



# Preliminary Engineering Report – 60<sup>th</sup> Avenue NE over Rock Creek

Contract No.: K-2223-55



Prepared For:

**City of Norman**

February 2023







### **Engineer's Certification**

I hereby certify that this Report for the 60<sup>th</sup> Avenue NE over Rock Creek project was prepared by Garver under my direct supervision for the City of Norman.

Jeff Rundle, P.E.  
State of Oklahoma PE License 27271

Garver, LLC  
Certificate of Authorization No. 4193 P.E., L.S.  
Renewal Date 06-30-2024







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## 1.0 Introduction/Purpose and Need

The City of Norman selected Garver to provide design services for the replacement of the 60<sup>th</sup> Avenue NE bridge over Rock Creek. The City of Norman has requested Garver to perform a preliminary engineering study to evaluate three replacement alternatives for the bridge, including both prestressed concrete and steel span bridges as well as a reinforced concrete box (RCB) structure.

The studied alternatives have been evaluated with respect to right-of-way impacts, utility relocations, hydraulic impacts, areas of cultural and environmental concern or significance, constructability and overall cost. Following the submittal of this report, a review meeting with the City of Norman to decide upon the preferred alternative is anticipated. After the preferred alternative is selected, Garver will move forward with the development of final construction plans.

## 2.0 Existing Conditions

### 2.1 Location

The bridge is in northeast Norman on 60<sup>th</sup> Avenue NE approximately one-half mile north of E. Rock Creek Road, shown in **Figure 1**. The bridge is located in the SW  $\frac{1}{4}$  of the NW  $\frac{1}{4}$  of Section 13, Township 9 North, Range 1 West.

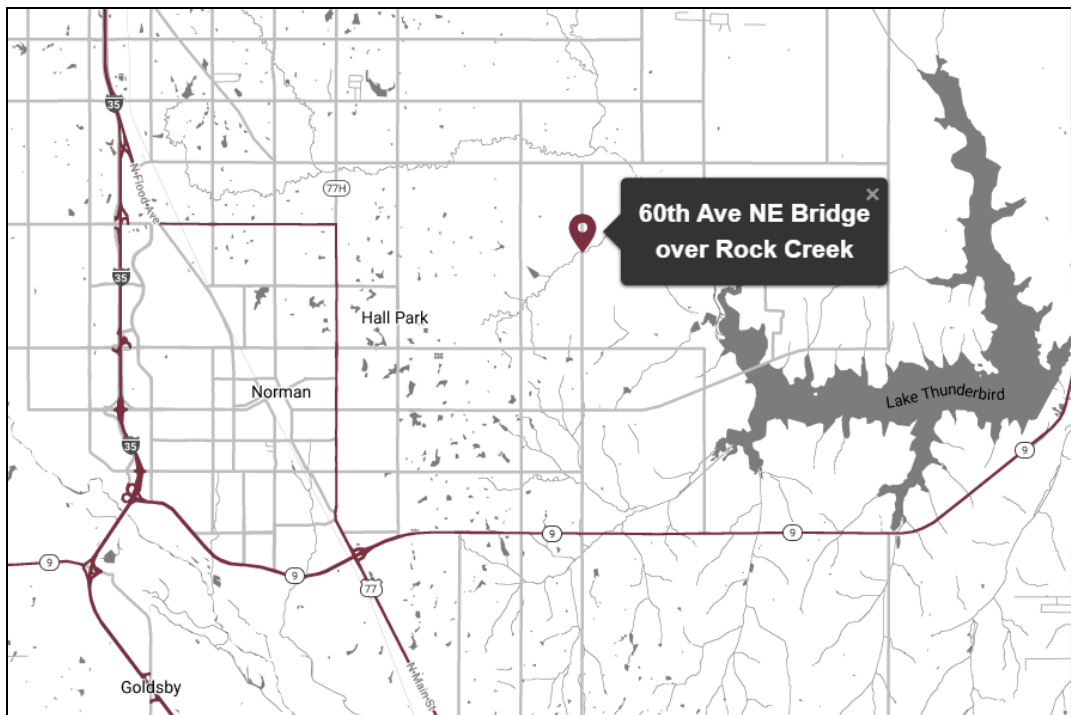


Figure 1 – Location of the 60th Ave NE Bridge







## 2.2 Site Conditions

The topography in the area north of the project area is mostly flat, while to the south can be characterized as rolling terrain. Rock Creek flows from the west to the east at the project site and feeds into Lake Thunderbird to the northeast. The creek at the project area shows signs of significant erosion with steep channel banks and a large scour hole downstream (**Figure 2**). There is evidence of previous attempts to repair the channel banks with concrete rubble around the existing bridge area. The vegetation surrounding Rock Creek is dense with trees and tall brush. NRCS soil survey maps indicate silty loam soils in the project area.



**Figure 2 - Downstream Scour**

The project site is located within a Federal Emergency Management Agency (FEMA) Zone A Special Flood Hazard Area (SFHA). The design criteria and hydrology and hydraulic methodology are further discussed in **Section 2.6**. Additionally, the project is located in the Lake Thunderbird Water Quality Protection Zone (WQPZ), however the ordinance does not pertain to public infrastructure and should not have an impact on the project.

## 2.3 Roadway

The existing roadway is an asphalt, two-lane rural arterial roadway consisting of two eleven-foot driving lanes without shoulders. The posted speed limit within the project corridor is 50 miles per hour (mph). The roadway surface over the existing bridge deck is made of concrete pavement that has been overlaid with asphalt and is in generally good condition. The average daily traffic is between 1,500 and 1,600 vehicles per day.



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The terrain north of the bridge is mostly flat, ultimately reaching a local low point about 300 feet north of the bridge. To the south of the bridge, the terrain becomes rolling hills, beginning with an incline of over 8.5 percent grade. There are two nearby driveways, gravel and newly constructed concrete, that will be impacted by this project. The existing sag vertical curve south of the bridge has an approximate “K value” of 41, well under the 96 recommended for sag vertical curves at a 50-mph design speed; therefore, a design exception will be necessary to accommodate any increase in roadway grade.

## 2.4 Right of Way and Utilities

The existing right-of-way (ROW) is sixty-six feet. The existing 60<sup>th</sup> Ave NE roadway centerline is nearly sixteen feet east of the north-south section line at the bridge but is centered up at each section corner. Existing utilities include fiber optics, pole-mounted and underground telecom, overhead electric, a four-inch polyethylene gas line, and a City of Norman water line. Most of the existing utilities are located in a 17-ft. public utility easement adjacent to the existing statutory right-of-way east of the bridge.

## 2.5 Bridge

The existing bridge structure on 60<sup>th</sup> Avenue NE over Rock Creek is a three-span, steel beam structure that is now permanently closed due to concerns raised about the structural adequacy of primary load carrying members during its most recent routine inspection. The bridge was closed on December 1, 2022 and must be replaced.

There are no as-built plans for this bridge. According to the current Bridge Inspection Report, the existing bridge was built in 1940 and provides a 26'-0" clear roadway width allowing for two lanes of vehicular traffic with no shoulders or pedestrian accommodations. The bridge is composed of 15ft. – 36ft. – 15ft. steel beam spans. See **Figure 3** for existing bridge elevation view or **Appendix A** for the most current Bridge Inspection Report.





**Figure 3 – Existing Bridge Elevation View**

#### 2.5.1 Existing Condition

The condition of the existing bridge is documented in the October 2022 Bridge Inspection Report (**Appendix A**). In summary, the existing bridge is considered structurally deficient due to the condition rating of “Poor (4)” given to the superstructure and substructure. Federal Highway Administration and ODOT guidelines specify that any bridge with a condition rating of four (4) or less be classified as structurally deficient.

According to the bridge inspection report, the deck slab is covered with an asphalt overlay and showing heavy cracks over the piers. The stay in place forms covering the soffit have minor section loss with rust. The steel girders are showing signs of deterioration along the bottom flanges including rust and deep pitting (see **Figure 4**). The deterioration is most severe at the beam ends over the piers.



**Figure 4 – Rust and Pitting in the Steel Girders and Stay-In-Place Forms**

The substructure consists of steel abutments and piers supported on steel columns. The abutments are mostly covered with rock and gravel. Very small areas of the abutment caps have heavy rust and pitting. The steel pier caps have severe rust and deep pitting in the bottom flange (see **Figure 5**). The steel columns show signs of minor section loss at the ground, primarily at the exterior columns.



**Figure 5 – Rust and Pitting in the Bottom Flange of Pier Cap**





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2.5.2 Functionality

Functionality is defined as the ability to provide the user with a product at its fully designed purpose, and it is related to the geometric components of the bridge system. Functionality is typically related to items such as lane widths, shoulder access, sight distances and clearances. According to the current Bridge Inspection Report, the existing bridge is considered Functionally Obsolete.

The bridge railing system for this structure is composed of metal railing connected directly to the steel superstructure members and is considered substandard. This classification is due to the current system not meeting the minimum load and crash-testing requirements of the AASHTO design specifications for traffic rail systems.

2.5.3 Structural

The existing bridge carrying 60<sup>th</sup> Avenue NE is currently designated as structurally deficient. According to the current Bridge Inspection Report, the existing bridge is load posted for 4 tons (see **Figure 6**). This load posting significantly reduces the types of vehicles that can use the crossing and must consequently find another route.



**Figure 6 – Load Posting Sign Prior to Bridge Closing**

Due to concerns about the condition of the existing substructure found in the October 2022 routine inspection, the City of Norman requested Garver perform a visual inspection of the bridge to confirm the findings. Garver's inspection generally agreed with the routine inspection findings and concerns with the



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structural adequacy of the bridge to remain in service. As a result, the bridge was closed to all traffic on December 1, 2022 with no plans to re-open until the bridge is replaced.

## 2.6 Hydrology and Hydraulics

60<sup>th</sup> Avenue NE over Rock Creek is located in a FEMA Zone A SFHA. The National Flood Insurance Program (NFIP) and the City of Norman Engineering Design Criteria (EDC) require that proposed improvements will not increase the water surface elevation of the base flood (100-year storm event) more than one foot within the community. Furthermore, the Norman EDC requires a minimum freeboard of one foot above the lowest structural member for the 100-year water surface elevation (WSEL) and a maximum channel velocity of 15 feet per second (fps).

Hydrologic analysis was conducted using the United States Geological Survey's (USGS) Scientific Investigation Report 2010-5137 "Methods for Estimating the Magnitude and Frequency of Peak Streamflows for Unregulated Streams in Oklahoma". The USGS regression equations were chosen since the site is within the applicable range of the method according to the Norman EDC. A summary of the calculations appears in **Table 1** below.

**Table 1 - Design Flow Rates**

Recurrence Interval	Peak Flow Rate (cfs)
2 Year	1073
5 Year	2002
10 Year	2801
25 Year	3984
50 Year	5218
100 Year	6139
500 Year	9779

The hydraulic model was performed in accordance with the Norman EDC. The hydraulic analysis for these sites uses the U.S. Army Corps of Engineers water surface profile program HEC-RAS version 6.2. Five models have been developed for the site: Natural, Existing, and Proposed Alternatives 1A, 1B, and 2. The topographical data used in the model was derived from on-ground survey by Lemke Land Surveying and lidar survey collected specifically for this project. The Manning's 'N' values were developed using aerial and site reconnaissance photos of the area. The modeling uses the sub-critical flow regime and average downstream channel slope as the downstream boundary conditions. The downstream normal depth slope used as the boundary condition of the model is 0.0027 ft/ft. This normal depth slope was estimated from the slope of the Energy Grade Line (EGL) in FEMA's Base Level Engineering (BLE) model for the project site.

The existing structure is a 15'-36'-15' Steel Beam bridge. The existing bridge has a low beam elevation of 1069.92 and an existing roadway overtopping elevation of 1070.95 approximately 300 feet north of the bridge. The existing roadway overtops at a storm frequency of 39 years.





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## 2.7 Environmental

Environmental constraints present within the 60<sup>th</sup> Avenue NE over Rock Creek study area include Rock Creek and potential habitat for threatened and endangered species. There are no potentially hazardous waste sites within the study area; however, two sites are within the vicinity. No tribal land, federal properties, easements, or wildlife and waterfowl refuges are present within the study area. Additionally, there are no airports, railroads, cemeteries, or parks identified within the study area. Environmental constraint information was obtained from a reconnaissance data collection effort performed by Garver in December 2022 and served as the basis for the assessment of environmental impacts.

A search performed by Stantec on known historic properties and archeological sites in the area did not reveal any known resources. The existing bridge (NBI 09189, Structure No. 14N3170E1210005) is a 26-foot-wide wide flange beam bridge built in 1940 (**Figure 7**). The bridge is a Category 2 structure and has been recommended not eligible for inclusion in the National Register of Historic Places.



**Figure 7 - NBI 09189**

Rock Creek is a potentially jurisdictional (blue line) intermittent stream (**Figure 8**). Rock Creek is not considered a critical resource water, Section 10 water, scenic river, or sensitive water or watershed. However, Rock Creek is listed in Oklahoma's 2022 303(d) list of impaired waters for Enterococcus bacteria and Escherichia coli. The Total Maximum Daily Load value for Enterococcus bacteria and Escherichia coli have not been established for this section of Rock Creek.





**Figure 8 - Rock Creek Facing Downstream (East)**

According to the 1989 Franklin, Okla. National Wetlands Inventory (NWI) map and the U.S. Fish and Wildlife Services NWI Wetlands Mapper, Rock Creek is mapped as a palustrine forested wetland. No wetlands were identified during the field reconnaissance and no wetlands have been formally delineated.

According to the list generated using the USFWS Information for Planning and Consultation tool, there are multiple species that could be impacted by the proposed project. These include the Tricolored Bat (*Perimyotis subflavus*), Piping Plover (*Charadrius melodus*), Red Knot (*Calidris canutus rufa*), Whooping Crane (*Grus americana*), Arkansas River Shiner (*Notropis girardi*), Peppered Chub (*Macrhybopsis tetranema*), and the Monarch Butterfly (*Danaus plexippus*). It is highly likely that habitat for the Tricolored Bat and Monarch Butterfly occurs within the 60<sup>th</sup> Avenue NE over Rock Creek study area.

According to a search of federal and state environmental databases, there are three hazardous waste sites adjacent to the study area (ERIS 2023). The AIRS Facility (ERIS Map ID 1), a wireless telecommunication tower, was observed during the field reconnaissance. There are no gas or oil well sites located within or adjacent to the study area, as identified in the Oklahoma Corporation Commission's (OCC) Oil and Gas Well database. According to the OCC's petroleum storage tank database, there are no storage tank sites within or adjacent to the study area. No additional hazardous waste sites were identified during the field reconnaissance.



### 3.0 Proposed Alternatives

#### 3.1 Span Bridge Alternative (Alternatives 1A & 1B)

For the proposed alternatives, the typical section consists of three 12-foot driving lanes with 10-foot outside shoulders. The typical section was determined by the City of Norman's Comprehensive Transportation Plan (CTP) and collaboration with City staff. The typical section was assumed to consist of nine (9") inches of asphalt pavement on eight (8") inches of aggregate base.

Two bridge superstructure options, rolled steel beams (Alternative 1A) and prestressed concrete beams (Alternative 1B), were investigated.

##### 3.1.1 Roadway

The proposed roadway alignment for this project will be centered on the section line. Remaining on the roadway's existing alignment, about sixteen (16') feet east of the section line, was considered; however, the concentration of existing utilities in the 17-foot public utility easement east of the existing right-of-way ensures much more utility relocation work would be required, including additional power poles and relocation of a water line which may otherwise be avoided. Although remaining on the existing alignment potentially reduces the roadway replacement costs by removing much of the horizontal taper distance, the roadway replacement limits in this case are governed by the vertical geometry, and cost savings for roadway reconstruction would be limited as a result.

Therefore, the proposed roadway alignment for this project will be centered on the section line. Although the number of impacted utilities may be lower, some utility relocations will still be required due to the increased roadway width. To accommodate the widened roadway, expanding to a 100-ft right-of-way is needed.

The existing vertical curve south of the bridge is not sufficient for the posted speed of the roadway. A design exception for the new roadway's vertical curvature as it ties back into the existing roadway south of the proposed bridge will be required.

##### 3.1.2 Bridge

The proposed bridge will be designed to accommodate the typical section described in Section 3.1. The bridge will be a square, single span, simply supported structure with a span length of approximately 100-feet. The proposed bridge layout avoids potential conflicts with the existing bridge substructure elements.

The bridge typical section is 58'-2" wide and will have an 8" deck supported by six beams spaced at 10'-0". ODOT TR3 concrete railings will be provided at the edges of the bridge. The proposed bridge substructure will be composed of pile-supported abutments. The approach slabs will be 30'-0" long and match the width of the bridge. For detailed conceptual General Plan and Elevation and Typical Section, see **Appendix B**.



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Rolled steel beams and prestressed concrete beams were investigated for the study. Rolled beams were included because they provide a smaller structural depth compared to prestressed concrete beams and have the potential to reduce the limits of roadway reconstruction needed. Option 1A investigated the use of W40x324 rolled steel beams, while Option 1B investigated the use of AASHTO Type IV prestressed concrete beams. Each option utilized the same beam length, number and spacing.

For both Alternatives 1A and 1B, the bridge is assumed to be a conventional ODOT style bridge with a construction joint at one abutment and an expansion joint at the second abutment. During final design, an integral style bridge can be investigated. An integral bridge eliminates expansion joints on the bridge and the maintenance issues that go along with them. It is anticipated that an integral bridge would have relatively the same construction cost as a conventional bridge.

3.1.3 Hydraulics

3.1.3.1 Rolled Steel Beams (Alternative 1A)

The proposed alternative 1A is a 100' Steel Beam bridge with a low chord of 1071.00 and a roadway overtopping elevation of 1071.35 approximately 300 feet north of the bridge. The proposed bridge has a roadway overtopping frequency of 116 years. The hydraulics characteristics of the natural channel, existing, and proposed structure are shown in **Table 2**.

