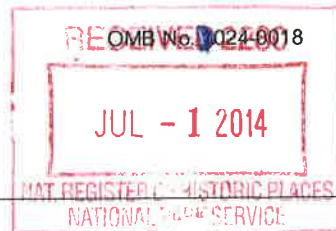


United States Department of the Interior

National Park Service

National Register of Historic Places Registration Form



497

1. Name of Property

Historic Name: East Navidad River Bridge

Other name/site number: State Highway 3 Bridge at East Navidad River

Name of related multiple property listing: NA

2. Location

Street & number: FM 1579 at East Navidad River

City or town: Schulenburg

State: Texas

County: Fayette

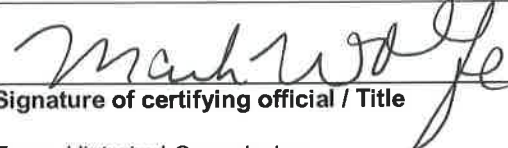
Not for publication: ☐Vicinity: ☒

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this
☒ 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 ☒ meets ☐ does not meet the National Register criteria.

I recommend that this property be considered significant at the following levels of significance:

☐ national ☒ statewide ☐ localApplicable National Register Criteria: ☒ A ☐ B ☒ C ☐ D

 Signature of certifying official / Title Texas Historical Commission State or Federal agency / bureau or Tribal Government	State Historic Preservation Officer	6/26/14 Date
---	-------------------------------------	-----------------

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria.

Signature of commenting or other official

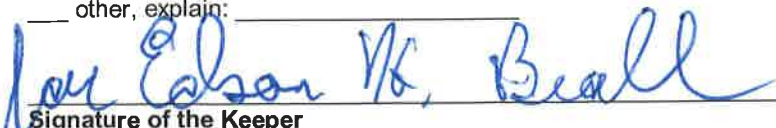
Date

State or Federal agency / bureau or Tribal Government

4. National Park Service Certification

I hereby certify that the property is:

- ☒ entered in the National Register
☐ determined eligible for the National Register
☐ determined not eligible for the National Register.
☐ removed from the National Register
☐ other, explain: _____


 Signature of the Keeper

 8-18-14
 Date of Action

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

5. Classification

Ownership of Property

☐	Private
☐	Public - Local
☒	Public - State
☐	Public - Federal

Category of Property

☐	building(s)
☐	district
☐	site
☒	structure
☐	object

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:

6. Function or Use

Historic Functions: Transportation: Road-related = bridge

Current Functions: Transportation: Road-related = bridge

7. Description

Architectural Classification: Other: concrete cantilever bridge

Principal Exterior Materials: Concrete

Narrative Description (see continuation sheets 6 through 7)

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

8. Statement of Significance

Applicable National Register Criteria

X	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.
X	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 values, 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: NA

Areas of Significance: Engineering, Transportation

Period of Significance: 1922

Significant Dates: 1922

Significant Person (only if criterion b is marked): NA

Cultural Affiliation (only if criterion d is marked): NA

Architect/Builder: Granger, Armour Townsend (for the Texas Highway Department)

Narrative Statement of Significance (see continuation sheets 8 through 16)

9. Major Bibliographic References

Bibliography (see continuation sheets 17-18)

Previous documentation on file (NPS):

- ☐ 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 # TX-78

Primary location of additional data:

- ☒ State historic preservation office (*Texas Historical Commission, Austin*)
- ☐ Other state agency
- ☐ Federal agency
- ☐ Local government
- ☐ University
- ☐ Other -- Specify Repository:

Historic Resources Survey Number (if assigned): NA

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

10. Geographical Data

Acreage of Property: less than one acre

Coordinates

Latitude/Longitude Coordinates

Datum if other than WGS84: NA

1. Latitude: 29.682677° Longitude: -96.863129° (see map, page 19)

Verbal Boundary Description: The nominated parcel includes the entire bridge structure at FM 1579 (former state Highway 3) at the East Navidad River. The bridge is 21'-2" feet wide and 199 feet long.

Boundary Justification: The boundary includes all components historically associated with the structure.

11. Form Prepared By

Name/title: Gregory Smith

Organization: Texas Historical Commission

Street & number: PO 12276

City or Town: Austin

State: Texas

Zip Code: 78711

Email: greg.smith@thc.state.tx.us

Telephone: 512-463-6013

Date: April 2014

Additional Documentation

Maps (see continuation sheets 19-20)

Additional items (see continuation sheets 21-30)

Photographs (see continuation sheets 5; 31-34)

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Photographs

State Highway 3 Bridge at East Navidad River
Schulenburg vicinity, Fayette County, Texas
Photographed by Gregory Smith
November 2012

Photo 1. West approach, looking east

Photo 2. East approach, looking west

Photo 3. East end builder's plate and railing, looking northwest

Photo 4. Substructure, looking east

Photo 5. Substructure, looking east

Photo 6. North profile from river bed, looking south

Photo 7. Primary span from river bed, looking southwest

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Description¹

The 1922 East Navidad River Bridge is a 199-foot-long concrete cantilever bridge on FM 1579 east of Schulenburg, Texas. It consists of two-curved cantilever arms supported on skewed concrete piers and abutments, with a 70-foot-long center arch span. Simple concrete slab and girder spans serve as approaches at each end of the bridge. The open-style railings are of a modified "Type C" design, with concrete posts and two-beam rail divided by battered concrete pedestals. The bridge has a total width of 21 feet and 2 inches, with an 18-foot roadway. Designed by Texas Highway Department engineer A.T. Granger, this graceful crossing retains a good degree of integrity.

The East Navidad River Bridge, approximately 3.4 miles east of Schulenburg, Texas, carries FM 1579 (formerly the OST, State Highway 3, and U.S. 90). The road is in a rural setting, and is approximately 18 feet wide, with no shoulders. The East Navidad River Bridges was the first of a small number of concrete cantilever bridges constructed by the Texas Highway Department between 1922 and 1932.² The bridge is composed of cantilevered girders balanced on skewed pedestal piers. The use of cantilevered girders allowed a longer span than a simple girder and created the illusion of an arch. The angle between the roadway and river might have influenced the decision to use a cantilever system. The bridge consists of three cantilever span concrete tee-beams (spans 2, 3, and 4) with two approach span concrete tee-beams (spans 1 and 5) at a forty-five degree left forward skew on concrete caps, and columns with driven timber pile foundations. The main span measures 70 feet in length, and is flanked by two curved cantilever arms supported on skewed concrete piers and abutments. Approach spans (one and five) each measure 35 feet. The main span cantilevers allowed a 1-inch gap between the bottom of the cantilever ends and the top of the approach span supports.

