

HISTORIC BRIDGE INVENTORY

Side Hill Viaduct

PROPERTY IDENTIFICATION

county	Navajo	inventory number	00145
milepost	321.02	inventory route	US 60
location	2.6 mi W Jct SR 73	feature intersected	Side Hill
city/vicinity	Carrizo	USGS quadrangle	Long Tom Canyon
district	83	UTM reference	12.570167.3766597

STRUCTURAL INFORMATION

main span number	8	main span type	201
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	6
main span length	12.0	superstructure	concrete transverse slab
structure length	97.0	substructure	concrete abutments, wingwalls and piers
roadway width	38.0	floor/decking	asphalt roadway
structure width	47.0	other features	steel Thrie beam guardrails

HISTORICAL INFORMATION

construction date	1936	designer/engineer	Arizona Highway Department
project number	FAP 105-D	builder/contractor	Harry J. Hagen, Globe AZ
information source	ADOT bridge records	structure owner	Arizona Department of Transportation
alteration date(s)	ca1990	alterations	Thrie beam guardrails installed

NATIONAL REGISTER EVALUATION

inventory score	52	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	eligible
		NRHP criteria	A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/>
		signif. statement	well-preserved example of singular structural type

FORM COMPLETED BY

Clayton B. Fraser, Principal

FRASERdesign
420 South County Road 23E
Loveland, Colorado 80537
31 October 2004



PHOTO INFORMATION

date of photo.: November 2002

view direction: northeast

photo no.: 02.11.40

CONSTRUCTION HISTORY

In the late 1920s the Arizona Highway Department began planning for construction of a major highway that would link Globe and Springerville in eastern Arizona. Designated as part of U.S. Highway 60, the Globe-Springerville Highway was initially surveyed in 1930-1931. AHD divided the 130-mile road into a series of shorter sections and began letting contracts for its construction in 1931. The heavy construction progressed northward from Globe and by 1936 the work had reached beyond Carrizo. There, on a steep hillside that sloped down to Corduroy Creek, highway department engineers encountered an unusual circumstance. In order to carry the highway over one narrow, rocky section of the hill, AHD designed a 97-foot-long reinforced concrete viaduct. Not a bridge in the truest sense, the Side Hill Viaduct increased the available roadway width by extending sideways from the existing hillside. It was comprised of eight relatively short concrete slab spans supported on a banked curve by solid concrete piers on spread footings that stepped down the hillside. As delineated by AHD, the structure would require 116 cubic yards of concrete and over 20,000 pounds of reinforcing steel.

AHD designated the construction of this viaduct—along with 3.2 miles of adjacent roadway—as Federal Aid Project 105-D and late in 1935 awarded the contract for the work to Harry J. Hagen. Under the supervision of AHD resident engineer A.F. Rath, the Globe contractor began work on the road soon thereafter. By May the Hagen crew had completed over half of the construction; by October the project was reported complete. Cost: \$5094.00. The Side Hill Viaduct has since carried mainline traffic, with the replacement of its original guardrails with steel Thrie beams as the only significant alteration.

SIGNIFICANCE STATEMENT

Stretching between Springerville and Ehrenberg, US 60 has historically formed an important east-west route across central Arizona. The highway functioned as a heavily trafficked ancillary route for US 66 across the northern part of the state, and it provided a vital link between the cities in the Salt River Valley—Phoenix, Tempe, Mesa—with the rest of the state. During the 1920s and 1930s the Arizona Highway Department improved the route in a massive multi-part construction effort. As one of the last structures built along the highway's length, the Side Hill Viaduct is significant as an original component of this regionally important route. Although it employed conventional concrete slabs for its individual spans, the structure's configuration on a steep hillside makes it unique among Arizona's bridges.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

☒ Criterion A
☐ Criterion B
☒ Criterion C

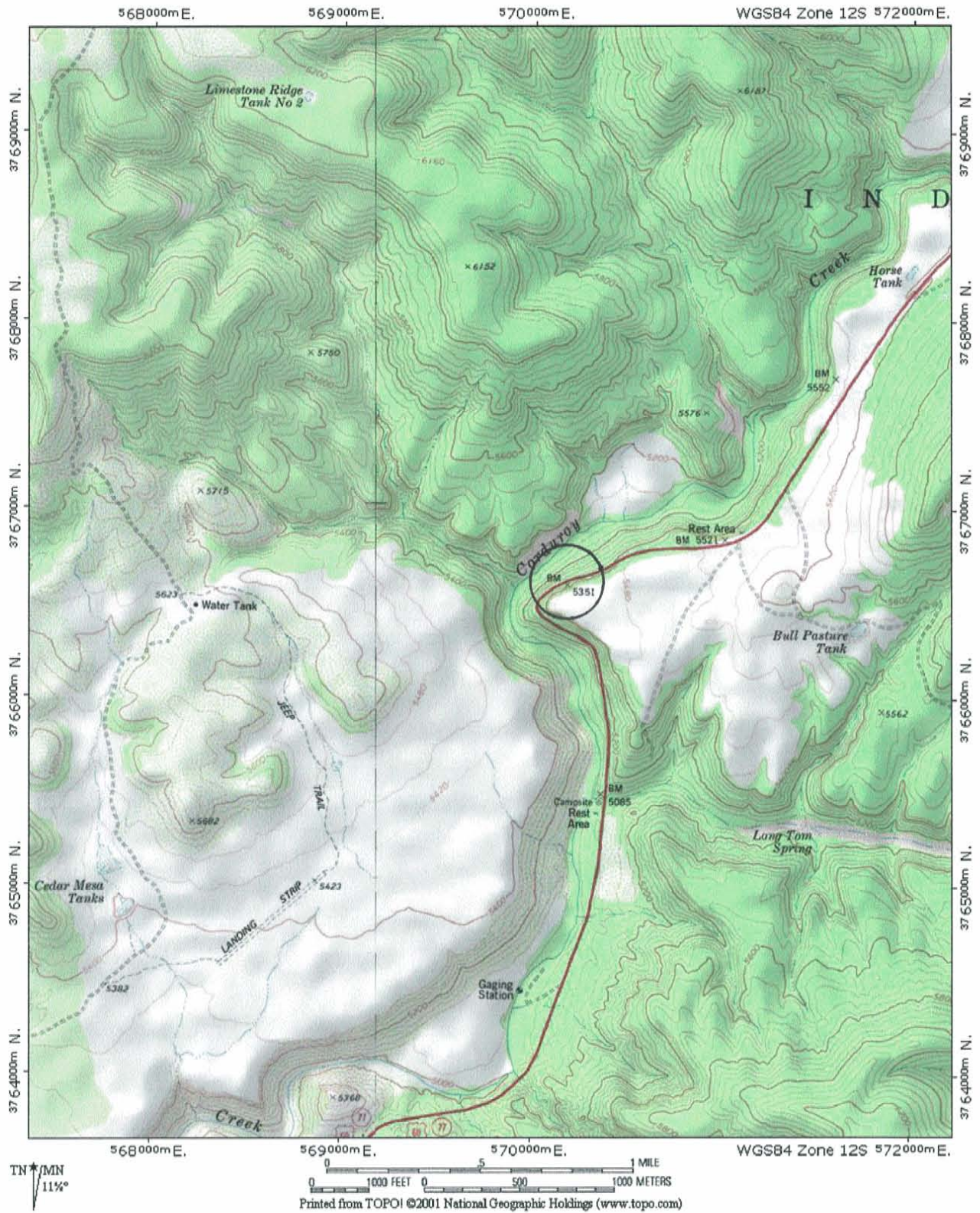
NATIONAL REGISTER ELIGIBILITY

individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering
 PERIOD OF SIGNIFICANCE: 1936-1964
 THEME(S): Transportation: Highways

SIDE HILL VIADUCT

Structure No. 0145



Location Map

HISTORIC BRIDGE INVENTORY

Winslow Underpass

PROPERTY IDENTIFICATION

county	Navajo	inventory number	00194
milepost	342.10	inventory route	AT&SF Railroad
location	0.1 mi South of Jct B 40	feature intersected	SR 87
city/vicinity	Winslow	USGS quadrangle	Winslow
district	87	UTM reference	12.527586.3875453

STRUCTURAL INFORMATION

main span number	2	main span type	207
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	
main span length	25.0	superstructure	concrete rigid frame
structure length	36.0	substructure	concrete abutments, retaining walls and piers
roadway width	0.0	floor/decking	ballasted railroad deck
structure width	0.0	other features	decorative pierced parapet walls and guardrails; curved and corbelled bulkhead brackets; Spanish tile- roofed corner tower

HISTORICAL INFORMATION

construction date	1936	designer/engineer	Arizona Highway Department
project number	WPGM 107	builder/contractor	Tanner Construction Company, Phoenix AZ
information source	ADOT bridge records	structure owner	Atchison, Topeka & Santa Fe Railroad
alteration date(s)	1997	alterations	stairway/walkway rehabilitated

NATIONAL REGISTER EVALUATION

inventory score	70	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u> </u> C <u>x</u>
		signif. statement	well-preserved Depression-era grade separation

FORM COMPLETED BY

Clayton B. Fraser, Principal

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420 South County Road 23E
Loveland, Colorado 80537
31 October 2004

WINSLOW UNDERPASS

Structure No. 0194



PHOTO INFORMATION

date of photo: November 2002

view direction: north northwest

photo no.: 02.11.115 02.11.117

CONSTRUCTION HISTORY

The Atchison Topeka & Santa Fe Railroad intersected with U.S. Highway 87 in Winslow, creating a considerable bottleneck for vehicular traffic. To alleviate this recurring problem, the Arizona Highway Department undertook construction of a grade separation that would carry the railroad over the highway. In April 1936 AHD opened the bids for the project. Funding for Winslow Underpass—designated as Works Progress Grade Maintenance Project 107—came from an enormous public relief bill passed by Congress in 1935, a portion of which was earmarked for grade separations. The underpass had been engineered late in 1935 by the AHD bridge department as a two-span reinforced concrete rigid frame structure with Mission Style architectural treatment.

The contract went to the R.C. Tanner Construction Company for an estimated \$150,000. With several other highway projects then underway, the Phoenix contractor was slow in beginning this structure, and as a result the work dragged through the summer. Tanner recruited heavily from the relief rolls for labor, using about 70,000 man-hours to build the structure. With its long approaches and decorative architecture, the Winslow Underpass was massive, consuming almost 300 cubic yards of concrete and 360,000 pounds of reinforcing steel. Tanner's men completed it in November, and it was formally dedicated before throngs of well-wishers on December 1, 1936. The Winslow Underpass has functioned unaltered since.

SIGNIFICANCE STATEMENT

The Winslow Underpass is noteworthy as one of several railroad grade separations in Arizona funded through the New Deal's Hayden-Cartwright Act. Federal relief programs of the mid-1930s broke with past policy by allowing federal funds to be used on urban, as well as rural, highway construction. Much of this money was steered into an extensive nationwide program to eliminate dangerous on-grade railroad crossings. Built in the height of the Great Depression, the Winslow Underpass achieved one of its primary goals—providing employment for local workers on relief. Like many other grade separations designed at the time by AHD, this structure employed a distinctive architectural treatment to help integrate into the surrounding urban fabric. The Winslow Underpass displays traditional Mission Style detailing, with its decoratively pierced parapet walls and tile-roofed tower. A prototypical Arizona style, this was the architectural idiom that AHD used for a number of its grade separations, most notably the Stone Avenue Underpass [7987] in Tucson, completed earlier in 1936. A locally important grade separation, the Winslow Underpass represents this noteworthy architectural trend.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

- ☒ Criterion A
☐ Criterion B
☒ Criterion C

NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

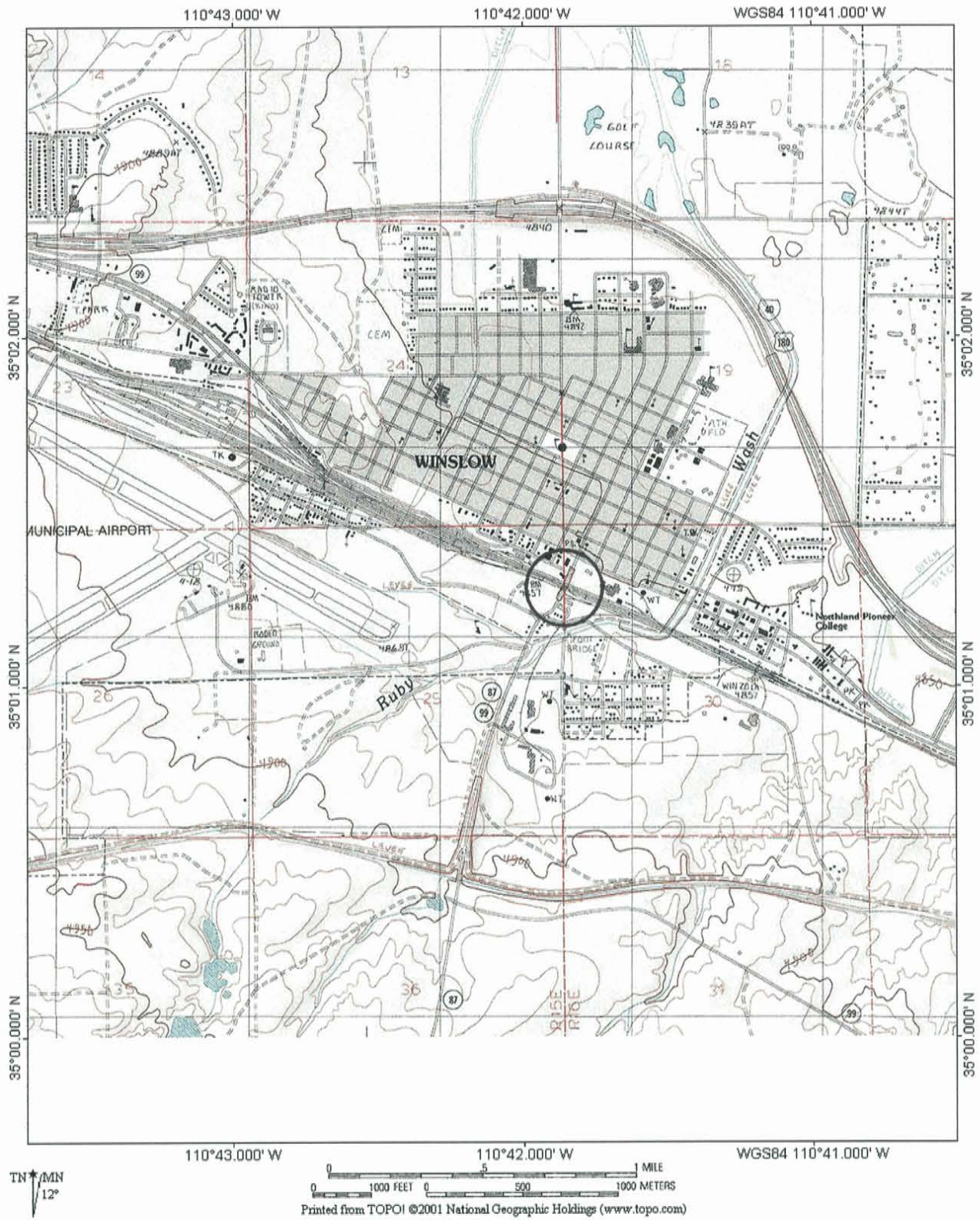
AREA OF SIGNIFICANCE: Transportation; Engineering