**Table 2 – Alternative 1A Hydraulic Summary**

HYDRAULIC SUMMARY - ALTERNATIVE 1A - ROLLED STEEL BEAMS									
Frequency (Years)	Q <sub>Total</sub> (cfs)	Natural Conditions WSEL (ft)	Existing Conditions		Proposed Conditions		Velocity (fps)		
			Elevation (ft)	Backwater (ft)	Elevation (ft)	Backwater (ft)	Natural	Existing	Proposed
2	1073	1060.00	1062.25	2.25	1060.18	0.18	2.65	5.18	5.18
5	2002	1062.50	1064.74	2.24	1062.80	0.30	3.60	6.71	6.55
10	2801	1064.16	1066.40	2.24	1064.56	0.40	4.19	7.58	7.30
25	3984	1066.25	1068.50	2.25	1066.84	0.59	4.85	8.44	8.11
50	5218	1068.15	1071.24	3.09	1068.89	0.74	5.40	7.62	8.71
100	6139	1069.44	1071.55	2.11	1070.22	0.78	5.70	8.17	8.97

3.1.3.2 Prestressed Concrete Beams (Alternative 1B)

The proposed alternative 1B is a 100' Prestressed Concrete Beam bridge with a low chord of 1071.00 and a roadway overtopping elevation of 1071.36 approximately 300 feet north of the bridge. The proposed bridge has a roadway overtopping frequency of 111 years. The hydraulics characteristics of the natural channel, existing, and proposed structure are shown in **Table 3**.







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Table 3 – Alternative 1B Hydraulic Summary

HYDRAULIC SUMMARY - ALTERNATIVE 1B - PRESTRESSED CONCRETE BEAMS									
Frequency (Years)	Q <sub>Total</sub> (cfs)	Natural Conditions WSEL (ft)	Existing Conditions		Proposed Conditions		Velocity (fps)		
			Elevation (ft)	Backwater (ft)	Elevation (ft)	Backwater (ft)	Natural	Existing	Proposed
2	1073	1060.00	1062.25	2.25	1060.29	0.29	2.65	5.18	5.56
5	2002	1062.50	1064.74	2.24	1062.95	0.45	3.60	6.71	6.99
10	2801	1064.16	1066.40	2.24	1064.74	0.58	4.19	7.58	7.76
25	3984	1066.25	1068.50	2.25	1067.02	0.77	4.85	8.44	8.50
50	5218	1068.15	1071.24	3.09	1069.01	0.86	5.40	7.62	8.92
100	6139	1069.44	1071.55	2.11	1070.34	0.90	5.70	8.17	9.12

3.1.4 Environmental

The Span Bridge Alternative would remove and replace the existing bridge over Rock Creek with a new 58-foot-2 inch wide by 100-foot-long span bridge. Replacement of the bridge would involve additional right-of-way (ROW). Best Management Practices will be implemented to limit the quantity of sediment entering the stream during construction. This alternative will likely not require a Section 404 permit from the U.S. Army Corps of Engineers (USACE).

Environmental impacts of the Span Bridge Alternative could include impacts to potential habitat for the Tricolored Bat and Monarch Butterfly. Removal of trees and shrubs should be restricted to areas within the actual limits of construction to avoid and minimize adverse impacts to bats. All aspects of the project may be modified to avoid tree removal. The Nationwide Monarch Butterfly CCAs conservation measures will be followed to minimize threats to the Monarch Butterfly. Migratory birds are protected by the federal Migratory Bird Treaty Act. Many birds commonly use bridges and culverts for nesting. The nesting season for most bird species extends from March 1 to August 31. No migratory bird use on the existing bridge was observed during the field reconnaissance; however, if an official survey for migratory bird use is conducted, the results are valid until the start of the 2023 nesting season (beginning March 1). The new span bridge will provide suitable habitat for migratory birds.

3.1.5 Construction Sequencing

The existing bridge has been closed to all traffic and a detour has been put in place. The detour of 60<sup>th</sup> Avenue NE shall remain during construction of the proposed bridge.

3.1.6 Cost Estimate

An estimated opinion of probable cost has been developed for Alternatives 1A and 1B and are presented in **Tables 4 and 5**. The opinion of probable cost accounts for the roadway improvements to 60<sup>th</sup> Avenue NE, bridge, traffic (temporary and permanent), right-of-way and utility relocations. An itemized cost estimate is provided in **Appendix C**.





**Table 4 - Alternative 1A Cost Estimate**

<b>ENGINEER'S OPINION OF PROBABLE COST</b>	
<b>ALTERNATIVE 1A - STEEL BEAMS</b>	
<b>ITEM DESCRIPTION</b>	<b>COST</b>
ROADWAY & TRAFFIC	\$ 648,204.00
BRIDGE	\$ 1,126,170.00
REMOVAL OF EXISTING BRIDGE STRUCTURE	\$ 30,000.00
RIGHT-OF-WAY & UTILITY RELOCATIONS	\$ 350,000.00
STAKING	\$ 50,000.00
MOBILIZATION	\$ 148,000.00
ENVIRONMENTAL MITIGATION	\$ -
CONTINGENCY (25%)	\$ 588,092.00
<b>TOTAL =</b>	<b>\$ 2,940,457.00</b>

**Table 5 - Alternative 1B Cost Estimate**

<b>ENGINEER'S OPINION OF PROBABLE COST</b>	
<b>ALTERNATIVE 1B- PRESTRESSED CONCRETE BEAMS</b>	
<b>ITEM DESCRIPTION</b>	<b>COST</b>
ROADWAY & TRAFFIC	\$ 680,036.00
BRIDGE	\$ 801,890.00
REMOVAL OF EXISTING BRIDGE STRUCTURE	\$ 30,000.00
RIGHT-OF-WAY & UTILITY RELOCATIONS	\$ 350,000.00
STAKING	\$ 50,000.00
MOBILIZATION	\$ 134,000.00
ENVIRONMENTAL MITIGATION	\$ -
CONTINGENCY (25%)	\$ 511,481.00
<b>TOTAL =</b>	<b>\$ 2,557,403.00</b>





### 3.2 Reinforced Concrete Box Alternative (Alternative 2)

#### 3.2.1 Roadway

For the proposed alternative, the typical section will have the same characteristics as described in **Section 3.1.1**.

#### 3.2.2 Bridge

The results of the hydraulic analysis indicated that a triple cell 20-foot wide by 21-foot tall, reinforced concrete box (RCB) would be required to meet the City of Norman's hydraulic design requirements. The proposed RCB for this alternative will be a non-skewed, approximately 78-foot long triple cell structure with non-standard end sections that includes an apron, wing walls, and curtain walls.

To minimize the impact of the raised profile grade for this alternative, the RCB will have no fill over it and is considered "at-grade". Therefore, the top slab of the RCB is used at the driving surface. At-grade RCB's tend to have more long-term maintenance concerns than RCB's under fill because they are in direct contact with the elements and de-icing chemicals used to treat roadways. Additionally, ODOT standard concrete traffic rails (TR3) will be placed at the edges of the RCB to protect traffic and to connect to the guardrail that will be placed at all four corners of the approach roadway. For detailed conceptual General Plan and Elevation, See **Appendix B**.

There are several challenges associated with the proposed layout of the RCB. The first challenge is that the height of the cells exceeds the ODOT standards by more than six feet and would require a custom end section design. The custom design is anticipated to require that the end section wing walls be supported by steel piling. The steel piling will require additional construction activities within the Rock Creek channel.

A second challenge with the proposed RCB is the large end section that would be required. As seen in **Figure 9**, the traditional end section design on the west side of the structure creates a conflict with the existing residential driveway on the southeast corner of the project side. This layout would also require extensive work within the Rock Creek channel to construct the end section and then re-grade the channel.





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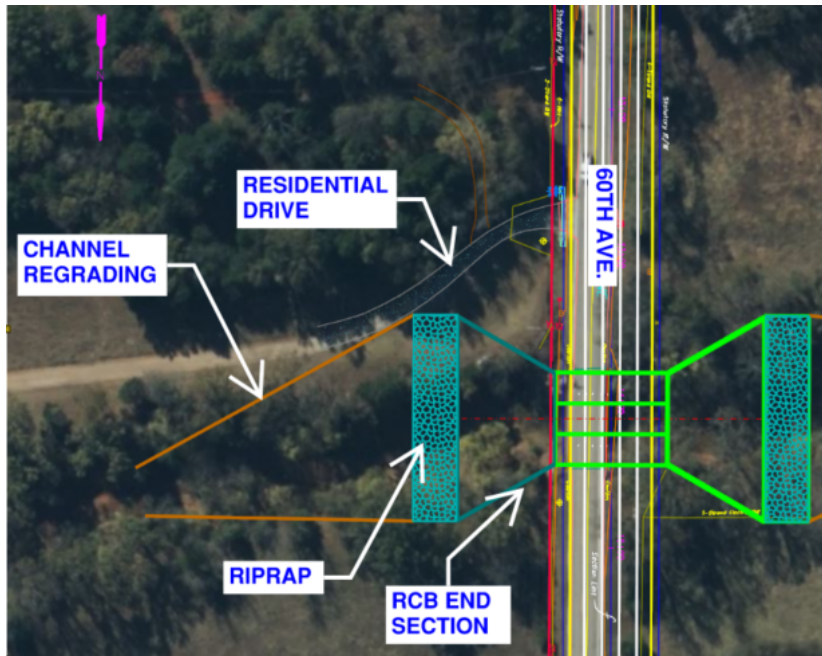


Figure 9 - RCB Traditional End Section

An alternative end section with straight wingwalls would lessen the impacts to the existing residential driveway and Rock Creek (see **Figure 10**), however they would not be eliminated.

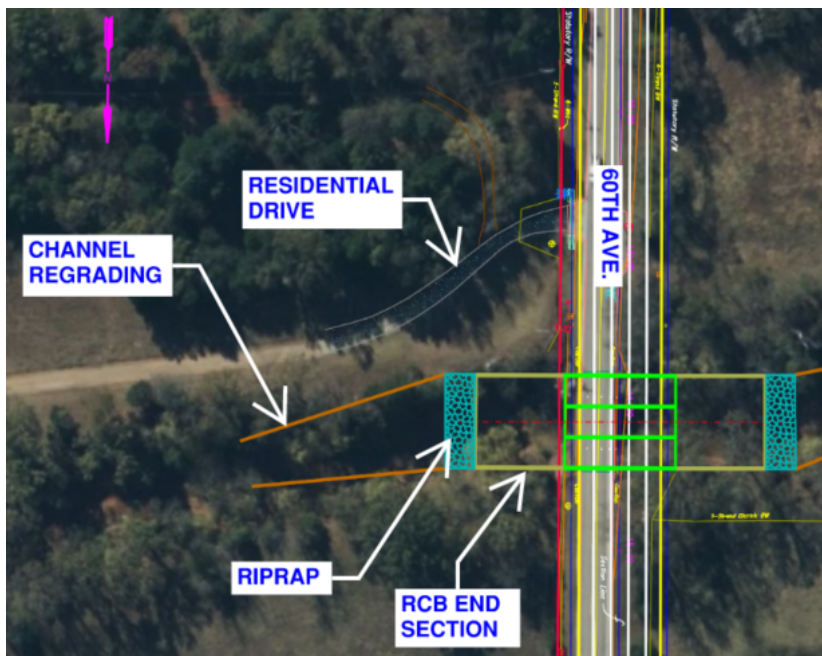


Figure 10 - Alternative RCB End Section





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3.2.3 Hydraulics

The proposed Alternative 2 is a 3-20'x21' RCB with an inlet elevation of 1050.30 and a roadway overtopping elevation of 1071.31 approximately 300 feet north of the bridge. The proposed structure has a roadway overtopping frequency of 160 years. The hydraulics characteristics of the natural channel, existing, and proposed structure are shown in **Table 6**.

**Table 6 - Alternative 2 Hydraulic Summary**

HYDRAULIC SUMMARY - ALTERNATIVE 2 - REINFORCED CONCRETE BOX									
Frequency (Years)	Q <sub>Total</sub> (cfs)	Natural Conditions WSEL (ft)	Existing Conditions		Proposed Conditions		Velocity (fps)		
			Elevation (ft)	Backwater (ft)	Elevation (ft)	Backwater (ft)	Natural	Existing	Proposed
2	1073	1060.00	1062.25	2.25	1059.88	-0.12	2.65	5.18	1.78
5	2002	1062.50	1064.74	2.24	1062.34	-0.16	3.60	6.71	2.64
10	2801	1064.16	1066.40	2.24	1063.99	-0.17	4.19	7.58	3.25
25	3984	1066.25	1068.50	2.25	1066.10	-0.15	4.85	8.44	4.01
50	5218	1068.15	1071.24	3.09	1068.03	-0.12	5.40	7.62	4.71
100	6139	1069.44	1071.55	2.11	1069.37	-0.07	5.70	8.17	5.18

3.2.4 Environmental

The Reinforced Concrete Box Alternative will remove and replace the existing bridge over Rock Creek with a new 20-foot wide by 21-foot tall RCB. Impacts from replacing the existing bridge with an RCB would be somewhat greater than the Span Bridge Alternative due to the need for additional ROW and channel work. Placement of the RCB, riprap, and channel regrading will require work below Rock Creek which will necessitate a Section 404 permit from the USACE. It is anticipated the project would fall under Nationwide Permit 14.

The 2022 revised Nationwide Permits issued by the USACE set a 0.03-acre threshold for the amount of stream-bed loss that triggers required compensatory mitigation. No streams have been formally delineated; however, an estimation of stream acreage that would be impacted can be calculated using the proposed ROW. The Tulsa District requires all new projects to use the Oklahoma Stream Mitigation Method to calculate stream credits. Mitigation of stream impacts would be accomplished through purchase of credits at an approved mitigation bank. For the Reinforced Concrete Box Alternative, an estimated cost of \$185,606.40 may be required to mitigate impacts to Rock Creek (**Table 7**).

**Table 7 - Estimated Stream Mitigation for Alternative 2**

<b>Type of Impact:</b>	RCB Placement, Riprap, Channel Work
<b>Required Credits<sup>1</sup>:</b>	707.072
<b>Amount per Credit<sup>2</sup>:</b>	\$175
<b>Estimated Cost<sup>3</sup>:</b>	\$185,606.40

<sup>1</sup> Estimated using the OSMM Tool

<sup>2</sup> Intermittent stream credit amount in the secondary service area of Deep Fork Mitigation Bank. Cost sent from Jason Hoffman.





60<sup>th</sup> Avenue NE over Rock Creek

<sup>3</sup> Includes a 1.5 multiplier

Environmental impacts of the Alternative 2 could also include impacts to potential habitat for the Tricolored Bat and Monarch Butterfly. Removal of trees and shrubs should be restricted to areas within the actual limits of construction to avoid and minimize adverse impacts to bats. All aspects of the project may be modified to avoid tree removal. The Nationwide Monarch Butterfly CCAs conservation measures will be followed to minimize threats to the Monarch Butterfly. Migratory birds are protected by the federal Migratory Bird Treaty Act. Many birds commonly use bridges and culverts for nesting. The nesting season for most bird species extends from March 1 to August 31. No migratory bird use on the existing bridge was observed during the field reconnaissance; however, if an official survey for migratory bird use is conducted, the results are valid until the start of the 2023 nesting season (beginning March 1). The new RCB will provide suitable habitat for migratory birds.

3.2.5 Construction Sequencing

The construction sequencing for the RCB alternative would be similar to the Span Bridge Alternatives described in **Section 3.1.5**.

3.2.6 Cost Estimate

An estimated opinion of probable cost has been developed for Alternative 2 and is presented in **Table 8**. The opinion of probable cost accounts for the roadway improvements to 60<sup>th</sup> Avenue NE, bridge, traffic (temporary and permanent), right-of-way and utility relocations. An itemized cost estimate is provided in **Appendix C**.

**Table 8 - Alternative 2 Cost Estimate**

<b>ENGINEER'S OPINION OF PROBABLE COST</b>	
<b>ALTERNATIVE 2 - REINFORCED CONCRETE BOX</b>	
<b>ITEM DESCRIPTION</b>	<b>COST</b>
ROADWAY & TRAFFIC	\$ 615,180.00
BRIDGE	\$ 1,844,570.00
REMOVAL OF EXISTING BRIDGE STRUCTURE	\$ 30,000.00
RIGHT-OF-WAY & UTILITY RELOCATIONS	\$ 500,000.00
STAKING	\$ 50,000.00
MOBILIZATION	\$ 193,000.00
ENVIRONMENTAL MITIGATION	\$ 185,606.40
CONTINGENCY (25%)	\$ 854,588.00
<b>TOTAL =</b>	<b>\$ 4,272,937.00</b>







#### 4.0 Conclusion

This Engineering Report compiles the existing condition of the study area, outlines the design approach and provides an overview of the bridge replacement alternatives considered. A project impact matrix has been included in **Table 9**.

**Table 9 - Project Impact Matrix**

60TH AVENUE NE OVER ROCK CREEK PROJECT MATRIX									
Alternative	Description	Total Cost	Construction Duration (days)	Right-of-Way (acre)	Utility Impacts	Permitting	Mitigation Costs	Cultural Resources	Long-Term Maintenance
1A	100' Steel Beam Span	\$2.9M	180	0.68	Medium	N/A	\$0	None	High
1B	100' Prestressed Beam Span	\$2.6M	180	0.68	Medium	N/A	\$0	None	Medium
2	3-20'x21' RCB	\$4.4M	210	1.2	High	Section 404 NWP 24	\$185,600	None	Low

Each of the alternatives proposed meet the primary objectives of replacing the existing 60<sup>th</sup> Avenue NE bridge over Rock Creek. For alternative plan sheets see **Appendix B**. For detailed costs estimate see **Appendix C**.