This 199-foot-long bridge features ornamental concrete railings. Modification of the Texas Highway Department's "Type C" rail design resulted in construction of the open-style railing consisting of a concrete post (positioned 5'-10" apart along the length of the bridge) and two-beam rail divided into sections by battered concrete pedestals. A. T. Granger, designer, incorporated incised panels and chamfered edges. The ornamental features are consistent with the evolving style of the period and the highway department's design philosophy that bridges, including those in "remote country districts," warrant "careful and artistic design."³

Pier placement for the bridge varies between 11'-0" and 10'-7". Main piers vary in elevation as their placement coincided with the clay line. Pilings of untreated timber were driven to sustain a load of 20 tons per pile. Dowels and bars of varying diameter and length secured piers to main girders. At the end of the cantilever arms are expansion joints, steel plates completely independent of the concrete, and installed after the concrete fully set. Posts in the reinforced concrete railing are of two sizes: those above the main piers (3 and 4) are larger than those over the remaining piers. Rails, 3.5" between the top and bottom rail, rest in recesses that allow them to "move freely to accommodate deflection of [the] cantilever arm." Rail posts above abutment bents I and 6 hold the nameplates. The two nameplates are identical and located on the inside of the end rail posts at bents 1 and 6. The plate, cast in one piece of U.S. Standard Statuary Bronze, is attached at each corner with a 1-11/2" bolt screwed into the plate from the backside.⁴

¹ Adapted from "East Navidad River Bridge, Spanning East Navidad River at FM1579, Schulenburg, Fayette County, TX." Historic American Engineering Record (HAER TX-78), National Park Service, U.S. Department of the Interior. <http://www.loc.gov/pictures/item/tx0947/>, accessed April 10, 2014.

² Trinity River Bridge, East Belknap Street Bridge, Fort Worth, Tarrant County, Texas (HAER TX-88), p. 2-3.

³ Historic American Engineering Record (HAER), National Park Service, U.S. Department of the Interior, "Big Conestoga Creek Bridge No. 12."

⁴ Record of State Control Number, Sections, and Jobs, Fayette County. No. 26-3-2, February 1922- October 1923.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Original drawings for the bridge call for a Texas Highway Department Standard wood guard fence on both sides of the road at each end of the bridge. It is not clear whether or not this fence was constructed; there is currently no guard rail at either end.

The East Navidad River Bridge still carries light traffic, but the new alignment of US 90 bypassed the bridge in the mid-1930s, helping to preserve its overall integrity. The cantilever ends of the girders have dropped about 1-to-1.5 inches at bents 2 and 5, probably because of being over-stressed by live load, and are resting on approach span supports. The approach span supports at the cantilever ends show cracking and spalling at the shear keys. Some rail members show spalling, and have exposed reinforcing bars. The west abutment shows cracked and spalling riprap and erosion at the toe. The west cantilever shows loss of reinforcing bar, and diaphragm spalling. The channel bank shows some scouring, exposing a portion of the toewall. Despite these problems, the East Navidad River Bridge retains its integrity of design, materials, workmanship, location, setting, and association.

In the summer of 2000, Peggy Hardman, Ph.D., prepared HAER documentation as part of the Texas Historic Bridges Recording Project by the Historic American Engineering Record (HAER) and Texas Department of Transportation (TxDOT) Environmental Affairs Division.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Statement of Significance

The 1922 East Navidad River Bridge on FM 1579 east of Schulenburg, Fayette County, Texas, was the first concrete cantilever bridge built by the State of Texas, and served a transcontinental highway known during various periods as *Texas Highway 3*, the Old Spanish Trail (OST), *Southern National Trunk Line*, and *U.S. 90*. The highway was a primary automobile route between Houston and San Antonio, and as part of a national highway running between St. Augustine, Florida, and San Diego, California. Bypassed in the mid-1930s, the original highway segment is maintained as a farm-to-market road, and the bridge serves as a remarkably intact example of an innovative design by engineer Armour T. Granger. Built by Fayette County with state and federal aid through the Texas Highway Department, the bridge is nominated to the National Register under Criterion A in the area of Transportation and Criterion C in the area of Engineering at the state level of significance.

Fayette County, Texas

Fayette County is approximately sixty miles southeast of Austin, and is traversed by several significant highways, including SH 71 (which carries traffic from Austin to Columbus through the county seat of La Grange), and US 90 and IH-10 (both of which carry traffic between San Antonio and Houston through the southern part of the county). The Colorado River bisects the county from northwest to southeast. Native Americans, Spanish explorers, and later Anglo settlers traveled through the area, attracted by good water and soil. The first known Anglo settlers, Aylett C. Buckner and Peter Powell, established a trading post on the La Bahia Road just west of La Grange. In 1837, the Republic of Texas established the county of Fayette. The economy of the county rested on farming, and the access to abundant natural resources. The Galveston, Harrisburg and San Antonio Railroad arrived in the southern part of the county in 1873, encouraging the settlement in the cities of Engle, Flatonia, and Schulenburg, and establishing a transportation corridor between Houston and San Antonio. Located approximately three miles west of the East Navidad River, Schulenburg grew with an influx of Germans, Austrians, and Czech settlers. The town took its name from Louis Schulenburg, who donated land to the railroad. Ernst Baumgarten, another land donor, opened a cottonseed-crushing plant, a lumberyard, a planing mill, a sash and door factory, and a cotton gin. He later opened the Schulenburg Oil Mill which produced Baumgarten Process Allinson Oil from cottonseed. By 1884, four newspapers served the community's population of about one thousand. By 1920, the population reached 1,246.⁵

Good Roads Movement in Texas and Establishment of Highway Associations⁶

The "Good Roads Movement" was an assemblage of numerous groups and organizations that promoted the development of improved roads nationwide beginning in the 1890s. Initiated largely by bicycle enthusiasts, these groups primarily sought good bicycle paths, but worked in tandem with farmers, ranchers, and other rural residents to petition for federal support of improved local and state transportation infrastructure. The railroad companies, rather than seeing good roads as competition, also supported the movement in recognition that improved access to their services improved their profitability as interstate shipping and transportation providers. Regional associations such as the Southwestern Good Roads Association worked with national groups such as the National Good Roads Association (NGRA) and United States Good Roads Association (USGRA) to seek federal assistance, and congress

⁵ Mark Odintz, "SCHULENBURG, TX," *Handbook of Texas Online* (<http://www.tshaonline.org/handbook/online/articles/hjs11>), accessed April 08, 2014. Uploaded on June 15, 2010. Published by the Texas State Historical Association.