PERIOD OF SIGNIFICANCE: 1936-1964

THEME(S): Transportation: Highways

WINSLOW UNDERPASS

Structure No. 0194



Location Map

HISTORIC BRIDGE INVENTORY

Cedar Canyon Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	00215
milepost	323.44	inventory route	US 60
location	5.3 mi E Jct SR 73	feature intersected	Cedar Canyon
city/vicinity	Carrizo	USGS quadrangle	Long Tom Canyon
district	83	UTM reference	12.572900.3768946

STRUCTURAL INFORMATION

main span number	1	main span type	311
appr. span number	3	appr. span type	402
degree of skew	0	guardrail type	9
main span length	180.0	superstructure	steel two-hinge girder-ribbed deck arch
structure length	283.0	substructure	concrete abutments and arch pedestals
roadway width	46.0	floor/decking	concrete deck over steel stringers
structure width	49.2	other features	arch rib: riveted built-up plate girder w/ angle flanges and web stiffeners; post: wide flange; lateral bracing: 1 angle; floor beam: I-beam; decorative steel pylons and guardrails

HISTORICAL INFORMATION

construction date	1938	designer/engineer	Arizona Highway Department
project number	FAP 105-E	builder/contractor	Pleasant-Hasler Construction Co., Phoenix AZ
information source	ADOT bridge records	structure owner	Arizona Department of Transportation
alteration date(s)	1993	alterations	substructure extended to one side and twin bridge moved to this location

NATIONAL REGISTER EVALUATION

inventory score	40	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u> </u> C <u>x</u>
		signif. statement	outstanding example of rare structural type, essentially reconstructed

FORM COMPLETED BY

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420 South County Road 23E
Loveland, Colorado 80537
31 October 2004

CEDAR CANYON BRIDGE

Structure No. 0215



PHOTO INFORMATION

date of photo.: November 2002

view direction: north west

photo no.: 02.11.44 02.11.49

CONSTRUCTION HISTORY

The Arizona Highway Department initially surveyed the route for US 60—the Globe-Springerville Highway—in 1930-1931. The heavy construction of the highway progressed northward from Globe in sections and by 1936 the work had reached nearby crossings of Cedar Canyon and Corduroy Creek, some 70 miles north-east of Globe. For these rugged, steep-walled canyons, AHD engineers designed identical steel deck arches similar to the recently completed Salt River Canyon Bridge [0129]. As delineated by the highway department, each bridge featured a two-hinge, riveted steel, girder ribbed deck arch that extended 180 feet between pins. The arch sprang into massive concrete pedestals set on spread footings and was flanked by steel stringer approach spans. The 50-foot-wide concrete deck was bounded on both sides by steel guardrails, with decorative Art Moderne pylons at the four corners. AHD designated them Federal Aid Project 105-E and in August 1936 awarded a construction contract for both bridges to the Pleasant-Hasler Construction Company of Phoenix for \$118,000. The contractors began work immediately on the concrete abutments and arch pedestals and had the bridges 20 percent complete before suspending work for the winter. Using over 200 tons per bridge of superstructural steel fabricated by Bethlehem, Pleasant-Hasler worked slowly the following spring and summer, completing the project in September 1937. The bridges carried mainline traffic for over 50 years, but their relatively narrow width impeded ADOT plans to four-lane the highway at this point. To address this need for extra deck width, ADOT in 1993 moved the superstructure of the Corduroy Creek Bridge beside the Cedar Canyon Bridge and installed it on new concrete arch pedestals. The two structures now function as a single, wide bridge.

SIGNIFICANCE STATEMENT

Completion of the Cedar Canyon and Corduroy Creek bridges marked the last link in US 60 between Globe and Springerville and one of the last links in the national highway. The structures are thus historically noteworthy as original components of a regionally important Arizona route. The modified Cedar Canyon bridge is technologically significant for its representation of steel arch design by the state highway department. The Salt River Canyon Bridge marked the first time that AHD used the girder-ribbed arch, followed soon thereafter by these two bridges. Other girder-ribbed arches were later built in the state after World War II, as the highway department adopted this as its standard long-span canyon design. The girder-ribbed arch represents a prevailing trend in Arizona and the country toward simplification in the detailing of highway bridges. Visually striking as it spans a picturesque mountain canyon, the Cedar Canyon Bridge is an important example of an uncommon structural type. The subsequent moving of the Corduroy Creek span to this location represents an innovative approach to historic preservation.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

☒ Criterion A
☐ Criterion B
☒ Criterion C

NATIONAL REGISTER ELIGIBILITY

individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

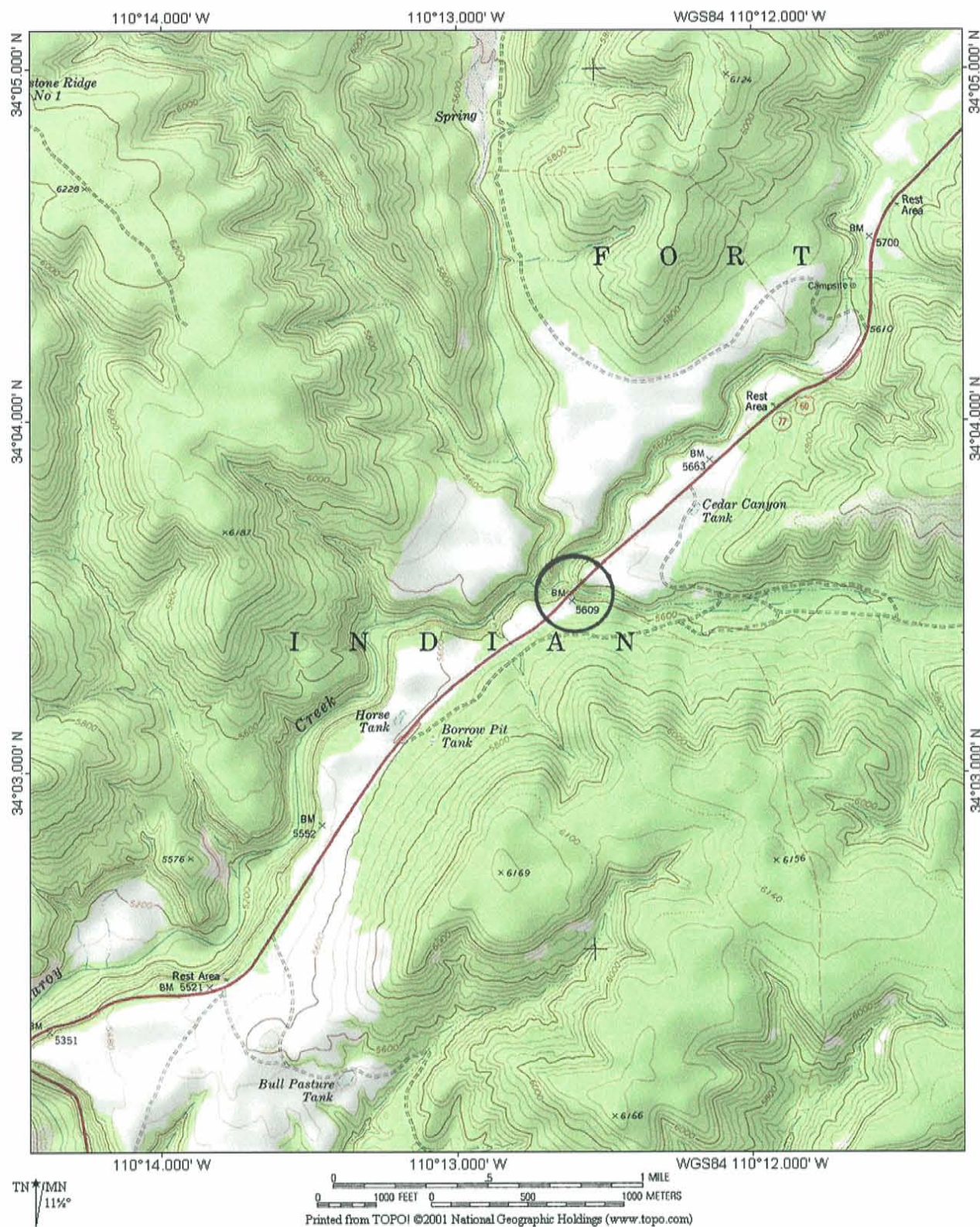
AREA OF SIGNIFICANCE: Transportation; Engineering

PERIOD OF SIGNIFICANCE: 1937-1964

THEME(S): Transportation: Highways

CEDAR CANYON BRIDGE

Structure No. 0215



Location Map

HISTORIC BRIDGE INVENTORY

Winslow Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	00229
milepost	344.95	inventory route	SR 87
location	1.4 mi East Jct SB 40	feature intersected	Little Colorado River
city/vicinity	Winslow	USGS quadrangle	Winslow
district	87	UTM reference	12.531565.3873690

STRUCTURAL INFORMATION

main span number	9	main span type	403
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	6
main span length	88.0	superstructure	steel cantilever plate deck girder
structure length	801.0	substructure	concrete abutments, wingwalls and piers
roadway width	26.0	floor/decking	concrete deck with asphalt overlay
structure width	28.8	other features	modest Art Moderne concrete wingwall bulkheads with chamfered and grooved pylons and concrete date medallions; steel guardrails with concrete curbs

HISTORICAL INFORMATION

construction date	1939	designer/engineer	Arizona Highway Department
project number	FAP 40-B(1)	builder/contractor	W.E. Bondurant, Roswell NM
information source	ADOT bridge records	structure owner	Arizona Department of Transportation
alteration date(s)		alterations	

NATIONAL REGISTER EVALUATION

inventory score	76	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u> </u> C <u>x</u>
		signif. statement	well-preserved large-scale bridge; important crossing on important route

FORM COMPLETED BY

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420 South County Road 23E
Loveland, Colorado 80537
31 October 2004

WINSLOW BRIDGE

Structure No. 0229

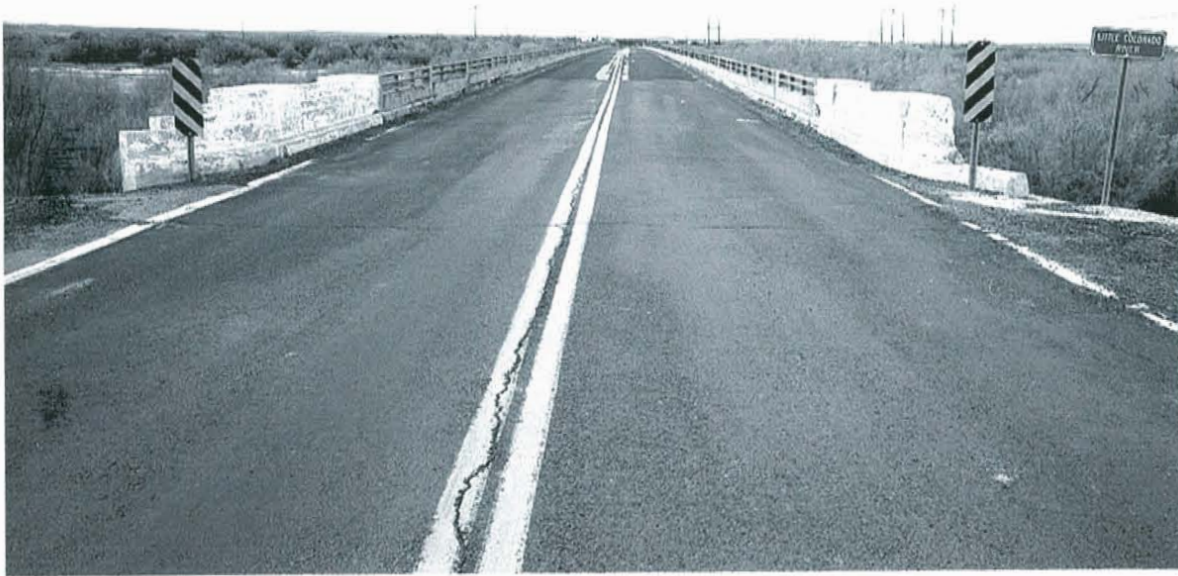


PHOTO INFORMATION

date of photo: November 2002

view direction: west northwest

photo no.: 02.11.120 02.11.123

CONSTRUCTION HISTORY

In 1917 Navajo County erected a 620-foot-long, four-span truss bridge over the Little Colorado River about 2½ miles east of Winslow. The following year the county added a pony truss approach span to one end. The Winslow-Holbrook Road was later incorporated into U.S. Highway 66, the major east-west route across northern Arizona. With its timber deck and 14-foot-wide roadway, the Winslow Bridge became a major bottleneck on the highway. In 1938 the Arizona Highway Department acted to replace it with a new, wider structure. For this AHD bridge engineers designed this multiple-span steel deck girder bridge, with the superstructure supported by concrete piers over concrete piles driven 55 feet below the riverbed. The nine girder spans were configured as cantilevers, carried continuously over the piers and spliced together at mid-span. This effectively increased their allowable span length to a maximum of 88 feet and simplified the bearing conditions by reducing the number of bearing shoes at each pier to two. The girders carried a reinforced concrete deck, which was bounded on both sides by steel beam guardrails. These guardrails were supported by concrete posts and bulkheads with decorative Art Moderne scoring and cast concrete date medallions located at the bridge's corners.

Early in 1939 AHD contracted with W.E. Bondurant of Roswell, New Mexico, under Federal Aid Project 40-B(1) to build the new bridge. A Bondurant crew began preparation for the pile driving on March 3, 1939, and began superstructural erection late that summer. As it had for the trusses in 1917, the American Bridge Company fabricated the steel girders for this bridge and shipped them to the site by rail. In September 1939 the Winslow Bridge was completed. It carried mainline highway traffic for some 20 years before construction of Interstate 40 to the north of the original highway. The bridge and adjacent roadway now carry intermittent traffic on State Highway 87. The bridge is unaltered but scheduled for replacement.