# Appendix A

# NBI Bridge Inspection Report





# Oklahoma Dept. of Transportation - Bridge Inspection Report

<b>NBI No.:</b> 09189	<b>Structure No.:</b> 14N3170E1210005	<b>Local ID:</b> 022A	<b>Suff. Rating:</b> 27.20	<b>SD</b>
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<b>Bridge Description:</b> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">15ft. - 36ft. - 15ft. WF BEAM</div> <p>1. State: Oklahoma 2. Division: Division 3 3. County: CLEVELAND 4. City: NORMAN Admin Area: Unknown 5a. On/Under: Route On Structure 5b. Kind of Hwy: City Street 5c. Lvl of Svc: Mainline 5d. Route No.: N3170 5e. Dir. Sufx: N/A (NBI)</p> <p>7. Facility Carried : 60TH AVE NE 6. Feat. Intersect: ROCK CREEK 9. Location: 0.5 N ROCK CREEK RD 11. Mile Post: 4.542 mi 13. LRS Inv. / Sub Rte: -1 / -1 16. Latitude: 35° 15' 19.30" 17. Longitude: 097° 21' 11.09" 98. Border Brdg: Unknown (P) % Responsible: 0.00 99. Border Brdg #: Unknown</p>	<p style="text-align: center;"><b>INSPECTION</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Type</th> <th>Insp. Req.</th> <th>Insp. Done</th> <th>Freq.</th> <th>Insp. Date</th> <th>Next Insp.</th> </tr> </thead> <tbody> <tr> <td>NBI:</td> <td></td> <td>1</td> <td>12 months</td> <td>10/10/2022</td> <td>10/10/2023</td> </tr> <tr> <td>FC:</td> <td>N</td> <td>0</td> <td></td> <td>NA</td> <td>NA</td> </tr> <tr> <td>UW:</td> <td>N</td> <td>0</td> <td></td> <td>NA</td> <td>NA</td> </tr> <tr> <td>OS:</td> <td>N</td> <td>0</td> <td></td> <td>NA</td> <td>NA</td> </tr> </tbody> </table> <p style="text-align: center;"><b>CLASSIFICATION</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>12. Base Hwy Net.: Not on Base Network</td> <td>101. Parallel Str.: No    bridge exists</td> </tr> <tr> <td>20. Toll Facility: On free road</td> <td>102. Traffic Dir.: 2-way traffic</td> </tr> <tr> <td>21. Custodian: City</td> <td>103. Temp. Str.: Not Applicable (P)</td> </tr> <tr> <td>22. Owner: City</td> <td>104. Hwy System: Not on NHS</td> </tr> <tr> <td>26. Function Class: 09 Rural Local</td> <td>105. Fed Land Hwy: IRR-Indian Res Rd</td> </tr> <tr> <td>37. Historical Sig.: Not eligible for NRHP</td> <td>110. Defense Hwy: Not a STRAHNET hwy</td> </tr> <tr> <td>100. Def. Hwy: Not a STRAHNET hwy</td> <td>112. NBIS Length: Long Enough</td> </tr> </table>	Type	Insp. Req.	Insp. Done	Freq.	Insp. Date	Next Insp.	NBI:		1	12 months	10/10/2022	10/10/2023	FC:	N	0		NA	NA	UW:	N	0		NA	NA	OS:	N	0		NA	NA	12. Base Hwy Net.: Not on Base Network	101. Parallel Str.: No    bridge exists	20. Toll Facility: On free road	102. Traffic Dir.: 2-way traffic	21. Custodian: City	103. Temp. Str.: Not Applicable (P)	22. Owner: City	104. Hwy System: Not on NHS	26. Function Class: 09 Rural Local	105. Fed Land Hwy: IRR-Indian Res Rd	37. Historical Sig.: Not eligible for NRHP	110. Defense Hwy: Not a STRAHNET hwy	100. Def. Hwy: Not a STRAHNET hwy	112. NBIS Length: Long Enough
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<p style="text-align: center;"><b>STRUCTURE TYPE AND MATERIALS</b></p> <p>43a/b. Main Span: Steel / Stringer/Girder 44a/b. Appr. Span: N/A / Not Applicable (P) 45. # of Main Spans: 3 46. # of Appr. Spans: 0 107. Deck Type: Concrete-Cast-in-Place 108a. Wearing Surface: Bituminous 108b. Membrane: None 108c. Deck protection: None</p>	<p style="text-align: center;"><b>CONDITION</b></p> <p>58. Deck: 6 Satisfactory 59. Sup.: 4 Poor 60. Sub: 4 Poor 62. Culvert: N/A (NBI) 61. Chan./Chan. Prot.: 5 Bank Prot Eroded</p> <p style="text-align: center;"><b>Flowline Notes</b></p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">2022- FL= 19.4 ft to E TOD</div> <div style="border: 1px solid black; padding: 2px;">2021, FL=19.1ft to ETOD 2019, FL = 19.2ft measured 35ft from NE corner.</div>
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<p style="text-align: center;"><b>AGE AND SERVICE</b></p> <p>19. Detour Length: 0.6 mi 27. Year Built: 1940 28a/b. Lanes on/und: 2 / 0 29. ADT: 1,669 30. Year of ADT: 2020 42a/b. Type of Svc on/und: Highway / Waterway</p> <p>106. Year Reconst.: 109. Truck ADT: 10%</p>	<p style="text-align: center;"><b>LOAD RATING AND POSTING</b></p> <p>31. Design Load: M 9 (H 10) 41. Post. Status: P Posted for load 70. Posting: 0 &gt;39.9% below 63. Op / 65. Inv. Rating Meth.: 1 LF Load Factor / 1 LF Load Factor</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>H</th> <th>HS</th> <th>3-3</th> <th>EV3</th> <th>SHV</th> </tr> </thead> <tbody> <tr> <td>64. Operating Rating (tons):</td> <td>5.60</td> <td>6.60</td> <td>15.50</td> <td>4.30</td> <td>5.60</td> </tr> <tr> <td>66. Inventory Rating (tons):</td> <td>3.40</td> <td>4.00</td> <td>9.30</td> <td>2.60</td> <td></td> </tr> </tbody> </table>		H	HS	3-3	EV3	SHV	64. Operating Rating (tons):	5.60	6.60	15.50	4.30	5.60	66. Inventory Rating (tons):	3.40	4.00	9.30	2.60	
	H	HS	3-3	EV3	SHV														
64. Operating Rating (tons):	5.60	6.60	15.50	4.30	5.60														
66. Inventory Rating (tons):	3.40	4.00	9.30	2.60															

<p style="text-align: center;"><b>GEOMETRIC DATA</b></p> <p>10. Vert. Clearance: 99.99 ft 32. Appr Rwy Width: 24.00 ft 33. Median: No median 34. Skew: 0.00° 35. Struct. Flared: No flare 47. Horizontal Clr: 26.00 ft 48. Length Max Span: 36.09 ft 49. Struct. Length: 65.95 ft</p> <p>50a. Curb/Sdwk Width L: 0.00 ft 50b. Curb/Sdwk Width R: 0.00 ft 51. Width Curb to Curb: 26.00 ft 52. Width Out to Out: 26.00 ft Deck Area: 1,711.46 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</p>	<p style="text-align: center;"><b>APPRAISAL</b></p> <p>36a. Brdg Rail: 0 Substandard 36b. Transition: 0 Substandard 36c. Appr. Rail: 0 Substandard 36d. Appr. Rail Ends: 0 Substandard 67. Str Evaluation: 2 Intolerable - Repl</p> <p>68. Deck Geom.: 4 Tolerable 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 Footir</p>
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<p style="text-align: center;"><b>OKLAHOMA ITEMS</b></p> <p>200c. Temperature: 68 200d. Weather: Cloudy 201. Struc. Stl. ASTM Desig.: -1 / -1 202. Waterprf. Membrane: -1 Date Installed: 01/01/1901 203. Type Exp. Device: Pourable 204. Type of Railing: Metal Railing (other) 205. Material Quantity: -1.00 208a. Type of Abutment: Other b. Type of Found.: Bears on Natural Found. 209. Type of Pier/Found.: B / No Steel Piling 210. Foundation Elev.: -1.00    -1.00 -1.00    -1.00    -1.00 211. Wear. Surf. Prot. Sys: None Date Installed: 01/01/1901 211c. Silane Reapplied 211d. Date: 213. Utilities Attached:</p>	<p style="text-align: center;"><b>PROPOSED IMPROVEMENTS</b></p> <p>94. Bridge Cost: \$255,000 95. Roadway Cost: \$140,000 96. Total Cost: \$406,000 97. Yr. of Cost Est.: 2015</p> <p>75. Type of Work: 31 Repl-Load Capacity 76. Lngth of Improvement: 163.9 ft 114. Future ADT: 2,336 115. Yr. of Future ADT: 2040</p> <p style="text-align: center;"><b>NAVIGATION DATA</b></p> <p>38. Nav. Control: Permit Not Required 39. Vert. Clearance: 0.0 ft 40. Horiz. Clearance: 0.0 ft</p> <p>111. Pier Protect.: Not Applicable (P) 116. Lift Bridge Vert. Clr.: 0.0 ft</p>
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<p>214a. Posted Weight Limit: 040404 b. Posted Speed Limit: 50 c. Narrow/1way Brdg Sign: No d. Vertical Clr. Sign: No Adv. Warning Sign: No e. Navigation Lights?: No Working/Not Working: No 215. Overpass: ACOG 218. Functionally Obsolete: FO 220. Bridge Redecked: - 221. Substr. Cond. (U/W): 222. Fill Over RCB: 223. Appr. Slab/Rwy Cond.: 2 225. Paint Type/Ovrct: Red Lead 3 Coat System 226. Date Painted: 1940 227. Paint Color: Silver 233. Deck Forming: Perm. Metal Deck Forr 238. School Bus Rte.: Current bus route 240. Appr. Rwy Type.: Asphalt/Bituminous 243. Grdr Spacing/No.: 3.40 / VA</p>	<p>244. Span Lengths: 15    36    15</p> <p>245. Girder Depth: 1.25 246a. Type of Overlay: AC Overlay b. Overlay Thickness: 6.00 c. Overlay Date: 01/01/1991 d. Ovlv Depth Changed &gt;1": N</p> <p>247. Protective Systems:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; height: 20px;"></td> <td style="width: 50%; height: 20px;"></td> </tr> <tr> <td style="width: 50%; height: 20px;"></td> <td style="width: 50%; height: 20px;"></td> </tr> </table> <p>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: - 264. Interstate Milepoint:</p>				



# Oklahoma Dept. of Transportation - Bridge Inspection Report

<b>NBI No.:</b> 09189	<b>Structure No.:</b> 14N3170E1210005	<b>Local ID:</b> 022A	<b>Suff. Rating:</b> 27.20	<b>SD</b>
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Inspection Date: 10/10/22      Troy Travis  
 Invoice No.: HWL141022      Inspected With: Colby Warden

Digitally signed by Troy Travis  
 DN: C=US, E=ttravis@hwlochner.com, O=HW Lochner,  
 OU=Oklahoma, CN=Troy Travis  
 Location: Oklahoma City, OK  
 Reason: I am the author of this document  
 Contact Info: ttravis@hwlochner.com  
 Date: 2022.11.28 13:32:59-06'00'

**BRIDGE NOTES:**

**INSPECTION NOTES:**      10/10/22

Banks have rubble & slurry concrete mix poured near the piles. Bank erosion may be occurring at the south interior bent piles. The NW & SE banks are vertical. Active bank erosion occurring on the SE bank.

**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	1,711.00	0%	0.00	100%	1,711.00	0%	0.00	0%	0.00
Cracking & scaling at edges. Covered with asphalt.											
510 / 4	Wearing Surfaces	sq.ft	1,711.00	100%	1,711.00	0%	0.00	0%	0.00	0%	0.00
Heavy cracks in asphalt and over piers.											
107 / 4	Steel Opn Girder/Beam	ft	604.00	0%	0.00	0%	0.00	100%	604.00	0%	0.00
FX - Bottom flanges have rust & deep pitting.											
515 / 4	Steel Protective Coating	sq.ft	4,202.00	0%	0.00	0%	0.00	100%	4,202.00	0%	0.00
Paint system has failed.											
202 / 4	Steel Column	each	12.00	0%	0.00	67%	8.00	33%	4.00	0%	0.00
FX - All exterior piles have minor section loss at the ground line.											
219 / 4	Stl Abutment	ft	52.00	0%	0.00	0%	0.00	100%	52.00	0%	0.00
Mostly covered by rock & gravel. Very small areas have heavy rust & pitting.											
231 / 4	Steel Pier Cap	ft	52.00	0%	0.00	90%	47.00	10%	5.00	0%	0.00
PX - Bottom flanges have severe rust & deep pitting. Web of caps losing section, supplementary caps have advanced corrosion.											
918 / 4	St.(substr)Prot.Coat	(EA)	436.00	0%	0.00	0%	0.00	0%	0.00	100%	436.00
Paint system has failed.											
301 / 4	Pourable Joint Seal	ft	52.00	0%	0.00	100%	52.00	0%	0.00	0%	0.00
Joints are covered by asphalt overlay.											
330 / 4	Metal Bridge Railing	ft	131.00	0%	0.00	0%	0.00	100%	131.00	0%	0.00
Rust is prevalent with minor pitting. Rail is too low.											
919 / 4	St.(Rail) Prot. Coat	(SF)	286.00	0%	0.00	0%	0.00	0%	0.00	100%	286.00
Paint system has failed.											
865 / 4	St.Open Gird End(5Ft)	(LF)	160.00	0%	0.00	0%	0.00	100%	160.00	0%	0.00
PX - Westernmost beam end has significant section loss. FX - Bottom flanges have severe rust & deep pitting. Section loss on beam ends at both piers are approximately 5%.											
875 / 1	Masonry Wingwall	(EA)	4.00	0%	0.00	0%	0.00	75%	3.00	25%	1.00
PX - Erosion at southeast corner of structure is encroaching onto the roadway, as well as northwest ditch.											
890 / 4	Steel SIP Form	(LF)	1.00	0%	0.00	0%	0.00	100%	1.00	0%	0.00
Forms are rusty & have significant section loss.											
958 / 4	Concrete Cracking SF	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00
Cracks are moderate in size & density.											
963 / 4	Steel Section Loss SF	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00
Minor to moderate section loss & deep pitting found in beams, beam ends, abutments, supplementary caps & railing.											
968 / 4	Erosion SF	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00
PX - Erosion at southeast corner of structure is encroaching onto the roadway, as well as northwest ditch.											





# Appendix B

# Alternative Plan Sheets





# PLAN OF 60TH AVENUE NE BRIDGE REPLACEMENT OVER ROCK CREEK

CITY OF NORMAN PROJECT NO. GEN #####  
GRADING, DRAINAGE, SURFACING, ...



The City of  
Norman

BRANDI STUDLEY  
Council Member

LAUREN SCHUELER  
Council Member

KELLY LYNN  
Council Member

HELEN GRANT  
Council Member

LARRY HEIKKILA  
Mayor

DARREL PYLE  
City Manager

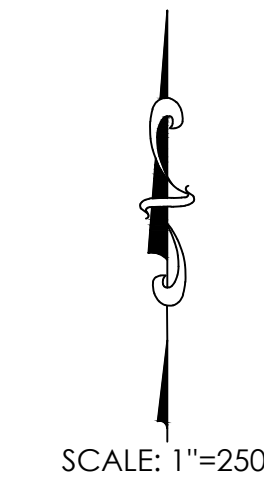
KATHRYN WALKER  
City Attorney

RARCHAR TORTORELLO  
Council Member

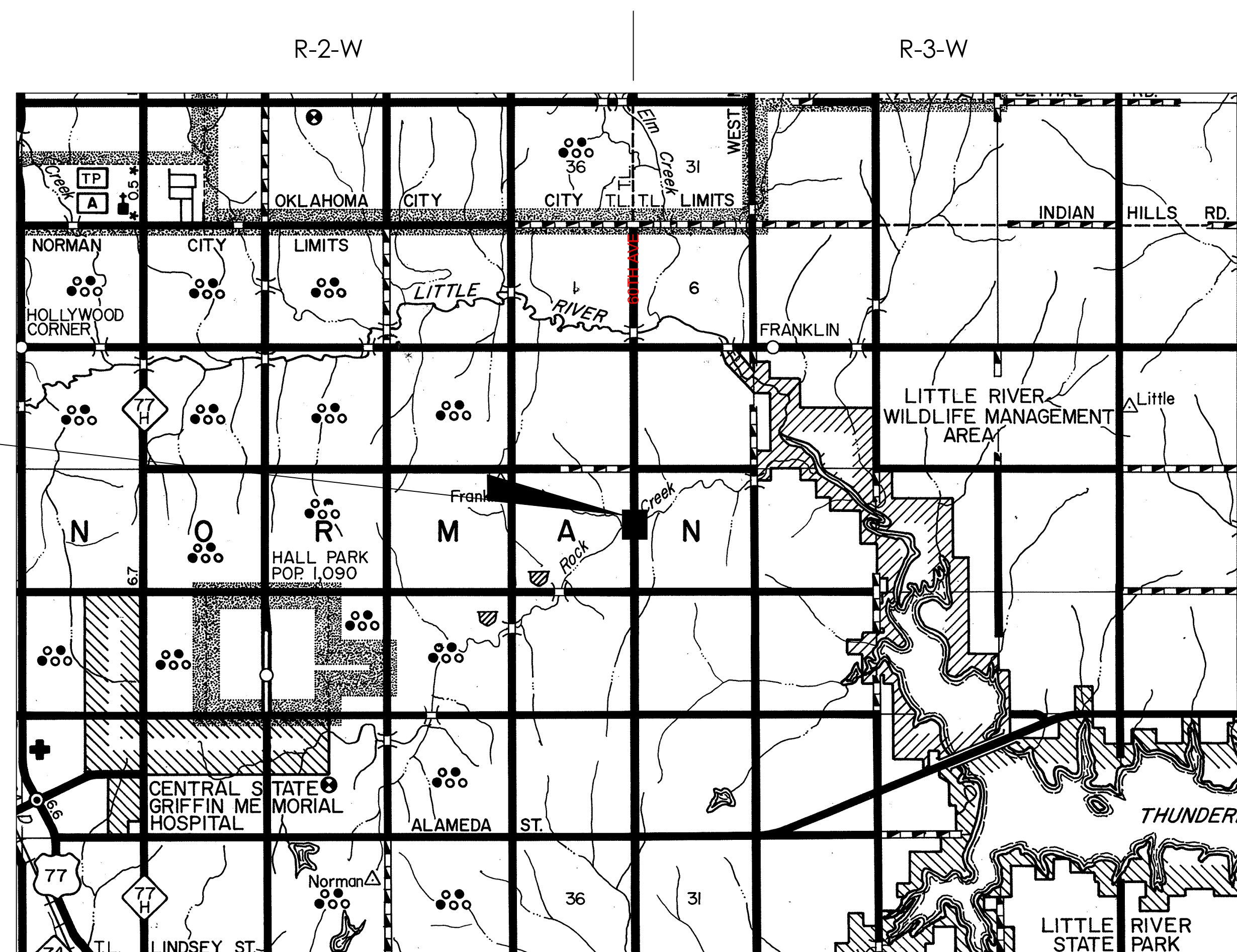
ELIZABETH FOREMAN  
Council Member

STEPHEN HOLMAN  
Council Member

MATTHEW PEACOCK  
Council Member



PROJECT LOCATION



LEGEND	
	EXISTING CONTOUR
	PROPOSED CONTOUR
	FENCE
	OVERHEAD ELECTRIC
	POWER POLE
	LIGHT POLE
	WATER LINE
	FIRE HYDRANT
	GATE VALVE
	WATER METER
	FIBER OPTIC UNDERGROUND
	TELEPHONE UNDERGROUND
	POWER UNDERGROUND
	CABLE TV UNDERGROUND
	GAS LINE
	GAS METER
	GAS VALVE
	SANITARY SEWER
	STORM SEWER
	GUARD POSTS
	ROAD SIGNS
	ROCK BAGS
	SILTATION FENCE
	EXISTING BUILDING
	PROPOSED ASPHALT PAVING
	PROPOSED P.C. CONCRETE REMOVALS

