.
2. Demo west side of existing bridge.
3. Construct partial proposed piers.
4. Construct temporary piers to support proposed tied arch superstructure during offline erection.

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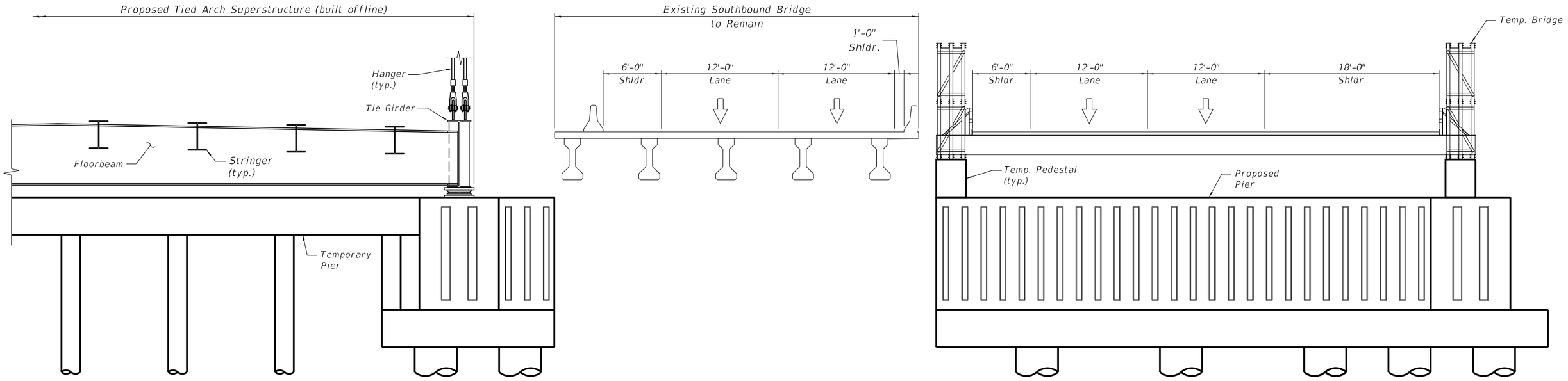
I-35 DALLAS JUNCTION TIED ARCH
SOUTHBOUND STAGING CONCEPT (2 OF 6)



SOUTHBOUND – PHASE I STEP 10 (CONTINUED)
(Looking North)

KEY STEPS:

1. Begin tied arch superstructure erection.

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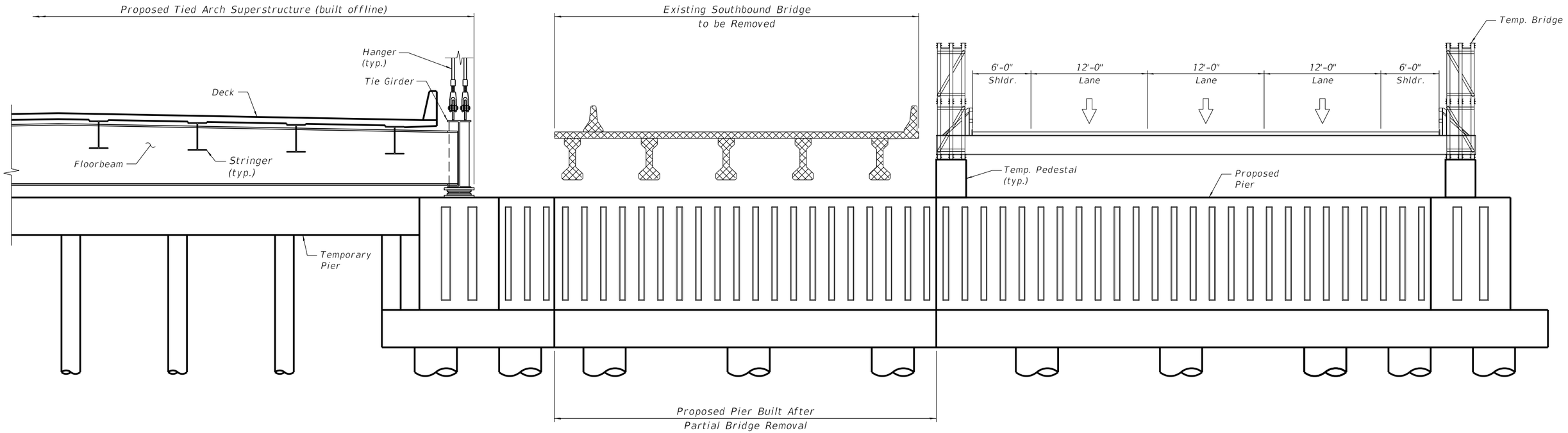
I-35 DALLAS JUNCTION TIED ARCH
SOUTHBOUND STAGING CONCEPT (3 0F 6)



SOUTHBOUND – PHASE II STEP 2 (REMOVAL) & STEP 3 (CONSTRUCTION)

(Looking North)

KEY STEPS:

1. Demo remainder of existing bridge.
2. Complete remainder of proposed piers.
3. Complete tied arch superstructure.

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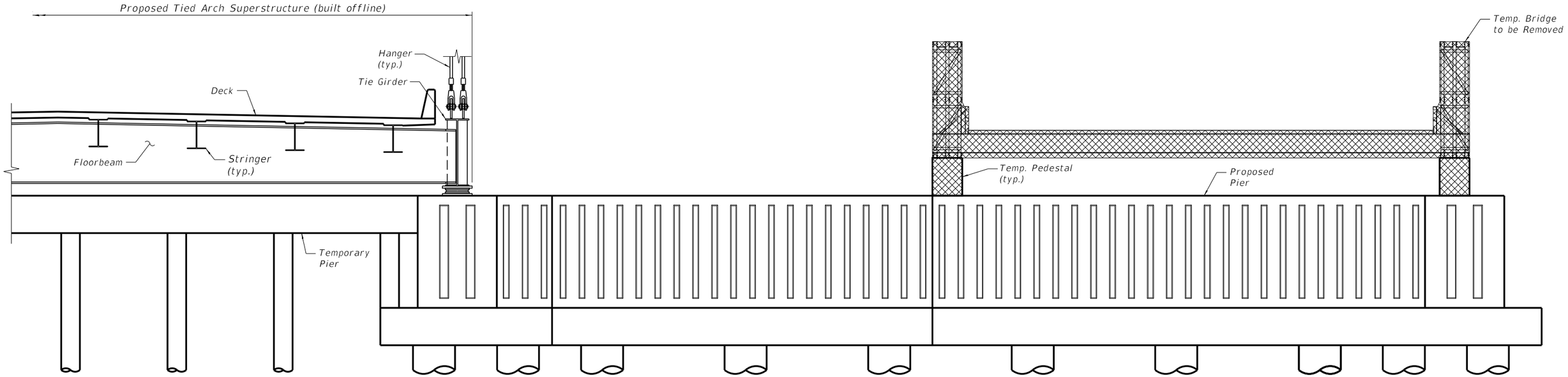
I-35 DALLAS JUNCTION TIED ARCH
SOUTHBOUND STAGING CONCEPT (4 OF 6)



SOUTHBOUND – PHASE II STEP 6

(Looking North)

KEY STEPS:

1. Close SB I-35 to traffic.
2. Remove temporary bridge.

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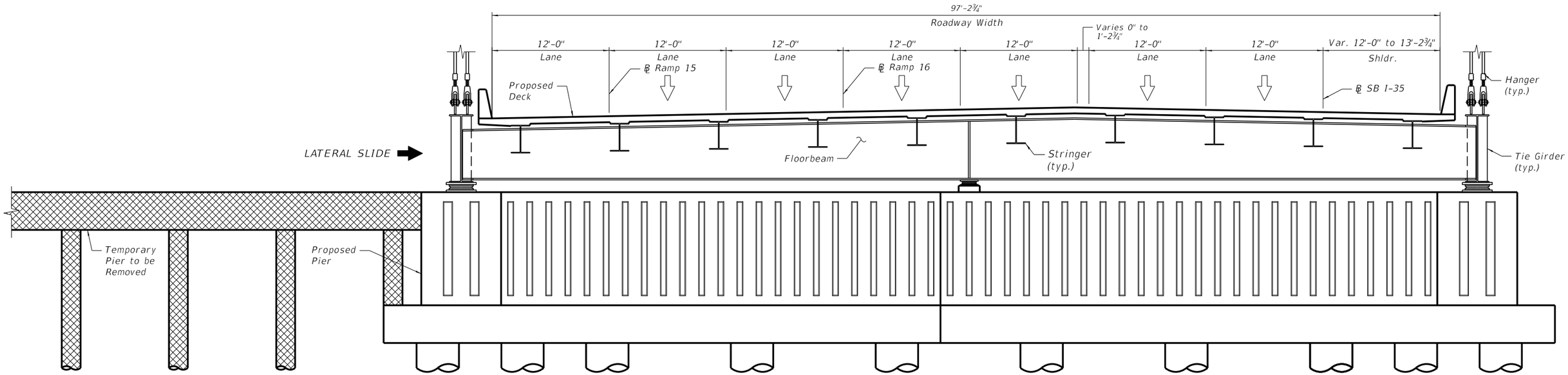
I-35 DALLAS JUNCTION TIED ARCH
SOUTHBOUND STAGING CONCEPT (5 OF 6)



SOUTHBOUND – PHASE II STEPS 7-9

(Looking North)

KEY STEPS:

1. Slide tied arch superstructure east off of temporary piers into final position on proposed piers.
2. Complete approach tie ins and joints.
3. Reopen roadway with traffic on proposed bridge.
4. Remove temporary piers.

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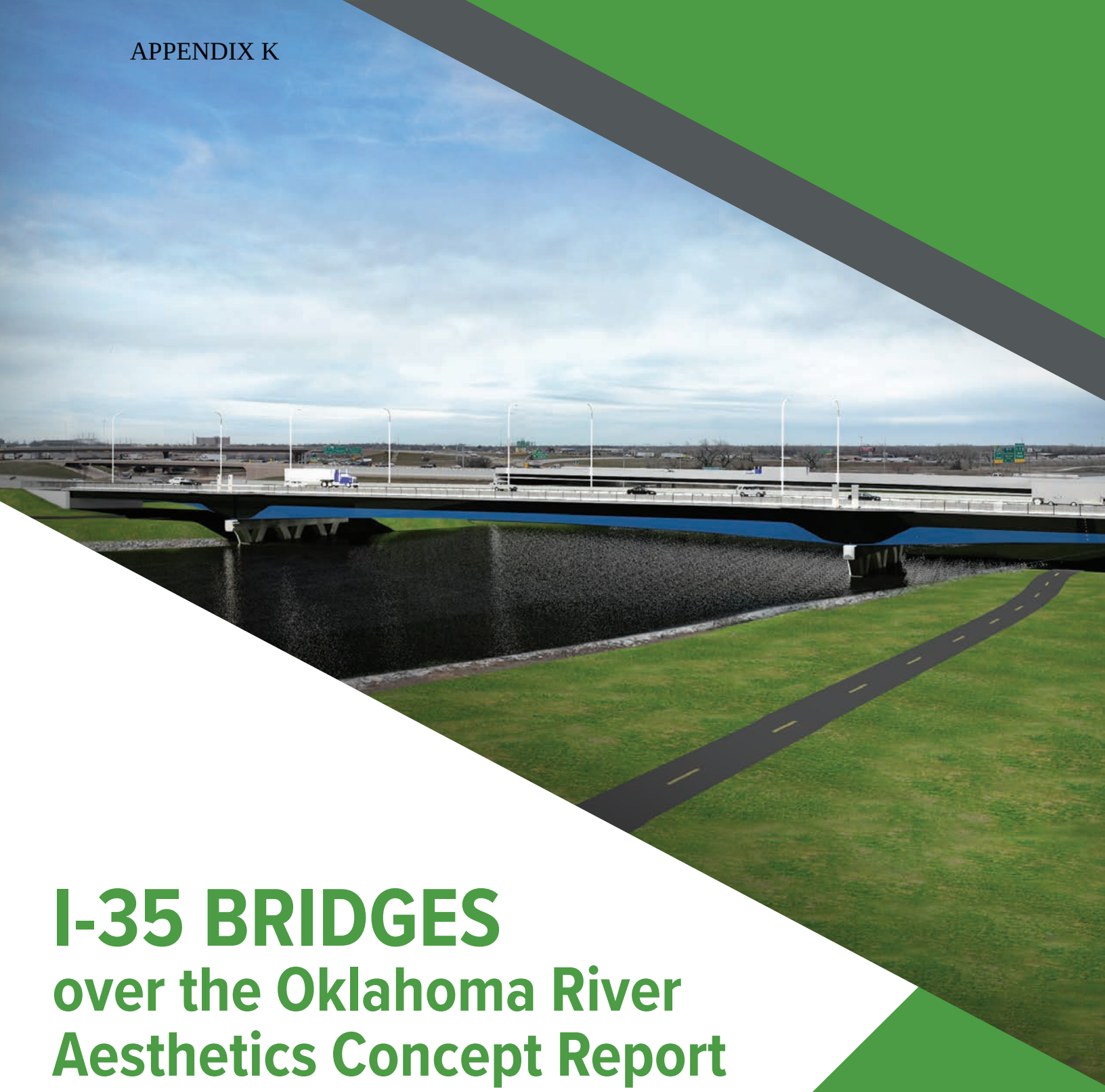
I-35 DALLAS JUNCTION TIED ARCH
SOUTHBOUND STAGING CONCEPT (6 OF 6)

APPENDIX K -
Aesthetic Study Report

APPENDIX K



I-35 BRIDGES
over the Oklahoma River
Aesthetics Concept Report

Prepared for Poe & Associates

February 28, 2023

benesch

INTRODUCTION

The I-35 river bridge replacement project is a marquis project in Oklahoma City that will have tremendous community benefits. This project includes the construction of two new I-35 mainline bridges and a new I-35 NB ramp bridge, all spanning the Oklahoma River. These roadway bridge reconstructions are part of a larger corridor/ interchange improvement that will help accommodate growing traffic demands by providing additional capacity and employing modern safety features. As part of the river bridge replacement project, a new multimodal path is proposed along the west side of the I-35 SB bridge. A path crossing the Oklahoma River at the I-35 location would complete a critical missing component of Oklahoma City's active transportation network and connect the north and south river trail systems. Due to the high cultural and commercial importance of this area, aesthetic enhancements are desired for the new river crossings and adjacent elements.

Benesch and Poe have completed a concept evaluation of a wide range of aesthetic enhancements that can be considered for implementation within the planned scope of work for this signature project. The objectives of this report are to:

- Identify aesthetic enhancement opportunities
- Present ideas and visuals
- Discuss potential cost premiums

Identify Aesthetic Enhancement Opportunities

The concept evaluation phase identified eleven project elements that can be targeted for aesthetic enhancement and are discussed within the following sections of this report (click to go to section):

1. Pier Type & Shape
2. Girder Shape
3. Path Bridge Structure Type
4. Pedestrian Overlooks
5. Barriers & Railings
6. Lighting
7. Monuments & Wayfinding
8. Concrete Surface Treatments
9. Steel Coatings
10. Maskwall
11. Path End Ramps

Present Ideas and Visuals

Aesthetic enhancement ideas are presented within this report as a combination of narrative descriptions and visuals. The visuals presented herein represent a combination of project-specific renderings that Benesch has developed and photos/renderings from other transportation projects that may be applicable to this project.

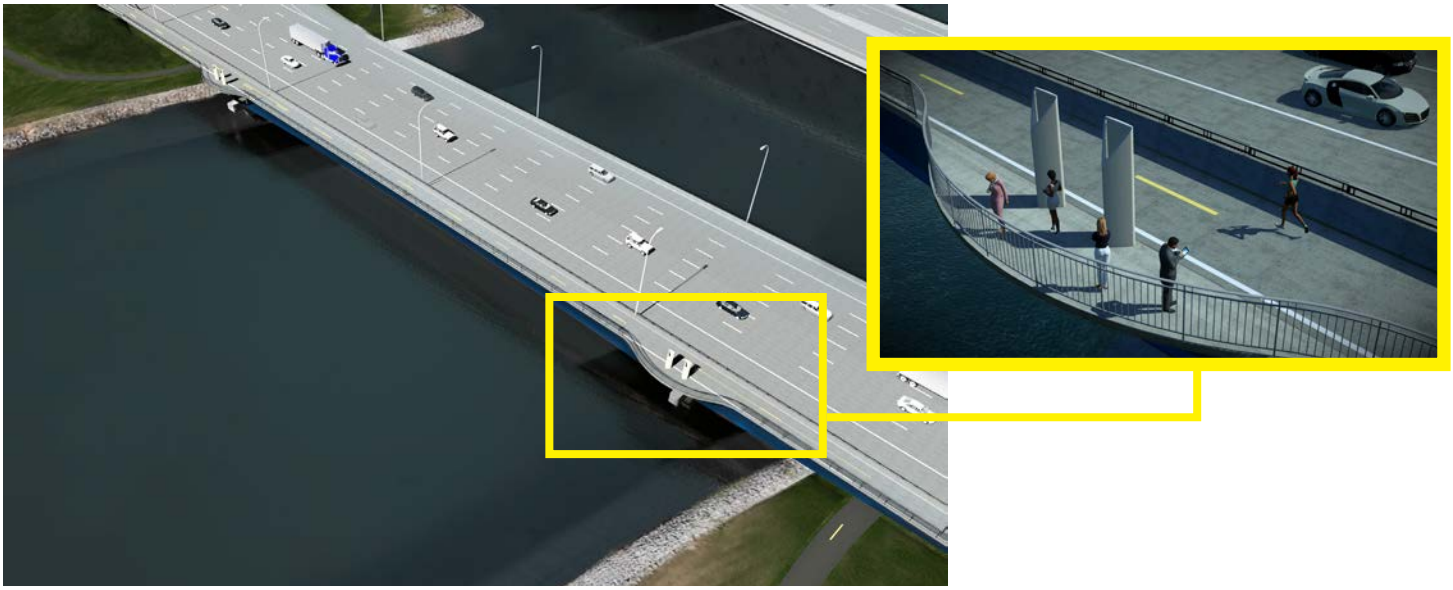
Cost Considerations

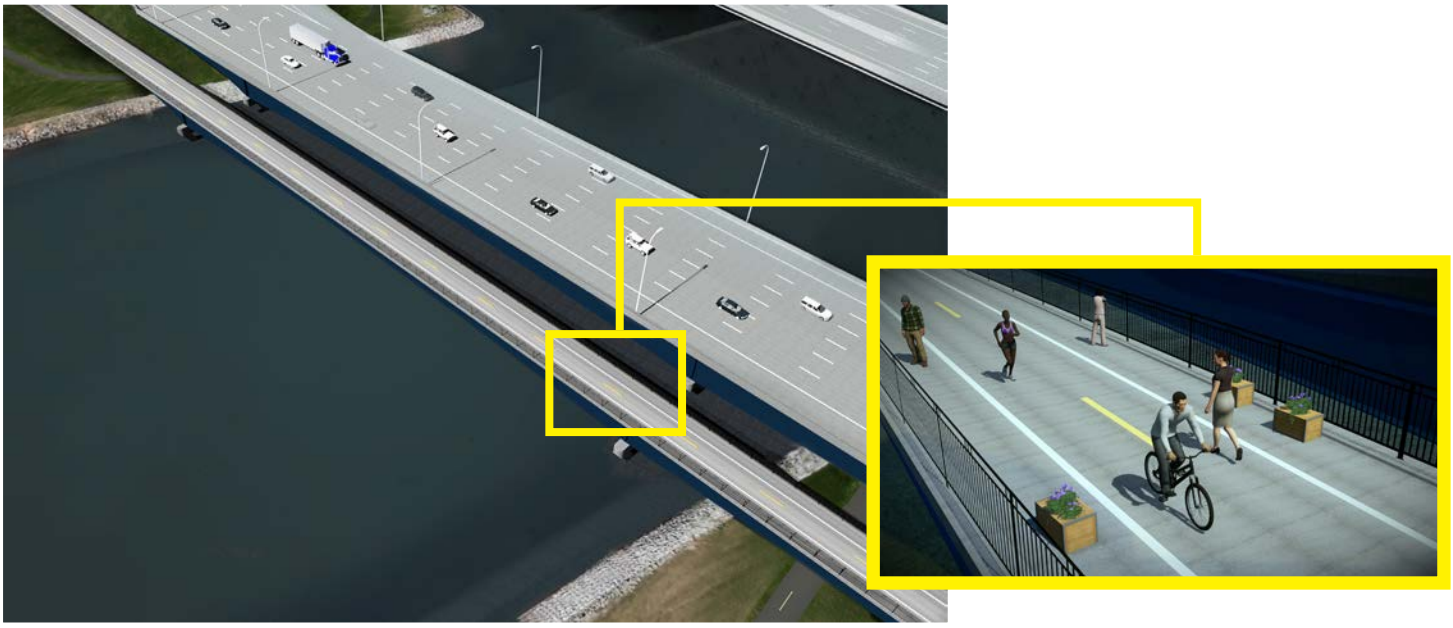
Within each section of this report, discussion has been included on the potential cost premiums associated with aesthetic enhancement of the targeted project elements. Potential cost premiums are presented with respect to the base scope of work required to complete this project. Note that some targeted elements are required as part of the base scope (i.e. piers and girders) and cost discussion is focused on the additional cost of enhancement; for other elements that are not required as part of the base scope (i.e. maskwalls) the cost would be a direct add to the project. It is important to note that the objective of this report is not to estimate a total project cost impact associated with implementation of a comprehensive aesthetic enhancement plan. It is anticipated that the project stakeholders will review the aesthetic opportunities and determine which opportunities are most desirable for this project. Actual cost magnitude will be determined as the final design is developed and the scale of aesthetic enhancement is agreed upon.

Project-Specific Renderings – Bridge Layouts

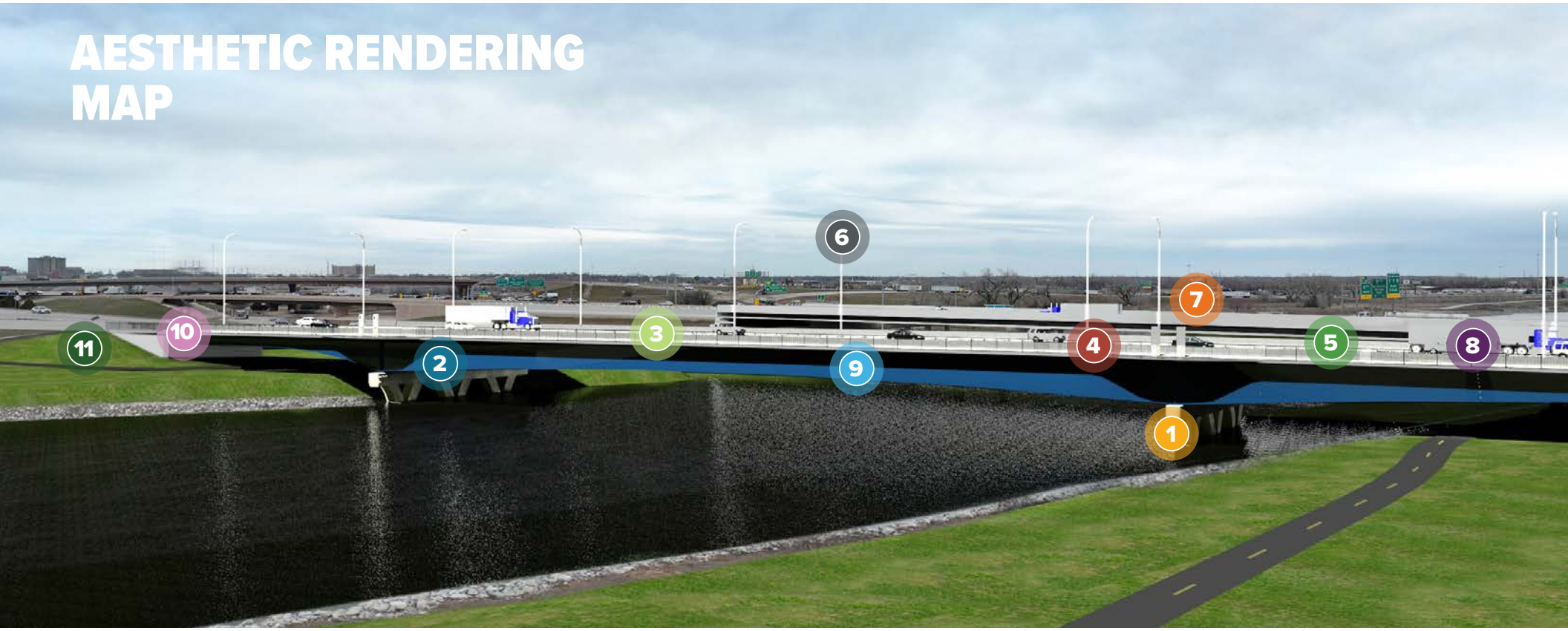
The proposed design concept for replacement of the I-35 NB and SB bridges over the Oklahoma River includes construction of long-span girder bridge structures that can allow the Oklahoma River to be classified as an Olympic level Class A rowing facility. In addition to replacement of the existing roadway bridges, a multi-use path crossing of the river along I-35 SB will be constructed. There are two design options for this multi-use path. The first options involves constructing a single widened SB structure that will accommodate both the I-35 SB traffic as well as the multi-use path. The multi-use path and I-35 SB traffic will be separated by a separation barrier. The second option involves constructing an independent path bridge west of the new I-35 SB bridge.

