

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM



1. NAME OF PROPERTY

HISTORIC NAME: US 281 Bridge at the Brazos River
OTHER NAMES/SITE NUMBER: PP0250-02-018

2. LOCATION

STREET & NUMBER: US 281, 2.2 miles north of I-20
CITY OR TOWN: Santo
STATE: Texas CODE: TX COUNTY: Palo Pinto CODE: 363
NOT FOR PUBLICATION: N/A
VICINITY: X
ZIP CODE: 76472

3. STATE/FEDERAL AGENCY CERTIFICATION

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this x nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property x meets does not meet the National Register criteria. I recommend that this property be considered significant nationally x statewide locally. (See continuation sheet for additional comments.)

Leotis J. Russell
Signature of certifying official

9-6-96
Date

State Historic Preservation Officer, Texas Historical Commission

State or Federal agency and bureau

In my opinion, the property x meets does not meet the National Register criteria.
(See continuation sheet for additional comments.)

Signature of commenting or other official

Date

State or Federal agency and bureau

4. NATIONAL PARK SERVICE CERTIFICATION

I hereby certify that this property is:

- entered in the National Register
 See continuation sheet.
- determined eligible for the National Register
 See continuation sheet.
- determined not eligible for the National Register
- removed from the National Register
- other (explain):

Edson H. Beall
Signature of the Keeper

10-10-96
Date of Action

5. CLASSIFICATION

OWNERSHIP OF PROPERTY: public-State

CATEGORY OF PROPERTY: structure

NUMBER OF RESOURCES WITHIN PROPERTY:	CONTRIBUTING	NONCONTRIBUTING
	0	0 BUILDINGS
	0	0 SITES
	1	0 STRUCTURES
	0	0 OBJECTS
	1	0 TOTAL

NUMBER OF CONTRIBUTING RESOURCES PREVIOUSLY LISTED IN THE NATIONAL REGISTER: 0

NAME OF RELATED MULTIPLE PROPERTY LISTING: Historic Bridges of Texas, 1866-1945

6. FUNCTION OR USE

HISTORIC FUNCTIONS: TRANSPORTATION/road-related (vehicular)

CURRENT FUNCTIONS: TRANSPORTATION/road-related (vehicular)

7. DESCRIPTION

ARCHITECTURAL CLASSIFICATION: Other: continuous through truss bridge

MATERIALS: FOUNDATION substructure: concrete piers and bents

WALLS N/A

ROOF N/A

OTHER superstructure: steel truss

NARRATIVE DESCRIPTION (see continuation sheets 7-1 through 7-4)

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Description:

The US 281 Bridge at the Brazos River is a through truss bridge consisting of one three-span continuous unit 656½ feet long and 12 steel I-beam approach spans, each 40 feet long, for an overall length of 1,138 feet (see Figure 2). The bridge provides a crossing over the Brazos River on US 281 in southeastern Palo Pinto County. It links Mineral Wells, the county's principal town and a health and recreation center, with Stephenville, the Erath County seat (see Figure 1). Palo Pinto County is in the Western Cross Timbers region of North Central Texas. The region's economy relies primarily on diversified agriculture, with beef cattle the prime revenue producer. Oil and gas are also important resources to the region.

Texas Highway Department (THD) engineers custom designed the bridge's truss spans. These spans form a continuous Warren truss with top chords resembling the curve seen in suspension bridges (see Photograph 3). They rest on reinforced concrete dumbbell piers with square battered columns on spread footings. Precast concrete pile bents support the 12 approach spans (see Photograph 2). Custom-designed approach railing consists of chamfered concrete posts, 15 by 9 inches in plan, with 3½-inch diameter pipes placed between them as the top rail. Two-inch pipe placed horizontally serves as the lower rail. Steel channel members, 12 inches deep, hang at about mid-height from the inside of the railing serving to deflect oncoming cars (see Photograph 1). This railing was considered both attractive and safe. Truss railing employs 12-inch deep steel channels. The bridge provides a 24-foot roadway with 1½-foot curbs serving as refuge walks for stranded pedestrians. A bronze plaque imbedded in the approach railing at each entrance to the bridge names the contractor and identifies THD and the Bureau of Public Roads (BPR) as the government agencies responsible for the project. The plaque reads:

BRAZOS RIVER BRIDGE
BUILT IN 1939 BY THE
TEXAS HIGHWAY DEPARTMENT
— * —
UNITED STATES
BUREAU OF PUBLIC ROADS
STATE HIGHWAY COMMISSION
ROBERT LEE BOBBITT CHAIRMAN
JOHN WOOD MEMBER
HARRY HINES MEMBER
JULIAN MONTGOMERY
HIGHWAY ENGINEER
BROWN & ROOT INC.
CONTRACTORS

From 1938 through 1939, Brown & Root built the Brazos River bridge under contract to THD. No major repairs or alterations have been performed on this bridge. As such, it retains substantial integrity of design, materials and workmanship. The bridge and its surroundings appear relatively unchanged since

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1939, maintaining integrity of location, setting, feeling and association. Although no projects are currently planned for the Brazos River bridge, its BRINSAP sufficiency rating as of June 1995 is 32.0, making it eligible for replacement under the federal Highway Bridge Replacement and Rehabilitation Program (HBRRP).