SHEET INDEX	
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	TYPICAL SECTIONS
3	ALTERNATIVE 1A P&P
4	ALTERNATIVE 1A GENERAL PLAN AND ELEVATION
5	ALTERNATIVE 1A TYPICAL SECTION
6	ALTERNATIVE 1B P&P
7	ALTERNATIVE 1B GENERAL PLAN AND ELEVATION
8	ALTERNATIVE 1B TYPICAL SECTION
9	ALTERNATIVE 2 P&P
10	ALTERNATIVE 2 GENERAL PLAN AND ELEVATION

THE FOLLOWING STANDARDS SHALL BE REQUIRED ON THIS PROJECT:

CITY OF NORMAN CONSTRUCTION STANDARDS					
GC 02	W 05	W 09b	ST 14	ST 18	ST 32
W 02	W 07	W 11	ST 14a	ST 21	ST 33
W 03	W 08	W 13	ST 15	ST 23	ST 36
W 04	W 09a	ST 11	ST 16	ST 29	SD 01

ODOT CONSTRUCTION STANDARDS					
SSS-2-0	TCS2-4-0	SSCD-4-0	CI-2-0		
TR-3-2-01E	EJ-SQ-04E	EJ-DTL-02E	HPI-2-01E		

PREPARED BY:

J. BRET CABBINESS, P.E.  
REGISTERED PROFESSIONAL ENGINEER NO. 18093

UTILITY OWNERS	
ONG	(405) 556.6411
OG&E	(405) 553.5785
CHICKASAW TELEPHONE CO.	(580) 622.3837
ONENET	(405) 225.9453
CITY OF NORMAN	(405) 217.7778
CITY OF NORMAN WATER	(405) 291.5545
CITY OF NORMAN SEWER	(405) 329.0703
AT&T	(405) 291.5545



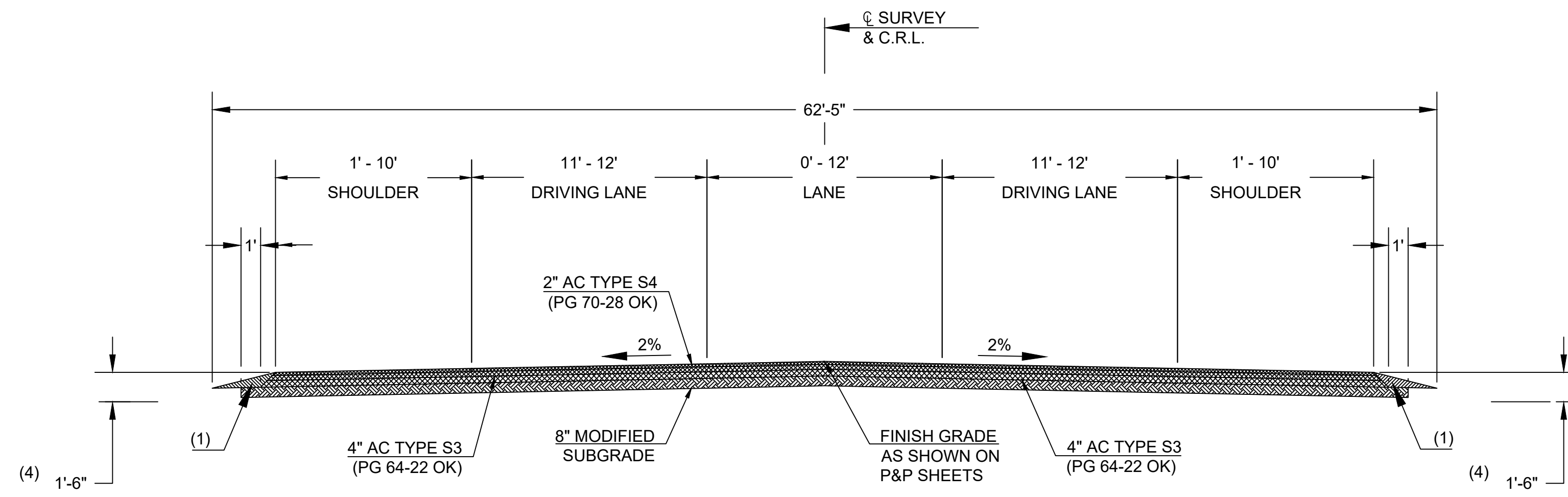
ONE CALL UTILITY LOCATION NUMBER  
(405) 840-5032  
(800) 522-6543

THIS NUMBER IS TO BE USED FOR INFORMATION ON THE LOCATION OF ALL UNDERGROUND UTILITIES. CONTACT THIS NUMBER AND OTHER SPECIFIED NUMBERS IN THE PLANS PRIOR TO ANY EXCAVATION.

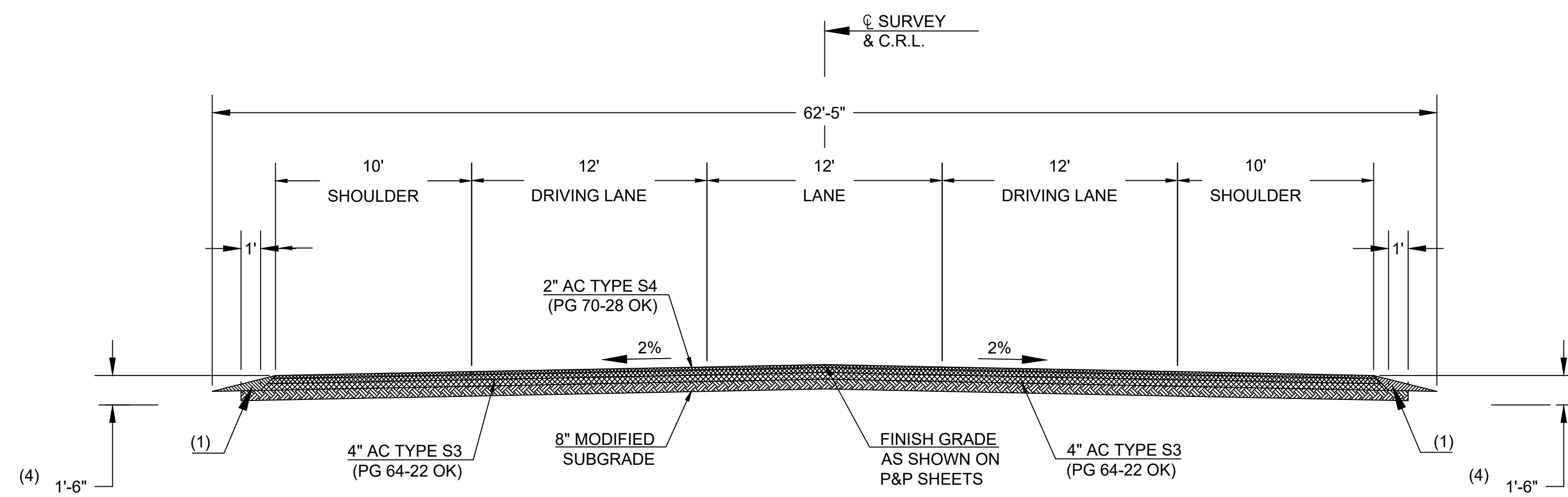
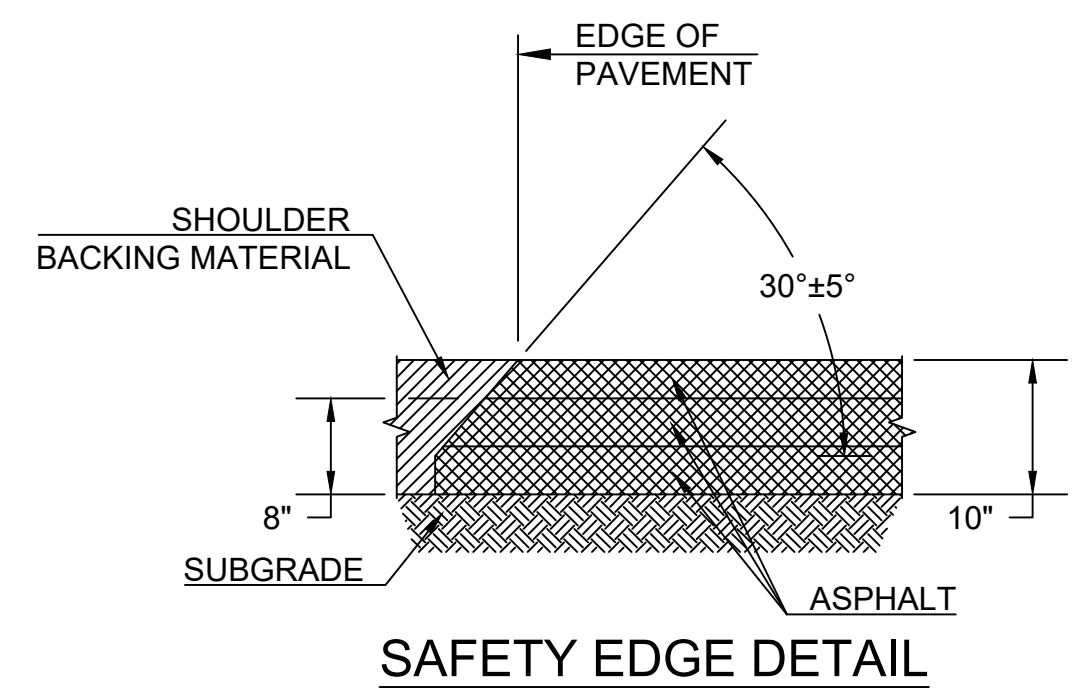
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TITLE SHEET  
PE REPORT - TS  
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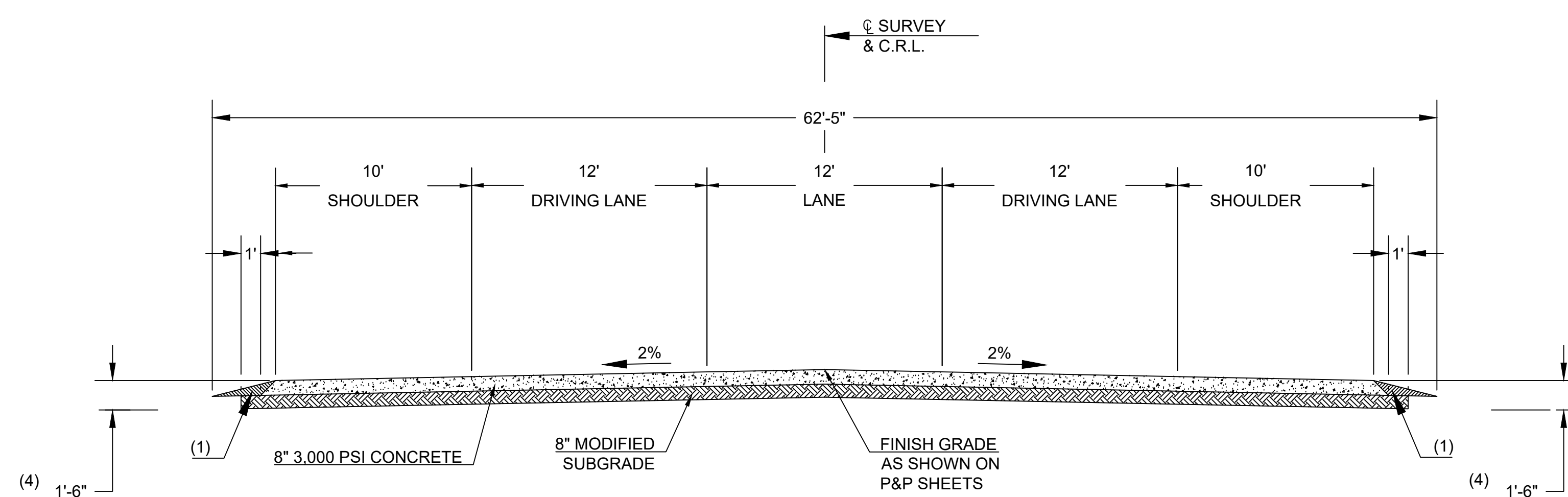
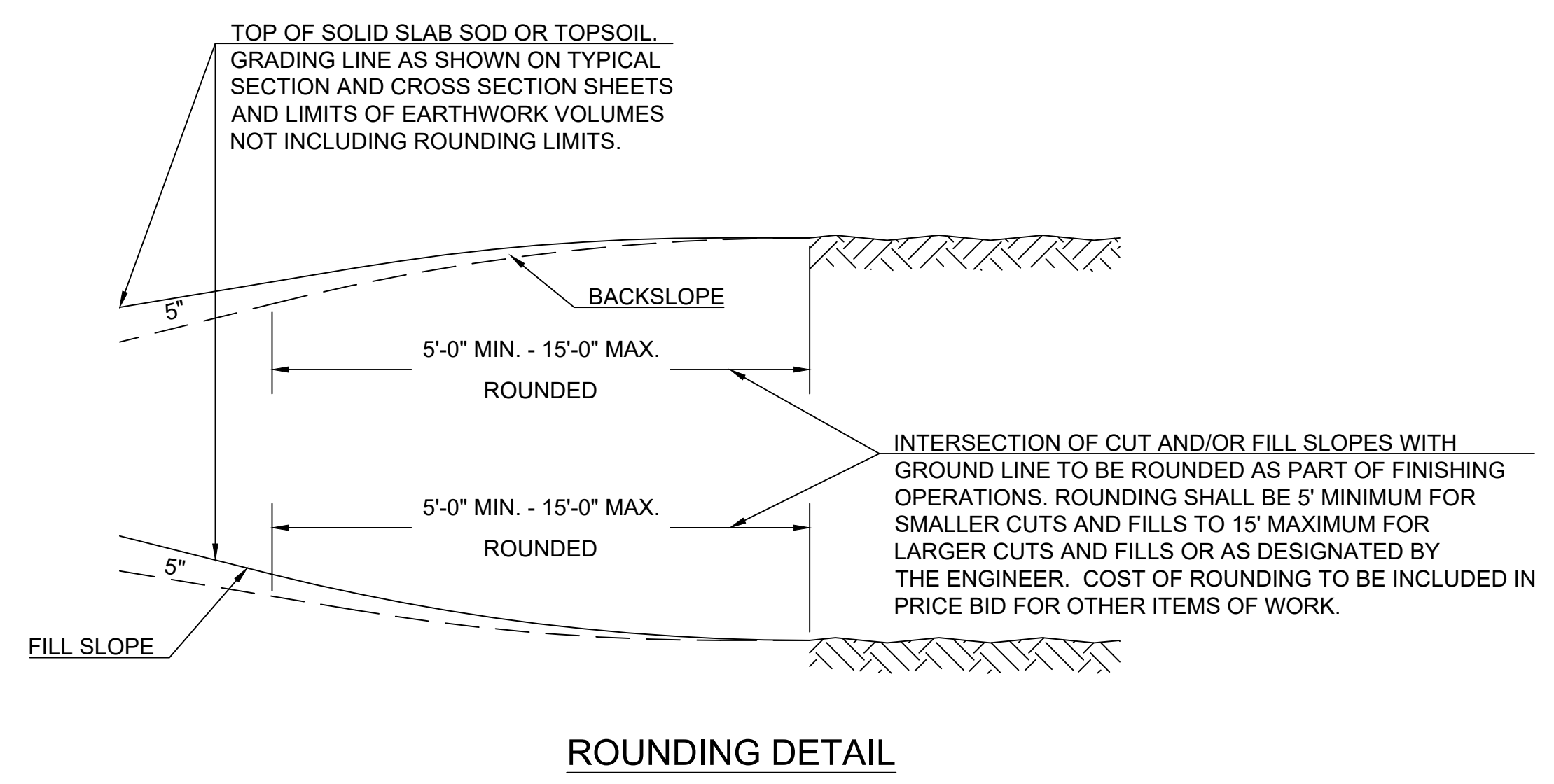
- (1) THIS AREA TO BE BACKFILLED WITH TRAFFIC BOUND SURFACE COURSE TYPE E AND SHALL BE PAID FOR AS SUCH.
- (2) TOPSOIL NOTE:  
THE CONTRACTOR SHALL STRIP ALL OF THE AVAILABLE TOPSOIL, STOCKPILE IT, AND PLACE IT BACK ON THE SECTION IN ACCORDANCE WITH SECTION 205 OF THE STANDARD SPECIFICATIONS. RESERVED TOPSOIL SHALL BE SPREAD FIRST ON THE COMPLETED 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 ITEM FOR SALVAGED TOPSOIL, LUMP SUM.  
  
THE GRADING LINE AS SHOWN ON THE TYPICAL AND CROSS SECTIONS IS TO THE TOP OF THE TOP SOIL. EARTHWORK QUANTITIES WERE NOT ADJUSTED FOR SALVAGE AND THE TOPSOIL QUANTITY IS INCLUDED IN THE MASS LINE BALANCE.
- (3) SEE ROUNDING DETAIL THIS SHEET.
- (4) DISTANCES ARE MEASURED VERTICALLY FROM THE EDGE OF THE FINISHED SHOULDER.
- (5) ALL SOILS WITHIN THE TOP TWO FEET OF THE GRADING SECTION AND ANY EMBANKMENT SLOPES TO BE NON-DISPERSIVE AS DETERMINED ACCORDING TO THE EMERSON CRUMB TEST AND EITHER THE PINHOLE TEST, ASTM D4645, OR THE DOUBLE HYDROMETER TEST, ASTM D4221.
- (6) SEE CROSS SECTIONS FOR SLOPE VARIATIONS.