The below renderings have been created to provide a general understanding of the two primary design options as it relates to the proposed multi-use path. The subsequent sections of this report go into greater detail regarding aesthetic enhancement options and costs, with example photos provided to help visualize the aesthetic options.





AESTHETIC RENDERING MAP



1 PIER TYPE & SHAPE

2 GIRDER SHAPE

3 PATH BRIDGE STRUCTURE TYPE

4 PEDESTRIAN OVERLOOKS

5 BARRIERS & RAILINGS

6 LIGHTING

7 MONUMENTS & WAYFINDING

8 CONCRETE SURFACE TREATMENTS

9 STEEL COATINGS

10 MASKWALLS

11 PATH END RAMPS

Click on any of the featured subjects to go directly to its respective section.

APPENDIX K

PIER TYPE & SHAPE 1

The proposed I-35 Bridges include two river piers for each structure. The piers are positioned to provide an open channel that accommodates an Olympic level Class A rowing facility with seven to eight racing lanes. The piers will be most visible to users of both the river and trail system beneath the bridges. For enhanced aesthetic value, different pier types/shapes may be considered.

Three pier types that may fit the Oklahoma River crossing site constraints include:

- Continuous wall piers
- Multi-column piers
- Hammerhead piers

These three conventional pier types can be aesthetically enhanced by modifying the shape of the columns or wall stems, as well as introducing different concrete surface treatments (see Concrete Coatings & Formliners).

Continuous Wall Piers

Figures 1.1 and **1.2** illustrate continuous wall piers. In **Figure 1.1,** aesthetic enhancement comes in the form of a vertical ribbed texture along the face of the wall stem and a rounded/striated end face. In **Figure 1.2**, an asymmetric wall pier was constructed that includes one sloped end and a textured surface.

Figure 1.1: Surtees Bridge, Stockton-On-Tees, United Kingdom

Figure 1.2: Mohawk Valley Gateway Overlook Bridge, Amsterdam, Netherlands

Click here to return to the rendering map!

RENDERING MAP

Multi-Column Piers

Figures 1.3 and 1.4 illustrate multi-column piers. In Figure 1.3, a two-column rectangular system with striated columns is utilized, with unique geometry to accommodate a path bridge penetration through the pier. In Figure 1.4, wrapped double-Y style columns were combined with a tapered pier cap to create the illusion of piers rising out of the water. The pier style was repeated across both approaches to this signature Mississippi River bridge.

Hammerhead Piers

Figure 1.5 illustrates a hammerhead pier. For this bridge, the hammerhead pier style was enhanced through the introduction of curved/tapered edges and an in-fill stem pattern. A hammerhead pier type is not anticipated to be a practical solution for the main I-35 NB and SB structures, as this pier type best accommodates a narrower roadway. However, similar styles could be incorporated into a multi-column pier configuration.

COST CONSIDERATIONS

The cost premium associated with a customized pier type or shape is primarily associated with customization of formwork, increased concrete volumes to achieve the desired effect and increased complexity of rebar placement. For this project, it is anticipated that modifying a conventional continuous wall or multi-column pier type to have a more customized shape will increase the cost of each pier by $25,000 to $75,000 (more customization would result in higher cost premiums).

**Note that the cost premium associated with formliners and/or surface treatments at piers is discussed elsewhere within this report.*

Figure 1.3: Red Gate Road over the Fox River, St. Charles, IL

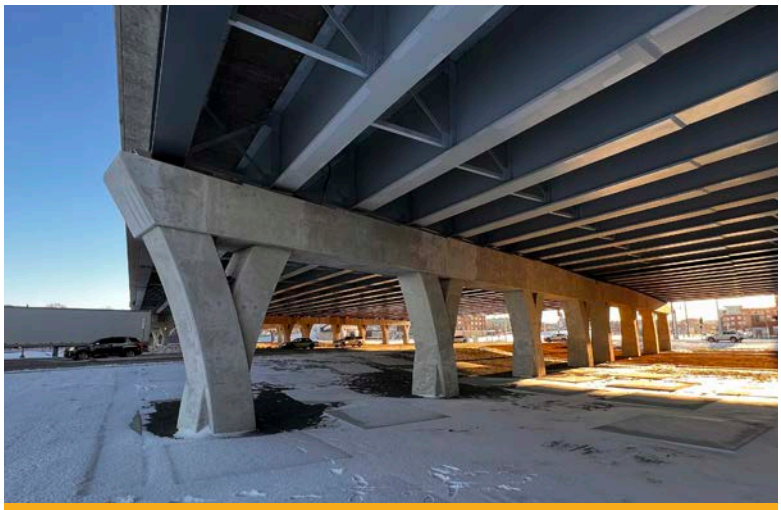


Figure 1.4: I-74 over the Mississippi River, Quad Cities, IL/IA

Figure 1.5: I-80/I-380 Interchange, Johnson County, IA

GIRDER SHAPE 2

The proposed I-35 Bridges include a steel girder superstructure, with girder depths that may exceed 10-feet to accommodate a main river span length exceeding 350-feet. The steel girders will be most visible to users of the river and trail system beneath the bridges. Different steel girder shapes can be considered that balance structural efficiency with aesthetic value.

I-shaped welded plate girders are currently proposed for the I-35 bridges. I-shaped plate girders are typically a uniform depth across the length of a bridge; however, a haunched girder shape is also commonly utilized for longer spans. A haunched girder has an increased girder depth at the piers with a shallower section at midspan. Not only does this create extra structural capacity where it is needed in the negative moment region over the piers, but the varying depth can create a more slender appearance. A haunched girder also will allow for an increased vertical clearance over the Oklahoma River at midspan. Haunched I-shaped plate girders are illustrated in **Figures 2.1** and **2.2**.

Figure 2.1: Hulton Bridge Over the Allegheny River, Allegheny County, PA

In addition to I-shaped plate girders, steel box girders may be a fit for the I-35 bridges. Steel box girders are generally more expensive than I-shaped plate girders, but they offer additional advantages such as reduced depth and increased torsional rigidity. Of note, steel box girders are a structurally efficient option for bridges with large variable overhangs such as those that may be considered on the path side of I-35 SB. **Figure 2.3** illustrates a haunched steel box girder interstate bridge.

Figure 2.2: Rouchleau Mine Bridge, Eveleth, MN

COST CONSIDERATIONS

There is not anticipated to be a notable cost premium associated with haunched steel I-shaped plate girders versus uniform depth girders. The increased fabrication costs of a haunched girder are partially, to mostly offset by the material and girder erection savings realized by using a more efficient structural section.

For a steel box girder, it is expected there will be a 15% to 30% cost premium on the furnished and erected steel cost when compared to a steel I-shaped plate girder.

Figure 2.3: Nene Bridge, Peterborough, United Kingdom

APPENDIX K

PATH BRIDGE STRUCTURE TYPE 3

A multi-use path will be constructed on the west side of I-35 SB, either on a shared structure with the roadway bridge or an offset independent path structure. If an independent path structure is pursued, there are several viable options for the superstructure configuration crossing the river.

It is anticipated that an independent path structure would require similar span configurations and lengths as the proposed I-35 roadway bridges, where a main span length exceeding 350-feet is required to accommodate the open channel rowing requirements. Each section below touches on path bridge types that can achieve the span configuration required. Bridge types are generally presented in order of increasing cost for this project.

Steel Plate/Box Girders

For an independent path bridge, a similar steel girder superstructure as that proposed for the I-35 roadway bridges could be implemented. Girders may either be uniform depth or haunched and either I or box shaped. More information on these options are included in the Girder Type section.

Steel Truss

Steel truss bridges use a combination of top/bottom chord, diagonal and vertical steel members to create long span path structures. Several vendors manufacture prefabricated truss bridges as an economical solution for path structures; however, given the length of spans required to cross the river, a custom-designed steel truss bridge would be anticipated for this project. Features of truss structures that impact the aesthetics include: aspect ratio of the panels and overall structure; bracing patterns; truss location (i.e. above or below deck). See Figure 3.1. Note that the bridge in Figure 3.1 utilizes a combined arch and truss type superstructure.

Figure 3.1: Menomonee Valley Bike Path Bridge, Milwaukee, WI

Figure 3.2: RiverEdge Bridge, Aurora, IL

Figure 3.3: Milwaukee 606 Trail Bridge, Chicago, IL

Segmental Concrete

Segmental concrete construction splices together short precast concrete sections that are post-tensioned in place. Uniform depth or haunched bridge profiles can be achieved, as can curved or S-shaped alignments. See **Figure 3.2**.

Tied/True Arch

Tied/true arches use a curved steel rib to suspend a bridge deck with hangers. Arch spans are most often utilized for span lengths exceeding 300-feet; that said, arch spans for shorter lengths are also viable. Arches offer a high degree of aesthetic enhancement to a project, with several variations possible. This includes: skewed overall bridge geometry (**Figure 3.3**); skewed arch ribs to create basket-handle style (**Figure 3.4**), a single arch rib (**Figure 3.5**), various aspect ratios and construction with/without bracing. Arch structure types do not readily accommodate curved or S-shaped alignments.

Cable-Stayed

A cable-stayed bridge supports the bridge deck from cables connected directly to tall towers. These tall towers can be in a multitude of shapes, including but not limited to: A-type, H-type, inverted Y, single pylon, diamond shape. Cable-stayed bridges can be symmetrical (tower at each end) or asymmetrical (single tower at one end) and can support a range of curved or S-shaped path alignments. See **Figure 3.6**.

Figure 3.4: Broadway Bridge over Arkansas River, Little Rock, AR

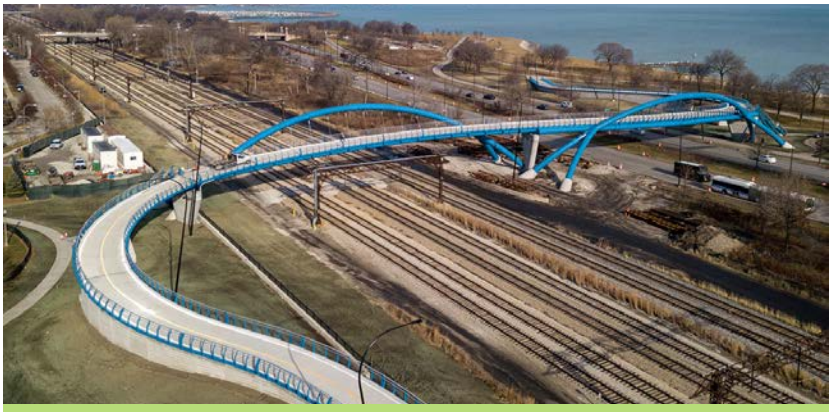


Figure 3.5: 41st Street Bridge, Chicago, IL

Figure 3.6: Dublin Link Bridge, Dublin, OH

Figure 3.7: Peace Bridge, Alberta, Canada

Hybrid/Abstract Structures

Unconventional hybrid structure types may also be considered for an independent path bridge, such as tube bridges. These hybrid structure types require extensive customization and are typically led through development by a bridge architect. See **Figure 3.7**.

COST CONSIDERATIONS

Constructing an independent path structure – in-kind but offset from the roadway structure - is anticipated to carry a $2M-$4M cost premium when compared to a shared structure. This cost premium is primarily associated with independent operations that would be required to construct this bridge and the likelihood that an independent bridge would have a wider path width than a shared use bridge. This increase in path width would result in more economical aspect ratios and provide for a continual “viewing space” of the river and facilities below.

If a more signature path structure type is desired – such as a steel truss or arch – the anticipated cost premium would increase into the $8M-$12M range (relative to the base cost of a combined structure). Given the span configuration and site parameters, neither a cable-stayed or hybrid/abstract structure type are considered practical for this project. Both options would involve a cost premium that is significantly larger than that of the steel girder, steel truss or arch bridge types.

APPENDIX K

PEDESTRIAN OVERLOOKS 4

A multi-use path will be constructed on the west side of I-35 SB, either on a shared structure with the roadway bridge or an offset independent path structure. In either alternate, pedestrian overlooks may be added to the outside of the structure to provide a safe area for path users to stop and experience the river and its surroundings.

Figure 4.1: Red Gate Road over the Fox River, St. Charles, IL

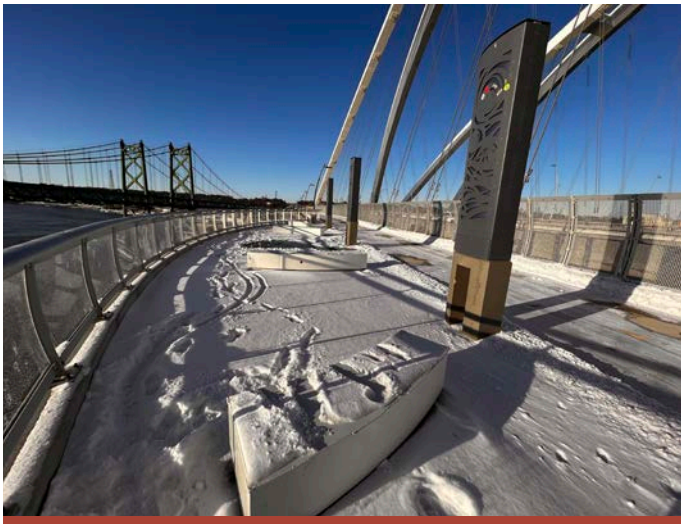


Figure 4.2: I-74 over the Mississppi River, Quad Cities, IL/IA

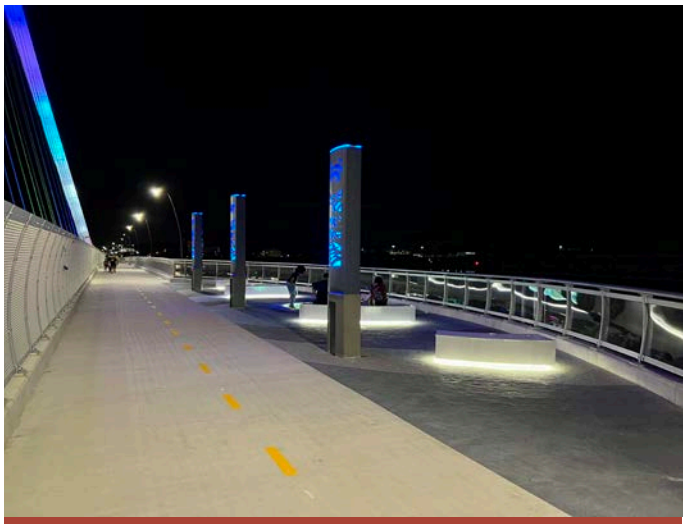


Figure 4.3: I-74 over the Mississppi River, Quad Cities, IL/IA

Figure 4.4: I-74 over the Mississppi River, Quad Cities, IL/IA

Pedestrian overlooks may be used for pedestrians and bikers to congregate as well as to place monuments, planters, bike racks, or any other elements that may enhance the multi-use path user experience. Pedestrian overlooks are typically constructed with a cantilevered extension of the deck beyond the typical edge of deck. Detailed framing is required in order to support the overhangs and any ancillary loads that would also be placed in this area. **Figure 4.1** shows a small and simple overlook with no additional features. **Figures 4.2 through 4.6** show several larger overlooks that include extra lighting, monuments, seating, and a circular glass oculus that would allow individuals to look down at the river below. Overlooks may be placed anywhere along the structure; however, common locations are at the piers or at midspan. See **Project Specific Renderings** section (**page 2**) for a rendering of a pedestrian overlook concept for the combined path/I-35 SB bridge. The pedestrian overlook concept shown is an approximately 10' wide extension of the bridge deck and is approximately 60' in length.

COST CONSIDERATIONS

The cost premium associated with the construction of pedestrian overlooks along the multi-use path on the shared structure is dependent on the geometry and complexity of the overlook. For an overlook of similar size and usage to that shown within the Project Specific Renderings section, the cost premium is anticipated to be $300,000 to $500,000, per overlook.

Figure 4.5: Mohawk Valley Gateway Overlook Bridge, Amsterdam, Netherlands

Figure 4.6: Dawn Bridge, Shanghai, China

APPENDIX K

BARRIERS & RAILINGS 5

The proposed I-35 Bridges project will include several barrier and railing types. The exterior barriers and railings will be most visible to users of the river and trail system beneath the bridges, while the interior barriers will be most visible to I-35 SB and NB traffic as well as users of the multi-use path.

Figure 5.1: I-90 Over Arlington Heights Bridge, Village of Elk Grove, IL

Figure 5.2: SE Park Bridge, Franklin, TN

Figure 5.3: Farnsworth Ave over Indian Creek, Aurora, IL

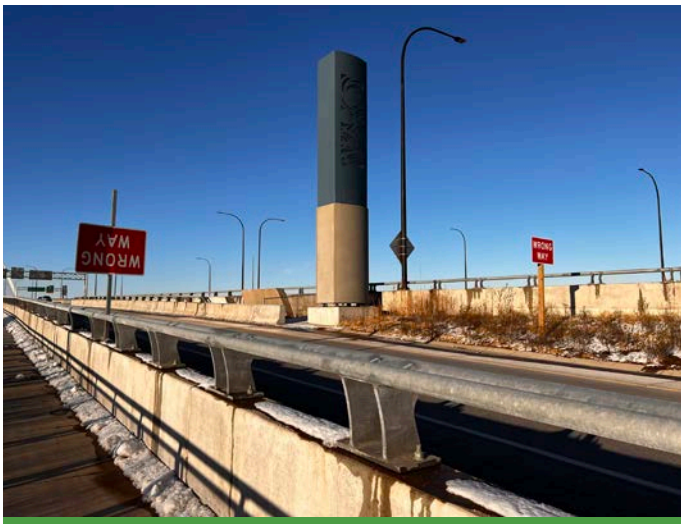


Figure 5.4: I-74 over the Mississppi River, Quad Cities, IL/IA

Roadway Barriers

The roadway barriers must provide interstate level crash-worthiness and are therefore limited in terms of unique parapet options. An F-shape barrier is a conventional bridge parapet given in the Oklahoma State design standards and would be a suitable option for this project. As shown in **Figure 5.1**, formliners or concrete coatings may be placed on the exterior face of the parapets to enhance the aesthetics.

Roadway/Path Separation Barriers

If the proposed multi-use path is integrated onto the west side of the I-35 SB structure, a separation barrier will be required between the roadway and path. This separation barrier will need to provide interstate level crash-worthiness while also being of sufficient height to accommodate bike traffic on the path (typically 4'-6"). The separation barrier may include metal railings mounted on top of the concrete barrier, and also include formliners or concrete coatings on the vertical faces of the barrier. See **Figures 5.2 through 5.4** for examples of separation barriers used on several projects throughout the country.

Pedestrian Railings

Pedestrian railings offer the most opportunity for customization due to the reduced loading requirements. Pedestrian railings typically include vertical posts, a top handrail and an infill system. The posts and handrails are most commonly steel elements that may be painted or coated to any color or texture desired. Infill systems may include wire mesh, cables, thin posts, glass panels, etc. Geometry of pedestrian railing elements can vary significantly, provided that minimum height requirements and maximum opening sizes are met. See **Figures 5.4 through 5.6** for examples of pedestrian railings used on bridge projects. As shown in **Figure 5.6**, the railing configuration may also change at key points along the structure, such as pedestrian overlooks.

COST CONSIDERATIONS

Aesthetic enhancement opportunities are more limited for the roadway and path separation barriers, thus cost premiums for these elements are not anticipated to be significant. Where cost can vary more dramatically is with the pedestrian railings. Depending on the material, finish and complexity of the pedestrian railing, the cost of the railing may be double or triple that of a basic galvanized pedestrian railing option (up to $750 per linear foot variation). One example of a high premium railing type would be an all-stainless steel railing system with unique geometry.

Figure 5.5: Lakefront Trail Bridge, Chicago, IL

Figure 5.6: I-74 over the Mississppi River, Quad Cities, IL/IA

APPENDIX K

LIGHTING 6

The proposed I-35 Bridge project includes several opportunities for aesthetic lighting. Aesthetic lighting can be experienced by users of the river/trail system underneath the bridge, roadway/path users on the bridge, as well as onlookers and stakeholders within the general project area. A targeted aesthetic lighting plan can create a customized experience and draw users to the area.