SIGNIFICANCE STATEMENT

The Little Colorado River presented one of the most formidable obstacles to transcontinental traffic across Arizona on the Santa Fe Highway (US 66). This crossing east of Winslow is thus one of the more important on the highway's length. With nine deck girder spans and an overall length of 800 feet, the Winslow Bridge is one of the larger structures in the inventory, but is otherwise technologically undistinguished. The Art Moderne detailing on the concrete bulkheads and the concrete medallions at each end distinguish the bridge architecturally and place it within the milieu of bridge construction of the 1930s.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

- ☒ Criterion A
☐ Criterion B
☒ Criterion C

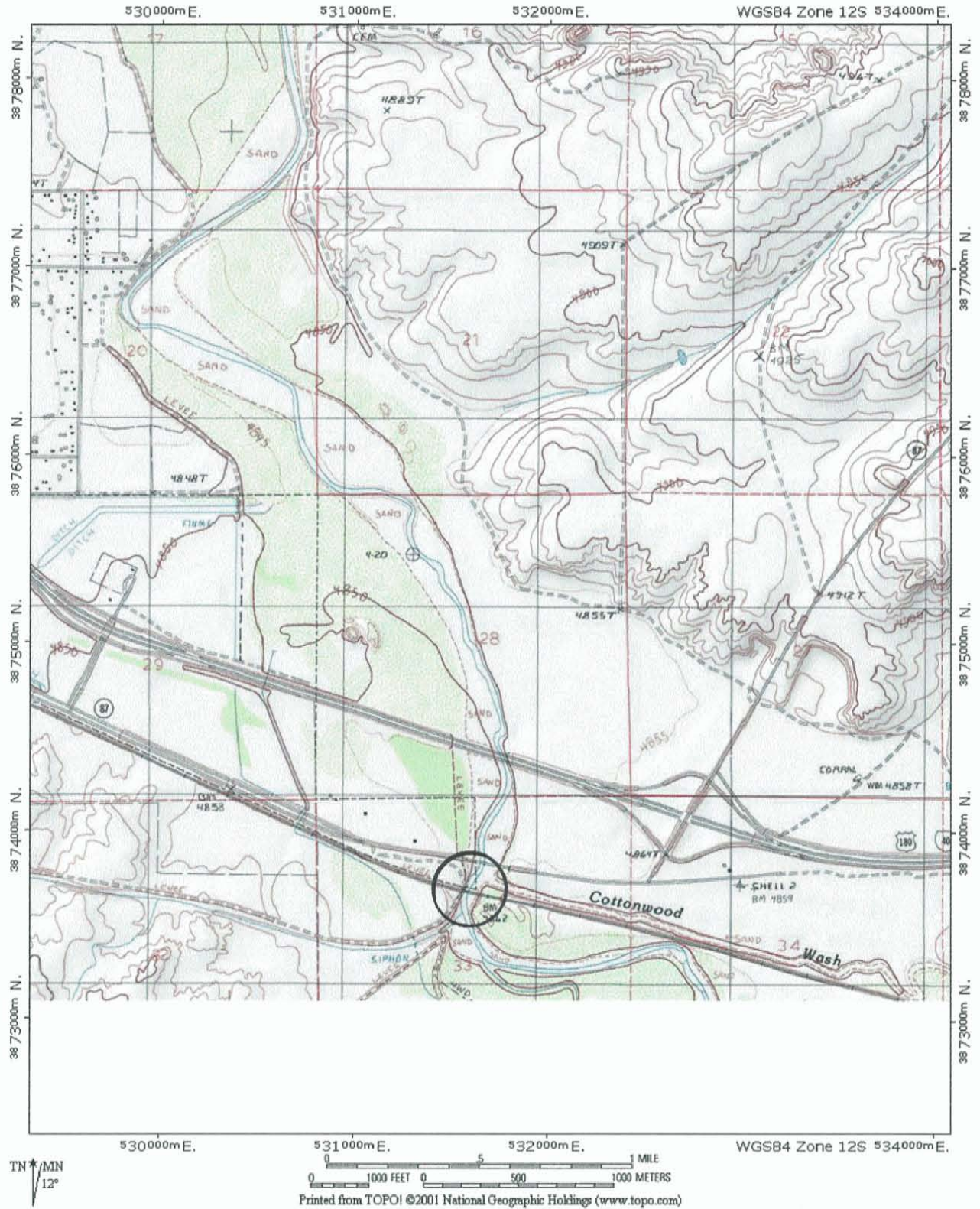
NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering
 PERIOD OF SIGNIFICANCE: 1939-1964
 THEME(S): Transportation: Highways

WINSLOW BRIDGE

Structure No. 0229



Location Map

HISTORIC BRIDGE INVENTORY

Ruby Channel Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	00275
milepost	341.82	inventory route	SR 87
location	0.35 mi South of Jct B 40	feature intersected	Ruby Channel Wash
city/vicinity	Winslow	USGS quadrangle	Winslow
district	87	UTM reference	12.527340.3875024

STRUCTURAL INFORMATION

main span number	9	main span type	201
appr. span number	0	appr. span type	
degree of skew	30	guardrail type	4
main span length	19.0	superstructure	concrete slab
structure length	157.0	substructure	concrete abutments, wingwalls and piers
roadway width	24.0	floor/decking	concrete deck with asphalt overlay
structure width	26.5	other features	concrete guardrails with recessed rectangular panels

HISTORICAL INFORMATION

construction date	1944	designer/engineer	Arizona Highway Department
project number	DANC 1-A(1)	builder/contractor	
information source	ADOT bridge records	structure owner	Arizona Department of Transportation
alteration date(s)		alterations	

NATIONAL REGISTER EVALUATION

inventory score	48	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
NRHP eligibility	eligible		
NRHP criteria	A <u>x</u> B <u> </u> C <u>x</u>		
signif. statement	unaltered example of common structural type, built as part of WWII effort		

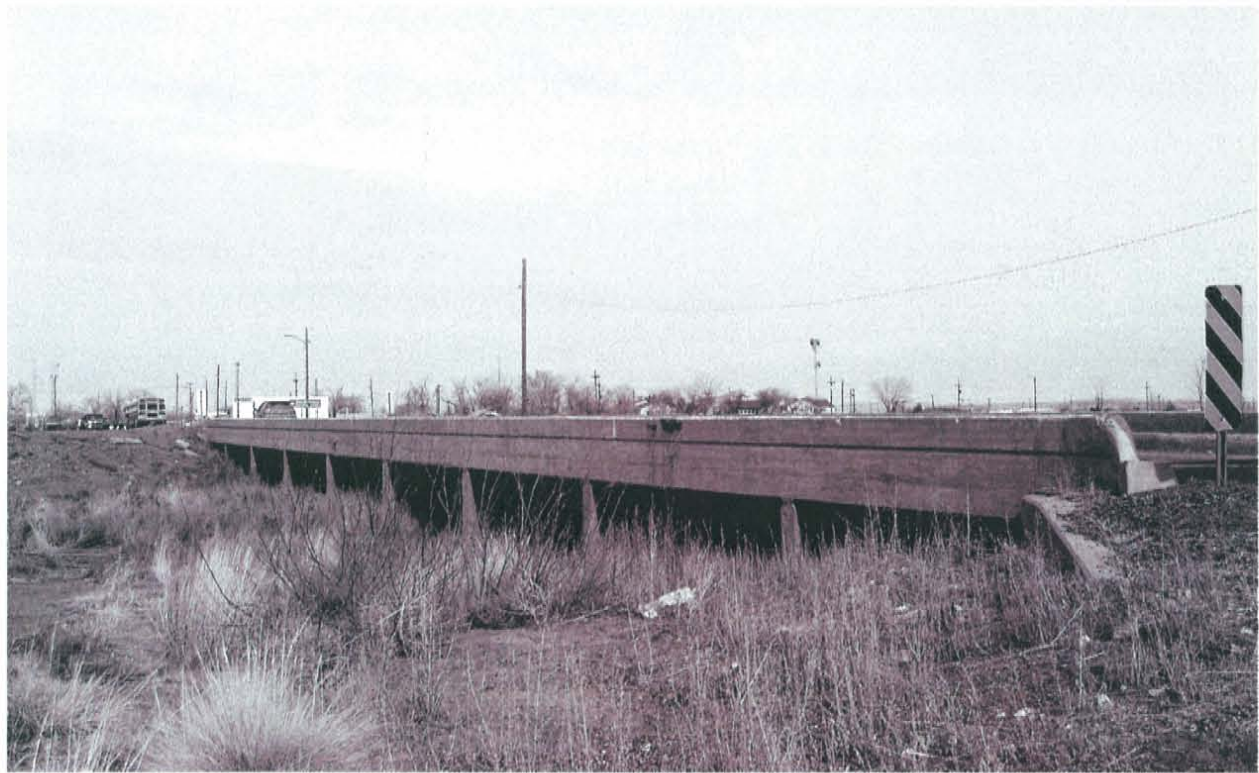
FORM COMPLETED BY

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420 South County Road 23E
Loveland, Colorado 80537
31 October 2004

RUBY CHANNEL BRIDGE

Structure No. 0275



CONSTRUCTION HISTORY

Due to wartime rationing, relatively few bridges were constructed in Arizona during World War II. Only four Defense Access structures—three concrete box culverts and a concrete slab—have been identified by the statewide bridge inventory. All were built as part of the same project, designated as DANC 1-A(1) and delineated by Arizona Highway Department engineers in June 1944. Located on State Route 87 (the Winslow-Long Valley Highway) south of Winslow, these four structures [4671, 4672, 4677 and 275] were built later that year. The Ruby Channel Bridge is one of these latter structures. As constructed, the Ruby Channel Bridge is configured as a nine-span reinforced concrete slab structure. The 10¾-inch-deep slabs are supported continuously on a 30-degree skew by full-width concrete abutments and solid concrete piers with spread footings. These are flanked on both sides by integrally poured solid concrete curbs and guardrails. Although taken from an AHD standard design, these guardrails, with their bridge-length recessed panels, constitute the only architectural feature of this otherwise plain-faced structure.

SIGNIFICANCE STATEMENT

The onset of World War II brought Depression-era highway construction to an abrupt halt in Arizona. With fuel under tight rationing, automobile production suspended and tires and car parts in short supply, overland travel diminished accordingly. The Works Progress Administration was dismantled, as the federal government shifted its focus from helping the unemployed to mobilizing for war. In its place a new form of federal grant program—Defense Access Projects—was instituted in 1941 under the Defense Highway Act. These projects were intended to build or improve roads associated with defense facilities, critical industries to build or improve roads associated with defense facilities, critical industries and sources of raw materials. Defense Access Project No. 1 in Arizona entailed construction of three timber bridges, 17 concrete culverts and about five miles of road within the Fort Huachuca Military Reservation in the southern part of the state. Others followed, but in actuality Arizona's participation in the Defense Access Program was limited. The impact of the war on Arizona's roads was not so much the extent of construction on defense-related facilities as the absence of other conventional road and bridge construction. The statewide bridge inventory includes only two dozen bridges and culverts built during the three years between 1943 and 1945 (versus 34 bridges in 1942 and 40 bridges in 1946). Most of these were minor concrete structures, built using standard AHD designs. With its nine concrete slab spans on a concrete substructure, the Ruby Channel Bridge is the largest of these. In essentially unaltered condition, it is distinguished as the most noteworthy of the highway drainage structures built as part of the war effort in Arizona.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

- ☒ Criterion A
☐ Criterion B
☒ Criterion C

NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

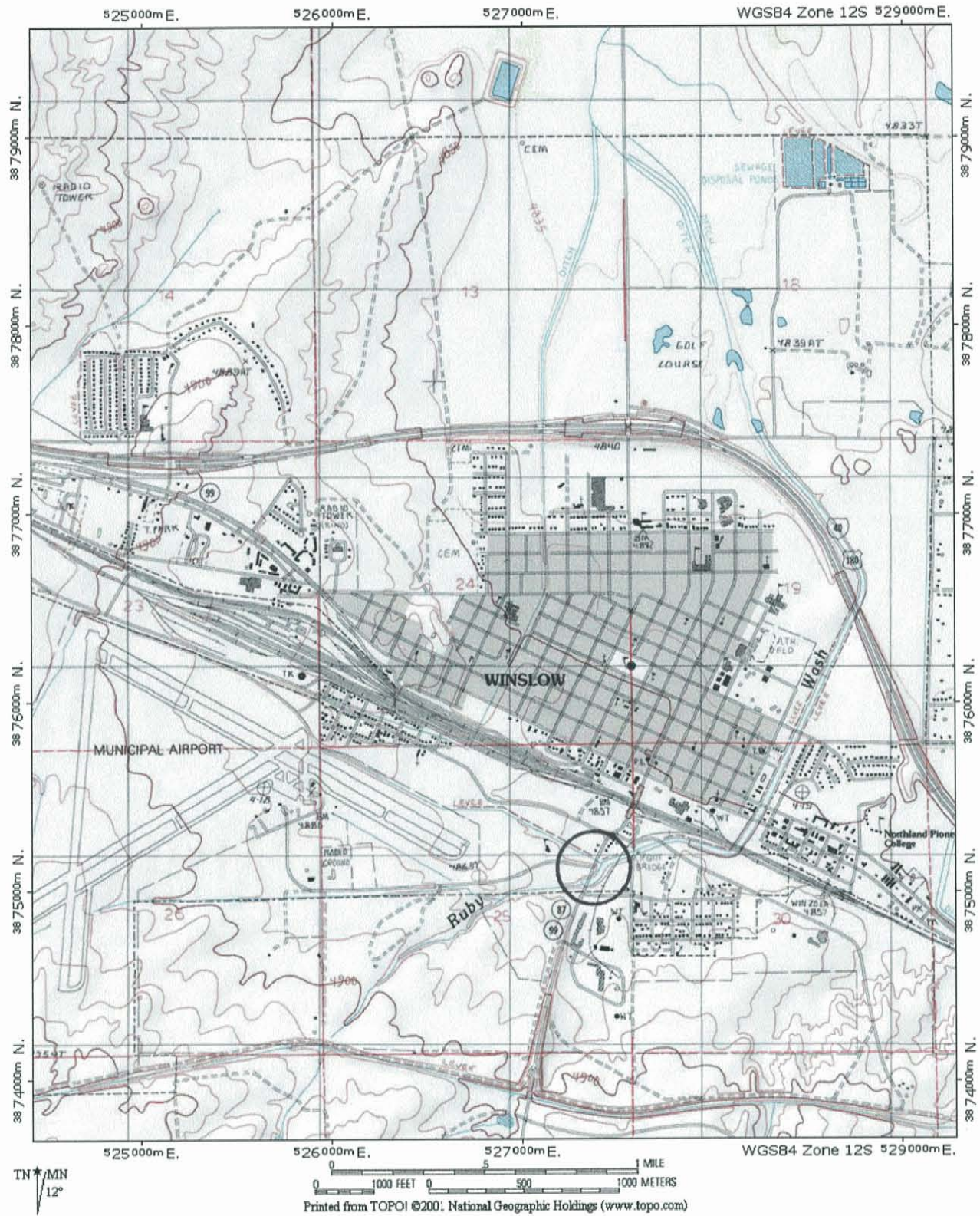
AREA OF SIGNIFICANCE: Engineering; Transportation

PERIOD OF SIGNIFICANCE: 1944-1964

THEME(S): Transportation: Highways

RUBY CHANNEL BRIDGE

Structure No. 0275



Location Map

HISTORIC BRIDGE INVENTORY

Clear Creek Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	01038
milepost	38.19	inventory route	SR 99
location	4.4 mi E Jct SR 87	feature intersected	Clear Creek
city/vicinity	Winslow	USGS quadrangle	Clear Creek Reservoir
district	87	UTM reference	12.532253.3869558