**TYPICAL SECTION NO. 1**  
C.R.L. STA. 10+80.00 TO STA. 14+50.00 60TH AVE  
C.R.L. STA. 16+50.00 TO STA. 22+29.00 60TH AVE

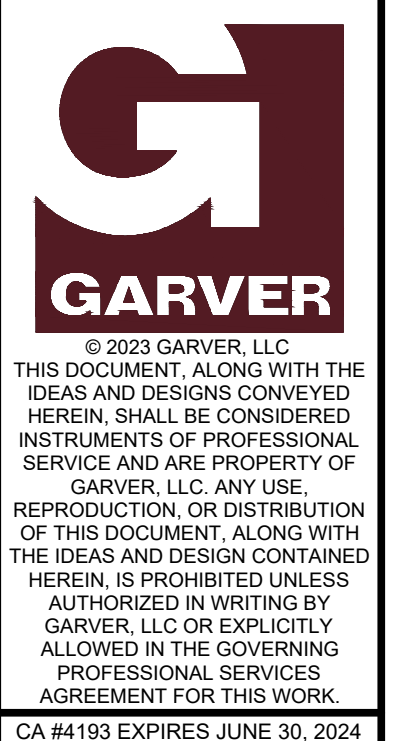


**TYPICAL SECTION NO. 2**  
C.R.L. STA. 14+50.00 TO STA. 14+69.00 60TH AVE  
C.R.L. STA. 16+30.00 TO STA. 16+50.00 60TH AVE



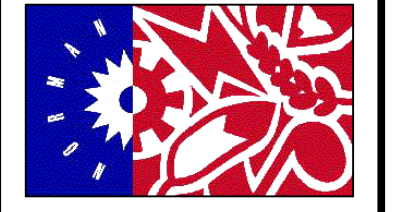
**TYPICAL SECTION NO. 3**  
C.R.L. STA. 14+69.00 TO STA. 15+00.00 60TH AVE  
C.R.L. STA. 16+00.00 TO STA. 16+30.00 60TH AVE

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Last plotted by: Debaets, Jaylynn H. Plot Date: 2/13/2023 1:33 PM Plotter used: None Plot Scale: 1:2,5949 Plot Size: 11x17



**PE REPORT**  
**NOT FOR CONSTRUCTION**

BY	DESCRIPTION	DATE	REV.



CLEVELAND COUNTY,  
OKLAHOMA  
60TH AVENUE NE  
BRIDGE REPLACEMENT  
OVER ROCK CREEK

**TYPICAL SECTIONS**

JOB NO.: 22T28060  
DATE: MARCH 2023  
DESIGNED BY: SCP  
DRAWN BY: JHD

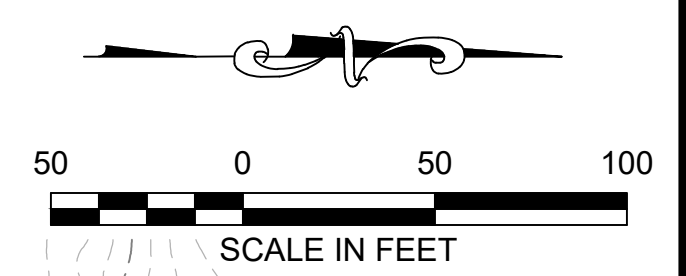
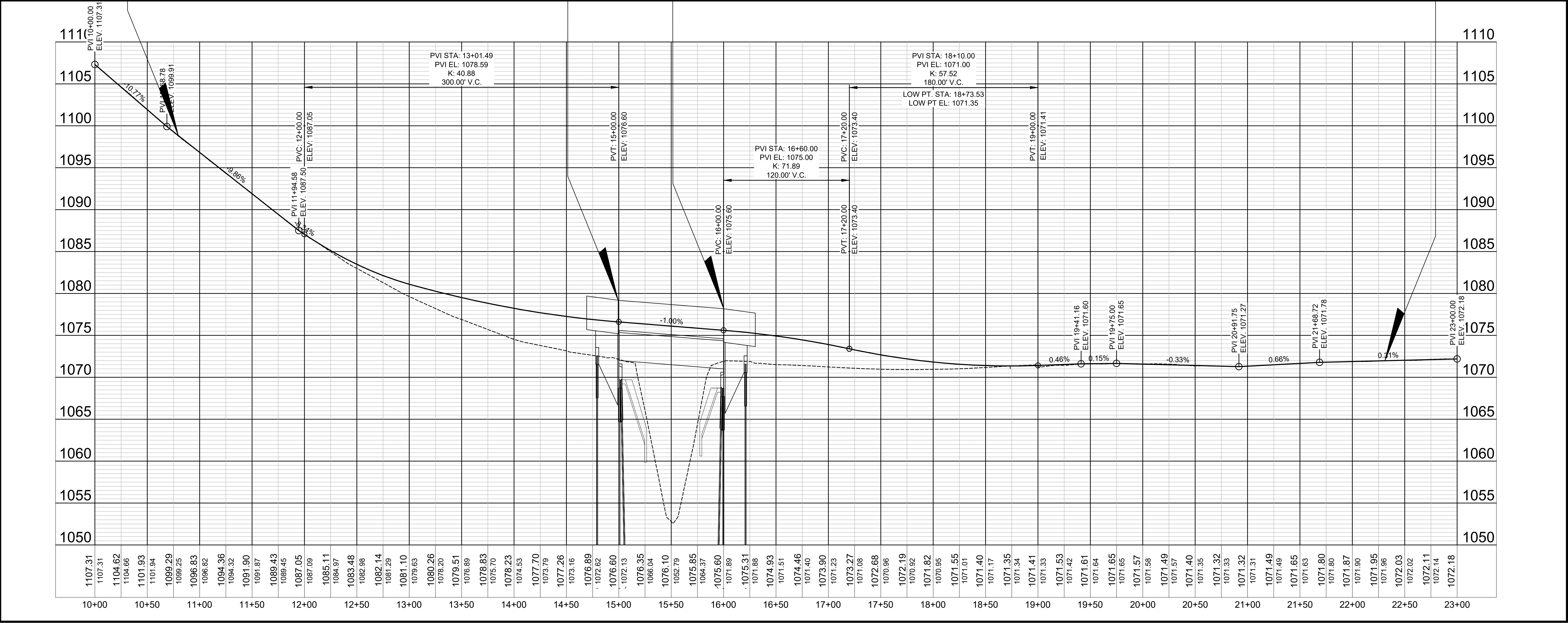
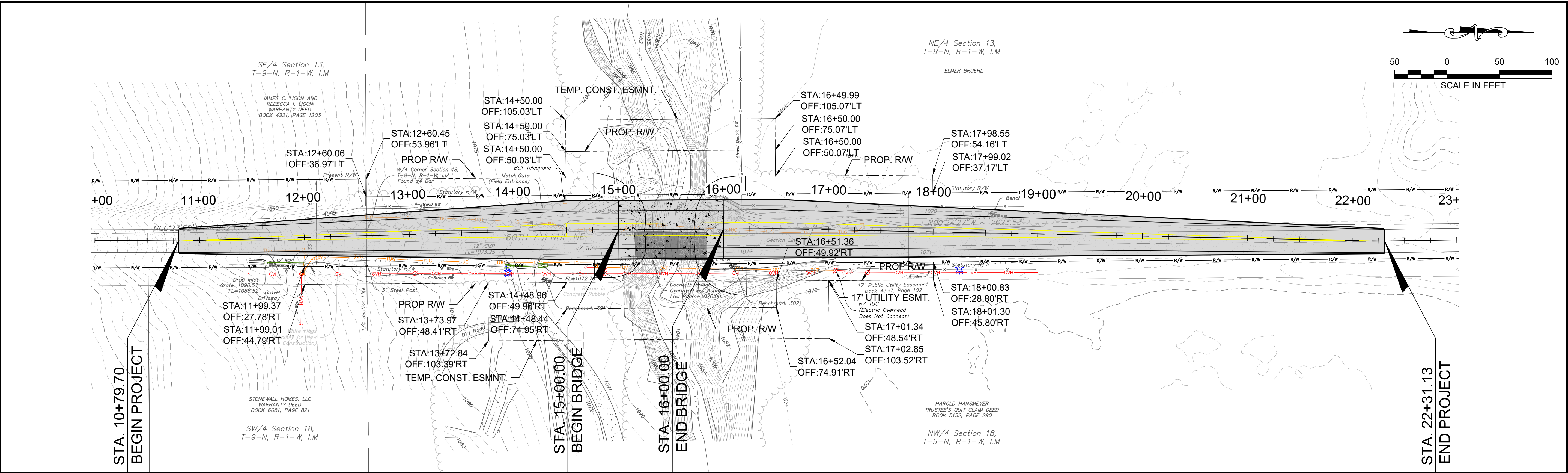
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DRAWING NUMBER  
**####**

SHEET NUMBER **2** OF 10



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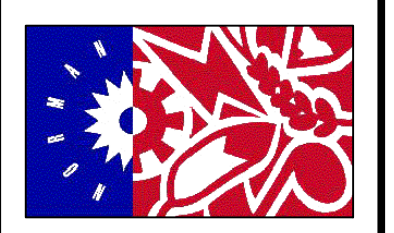


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 CA #4193 EXPIRES JUNE 30, 2024

**PE REPORT  
 NOT FOR CONSTRUCTION**

REV.	DATE	DESCRIPTION	BY



CLEVELAND COUNTY,  
 OKLAHOMA

60TH AVENUE NE  
 BRIDGE REPLACEMENT  
 OVER ROCK CREEK

ALTERNATIVE  
 1A P&P

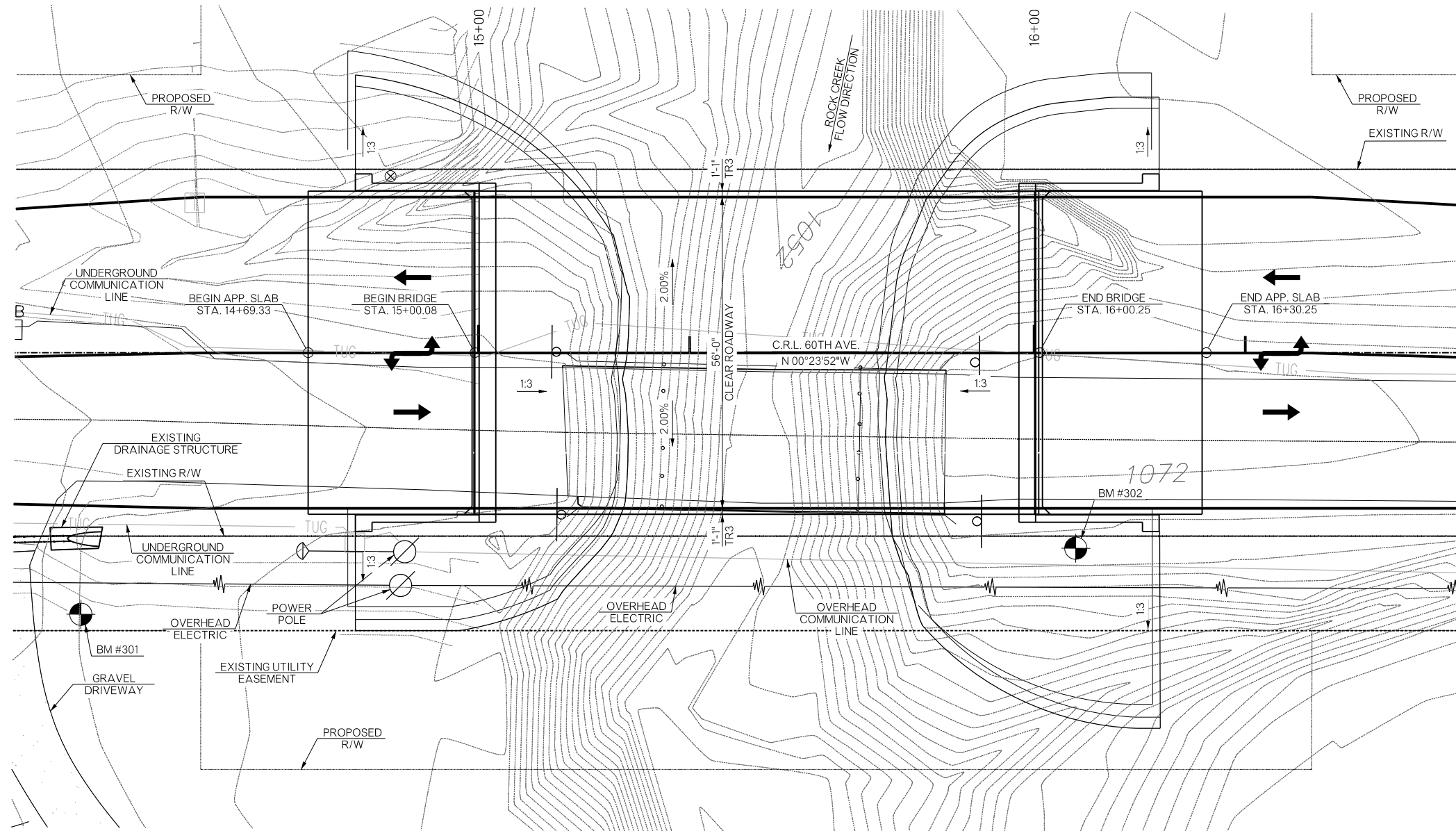
JOB NO.: 22T28060  
 DATE: MARCH 2023  
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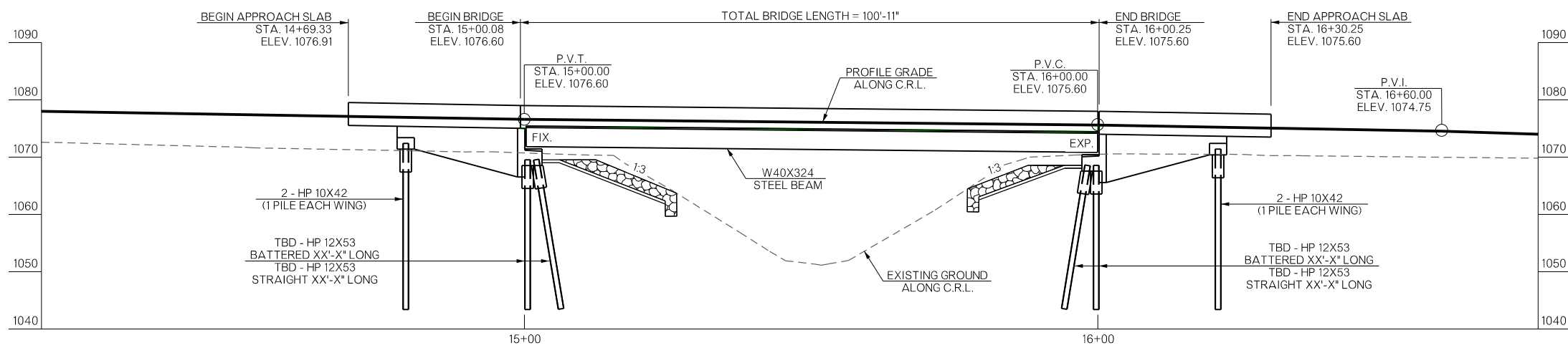
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SHEET NUMBER 3 OF 10

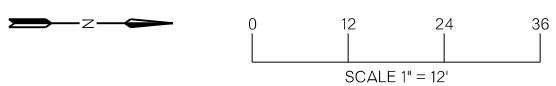




PLAN



ELEVATION



**DESIGN DATA**  
**(LOAD AND RESISTANCE FACTOR DESIGN)**

CLASS AA CONCRETE  
CLASS A CONCRETE  
REINFORCING STEEL (GRADE 60)  
STRUCTURAL STEEL (M270, GR. 50W)  
STRUCTURAL STEEL (PILING) (M270, GR. 50)  
STAINLESS STEEL A240 (TYPE 316)

F'C = 4,000 P.S.I.  
F'C = 3,000 P.S.I.  
FY = 60,000 P.S.I.  
FY = 50,000 P.S.I.  
FY = 50,000 P.S.I.  
FY = 30,000 P.S.I.

LOADING: HL93 AND 20 P.S.F. FUTURE WEARING SURFACE OR OKLAHOMA OVERLOAD TRUCK, 20 P.S.F. FUTURE WEARING SURFACE, AND 5 P.S.F. STAY-IN-PLACE FORMS.

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION WITH CURRENT INTERIMS.

ANSI/AASHTO/AWS: D1.5 BRIDGE WELDING CODE  
ANSI/AASHTO/AWS: D1.6 STRUCTURAL WELDING CODE - STAINLESS STEEL

LFD OPERATING RATING: HS XX.X

**HYDRAULIC SUMMARY**

FREQ.	Q (CFS)	CHW (FT)	V (FPS)
2	1,073	1060.18	5.18
5	2,002	1062.80	6.55
10	2,801	1064.56	7.30
25	3,984	1066.84	8.11
50	5,218	1068.89	7.11
100	6,319	1070.22	8.97



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CA #4193 EXPIRES JUNE 30, 2024

**FOR INFORMATION ONLY**

REV.	DATE	DESCRIPTION	BY



CLEVELAND COUNTY,  
OKLAHOMA  
60TH AVENUE NE  
BRIDGE REPLACEMENT  
OVER ROCK CREEK

**ALTERNATIVE 1A  
GENERAL PLAN  
& ELEVATION**

JOB NO.:  
DATE:  
DESIGNED BY: JTR  
DRAWN BY: NBK

BAR IS ONE INCH ON ORIGINAL DRAWING  
0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER

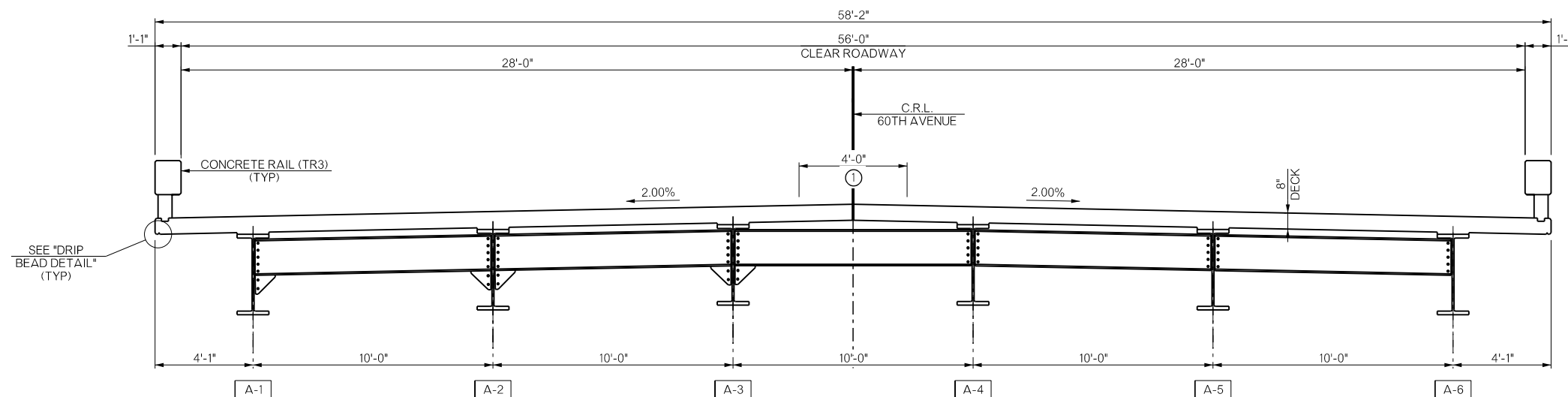




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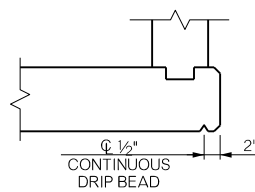


SECTION AT END DIAPHRAGM

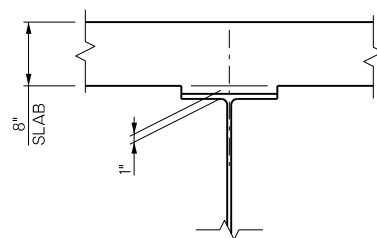
SECTION AT INTERMEDIATE DIAPHRAGM

① ROUND 2'-0" EACH SIDE OF  $\phi$  TO AVOID SHARP EDGES.