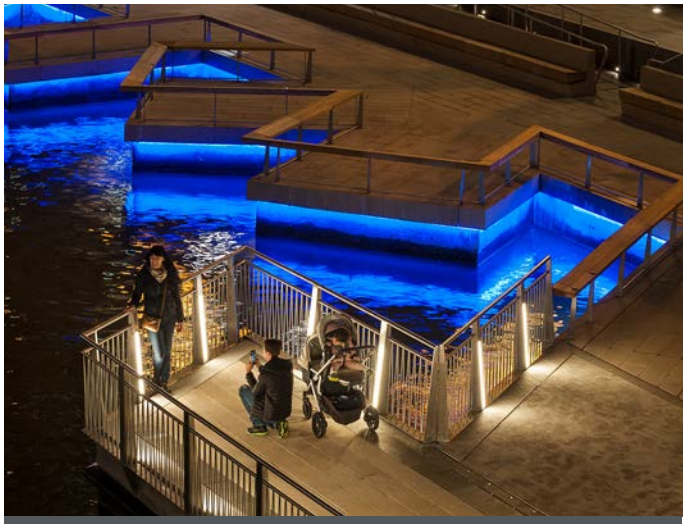


Figure 6.1: Chicago Riverwalk, Chicago, IL

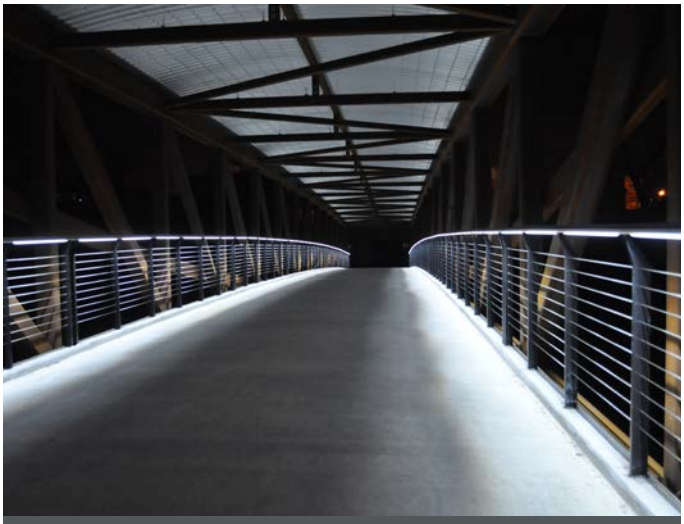


Figure 6.2: Menomonee Valley Bike Path Bridge, Milwaukee, WI

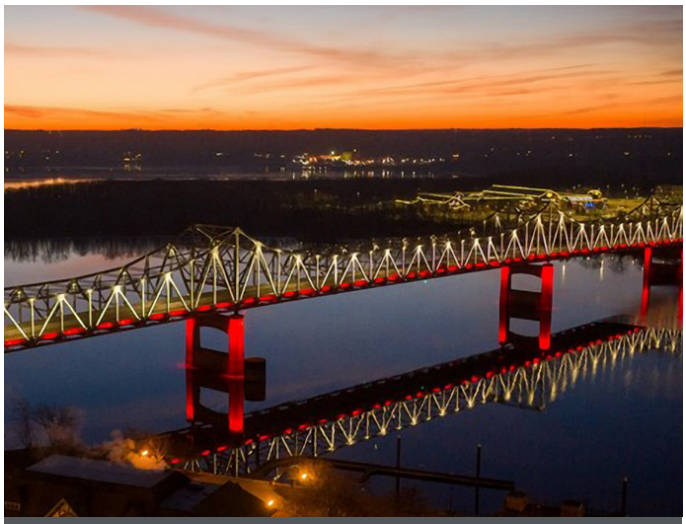


Figure 6.3: Murray Baker Bridge, Peoria, IL

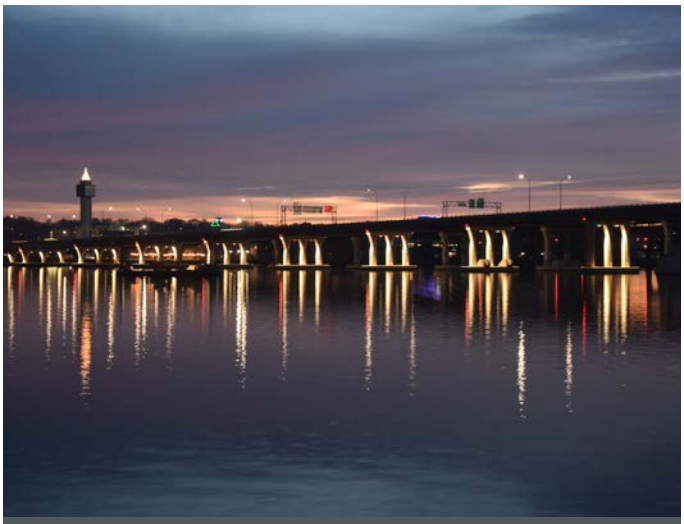


Figure 6.4: I-74 over the Mississppi River, Quad Cities, IL/IA

Aesthetic lighting opportunities within the I-35 Bridges project include lighting of the following elements:

- Pedestrian Railings - **Figures 6.1** and **6.2**
- Substructure Elements (Piers and Abutments) - **Figures 6.3** and **6.4**
- Fascia Girders – **Figures 6.5** and **6.6**
- Roadway/Path Light Poles – **Figure 6.7**

Aesthetic lighting offers unique opportunities for stakeholder engagement and customization. Customization can come in the form of:

- Allowing public input to choose aesthetic lighting locations and schemes. One example of this is the nearby Skydance Bridge, with different light schemes available for use on any particular day.
- Programming interactive color patterns and combinations, such as red/green during the holidays, red/blue at 4th of July, river race day lighting, etc. (**Figure 6.8, following page**)
- Custom-designed light poles.

COST CONSIDERATIONS

The anticipated cost premiums associated with different aesthetic lighting elements are as follows:

- Integrated handrail lighting – Up to $250 per linear foot of railing
- Girder flood lights – Up to $600 per linear foot of fascia girder
- Custom roadway/path light poles – Up to $5,000 per light pole
- Substructure lighting – $10,000 to $20,000 per substructure unit
- Advanced light system controller and programming such that light colors may be varied and synchronized – Up to $500,000
- Multi-color LED lights, in lieu of all white lighting – 10% overall lighting premium

Figure 6.5: I35 W. Bridge, Minneapolis, MN

Figure 6.6: RiverEdge Bridge, Aurora, IL

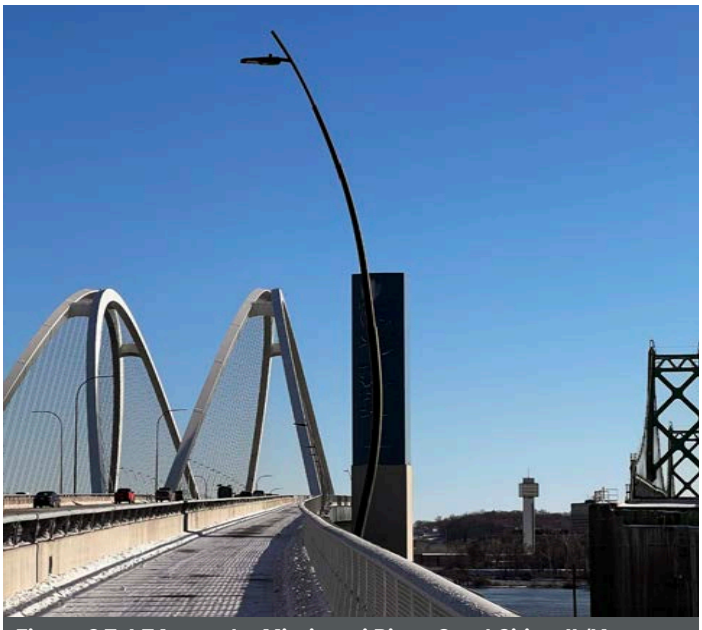


Figure 6.7: I-74 over the Mississppi River, Quad Cities, IL/IA

Figure 6.8: I-74 over the Mississppi River, Quad Cities, IL/IA

Illustrated to the left is a color-changing scheme implemented on the recently constructed I-74 over the Mississippi River Bridge between Iowa and Illinois. A heavy stakeholder engagement plan was implemented to obtain feedback on lighting schemes. Lights can be programmed to provide thousands of different combinations.

APPENDIX K

MONUMENTS & WAYFINDING

7

Monuments and/or wayfinding elements may be added throughout the project limits to to enhance the user experience and connect the newly built structures to the community. These elements can be particularly impactful along the proposed multi-user path, where users can engage directly with these structures.

Figure 7.1: I-74 over the Mississppi River, Quad Cities, IL/IA

Figure 7.2: New York Street Bridge, Aurora, IL

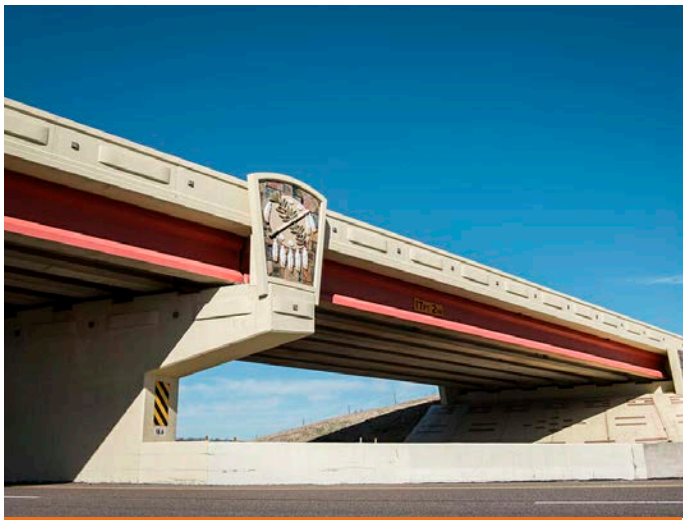


Figure 7.3: Heritage Bridge, Oklahoma City, OK

Figure 7.4: North Washington Street Bridge, Boston, MA

There are several types of monuments and wayfinding elements that may be added to the structure. Monuments such as the ones shown in **Figures 7.1** and **7.2** may be statues or sculptures placed directly onto the bridge surface. Monuments may also be built up onto the end sections of pier caps, as shown in **Figure 7.3** (Heritage Bridge in Oklahoma City). Unique elements such as the trellis system shown in **Figure 7.4** may also be added to the structure as a delineator between the traffic lanes and the multi-use path. Wayfinding signage such as the ones shown in **Figures 7.5** and **7.6** may also be added in several locations such as the exterior parapets, along the multi-use path, at the railings, etc.

COST CONSIDERATIONS

The cost associated with monuments and wayfinding elements on or adjacent to a structure is highly dependent on the size, shape, material, and complexity of each element. For a project of this magnitude, the cost of these elements – assuming more conventional materials are used – is anticipated to be approximately $5,000 to $10,000 per element furnished and installed.

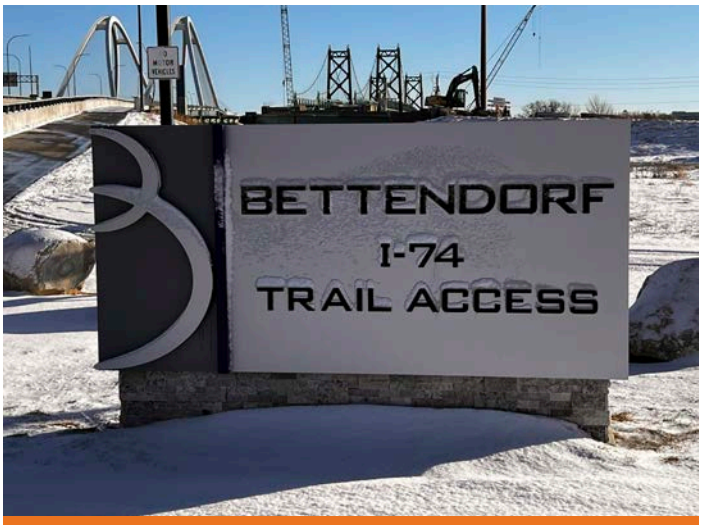


Figure 7.5: I-74 over the Mississppi River, Quad Cities, IL/IA

Figure 7.6: Gulf State Park Bridge, Gulf State Park, AL

APPENDIX K

CONCRETE SURFACE TREATMENTS

8

The proposed I-35 Bridge project includes several concrete elements, including bridge substructures, retaining walls and concrete barriers. For concrete surfaces exposed to view, different concrete formliners and coatings can be incorporated.

Figure 8.1: SH-9 Bridge, Norman, OK

Figure 8.2: Main Street and I-35 Bridge, Norman, OK

Figure 8.3: Red Gate Road over the Fox River, St. Charles, IL

Figure 8.4: Epcot Center Drive, Orlando, FL

Concrete Formliners

Formliners allow for artwork, logos, symbols, and textures and patterns of almost any kind to be imprinted onto a concrete surface. **Figures 8.1** and **8.2** depict local bridge projects where formliners were utilized to highlight key aspects of Oklahoma's culture and identity. **Figures 8.3 through 8.5** show additional formliner patterns that have been used throughout the country. Many formliner fabricators have premade formliners in stock and ready for re-use to be more cost efficient; however, custom formliners may also be created.

Concrete Coatings

Coatings may be used to color stain a concrete surface and also to seal the concrete from water/salt infiltration. **Figure 8.6** shows an example where concrete coatings were used to vary the color of the concrete pier.

COST CONSIDERATIONS

The cost premium for concrete formliners is expected to be between $10 and $20 per square foot of formlined surface. The premium varies depending on the complexity of the formliner and whether the formliner is custom made or pre-stocked and how many uses can be achieved with each formliner. The cost premium for staining concrete is expected to be between $5 and $10 per square foot of applied stain/sealer.

Figure 8.5: Glenn Highway and Muldoon Road, Ancorage, AK

Figure 8.6: I-80/I-380 Interchange, Johnson County, IA

STEEL COATINGS 9

The proposed I-35 Bridge project includes several steel elements, including steel girders, railings and sign structures. Steel coatings may be used to provide corrosion protection while simultaneously creating different aesthetic options.

Stainless Steel

Stainless steel may be used for pedestrian railings along the proposed path. Stainless steel is strong, durable, and resistant to corrosion. Stainless steel has a shiny, reflective color. See **Figure 9.1**.

Paint Coatings

Different paint coatings may be used on all steel elements in the project. Paint systems provide varying degrees of corrosion protection, depending on the product. Paint coatings can be modified to any desired color. Examples of paint coatings can be seen in **Figures 9.2** and **9.5**.

Weathering Steel

Weathering steel is an option for the bridge girders. Weathering steel provides an inherent outer coating of corrosion on the surface. Once the outer surface has rusted, the steel beneath the surface is protected from further corrosion. Weathering steel results in a brown/orange rust color, as seen in **Figures 9.3** and **9.4**.

Figure 9.1: Throop Street Bridge, Chicago, IL

Figure 9.2: Throop Street Bridge, Chicago, IL

Figure 9.3: Addison Pedestrian Bridge, Chicago, IL

Metallization

Metalizing steel is an option for all steel elements in the project. Metalizing steel involves spraying on a coat of metal to a steel surface. This metal coat offers protection against corrosion and may be painted over. See **Figure 9.6**.

Galvanization

Galvanized steel may be used on railings and signs within the project. Galvanizing involves applying a coating of zinc to the surface of a steel element. This coating of zinc offers the base steel protection against corrosion and is generally considered extremely durable. Galvanization is typically done by dipping steel elements into a hot zinc bath (hot dip galvanizing). Galvanizing results in a silver/chrome color, as shown in **Figure 9.6**. The size of the zinc bath limits what steel may be galvanized. Galvanizing would not be feasible for the primary steel girder segments.

COST CONSIDERATIONS

Cost premiums associated with different steel coatings and finishes are highly dependent on market trends and conditions at the time of material procurement. In general for steel superstructure coatings, weathering steel and paint coatings are expected to have similar costs. Metalizing the girders prior to painting is expected to carry between a 20% and 30% coating cost premium. Galvanized coatings and stainless steel are not practical and/or feasible for the steel superstructures on this project, given segment lengths. Galvanized coatings and stainless steel finishes would be most applicable to smaller/lighter elements, such as pedestrian railings. However, it is noteworthy that the initial increase in cost of some of the coating options may be partially offset by reduced long-term maintenance costs.

Note that the cost premium associated with higher end steel coatings and finishes for pedestrian railings is discussed elsewhere within this report.

Figure 9.4: I-91 Interchange 29 Exit Ramp Flyover Bridge, Hartford, CT

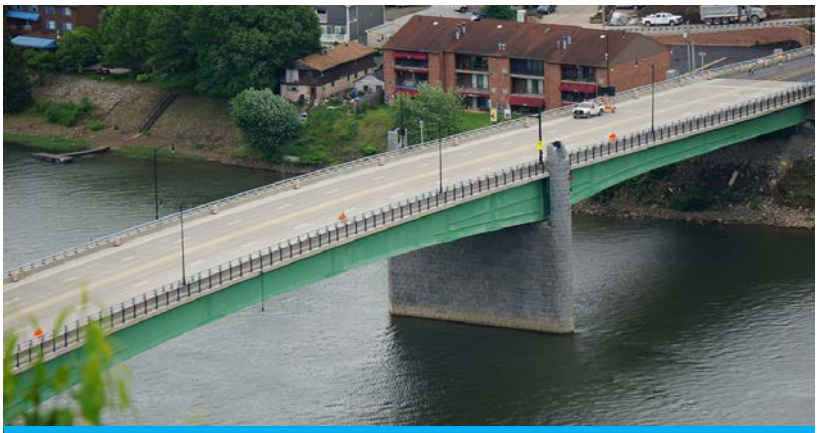


Figure 9.5: Hulton Bridge Over the Allegheny River, Allegheny County, PA

Figure 9.6: Steel Truss Bridge - Galvanized

MASKWALLS 10

The proposed I-35 Bridges include abutments at both ends of each bridge. One option to hide the girder ends/bearings at the outside of the abutment is to construct a maskwall. Maskwalls would be visible to users of the river and trail system beneath the bridges.

Maskwalls are short cast-in-place or precast concrete walls placed at the end of an abutment. These wall segments can either be standalone or connect into an approach retaining wall system. For enhanced aesthetic value, concrete coatings or formliners can be placed on the outside face of the wall. See **Figures 10.1 through 10.3** for different maskwall concepts.

COST CONSIDERATIONS

Maskwalls are relatively low cost items. The cost premium associated with maskwall construction at the ends of a stub type abutment is expected to be approximately $20,000 per location.

Figure 10.1: Elk Street Diverging Diamond Interchange, Elk City, OK

Figure 10.2: I-74 over the Mississppi River, Quad Cities, IL/IA

Figure 10.3: I-5/French Camp Road Bridge, Sockton, CA

PATH END RAMPS 11

A multi-use path will be constructed on the west side of I-35 SB, either on a shared structure with the roadway bridge or an offset independent path structure. In either alternate, ramps at the ends of the river bridge must be constructed to create a connection between the elevated path crossing the river and the river level path network. These end ramps will be visible by the users of the river, the trail system beneath the bridges, and the roadway. Path ramps offer opportunities for aesthetic enhancement through unique alignments, types and adornments.

There are two options for making the ramp connections at the ends of the multi-use path river crossing: at-grade ramps or structural ramps.

At-Grade Ramps

An at-grade ramp would be a path built on an embankment or retained soil. This is generally the most economical ramp system, provided sufficient land is available for the earthwork needed to support the ramp run lengths to create the elevation change. Some aesthetic enhancement options include targeted landscaping and/or formliners when walls are required. **Figure 11.1** illustrates an at-grade ramp system.

Structural Ramps

A structural ramp would be a continuation of the main river structure; however, the ramp structure type would not need to be a direct match to the river bridge. Alternate materials could be utilized, such as concrete or timber. Structural ramps allow for more unique loop ramp alignments, require a smaller footprint than an at-grade ramp and allow for the space beneath the ramp to remain available for use. Structural ramps are generally more expensive than at-grade ramps given the cost of bridge materials and construction will exceed at-grade earthwork placement. Examples of structural ramps can be seen in **Figures 11.2** and **11.3**.

Elevator/Letdown Structures

Note that a third option for connecting path users from river bridge level to river trail level is an elevator/letdown structure. Letdown structures are typically very expensive and only utilized when space is not available for a ramp system. This constraint is not expected to exist for the I-35 Bridges, thus letdown structures have not been explored in this report.

COST CONSIDERATIONS

If there are no ROW constraints, the most cost-effective path end ramp option would be an at-grade ramp. Relative to an at grade ramp, the cost premium for a structural ramp option is expected to be $500K to $1M per bridge end, depending on overall ramp length and desired configurations.

Figure 11.1: 606 Trail, Chicago, IL

Figure 11.2: Menomonee Valley Bike Path Bridge, Milwaukee, WI

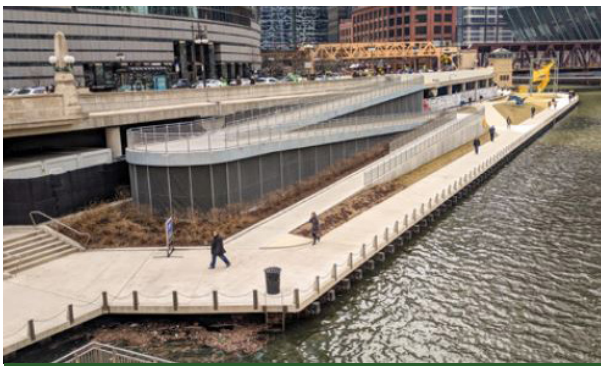


Figure 11.3: Chicago Riverwalk, Chicago, IL

PHOTO REFERENCES

All photographs, images, and renderings shown in this report have been taken, developed, or created by Benesch with the exception of the following:

Figure 1.1: https://travel.sygic.com/en/poi/surtees-bridge-poi:32880568
Figure 1.2: https://dailygazette.com/2016/08/17/some-skeptical-pedestrain-bridge-will-revitalize-c/
Figure 1.5: https://iowadot.gov/i80-i380/Photo-Video-gallery
Figure 2.1: https://www.aisc.org/nsba/prize-bridge-awards/prize-bridge-winners/hulton-bridge/
Figure 2.2: https://www.aisc.org/nsba/prize-bridge-awards/prize-bridge-winners/rouchleau-mine-bridge/
Figure 2.3: https://www.newcivilengineer.com/latest/skanska-complete-nene-bridge-strengthening-27-09-2019/
Figure 3.2: https://www.tylin.com/work/projects/riveredge-park-pedestrian-bridge
Figure 3.4: https://www.aisc.org/nsba/prize-bridge-awards/prize-bridge-winners/broadway-bridge-over-the-arkansas-river/
Figure 3.6: https://cdn.asce.org/source/uploads/2020/11/RWB-Bridge-2jj-scaled.jpg
Figure 3.7: https://www.theconstantrambler.com/exploring-alberta-photographs/
Figure 4.5: https://www.saratogaassociates.com/wp-content/uploads/Mohawk-Valley-Gateway-Overlook-1.jpg
Figure 4.6: https://www.mvrdv.nl/projects/327/dawn-bridge
Figure 5.1: Google Earth Street View Image
Figure 6.3: https://www.acecileea.com/projects2022/sa8.php
Figure 6.5: https://peapix.com/bing/614
Figure 6.6: https://thevoice.us/high-tech-lighting-caresses-and-illuminates-new-bridge-in-aurora/
Figure 7.3: https://creativedesignresolutions.com/project/heritage-bridge/
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Figure 8.1: https://www.creativeformliners.com/project/sh9-wi-35/
Figure 8.2: https://creativedesignresolutions.com/project/main-street-i-35-bridge/
Figure 8.4: https://reinforcedearth.com/projects/architectural-gallery/
Figure 8.5: https://reinforcedearth.com/projects/architectural-gallery/
Figure 8.6: https://iowadot.gov/i80-i380/Photo-Video-gallery
Figure 9.4: https://www.aisc.org/modernsteel/news/2022/march/connecticut-bridge-wins-top-nsba-prize/
Figure 9.5: https://www.aisc.org/nsba/prize-bridge-awards/prize-bridge-winners/hulton-bridge/
Figure 9.6: https://usbridge.com/steel-galvanizing-for-bridges/
Figure 10.1: https://creativedesignresolutions.com/project/elk-city-diverging-diamond-interchange
Figure 10.3: https://www.creativeformliners.com/project/stockton/

APPENDIX L -
Project History

CI-2436 - I-35 Dallas Junction Ramp Widening Nov 29, 2023

Project History

- **Fall 2015** – As a result of continued congestion, ODOT commenced with a study of the I-35/I-40/ I-235 "Dallas Junction" interchange. The studies stated goal was to identify potential options for increasing the capacity on the I-35 mainline by adding new two-lane span bridges paralleling the existing I-35 bridges over the Oklahoma River. Two different parallel bridge configurations were included in the studies initiation.
  As part of the project solicitation and interview, Poe and Associates proposed a 3rd option, to replace the existing I-35 northbound and southbound river bridges with new 6-lane facilities. The proposed bridge replacements would include multimodal enhancements due to the unique location of the bridge near the Oklahoma River trails and ongoing commercial development. During the onset of the study, a ramp bridge to the newly constructed Oklahoma Boulevard was under construction. The study would need to account for the ramp bridge once completed. Another goal determined early in the study development was to investigate increasing the capacity of I-35 southbound by including an additional travel lane through the SW 15th interchange. The I-35 SB expansion and the third bridge option were then included in the study scoping for further investigation. The study initiated in 2015.
- **August 2016** - A kickoff meeting was held after preliminary survey data had been collected and preliminary concepts were developed for discussion. ODOT, City of Oklahoma City, Poe & Associates, and the Oklahoma River Authority were the key stakeholders at the meeting. As a result of the meeting, the Oklahoma River Authority and City of Oklahoma City requested that a bridge investigation be included in the study with the goal of improving the underlying rowing facility on the Oklahoma river. To improve the rowing facility, the bridge investigation included identifying minimizing or removal of the piers from the waterway by using long spans over the river racecourse. Bridge Analysis and concept revisions were initiated to research the impacts of the long span bridges.
- **September 2017** Due to excessive queuing on the I-40 ramps to I-35, ODOT initiated a study and then PS&E plans on the operational characteristics of the I-40 to I-35 ramps. The study included potential interim solutions to relieve the queuing. The selected solution from the study was then quickly developed into an accelerated PS&E plan. The plans included realigning and widening two existing single lane ramps to two lanes ramps with expanded shoulders and protective barrier. The (1) existing I-40 westbound to I-35 southbound exit ramp and the (2) I-35 northbound to I-40 eastbound ramps were expanded to the two-lane configuration. To accommodate the ramps, the existing I-35 northbound and southbound bridges shoulders were reduced and design exceptions utilized to accommodate the additional ramp lanes. This led to both bridges potentially becoming functionally obsolete. The Interim ramp widening project completed construction in **March, 2018.**
- **October 2017** - During the development of the Interim ramp widening project, the study concepts were modified to incorporate the new ramp and bridge analysis. Preliminary design concept drawings were submitted for review to ODOT. In **December, 2017** Coordination

meetings were held with the department to discuss the findings of the concepts and minor modifications introduced. Roadway traffic analysis was then initiated on the proposed concepts.