GENERAL SPECS

TRUSS TYPE: continuous Warren through
 THD STD. DESIGN: n/a
 NO. TRUSS SPANS: 3 (continuous unit)
 TRUSS SPAN LENGTH: 1 - 656'6" 3-span continuous unit
 ROADWAY WIDTH: 24'
 DECK WIDTH: 28'
 APPROACH SPANS: 12 - 40' I-beam spans
 OVERALL LENGTH: 1138'4"

SPECIAL FEATURES

BRIDGE PLAQUE: yes
 APPROACH RAILING: concrete/steel railing
 OTHER: 18-inch refuge walks

SUPERSTRUCTURE

TRUSS DEPTH: 36'
 TRUSS PANELS: 8 - 25'3"; 10 - 25'3"; 8 - 25'3"
 TOP CHORD & END POSTS: 2 channels w/ cover plates & lacing
 BOTTOM CHORD: 2 channels w/ batten plates & lacing
 VERTICAL POSTS: 2 double angles w/ plate separator
 DIAGONAL MEMBERS: 2 double angles w/plate separator
 or 2 channels w/ lacing
 DECK TYPE: concrete

SUBSTRUCTURE

PIERS/INTERIOR BENTS: concrete piers and interior bents
 THD STD. DESIGN: n/a
 ABUTMENTS/END BENTS: concrete end bents
 THD STD. DESIGN: n/a

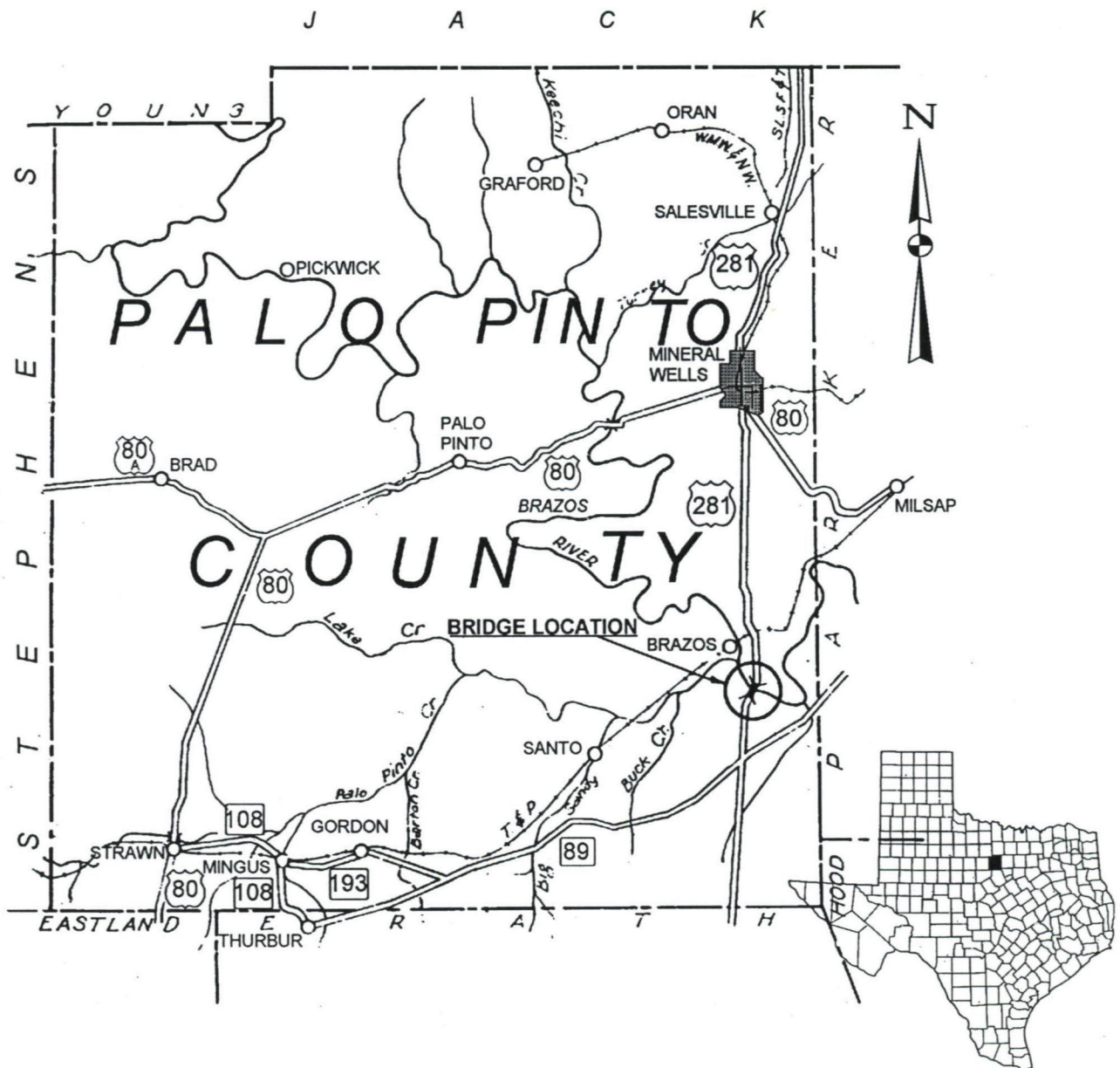
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Figure 1. Map of Palo Pinto county with the location of the Brazos River bridge as shown in the 1939 plans.