STRUCTURAL INFORMATION

main span number	1	main span type	311
appr. span number	2	appr. span type	402
degree of skew	0	guardrail type	6
main span length	130.0	superstructure	steel two-hinge girder-ribbed deck arch
structure length	167.0	substructure	concrete abutments and wingwalls
roadway width	26.0	floor/decking	concrete deck
structure width	28.0	other features	steel beam guardrails

HISTORICAL INFORMATION

construction date	1950	designer/engineer	Arizona Highway Department
project number	S-50(2)	builder/contractor	Western Constructors Inc., Phoenix AZ
information source	ADOT bridge records	structure owner	Arizona Department of Transportation
alteration date(s)		alterations	

NATIONAL REGISTER EVALUATION

inventory score	51	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	eligible
		NRHP criteria	A _____ B _____ C <u>x</u>
		signif. statement	well-preserved example of rare structural type

FORM COMPLETED BY

Clayton B. Fraser, Principal

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420 South County Road 23E
Loveland, Colorado 80537
31 October 2004



PHOTO INFORMATION

date of photo.: November 2002

view direction: south west

photo no.: 02.11.130 02.11.132

CONSTRUCTION HISTORY

After World War II the Arizona Highway Department resumed its extensive highway program, improving existing routes across the state and replacing bridges where necessary. Part of this effort entailed the upgrading of a county road that extended southeast of Winslow and replacing the existing truss bridge over Clear Creek with an all-new steel structure. As delineated by the AHD bridge department, the new Clear Creek bridge would be a 130-foot, two-hinged, girder-ribbed deck arch that sprang from concrete pedestals on solid rock. The central three-ribbed arch was approached on both sides by shorter steel stringer spans, the aggregate length of which equaled the length of the existing truss at 167 feet. With a radius of 148 feet and an arch rise of only 15 feet, the welded steel arch ribs carried a series of wide flange columns, which carried wide flange floor beams and stringers and the 28-foot-wide concrete deck. The highway department designated this project as S 50(2) and on October 26, 1949, let the contract for its construction to Western Constructors of Phoenix. The Western crew first moved the existing truss to one side for use as a construction detour and then began construction on the concrete arch pedestals. The men worked through the winter building this small-scale arch, completing it the following year. Since that time, the Clear Creek Bridge has carried traffic on this secondary state highway, in essentially unaltered condition.

SIGNIFICANCE STATEMENT

The Clear Creek Bridge is technologically significant for its structural configuration. Beginning with the Salt River Canyon Bridge [0129] in 1934, AHD built about a dozen girder-ribbed steel arches in the 1930s and 1940s. A much more streamlined structural type than its spandrel-braced predecessors, it represented a prevailing trend in Arizona and the country toward simplification in the detailing of highway bridges. AHD erected three girder ribbed arches in 1949—the Pinto Creek Bridge [0351] in Gila County, the Superior Bridge [0406] in Pinal County and the Clear Creek Bridge. Although this last structure is smaller in scale than the other two, it is nevertheless noteworthy as a well-preserved example of an uncommon structural type. The Clear Creek Bridge is also technologically noteworthy for its welded construction. In the post-war years, as fabrication and welding techniques improved, engineers around the country began experimenting with welded girders in lieu of riveted built-up beams on bridges. Although the advantages to welding appeared clear, the welding on these earliest structures later proved through ultrasonic testing to be prone to fatigue and stress cracking at the weld lines, however, and the use of this type of fabrication was discontinued in favor of bolted connections and splices. In Arizona, relatively few welded bridges were ever built in the post-war years before the structural configuration fell from favor. Designed and built in the late 1940s, the Clear Creek Bridge represents one of the earliest attempts in the state of this innovative, but ultimately flawed, fabrication technique.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master
- ☐ possesses high artistic values
- ☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons
- ☐ associated with significant events or patterns
- ☐ contributes to historical district

NATIONAL REGISTER CRITERIA

- ☐ Criterion A
- ☐ Criterion B
- ☒ Criterion C

NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no
- contributes to district ☐ yes ☒ no

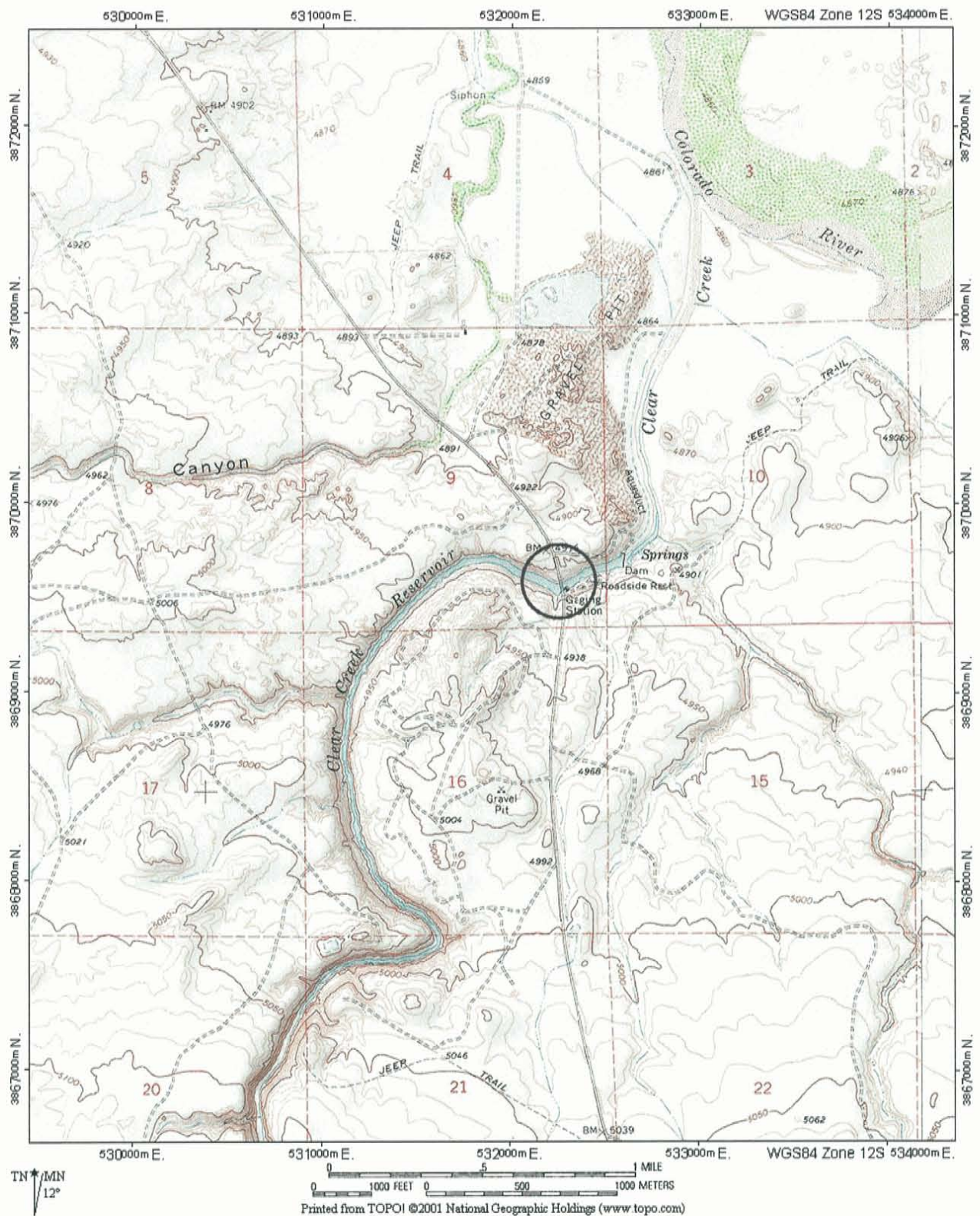
AREA OF SIGNIFICANCE: Engineering

PERIOD OF SIGNIFICANCE: 1950-1964

THEME(S): Transportation: Highways

CLEAR CREEK BRIDGE

Structure No. 1038



Location Map

HISTORIC BRIDGE INVENTORY

West Carrizo Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	02057
milepost	300.75	inventory route	I 40 SFR
location	7.9 mi E Jct SR 77	feature intersected	Little Lithodendron Wash
city/vicinity	Carrizo	USGS quadrangle	Carrizo Butte
district	87	UTM reference	12.595880.3872617

STRUCTURAL INFORMATION

main span number	18	main span type	702
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	7
main span length	19.0	superstructure	timber stringer
structure length	343.0	substructure	timber pile bent abutments and piers with timber sill plates
roadway width	23.0	floor/decking	timber deck with asphalt overlay
structure width	24.7	other features	timber guardrails and supports; sand barrels (for firefighting) placed on timber platforms mounted on sides of bridge

HISTORICAL INFORMATION

construction date	1932	designer/engineer	Arizona Highway Department
project number	FAP 83-C Sch. 1	builder/contractor	Canion & Royden, Phoenix AZ
information source	ADOT bridge records	structure owner	Arizona Department of Transportation
alteration date(s)	1986	alterations	deck and stringers replaced

NATIONAL REGISTER EVALUATION

inventory score	53	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u> </u> C <u>x</u>
		signif. statement	outstanding multiple-span example of common structural type

FORM COMPLETED BY

Clayton B. Fraser, Principal

FRASERdesign
420 South County Road 23E
Loveland, Colorado 80537
31 October 2004

WEST CARRIZO BRIDGE

Structure No. 2057



PHOTO INFORMATION

date of photo: November 2002

view direction: west northeast

photo no.: 02.11.69 02.11.78

CONSTRUCTION HISTORY

The two timber trestle bridges over the branches of Carrizo Wash on US 66 near Goodwater were known to be dangerous in the 1920s. At least nine accidents had occurred on them involving fatalities or serious injuries, and political pressure was mounting as the Arizona Highway Department moved to replace them in 1931. For the eastern bridge, the AHD bridge department delineated a 22-span timber trestle, for the western bridge an 18-span trestle. Both bridges featured identical span lengths and detailing. AHD designed the timber stringer bridges as starkly utilitarian structures, with redwood decks, stringers, pile bent piers and abutments and timber plank retaining walls.

AHD designated the project to build the two structures and 2.8 miles of highway between them as Federal Aid Project 83-C, Schedule 1. In December the agency awarded the contract to Canion and Royden of Phoenix for \$57,157. The contractors began work in January 1932, finishing in June. Both the Carrizo Bridges carried mainline traffic until construction of Interstate 40 immediately north in 1960. The timber bridges were left in place to carry local traffic beside the interstate. Today they are a study in contrasts: the western bridge was extensively rehabilitated in 1986 by ADOT, and the eastern structure [abd.], abandoned for years without maintenance, stands in severely deteriorated condition.

SIGNIFICANCE STATEMENT

The Arizona Highway Department generally eschewed timber bridges for concrete structures in the 1910s and 1920s, calculating the life of a timber structure as 35 years vs. 100 years for a concrete span. AHD nevertheless did develop standards for timber spans and built numerous small-scale bridges on secondary routes in the 1920s and 1930s. Long, multiple-span timber trestles on primary routes were rare, and the two Carrizo bridges are the only such structures identified in the inventory. They are thus technologically noteworthy as the best examples of timber trestle construction among the vehicular bridges in the state. The two bridges are historically significant as integral links in the National Old Trails Highway—the primary transcontinental route across northern Arizona.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

- ☒ Criterion A
☐ Criterion B
☒ Criterion C

NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

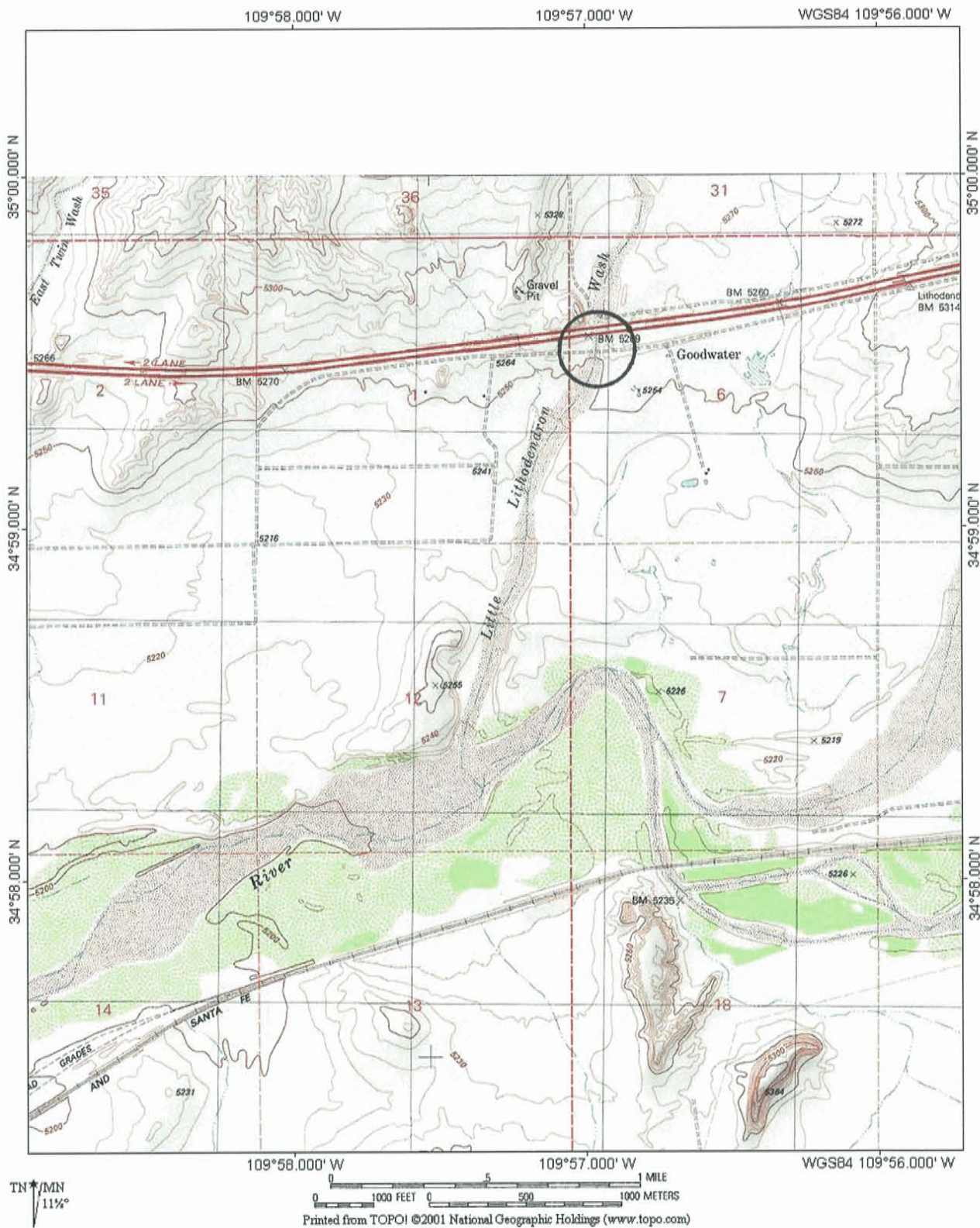
AREA OF SIGNIFICANCE: Transportation; Engineering