⁶ Adapted from "Old Spanish Trail from U.S. 90 to Interstate Highway 10, Colorado County, Texas" National Register nomination by Gregory Smith, 2012.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

responded in 1893 with the establishment of the Office of Roads Inquiry (ORI) under the Department of Agriculture.⁷

Interest in good roads in Texas resulted in statewide meetings beginning in 1895, but it wasn't until 1910 that the Texas Good Roads Association (TGRA) formed. The availability of more affordable automobiles and the cheaper fuel products of Texas' new and ever-growing petroleum industry no doubt spurred more interest in good roads during the second decade of the twentieth century, with 126 local "good roads" clubs organized by 1914.⁸ Automobile enthusiasts, especially in urban areas of Texas, joined regional auto clubs, which furthered the cause of good roads, and in the absence of government oversight of a state highway system, produced maps and guides for their members. These organizations and their efforts to identify drivable roads were a precursor to organizations that supported particular automobile routes and also produced maps and guides. Support for good roads and especially their usefulness to rural Texans became commonplace in local newspapers, as well as regional and national magazines, such as the Dallas-based *Farm and Ranch* and *Holland's Magazine*, which in 1912 promoted an automobile tour between Dallas, San Antonio, Galveston, and back to Dallas.⁹

By 1910, private highway associations began to organize to promote good roads in general, and support improvement of particular regional and national routes. By the mid-1920s, dozens of named regional and interstate auto routes in Texas were identified on road maps, including the Bankhead Highway (Washington, DC, to San Diego, via Texarkana, Dallas, and El Paso), the Meridian Highway (Winnipeg to Mexico City, via Fort Worth and Laredo), and the Old Spanish Trail (St. Augustine, Florida to San Diego, via Houston, San Antonio, and El Paso). Many distinct organizations claimed the same segments of highways as their own, publishing maps and guides that excluded competing routes, and established highway markings from signs to painted telephone poles, often leading to confusion for motorists, especially in the absence of a comprehensive numbered road network at the state or federal levels.¹⁰ These associations furthered the cause of good roads through increased public awareness and supported roadside businesses, which in turn advertised their services in the associations' publications. The task of improving the roads, however, was left to various governmental entities, beginning with municipal and county governments, but eventually including a high degree of state and federal control.

The Old Spanish Trail (OST) in Texas¹¹

Despite its name, the Old Spanish Trail is not historically Spanish, nor is it a trail, nor is it even particularly old, except in the context of 20th century automobile highways. Instead, the OST was the southernmost of the transcontinental automobile highways supported by a variety of associations which identified the need for a road connecting San Augustine with San Diego as early as 1913.¹² This southern route was plagued with geographic obstacles, including swamps, lakes, and the Gulf of Mexico, as well as the general disorganization of states' road financing and roadbuilding efforts. In 1915, the Old Spanish Trail Association organized in Mobile, Alabama, and followed up with annual conferences in Pensacola and Tallahassee. The group's initial momentum was stalled by World War I and other factors, but the 1919 OST convention in Houston expanded Texas' influence when Harral Ayres of San Antonio was appointed to serve as managing director of the organization (a post he held for a decade).

⁷ Dwayne Jones. "Bankhead Highway Historic District, Taylor County, Texas." National Register nomination, 19.

⁸ Jones, 22.

⁹ Jones, 19.

¹⁰ *Rand-McNally Official 1923 Auto Trails Map* (Chicago, Ill.), 1923.

¹¹ Adapted from "Old Spanish Trail from U.S. 90 to Interstate Highway 10, Colorado County, Texas" National Register nomination by Gregory Smith, 2012.

¹² Jones, Dwayne. "Old Spanish Trail: National Trunkline of the Southern Borderlands." *Society for Commercial Archeology Journal* 15 (Fall 1997), 11. This article provides a good overview of the OST Association's history.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Ayres strongly endorsed the promotion of the OST as a linkage of places and sites historically connected to Spanish exploration and settlement in the Americas.¹³

The OST Association publicized the route in ways similar to those of other national road associations, including publication of the short-lived *Old Spanish Trail Magazine*, tourist guides, maps, and an annual yearbook. The group adopted standardized signage guidelines, specifying red, white, and yellow banding on telephone poles and other signs. By 1921, the road through Texas connected Orange to El Paso, via Houston, Columbus, Schulenburg, San Antonio, Kerrville, and Fort Stockton, although individual segments varied in regards to their all-weather drivability. West of Pecos County, the same road was claimed as the mainline of both the OST and the Bankhead Highway. Later OST divisions included a spur between San Antonio and Del Rio, a scenic route through Fort Davis, and a choice of routes through either Gonzales or Luling, Texas. The federal government did not initially recognize the OST as a high-priority route, prompting Ayres and the organization to increase efforts for national support in 1922, resulting in a declaration by southern congressmen in support of the road, and the U.S. Department of Defense affirming the necessity of a southern transcontinental route in the interest of national security. The OST's establishment as the "southern national highway" opened the door to federal funding.¹⁴

Government Support of Good Roads¹⁵

The efforts of highway organizations such as the Old Spanish Trail Association coincided with greater government involvement in road and highway development. As the OST Association gained momentum in the late teens, plans for the first federally-aided improvements along the OST in Texas were underway. While other state governments (beginning with the high population centers in the northeast, followed by those in the Midwest and the south), established centralized highway departments as early as the 1890s, Texas was one of the last states to do so. Between 1903 and 1915, the Texas legislature passed transportation bills which continued to leave control of road-building to the individual counties. Meanwhile, the number of automobile registrations in Texas skyrocketed. The federal government established the Office of Public Roads (OPR) under the Agricultural Appropriation Act of 1906. The office served to promote "good road construction by testing materials and road-building methods, and providing scientific information to local and state road administrations."¹⁶ In 1913, the OPC established a program with the U.S. Post Office Department to improve existing post roads, and dispersed \$500,000 to states to improve their post roads, requiring a two-thirds match by county or state governments. The program yielded only 466 miles of improved roads in 17 states.¹⁷ The Federal Road Act of 1916 allocated federal road construction funds only to states with central highway agencies. In 1917, Governor Jim Ferguson signed a bill to create a state highway department, and authorized the establishment of a state highway commission, the creation of the office of state highway engineer to oversee highway projects, and the appointment of a secretary to direct vehicle registrations. Motor vehicle registration fees provided funds for the department's operations. Counties retained control over road planning, and were reimbursed from the state highway fund. County engineers submitted plans and specifications to the state highway engineer for approval. The Texas Highway Commission proposed a network of 22 state highways at its first meeting on June 21, 1917.¹⁸ These routes largely followed existing county and local roads, and

¹³ Jones, 12.