- **January 2019** - A ramp extending off of the I-35 Northbound bridge was completed to access the newly constructed Oklahoma City Boulevard. Traffic Analysis was halted so that new traffic data could be collected to included the traffic patterns introduced by the Oklahoma City Boulevard bridges. ODOT Traffic Division began data collection and analysis of the traffic operations.
- **Spring 2020** - ODOT and Poe began looking at alternative bridge structures to span the Oklahoma River. Analysis showed that the higher cost and inefficiencies in utilizing more traditional bridge structures made them impractical. To assist in the investigation of the alternative bridge structures, Poe reached out to Benesch due to their extensive experience and familiarity with Poe to help develop a long span bridge concept.
- **Sept. 2020** - A study was then initiated by ODOT assisted by Poe and Benesch to investigate feasible long span bridge options. Preliminary studies were submitted in **March, 2021** and then completed in **October, 2021**. As a result of the study, two bridge configuration were selected for further investigation. A Tied Arch and smaller Cable Stay type bridge were presented due to the span length required to remove piers in the water. Included in the study were preliminary bridge GP&E's and visuals of the concepts.
- **Summer 2021** - ODOT began initiating meetings with key stakeholders to present the bridge study findings to date. Poe and Benesch provided support data and visuals for the meeting support. In **February 2022**, the first of the formal meetings, ODOT presented the long span bridge options with exhibits, cost estimates, and maintenance of traffic data to the stakeholders for comment. A second stakeholder meeting was then held with Tier 1 stakeholders in **November, 2022**. As a result of the initial stakeholder meeting, Poe was tasked with researching the 2022 US Rowing guidelines in coordination with the Oklahoma Riversport Authority to find potential bridge options that would meet Class A rowing facility regulations. The regulations allowed for potential bridge piers in the water if a minimal boundary outside of the raceway was not obstructed. Two bridge configurations were studied based on potential race course layouts and presented to the department for comment. A proposed 3-span plate girder bridge that spanning an 8-lane rowing facility centered in the river was selected for further development.
- **June, 2022** – ODOT, assisted by consulting firm High Street and Poe & Associates, began work on an application for a planning grant under the federal Bipartisan Infrastructure Grant program. If awarded, the planning grant was to help supplement funding for the stakeholder efforts, The grant application was completed and submitted to the US Department of Transportation **in July, 2022.**
- **January, 2023** , ODOT initiated a task order with Poe & Associates and Benesch to develop different bridge aesthetic options to present to stakeholders in a proposed March meeting. The bride aesthetics would complement the 3-span plate girder river bridge selected for investigation. Completion of the bridge aesthetic report occurred in **February, 2023.**

- **February *2023*:** RAISE Bridge grant application submitted for multimodal bridge funding.
- **May 2023**: Stakeholder Meeting #3 – Meeting held with ODOT, Poe, Oklahoma City Leadership, Riversport, and the Chickasaw Nation to discuss the multimodal bridge and aesthetic options on the mainline bridges.

- **June 2023**: Follow-up meeting with Oklahoma City Engineering Department to discuss

potential aesthetic options for the multimodal bridge.

- **August 2023***:* RAISE Mega Bridge grant application submitted for project funding.
- **November 2023**: BIP Large Bridge grant application submitted for bridge funding.

APPENDIX M -
Existing Bridge Data and NBI Reports

3 – Existing Bridges

As illustrated on Figure M-2, there are 31 bridges within the study area, of which ten bridges are directly impacted by the potential design concepts discussed within this report.

I-35 Northbound and Southbound (box culvert at creek under) – NBI 14239
This culvert is a double (10' X 6' X 250') concrete culvert, with the same road section as the typical section of the I-35, both north and southbound. The culvert was originally built in 1959. The culvert inspection report indicates "No Major Problems", "Minor Damage" to the channel and is rated Not Deficient and has a sufficiency rating of 83.0 and a health rating of 100.0.

I-35 Northbound (Oklahoma River Under) – NBI 21356
This bridge is a 101'-4(100')-2(100')-101' Pre-stressed Concrete Slab Span with Concrete Barrier. The bridge has a 70' approximate deck width to accommodate a 68' Clear Roadway. The bridge was originally built in 1986. Data from inspection reports indicate the deck in good condition, the superstructure to be satisfactory, and the substructure to be fair. The bridge is rated Not Deficient and has a sufficiency rating of 76.7.

I-35 Southbound (Oklahoma River Under) – NBI 21723
This bridge is a 101'-4(100')-2(100')-101' Pre-stressed Concrete Slab Span with Concrete Barrier. The bridge has a 70' approximate deck width to accommodate a 68' Clear Roadway. The bridge was originally built in 1987. Data from inspection reports indicate the deck and superstructure to be in good condition, and the substructure to be satisfactory. The bridge is rated Not Deficient and has a sufficiency rating of 80.1.

SE 15th Street (I-35 Under) – NBI 23635
This bridge is an 86'-86' Continuous Plate Girder Concrete Slab Spans with Concrete Barrier. The bridge has a 96' approximate deck width to accommodate a 74' Clear Roadway. The bridge was built in 1994. Data from inspection reports indicate the deck, superstructure, and substructure to be in good condition. This bridge has a sufficiency rating of 93.1 and is considered Not Deficient.

Utility Bridge at SE 15th Street (I-35 Under) – NBI 22650
This bridge is an 80'-80' Continuous Plate Girder Spans with concrete barrier. This bridge carries only utilities, not traffic, therefore only having a deck width of 9'. The bridge was built in 1990. Data from inspection reports indicate the deck, superstructure, and substructure to be in good condition. This bridge has a sufficiency rating of -2.0 but is not subject to an operational rating.

- I-35 Northbound (BN&SF Railroad Under) – NBI 21335

  This bridge is a (75'-100'-75') Prestressed Concrete Slab Span with Concrete Barrier. The bridge has a 70' approximate deck width to accommodate a 68' Clear Roadway. The bridge was originally built in 1986.

  Data from inspection reports indicate the deck and superstructure to be in good condition, and the substructure to be fair. The bridge is rated Not Deficient and has a sufficiency rating of 86.3.

- I-35 Southbound (BN&SF Railroad Under) – NBI 21708

  This bridge is a (75'-100'-75') Prestressed Concrete Slab Span with Concrete Barrier. The bridge has a 71' approximate deck width to accommodate a 68' Clear Roadway. The bridge was originally built in 1987.

  Data from inspection reports indicate the deck to be in satisfactory condition, the superstructure to be in good condition and the substructure to be fair. The bridge is rated Not Deficient and has a sufficiency rating of 86.3.

- SE 20th Street (I-35 Under) – NBI 23634

  This bridge is an 80'-80' Continuous Plate Girder Concrete Slab Spans with Concrete Barrier. The bridge has a 72' approximate deck width to accommodate a 64' Clear Roadway. The bridge was built in 1994.

- SE 25th Street (I-35 Under) – NBI 24169

  This bridge is a 79'-91' Continuous Plate Girder Concrete Slab Spans with 10' sidewalks on both sides with Concrete Barriers. The bridge has a 86' approximate deck width to accommodate a 65' Clear Roadway. The bridge was built in 1996.

  Data from inspection reports indicate the deck and substructure is in good condition, while the superstructure to be in very good condition. This bridge has a sufficiency rating of 94.1 and is considered Not Deficient.

- I-35 NB Ramp S-W to Oklahoma Boulevard (I-35 SB Ramp E-S Under) – NBI 28603

  This bridge is a 100'-150'-100' Plate Girder Concrete Slab Spans with Concrete Barrier. The bridge has a 32' approximate deck width to accommodate a 29' Clear Roadway. The bridge was built in 2016.

  Data from inspection reports indicate the deck to be in good condition, the superstructure and substructure to be in very good condition. This bridge has a sufficiency rating of 98.0 and is considered Not Deficient.

Glossary for Bridge Conditions

- Bridge Class RCB Culvert – Culverts that carry vehicular traffic, have a span length greater than 2- feet and are part of the National Bridge Inventory system (NBI).

- Roadway Class RCB Culvert – Culverts that carry vehicular traffic, have a span length of less than or equal to 20 feet and are not part of the National Bridge Inventory system (NBI).

- Sufficiency Rating – Sufficiency rating is a computed numerical value that is used to determine eligibility of a bridge for Federal funding. The sufficiency rating formula result varies from 0 to 100. The formula includes factors for structural condition, bridge geometry and traffic considerations. A bridge with a sufficiency of 80 or less is eligible for Federal bridge rehabilitation funding. A bridge with a sufficiency rating of 50 or less is eligible for Federal bridge replacement funding.

- Structurally Deficient – The classification of structurally deficient is used to determine eligibility for Federal bridge replacement or rehabilitation funding. Bridges are classified as structurally deficient if they have a general condition rating for the deck, superstructure, substructure or culvert as 4 or less or if the road approaches regularly overtop due to flooding. A general condition rating of 4 means that the component rating is described as poor. The fact that a bridge is structurally deficient does not imply that it is unsafe. A structurally deficient bridge typically needs maintenance and repair and eventual rehabilitation or replacement to address deficiencies.

- Functionally Obsolete – A functionally obsolete bridge is one that was built to standards that does not meet the minimum Federal clearance requirements for a new bridge. These bridges are not automatically rated as structurally deficient, nor are they inherently unsafe. Functionally obsolete bridges include those that have sub-standard geometric features such as narrow lanes, narrow shoulders, poor approach alignment or inadequate vertical under clearance. This classification is also a term used as a priority status for Federal bridge replacement or rehabilitation funding eligibility.

APPENDIX M

I-35 Bridge Replacement Data															
									Bridge Inspection Ratings (2020 NBI)						
NBI	Location	Bridge Description	Design Speed (mph)	ADT(2020) (Vehicles per Day)	Future ADT(2040) (Vehicles per Day)	Year of Construction	Deck Width (')	Clear Roadway Width (')	Deck	Superstructure	Substructure	Sufficiency Rating	Posted Vertical Clearance (')	F.O/S.D.
24169	I-35 (SE 25th St. Over)	79'-91' Continuous Plate Girder Spans w/ 2-10' Sidewalks & Retaining Wall	60	4,000	6,400	1996	86	64	7	8	7	94	16' 2"	No
23634	I-35 (SE 20th St. Over)	2-80' Continuous Plate Girder Spans SK. 83 DEG. 59' 54"	60	500	800	1994	72	50	7	8	7	89	16' 4"	No
23635	I-35 (SE 15th St. Over)	2-86' Continuous Plate Girder Spans SK. 69 DEG. 69' 59"		5,000	8,000	1994	96	74	7	7	7	93	16' 4"	No
22650	I-35 (Utility Bridge Over)	2-78' Continuous Plate Girder Spans		114,800	183,680	1990	9	9	7	7	7	-2	16' 4"	No
14239	I-35 CL RCB	2-10'x6'x250' RCB SK 60 DEG.	60	136,800	218,880	1959	NA	NA				83	NA	No
21335	I-35 NB (BNSF RR Under)	75'-100'-75' P.C. Beam Spans SK. 62 DEG. 44' 56.13"	60	67,950	108,720	1986	70	68	7	7	5	86	23' 1"	No
21708	I-35 SB (BNSF RR Under)	75'-100'-75' P.C. Beam Spans SK. 60 DEG. 57'11"	60	68,400	109,440	1987	71	68	6	7	5	86	23' 1"	No
21723	I-35 SB (Oklahoma River)	101',4-100',2-100',101' Prestressed Conc. Beam Spans SK. 73 DEG.	50	68,400	109,440	1987	70	68	5	5	5	80		No (*Shoulder Width)
21356	I-35 NB (Oklahoma River)	101',4-100',2-100',101 Prestressed Conc. Beam Spans SK. 74 DEG.	50	67,950	108,720	1986	70	68	5	5	5	77		No (*Shoulder Width)
27869	I-35 SB / I-40 WB (Eastern Under)	46.25'-98'-46.25' P.C. Beam Spans	50	60,350	96,560	2000	86	83	7	8	6	96	16' 11"	No
26296	I-35 NB / I-40 EB (Eastern Under)	46.25'-98'-46.25' P.C. Beam Spans	50	60,350	96,560	2000	86	83	7	8	6	96	16' 11"	No
22096	I-35 Ramps S-W-N (I-35 E-S/I-40 WB Under)	(146'-122'-132' Cont.) (203'-231' Cont.) 110' Plate Girder Var. Skew, 4.5 DEG. LT Curve	50	25,000	40,000	1988	71	68	6	7	7	85		No
28603	I-35 NB Ramp S-W (I-35 SB Ramp E-S Under)	100'-150'-100' Plate Girder Spans w/ 29' CLR. RDY.	50	1,000	1,600	2016	32	29	7	8	8	98		No
21722	I-40 EB (I-35 S-W/I-35 E-S Under)	160',2-205',142' Continuous Plate Girder Spans East End SK.45 DEG.	50	96,500	154,400	1987	95	92	7	7	7	82	17' 2"	No
28602	I-35 NB Ramp S-W (I-40 WB Under)	140'-212.5'-140' Plate Girder Spans w/ 29' CLR. RDY. and F-Shaped Parapet	50	1,000	1,600	2016	32	32	7	8	8	99		No
22423	I-235 SB (I-40/Reno/RR/I-235 Ramp Under)	103', 201', 146', 190', 159', 154', 155', (157',2-147' Continuous)70', 132'(3-97', 56', 97') PL Girder Spans	50	43,750	70,000	1989	59	56	7	7	7	91	16' 10"	No
28509	I-235 SB Ramp #17 (I-40 WB Under)	135', 180', 105' Continuous Plate Girder Spans x 29' CLY RDWY	50	37,400	59,840	1989	32	29	7	7	7	93		No
21912	I-40 EB (Creek Under)	4-12'x10'x651' to 3-12'x10'x270' RCB Skew Varies		107,300	171,680	1988		108	N	N	N	83		No

APPENDIX M

I-35 Bridge Replacement Data															
									Bridge Inspection Ratings (2020 NBI)						
NBI	Location	Bridge Description	Design Speed (mph)	ADT(2020) (Vehicles per Day)	Future ADT(2040) (Vehicles per Day)	Year of Construction	Deck Width (')	Clear Roadway Width (')	Deck	Superstructure	Substructure	Sufficiency Rating	Posted Vertical Clearance (')	F.O/S.D.
28601	Lincoln/Byers (I-40/Ramps T-S-O Under)	128'-123.75'-123.75'-120.5'-95' Spans	30	5,000	8,000	2011	67	52	7	9	8	84	31' 5"	No
28598	I-40 WB To BLVD. (I-235 Ramp N-W/UPRR Under)	61'-(83.4'-103' Continuous)-58'-(111'-109.5' Continuous)-69.75' Plate Girder Spans 38' CLR. RDY. w/ F-Shaped Rails	50	1,000	1,600	2016	38	38	7	8	8	99		No
28597	Boulevard EB Ramp (I-40/I-235 Ramp N-W Under)	(99'-73'-81'), (95'-111.6',139',76.6') Continuous Steel Spans w/ F-Shape Rails & Closed Median	50	500	800	2016	65	62	7	8	8	98		No
28599	I-235 Ramp N-W (Drainage/Slope Under)	110' Plate Girder Span 29' CLR. RDY. w/ F-Shape Rails	50	1,000	1,600	2016	32	29	7	8	8	100		No
27828	I-40 EB (Bricktown Canal EXT.)	85' Conc Box Girder Span w/ 86.5' CLR. RDY. w/ Conc Parapets		53,650	85,840	2007	90	86	7	8	8	98		No
27829	I-40 WB (FUT. Bricktown Canal EXT.)	85' Conc Box Girder Span w/ 104.6' CLR. RDY. w/ Conc Parapets		54,000	86,400	2007	107	100	7	9	8	98		No
28508	I-235 SB Ramp #5 (Reno Ave Under)	70', 3-105.75' Continuous Plate Girder Spans w/ 29' CLR. RDY.	50	37,400	59,840	1989	32	29	7	7	6	84	15' 5"	No
28600	I-235 N-W To BLVD. (Reno Sheridan Ave. Under)	(120'-150'-120'-Cont.),(120'-120'-Cont.),120',97',100',108' Simply Supported Plate Girder Spans On A Curve w/ 29' CLR. RDY. & F-Shaped Rails	50	1,000	1,600	2016	32	29	7	8	8	100		
22421	I-235 NB (Reno/BNSF RR/I-235 Ramp Under)	2-95'(198'-174'-118')(4-123')(78'-78'-78'-65'-96' Continuous) Plate Girder, VAR. Skew, Partly Curved	50	43,500	69,600	1989	71	67	7	7	6	98	21' 3"	No
22419	I-235 NB (Lincoln/I-235 Ramp/BNSF RR Under)	97'-125'-161'-63'-134'-125'-94'-86'-96'- Continuous Plate Girder Spans	60	40,100	64,160	1989	59	56	6	6	6	96	19' 2"	No
22418	I-235 SB (Lincoln/I-235 Ramp/BNSF RR Under)	97'-101'-148'-157'-144'-126'-94'-101' Continuous Plate Girder Spans	60	40,350	64,560	1989	71	68	6	6	7	97	19' 2"	No
28267	I-235 NB Off Ramp (Median/Ditch Under)	100'-102' Continuous Plate Girder Spans w/ Slope Faced Parapets	45	37,700	60,320	1989	28	25	6	7	5	82		No
22343	I-235 (NE 4th St. Under)	120' Plate Girder Span SK. 50 DEG. 14'	60	80,700	129,120	1989	120	114	7	7	6	82	16' 9"	No

Bridge Data from 2022 NBI over Oklahoma River

	I-35 NB	**I-35 SB**
Year Constructed	1986	1987
Travel Lanes	Five 12-foot lanes	Five 12-foot lanes
ADT (2020)	67,950	68,400
Design Load	MS 18 (Metric); H 20 (English)	MS 18 (Metric); H 20 (English)
Median	Open median	Open median
History	Bridge is not eligible for the National Register of Historic Places	Bridge is not eligible for the National Register of Historic Places
Material and/or design	Prestressed concrete	Prestressed concrete
Type of design and/or construction	Concrete continuous	Concrete continuous
Structure length	244.4 meters; 803 feet	244.4 meters; 803 feet
Roadway width	20.7 meters; 68 feet	20.7 meters; 68 feet
Condition rating – deck, superstructure, and substructure	5 FAIR CONDITION - all primary structural elements are sound but may have minor section loss, cracking, spalling or scour.	5 FAIR CONDITION - all primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
Type of work proposed	Replacement of bridge or other structure because of substandard load carrying capacity or substandard bridge roadway geometry.	Replacement of bridge or other structure because of substandard load carrying capacity or substandard bridge roadway geometry.
Inspection date	July 2020	July 2020
Inspection frequency	24 months	24 months
STRAHNET Highway Designation	Yes, Interstate STRAHNET route.	Yes, Interstate STRAHNET route.
Average Daily Truck Traffic	12% , 8,154	12%, 8,208
Designated National Network	Yes, is part of the national highway freight network (NHFN)	Yes, is part of the national highway freight network (NHFN)
2040 ADT (from NBI)	108,720	109,440
2030 ADT (From Stakeholder Presentation)	73,800	73,800
2040 ADT (From Stakeholder Presentation)	92,965	92,965

Oklahoma Dept. of Transportation - Bridge Inspection Report

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	
21356	5515 0566EX	-1	76.70	ND

IDENTIFICATION

Bridge Description:
101ft.,4(100ft.),2-100ft.,101 PRESTRESSED CONC BM SPANS SK. 74 DEG.