TYPICAL SECTION  
(LOOKING FORWARD STATION)



DRIP BEAD DETAIL



BEAM HAUNCH DETAIL

NOTE:  
 PLAN QUANTITIES FOR CLASS AA CONCRETE INCLUDE BEAM HAUNCHES. THE HAUNCH HEIGHT SHOWN IS THE THEORETICAL HAUNCH HEIGHT AT THE CENTERLINE BEARING ONLY, MEASURED FROM BOTTOM OF DECK SLAB TO TOP OF TOP FLANGE, AND VARIES ACROSS THE SPAN. DETERMINE THE ACTUAL HAUNCH HEIGHT (ACCOUNTING FOR BEAM CAMBER, DEAD LOAD DEFLECTION AND ROADWAY GRADE) AFTER ERECTION OF THE BEAMS AND SUBMIT TO THE ENGINEER FOR APPROVAL. THE ENGINEER WILL NOT MEASURE DIFFERENCES BETWEEN THE THEORETICAL AND THE ACTUAL HAUNCH HEIGHTS FOR PAYMENT.

REV.	DATE	DESCRIPTION	BY



CLEVELAND COUNTY,  
OKLAHOMA

60TH AVENUE NE  
BRIDGE REPLACEMENT  
OVER ROCK CREEK

ALTERNATIVE 1A  
TYPICAL SECTION

JOB NO.:  
DATE:  
DESIGNED BY: JTR  
DRAWN BY: NBK

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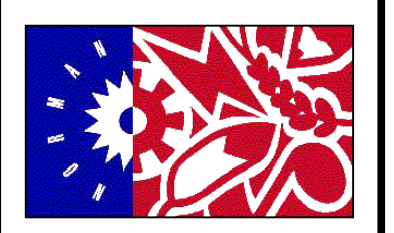
SHEET NUMBER 5 OF 10



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 CA #4193 EXPIRES JUNE 30, 2024

**PE REPORT  
 NOT FOR CONSTRUCTION**

REV.	DATE	DESCRIPTION	BY



CLEVELAND COUNTY,  
 OKLAHOMA  
 60TH AVENUE NE  
 BRIDGE REPLACEMENT  
 OVER ROCK CREEK

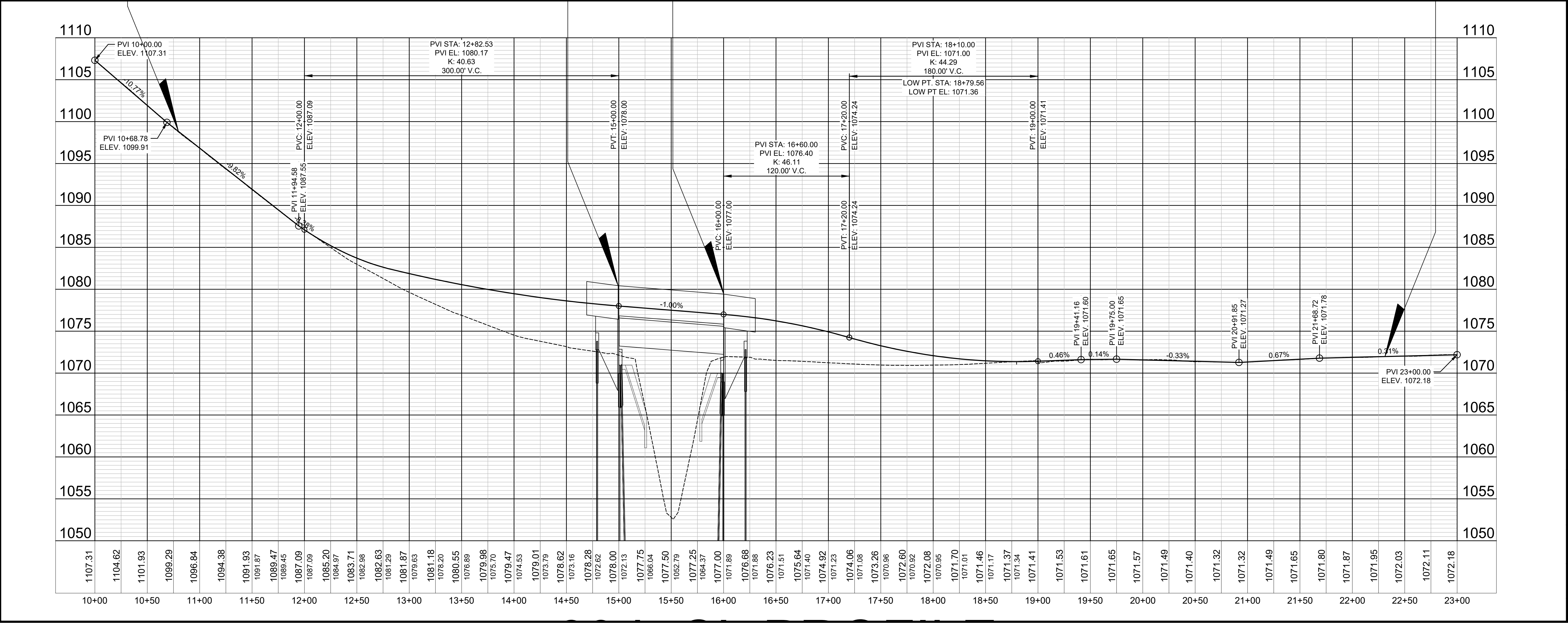
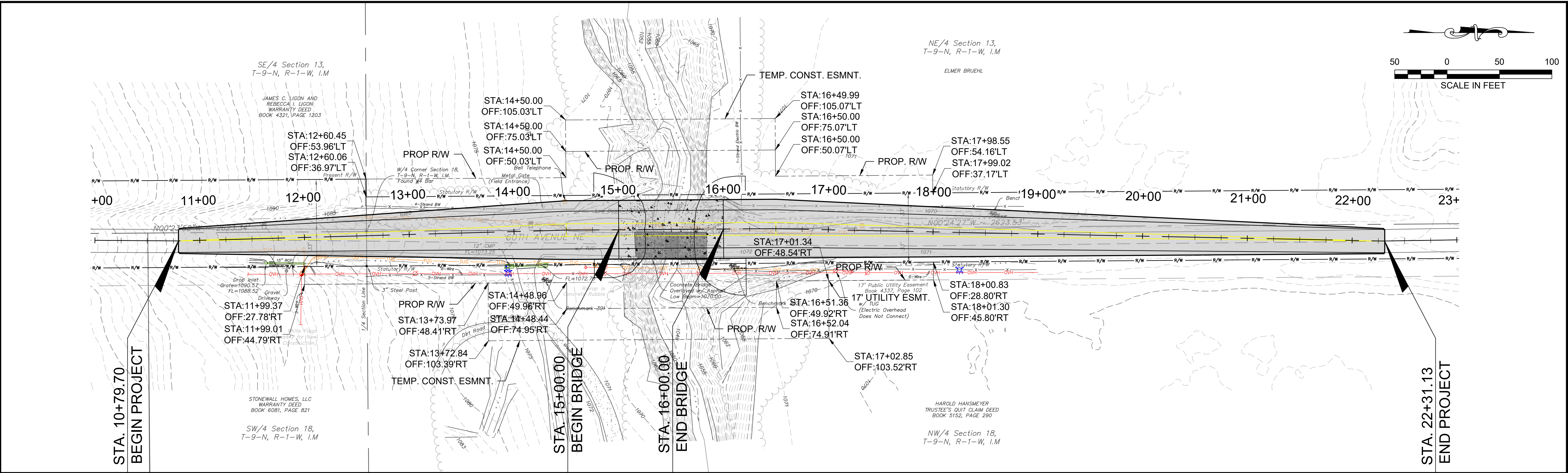
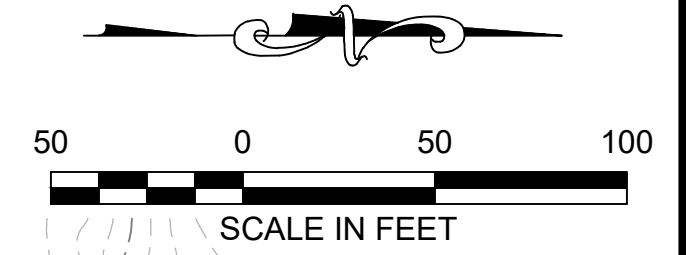
ALTERNATIVE  
 1B P&P

JOB NO.: 22T28060  
 DATE: MARCH 2023  
 DESIGNED BY: SCP  
 DRAWN BY: JHD

BAR IS ONE INCH ON ORIGINAL DRAWING  
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DRAWING NUMBER  
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SHEET NUMBER  
 6 OF 10



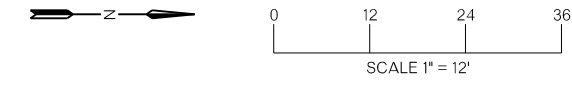
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 CA #4193 EXPIRES JUNE 30, 2024

FOR INFORMATION ONLY



**DESIGN DATA**  
**(LOAD AND RESISTANCE FACTOR DESIGN)**

CLASS AA CONCRETE F'C = 4,000 P.S.I.  
 CLASS A CONCRETE F'C = 3,000 P.S.I.  
 REINFORCING STEEL (GRADE 60) FY = 60,000 P.S.I.  
 STRUCTURAL STEEL (M270, GR. 50W) FY = 50,000 P.S.I.  
 STRUCTURAL STEEL (PILING) (M270, GR. 50) FY = 50,000 P.S.I.  
 STAINLESS STEEL A240 (TYPE 316) FY = 30,000 P.S.I.

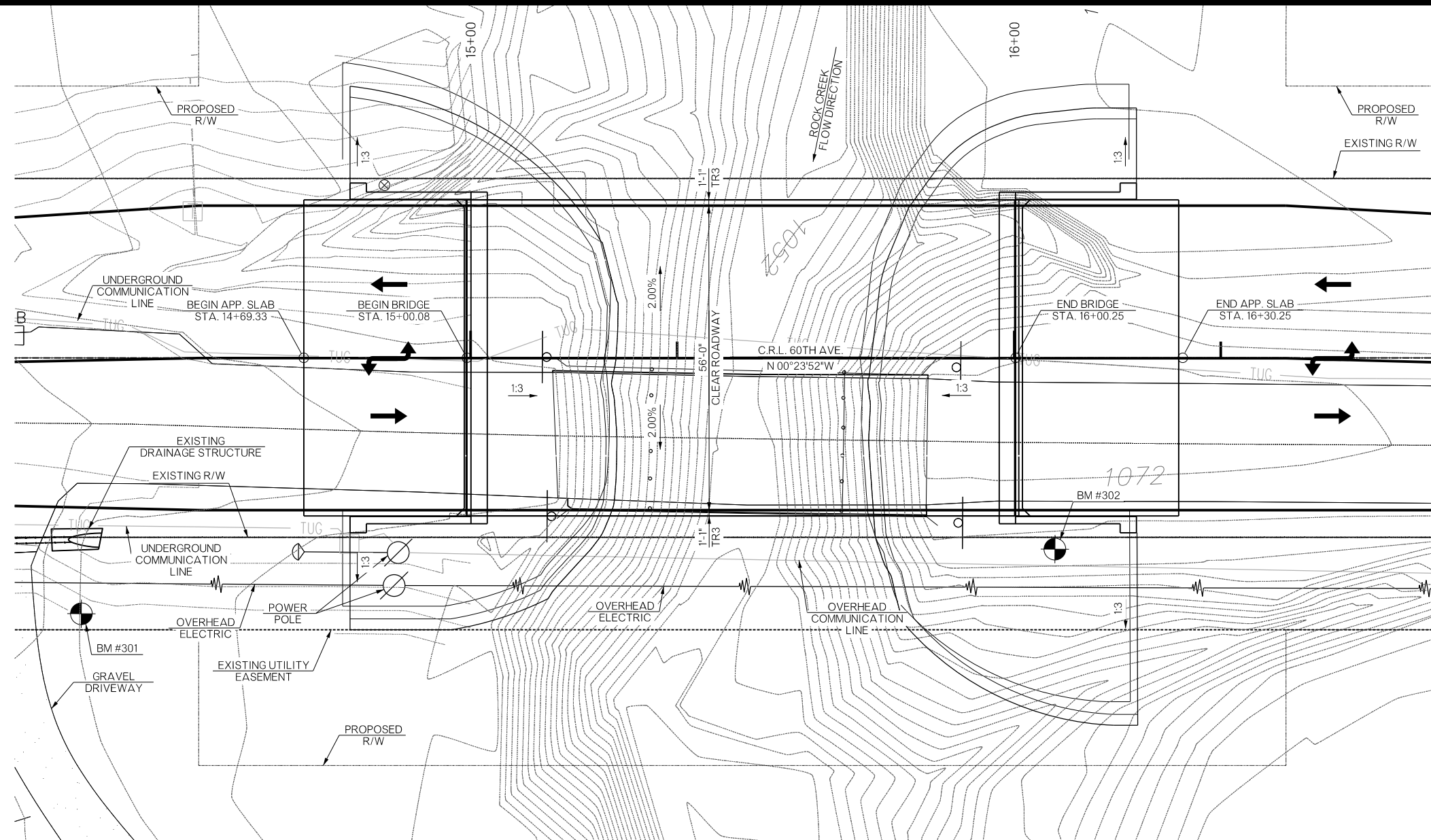
LOADING: HL 93 AND 20 P.S.F. FUTURE WEARING SURFACE OR OKLAHOMA OVERLOAD TRUCK, 20 P.S.F. FUTURE WEARING SURFACE, AND 5 P.S.F. STAY-IN-PLACE FORMS.

DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION WITH CURRENT INTERIMS.

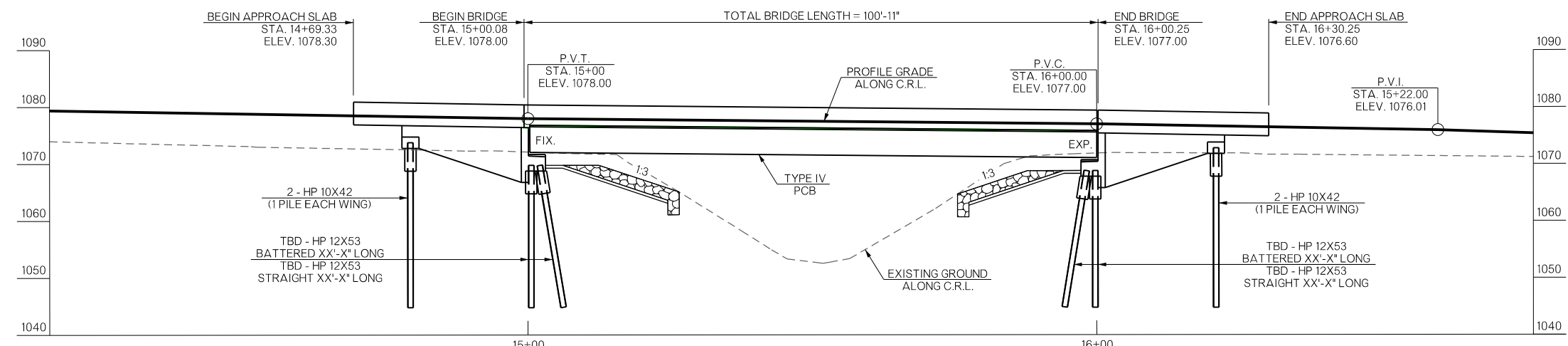
ANSI/AASHTO/AWS: D1.5 BRIDGE WELDING CODE  
 ANSI/AASHTO/AWS: D1.6 STRUCTURAL WELDING CODE - STAINLESS STEEL  
 LFD OPERATING RATING: HS XX.X

**HYDRAULIC SUMMARY**

FREQ.	Q (CFS)	CHW (FT)	V (FPS)
2	1,073	1060.29	5.56
5	2,002	1062.95	6.99
10	2,801	1064.74	7.76
25	3,984	1067.02	8.50
50	5,218	1069.01	8.92
100	6,319	1070.34	9.12



PLAN



ELEVATION

REV.	DATE	DESCRIPTION	BY



CLEVELAND COUNTY,  
 OKLAHOMA  
 60TH AVENUE NE  
 BRIDGE REPLACEMENT  
 OVER ROCK CREEK

ALTERNATIVE 1B  
 GENERAL PLAN  
 & ELEVATION

JOB NO.:  
 DATE:  
 DESIGNED BY: JTR  
 DRAWN BY: NBK

BAR IS ONE INCH ON ORIGINAL DRAWING  
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DRAWING NUMBER

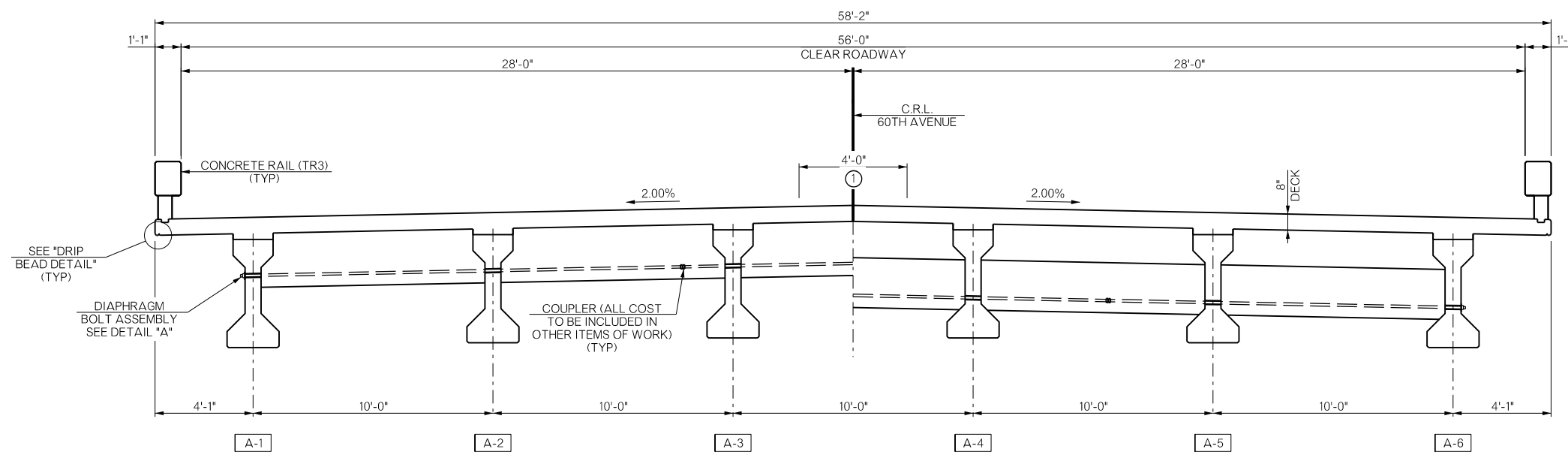




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CA #4193 EXPIRES JUNE 30, 2024

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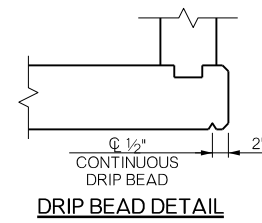


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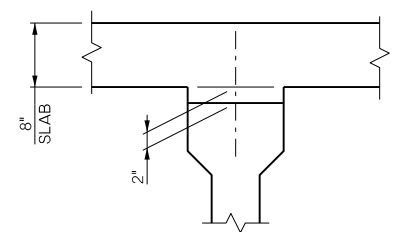
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① ROUND 2'-0" EACH SIDE OF  $\text{C}$  TO AVOID SHARP EDGES.