¹⁴ Jones, 13.

¹⁵ Adapted from "1918 State Office Building and 1933 State Highway Building," National Register of Historic Places nomination (1997), pp. 34-35.

¹⁶ Adapted from "Bunton Branch Bridge, Kyle vicinity, Hays County, Texas." National Register of Historic Places nomination, (2000), p 8.

¹⁷ Ibid.

¹⁸ Texas Department of Transportation. "Historic Road Infrastructure of Texas." Draft Multiple Property Documentation Form, 2012, 42.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

many followed routes that had been identified and promoted by various named highway associations. By 1919, the first 38 state highways were formally designated, including State Highway 3 (the Southern National Route, later the OST), running from Orange to El Paso, with an alignment through southern Fayette County.

Texas' 1925 highway law finally turned financial control of the state's roads to the state highway department. The legislature had established the gasoline tax in 1923, three-fourths of which went to the highway department. The legislature passed increases in the gasoline tax in 1927 and 1929, which provided the financial resources necessary for large-scale highway construction. The department continued to expand in the late 1920s, adding the Road Design Division, responsible for locating, planning, and designing new roads, and the Right of Way Division, authorized to acquire right-of-way for road construction, in 1929.

East Navidad River Bridge

The East Navidad River Bridge was constructed under a joint Fayette County/State of Texas project (State Aid Project No. 256 A), funded under the Federal Aid Act of 1921 to improve sections of highway in Fayette County. Three employees of the Texas Department of Highways (TDH) participated in the project design: State Bridge Engineer George Wickline; bridge designer A. T. Granger (identified in TDH records as a "draftsman"); and J. B. Kearby. Contractor Lake Robertson served as "Resident Engineer." Two name plates located on the inside of the end rail posts over abutment bent shafts at each end of the bridge also identify Fayette County Commissioners and Texas Highway Department engineers involved in the project.

Like similar projects statewide, the construction of improved roads in Fayette County was championed by county and municipal governments, private associations, and individual citizens. Schulenburg, Texas' weekly newspaper, the *Schulenburg Sticker*, was a reliable promoter of good roads in the early 20th century, and regularly featured articles that reflected local interest in the improvement of the county and state highway systems, and the potential benefit of the small city's location along one or more major highways, including the coast-to-coast Old Spanish Trail. The newspaper followed the activities of various highway promotional organizations as well as governmental support of modern road construction through legislation, the establishment of the Texas Highway department, and various bond elections.

In September 1917, the Texas Highway Commission designated Houston-San Antonio Road (running through Schulenburg) as "State Highway 3." The *Sticker* reported:

The route through Schulenburg has been approved as to location. It must now be built to government specifications...it looks like this section will never have a better chance to build a stretch of modern road and see how much more service it gives for less money than the old style roads and culverts.¹⁹

Support of the Houston-San Antonio Highway increased in Fayette County, as citizens met to discuss the benefit of improved roads for the region, and how the state highway could serve as a model for other roads. The promise of state and federal funds no doubt made a difference, as the *Sticker* reported that at a November 1917 citizens meeting:

¹⁹ "The Highway Designated." *The Schulenburg Sticker* (Schulenburg, Tex.), Vol. 24, No. 1, Ed. 1 Friday, September 28, 1917." Accessed April 7, 2014.
<http://texashistory.unt.edu/ark:/67531/metapath189677/m1/4/zoom/?q=fayette%20highway%20bonds>.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Men who had opposed road improvement in the past expressed themselves as in favor of making every effort to take advantage of the government and state offer to put up a large part of the money for building one permanent road, so that the people could see the saving over the present system of dirt roads.²⁰

By November 1919, four highway associations claimed Schulenburg as a point on their routes: the Old Spanish Trail; the Central Route; the Southern National Highway; and the R.L. Lee Highway. Although none of the road associations took responsibility for actually building roads (and many associations claimed the same local roads as components of their trails), the *Sticker* saw this level of interest as a sign of progress for the city: "When [property owners] see the thousands of cars from all parts of the United States making the trip in a steady stream into the town, they will grasp what such a project means."²¹ Construction of bridges and improved roads through Fayette County was underway in 1921, an effort featured in *Texas Highway Bulletin*, although construction did not move fast enough for the editorial board of the *Schulenburg Sticker*, which lamented that after four years and \$200,000 in local bonds, "...Brother we have seven (7) miles of road built, sure nuf seven whole miles...the contract for the big East Navidad bridge has never been let...Why? Oh, Why?"²² These concerns would soon be addressed, however: on January 31, 1922, the contract for finishing the highway – including construction of the East Navidad Bridge – was finally let. The contract included the graveling on the road from the Gonzales County line on the west to the Colorado County line on the east. The *Sticker* lauded the qualifications of the selected bridge contractor, Lake Robertson of nearby La Grange, explaining that "a better man for the job would be hard to get[,] for Lake is a good conscientious and able worker when it comes to building bridges and when completed, this bridge will rank second to none within the state."²³ Robertson received nearly \$30,000, a fourth of which came from the federal government's matching funds.²⁴

Engineer Armour Granger departed from traditional concrete construction methods in the design of the bridge, creating "a structure in harmony with the picturesque countryside of the East Navidad River, and pleasing to the eyes of motorists passing through the Schulenburg area as they traveled the Old Spanish Trail/State Highway 3."²⁵ The new bridge replaced a smaller metal truss with a timber deck at the crossing. In January 1922, the Federal Bureau of Public sent a letter to State Bridge Engineer George Wickline regarding the bridge's design and the proposed construction methods. The bureau advised caution during the concrete pour stage to ensure that reinforcing bars at the top of the structure would be protected from being covered with mortar during the early-stage pours. The bureau also recommended a sequence of operation for construction, indicating that false work

²⁰ "Houston-San Antonio Highway." *The Schulenburg Sticker* (Schulenburg, Tex.), Vol. 24, No. 7, Ed. 1 Friday, November 9, 1917. Accessed April 7, 2014.

<http://texashistory.unt.edu/ark:/67531/metapth189683/m1/1/zoom/?q=fayette%20highway%20bonds>.

²¹ "Fourth Road Marker Landed." *The Schulenburg Sticker* (Schulenburg, Tex.), Vol. 24, No. 13, Ed. 1 Friday, December 21, 1917. Accessed April 7, 2014.

<http://texashistory.unt.edu/ark:/67531/metapth189689/m1/1/zoom/?q=fayette%20highway%20bonds>.