1. State: Oklahoma
2. Division: Division 4
3. County: OKLAHOMA
4. City: OKLA. CITY
Admin Area: Unknown
5a. On/Under: Route On Structure
5b. Kind of Hwy: Interstate Hwy
5c. Lvl of Srvc: Mainline
5d. Route No.: 00035
5e. Dir. Sufx: N/A (NBI)

7. Facility Carried : I-35 N.B.
6. Feat. Intersect: OKLAHOMA RIVER
9. Location: 5.6 MI N CLEVELAND CO
11. Mile Post: 5.677 mi
13. LRS Inv. / Sub Rte: 5500015H / 00
16. Latitude: 35° 27' 36.09"
17. Longitude: 097° 29' 29.41"
98. Border Brdg: Unknown (P)
% Responsible: 0.00
99. Border Brdg #: Unknown

INSPECTION

Type	Insp. Req.	Insp. Done	Freq.	Insp. Date	Next Insp.
NBI:		1	24 months	6/30/2022	06/30/2024
FC:	N	0		NA	NA
UW:	N	0		NA	NA
OS:	N	0		NA	NA

CLASSIFICATION

12.Base Hwy Net.: On Base Network
20. Toll Facility: On free road
21. Custodian: State
22. Owner: State
26. Function Class: 11 Urban Interstate
37. Historical Sig.: Not eligible for NRHP
100. Def. Hwy: On Interstate STRAHNE

101. Parallel Str.: Right of || bridge
102. Traffic Dir.: 1-way traffic
103. Temp. Str.: Not Applicable (P)
104. Hwy System: On the NHS
105. Fed Land Hwy: N/A (NBI)
110. Defense Hwy: On Interstate STRAHNE
112. NBIS Length: Long Enough

STRUCTURE TYPE AND MATERIALS

43a/b. Main Span: P/S Conc. / Stringer/Girder
44a/b. Appr. Span: Unknown / Unknown (P)
45. # of Main Spans: 8
46. # of Appr. Spans: 0
107. Deck Type: Concrete-Cast-in-Place
108a. Wearing Surface: Monolithic Concrete
108b. Membrane: Unknown
108c. Deck protection: Epoxy Coated Reinforci

CONDITION

58.Deck: 5 Fair
59.Sup.: 5 Fair
60.Sub: 5 Fair
62.Culvert: N/A (NBI)
61.Chan./Chan. Prot.: 8 Protected

Flowline Notes
FL = 34' AT CENTER OF CHANNEL, W.SIDE, TOP OF PARAPET

AGE AND SERVICE

19. Detour Length: 0.1 mi
27. Year Built: 1986
28a/b. Lanes on/und: 4 / 0
29. ADT: 67,950
30. Year of ADT: 2020
42a/b. Type of Svc on/und: Highway / Waterway

106. Year Reconst.:
109. Truck ADT: 12%

LOAD RATING AND POSTING

31. Design Load: MS 18 (HS 20)
41. Post. Status: A Open, no restriction
70. Posting: 5 At/Above Legal Loads
Date Rated: 06/03/2020
63.Op / 65.Inv. Rating Meth.: 1 LF Load Factor / 1 LF Load Factor

	H	HS	3-3	EV3	SHV
64. Operating Rating (tons):	34.30	49.10	64.20	43.50	50.50
66. Inventory Rating (tons):	17.40	26.00	32.50	24.40	

GEOMETRIC DATA

10. Vert. Clearance: 99.99 ft
32. Appr Rwy Width: 68.00 ft
33. Median: Open median
34. Skew: 7.00°
35. Struct. Flared: Yes, flared
47Horizontal Clr: 68.00 ft
48. Length Max Span: 101.00 ft
49. Struct. Length: 802.00 ft

50a. Curb/Sdwlk Width L: 0.00 ft
50b. Curb/Sdwlk Width R: 0.00 ft
51. Width Curb to Curb: 68.00 ft
52. Width Out to Out: 70.00 ft
Deck Area: 56,140.09 sq. ft
53. Min.Vert.Cl.Ovr Brg: 99.99 ft
54a.Min.Vt.Undclr.Ref.: N Feature not hwy c
54b. Min. Vert. Undclr.: 0.00 ft
55a. Min.Lat.Undclr.Ref: N Feature not hwy
55. Min.Lat.Underclr. R: 0.00 ft
56. Min.Lat.Underclr. L: 0.00 ft

APPRAISAL

36a. Brdg Rail: 1 Meets Standards
36b. Transition: 1 Meets Standards
36c. Appr. Rail: 1 Meets Standards
36d. Appr.Rail Ends: 1 Meets Standarc
67. Str Evaluation: 5 Above Min Tolera

68. Deck Geom.: 6 Equal Min Criteria
69. Vert./Horiz. Undclr: Not applicable (NB
71. Waterway Adeq: 8 Equal Desirable
72. Appr. Alignment: 8 Equal Desirable Crit
113. Scour Critical: 8 Stable Above Footin

PROPOSED IMPROVEMENTS

94. Bridge Cost: $5,330,838
95. Roadway Cost: $4,500,000
96. Total Cost: $10,387,301
97. Yr.of Cost Est.: 2015

75. Type of Work: 31 Repl-Load Capacity
76. Lngth of Improvement: 802.0 ft
114. Future ADT: 108,720
115. Yr.of Future ADT: 2040

NAVIGATION DATA

38. Nav. Control: Permit Not Required
39. Vert. Clearance: 0.0 ft
40. Horiz. Clearance: 0.0 ft

111. Pier Protect.: 1 Not Required
116. Lift Bridge Vert. Clr.: 0.0 ft

OKLAHOMA ITEMS

200c. Temperature: 93
200d. Weather: Clear
201. Struc.Stl. ASTM Desig.: A-36 / 20
202. Waterprf.Membrane: -1
Date Installed: 01/01/1901
203. Type Exp. Device: Sealed Expansion Joint
Pourable _
204. Type of Railing: SFP-1
205. Material Quantity: 136.00
208a. Type of Abutment: Skeleton
b. Type of Found.: Steel Piling
209. Type of Pier/Found.: 3 / No
Drilled Shaft-No Footing
210. Foundation Elev.: -1.00 -1.00 -1.00 -1.00 -1.00
211. Wear.Surf.Prot.Sys: Silane
Date Installed: 01/01/1901
211c. Silane Reapplied
211d. Date :
213. Utilities Attached: Power

214a. Posted Weight Limit: NR
b. Posted Speed Limit: 60
c. Narrow/1way Brdg Sign: No
d. Vertical Clr. Sign: No
Adv. Warning Sign: No
e. Navigation Lights?: No
Working/Not Working: NA
215. Overpass: INTERSTATE
218. Functionally Obsolete : -
220. Bridge Redecked _
221. Substr.Cond.(U/W):
222. Fill Over RCB:
223. Appr.Slab/Rwy Cond.: 3
225. Paint Type/Ovrct: N/A
226. Date Painted:
227. Paint Color: -1
233. Deck Forming: Conventional Forming
238. School Bus Rte.: Current & Desired route
240. Appr. Rwy Type.: Concrete
243. Grdr Spacing/No.: / 9

244. Span Lengths: 101 100 100 100 100 100 100 100 101
245. Girder Depth:
246a. Type of Ovelay: NA
b. Overlay Thickness: 0.00
c. Overlay Date: 01/01/1901
d. Ovly Depth Changed >1": N
247. Protective Systems: DPWR/Epoxy Coated Ba
248. # Field Splices w/ Corrosion:
249. Scour Crit. POA Exists?: No
250. Headwall:
258. Plans w/Found.in ODOT File: _
259. Scour Eval. in ODOT File: _
263. Interchange at Intersection: No
264. Interstate Milepoint: 126.47

Oklahoma Dept. of Transportation - Bridge Inspection Report

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	
21356	5515 0566EX	-1	76.70	ND

Inspection Date: 6/30/22 Mark Peterman

Invoice No.: MP - 4B - 22 Inspected With: Keith Bennett

BRIDGE NOTES:

INSPECTION NOTES: **6/30/22**

NOTE:INSP.W/SNOOPER.
PX- The SE & the NE approach rail ends need to be updated to meet safety standards.
* Overhead clearance to highway traffic sign = 18.6' * Good riprap on the river banks (some damage 150' west of the structure) * Light poles on the East side only * PX- needs slopewalls added on each abutment * Channel is clear & under spans #2 thru #7 * The girder end blocks at bents #2, 3, & 4 are cracking & spalling but they are not into the beams themselves YET * Structure needs joint repairs ASAP!
8/31/2017 - EXPOSED PILES AT ABUTMENTS HAVE BEEN COVERED - SUB RATING REVISED TO A '5'(G HINES) *

ELEMENT CONDITION STATE DATA

Elem. / Env	Description	Unit	Total Qty	% 1	Qty. 1	% 2	Qty. 2	% 3	Qty. 3	% 4	Qty. 4
12 / 4	Re Concrete Deck	sq.ft	54,536.00	91%	49,536.00	9%	5,000.00	0%	0.00	0%	0.00
	FX - MOD. MAP & TRANS. CRACKING THR. Initial wear in wheel lanes w/ exposed aggregate. Numerous small to moderate spalls along joint armor at BENTS # 1, 5, 6 & 7.										
109 / 4	Pre Opn Conc Girder/Beam	ft	6,408.00	100%	6,383.00	0%	25.00	0%	0.00	0%	0.00
	FX - Some minor to moderate damage on the outer beams in span # 3 & BM. 8 @ BENT 6. from equipment used on the MAPS project. No exposed steel noted (photo). MINOR SPALLING & MOD./SEV. CRACKING @ LINKAGE BLOCKS.										
205 / 4	Re Conc Column	each	22.00	82%	18.00	14%	3.00	5%	1.00	0%	0.00
	FX: MINOR/MOD. SPALL W/EXPOSED REBAR & VERT. CRACKING @ P.5.CENTER COL. (LACK OF CON. COVER.) Minor spall/DELAM. near the ground line on # 3 in bent # 2 (photo). Some minor cracking noted on # 2, 3, & 4 in bent # 7 where the form support holes were grouted in - not serious. MINOR SPALL @ P. 2, COL. 1. MINOR VERT. CRACKING @ P. 7, COL. 1.										
215 / 4	Re Conc Abutment	ft	188.00	89%	168.00	11%	20.00	0%	0.00	0%	0.00
	Some minor cracking in scattered areas on each abutment mainly near the lower corners of some pedestals. Some cracks have minor staining & efflorescence. There are some light vertical cracks above the seat on the North abutment. The pedestals on the North have some minor separation from the backwall - not serious (photo). Solid overall. MINOR DELAM. @ N. ABUT.										
234 / 4	Re Conc Pier Cap	ft	517.00	92%	477.00	8%	40.00	0%	0.00	0%	0.00
	FX - Hairline vertical/horizontal cracks exist on each cap mainly near the upper edge of the seats at the corners of BENT # 1, 2, 5 & 8. & the light pedestals due to cantilever effects (see close-up photo). Not serious at this time. P. 1, W/EFFL.										
310 / 4	Elastomeric Bearing	each	154.00	90%	139.00	10%	15.00	0%	0.00	0%	0.00
	FX - Some minor deformation noted on some pads at each abutment.										
331 / 4	Re Conc Bridge Railing	ft	1,604.00	87%	1,394.00	13%	210.00	0%	0.00	0%	0.00
	FX - Light vertical cracking every 6ft. to 8ft. in rail on each side. Some minor traffic damage noted in a few areas. The water-proof coating is peeled & failing all areas.										
819 / 4	PS Conc.Gird.End(5Ft	(LF)	810.00	94%	760.00	6%	45.00	1%	5.00	0%	0.00
	FX: MINOR SPALLS @ P. 5, BM. 1, 3, 5 & 9 & P. 1, BM. 1 & 9.										
859 / 4	Soffit	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00
	FX - MINOR TRANS. CRACKING W/EFFL. Less than 2% of the total area is distressed - mainly below curbs near the expansion joints. No steel noted.										
906 / 4	Sealed Exp.Jt.(SEJ-3	(LF)	340.00	94%	320.00	6%	20.00	0%	0.00	0%	0.00
	PX: REMOVE DEBRIS.										
909 / 4	Pourable Fix Jt.Seal	(LF)	340.00	75%	255.00	25%	85.00	0%	0.00	0%	0.00
	NOTE: SEJs @ THE ABUTS. WERE TURNED INTO POURABLE JOINTS. CON. JOINTS ARE NOT FULL DEPTH.										
916 / 4	St.Bearing Assembly	(LF)	154.00	64%	99.00	36%	55.00	0%	0.00	0%	0.00
	FX: S. ABUT. BM. 7 & 8 HAVE SHEARED ANCHOR BOLTS & N. ABUT., BMS. 1, 4, 12 & 13.										
958 / 4	Concrete Cracking SF	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00
	FX - Some moderate transverse cracks noted in spans # 4 & # 5. Also some minor pattern cracking present in a few other areas										
962 / 4	Super.Traffic Impact	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00
	FX - Some minor to moderate damage on the outer beams in span # 3 from equipment used on the MAPS project. No exposed steel noted (photo).										
973 / 4	Horizontal Force SF	(EA)	1.00	0%	0.00	0%	0.00	100%	1.00	0%	0.00
	FX: ANCHOR BOLTS ARE BENT OR SHEARED @ ABUTS. MOVEMENT IS TOWARDS PIERS.										

Oklahoma Dept. of Transportation - Bridge Inspection Report

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	
21723	5515 0566WX	-1	80.10	ND

IDENTIFICATION

Bridge Description:

101ft.,4-100ft.,2-100ft.,101ft. PRESTRESSED CONC BM SPANS SK. 73 DEG.

1. State: Oklahoma
2. Division: Division 4
3. County: OKLAHOMA
4. City: OKLA. CITY
Admin Area: Unknown
5a. On/Under: Route On Structure
5b. Kind of Hwy: Interstate Hwy
5c. Lvl of Srvc: Mainline
5d. Route No.: 00035
5e. Dir. Sufx: N/A (NBI)

7. Facility Carried : I-35 S.B.
6. Feat. Intersect: OKLAHOMA RIVER
9. Location: 5.7 MI N CLEVELAND CO
11. Mile Post: 5.659 mi
13. LRS Inv. / Sub Rte: 5500015HV / 00
16. Latitude: 35° 27' 27.89"
17. Longitude: 097° 29' 30.55"
98. Border Brdg: Unknown (P)
% Responsible: 0.00
99. Border Brdg #: Unknown

INSPECTION

Type	Insp. Req.	Insp. Done	Freq.	Insp. Date	Next Insp.
NBI:		1	24 months	6/30/2022	06/30/2024
FC:	N	0		NA	NA
UW:	N	0		NA	NA
OS:	N	0		NA	NA

CLASSIFICATION

12.Base Hwy Net.: On Base Network
20. Toll Facility: On free road
21. Custodian: State
22. Owner: State
26. Function Class: 11 Urban Interstate
37. Historical Sig.: Not eligible for NRHP
100. Def. Hwy: On Interstate STRAHNE

101. Parallel Str.: Left of || bridge
102. Traffic Dir.: 1-way traffic
103. Temp. Str.: Not Applicable (P)
104. Hwy System: On the NHS
105. Fed Land Hwy: N/A (NBI)
110. Defense Hwy: On Interstate STRAHNE
112. NBIS Length: Long Enough

STRUCTURE TYPE AND MATERIALS

43a/b. Main Span: P/S Conc. / Stringer/Girder
44a/b. Appr. Span: Unknown / Unknown (P)
45. # of Main Spans: 8
46. # of Appr. Spans: 0
107. Deck Type: Concrete-Cast-in-Place
108a. Wearing Surface: Monolithic Concrete
108b. Membrane: Unknown
108c. Deck protection: Epoxy Coated Reinforci

CONDITION

58.Deck: 5 Fair
59.Sup.: 5 Fair
60.Sub: 5 Fair
62.Culvert: N/A (NBI)
61.Chan./Chan. Prot.: 8 Protected

Flowline Notes

35' 2" W. SIDE, TOP OF PARAPET.

AGE AND SERVICE

19. Detour Length: 0.1 mi
27. Year Built: 1987
28a/b. Lanes on/und: 4 / 0
29. ADT: 68,400
30. Year of ADT: 2020
42a/b. Type of Svc on/und: Highway / Waterway

106. Year Reconst.:
109. Truck ADT: 12%

LOAD RATING AND POSTING

31. Design Load: MS 18 (HS 20)
41. Post. Status: A Open, no restriction
70. Posting: 5 At/Above Legal Loads
Date Rated: 06/03/2020
63.Op / 65.Inv. Rating Meth.: 1 LF Load Factor / 1 LF Load Factor

	H	HS	3-3	EV3	SHV
64. Operating Rating (tons):	30.70	48.20	58.00	46.50	50.80
66. Inventory Rating (tons):	18.40	28.80	34.70	27.80	

GEOMETRIC DATA

10. Vert. Clearance: 99.99 ft
32. Appr Rwy Width: 68.00 ft
33. Median: Open median
34. Skew: 16.00°
35. Struct. Flared: Yes, flared
47Horizontal Clr: 68.00 ft
48. Length Max Span: 101.00 ft
49. Struct. Length: 802.00 ft

50a. Curb/Sdwlk Width L: 0.00 ft
50b. Curb/Sdwlk Width R: 0.00 ft
51. Width Curb to Curb: 68.00 ft
52. Width Out to Out: 70.00 ft
Deck Area: 56,140.09 sq. ft
53. Min.Vert.Cl.Ovr Brg: 99.99 ft
54a.Min.Vt.Undclr.Ref.: N Feature not hwy c
54b. Min. Vert. Undclr.: 0.00 ft
55a. Min.Lat.Undclr.Ref: N Feature not hwy
55. Min.Lat.Underclr. R: 0.00 ft
56. Min.Lat.Underclr. L: 0.00 ft

APPRAISAL

36a. Brdg Rail: 1 Meets Standards
36b. Transition: 1 Meets Standards
36c. Appr. Rail: 1 Meets Standards
36d. Appr.Rail Ends: 1 Meets Standarc
67. Str Evaluation: 5 Above Min Tolera

68. Deck Geom.: 6 Equal Min Criteria
69. Vert./Horiz. Undclr: Not applicable (NB
71. Waterway Adeq: 7 Above Minimum
72. Appr. Alignment: 8 Equal Desirable Crit
113. Scour Critical: 8 Stable Above Footin

PROPOSED IMPROVEMENTS

94. Bridge Cost: $5,330,838
95. Roadway Cost: $4,500,000
96. Total Cost: $10,387,301
97. Yr.of Cost Est.: 2015

75. Type of Work: 31 Repl-Load Capacity
76. Lngth of Improvement: 802.0 ft
114. Future ADT: 109,440
115. Yr.of Future ADT: 2040

NAVIGATION DATA

38. Nav. Control: Permit Not Required
39. Vert. Clearance: 0.0 ft
40. Horiz. Clearance: 0.0 ft

111. Pier Protect.: 1 Not Required
116. Lift Bridge Vert. Clr.: 0.0 ft

OKLAHOMA ITEMS

200c. Temperature: 88
200d. Weather: Clear
201. Struc.Stl. ASTM Desig.: A36 / 20
202. Waterprf.Membrane: -1
Date Installed: 01/01/1901
203. Type Exp. Device: Sealed Expansion Joint
Pourable
204. Type of Railing: SFP-1
205. Material Quantity: 141.00
208a. Type of Abutment: Skeleton
b. Type of Found.: Steel Piling
209. Type of Pier/Found.: 3 / No
Drilled Shaft-No Footing
210. Foundation Elev.: -1.00 -1.00 -1.00 -1.00 -1.00
211. Wear.Surf.Prot.Sys: Silane
Date Installed: 01/01/1901
211c. Silane Reapplied
211d. Date :
213. Utilities Attached: Power

214a. Posted Weight Limit: NR
b. Posted Speed Limit: 60
c. Narrow/1way Brdg Sign: No
d. Vertical Clr. Sign: No
Adv. Warning Sign: No
e. Navigation Lights?: No
Working/Not Working: NA
215. Overpass: INTERSTATE
218. Functionally Obsolete : -
220. Bridge Redecked _
221. Substr.Cond.(U/W):
222. Fill Over RCB:
223. Appr.Slab/Rwy Cond.: 3
225. Paint Type/Ovrct: N/A
226. Date Painted:
227. Paint Color: -1
233. Deck Forming: Conventional Forming
238. School Bus Rte.: Current & Desired route
240. Appr. Rwy Type.: Concrete
243. Grdr Spacing/No.: / 9

244. Span Lengths: 101 100 100 100 100 100 100 100 101
245. Girder Depth:
246a. Type of Ovelay: NA
b. Overlay Thickness: 0.00
c. Overlay Date: 01/01/1901
d. Ovly Depth Changed >1": N
247. Protective Systems: DPWR/Epoxy Coated Ba
248. # Field Splices w/ Corrosion:
249. Scour Crit. POA Exists?: No
250. Headwall:
258. Plans w/Found.in ODOT File: _
259. Scour Eval. in ODOT File: _
263. Interchange at Intersection: No
264. Interstate Milepoint: 126.47

Oklahoma Dept. of Transportation - Bridge Inspection Report

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	
21723	5515 0566WX	-1	80.10	ND

Inspection Date: 6/30/22 Mark Peterman

Invoice No.: MP - 4B - 22 Inspected With: Keith Bennett

BRIDGE NOTES:

INSPECTION NOTES: **6/30/22**

NOTE:INSP.W/SNOOPER.
PX- There's heavy erosion along the SW wing from a failed curb drain & it's causing the footing for a light pole to be exposed up to 3.5'. The pole could fall into traffic if not repaired ASAP! Also the SW wing & shoulder are being undermined as well.
The channel is clean & under spans # 3 thru 7 * The girder end blocks at bents #2, 3, & 4 are cracking & spalling - not into beams themselves at this time.

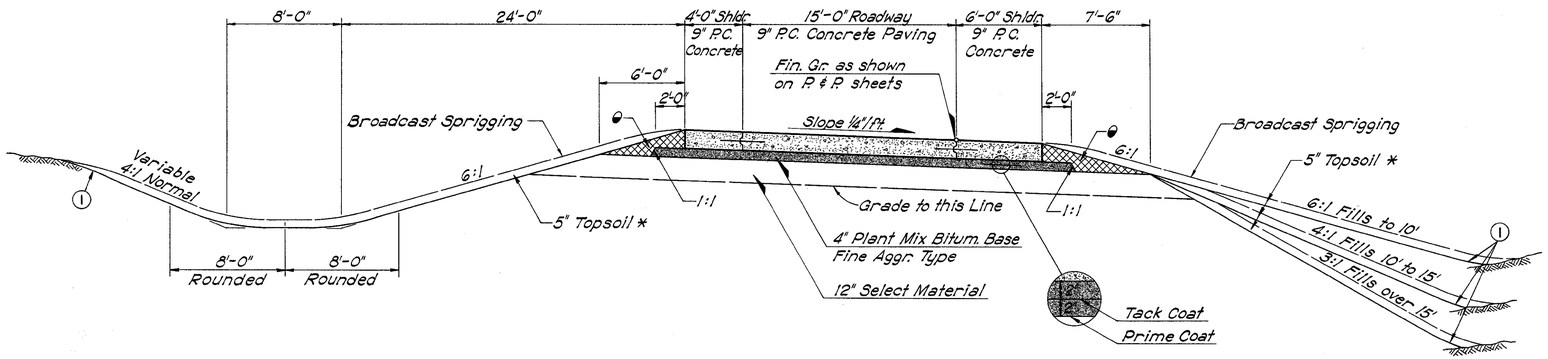
ELEMENT CONDITION STATE DATA

Elem. / Env	Description	Unit	Total Qty	% 1	Qty. 1	% 2	Qty. 2	% 3	Qty. 3	% 4	Qty. 4
12 / 4	Re Concrete Deck	sq.ft	54,536.00	90%	49,081.00	10%	5,455.00	0%	0.00	0%	0.00
	FX: MOD. MAP & TRANS. CRACKING THR. Light wear in wheel lanes w/ exposed aggregate.										
109 / 4	Pre Opn Conc Girder/Beam	ft	6,318.00	100%	6,303.00	0%	15.00	0%	0.00	0%	0.00
	FX - MOD./SEV. SPALL TO LINKAGE BLOCK @ P. 2. BM. 3. Some light to moderate chipped areas on lower edges of a few girders in spans # 3 & 8 (photo). MOD.CRACKING TO LINKAGE BLOCKS.										
205 / 4	Re Conc Column	each	22.00	95%	21.00	5%	1.00	0%	0.00	0%	0.00
	FX: MOD./SEV. VERT. CRACKING @ P. 5. W. COL.										
215 / 4	Re Conc Abutment	ft	175.00	74%	129.00	22%	38.00	5%	8.00	0%	0.00
	FX: PED. WERE PATCHED THR. Pedestals at both abutments are cracking and spalling from bearing anchor movement (photo). Some small to moderate cracks noted on several other pedestals on the South abutment from the same cause. A few very small spalls noted on the lower edge of the North abutment as well. Some minor cracking exists on each abutment in scattered areas. Most North pedestals have minor separation at the backwall. 8/31/2017 - SPALL ON #11 AT NORTH HAS BEEN REPAIRED (G HINES).										
234 / 4	Re Conc Pier Cap	ft	518.00	94%	489.00	5%	26.00	1%	3.00	0%	0.00
	FX - MINOR SPALL W/EXPOSED REBAR @ P. 7. Small spall on West end of bent # 1 cap w/ rust developing on EPOXY-COATED steel (photo). Each cap has very light vertical/diagonal cracks developing at the corners of the light pedestals & some girder pedestals due to the cantilever forces above the outer piers. (None serious at this time.)										
301 / 4	Pourable Joint Seal	ft	544.00	63%	344.00	37%	200.00	0%	0.00	0%	0.00
	NOTE: SEJs @ ABUTS WERE TURNED INTO POURABLES. CON. JOINTS ARE NOT FULL DEPTH.										
310 / 4	Elastomeric Bearing	each	152.00	91%	138.00	9%	14.00	0%	0.00	0%	0.00
	PX - Almost every anchor on the South abutment is BROKEN due to movement (photo) - all need re-anchored to keep them on the pedestals. 5 are broken on the North abutment also. Some minor pad deformation noted. ALSO SOME BROKEN BOLTS AT PIER 1.										
331 / 4	Re Conc Bridge Railing	ft	1,604.00	90%	1,449.00	10%	155.00	0%	0.00	0%	0.00
	FX - Light vertical cracking every 5ft. to 6ft. on West rail w/ some light damage noted. The waterproof coating is peeling & failing in most areas.										
924 / 4	Conc Rail Prot Coat	(SF)	6,500.00	0%	0.00	100%	6,500.00	0%	0.00	0%	0.00
819 / 4	PS Conc.Gird.End(5Ft	(LF)	900.00	97%	875.00	2%	20.00	1%	5.00	0%	0.00
	FX - Spalling on the North end of the West beam in span # 1 w/ rebar & strands visible (photo).Some minor cracking of end caps on each end of 1, 2 & 3. MINOR SPALL @ P. 5, BM. 1 & P. 1, BM. 1. MINOR CRACKING @ P. 7, BM. 1, P. 6, BM. 1. MINOR DIAG. CRACKING FROM FABR.										
859 / 4	Soffit	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00
	FX: Minor stains. cracking. & delaminations noted below curbs at each joint. Less than 2% of total area affected. Some cracks w/ light efflorescence also noted on inner areas of spans # 4 & 6 . OUTER EDGES HAVE MOD. SPALLING W/EXPOSED REBAR AND COULD POSIBLY FALL ONTO BOATERS IN OK RIVER.										
906 / 4	Sealed Exp.Jt.(SEJ-3	(LF)	272.00	0%	0.00	100%	272.00	0%	0.00	0%	0.00
	FX - FULL OF DEBRIS.										
916 / 4	St.Bearing Assembly	(LF)	152.00	0%	0.00	100%	152.00	0%	0.00	0%	0.00
	-1										
958 / 4	Concrete Cracking SF	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00
	FX - Light to moderate pattern cracking noted in almost all spans. Some moderate transverse cracks noted in a few areas.										
962 / 4	Super.Traffic Impact	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00
	FX - Some damage to a few beams in spans # 3 & 8 along the lower edges. Caused by heavy equipment used for the Oklahoma River project (no road under structure). No steel exposed - none serious at this time.										
968 / 4	Erosion SF	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00
	FX - EROSION at light pole located at s.w. corner. needs repaired & ABUT. N. E. CORNER.										