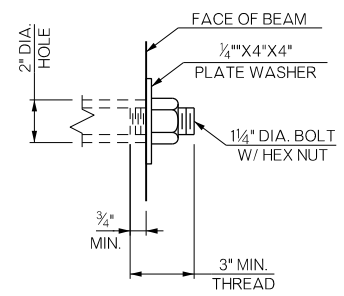
TYPICAL SECTION (LOOKING FORWARD STATION)



DRIP BEAD DETAIL



BEAM HAUNCH DETAIL



DETAIL "A"

**NOTE:**  
 PLAN QUANTITIES FOR CLASS AA CONCRETE INCLUDE BEAM HAUNCHES. THE HAUNCH HEIGHT SHOWN IS THE THEORETICAL HAUNCH HEIGHT AT THE CENTERLINE BEARING ONLY, MEASURED FROM BOTTOM OF DECK SLAB TO TOP OF BEAM, AND VARIES ACROSS THE SPAN. DETERMINE THE ACTUAL HAUNCH HEIGHT (ACCOUNTING FOR BEAM CAMBER, DEAD LOAD DEFLECTION AND ROADWAY GRADE) AFTER ERECTION OF THE BEAMS AND SUBMIT TO THE ENGINEER FOR APPROVAL. THE ENGINEER WILL NOT MEASURE DIFFERENCES BETWEEN THE THEORETICAL AND THE ACTUAL HAUNCH HEIGHTS FOR PAYMENT.

**DIAPHRAGM BOLT NOTES:**  
 PROVIDE STRUCTURAL STEEL FOR DIAPHRAGM BOLTS AND PLATE WASHERS IN ACCORDANCE WITH AASHTO M270 (ASTM A709), GRADE 50W (WEATHERING STEEL, CHARPY V-NOTCH TESTING NOT REQUIRED). THE CONTRACTOR MAY SUBSTITUTE A #10 REINFORCING BAR IN ACCORDANCE WITH AASHTO M31, GRADE 60, AND THREADED AT THE ENDS AS SHOWN FOR THE DIAPHRAGM BOLT AT NO ADDITIONAL COST TO THE DEPARTMENT. PROVIDE HEX NUTS IN ACCORDANCE WITH AASHTO M291 (ASTM A563).

PAINT EXPOSED DIAPHRAGM BOLT, PLATE WASHER AND HEX NUT WITH TWO (2) COATS OF ZINC-RICH PAINT (6 MIL. MINIMUM THICKNESS) AFTER ASSEMBLY. INCLUDE ALL COST OF DIAPHRAGM BOLT, PLATE WASHER AND HEX NUT IN THE CONTRACT UNIT PRICE FOR "STRUCTURAL STEEL".

REV.	DATE	DESCRIPTION	BY



CLEVELAND COUNTY,  
 OKLAHOMA  
 60TH AVENUE NE  
 BRIDGE REPLACEMENT  
 OVER ROCK CREEK

ALTERNATIVE 1B  
 TYPICAL SECTION

JOB NO.:  
 DATE:  
 DESIGNED BY: JTR  
 DRAWN BY: NBK

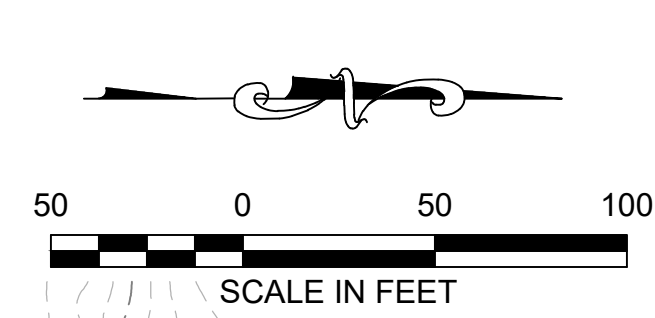
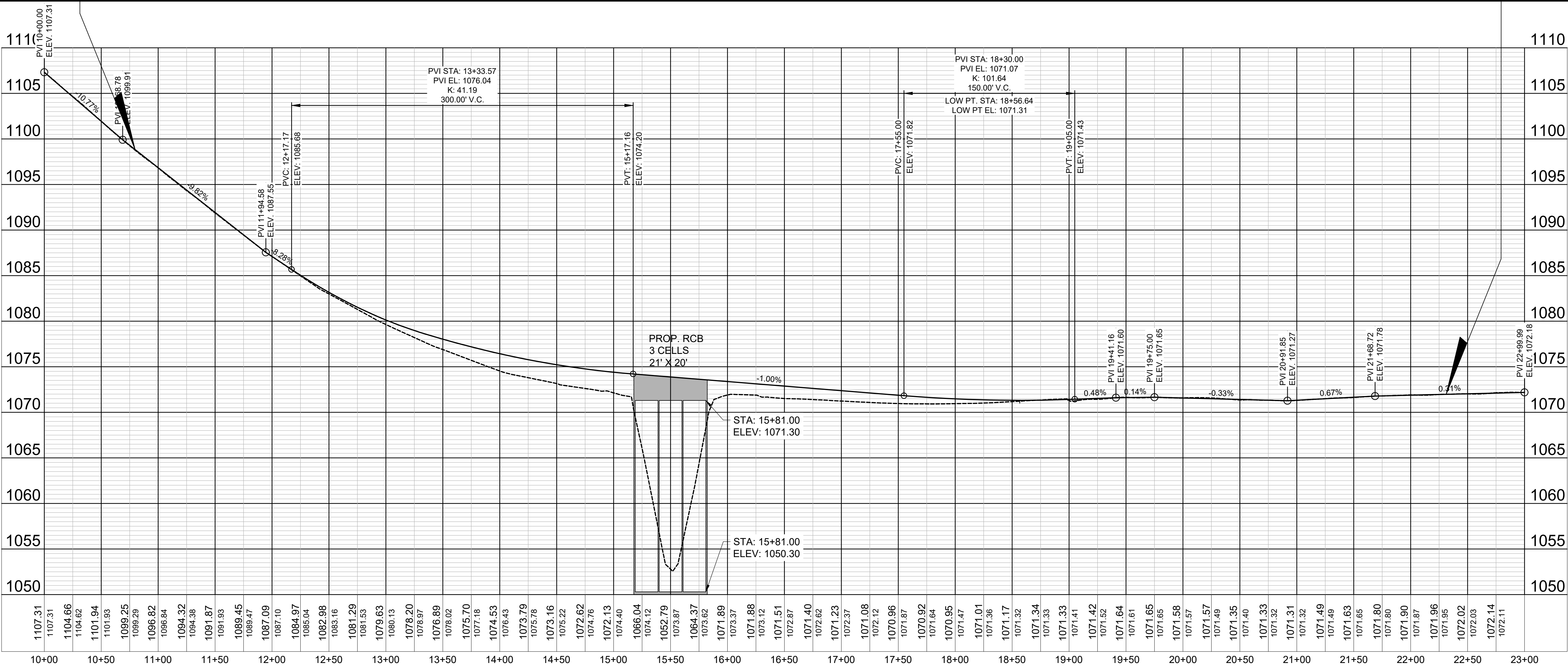
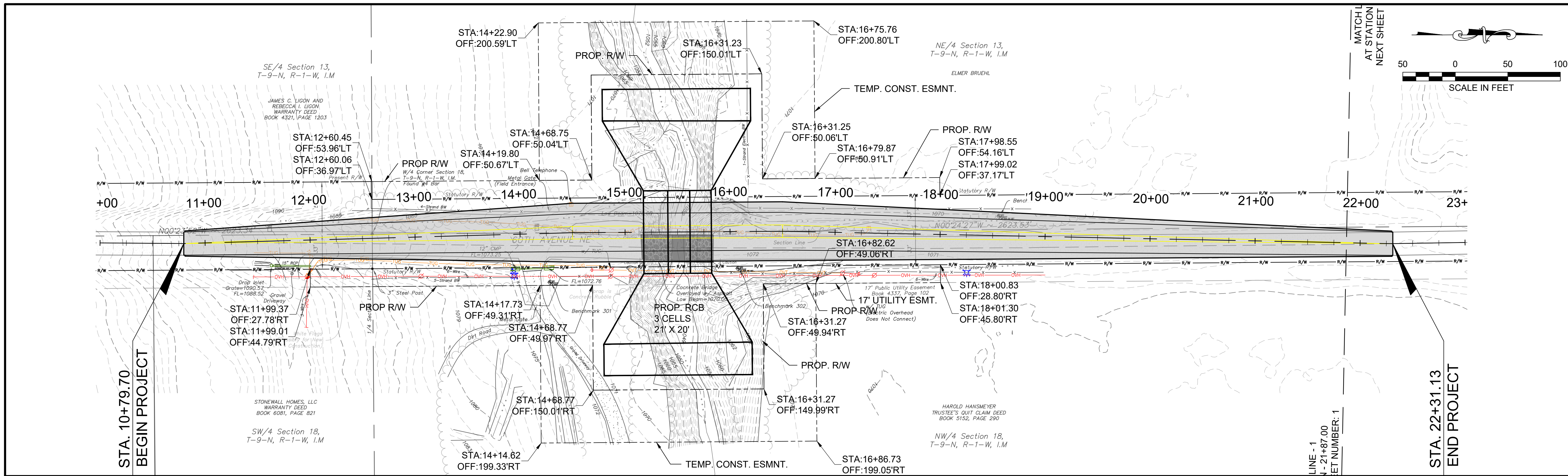
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DRAWING NUMBER

SHEET NUMBER 8 OF 10



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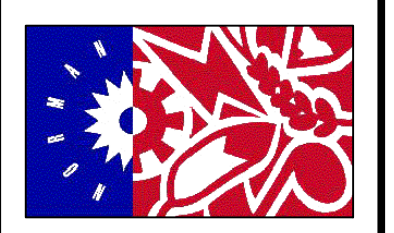


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 CA #4193 EXPIRES JUNE 30, 2024

**PE REPORT  
 NOT FOR CONSTRUCTION**

REV.	DATE	DESCRIPTION	BY



CLEVELAND COUNTY,  
 OKLAHOMA

60TH AVENUE NE  
 BRIDGE REPLACEMENT  
 OVER ROCK CREEK

ALTERNATIVE  
 2 P&P

JOB NO.: 22T28060  
 DATE: MARCH 2023  
 DESIGNED BY: SCP  
 DRAWN BY: JHD

BAR IS ONE INCH ON ORIGINAL DRAWING  
 0" = 1" (IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.)

DRAWING NUMBER  
 #####

SHEET NUMBER  
 9 OF 10





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 CA #4193 EXPIRES JUNE 30, 2024

FOR INFORMATION ONLY

REV.	DATE	DESCRIPTION	BY



CLEVELAND COUNTY, OKLAHOMA  
 60TH AVENUE NE BRIDGE REPLACEMENT OVER ROCK CREEK

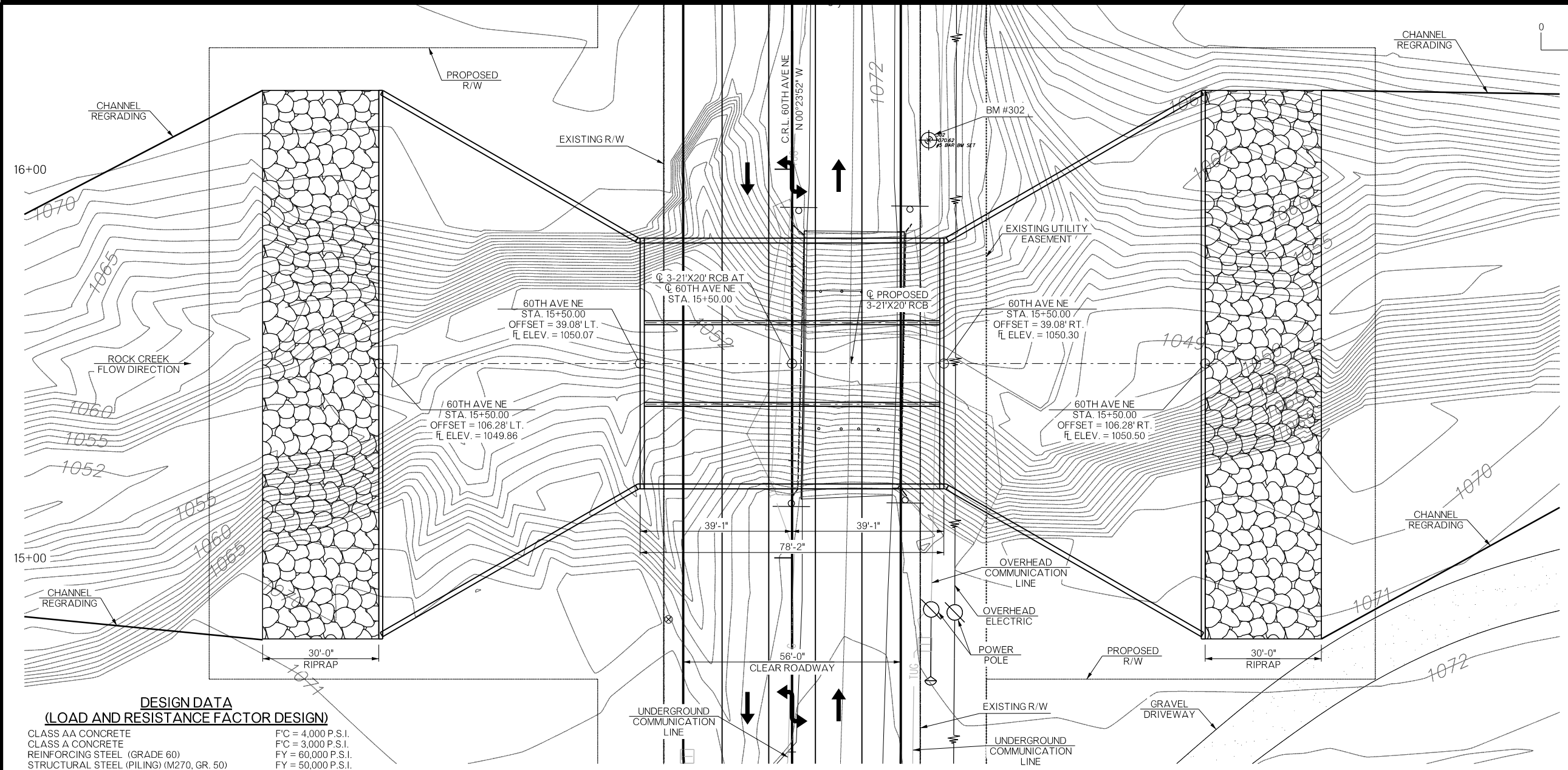
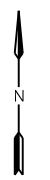
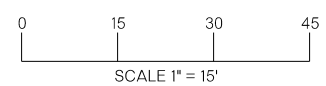
ALTERNATIVE 2 GENERAL PLAN & ELEVATION

JOB NO.:  
 DATE:  
 DESIGNED BY: JTR  
 DRAWN BY: NBK

BAR IS ONE INCH ON ORIGINAL DRAWING  
 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER

SHEET NUMBER 10 OF 10



PLAN

**DESIGN DATA**  
**(LOAD AND RESISTANCE FACTOR DESIGN)**

CLASS AA CONCRETE	F <sub>c</sub> = 4,000 P.S.I.
CLASS A CONCRETE	F <sub>c</sub> = 3,000 P.S.I.
REINFORCING STEEL (GRADE 60)	F <sub>y</sub> = 60,000 P.S.I.
STRUCTURAL STEEL (PILING) (M270, GR. 50)	F <sub>y</sub> = 50,000 P.S.I.
STAINLESS STEEL A240 (TYPE 316)	F <sub>y</sub> = 30,000 P.S.I.

LOADING: HL93 AND 20 P.S.F. FUTURE WEARING SURFACE OR OKLAHOMA OVERLOAD TRUCK AND 20 P.S.F. FUTURE WEARING SURFACE.