²² "Highway Work Progressing Very Slowly - Why?" *The Schulenburg Sticker* (Schulenburg, Tex.), Vol. 28, No. 15, Ed. 1 Friday, December 23, 1921. Accessed April 3, 2014.

<http://texashistory.unt.edu/ark:/67531/metapth189745/m1/1/zoom/?q=%22east%20navidad%20bridge%22>.

²³ "County Lets Contract for Finishing Highway." *The Schulenburg Sticker* (Schulenburg, Tex.), Vol. 28, No. 21, Ed. 1 Friday, February 3, 1922. Accessed April 3, 2014.

<http://texashistory.unt.edu/ark:/67531/metapth189748/m1/1/zoom/?q=%22east%20navidad%20bridge%22>.

²⁴ Record of State Control Number, Sections, and Jobs, Fayette Couty. No. 26-3-2, February 1922-October 1923.

²⁵ Peggy Hardman, Ph.D., "East Navidad River Bridge, Spanning East Navidad River at FM1579, Schulenburg, Fayette County, TX." Historic American Engineering Record (HAER TX-78), National Park Service, U.S. Department of the Interior. <http://www.loc.gov/pictures/item/tx0947/>, accessed April 10, 2014.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

should be supported on piles, and specified the order of pours in eight steps. Bridge plans drawn up by Granger offered numerous cautionary statements about the pouring of the concrete.²⁶

Granger elaborated on the placement and dimensions of the reinforcing steel in his drawings. He also cautioned "joints shall not be made at other points than indicated on plans except with the written consent of the engineer."²⁷ Likely addressing concerns about the design raised by Washington engineers, Granger wrote in July 1921:

Reinforcing shall be carefully placed in position shown on plans, and bars shall be rigidly fastened to each other and to the forms so that they cannot be disturbed during the depositing of the concrete." In another section of the drawings, Granger warns, "reinforcing must be wired very securely."²⁸

The HAER documentation notes that "steel reinforcement has about 100 times the tensile strength of concrete. In concrete reinforced members, the concrete resists compressive forces while the steel reinforcement resists tensile forces. Properly cast in a concrete member, the steel and concrete act in harmony to create a very strong and durable construction material. In his East Navidad River Bridge, Granger specified 85,780 pounds of reinforcing steel."²⁹

Whereas Washington engineers worried about weakness in the bridge should the concrete be poured in a multi-sequenced event, Granger addressed that concern by planning for the

pouring...to be continuous from end of cantilever arm at Pier 2 to construction joint near center of span B ... [and] after concrete has set the bulkhead at this joint shall be removed and the exposed concrete surface rubbed vigorously with a wire brush and then chipped to roughen the surface and secure as good as bond as possible. No foreign material of any sort shall be left between the concrete surfaces and the joint. Pouring shall then be continuous from the joint to the end of the cantilever arm at Pier 5. The maximum quantity to be poured at one run is about 86 cubic yards.³⁰

On September 12, 1922, Lake Robertson completed the series of concrete pours (200 yards in a single day), with the assistance of two alternating 40-man gangs working in 3-hour shifts. The *Sticker* reported:

The scene out at the bridge resembled more the scene of a big railroad wreck than anything else we get to see in this section of the country. Every man was doing his best. A big place was arranged under the tress at which Otto Bruner, one of the Schulenburg butchers, was barbecuing seven calves to feed the men as they were relieved during the day...Big crowds were coming and going all day watching the good work go on. Thus Lake Robertson has again established himself as a

²⁶ Letter from J.D. Fauntleroy, Bureau of Public Roads District Engineer (Forth Worth), to State Bridge Engineer Wickline, January 25, 1922. Record of State Control Number, Sections, and Jobs, Fayette County. No. 26-3-2, February 1922-October 1923 (microfilm at Texas Department of Transportation).

²⁷ Ibid.

²⁸ Ibid.

²⁹ Hardman, np.

³⁰ Record of State Control Number, Sections, and Jobs, Fayette County. No. 26-3-2, February 1922-October 1923.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

master bridge builder, large enough to handle any kind of a job with the knowledge and foresight to see that every detail and every move runs like the work of a clock.³¹

The East Navidad River Bridge was completed in late November, 1922.³² Although it appears to be an arch bridge, it stands as a rare Texas example of a reinforced concrete cantilever bridge, formed by two projecting beams anchored and counterweighted at each end, and joined in the center. This bridge type “made a brief appearance [in Texas] in the 1920s and 1930s as an alternative to concrete arch construction” that allowed longer spans and could be built “where unsatisfactory foundation conditions would prohibit a true arch.”³³ The East Navidad River Bridge was the first such bridge built by the State of Texas, followed in 1930 by a 472-foot-long bridge carrying South Oakes Street over the North Concho River in Tom Green County. In 1932, the Texas Highway Department constructed two concrete cantilever bridges in Fort Worth, carrying US 377/East Belknap Street over the Trinity River and the Jacksboro Highway over the West Fork of the Trinity River. In both situations, the concrete cantilever design was chosen to give the high-profile bridges the “artistic effect of an arch.”³⁴ These bridges were the last of the type to be constructed by the THD.

*George Grover Wickline, State Bridge Engineer*³⁵

George Grover Wickline became the State Bridge Engineer of the newly created Texas Highway Department in 1918, where he held the post until his death in 1943. Wickline was born in Stephenville, Texas in 1883, attended public schools and John Tarleton State College in Stephenville, and in 1904 earned a civil engineering degree from the University of Texas at Austin. He learned firsthand all aspects of bridge and road engineering by working as a survey crew member or assistant engineer for various railway companies, and as a bridge engineer or resident engineer for several city and county governments. Wickline spent most of his career in Texas, but in 1906-1908 he worked as a draftsman, designer, and assistant engineer on the Owens Valley Aqueduct in California, a huge project designed to deliver water from the valley to Los Angeles.³⁶ Wickline became a member of the Texas State Board of Professional Engineers in 1937. As state bridge engineer for the Texas Highway Department, Wickline oversaw the Bridge Division, and helped develop standards for bridge construction on the state's highway system. Between 1936 and 1938, he supervised the construction of the Rainbow Bridge over the Neches River at State Highway 87 between Orange and Port Arthur.³⁷ No records indicate if Wickline had any concerns about Granger's design for the East Navidad River Bridge.

³¹ “Lake Robertson Achieves Difficult Task.” *The Schulenburg Sticker* (Schulenburg, Tex.), Vol. 29, No. 1, Ed. 1 Friday, September 15, 1922.” Accessed April 3, 2014.

<http://texashistory.unt.edu/ark:/67531/metapth189773/m1/1/zoom/?q=%22lake%20robertson%22>.