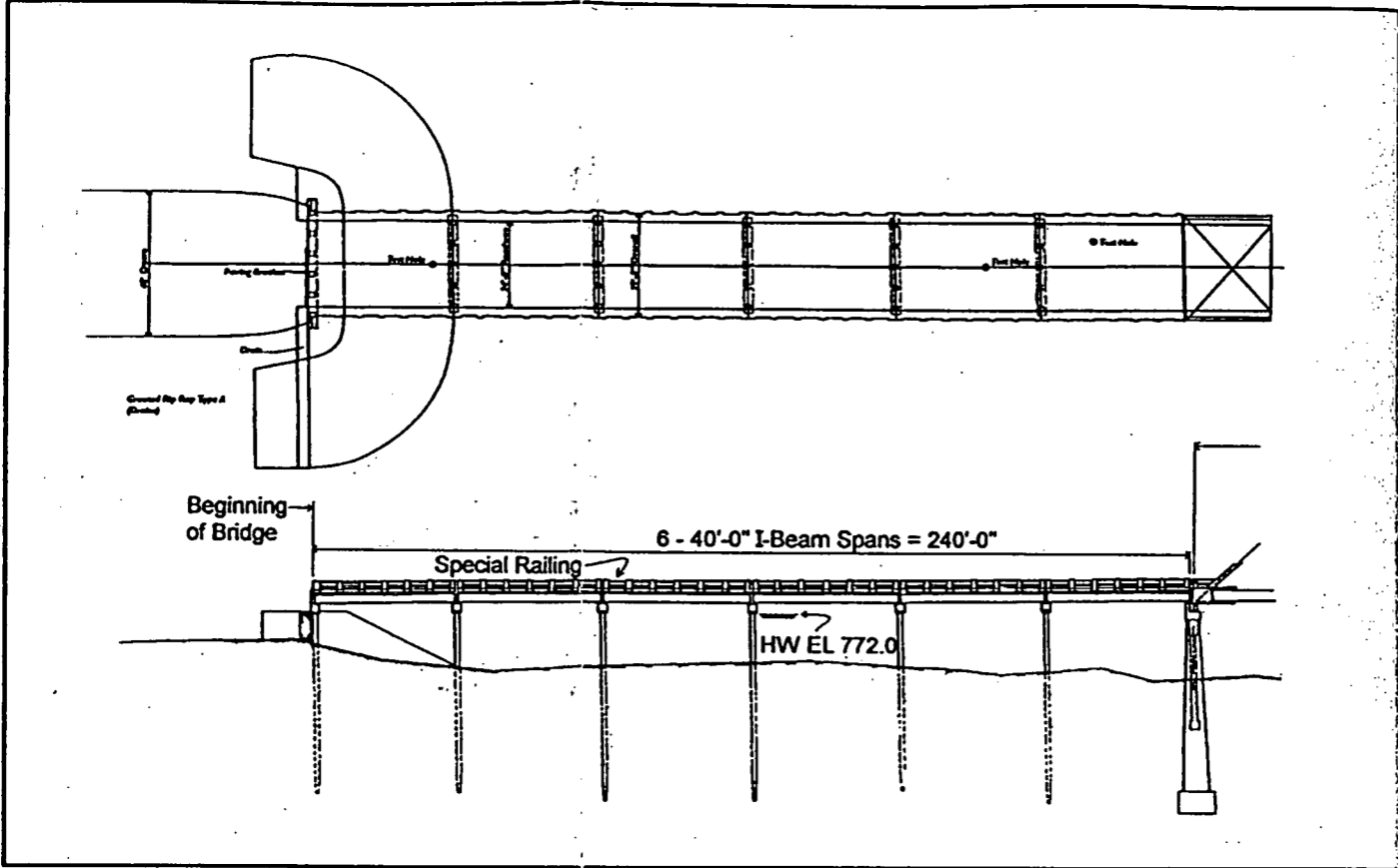
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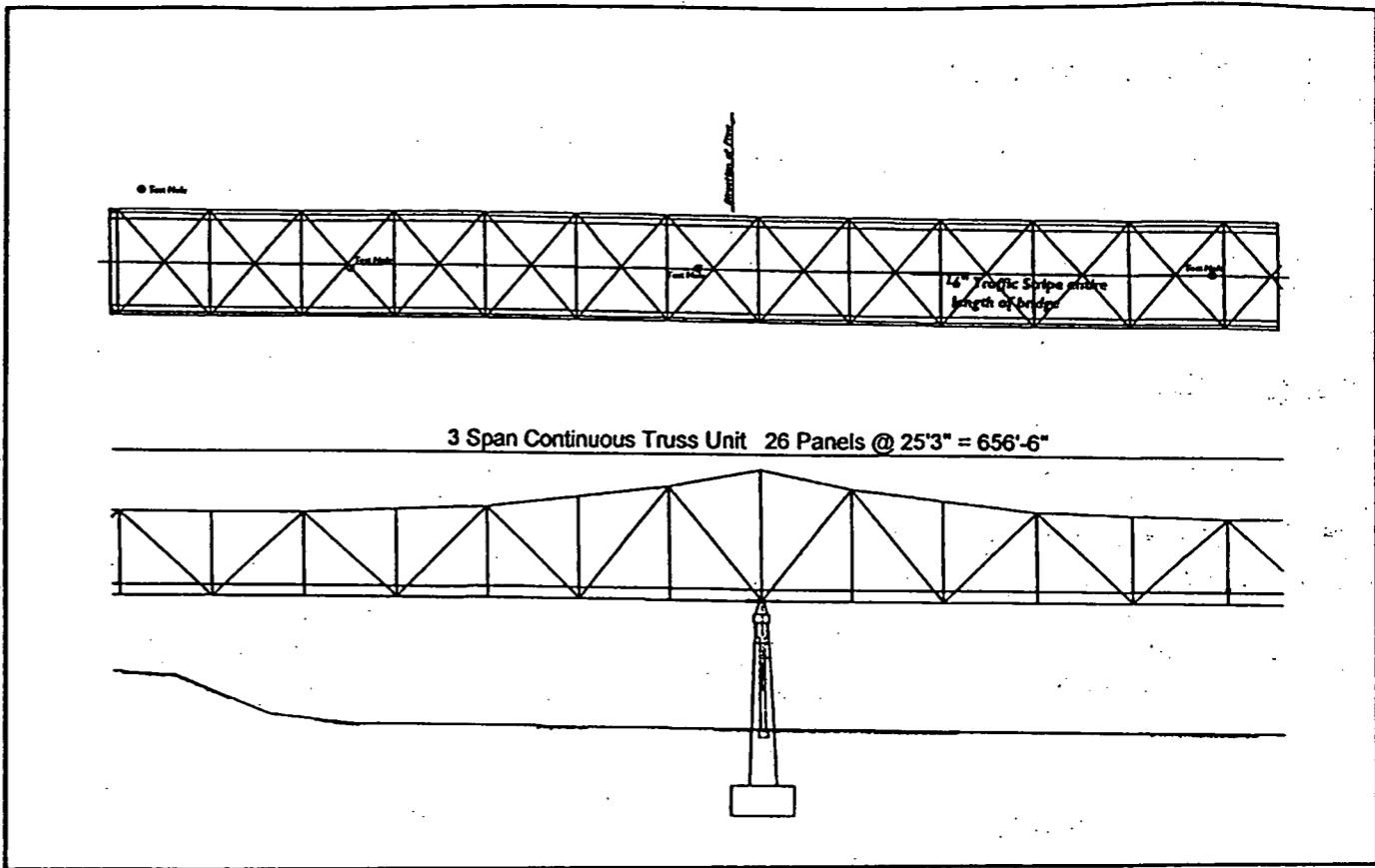
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US 281 Bridge of the Brazos River