PERIOD OF SIGNIFICANCE: 1932-1964

THEME(S): Transportation: Highways

WEST CARRIZO BRIDGE

Structure No. 2057



Location Map

HISTORIC BRIDGE INVENTORY

Woodruff Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	08156
milepost	0.00	inventory route	Woodruff-Snowflake Road
location	3.0 mi S of Woodruff	feature intersected	Little Colorado River
city/vicinity	Woodruff	USGS quadrangle	Tenmile Cedars
district	87	UTM reference	12.588135.3844560

STRUCTURAL INFORMATION

main span number	1	main span type	310
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	6
main span length	120.0	superstructure	steel rigid-connected Warren through truss
structure length	121.0	substructure	stone masonry abutments and wingwalls
roadway width	13.2	floor/decking	timber deck over steel stringers
structure width	16.3	other features	upper chord: 2 channels w/ cover plate and lacing; lower chord: 2 angles w/ batten plates; vertical/diagonal: 2 or 4 angles w/ batten plates; lateral bracing: 1 angle; floor beam: I-beam; steel lattice guardrails

HISTORICAL INFORMATION

construction date	1917	designer/engineer	American Bridge Company
project number		builder/contractor	American Bridge Company, Chicago IL
information source	county bridge records	structure owner	Navajo County
alteration date(s)	1940	alterations	truss moved to this location

NATIONAL REGISTER EVALUATION

inventory score	67	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/>
		signif. statement	unique example of structural type, once part of regionally important crossing

FORM COMPLETED BY

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420 South County Road 23E
Loveland, Colorado 80537
31 October 2004

WOODRUFF BRIDGE

Structure No. 8156



PHOTO INFORMATION

date of photo.: November 2002

view direction: northwest west

photo no.: 02.11.58 02.11.59

CONSTRUCTION HISTORY

The Lyman Dam at St. Johns collapsed on April 14, 1915, wiping out most of the bridges over the Little Colorado River between St. Johns and Winslow. To finance the enormous reconstruction effort, Navajo County in January 1916 voted a \$63,000 bond issue. The county in June advertised for proposals for seven bridges, including one over the Little Colorado east of Winslow. The next month eight companies responded with competitive designs and bids. For five of the smaller structures (including the St. Joseph Bridge [8157]), the county contracted with the Omaha Structural Steel Works. For the Winslow structure, which was by far the largest of the bridges, the board contracted with Los-Angeles-based Mesmer and Rice, lowest bidder at \$23,800. The U.S. Indian Service paid half of this cost. The American Bridge Company of Chicago used steel rolled by Lackawanna to fabricate the multiple-span truss bridge, shipping the truss components to Arizona by rail. Mesmer and Rice worked on the bridge's substructure until their dismissal by the county after numerous disputes. Omaha Structural Steel Works completed the four-span truss bridge in December 1917 and added a pony truss to one end the following year. The Winslow Bridge carried mainline traffic on U.S. Highway 66. Its narrow width and timber deck eventually formed a bottleneck on the highway, and in 1939 it was replaced with a steel girder structure [0229]. Navajo County then moved and re-erected one of the trusses to this remote secondary road crossing near the Woodruff Dam. Here it functions without further alteration.

SIGNIFICANCE STATEMENT

The Little Colorado River formed one of the most formidable obstacles to transcontinental traffic across Arizona on the National Old Trails Highway (US 66). The Winslow crossing was one of the most important on the highway's length. Erected by Navajo County as the state highway department was in its formative years, the bridge here was therefore one of the more important vehicular structures in the state. Multiple-span through trusses such as this were unusual in Arizona, and only two remain intact today: the Gillespie Dam Bridge [8021] and the Boulder Creek Bridge [0193], which itself uses trusses salvaged from an earlier structure. Navajo County's salvage of this span from the Winslow Bridge is typical of another trend in the state—the moving of trusses from major arterials to secondary routes. Several trusses in the state have been dismantled and re-erected in this fashion. They were erected with the possibility of later moving in mind, and this re-erection does not diminish their structural integrity appreciably. The Woodruff Bridge is technologically significant as the only example in Arizona of this atypical structural type. Although the Warren truss became a standard vehicular configuration in the United States in the 1910s, polygonal-chorded examples are rare. Only one polygonal pony truss (the Chevelon Creek Bridge [8158]) and one polygonal through truss—the Woodruff Bridge—have been identified by the statewide bridge inventory.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

☒ Criterion A
☐ Criterion B
☒ Criterion C

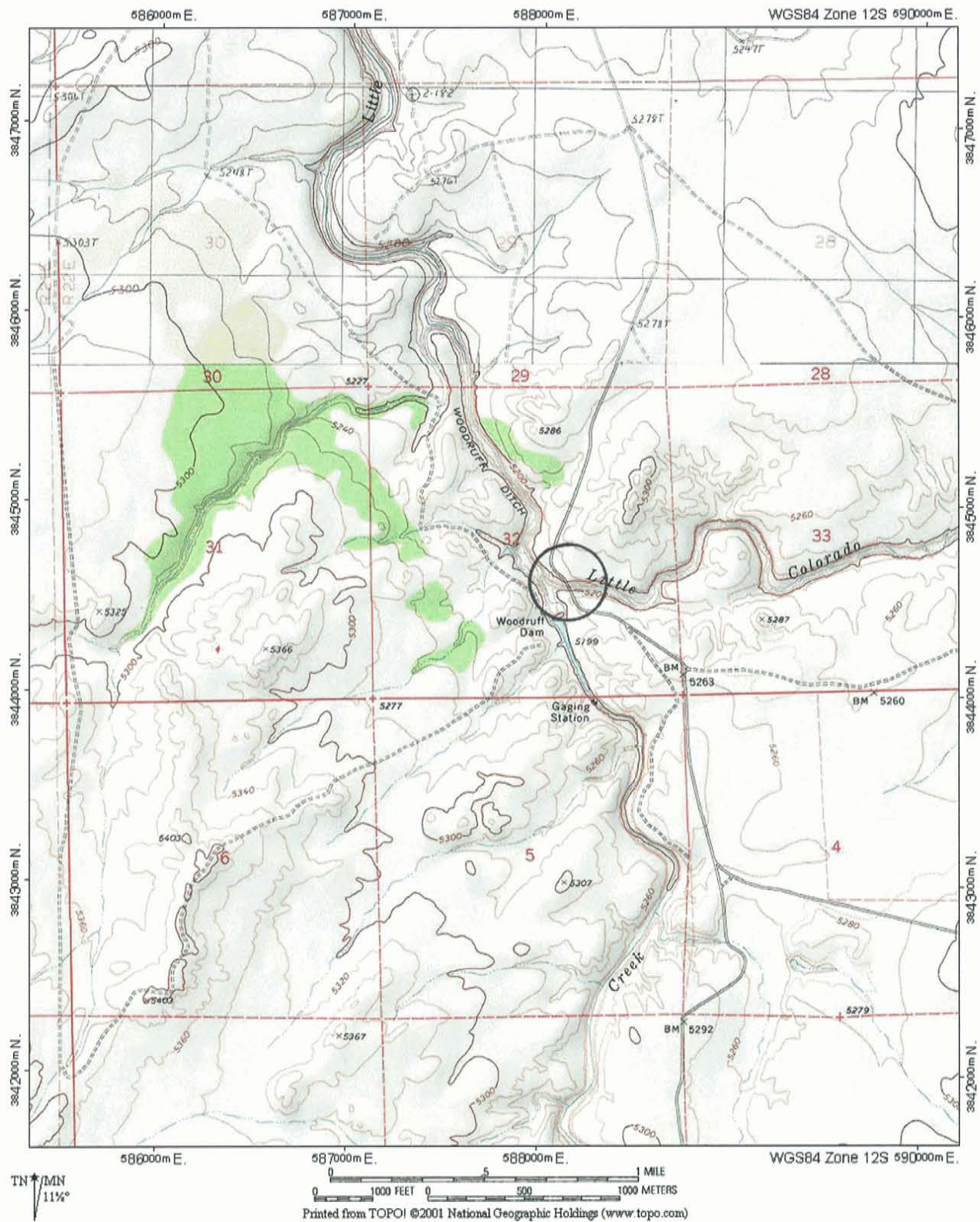
NATIONAL REGISTER ELIGIBILITY

individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering
 PERIOD OF SIGNIFICANCE: 1917-1964
 THEME(S): Transportation: Highways

WOODRUFF BRIDGE

Structure No. 8156



Location Map

HISTORIC BRIDGE INVENTORY

St. Joseph Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	08157
milepost	0.00	inventory route	Joseph City-Holbrook Road
location	1.33 mi S Jct Old US 66	feature intersected	Little Colorado River
city/vicinity	Joseph City	USGS quadrangle	Joseph City
district	87	UTM reference	12.561740.3866786

STRUCTURAL INFORMATION

main span number	6	main span type	310
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	6
main span length	83.0	superstructure	steel rigid-connected Pratt pony truss
structure length	500.0	substructure	concrete abutments, wingwalls and corrugated steel piers with concrete caps
roadway width	12.6	floor/decking	timber deck with asphalt wheel tracks
structure width	16.1	other features	upper chord: 2 channels w/ cover plate and lacing; lower chord, vertical and diagonal: 2 angles w/ batten plates; lateral bracing: 1 angle; floor beam: I- beam; steel lattice guardrails

HISTORICAL INFORMATION

construction date	1917	designer/engineer	Omaha Structural Steel Works, Omaha NE
project number		builder/contractor	Omaha Structural Steel Works, Omaha NE
information source	county bridge records	structure owner	Navajo County
alteration date(s)	1978	alterations	substructure replaced and superstructure raised

NATIONAL REGISTER EVALUATION

inventory score	74	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A _____ B _____ C <u>x</u> _____
		signif. statement	one of larger-scale early bridge construction projects undertaken by Arizona county

FORM COMPLETED BY

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420 South County Road 23E
Loveland, Colorado 80537
31 October 2004

ST. JOSEPH BRIDGE

Structure No. 8157



PHOTO INFORMATION

date of photo.: November 2002

view direction: south southwest

photo no.: 02.11.105 02.11.108

CONSTRUCTION HISTORY

In April 1912 a citizens' group petitioned the Navajo County Board of Supervisors for a vehicular bridge over the Little Colorado River at St. Joseph. Typically, the board deferred the matter. In February 1915 another group requested the bridge, but the board again deferred. Finally, in the wake of the Lyman Dam disaster, Navajo County voted a \$63,000 bond issue in January 1916 to finance construction of seven bridges damaged or destroyed when the dam broke. The St. Joseph Bridge was one of these. In June the board advertised for the bridges' construction. The following month the county received proposals and designs from eight bridge companies: the Monarch Engineering Company, Miller Construction Company, El Paso Bridge & Iron Company, Canton Bridge Company, Midland Bridge Company, Omaha Structural Steel Works, Mesmer & Rice, and B.Y. Duke. Nebraska-based Omaha Structural Steel Works was awarded the contract for the St. Joseph bridge and five other smaller structures for \$36,863.

For this crossing, Omaha Structural Steel engineered a series of six rigid-connected pony trusses, supported by concrete-filled steel cylinder piers and flanked on both ends by timber pile approaches. The 83-foot trusses used a Pratt configuration, with steel stringers, concrete deck and steel lattice guardrails. Using steel rolled by Lackawanna and Illinois, Omaha Structural Steel fabricated the medium-span trusses, shipped the pieces to the site by rail and erected them the following spring. The St. Joseph Bridge was complete by June 1917. It has functioned as a county-road bridge since. The bridge has more recently been altered by the replacement of its substructure.

SIGNIFICANCE STATEMENT

Before creation of the Arizona Territorial Engineer's office in 1909, vehicular bridges were built either by the counties or by private entities such as toll road operators. The state began building bridges immediately after its formation in 1912. Following passage of the Federal Aid Highways Act in 1916, the Arizona Highway Department standardized bridge design and construction, concentrating more on concrete construction than on steel. But in the early years before the highway department controlled bridge design and construction in Arizona, the counties continued to build bridges from their own designs. The St. Joseph Bridge is one of the larger county-built structures in the state—designed, fabricated and erected under contract by a nationally prominent bridge company. The bridge is significant as one of the few multiple-span vehicular trusses remaining in Arizona. Although its substructural replacement has diminished its physical integrity, the St. Joseph Bridge remains an important early example of vehicular truss construction.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons
☐ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

- ☐ Criterion A
☐ Criterion B
☒ Criterion C

NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

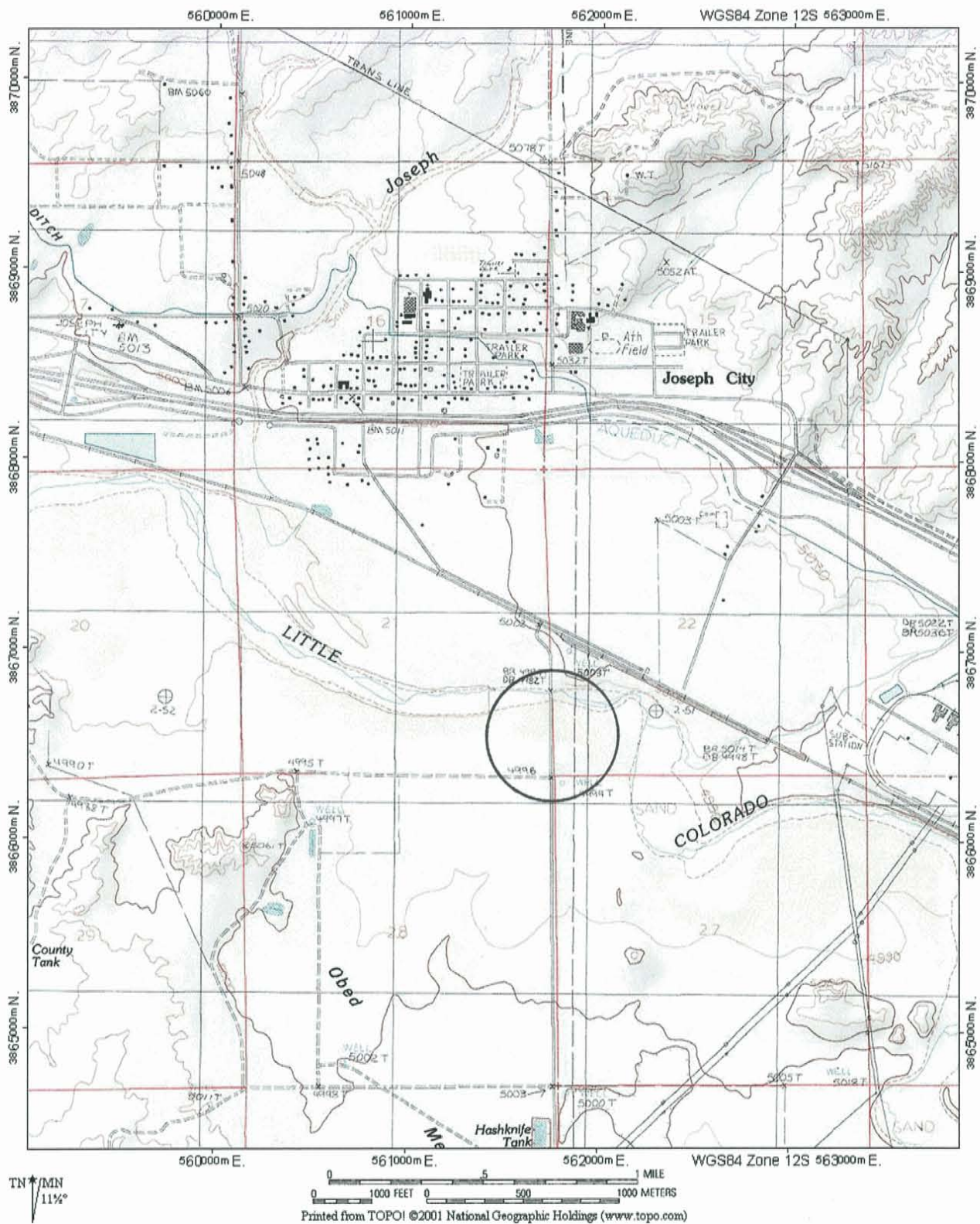
AREA OF SIGNIFICANCE: Transportation; Engineering