³² “Bridge Completed.” *The Schulenburg Sticker* (Schulenburg, Tex.), Vol. 29, No. 12, Ed. 1 Friday, December 1, 1922.” Accessed April 3, 2014.

<http://texashistory.unt.edu/ark:/67531/metapth189784/m1/4/zoom/?q=%22east%20navidad%20bridge%22>.

³³ Texas Department of Transportation. “Historic Road Infrastructure of Texas.” Draft Multiple Property Documentation Form, 2013 (on file at Texas Historical Commission), p.133.

³⁴ Ibid.

³⁵ Adapted from “American Engineering Record (HAER TX-78), National Park Service, U.S. Department of the Interior. <http://www.loc.gov/pictures/item/tx0947/>, accessed April 10, 2014.

³⁶ “George Wickline,” Application for Registration to Practice Professional Engineering, 8 December 1937. Texas State Board of Registration for Professional Engineers, Austin, Texas.

³⁷ Ibid.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Armour Townsend Granger (1898-1965), Bridge Designer and Engineer

The HAER report noted that little was known of bridge designer A.T. Granger aside from his brief employment at the Texas Highway Department in 1921, but subsequent research has revealed that Armour T. Granger enjoyed a long career as a bridge engineer and educator, and that this bridge is most likely his first built design.

Granger, the son of John and Jane Rebecca (Baker) Granger, was born in Austin on March 21, 1898. He entered the University of Texas in 1916, earned a Bachelor of Science degree in civil engineering in 1918 and completed his graduate work in 1921.³⁸ In 1919-20, Granger lived in Kansas City, working as a structural designer for the engineering firm Harrington, Howard & Ash, which specialized in the design of bridges, most notably moveable bridges.³⁹ In June 1920, he married Willoughby Crawford in Austin.⁴⁰ Granger returned to the University of Texas (UT) in 1920 as an instructor in civil engineering, reaching the rank of associate professor by 1928.⁴¹ He worked at the Texas Highway Department (where his father John was "chief clerk") as a "draftsman" for a short period, designing the East Navidad River Bridge between July 21 and September 2, 1921, before resigning on September 15, 1921.⁴² While at UT, Granger supervised the 1924-26 construction of the university's Memorial Stadium, and designed the north end of the facility. Between 1928 and 1934, Granger worked as an engineer for Ash-Howard-Needles & Tammen in Kansas City, moving to the firm's New York office c.1935, where he assisted with the design or supervision of the design of the Harlem River Bridge and the Tri-Borough Bridge in New York, and several bridges over the Missouri, Ohio, and Delaware rivers.⁴³ In 1939, Granger was hired by the University of Tennessee at Knoxville as an associate professor of civil engineering, becoming a professor and head of the Department of Civil Engineering in 1940. Granger became dean of the College of Engineering in 1956, serving until September 1965, when he decided to return to full-time teaching. He died in 1966.

Granger maintained a consulting practice beginning in 1940, and, with Rentenbach Engineering, designed the 1948 horseshoe-shaped south expansion to the University of Tennessee football stadium, which increased its seating capacity to 46,390 and added 166 dormitory rooms.⁴⁴ He was the author of the section on "Steel Bridges" in the handbook of *American Civil Engineering Practice*, Vol. III, and co-author (with Edgar G. Shelton) of "The City Building Code" in 1951. Granger was a member of various national engineering associations, and served on the Tennessee State Board of Architectural and Engineering Examiners. Granger was elected an Associate Member of the *American Society of Civil Engineers* (ASCE) in 1925, and became a fellow in 1959. He became a Life Member in 1960.⁴⁵

³⁸ "Granger, Armour Townsend; ASCE Life Member (1898-1966)." Accessed April 3, 2014.

<http://cedb.asce.org/cgi/WWWdisplay.cgi?15251>.

³⁹ Kansas City Directory, 1919; United States Census, 1920; The firm became known as Howard, Needles, Tammen and Bergendoff in 1941 (<https://digital.lib.washington.edu/architect/partners/2570/>, accessed April 3, 2014).

⁴⁰ Mr. and Mrs. Granger had two daughters, Amy Jane (Mrs. William A. Haldeman) and Charlotte Emily (Mrs. William B. Hinman). "Granger, Armour Townsend; ASCE Life Member (1898-1966)." Accessed April 3, 2014.
<http://cedb.asce.org/cgi/WWWdisplay.cgi?15251>.

⁴¹ The 1933 University of Texas Yearbook – "The Cactus" – notes that Granger "an alumnus of the University had much to do with the building of the entire structure" of Memorial Stadium 1924.

⁴² THD employment records, on file at TxDOT, Austin, Texas; "Granger, Armour Townsend," *The National Cyclopaedia of American Biography*; Vol. 53. Rev. Clifton, N. J: James T. White, 1971.

⁴³ Ibid.; "Granger, Armour Townsend; ASCE Life Member (1898-1966)." Accessed April 3, 2014.

<http://cedb.asce.org/cgi/WWWdisplay.cgi?15251>

⁴⁴ "Neyland Stadium Is Not Used Just For Football - 11/26/2013 - Chattanooga.com." Accessed April 2, 2014.

<http://www.chattanooga.com/2013/11/26/264403/Neyland-Stadium-Is-Not-Used-Just-For.aspx>

⁴⁵ "Granger, Armour Townsend; ASCE Life Member (1898-1966)." Accessed April 3, 2014.

<http://cedb.asce.org/cgi/WWWdisplay.cgi?15251>.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Lake Robertson, Resident Engineer and Contractor

Born in Brownwood, Texas, Lake Robertson was well-established as a bridge designer and builder when he moved to Fayette County. He built bridges on the Old Spanish Trail spanning Foster's Creek, the East and West Navidad River, and worked as a subcontractor on the bridge spanning the Colorado River at La Grange, Texas. Upon completion of the East Navidad River Bridge, Robertson and his family moved to San Antonio, then to the Kerrville area where they purchased the "Heart of the Hills" resort. Robertson lived there until his death in February 1936, at the age of forty-four.⁴⁶

East Navidad River Bridge Today

As the primary road between Schulenburg and Weimar, Texas, the highway segment served by the East Navidad River Bridge was known as the Old Spanish Trail, State Highway 3, and U.S Route 90 until it was bypassed by a new highway in the mid-1930s. In 1935, a new U.S. 90 bridge was constructed across the East Navidad River approximately a half mile to the north of the old bridge. The new alignment provided a 24-foot-wide roadway, and eliminated two 90-degree turns and an at-grade railroad crossing. This bypass relegated the old highway to a minor road (now designated as FM 1579), and helped ensure the preservation of the well-engineered and well-built bridge that still carries traffic. The seven-mile-long bypassed road segment itself (from the intersection with US 90 east of Schulenburg to the heart of Weimar, Texas) appears to retain a good degree of integrity and may also be eligible for listing in the National Register as an excellent example of an early improved highway along a transcontinental automobile route in rural Texas.