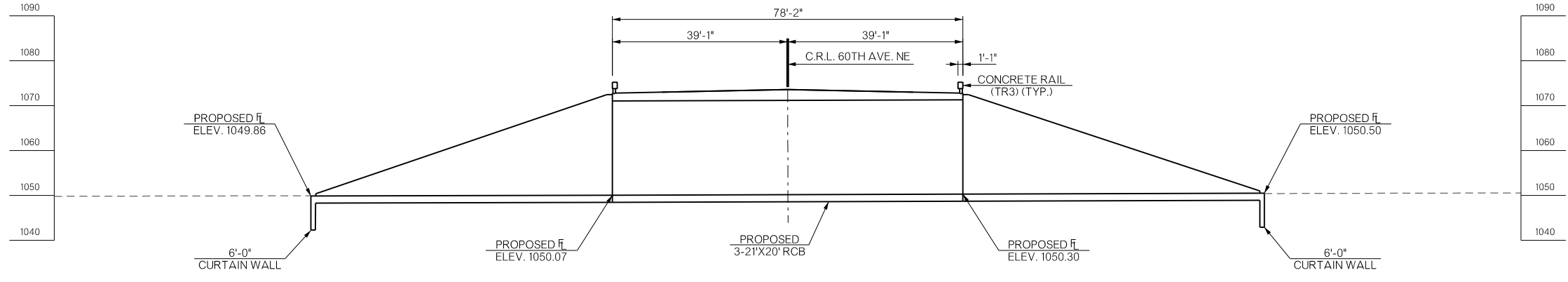
DESIGN: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION WITH CURRENT INTERIMS.

ANSI/AASHTO/AWS: D1.5 BRIDGE WELDING CODE  
 ANSI/AASHTO/AWS: D1.6 STRUCTURAL WELDING CODE - STAINLESS STEEL

LFD OPERATING RATING: HS XX.X

**HYDRAULIC SUMMARY**

FREQ.	Q (CFS)	CHW (FT)	V (FPS)
2	1,073	1059.88	1.78
5	2,002	1062.34	2.64
10	2,801	1063.99	3.25
25	3,984	1066.10	4.01
50	5,218	1068.03	4.71
100	6,319	1069.37	5.18



ELEVATION





# Appendix C

## Itemized Cost Estimate





**ENGINEER'S OPINION OF PROBABLE COST - ALTERNATIVE 1A - STEEL BEAMS**

ROADWAY & TRAFFIC					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
201(A) 1200	CLEARING AND GRUBBING	LS	1.00	\$ 25,000.00	\$ 25,000.00
202(A) 2200	UNCLASSIFIED EXCAVATION	CY	1,882.00	\$ 12.00	\$ 22,584.00
202(D) 2500	UNCLASSIFIED BORROW	CY	610.00	\$ 20.00	\$ 12,200.00
221(B) 2300	TEMPORARY SILT FENCE	LF	2,500.00	\$ 2.50	\$ 6,250.00
230(A) 7200	SOLID SLAB SODDING	SY	13,500.00	\$ 5.00	\$ 67,500.00
307(K) 4200	STABILIZED SUBGRADE	SY	5,503.00	\$ 8.00	\$ 44,024.00
407(B) 7300	TACK COAT	GAL	2,899.00	\$ 4.00	\$ 11,596.00
411(A) 1220	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	1,998.00	\$ 115.00	\$ 229,770.00
411(C) 1420	SUPERPAVE, TYPE S4(PG 70-28 OK)	TON	361.00	\$ 130.00	\$ 46,930.00
411(C) 1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	139.00	\$ 130.00	\$ 18,070.00
414(A) 5200	CONCRETE PAVEMENT	SY	1,044.00	\$ 120.00	\$ 125,280.00
610(B) 5310	CONCRETE DRIVEWAY	SY	100.00	\$ 100.00	\$ 10,000.00
619(B) 6380	REMOVAL OF CONCRETE DRIVEWAY	SY	100.00	\$ 40.00	\$ 4,000.00
-	SIGNING AND STRIPING	LS	1.00	\$ 25,000.00	\$ 25,000.00
<b>ROADWAY &amp; TRAFFIC TOTAL =</b>					<b>\$ 648,204.00</b>

BRIDGE					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
504(A) 5200	APPROACH SLAB	SY	387.80	\$ 300.00	\$ 116,340.00
504(D) 5410	CONCRETE RAIL (TR3)	LF	321.90	\$ 75.00	\$ 24,142.50
506(A) 7225	STRUCTURAL STEEL M270 GRADE 50W	LB	207,270.00	\$ 2.50	\$ 518,175.00
507(A) 8200	STAINLESS STEEL FIXED BEARING ASSEMBLY	EA	6.00	\$ 3,500.00	\$ 21,000.00
507(B) 8300	STAINLESS STEEL EXP. BEARING ASSEMBLY	EA	6.00	\$ 3,500.00	\$ 21,000.00
509(A) 0210	CLASS AA CONCRETE	CY	165.30	\$ 700.00	\$ 115,710.00
509(B) 0320	CLASS A CONCRETE	CY	82.60	\$ 850.00	\$ 70,210.00
511(B) 2310	EPOXY COATED REINFORCING STEEL	LB	54,220.00	\$ 1.65	\$ 89,463.00
514(A) 5210	PILES, FURNISHED (HP 10X42)	LF	140.00	\$ 50.00	\$ 7,000.00
514(A) 5220	PILES, FURNISHED (HP 12X53)	LF	794.00	\$ 55.00	\$ 43,670.00
514(B) 5310	PILES, DRIVEN (HP 10X42)	LF	140.00	\$ 25.00	\$ 3,500.00
514(B) 5320	PILES, DRIVEN (HP 12X53)	LF	794.00	\$ 25.00	\$ 19,850.00
518(B) 0300	SEALED EXPANSION JOINTS	LF	60.00	\$ 350.00	\$ 21,000.00
619(D) 6700	REMOVAL OF EXISTING BRIDGE STRUCTURE	LSUM	1.00	\$ 30,000.00	\$ 30,000.00
-	MISCELLANEOUS ITEMS (5% OF ALL OTHER COSTS)	LSUM	1.00	\$ 55,100.00	\$ 55,100.00
<b>BRIDGE TOTAL =</b>					<b>\$ 1,156,170.00</b>

RIGHT OF WAY & UTILITY RELOCATIONS					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
-	RIGHT-OF-WAY & UTILITY RELOCATIONS	LSUM	1.00	\$ 350,000.00	\$ 350,000.00
<b>RIGHT OF WAY &amp; UTILITY RELOCATIONS TOTAL =</b>					<b>\$ 350,000.00</b>

STAKING					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
642(B) 0096	CONSTRUCTION STAKING LEVEL 2	LSUM	1.00	\$ 50,000.00	\$ 50,000.00
<b>STAKING TOTAL =</b>					<b>\$ 50,000.00</b>

MOBILIZATION					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
220 2800	SWPP DOCUMENTATION AND MANAGEMENT	LSUM	1.00	\$ 5,000.00	\$ 5,000.00
641 1399	MOBILIZATION	LSUM	1.00	\$ 143,000.00	\$ 143,000.00
<b>MOBILIZATION TOTAL =</b>					<b>\$ 148,000.00</b>

MITIGATION					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
N/A	ENVIRONMENTAL MITIGATION	LSUM	0.00	\$ -	\$ -
<b>MITIGATION TOTAL =</b>					<b>\$ -</b>

<b>ROADWAY &amp; TRAFFIC SUBTOTAL</b>	\$ 648,204.00
<b>BRIDGE SUBTOTAL</b>	\$ 1,156,160.50
<b>ROW &amp; UTILITIES SUBTOTAL</b>	\$ 350,000.00
<b>STAKING SUBTOTAL</b>	\$ 50,000.00
<b>MOBILIZATION SUBTOTAL</b>	\$ 148,000.00
<b>MITIGATION SUBTOTAL</b>	\$ -
<b>SUBTOTAL</b>	\$ 2,352,364.50
<b>CONTINGENCY (25%)</b>	\$ 588,092.00
<b>TOTAL</b>	\$ 2,940,457.00



**ENGINEER'S OPINION OF PROBABLE COST - ALTERNATIVE 1B - PRESTRESSED CONCRETE BEAMS**

ROADWAY & TRAFFIC					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
201(A) 1200	CLEARING AND GRUBBING	LS	1.00	\$ 25,000.00	\$ 25,000.00
202(A) 2200	UNCLASSIFIED EXCAVATION	CY	1,758.00	\$ 12.00	\$ 21,096.00
202(D) 2500	UNCLASSIFIED BORROW	CY	2,276.00	\$ 20.00	\$ 45,520.00
221(B) 2300	TEMPORARY SILT FENCE	LF	2,500.00	\$ 2.50	\$ 6,250.00
230(A) 7200	SOLID SLAB SODDING	SY	13,500.00	\$ 5.00	\$ 67,500.00
307(K) 4200	STABILIZED SUBGRADE	SY	5,503.00	\$ 8.00	\$ 44,024.00
407(B) 7300	TACK COAT	GAL	2,899.00	\$ 4.00	\$ 11,596.00
411(A) 1220	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	1,998.00	\$ 115.00	\$ 229,770.00
411(C) 1420	SUPERPAVE, TYPE S4(PG 70-28 OK)	TON	361.00	\$ 130.00	\$ 46,930.00
411(C) 1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	139.00	\$ 130.00	\$ 18,070.00
414(A) 5200	CONCRETE PAVEMENT	SY	1,044.00	\$ 120.00	\$ 125,280.00
610(B) 5310	CONCRETE DRIVEWAY	SY	100.00	\$ 100.00	\$ 10,000.00
619(B) 6380	REMOVAL OF CONCRETE DRIVEWAY	SY	100.00	\$ 40.00	\$ 4,000.00
-	SIGNING AND STRIPING	LS	1.00	\$ 25,000.00	\$ 25,000.00
<b>ROADWAY &amp; TRAFFIC TOTAL =</b>					<b>\$ 680,036.00</b>

BRIDGE					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
503(A) 4240	PRESTRESSED CONCRETE BEAMS (TYPE IV)	LF	598.00	\$ 350.00	\$ 209,300.00
504(A) 5200	APPROACH SLAB	SY	387.80	\$ 300.00	\$ 116,340.00
504(D) 5410	CONCRETE RAIL (TR3)	LF	321.90	\$ 75.00	\$ 24,142.50
507(A) 8200	STAINLESS STEEL FIXED BEARING ASSEMBLY	EA	6.00	\$ 3,500.00	\$ 21,000.00
507(B) 8300	STAINLESS STEEL EXP. BEARING ASSEMBLY	EA	6.00	\$ 3,500.00	\$ 21,000.00
509(A) 0210	CLASS AA CONCRETE	CY	165.30	\$ 700.00	\$ 115,710.00
509(B) 0320	CLASS A CONCRETE	CY	82.60	\$ 850.00	\$ 70,210.00
511(B) 2310	EPOXY COATED REINFORCING STEEL	LB	54,220.00	\$ 1.65	\$ 89,463.00
514(A) 5210	PILES, FURNISHED (HP 10X42)	LF	140.00	\$ 50.00	\$ 7,000.00
514(A) 5220	PILES, FURNISHED (HP 12X53)	LF	794.00	\$ 55.00	\$ 43,670.00
514(B) 5310	PILES, DRIVEN (HP 10X42)	LF	140.00	\$ 25.00	\$ 3,500.00
514(B) 5320	PILES, DRIVEN (HP 12X53)	LF	794.00	\$ 25.00	\$ 19,850.00
518(B) 0300	SEALED EXPANSION JOINTS	LF	60.00	\$ 350.00	\$ 21,000.00
619(D) 6700	REMOVAL OF EXISTING BRIDGE STRUCTURE	LSUM	1.00	\$ 30,000.00	\$ 30,000.00
-	MISCELLANEOUS ITEMS (5% OF ALL OTHER COSTS)	LSUM	1.00	\$ 39,700.00	\$ 39,700.00
<b>BRIDGE TOTAL =</b>					<b>\$ 831,890.00</b>

RIGHT OF WAY & UTILITY RELOCATIONS					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
-	RIGHT-OF-WAY & UTILITY RELOCATIONS	LSUM	1.00	\$ 350,000.00	\$ 350,000.00
<b>RIGHT OF WAY &amp; UTILITY RELOCATIONS TOTAL =</b>					<b>\$ 350,000.00</b>

STAKING					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
642(B) 0096	CONSTRUCTION STAKING LEVEL 2	LSUM	1.00	\$ 50,000.00	\$ 50,000.00
<b>STAKING TOTAL =</b>					<b>\$ 50,000.00</b>

MOBILIZATION					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
220 2800	SWPP DOCUMENTATION AND MANAGEMENT	LSUM	1.00	\$ 5,000.00	\$ 5,000.00
641 1399	MOBILIZATION	LSUM	1.00	\$ 129,000.00	\$ 129,000.00
<b>MOBILIZATION TOTAL =</b>					<b>\$ 134,000.00</b>

MITIGATION					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
N/A	ENVIRONMENTAL MITIGATION	LSUM	0.00	\$ -	\$ -
<b>MITIGATION TOTAL =</b>					<b>\$ -</b>

<b>ROADWAY &amp; TRAFFIC SUBTOTAL</b>	\$ 680,036.00
<b>BRIDGE SUBTOTAL</b>	\$ 831,885.50
<b>ROW &amp; UTILITIES SUBTOTAL</b>	\$ 350,000.00
<b>STAKING SUBTOTAL</b>	\$ 50,000.00
<b>MOBILIZATION SUBTOTAL</b>	\$ 134,000.00
<b>MITIGATION SUBTOTAL</b>	\$ -
<b>SUBTOTAL</b>	\$ 2,045,921.50
<b>CONTINGENCY (25%)</b>	\$ 511,481.00
<b>TOTAL</b>	\$ 2,557,403.00

**ENGINEER'S OPINION OF PROBABLE COST - ALTERNATIVE 2 - REINFORCED CONCRETE BOX**

ROADWAY & TRAFFIC					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
201(A) 1200	CLEARING AND GRUBBING	LS	1.00	\$ 25,000.00	\$ 25,000.00
202(A) 2200	UNCLASSIFIED EXCAVATION	CY	3,714.00	\$ 12.00	\$ 44,568.00
221(B) 2300	TEMPORARY SILT FENCE	LF	3,000.00	\$ 2.50	\$ 7,500.00
230(A) 7200	SOLID SLAB SODDING	SY	15,500.00	\$ 5.00	\$ 77,500.00
307(K) 4200	STABILIZED SUBGRADE	SY	5,503.00	\$ 8.00	\$ 44,024.00
407(B) 7300	TACK COAT	GAL	3,577.00	\$ 4.00	\$ 14,308.00
411(A) 1220	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	2,466.00	\$ 115.00	\$ 283,590.00
411(C) 1420	SUPERPAVE, TYPE S4(PG 70-28 OK)	TON	434.00	\$ 130.00	\$ 56,420.00
411(C) 1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	179.00	\$ 130.00	\$ 23,270.00
610(B) 5310	CONCRETE DRIVEWAY	SY	100.00	\$ 100.00	\$ 10,000.00
619(B) 6380	REMOVAL OF CONCRETE DRIVEWAY	SY	100.00	\$ 40.00	\$ 4,000.00
-	SIGNING AND STRIPING	LS	1.00	\$ 25,000.00	\$ 25,000.00
<b>ROADWAY &amp; TRAFFIC TOTAL =</b>					<b>\$ 615,180.00</b>

BRIDGE					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
501(A) 1210	STRUCTURAL EXCAVATION UNCLASSIFIED	SY	1,150.00	\$ 40.00	\$ 46,000.00
504(D) 5410	CONCRETE RAIL (TR3)	LF	129.00	\$ 75.00	\$ 9,675.00
509(A) 0210	CLASS AA CONCRETE	CY	1,746.80	\$ 700.00	\$ 1,222,760.00
511(B) 2310	EPOXY COATED REINFORCING STEEL	LB	276,840.00	\$ 1.65	\$ 456,786.00
514(A) 5210	PILES, FURNISHED (HP 10x42)	LF	400.00	\$ 50.00	\$ 20,000.00
514(B) 5310	PILES, DRIVEN (HP 10x42)	LF	25.00	\$ 1.65	\$ 41.25
619(D) 6700	REMOVAL OF EXISTING BRIDGE STRUCTURE	LSUM	1.00	\$ 30,000.00	\$ 30,000.00
-	MISCELLANEOUS ITEMS (5% OF ALL OTHER COSTS)	LSUM	1.00	\$ 89,300.00	\$ 89,300.00
<b>BRIDGE TOTAL =</b>					<b>\$ 1,874,570.00</b>

RIGHT OF WAY & UTILITY RELOCATIONS					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
-	RIGHT-OF-WAY & UTILITY RELOCATIONS	LSUM	1.00	\$ 500,000.00	\$ 500,000.00
<b>RIGHT OF WAY &amp; UTILITY RELOCATIONS TOTAL =</b>					<b>\$ 500,000.00</b>

STAKING					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
642(B) 0096	CONSTRUCTION STAKING LEVEL 2	LSUM	1.00	\$ 50,000.00	\$ 50,000.00
<b>STAKING TOTAL =</b>					<b>\$ 50,000.00</b>

MOBILIZATION					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
220 2800	SWPP DOCUMENTATION AND MANAGEMENT	LSUM	1.00	\$ 5,000.00	\$ 5,000.00
641 1399	MOBILIZATION	LSUM	1.00	\$ 188,000.00	\$ 188,000.00
<b>MOBILIZATION TOTAL =</b>					<b>\$ 193,000.00</b>

MITIGATION					
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
N/A	ENVIRONMENTAL MITIGATION	LSUM	1.00	\$ 185,606.40	\$ 185,606.40
<b>MITIGATION TOTAL =</b>					<b>\$ 185,606.40</b>

<b>ROADWAY &amp; TRAFFIC SUBTOTAL</b>	\$ 615,180.00
<b>BRIDGE SUBTOTAL</b>	\$ 1,874,562.25
<b>ROW &amp; UTILITIES SUBTOTAL</b>	\$ 500,000.00
<b>STAKING SUBTOTAL</b>	\$ 50,000.00
<b>MOBILIZATION SUBTOTAL</b>	\$ 193,000.00
<b>MITIGATION SUBTOTAL</b>	\$ 185,606.40
<b>SUBTOTAL</b>	\$ 3,418,348.65
<b>CONTINGENCY (25%)</b>	\$ 854,588.00
<b>TOTAL</b>	\$ 4,272,937.00