PERIOD OF SIGNIFICANCE: 1917-1964

THEME(S): Transportation: Highways

ST. JOSEPH BRIDGE

Structure No. 8157



Location Map

HISTORIC BRIDGE INVENTORY

Chevelon Creek Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	08158
milepost	0.00	inventory route	Holbrook-Winslow Road
location	6.64 mi E Jct SR 99	feature intersected	Chevelon Creek
city/vicinity	Hibbard	USGS quadrangle	Hibbard
district	87	UTM reference	12.542997.3864625

STRUCTURAL INFORMATION

main span number	1	main span type	310
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	6
main span length	102.0	superstructure	steel rigid-connected polygonal Warren pony truss
structure length	103.0	substructure	concrete abutments and wingwalls
roadway width	13.3	floor/decking	concrete deck over steel stringers
structure width	16.2	other features	upper chord: 2 channels w/ cover plate and lacing; lower chord: 2 angles w/ batten plates; vertical: 2 angles w/ lacing; diagonal: 4 angles w/ batten plates; lateral bracing: 1 angle; floor beam: I-beam; steel lattice guardrails

HISTORICAL INFORMATION

construction date	1913	designer/engineer	Arizona State Engineer
project number		builder/contractor	Missouri Valley Bridge & Iron Co., Leavenworth KS
information source	ADOT bridge records	structure owner	Navajo County
alteration date(s)		alterations	

NATIONAL REGISTER EVALUATION

inventory score	94	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/>
		signif. statement	one of Arizona's most historically and technologically important vehicular spans

FORM COMPLETED BY

Clayton B. Fraser, Principal

FRASERdesign
420 South County Road 23E
Loveland, Colorado 80537
31 October 2004



PHOTO INFORMATION

date of photo.: November 2002

view direction: east northeast

photo no.: 02.11.109 02.11.110

CONSTRUCTION HISTORY

The deep, rocky canyon over Chevelon Creek cut across the Coconino Plateau east of Winslow, forming a "practically impassible" topographic barrier to the Santa Fe Highway across northern Arizona. In 1912 the newly formed state legislature appropriated \$5,500 from the State Road Fund for construction of a substantial new structure here. State Engineer Lamar Cobb delineated a long-span pony truss that would free-span the canyon here, and on October 2, 1912, the state contracted with the Missouri Valley Bridge & Iron Works for the bridge. As stipulated in the contract, Missouri Valley would pour the concrete foundations and design, fabricate and erect the 100-foot truss.

A Missouri Valley crew began construction late in 1912, pouring the seven cubic yards of concrete onto solid rock for the abutments. For this crossing, the Leavenworth-based company delineated a Warren truss, with rigid connections and polygonal upper chords made up of built-up box beams. The deck, a poured-in-place concrete slab over steel stringers, was bounded by concrete curbs and steel lattice guardrails. In January Cobb approved the truss's design. By the end of June construction was 80 percent complete. The state accepted the completed bridge the following month. Total cost: \$4,985. The Chevelon Creek Bridge carried mainline traffic on the Santa Fe Highway until a realignment sometime between 1917 and 1924 moved the route north of the Little Colorado River. The bridge and adjacent roadway were then relegated to county road status. The Chevelon Creek Bridge now carries sparse local traffic at this remote crossing. The truss sub- and superstructure remain unaltered, albeit heavily tagged by graffiti, with the addition of concrete Jersey barrier sections at the approaches as the only alterations.

SIGNIFICANCE STATEMENT

As an important crossing on the Santa Fe Highway, the Chevelon Creek Bridge formed an integral part of one of America's primary transcontinental routes. The bridge is even more important, however, as one of the first highway structures undertaken by the newly formed State of Arizona. The structure was only the second truss replacement undertaken by the state, preceded by the Florence Bridge—since razed—over the Gila River. The Chevelon Creek Bridge was the first truss built by the state, designed, fabricated and erected by a nationally important bridge firm. As such, the bridge more closely resembled the earlier county-built spans than the highway structures to follow. Exceeded in age and span length by only one other pony truss in the inventory [Hereford Bridge **9214**], the Chevelon Creek Bridge is one of Arizona's most historically and technologically important spans.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

- ☒ Criterion A
☐ Criterion B
☒ Criterion C

NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

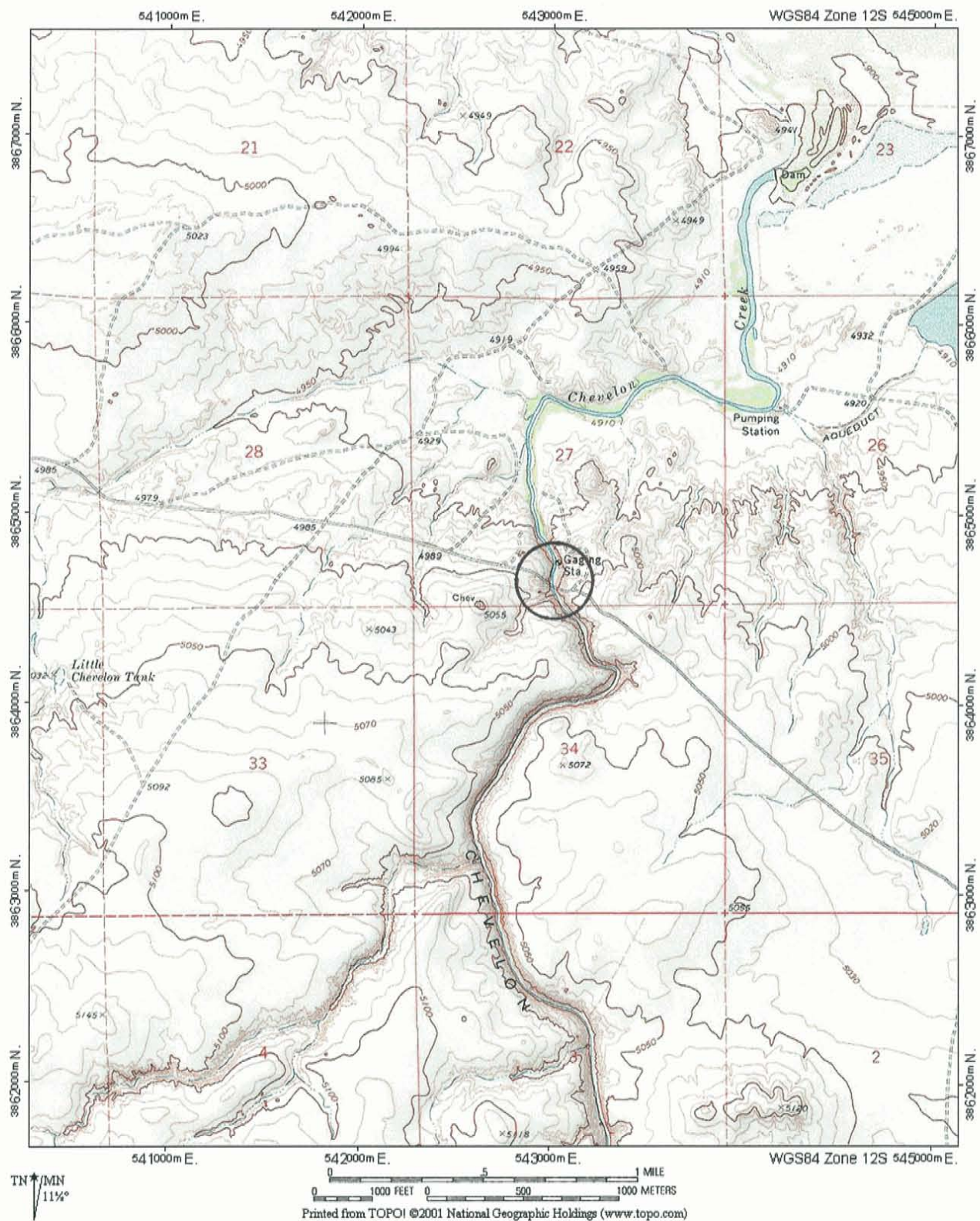
AREA OF SIGNIFICANCE: Transportation; Engineering

PERIOD OF SIGNIFICANCE: 1913-1964

THEME(S): Transportation: Highways

CHEVELON CREEK BRIDGE

Structure No. 8158



Location Map

HISTORIC BRIDGE INVENTORY

Tanner Wash Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	08160
milepost	0.00	inventory route	Cholla Lake Road
location	1.33 mi SE Jct B 40	feature intersected	Tanner Wash
city/vicinity	Joseph City	USGS quadrangle	Joseph City
district	87	UTM reference	12.564113.3867100

STRUCTURAL INFORMATION

main span number	2	main span type	104
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	4
main span length	38.0	superstructure	concrete deck girder
structure length	76.0	substructure	concrete abutments, wingwalls and pier
roadway width	20.1	floor/decking	concrete deck with asphalt overlay
structure width	23.0	other features	concrete guardrails with recessed rectangular panels

HISTORICAL INFORMATION

construction date	1926	designer/engineer	Arizona Highway Department
project number	FAP 40 (2nd Reo.)	builder/contractor	G.W. McMillan, El Paso TX
information source	ADOT bridge records	structure owner	Navajo County
alteration date(s)		alterations	

NATIONAL REGISTER EVALUATION

inventory score	48	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	eligible
		NRHP criteria	A <u>x</u> B <u> </u> C <u>x</u>
		signif. statement	well-preserved example of early standard structural type, on important route

FORM COMPLETED BY

Clayton B. Fraser, Principal

FRASERdesign
420 South County Road 23E
Loveland, Colorado 80537
31 October 2004

TANNER WASH BRIDGE

Structure No. 8160



PHOTO INFORMATION

date of photo: November 2002

view direction: east north

photo no.: 02.11.101 02.11.102

CONSTRUCTION HISTORY

By late 1925 four crossings on U.S. Highway 66 in Navajo County required replacement, according to the Arizona Highway Department. The Manilla Wash Bridge had been destroyed by flooding, two unpaved low water crossings near Winslow retained water after each rain, and the existing timber bridge over Tanner Wash near Holbrook had been allowed to deteriorate beyond the point of repair. Reconstruction of the two Winslow crossings consisted of raising and grading the dips. For Tanner and Manilla washes, AHD engineers designed identical short-span concrete girder structures in December 1925. Using standard design and detailing, the bridges featured all-concrete construction, with concrete substructures, girders, deck and guardrails with rectangular recessed panels. Early the following year the highway department reopened Federal Aid Project 40 for a second time to build the four structures (the first reopening was for the Joseph City Bridge, now gone). AHD let the construction contract to G.W. McMillan of El Paso, Texas. A McMillan crew began work on the project on May 17, 1926, and completed the bridges on November 6. The Tanner Wash and Manilla Wash bridges carried mainline traffic until construction of Interstate 40 in the late 1950s. The Manilla Wash structure was replaced at that time, and the Tanner Wash Bridge was retired from the primary road system and left in place as a county-owned bridge. It now carries local traffic beside the interstate, in unaltered condition.

SIGNIFICANCE STATEMENT

The Tanner Wash Bridge is historically noteworthy for its association with US 66. Alternately known as the Santa Fe Highway (in Arizona) and the National Old Trails Highway (its national designation), the road has served historically as the principal east-west transcontinental route across northern Arizona. Only the Ocean-to-Ocean Highway, which passed through Yuma, Phoenix and Safford, carried more traffic in the state. Built in the 1920s during a period of extensive highway construction in Arizona, the Tanner Wash Bridge was an integral part of this significant highway. The bridge is technologically important as a representative example of AHD bridge construction. The state had begun using concrete for bridge superstructures as early as 1910. The earliest girder bridges, such as the Antelope Hill Bridge [abd.] in Yuma County and the Santa Cruz River Bridge [8166] in Santa Cruz County, employed two deep girders that were cast integrally with the concrete deck. By 1922, after brief experimentation with a three-girder design, AHD had refined its girder standard to incorporate four somewhat shallower girders, to create greater under-bridge clearance. The Tanner Wash Bridge uses this latter design. It is today distinguished as one of the earliest intact examples in Arizona of this revised configuration. As such it is a noteworthy remnant of early AHD concrete bridge engineering.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