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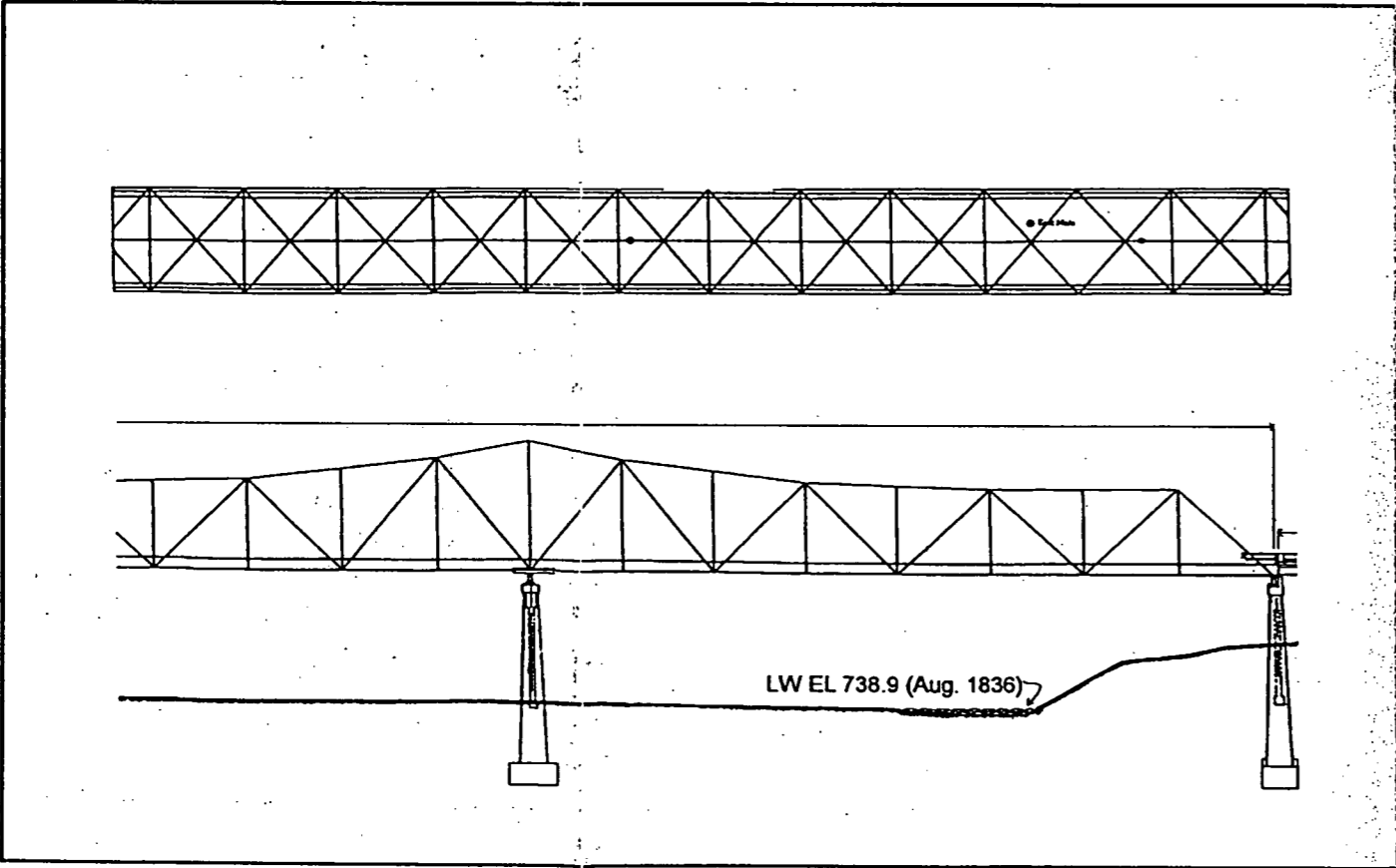
Figure 2. Elevation of the Brazos River bridge as shown in the 1939 plans.