The 1922 East Navidad River Bridge is isolated from the subsequent road alignment that replaced it and is nominated under Criterion C in the area of Engineering at the state level of significance as an intact and rare example of a concrete cantilever bridge in Texas. Designed to carry traffic between the growing and militarily-strategic population centers of San Antonio and Houston, the state-of-the-art bridge served as an example to other Texas counties at its completion, and is nominated to the National Register under Criterion A in the area of Transportation, as it exemplifies the cooperation of local, state and federal highway governments in addressing the need for improved roads in the early 20th century.

⁴⁶ *The Schulenberg Sticker*, February 14, 1936.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

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East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Geographical Data

Latitude: 29.682677°
Longitude: -96.863129°

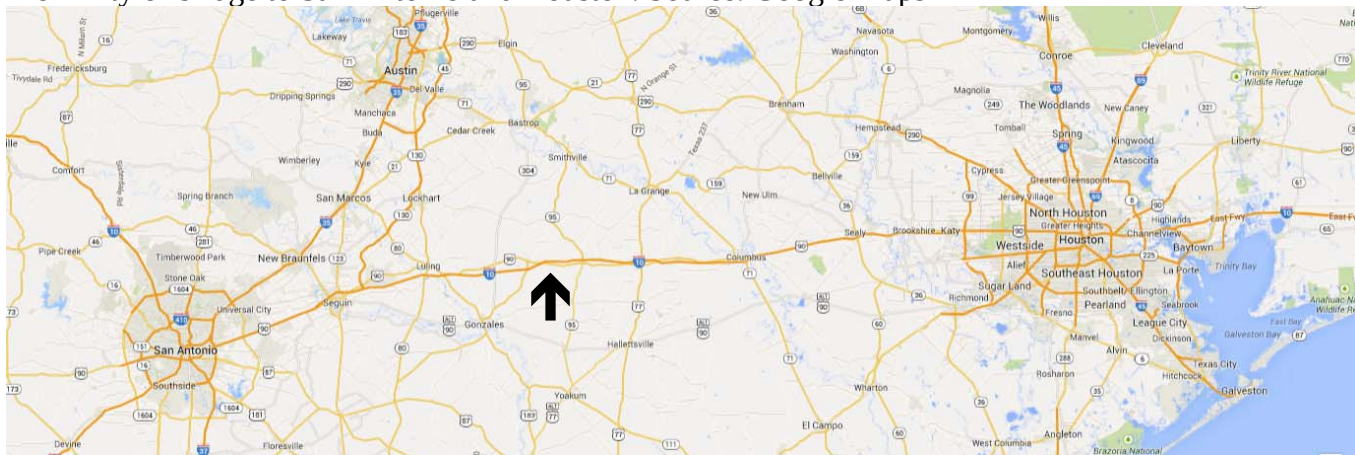
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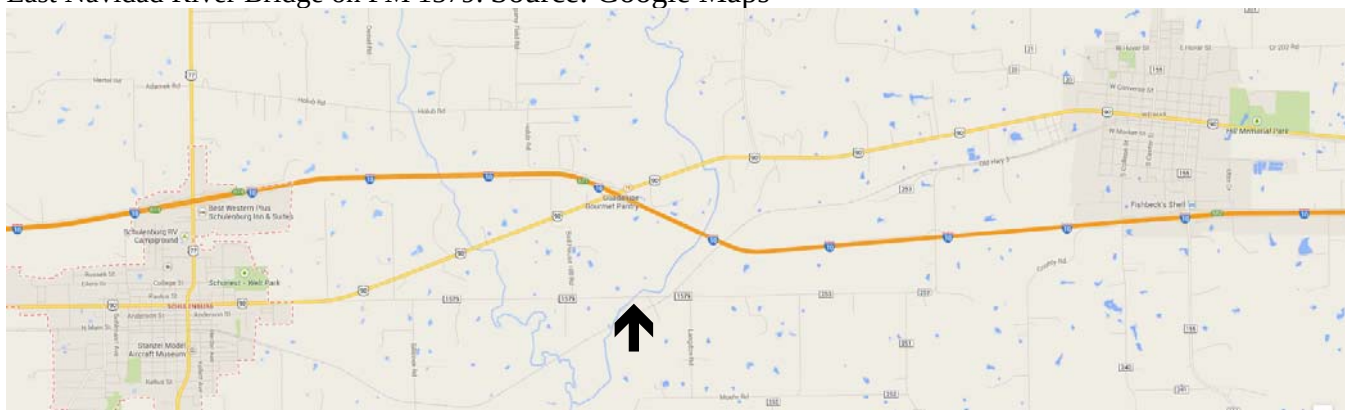
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East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

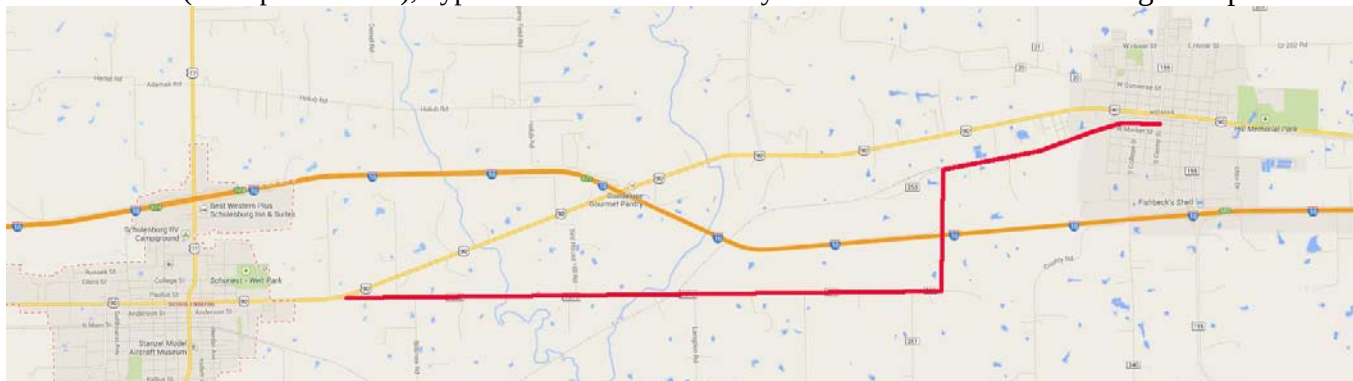
Proximity of bridge to San Antonio and Houston. Source: Google Maps