- ☒ Criterion A
☐ Criterion B
☒ Criterion C

NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

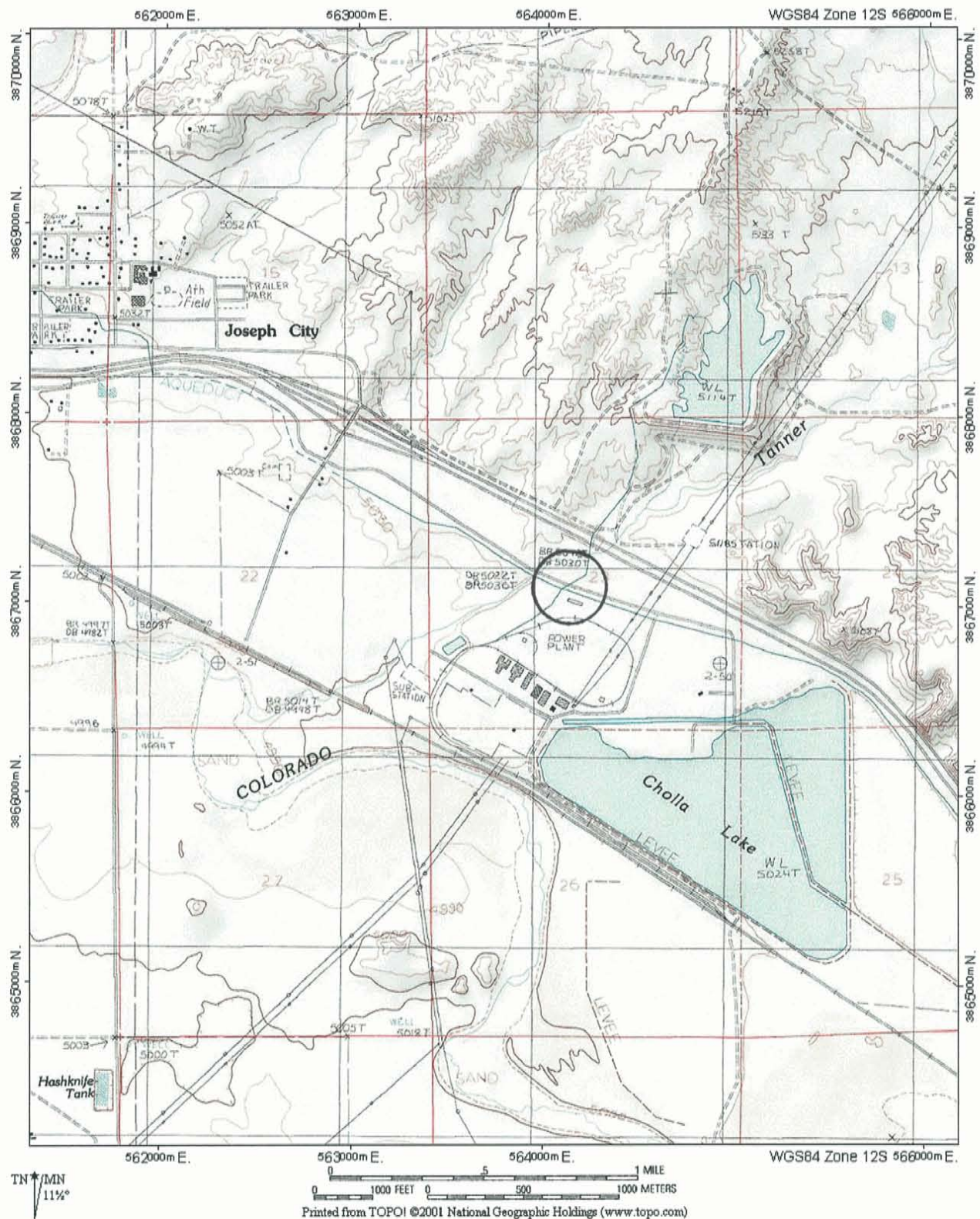
AREA OF SIGNIFICANCE: Transportation; Engineering

PERIOD OF SIGNIFICANCE: 1926-1964

THEME(S): Transportation: Highways

TANNER WASH BRIDGE

Structure No. 8160



Location Map

HISTORIC BRIDGE INVENTORY

East Carrizo Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	abd.
milepost	0.00	inventory route	abd. US 66
location	0.1 mi South of I-40	feature intersected	Lithodendron Wash
city/vicinity	Adamana	USGS quadrangle	Little Lithodendron Tank
district	87	UTM reference	12.599620.3873430

STRUCTURAL INFORMATION

main span number	22	main span type	702
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	0
main span length	18.0	superstructure	timber stringer
structure length	420.0	substructure	timber pile bent abutments and piers w/ timber sill plates
roadway width	22.7	floor/decking	timber deck with asphalt overlay
structure width	24.0	other features	timber guardrails w/ timber balusters

HISTORICAL INFORMATION

construction date	1932	designer/engineer	Arizona Highway Department
project number	FAP 83-C	builder/contractor	Canion & Royden, Phoenix AZ
information source	ADOT bridge records	structure owner	abandoned
alteration date(s)		alterations	

NATIONAL REGISTER EVALUATION

inventory score	63	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u> </u> C <u>x</u>
		signif. statement	undistinguished, relatively late example of uncommon structural type, undocumented

FORM COMPLETED BY

Clayton B. Fraser, Principal

FRASERdesign
420 South County Road 23E
Loveland, Colorado 80537
31 October 2004

EAST CARRIZO BRIDGE

Structure No.: abandoned



PHOTO INFORMATION

date of photo: November 2002

view direction: west northeast

photo no.: 02.11.83 02.11.86

CONSTRUCTION HISTORY

The two timber trestle bridges over the branches of Carrizo Wash on US 66 near Goodwater were known to be dangerous in the 1920s. At least nine accidents had occurred on them involving fatalities or serious injuries, and political pressure was mounting as the Arizona Highway Department moved to replace them in 1931. For the eastern bridge, the AHD bridge department delineated a 22-span timber trestle, for the western bridge an 18-span trestle. Both bridges featured identical span lengths and detailing. AHD designed the timber stringer bridges as starkly utilitarian structures, with redwood decks, stringers, pile bent piers and abutments and timber plank retaining walls.

AHD designated the project to build the two structures and 2.8 miles of highway between them as Federal Aid Project 83-C, Schedule 1. In December the agency awarded the contract to Canion and Royden of Phoenix for \$57,157. The contractors began work in January 1932, finishing in June. Both the Carrizo Bridges (other: **0257**) carried mainline traffic until construction of Interstate 40 immediately north in 1960. The timber bridges were left in place to carry local traffic beside the interstate. Today they are a study in contrasts: the western bridge was extensively rehabilitated in 1986 by ADOT, and the eastern structure, abandoned for years without maintenance, stands in severely deteriorated condition.

SIGNIFICANCE STATEMENT

The Arizona Highway Department typically eschewed timber bridges for concrete structures in the 1910s and 1920s, calculating the life of a timber structure as 35 years vs. 100 years for a concrete span. AHD nevertheless did develop standards for timber spans and built numerous small-scale bridges on secondary routes in the 1920s and 1930s. Long, multiple-span timber bridges on primary routes were rare, and the two Carrizo bridges are the only such structures identified in the inventory. They are thus technologically noteworthy as the best examples of timber trestle construction among the vehicular bridges in the state. The two bridges are historically significant as integral links in the National Old Trails Highway—the primary transcontinental route across northern Arizona.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

- ☒ Criterion A
☐ Criterion B
☒ Criterion C

NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering

PERIOD OF SIGNIFICANCE: 1932-1964

THEME(S): Transportation: Highways

Structure No.: abandoned



HISTORIC BRIDGE INVENTORY

Holbrook Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	private
milepost	0.00	inventory route	abd. US 70
location	4.2 mi SE of Holbrook	feature intersected	Little Colorado River
city/vicinity	Holbrook	USGS quadrangle	Sun Valley
district	87	UTM reference	12.581408.3860500

STRUCTURAL INFORMATION

main span number	1	main span type	111
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	0
main span length	174.0	superstructure	concrete filled spandrel Luten arch
structure length	190.0	substructure	concrete abutments and wingwalls
roadway width	16.0	floor/decking	asphalt roadway over earth fill
structure width	18.0	other features	paneled concrete parapet walls; plain tapered cantilever brackets

HISTORICAL INFORMATION

construction date	1916	designer/engineer	Arizona State Engineer
project number		builder/contractor	state work force
information source	ADOT bridge records	structure owner	Navajo County
alteration date(s)		alterations	

NATIONAL REGISTER EVALUATION

inventory score	81	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u> </u> C <u>x</u>
		signif. statement	well-preserved example of early AHD concrete bridge design

FORM COMPLETED BY

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Loveland, Colorado 80537
31 October 2004

HOLBROOK BRIDGE

Structure No.: private



PHOTO INFORMATION

date of photo.: November 2002

view direction: east southwest

photo no.: 02.11.91 02.11.93

CONSTRUCTION HISTORY

Without first consulting with the Arizona State Engineer, the Navajo County Board of Supervisors in 1912 contracted with the El Paso Bridge & Iron Company of Texas to erect a 128-foot truss bridge on a county road over the Little Colorado River three miles southeast of Holbrook. Completed in 1913, the bridge lasted only until April 14, 1915, when the Lyman Dam at St. Johns burst and swept away it and four other metal bridges downstream. "The site [for the Holbrook Bridge] was a poor one and foundations faulty," stated State Engineer Lamar Cobb. He acted immediately to survey a new site 1,000 feet upstream from the original for a suitable replacement structure.

That summer, with the consultation of bridge engineer Daniel Luten, Cobb's office designed a long-span Luten arch for the replacement structure. A state work force began excavating for the foundations of the new bridge on September 1, 1915, and work continued without incident until a flash flood washed the centering timbers away on January 19. The men resumed work soon after, rebuilding the centering and eventually completing the bridge in March 1916. Total cost: \$18,892. The Holbrook arch bridge carried mainline traffic until its replacement in 1961. Since then it has carried a private ranch road in deteriorating condition.

SIGNIFICANCE STATEMENT

The Lyman Dam disaster graphically demonstrated the impermanence of steel bridges to Arizona engineers. "The [replacement] bridge is the first concrete structure of any size near Holbrook," stated Cobb, "and the people generally are highly pleased with the substantial manner of construction, as well as the beauty of the bridge." Though not on the transcontinental Old Trails Highway, the Holbrook Bridge functioned as a regionally important crossing of the Little Colorado River for decades until its replacement in 1975. Technologically, the bridge is significant as an exemplary long-span example of a proprietary concrete arch design. It and twelve other Luten arches in Arizona were directly associated—either through engineering or construction—with the Topeka Bridge & Iron Company, the western representative of Daniel B. Luten's Indiana-based National Bridge Company. Patterned after an arch reinforcing scheme developed by Austrian engineer Josef Melan, Luten's filled spandrel arch was the most widely built of the proprietary arch types in America. Designed by Luten himself, the Holbrook Bridge is thus closely associated with this nationally important bridge company. Promotional literature published by the National Bridge Company indicates that this is the longest concrete arch ever built in America using Luten's patented technology. In unaltered condition, the Holbrook Bridge is thus one of Arizona's most important early vehicular spans.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

- ☒ Criterion A
☐ Criterion B
☒ Criterion C

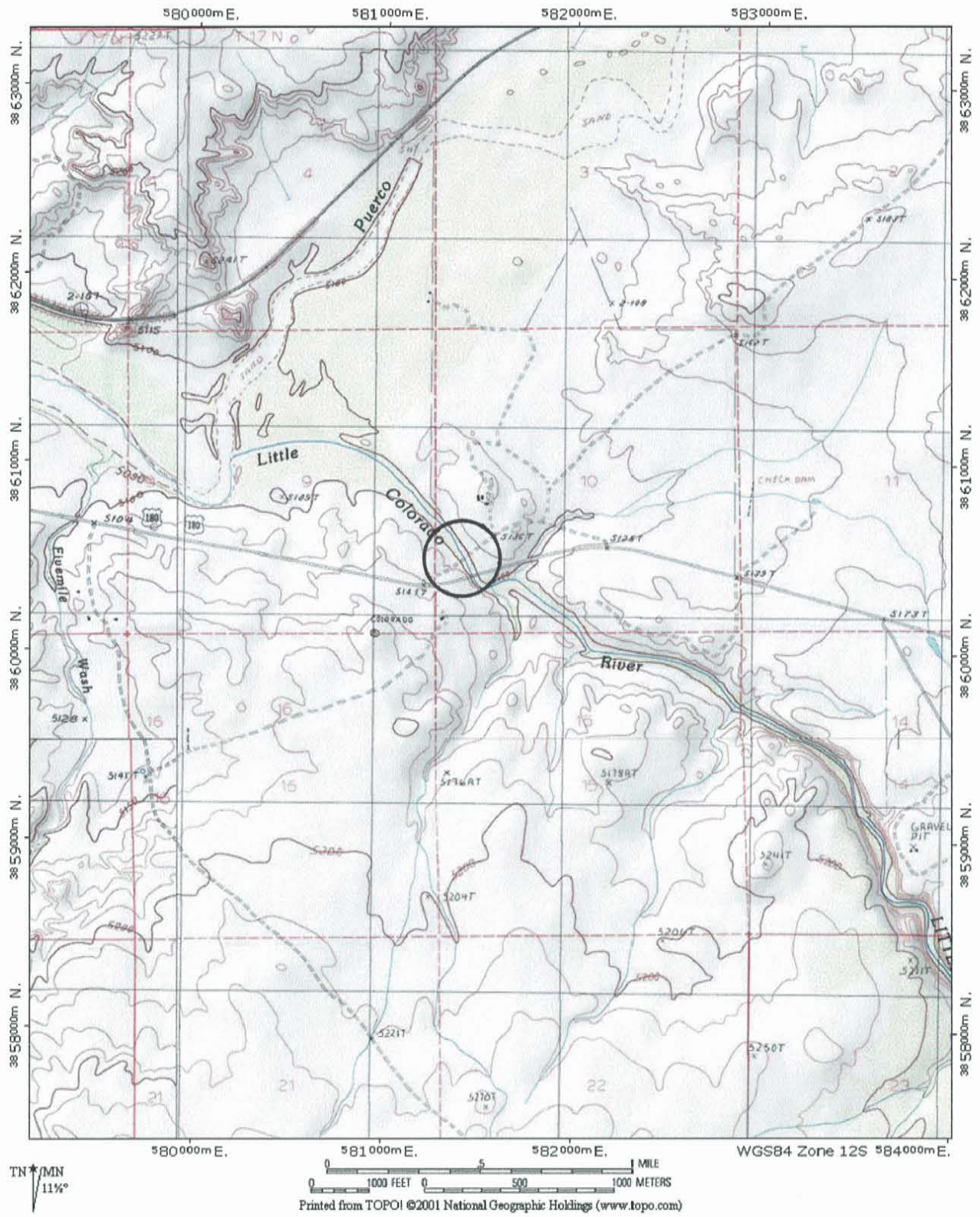
NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering
 PERIOD OF SIGNIFICANCE: 1916-1964
 THEME(S): Transportation: Highways

HOLBROOK BRIDGE

Structure No.: private



HISTORIC BRIDGE INVENTORY

Jacks Canyon Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	abd.
milepost	0.00	inventory route	abd. S99
location	4.5 mi South of Winslow	feature intersected	Jacks Canyon
city/vicinity	Winslow	USGS quadrangle	Clear Creek Reservoir
district	87	UTM reference	12.531623.3870378

STRUCTURAL INFORMATION

main span number	1	main span type	101
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	0
main span length	30.0	superstructure	concrete rail top slab
structure length	44.0	substructure	concrete abutments and wingwalls
roadway width	16.2	floor/decking	concrete deck
structure width	18.0	other features	steel pipe guardrails (removed) w/ concrete curbs

HISTORICAL INFORMATION

construction date	1913	designer/engineer	Arizona State Engineer
project number		builder/contractor	state work force
information source	ADOT bridge records	structure owner	Navajo County
alteration date(s)	ca1980	alterations	guardrails removed

NATIONAL REGISTER EVALUATION

inventory score	81	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u> </u> C <u>x</u>
		signif. statement	well-preserved example of early AHD concrete bridge design

FORM COMPLETED BY

Clayton B. Fraser, Principal

FRASERdesign
420 South County Road 23E
Loveland, Colorado 80537
31 October 2004

JACKS CANYON BRIDGE

Structure No.: abandoned



PHOTO INFORMATION

date of photo: November 2002

view direction: northwest east

photo no.: 02.11.127 02.11.128

CONSTRUCTION HISTORY

The Santa Fe Highway across northern Arizona crossed rugged Jacks Canyon about 4½ miles southwest of Winslow in Navajo County. Named after Jack "Dishrag" DeSchratt, the narrow canyon was steep and rocky and presented a serious obstacle to the major east-west highway. In 1913 Navajo County contacted Arizona State Engineer Lamar Cobb with a request for a vehicular bridge at this location. After visiting the site, Cobb designed this modestly scaled, single-span, reinforced concrete slab to carry the route. That year force account laborers on the state payroll constructed the bridge under the direction of Assistant Engineer B.M. Atwood for a cost of \$1,163. The plank formwork was crude, the design simple and unarticulated, and the guardrails were threaded steel pipes—indicative of the early construction by an unskilled work crew. The Jacks Canyon Bridge carried mainline vehicular traffic—first on the Santa Fe Highway, later as part of State Highway 99—until its abandonment. (The present bridge that replaced the 1913 structure was built in 1968.) The steel guardrails have since been removed and the concrete deck and approaches have deteriorated to an extent, but the Jacks Canyon Bridge remains otherwise intact.