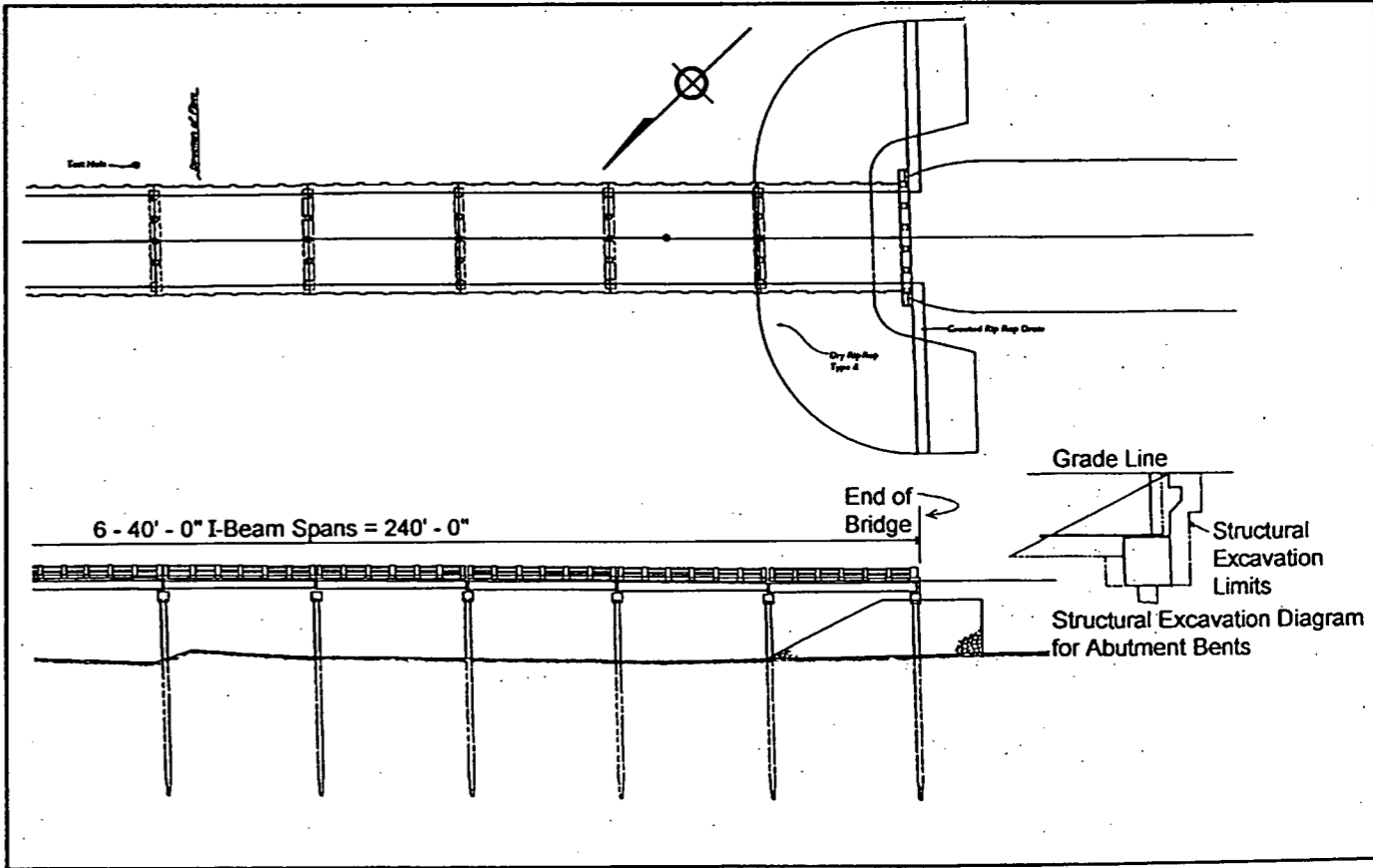
PLAN SHEET 1 OF 4



PLAN SHEET 2 OF 4



PLAN SHEET 3 OF 4



PLAN SHEET 4 OF 4

TOTAL LENGTH OF BRIDGE = 1134' - 4"

8. STATEMENT OF SIGNIFICANCE

APPLICABLE NATIONAL REGISTER CRITERIA

- A** PROPERTY IS ASSOCIATED WITH EVENTS THAT HAVE MADE A SIGNIFICANT CONTRIBUTION TO THE BROAD PATTERNS OF OUR HISTORY.
- B** PROPERTY IS ASSOCIATED WITH THE LIVES OF PERSONS SIGNIFICANT IN OUR PAST.
- C** PROPERTY EMBODIES THE DISTINCTIVE CHARACTERISTICS OF A TYPE, PERIOD, OR METHOD OF CONSTRUCTION OR REPRESENTS THE WORK OF A MASTER, OR POSSESSES HIGH ARTISTIC VALUE, OR REPRESENTS A SIGNIFICANT AND DISTINGUISHABLE ENTITY WHOSE COMPONENTS LACK INDIVIDUAL DISTINCTION.
- D** PROPERTY HAS YIELDED, OR IS LIKELY TO YIELD, INFORMATION IMPORTANT IN PREHISTORY OR HISTORY.