APPENDIX N -
Existing Typical Sections and Curve Information

FED. ROAD DIST. NO.	STATE	F.A. PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	OKLA.	I-235-1(019)		5	113

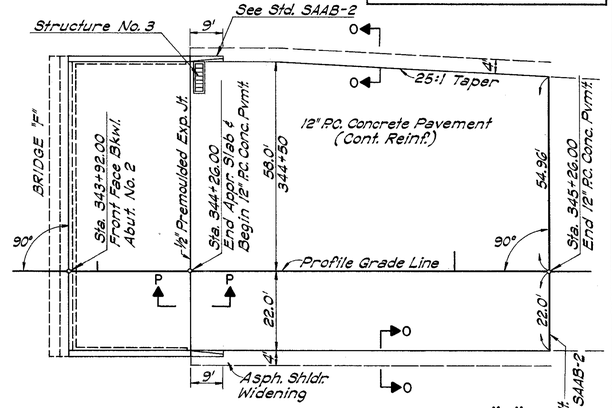
REVISIONS	
DESCRIPTION	DATE



TYPICAL GRADING & SURFACING SECTION

STA. 337+20.00 TO STA. 345+66.78 LINE 3
STA. 337+20.00 TO STA. 342+37.50 LINE 4

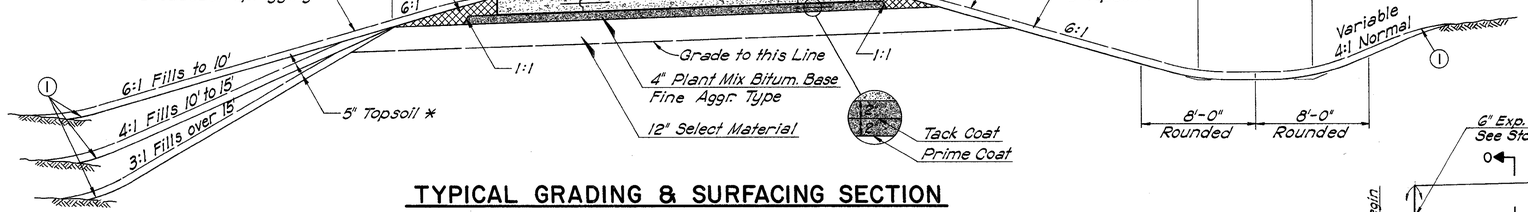
SECTION F-F



P.C. CONCRETE PAVEMENT AT END OF BRIDGE "F"

NOTES:
- See Backfill Note, Sheet No. 3
- * See Topsoil Note, Sheet No. 3
- (1) See Rounding Note, Sheet No. 3

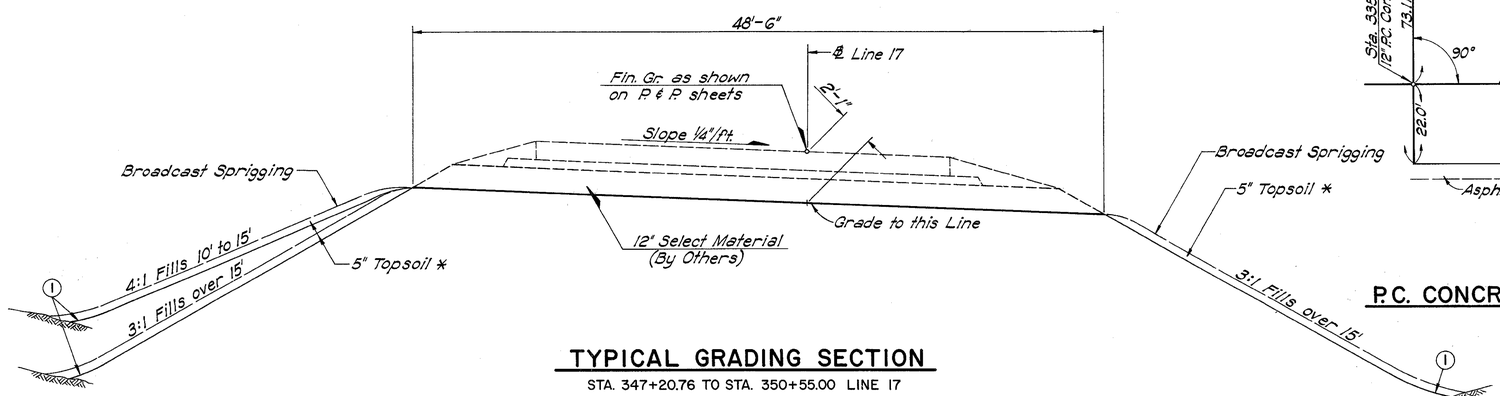
For Sections O-O & P-P see Sheet No. 4



TYPICAL GRADING & SURFACING SECTION

STA. 338+43.49 TO STA. 347+51.43 LINE 16

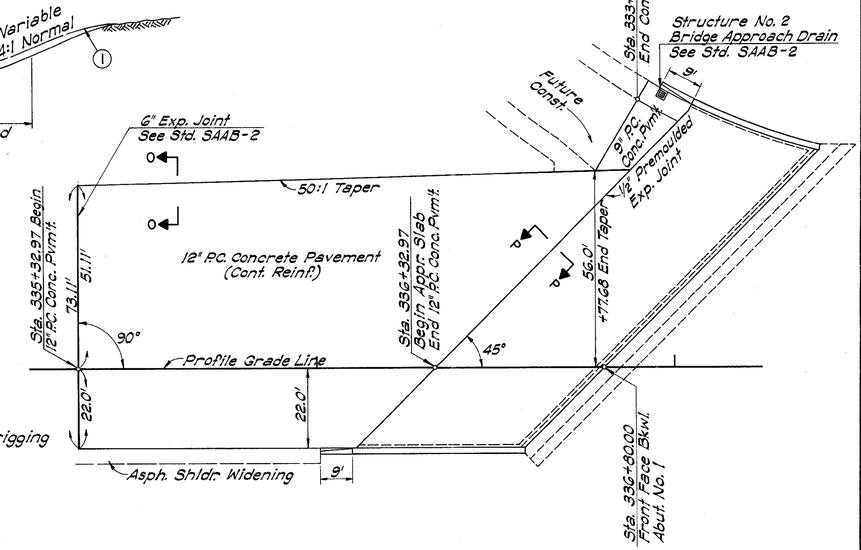
SECTION G-G



TYPICAL GRADING SECTION

STA. 347+20.76 TO STA. 350+55.00 LINE 17

SECTION H-H



P.C. CONCRETE PAVEMENT AT BEGINNING OF BRIDGE "F"

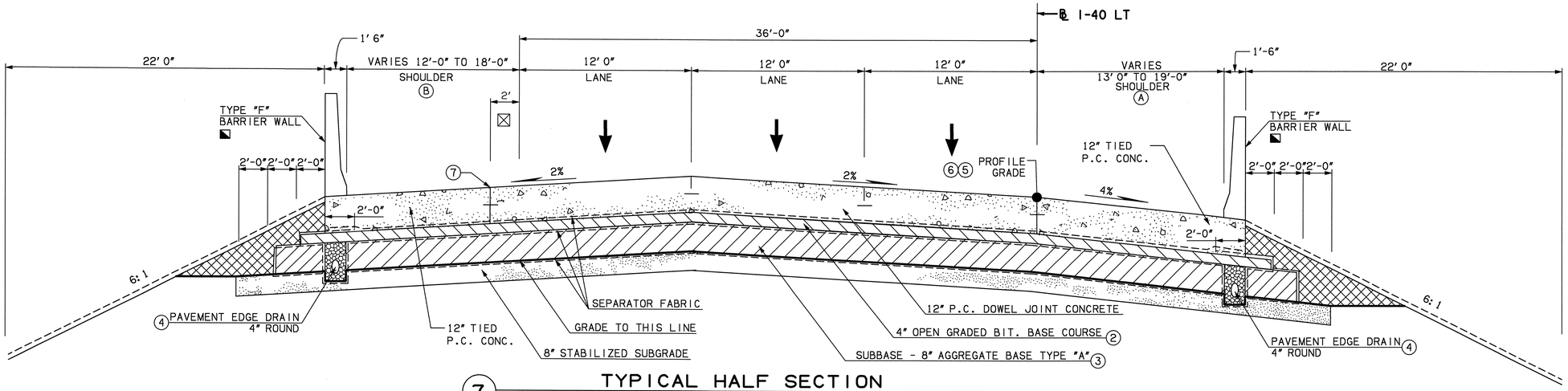
Design		
Drawn		
Checked		
Approved		
Squad		

TYPICAL SECTIONS

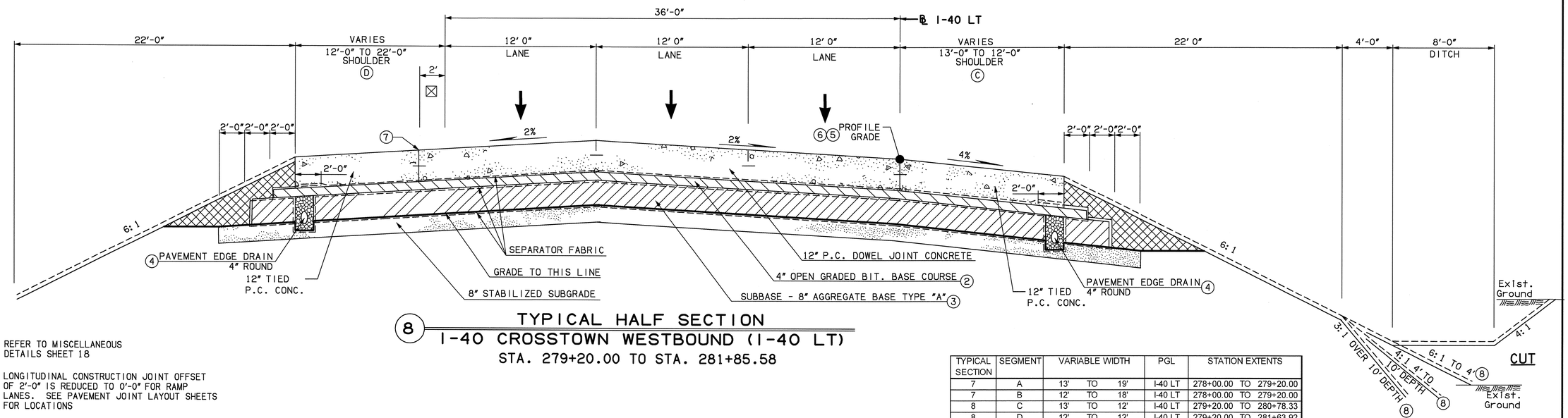
F. A. Project No. I-235-1(019) Sheet No. 5

6/15/2010

FED. ROAD DIST NO	STATE	J/P PROJ NO	FISCAL YEAR	SHEET NO	TOTAL SHEETS
6	OKLA	17428(34)	03	6	484



7 TYPICAL HALF SECTION
I-40 CROSSTOWN WESTBOUND (I-40 LT)
STA. 271+00.91 TO STA. 279+20.00



8 TYPICAL HALF SECTION
I-40 CROSSTOWN WESTBOUND (I-40 LT)
STA. 279+20.00 TO STA. 281+85.58

TYPICAL SECTION	SEGMENT	VARIABLE WIDTH	PGL	STATION EXTENTS
7	A	13' TO 19'	I-40 LT	278+00.00 TO 279+20.00
7	B	12' TO 18'	I-40 LT	278+00.00 TO 279+20.00
8	C	13' TO 12'	I-40 LT	279+20.00 TO 280+78.33
8	D	12' TO 12'	I-40 LT	279+20.00 TO 281+63.92
8	D	22' TO 19'-7"	I-40 LT	281+63.92 TO 281+85.58

REFER TO MISCELLANEOUS DETAILS SHEET 18

LONGITUDINAL CONSTRUCTION JOINT OFFSET OF 2'-0" IS REDUCED TO 0'-0" FOR RAMP LANES. SEE PAVEMENT JOINT LAYOUT SHEETS FOR LOCATIONS

(1) PERMANENT SLOPE PROTECTION
Refer to detail sheet 19

(2) OPEN GRADED BASE : See "Pay Quantity Notes". Will be bid as Bituminous.

(3) AGGREGATE BASE : See "Pay Quantity Notes". Payment to be based on theoretical section.

(4) PAVEMENT EDGE DRAIN : See "ODOT Std. Drawing PED-2" and detail sheet 19. Edge Drain Outlets shall be placed at all low locations in the typical mainline paving section : left, right, and center. Laterals for edge drains will be daylighted through the fill slopes at low points and at 300'+ intervals. See Summary for Stations & Locations, Sheet 43

(5) TYPICAL SUPERELEVATION:
Revolve the superelevation about the profile grade point. Superelevation is specified on Geometric Data Sheet 56. Superelevation runoff length is specified on profiles. Refer to ODOT Standard SUEL1-2 and AASHTO 2004 for additional information.

(6) Superelevate the inside shoulders with the traffic lanes, no rollover.

(7) Maximum rollover from traffic lane slope to outside shoulder slope is 0.07 ft/ft.

(8) Fill slope depths are defined from edge of shoulder.

CONCRETE SAFETY SHAPED BARRIER
See "Cast-In-Place Median Barrier", Std. MB-3
NCHRP 350 F-SHAPE

BACKFILLING NOTE :
To be Backfilled and Compacted as a part of the Finishing Operations. Cost to be included in the price bid for other items of work.

ROUNDING NOTE :
Intersections of cut and fill slopes with the ground line are to be rounded as a part of the finishing operations. Rounding shall be 5' minimum for smaller cuts and fills, to 15' maximum for larger cuts and fills, or as designated by the Engineer. Cost of rounding to be included in the price bid for other items of work.

TOPSOILING NOTE :
The contractor shall strip all of the available topsoil, stockpile it and place it back on the section in accordance with Section 205 of the Standard Specifications. Reserved topsoil shall be spread first on the complete slopes of the cut sections and the remainder on completed fill slopes or other priority areas located by the Engineer. All additional costs associated with operation shall be included in the Pay Items for Salvaged Topsoil, lump sum.

CONCRETE MEDIAN BARRIER:
See detail sheet Cast-In-Place Median Barrier Special Design 1B, Sheet 20

Design	JES	12/07
Drawn	SDD	12/07
Checked	DLW	1/08
Approved	SRJ	1/08
Squad	BENHAM	

TYPICAL SECTIONS (4)

Job Piece No. 17428(34) Sheet No. 6

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6/15/2010

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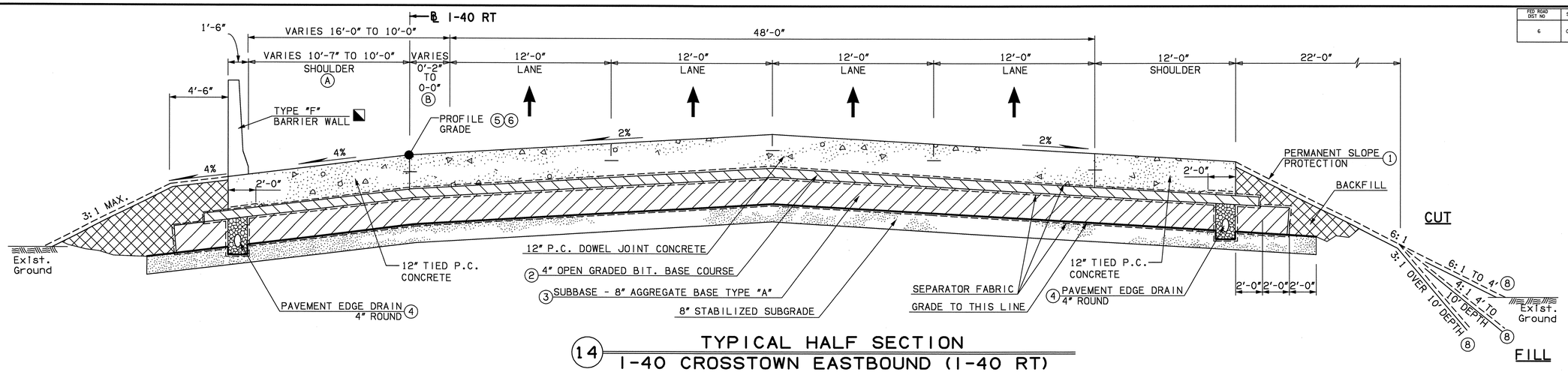
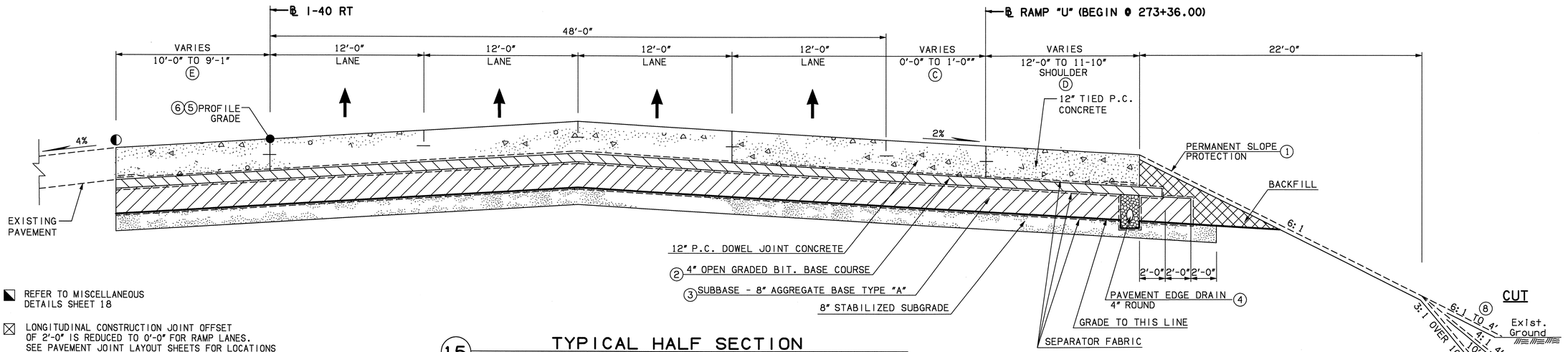
FED ROAD DIST NO	STATE	J/P PROJ NO	FISCAL YEAR	SHEET NO	TOTAL SHEETS
6	OKLA	17428(34)	03	10	484



(14) TYPICAL HALF SECTION
I-40 CROSSTOWN EASTBOUND (I-40 RT)
STA. 272+39.39 TO STA. 272+50.30



(15) TYPICAL HALF SECTION
I-40 CROSSTOWN EASTBOUND (I-40 RT)
STA. 272+50.30 TO STA. 273+61.11

◥ REFER TO MISCELLANEOUS DETAILS SHEET 18

☒ LONGITUDINAL CONSTRUCTION JOINT OFFSET OF 2'-0" IS REDUCED TO 0'-0" FOR RAMP LANES. SEE PAVEMENT JOINT LAYOUT SHEETS FOR LOCATIONS

◐ MATCH EXIST. PAVEMENT ALONG EDGE OF LANE

TYPICAL SECTION	SEGMENT	VARIABLE WIDTH			PGL	STATION EXTENTS		
14	A	10'-2"	TO	10'	I-40 RT	272+39.39	TO	272+50.30
14	B	0'-2"	TO	0'	I-40 RT	272+39.39	TO	272+50.30
15	C	0'	TO	1'-0"	I-40 RT	273+36.00	TO	273+61.11
15	D	12'	TO	11'-10"	I-40 RT	273+36.00	TO	273+61.11
15	E	10'	TO	9'-1"	I-40 RT	272+50.30	TO	273+61.11

(1) PERMANENT SLOPE PROTECTION
Refer to detail sheet 19

(2) OPEN GRADED BASE : See "Pay Quantity Notes". Will be bid as Bituminous.

(3) AGGREGATE BASE : See "Pay Quantity Notes". Payment to be based on theoretical section.

(4) PAVEMENT EDGE DRAIN : See "ODOT Std. Drawing PED-2" and detail sheet 19. Edge Drain Outlets shall be placed at all low locations in the typical mainline paving section : left, right, and center. Laterals for edge drains will be daylighted through the fill slopes at low points and at 300'± intervals. See Summary for Stations & Locations, Sheet 43

(5) TYPICAL SUPERELEVATION:
Revolve the superelevation about the profile grade point. Superelevation is specified on Geometric Data Sheet 56. Superelevation runoff length is specified on profiles. Refer to ODOT Standard SUEL1-2 and AASHTO 2004 for additional information.

(6) Superelevate the inside shoulders with the traffic lanes, no rollover.

(7) Maximum rollover from traffic lane slope to outside shoulder slope is 0.07 ft/ft.

(8) Fill slope depths are defined from edge of shoulder.

CONCRETE SAFETY SHAPED BARRIER
See "Cast-In-Place Median Barrier", Std. MB-3 NCHRP 350 F-SHAPE

BACKFILLING NOTE :
To be Backfilled and Compacted as a part of the Finishing Operations. Cost to be included in the price bid for other items of work.

ROUNDING NOTE :
Intersections of cut and fill slopes with the ground line are to be rounded as a part of the finishing operations. Rounding shall be 5' minimum for smaller cuts and fills, to 15' maximum for larger cuts and fills, or as designated by the Engineer. Cost of rounding to be included in the price bid for other items of work.

TOPSOILING NOTE :
The contractor shall strip all of the available topsoil, stockpile it and place it back on the section in accordance with Section 205 of the Standard Specifications. Reserved topsoil shall be spread first on the complete slopes of the cut sections and the remainder on completed fill slopes or other priority areas located by the Engineer. All additional costs associated with operation shall be included in the Pay Items for Salvaged Topsoil, lump sum.