SIGNIFICANCE STATEMENT

Alternately known as the Santa Fe Highway (in Arizona) and the National Old Trails Highway (its national designation), this transcontinental route has served historically as the principal east-west artery across northern Arizona. Only the Ocean-to-Ocean Highway, which passed through Yuma, Phoenix and Safford, carried more traffic in the state during the 1910s and 1920s. The Jacks Canyon Bridge formed a minor but integral link in the road during Arizona's early state period and is historically significant as the earliest structure in Arizona remaining from the original route.

The bridge is technologically important as the earliest and longest example in the inventory of an unusual structural subtype—the rail top slab. Using railroad rails spaced at 24" o.c. as reinforcing, the rail top slab is termed structurally as a one-way slab, in that it acted only one way in flexure under load. This one-way flexure tended to limit the bridges to short-span applications. Only two other bridges in the state—the Old Trails Wash Bridge [8594] in Mohave County and the Black Gap Bridge [8534] in Greenlee County, built in 1917 and 1921, respectively—are known to use this structural configuration. Though relatively modest in size and appearance and diminished somewhat physically by the removal of its guardrails, the Jacks Canyon Bridge is an important representative of early bridge construction in Arizona.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

☒ Criterion A
☐ Criterion B
☒ Criterion C

NATIONAL REGISTER ELIGIBILITY

individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

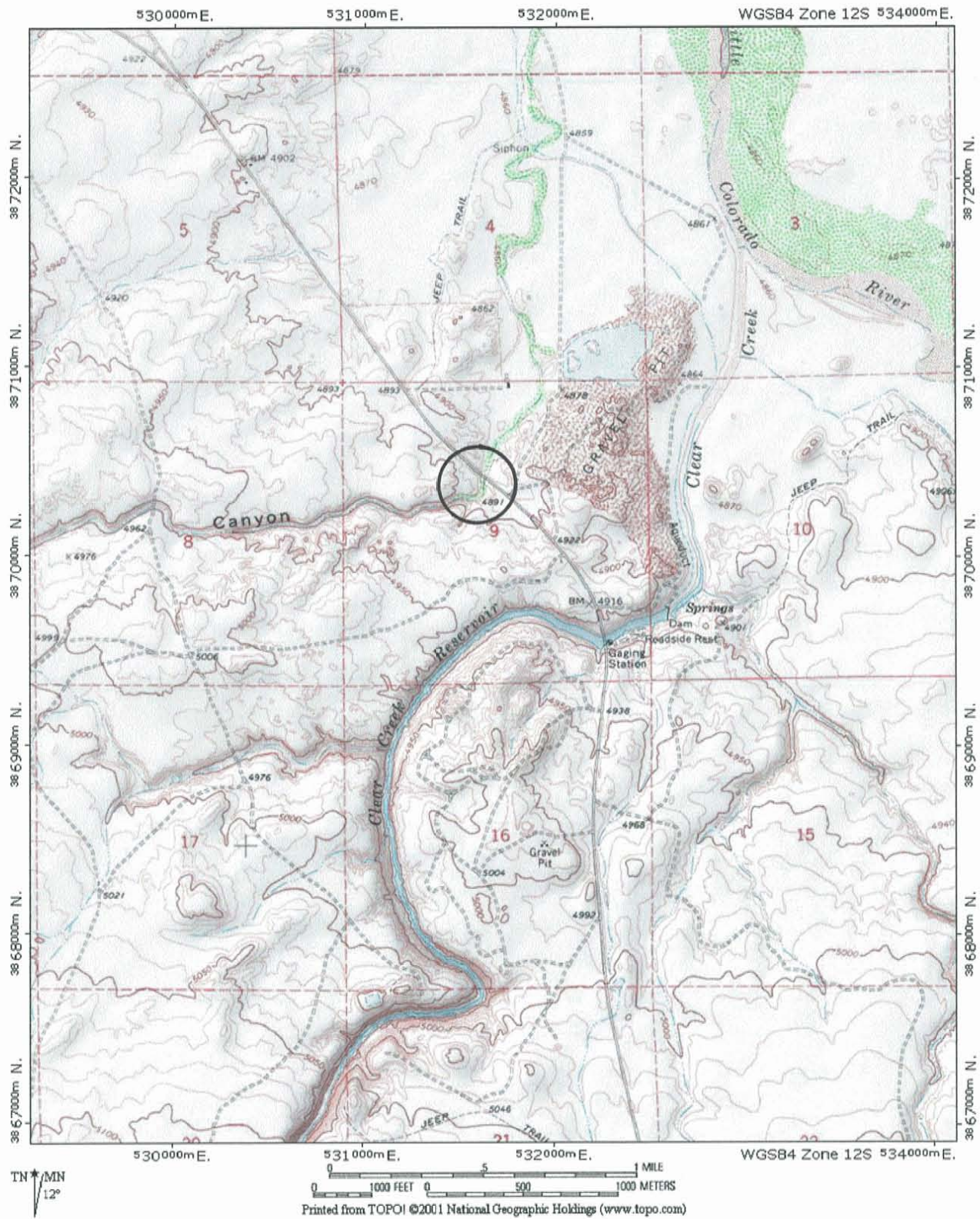
AREA OF SIGNIFICANCE: Transportation; Engineering

PERIOD OF SIGNIFICANCE: 1913-1964

THEME(S): Transportation: Highways

JACKS CANYON BRIDGE

Structure No.: abandoned



Location Map

HISTORIC BRIDGE INVENTORY

Woodruff Bridge

PROPERTY IDENTIFICATION

county	Navajo	inventory number	abd.
milepost	0.00	inventory route	abd. town road
location	Woodruff	feature intersected	Little Colorado River
city/vicinity	Woodruff	USGS quadrangle	Woodruff
district	87	UTM reference	12.587450.3849418

STRUCTURAL INFORMATION

main span number	1	main span type	310
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	0
main span length	75.0	superstructure	steel rigid-connected Pratt pony truss
structure length	130.0	substructure	stone masonry abutments and wingwalls
roadway width	12.3	floor/decking	timber deck and timber wearing planks
structure width	15.0	other features	upper chord: 2 built-up channels w/ cover plate and double lacing; lower chord: 2 rectangular eyebars; vertical: 2 channels w/ lacing; diagonal: 4 rectangular eyebars; lateral bracing: 1 angle; steel lattice guardrails

HISTORICAL INFORMATION

construction date	1918	designer/engineer	Omaha Structural Steel Works, Omaha NE
project number		builder/contractor	Omaha Structural Steel Works, Omaha NE
information source	ADOT bridge records	structure owner	Navajo County
alteration date(s)	1937	alterations	truss moved to this location

NATIONAL REGISTER EVALUATION

inventory score	59	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	eligible
		NRHP criteria	A <u>x</u> B <u> </u> C <u>x</u>
		signif. statement	remnant of once-important multiple-span truss bridge

FORM COMPLETED BY

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420 South County Road 23E
Loveland, Colorado 80537
31 October 2004

WOODRUFF BRIDGE

Structure No.: abandoned



PHOTO INFORMATION

date of photo: November 2002

view direction: east southwest

photo no.: 02.11.97 02.11.98

CONSTRUCTION HISTORY

The Lyman Dam at St. Johns collapsed on April 14, 1915, wiping out most of the bridges over the Little Colorado River between St. Johns and Winslow. To finance the enormous reconstruction effort, Navajo County in January 1916 voted a \$63,000 bond issue. The county board of supervisors in June advertised for proposals for seven bridges, including one over the Little Colorado east of Winslow. The next month eight companies responded with competitive designs and bids. For five of the smaller structures (including the St. Joseph Bridge [8157]), the county contracted with the Omaha Structural Steel Works. For the Winslow structure, which was by far the largest of the bridges, the board contracted with Los-Angeles-based Mesmer and Rice, lowest bidder at \$23,800. The U.S. Indian Service paid half of this cost. The American Bridge Company of Chicago used steel rolled by Lackawanna to fabricate the multiple-span truss bridge, shipping the truss components to Arizona by rail. Mesmer and Rice worked on the bridge's substructure until their dismissal by the county after numerous disputes. Omaha Structural Steel Works completed the four-span truss bridge in December 1917. In 1918 the county contracted with Omaha Steel to add a pony truss approach span on one end of the bridge. The contractors erected this medium-span, rigid-connected Pratt truss that year. When the Arizona Highway Department replaced the Winslow Bridge in 1939, Navajo County salvaged and re-erected this pony truss over stone masonry abutments in the small town of Woodruff. It carried local traffic until it too was replaced in 1975. The Woodruff Bridge now carries a pipeline and pedestrian traffic.

SIGNIFICANCE STATEMENT

The Little Colorado River formed one of the most formidable obstacles to transcontinental traffic across Arizona on the Old Trails Highway (US 66). The Winslow crossing was one of the most important on the highway's length. Erected by Navajo County as the state highway department was in its formative years, the bridge here was therefore one of the more important vehicular structures in the state. Multiple-span through trusses such as this were unusual in Arizona, and only two remain intact today: the Gillespie Dam Bridge [8021] and the Boulder Creek Bridge [0193], which itself uses trusses salvaged from an earlier structure. Navajo County's salvage of this span from the Winslow Bridge is typical of another trend in the state—the moving of trusses from major arterials to secondary routes. Several trusses in the state have been dismantled and re-erected in this fashion. Trusses were often erected with the possibility of later moving in mind, and this re-erection does not diminish their structural integrity appreciably. The Woodruff Bridge is technologically noteworthy as a well-preserved example—one of three in Arizona—of what was once a standard structural type, the riveted Pratt pony truss.

NATIONAL REGISTER EVALUATION

TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master
☐ possesses high artistic values
☒ represents a type, period or method of construction

HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons
☒ associated with significant events or patterns
☐ contributes to historical district

NATIONAL REGISTER CRITERIA

- ☒ Criterion A
☐ Criterion B
☒ Criterion C

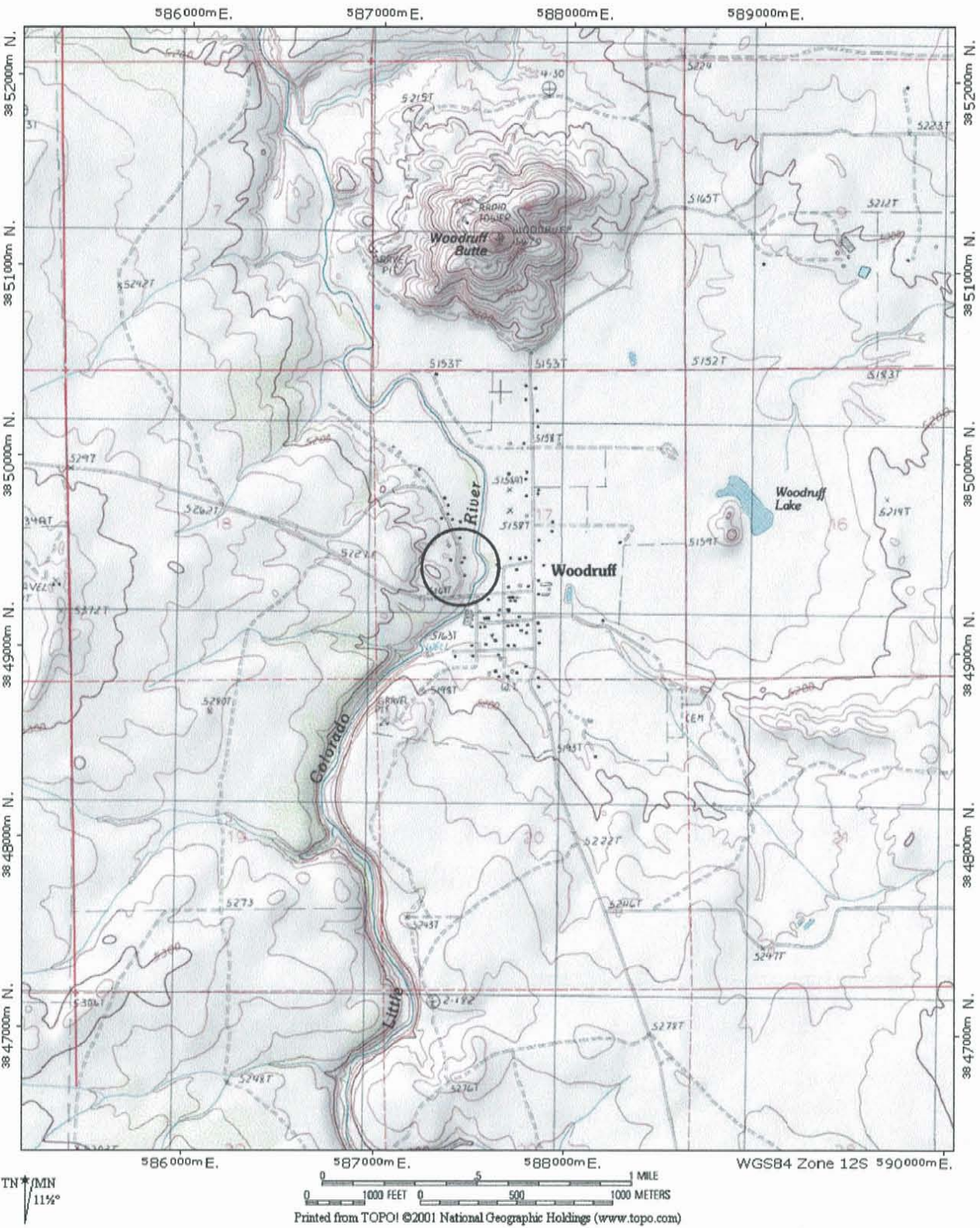
NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering
 PERIOD OF SIGNIFICANCE: 1918-1964
 THEME(S): Transportation: Highways

WOODRUFF BRIDGE

Structure No.: abandoned



Location Map