CRITERIA CONSIDERATIONS: N/A

AREAS OF SIGNIFICANCE: Engineering

PERIOD OF SIGNIFICANCE: 1938-1939

SIGNIFICANT DATES: 1938-1939

SIGNIFICANT PERSON: N/A

CULTURAL AFFILIATION: N/A

ARCHITECT/BUILDER: Bridge Designer: Texas Highway Department
Truss Fabricator: Bethlehem Steel Company of Pittsburgh, Pennsylvania
Bridge Builder: Brown & Root, Inc., of Austin, Texas

NARRATIVE STATEMENT OF SIGNIFICANCE (see continuation sheets 8-5 through 8-6)

9. MAJOR BIBLIOGRAPHIC REFERENCES

BIBLIOGRAPHY (see continuation sheet 9-7)

PREVIOUS DOCUMENTATION ON FILE (NPS): N/A

- preliminary determination of individual listing (36 CFR 67) has been requested.
- previously listed in the National Register
- previously determined eligible by the National Register
- designated a National Historic Landmark
- recorded by Historic American Buildings Survey #
- recorded by Historic American Engineering Record #

PRIMARY LOCATION OF ADDITIONAL DATA:

- State historic preservation office (*Texas Historical Commission*)
- Other state agency (*Texas Department of Transportation*)
- Federal agency
- Local government
- University
- Other -- Specify Repository:

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Statement of Significance:

The US 281 Bridge at the Brazos River was constructed from 1938 to 1939. This custom-designed continuous truss bridge, with its combination of typifying features, is significant for embodying the defining characteristics of a THD truss bridge. As such, the bridge meets National Register Criterion C in the area of Engineering at a state level of significance.

The Brazos River bridge was built on US 281, which extends south from Wichita Falls, near the Oklahoma state line, towards San Antonio, linking several county seats along the way in Erath, Hamilton, Lampasas, Burnet and Blanco counties. The route continues south from San Antonio to Alice, Falfurrias and Edinburg in South Texas, ending at Hidalgo near the Mexican border. US 281 was previously designated SH 66, but was improved and upgraded to a US highway in the mid-1930s, bearing the shared designation US 281/SH 66. By 1942, the SH 66 designation had been dropped.

The Brazos River bridge was planned and constructed as part of a larger THD effort to upgrade SH 66 to a US route. This undertaking involved some relocation and realignment of the highway, including the segment between Mineral Wells and Stephenville. As was typical for early state highways, local roads originally built to connect the small communities of Brazos, Santo and Patillo had been designated a state highway to serve regional traffic. Once upgraded, the highway bypassed these towns in favor of a more direct route. New bridges were required to serve as crossings on the relocated highway. The US 281 Bridge over the Brazos River essentially replaced a county-built bridge that served on the original route of SH 66.

Sub-surface investigation of the proposed bridge site revealed a hard blue shale suitable for founding spread footings. This kind of stable foundation material was conducive to the construction of a continuous truss span, and preliminary planning work for the replacement bridge reflected this. Generally, a continuous truss bridge was considered aesthetically superior to a series of simply supported spans. However, the continuous truss was subject to the amplified effects of secondary stresses due to pier settlement and the cumulative effects of temperature expansion. A stable foundation, as was encountered in the Brazos River bottom, decreased the likelihood of pier settlement and was ideal for continuous span construction. Continuous bridges were sometimes more economical than their simply supported counterparts, particularly for long-span bridges. Despite the relatively modest span lengths, cost calculations revealed the improved economy of the continuous design for the Brazos River bridge. The Preliminary Bridge Inspection Report, dated May 4, 1938, stated:

In regard to the type of bridge submitted, the State's representatives informed me that several estimates had been made using various combinations of simple truss spans and plate girder spans, and it was found that the most economical type using the same roadway width as the continuous type amounted to approximately \$185,000 and that the continuous layout could be built for approximately \$180,000. On the basis of this saving, this type of structure was proposed. With the foundation conditions being as described above, it would appear that the continuous structure would be a satisfactory installation at the proposed site.

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Convenience of erection was also a major advantage of continuous spans. The span under construction could be cantilevered from previously built spans acting as anchors. This minimized the amount of falsework needed and was especially advantageous for the construction of long spans over deep water. THD engineers did not, however, specify cantilever erection for the Brazos River bridge. As stated in an October 18, 1938, teletype to the division engineer in Fort Worth, "Plans anticipate erection of trusses on falsework but cantilever erection is permissible. Contractor would be required to submit erection scheme and furnish at his own expense any additional metal required to reinforce such members as would otherwise be overstressed."

Rather than use a standard design, THD bridge engineers developed a special design for the Brazos River bridge, incorporating a continuous truss span for improved economy and appearance. The bridge's top chord curves between two high points, similar to the cable configuration used on suspension bridges. The truss' high points lie over the piers, reflecting the need to resist larger stresses at these locations. The US 281 Bridge at the Brazos River is one of only seven continuous through truss bridges surviving in Texas and one of only five built before World War II and therefore considered historic. The Colorado River bridge in Lampasas County (refer to nomination of US 190 Bridge at the Colorado River, LM0272-05-023, NRHP 1995) is the only other historic truss bridge in Texas with a curved and peaked top chord.

By September 1938, the Brazos River bridge project had been placed on the 1939 Regular Federal Aid Program. THD submitted the plans, specifications and estimate (PS&E) to BPR and received approval of the project on September 20. The accompanying appropriation amounted to \$88,800 of federal funds to cover 50 percent of the project cost. State funds covered the remainder. The Texas Highway Commission opened bids for the project on October 25, 1938. After reviewing the six bids submitted, the commission awarded the contract to Brown & Root, Inc., of Austin, which submitted the low bid of nearly \$171,000. The Bethlehem Steel Company of Pittsburgh, Pennsylvania, fabricated the steel spans.

Construction work on the project began on December 16, 1938. The THD resident engineer in Mineral Wells supervised the construction, which engineers from both THD and BPR inspected. The contractor chose not to use the cantilever erection method for the steel spans, employing falsework instead. The contractor requested permission to weld the steel channel truss railing, believing that they could achieve better results with this method. THD objected only because of difficulties maintenance forces would later encounter in making repairs to bent or damaged members. THD and the contractor apparently reached a compromise, as evidenced by a field change to employ Dardet rivet bolts to connect the truss railing. Work on the project continued without incident and was completed on September 23, 1939.