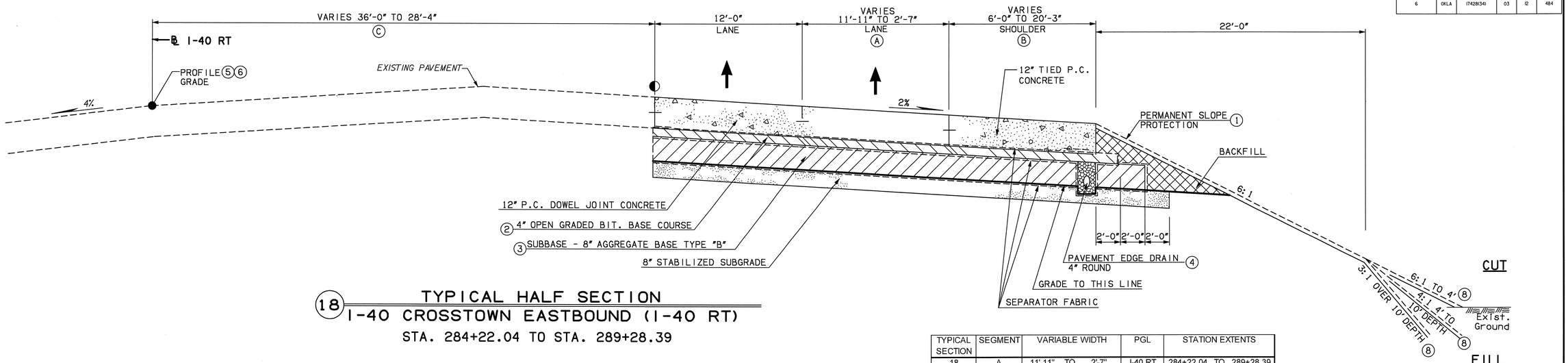
CONCRETE MEDIAN BARRIER:
See detail sheet Cast-In-Place Median Barrier Special Design 1B, Sheet 20

Design	JES	12/07
Drawn	SDD	12/07
Checked	DLW	1/08
Approved	SRJ	1/08
Squad	BENHAM	

TYPICAL SECTIONS (8)

Job Piece No. 17428(34) Sheet No. 10

FED. ROAD DIST. NO.	STATE	J/P PROJ NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	OKLA	17428(34)	03	12	484



18 TYPICAL HALF SECTION
I-40 CROSSTOWN EASTBOUND (I-40 RT)
STA. 284+22.04 TO STA. 289+28.39

TYPICAL SECTION	SEGMENT	VARIABLE WIDTH	PGL	STATION EXTENTS
18	A	11'-11" TO 2'-7"	I-40 RT	284+22.04 TO 289+28.39
18	B	6'	I-40 RT	284+22.04 TO 288+51.83
18	B	6' TO 6'-9"	I-40 RT	288+51.83 TO 288+94.36
18	B	20'-3" TO 10'-6"	I-40 RT	288+94.36 TO 289+28.39
18	C	36'-0" TO 28'-4"	I-40 RT	284+22.04 TO 289+28.39

◐ MATCH EXIST. PAVEMENT ALONG EDGE OF LANE

(1) PERMANENT SLOPE PROTECTION
Refer to detail sheet 19

(2) OPEN GRADED BASE : See "Pay Quantity Notes". Will be bid as Bituminous.

(3) AGGREGATE BASE : See "Pay Quantity Notes". Payment to be based on theoretical section.

(4) PAVEMENT EDGE DRAIN : See "ODOT Std. Drawing PED-2" and detail sheet 19. Edge Drain Outlets shall be placed at all low locations in the typical mainline paving section : left, right, and center. Laterals for edge drains will be daylighted through the fill slopes at low points and at 300'± intervals. See Summary for Stations & Locations, Sheet 43

(5) TYPICAL SUPERELEVATION:
Revolve the superelevation about the profile grade point. Superelevation is specified on Geometric Data Sheet 56. Superelevation runoff length is specified on profiles. Refer to ODOT Standard SUEL1-2 and AASHTO 2004 for additional information.

(6) Superelevate the inside shoulders with the traffic lanes, no rollover.

(7) Maximum rollover from traffic lane slope to outside shoulder slope is 0.07 ft/ft.

(8) Fill slope depths are defined from edge of shoulder.

CONCRETE SAFETY SHAPED BARRIER
See "Cast-In-Place Median Barrier", Std. MB-3 NCHRP 350 F-SHAPE

BACKFILLING NOTE :
To be Backfilled and Compacted as a part of the Finishing Operations. Cost to be included in the price bid for other items of work.

ROUNDING NOTE :
Intersections of cut and fill slopes with the ground line are to be rounded as a part of the finishing operations. Rounding shall be 5' minimum for smaller cuts and fills, to 15' maximum for larger cuts and fills, or as designated by the Engineer. Cost of rounding to be included in the price bid for other items of work.

TOPSOILING NOTE :
The contractor shall strip all of the available topsoil, stockpile it and place it back on the section in accordance with Section 205 of the Standard Specifications. Reserved topsoil shall be spread first on the complete slopes of the cut sections and the remainder on completed fill slopes or other priority areas located by the Engineer. All additional costs associated with operation shall be included in the Pay Items for Salvaged Topsoil, lump sum.

CONCRETE MEDIAN BARRIER:
See detail sheet Cast-In-Place Median Barrier Special Design 1B, Sheet 20

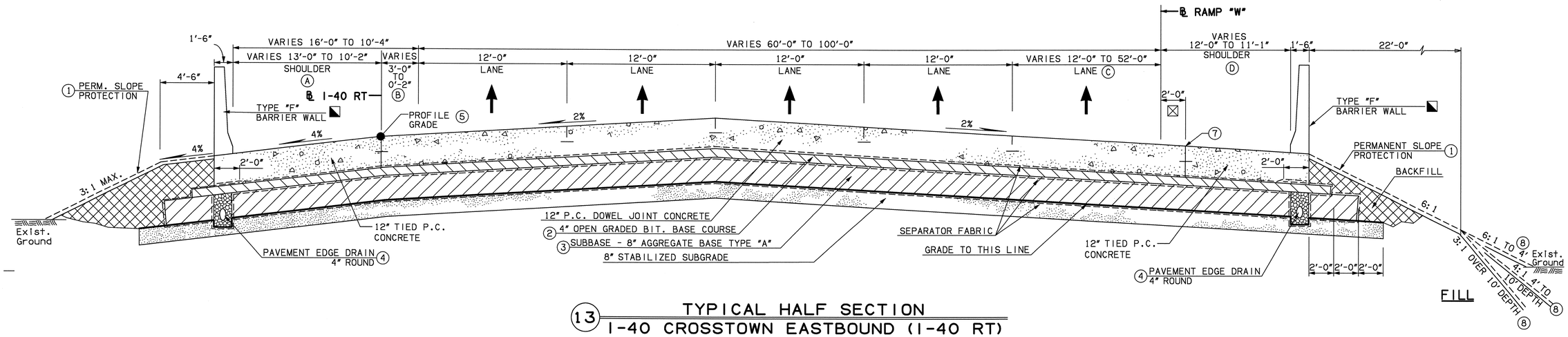
Design	JES	12/07
Drawn	SDD	12/07
Checked	DLW	1/08
Approved	SRJ	1/08
Squad	BENHAM	

TYPICAL SECTIONS (10)

Job Piece No. 17428(34) Sheet No. 12

6/15/2010

FED ROAD DIST NO	STATE	J/P PROJ NO	FISCAL YEAR	SHEET NO	TOTAL SHEETS
6	OKLA	17428(34)	03	9	484



(13) TYPICAL HALF SECTION
I-40 CROSSTOWN EASTBOUND (I-40 RT)
STA. 269+94.18 TO STA. 272+39.39

TYPICAL SECTION	SEGMENT	VARIABLE WIDTH	PGL	STATION EXTENTS
13	A	13' TO 10'-2"	I-40 RT	270+40.27 TO 272+39.39
13	B	3' TO 0'-2"	I-40 RT	269+94.18 TO 272+39.39
13	C	12' TO 52'	I-40 RT	269+94.18 TO 272+39.39
13	D	12' TO 11'-1"	I-40 RT	271+84.52 TO 272+39.39

(1) PERMANENT SLOPE PROTECTION
Refer to detail sheet 19

(2) OPEN GRADED BASE : See "Pay Quantity Notes".
Will be bid as Bituminous.

(3) AGGREGATE BASE : See "Pay Quantity Notes".
Payment to be based on theoretical section.

(4) PAVEMENT EDGE DRAIN : See "ODOT Std. Drawing PED-2" and detail sheet 19. Edge Drain Outlets shall be placed at all low locations in the typical mainline paving section : left, right, and center. Laterals for edge drains will be daylighted through the fill slopes at low points and at 300'± intervals. See Summary for Stations & Locations, Sheet 43

(5) TYPICAL SUPERELEVATION:
Revolve the superelevation about the profile grade point. Superelevation is specified on Geometric Data Sheet 56. Superelevation runoff length is specified on profiles. Refer to ODOT Standard SUEL1-2 and AASHTO 2004 for additional information.

(6) Superelevate the inside shoulders with the traffic lanes, no rollover.

(7) Maximum rollover from traffic lane slope to outside shoulder slope is 0.07 ft/ft.

(8) Fill slope depths are defined from edge of shoulder.

CONCRETE SAFETY SHAPED BARRIER
See "Cast-In-Place Median Barrier", Std. MB-3 NCHRP 350 F-SHAPE

BACKFILLING NOTE :
To be Backfilled and Compacted as a part of the Finishing Operations. Cost to be included in the price bid for other items of work.

ROUNDING NOTE :
Intersections of cut and fill slopes with the ground line are to be rounded as a part of the finishing operations. Rounding shall be 5' minimum for smaller cuts and fills, to 15' maximum for larger cuts and fills, or as designated by the Engineer. Cost of rounding to be included in the price bid for other items of work.

TOPSOILING NOTE :
The contractor shall strip all of the available topsoil, stockpile it and place it back on the section in accordance with Section 205 of the Standard Specifications. Reserved topsoil shall be spread first on the complete slopes of the cut sections and the remainder on completed fill slopes or other priority areas located by the Engineer. All additional costs associated with operation shall be included in the Pay Items for Salvaged Topsoil, lump sum.

CONCRETE MEDIAN BARRIER:
See detail sheet Cast-In-Place Median Barrier Special Design 1B, Sheet 20

◥ REFER TO MISCELLANEOUS DETAILS SHEET 18

☒ LONGITUDINAL CONSTRUCTION JOINT OFFSET OF 2'-0" IS REDUCED TO 0'-0" FOR RAMP LANES. SEE PAVEMENT JOINT LAYOUT SHEETS FOR LOCATIONS

Design	JES	12/07
Drawn	SDD	12/07
Checked	DLW	1/08
Approved	SRJ	1/08
Squad	BENHAM	

TYPICAL SECTIONS (7)

Job Piece No. 17428(34) Sheet No. 9

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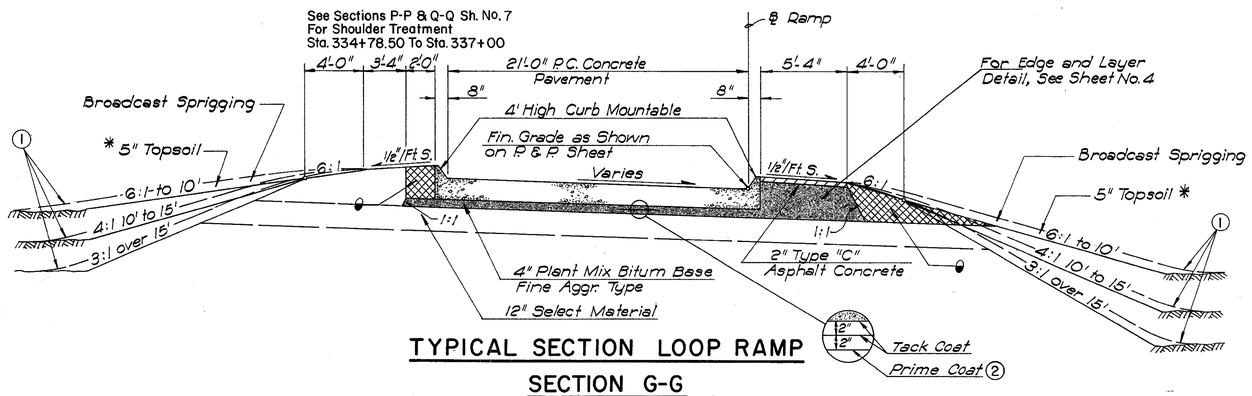
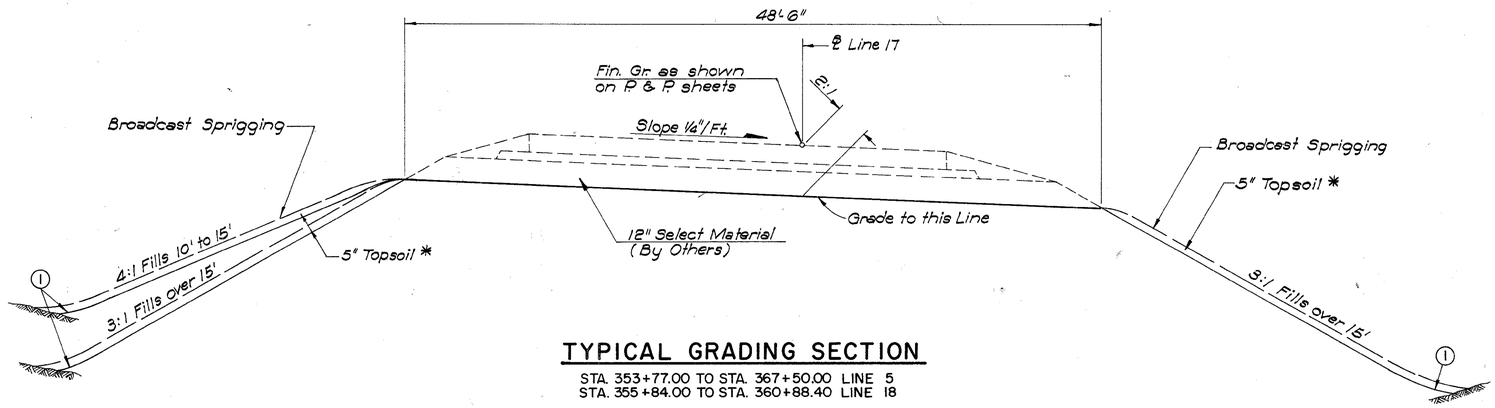
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	OKLA.	I-235-1(020)		5	189

REVISIONS	
DESCRIPTION	DATE



TYPICAL SECTION LOOP RAMP

SECTION G-G

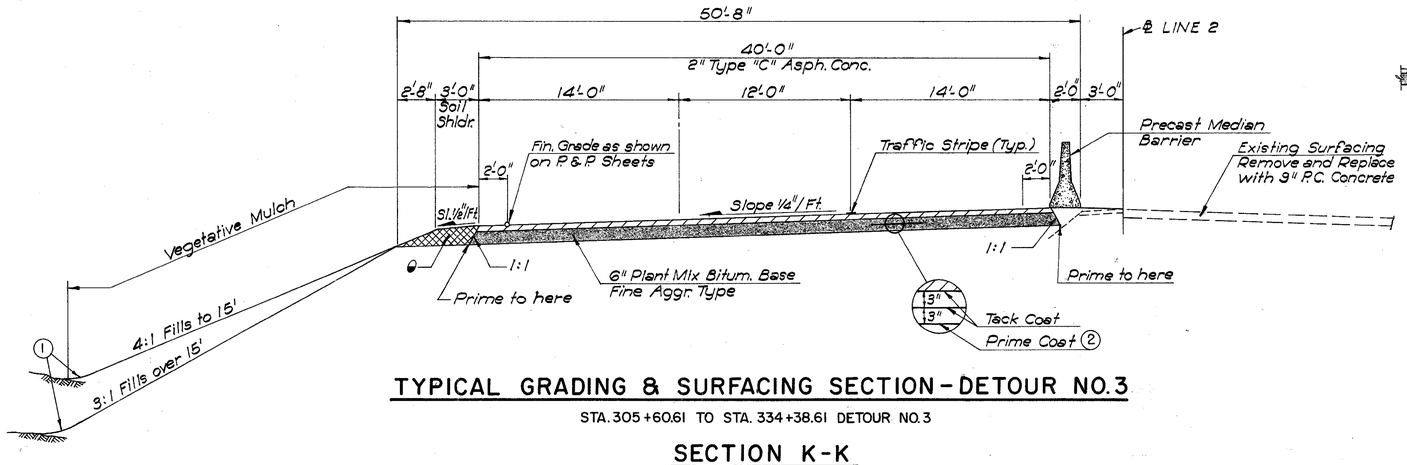


TYPICAL GRADING SECTION

STA. 353+77.00 TO STA. 367+50.00 LINE 5
STA. 355+84.00 TO STA. 360+88.40 LINE 18

SECTION J-J

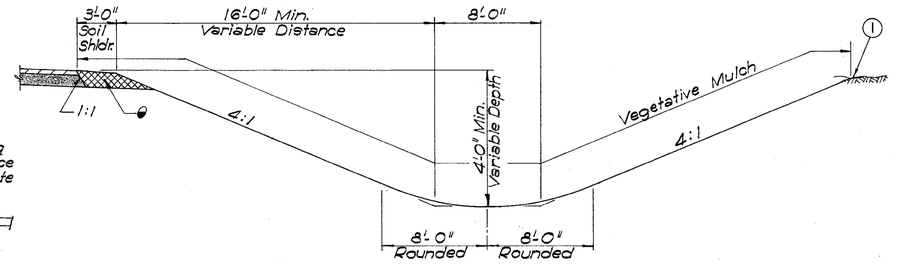
NOTES:-
- See Backfill Note, Sheet No. 3
- * See Topsoil Note, Sheet No. 3
- (1) See Rounding Note, Sheet No. 3
- (2) See Prime Note, Sheet No. 3



TYPICAL GRADING & SURFACING SECTION - DETOUR NO. 3

STA. 305+60.61 TO STA. 334+38.61 DETOUR NO. 3

SECTION K-K



TYPICAL DITCH SECTION FOR DETOURS

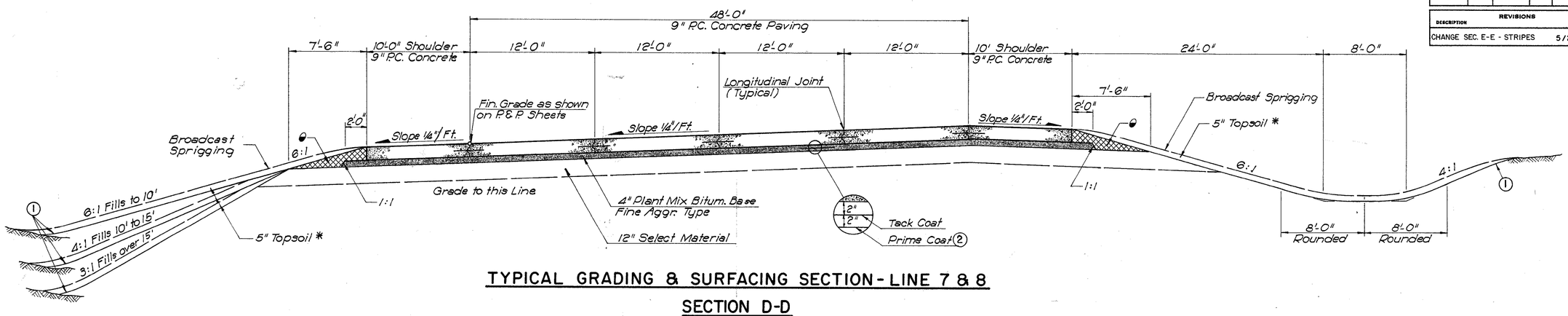
Design		
Drawn		
Checked		
Approved		
Squad		

TYPICAL SECTIONS

F.A. Project No. I-235-1(020) Sheet No. 5

FED. ROAD DIST. NO.	STATE	F.A. PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	OKLA.	I-235-1(020)		4	189

REVISIONS	
DESCRIPTION	DATE
CHANGE SEC. E-E - STRIPES	5/23/86

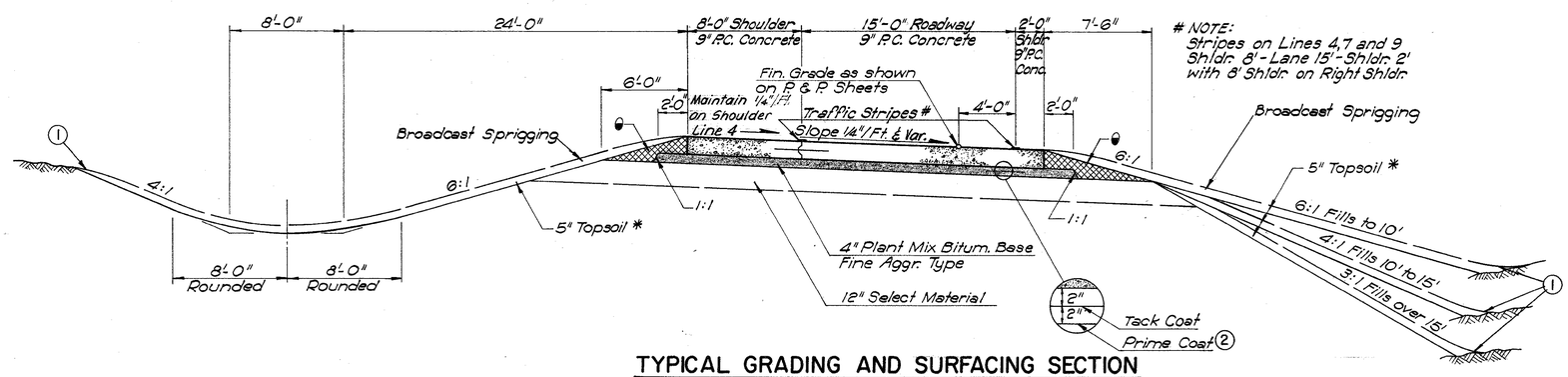


TYPICAL GRADING & SURFACING SECTION - LINE 7 & 8

SECTION D-D

STA. 353+11.90 TO STA. 353+75.00 LINE 8

NOTES:-
- See Backfill Note, Sheet No. 3
- * See Topsoil Note, Sheet No. 3
- (1) See Rounding Note, Sheet No. 3
- (2) See Prime Note, Sheet No. 3

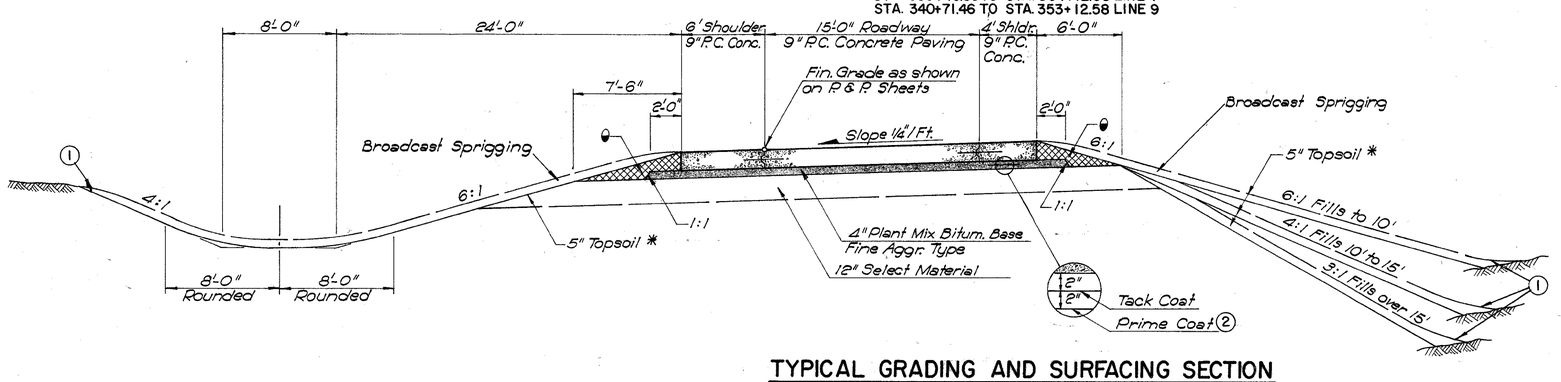


NOTE:
Stripes on Lines 4, 7 and 9
Shldr. 8' - Lane 15' - Shldr. 2'
with 8' Shldr. on Right Shldr.