10. GEOGRAPHICAL DATA

ACREAGE OF PROPERTY: less than one acre

UTM REFERENCES	Zone	Easting	Northing	Zone	Easting	Northing
1	14	584420	3611710	3	—	—
2	—	—	—	4	—	—

(— see continuation sheet)

VERBAL BOUNDARY DESCRIPTION (see continuation sheet 10-7)

BOUNDARY JUSTIFICATION (see continuation sheet 10-7)

11. FORM PREPARED BY

NAME/TITLE:	text by Regina A. Lauderdale graphics by Pat St. George	DATE: September 1996
ORGANIZATION:	Texas Historical Commission/ Texas Department of Transportation	TELEPHONE: 512/463-6094
STREET & NUMBER:	Texas Historical Commission P.O. Box 12276	ZIP CODE: 78711
CITY OR TOWN:	Austin STATE: TX	

ADDITIONAL DOCUMENTATION

CONTINUATION SHEETS

MAPS

PHOTOGRAPHS

ADDITIONAL ITEMS

PROPERTY OWNER

NAME	Texas Department of Transportation	
STREET & NUMBER	125 East 11th Street	TELEPHONE 512/416-2606
CITY OR TOWN	Austin STATE TX	ZIP CODE 78701

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Bibliography:

Condit, Carl. *American Building*. Chicago: University of Chicago Press, 1968.

Hool, George A., and W.S. Kinne, eds. *Movable and Long-span Steel Bridges*. 2d ed. New York: McGraw Hill, 1943.

Texas Highway Department. Plans of Proposed State Highway Improvement. Control-Section-Job No. 0252-02-004, located at TxDOT headquarters in Austin.

Texas Highway Department. Project Correspondence Files. Control-Section-Job No. 0252-02-004, located at TxDOT headquarters in Austin.

Verbal Boundary Description:

The nomination boundaries encompass the complete structure, US 281 Bridge at the Brazos River, including the approach spans and approach railing, as well as the ground upon which the structure stands.

Boundary Justification:

The boundary includes all components historically associated with the property.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

REQUESTED ACTION: NOMINATION

PROPERTY US 281 Bridge at the Brazos River
NAME:

MULTIPLE Historic Bridges of Texas MPS
NAME:

STATE & COUNTY: TEXAS, Palo Pinto

DATE RECEIVED: 9/09/96 DATE OF PENDING LIST: 9/24/96
DATE OF 16TH DAY: 10/10/96 DATE OF 45TH DAY: 10/24/96
DATE OF WEEKLY LIST:

REFERENCE NUMBER: 96001126

NOMINATOR: STATE

REASONS FOR REVIEW:

APPEAL: N DATA PROBLEM: N LANDSCAPE: N LESS THAN 50 YEARS: N
OTHER: N PDIL: N PERIOD: N PROGRAM UNAPPROVED: N
REQUEST: N SAMPLE: N SLR DRAFT: N NATIONAL: N

COMMENT WAIVER: N

ACCEPT RETURN REJECT 10-10-96 DATE

ABSTRACT/SUMMARY COMMENTS:

RECOM./CRITERIA _____

REVIEWER _____ DISCIPLINE _____

TELEPHONE _____ DATE _____

DOCUMENTATION see attached comments Y/N see attached SLR Y/N



SITE NO. PPO250-02-018

US 281 BRIDGE AT BRAZOS RIVER

HISTORIC BRIDGES OF TEXAS

PALO PINTO CO., TEXAS

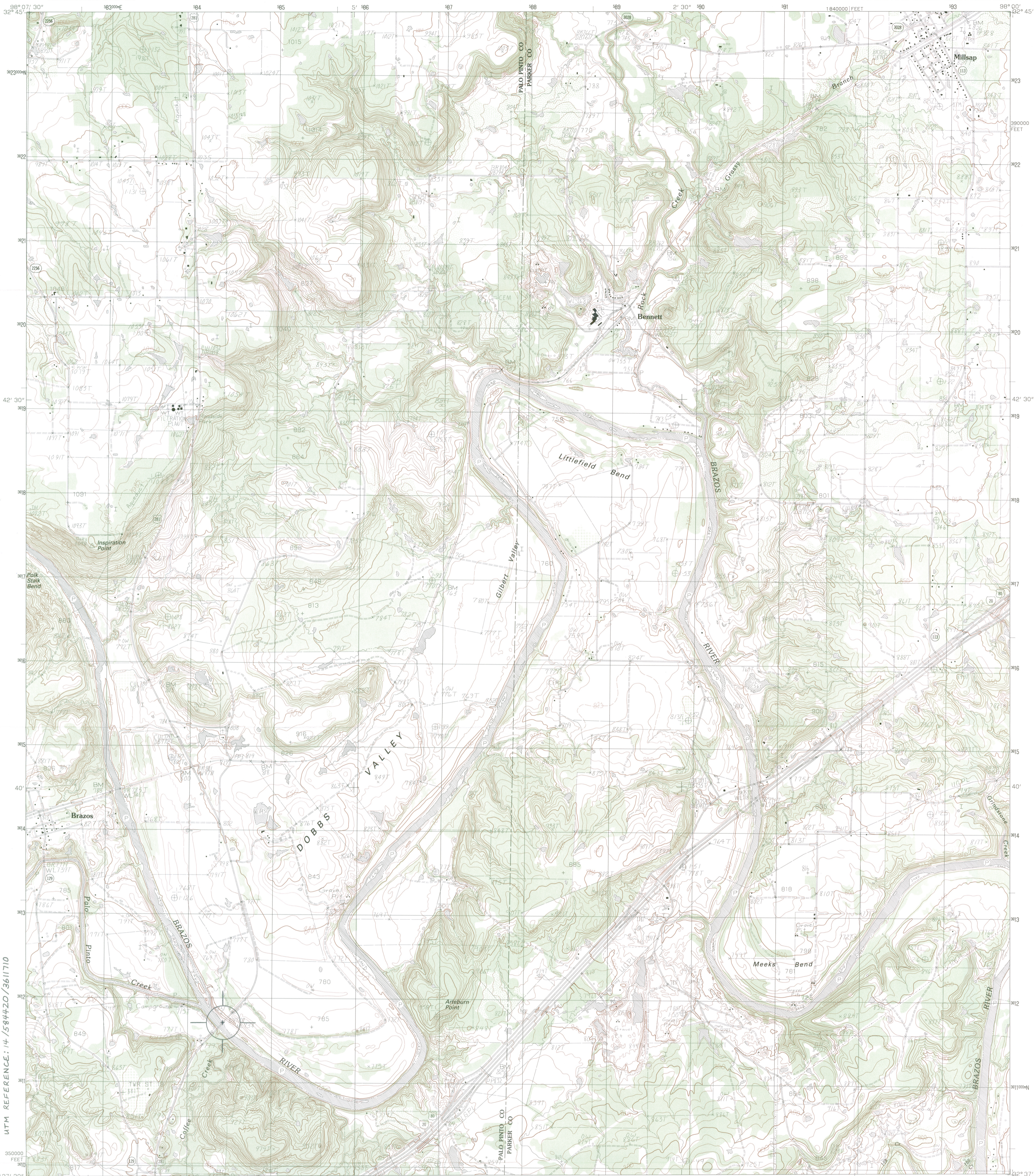
PHOTOGRAPH 1 OF 3



SITE NO. PP0250-02-018
US 281 BRIDGE AT BRAZOS RIVER
HISTORIC BRIDGES OF TEXAS
PALO PINTO CO., TEXAS
PHOTOGRAPH 2 OF 3



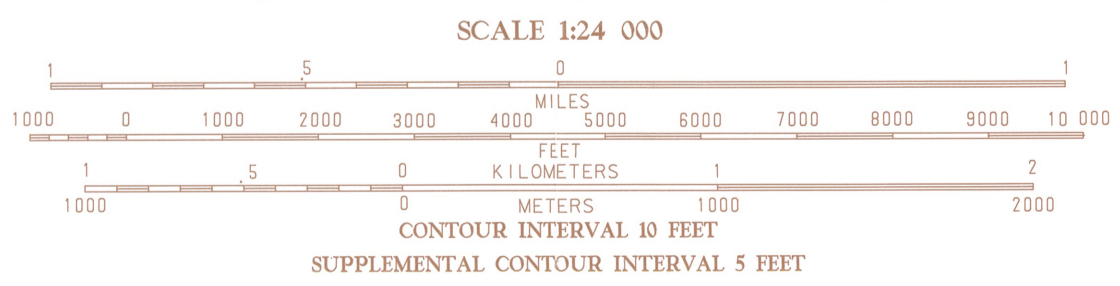
SITE NO. PP0250-02-018
US 281 BRIDGE AT BRAZOS RIVER
HISTORIC BRIDGES OF TEXAS
PALO PINTO CO., TEXAS
PHOTOGRAPH 3 OF 3 (HISTORIC)



HISTORIC BRIDGES OF TEXAS
 US 281 BRIDGE AT BRAZOS RIVER
 VICINITY OF NEW SALEM, PALO PINTO CO, TEXAS
 UTM REFERENCE: 14J584420/3611710

PRODUCED BY THE UNITED STATES GEOLOGICAL SURVEY
 CONTROL BY USGS, NOS/NOAA
 COMPILED FROM AERIAL PHOTOGRAPHS TAKEN 1977
 FIELD CHECKED 1979 MAP EDITED 1984
 PROJECTION LAMBERT CONFORMAL CONIC
 GRID: 100-METER UNIVERSAL TRANSVERSE MERCATOR ZONE 14
 1000-FOOT STATE GRID TICKS TEXAS NORTH CENTRAL ZONE
 UTM GRID DECLINATION 0°30' EAST
 1984 MAGNETIC NORTH DECLINATION 8° EAST
 VERTICAL DATUM NATIONAL GEODETIC VERTICAL DATUM OF 1929
 HORIZONTAL DATUM 1927 NORTH AMERICAN DATUM
 To place on the predicted North American Datum of 1983,
 move the projection lines as shown by dashed corner ticks
 (10 meters south and 30 meters east)
 There may be private inholdings within the boundaries of any
 Federal and State Reservations shown on this map
 All marginal data and lettering generated and positioned by
 automated type placement procedures
 All unclassified lakes are perennial

PROVISIONAL MAP
 Produced from original
 manuscript drawings. Informa-
 tion shown as of date of
 field check. 3



THIS MAP COMPLES WITH NATIONAL MAP ACCURACY STANDARDS
 FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225
 OR RESTON, VIRGINIA 22092

ROAD LEGEND
 Improved Road
 Unimproved Road
 Trail
 Interstate Route U.S. Route State Route

QUADRANGLE LOCATION

1	2	3	1 Mineral Wells West
4	5	4 Mineral Wells East	
6	7	5 Brazos West	
		6 Brazos	
		7 Lipan	
		8 Denton	

ADJOINING 7.5' QUADRANGLE NAMES
 3298-414

BRAZOS EAST, TEXAS
 PROVISIONAL EDITION 1984
 32098-FI-TT-024