TYPICAL GRADING AND SURFACING SECTION

SECTION E-E

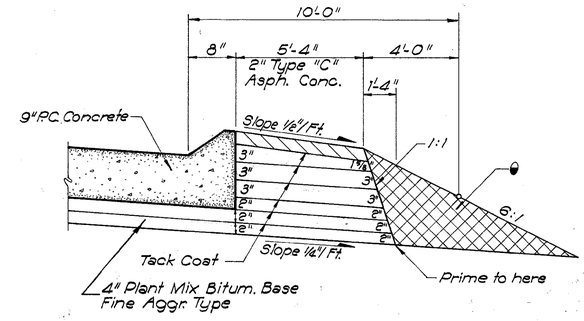
STA. 342+37.50 TO STA. 348+60.46 LINE 4
STA. 359+40.66 TO STA. 364+12.68 LINE 7
STA. 340+71.46 TO STA. 353+12.58 LINE 9



TYPICAL GRADING AND SURFACING SECTION

SECTION F-F

STA. 351+81.15 TO STA. 359+40.66 LINE 7



EDGE AND LAYER DETAIL FOR SECTION G-G

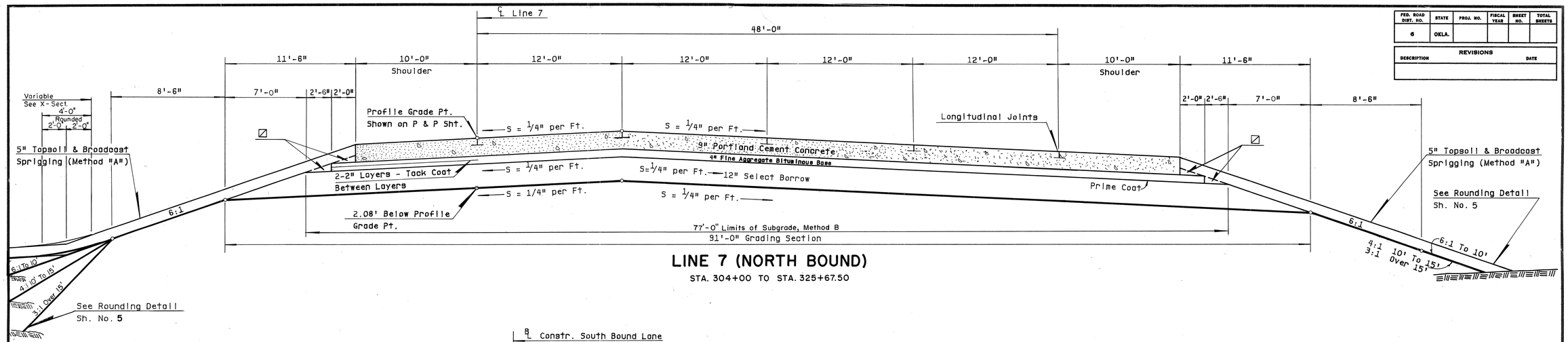
Design		
Drawn		
Checked		
Approved		
Squad		

TYPICAL SECTIONS

F.A. Project No. I-235-1(020) Sheet No. 4

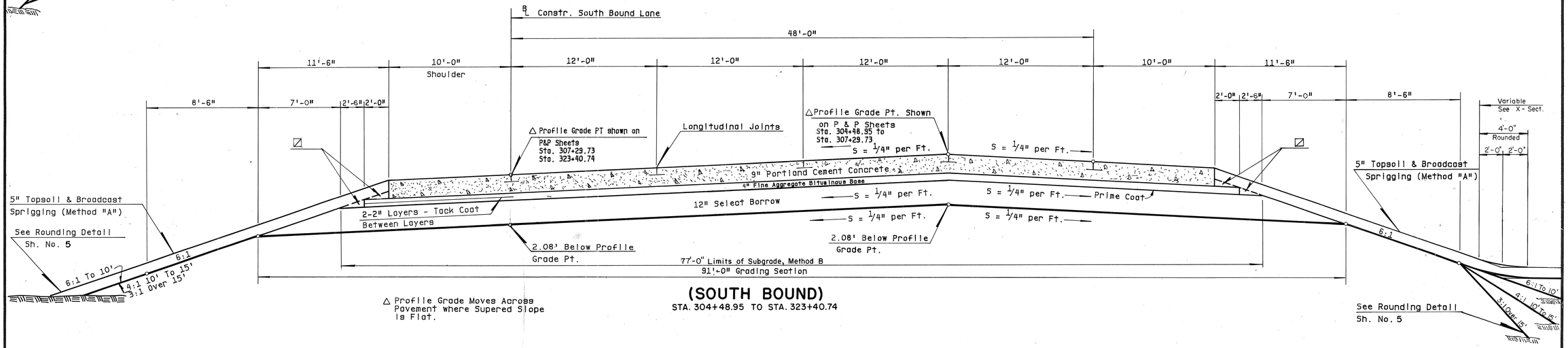
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	OKLA.				

REVISIONS	
DESCRIPTION	DATE



LINE 7 (NORTH BOUND)

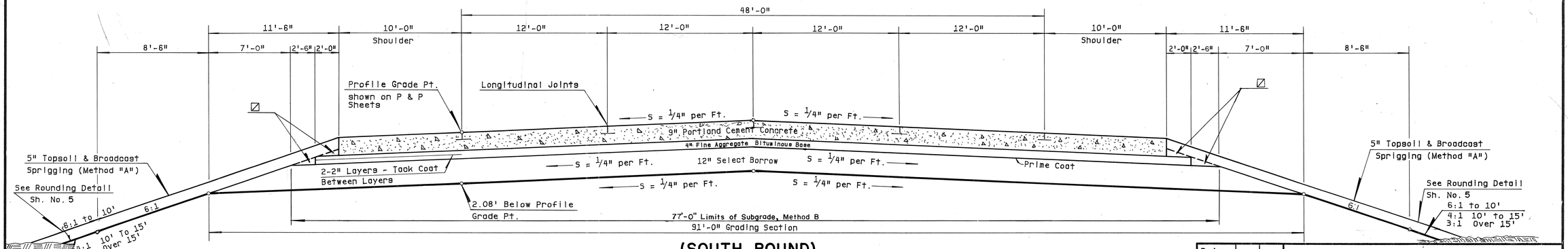
STA. 304+00 TO STA. 325+67.50



(SOUTH BOUND)

STA. 304+48.95 TO STA. 323+40.74

△ Profile Grade Moves Across Pavement where Supered Slope is Flat.



(SOUTH BOUND)

STA. 323+40.74 TO STA. 326+47.50

▨ This area to be backfilled with topsoil at the time topsoil is placed on slopes.

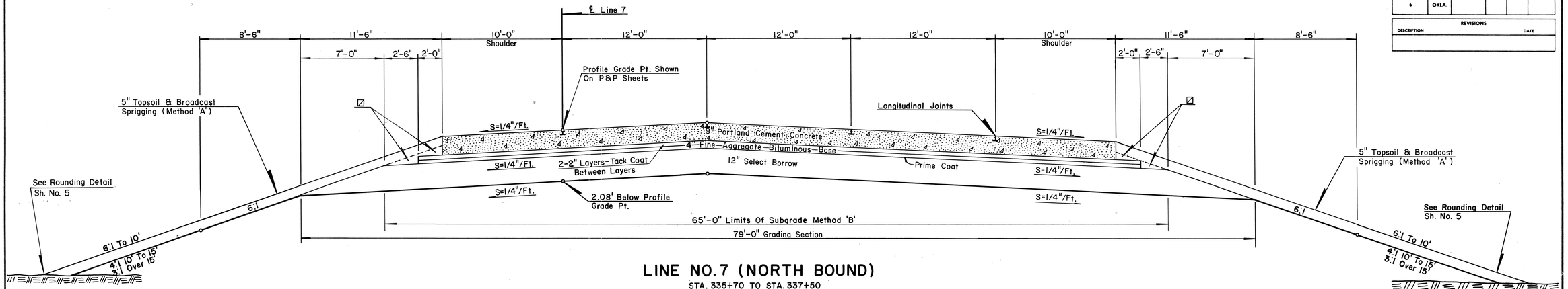
Design		
Drawn		
Checked		
Approved		
Squad		

TYPICAL SECTIONS

F.A. Project No. I-35-3(107)126 Sheet No. 2

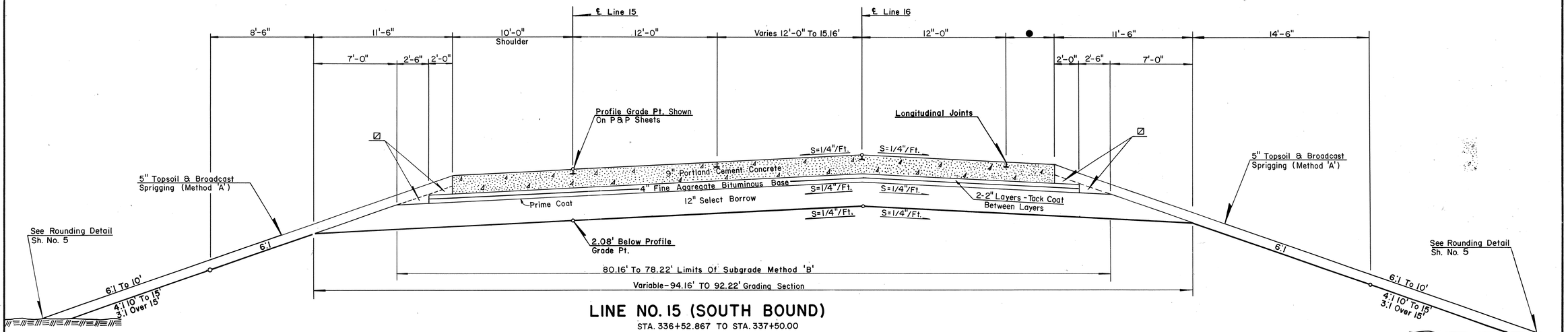
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	OKLA.				

REVISIONS	
DESCRIPTION	DATE



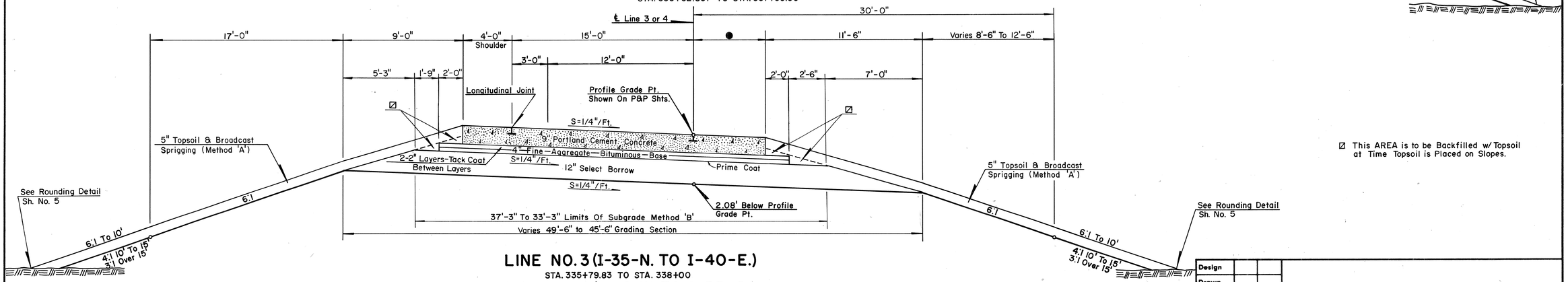
LINE NO. 7 (NORTH BOUND)

STA. 335+70 TO STA. 337+50



LINE NO. 15 (SOUTH BOUND)

STA. 336+52.867 TO STA. 337+50.00



LINE NO. 3 (I-35-N. TO I-40-E.)

STA. 335+79.83 TO STA. 338+00

LINE NO. 4 (I-40-W. TO I-35-S.)

STA. 335+79.06 TO STA. 337+20.00

● Variable Width Shldr. See Joint Layouts.

Ø This AREA is to be Backfilled w/ Topsoil at Time Topsoil is Placed on Slopes.

Design		
Drawn		
Checked		
Approved		
Squad		

TYPICAL SECTIONS

F.A. Project No. I-35-3(107)126 Sheet No. 3

SUMMARY OF EXISTING HORIZONTAL & VERTICAL CURVES - MAINLINE											
LOCATION	HORIZONAL CURVE		VERTICAL CURVE								V.P.I
MAINLINE	MIN. RAD.	DES. SPD.	TYPE		GRADE		ALG. DIFF.	L	"K"	DES. SP.	
	FT.	MPH	CREST	SAG	G1	G2	"A"	FT.	L/A	MPH.	STA.
I-35 MAINLINE	5,729.58	50		X	1.62	2.32	0.70	200	285.71	50	305+50.00
			X		2.32	-4.80	7.12	800	112.36	50	311+50.00
			X		1.55	-1.96	3.51	600	170.94	50	311+50.00
				X	-2.40	0.90	3.30	600	181.82	50	323+00.00
			X		0.90	0.40	0.50	200	400.00	50	337+50.00
				X	-1.96	0.40	2.36	600	254.24	50	324+00.00
				X	0.40	3.00	2.60	400	153.85	50	335+50.00
			X		-0.31	-2.62	2.31	380	164.50	50	337+40.00
				X	-2.59	-0.50	2.09	350	167.30	55	276+50.00
	5,729.58	60	X		-0.50	-1.53	1.03	600	582.52	55	287+00.00
	2,864.79	60		X	-1.53	1.80	3.33	600	180.18	55	296+20.00
I-40 MAINLINE				X	0.00	0.30	0.30	600	2,000.00	50	322+00.00
			X		0.30	-0.70	1.00	225	225.00	50	330+56.10
				X	-0.70	0.00	0.70	250	357.14	50	335+79.81
	11,459.16	50		X	0.00	0.30	0.30	200	666.67	60	313+00.00
				X	0.30	3.55	3.25	400	123.08	60	325+07.40
			X		3.55	-4.66	8.21	700	85.26	50	341+20.00
	22,918.31	60		X	-4.66	4.00	8.66	1200	138.57	60	357+72.43
	5,729.65	70		X	-0.25	0.30	0.55	210	381.82	70	277+00.00
	2,545.48	70		X	-0.48	4.60	5.07	700	137.96	70	266+20.00
				X	4.60	4.57	0.02	300	13,636.36	70	272+50.00
I-235 MAINLINE				X	0.40	3.00	2.60	400	153.85	50	335+50.00
	1,637.02	50	X		3.00	-0.40	3.40	600	176.47	50	345+00.00
	3,274.04	50	X		-0.40	-0.58	0.18	90	500.00	50	365+85.00

SUMMARY OF EXISTING HORIZONTAL & VERTICAL CURVES - RAMPS

LOCATION		HORIZONAL CURVE		VERTICAL CURVE								V.P.I
RAMPS		MIN. RAD.	DES. SPD.	TYPE		GRADE		ALG. DIFF.	L	"K"	DES. SP.	
		FT.	MPH	CREST	SAG	G1	G2	"A"	FT.	L/A	MPH.	STA.
I-35 RT. SERVICE ROAD	Ramp 15A	5,729.58	40		X	-0.91	2.10	3.00	300	99.90	40	275+25.00
		1,909.86	40		X	-2.10	-0.92	1.18	300	255.10	40	286+00.00
					X	-0.92	2.00	2.92	300	102.60	40	293+00.00
I-35 LT. SERVICE ROAD	RAMP 15B	1,909.86	40		X	1.36	2.10	0.74	250	337.84	40	275+25.00
		5,592.26	40	X		-2.10	-3.50	1.40	150	107.14	40	278+50.00
					X	-3.50	-0.60	2.91	500	172.12	40	281+50.00
		2,664.79	40		X	-0.60	0.40	1.00	100	100.50	40	287+75.00
					X	0.40	2.01	1.61	200	124.22	40	294+50.00
S.E. 15TH STREET	RAMP 15C			X		-2.10	-4.90	2.80	200	71.43	40	296+50.00
					X	-4.54	2.40	6.94	500	72.05	40	302+00.00
S.E. 15TH STREET	RAMP 15D			X		-2.10	-4.90	2.80	200	71.43	40	296+50.00
		2,854.79	60		X	-4.90	2.00	6.90	400	57.97	40	299+50.00
I-40 WB TO I-35 SB	RAMP B	716.20	50									
	RAMP B	1,041.74	50		X	-2.62	-0.55	2.07	350	169.08	60	341+56.76
	RAMP B	955.87	50		X	-0.55	0.60	1.15	200	173.91	60	347+40.63
	RAMP B	1,041.74	50	X		-0.31	-2.62	2.31	380	164.50	60	337+40.00
	RAMP B	955.87	50		X	-2.62	-0.55	2.07	350	169.08	60	341+56.76
I-40 WB TO I-235 NB	RAMP C				X	-0.53	1.50	2.03	200	98.52	50	342+00.00
	RAMP C				X	1.50	4.00	2.50	200	80.00	50	344+50.00
	RAMP C	4,583.66	50	X		4.00	0.21	3.79	325	85.75	50	351+50.00
I-40 EB TO I-235 NB (RAMP U)	RAMP U	185.00	30		X	-6.44	0.60	7.04	300	42.61	30	336+25.00
	RAMP U	170.00	25									
I-35 NB TO I-40 EB	RAMP A				X	0.77	2.00	1.23	150	121.95	60	338+50.17
	RAMP A	763.94	50	X		2.00	-3.00	5.00	425	85.00	50	343+16.78
I-40 EB TO I-35 SB	RAMP W	763.94	50	X		-3.70	3.00	6.70	600	89.55	50	343+05.76
I-235 SB TO I-40 EB	RAMP V	1,637.02	50		X	-4.60	2.50	7.10	500	70.42	50	349+20.00
I-35 NB TO I-40 WB	RAMP O	3,274.05	60		X	-1.88	-0.30	1.58	300	189.87	55	255+00.00
	RAMP O	1,273.24	55									
	RAMP O				X	-0.30	0.30	0.60	100	166.67	55	259+55.00
	RAMP O	1,909.86	60		X	0.30	3.01	2.71	400	147.82	55	264+10.00
	RAMP O			X		3.01	1.79	1.22	300	246.10	55	271+90.00
	RAMP O	1,273.24	50	X		0.90	0.40	0.50	200	400.00	50	337+50.00
I-235 SB TO I-40 WB	RAMP P	666.16	45		X	-2.07	4.46	6.53	650	99.51	40	257+20.00
	RAMP P	1,909.86	60									
	RAMP P				X	-0.45	4.89	5.34	550	103.00	40	356+60.00
	RAMP P	666.16	40	X		4.89	0.40	4.49	300	66.82	40	362+00.00
I-40 WB TO OKLAHOMA CITY BOULEVARD WB	RAMP T	2,864.79	50		X	-4.71	-1.40	3.31	374	113.12	50	254+50.00
	RAMP T				X	-1.40	-0.29	1.11	176	158.16	50	257+25.00
	RAMP T	5,498.62	70		X	-0.29	0.18	0.47	100	211.86	70	259+00.00
I-235 SB TO OKLA. CITY BLVD WB	RAMP R	848.83	50		X	-3.11	1.95	5.06	550	108.61	50	252+50.00
	RAMP R	600.00	50	X		1.95	-0.51	2.46	480	195.12	50	261+00.00
I-35 NB TO OKLAHOMA CITY BOULEVARD WB	RAMP S	2,852.79	50		X	-4.71	2.62	7.33	980	133.79	50	257+39.41
	RAMP S	1,041.74	50	X		2.62	-0.32	2.94	460	156.52	50	270+13.20
	RAMP S				X	-0.32	1.01	1.33	300	225.73	50	275+13.20
	RAMP S	2,821.86	70	X		1.01	-1.84	2.85	400	140.35	50	278+63.20
	RAMP S				X	-1.84	-0.06	1.78	300	168.35	50	282+63.20

APPENDIX O -
Commercial and Freight Impacts

Commercial and Freight Opportunities

Oklahoma River Water Events and Tourism Opportunities

The Oklahoma River was dammed in 2004 as part of Oklahoma City's first Metropolitan Area Projects (MAPS) capital improvement program for new and upgraded sports, recreation, entertainment, and cultural facilities. The $54 million project, supported by a self-imposed sales tax increase, rejuvenated the dry riverbed of the former North Canadian River by creating a dam-controlled river segment flanked by landscaped recreation Oklahoma River trails that connect to the larger Oklahoma City Trails network. This transformative public investment led to the privately funded construction of the Chesapeake Boathouse in 2006. There are now numerous boathouses, including the University of Central Oklahoma Boathouse and the $10 million Devon Boathouse which is home to the U.S. Rowing National High-Performance Center.

Because of these investments, and a temperate climate that allows year-round training on the water, the Oklahoma River has quickly emerged as one of the premier rowing venues in the world for both competition and training. In 2007, the USA Rowing World Challenge drew teams from Canada, Mexico, Australia, New Zealand, and Switzerland and in 2008, the U.S. Canoe and Kayak Olympic Trials for flatwater sprint were held on the Oklahoma River.

However, Olympic-level international rowing events require 2,000 meters of unobstructed linear river; the current I-35 bridge piers obstruct that course. The new I-35 bridges and the Project will only have two piers on each bridge; that design will provide adequate room to host future Rowing World Cups, NCAA rowing events, and other officially sanctioned events such as the U.S. Rowing National Championships and Olympic trials for rowing events. The Project will also include spectator viewing areas providing exceptional pedestrian-accessible observation opportunities for residents and visitors. The previous investments and the continued economic success of Oklahoma City will benefit from having a multimodal path on the I-35 SB bridge.

Riversport has estimated the economic impact of the races announced through 2025 will exceed $10 million, with each competition drawing 400 to 800 athletes from more than 60 countries for pre-event training weeks the competitions. Executive Director Mike Knopp states, "Hosting international races at this level means that some athletes and coaches will actually move to Oklahoma City to live, work, and train … You will also have officials, coaches, and family members as well as media. We will see the impact in our hotels, restaurants, transportation, tourism, and entertainment. That is not even considering the economic ripples that happen when a city is elevated like this on the world stage."

New Development - OKANA Resort

The Chickasaw Nation is developing a $300 million private OKANA resort next to the First Americans Museum on the downtown riverfront shore and adjacent to the Project In addition to an 11-story, 404-room hotel riverfront hotel, the private resort will include a spa, outdoor adventure lagoon, indoor waterpark, gold center, conference space amphitheater, restaurants, Native American marketplace, and retail outlets. The Project will provide a direct walking or biking connection to and from downtown Oklahoma City and the OKANA resort, which should increase tourism in downtown Oklahoma City and at the OKANA Resort.

The OKANA resort is a mixed-use development and is projected to have a $97 million impact on Oklahoma City within one year of completion and a billion-dollar impact within the next decade. It is estimated that within the first decade, OKANA resort will create 800 full-time jobs.

The Project will enhance tourism connectivity between downtown Oklahoma City and OKANA resort.

OKANA Resort Site and Rendering

SOURCE: UNITED FOR OKLAHOMA

Freight Movement

While freight movement is not directly pertinent to the I-35 multimodal path Project, a short discussion of the I-35 freight movement may provide more context to the review team. The Project location is on a segment of I-35 that has been identified as a freight bottleneck in the Oklahoma Freight Transportation Plan. The Truck Travel Time Reliability (TTTR) score is 2.49 on the I-35 bridges during the morning and afternoon peak travel times. ODOT's 2022 TTTR target on the Interstate is 1.33. Replacing and widening the I-35 bridges would most likely make this I-35 segment more reliable.

I-35 is the largest single North-South truck freight corridor in the Central United States. It traverses six states and is on the NHS, STRAHNET, and the NHFN. I-35 is one of the most significant truck freight corridors in the U.S and the highest volume truck corridor in Oklahoma. There are nearly 18,000 trucks per day that cross the I-35 NB and SB

bridges with average daily truck traffic at 10 percent. I-35 is the highest volume truck route in the state of Oklahoma.

In Oklahoma City, I-35 intersects other major east-west freight corridors, I-40 and I-44, and thus the I-35 bridge in Oklahoma City is critically located at the crossroads of intercontinental goods movement, linking west and east coast ports to major urban areas throughout the country, and connecting to the major US-Mexican trade route. The new I-35 bridges are anticipated to reduce congestion and improve reliability for freight movement.

In Acres Park, which lies south of the Project location, there are several freight and logistic centers, including Pallet Logistics of America, Saia LTL Freight, Old Dominion Freight Line, and Estes Express Line