East Navidad River Bridge on FM 1579. Source: Google Maps



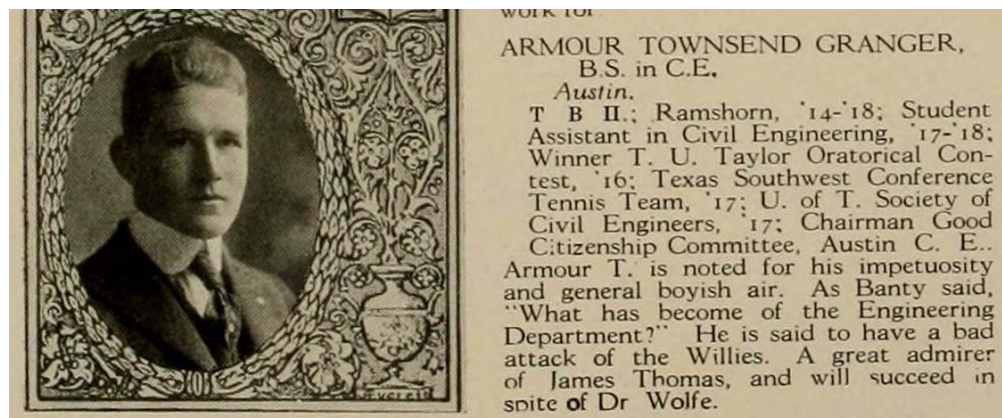
Route of SH 3 (Old Spanish Trail), bypassed in the mid-1930s by current U.S. 90. Source: Google Maps



East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Armour T. Granger in the 1918 University of Texas yearbook (*The Cactus*).

Source: Ancestry.com



Armour T. Granger (no date)

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East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

HAER Photograph by Bruce A. Harms (2001)
East Approach, looking west



East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

HAER Photograph by Bruce A. Harms (2001)
South side, looking northwest



East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

HAER Photograph by Bruce A. Harms (2001)
Skewed substructure, looking west



East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

HAER Photograph by Bruce A. Harms (2001)
East abutment, looking east



East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

HAER Photograph by Bruce A. Harms (2001)
Drops at bents 2 and 5, looking north



East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

HAER Photograph by Bruce A. Harms (2001)
Builder's plate, looking north

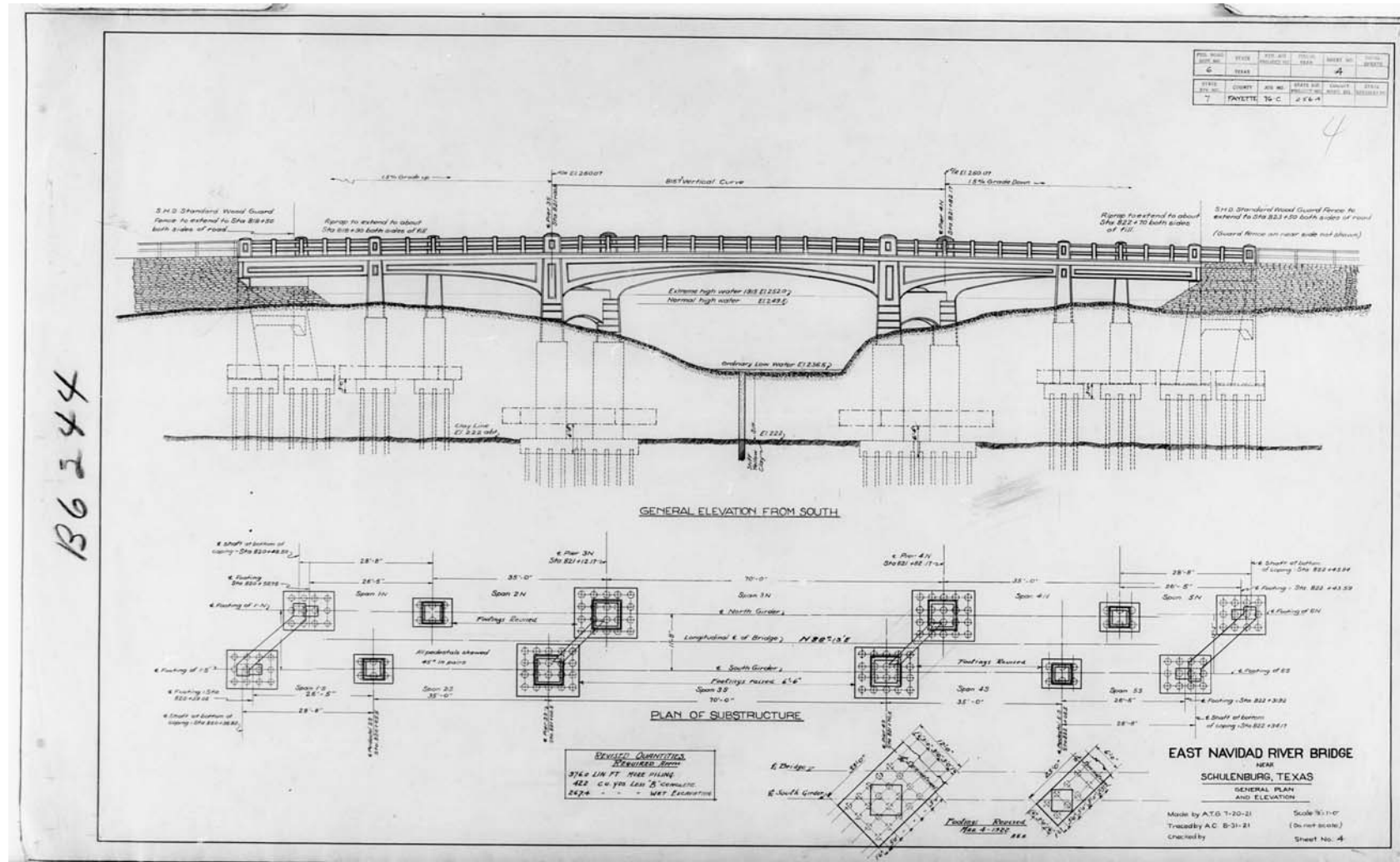


HAER No. TX-79-6

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Fayette 0026-03-002 1923_Page_3

Source: TXDoT



Figures, Page 28

Source: TXDoT



Source: TXDoT



East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

Photographs

East Navidad River Bridge
Schulenburg vicinity, Fayette County, Texas
Photographed by Gregory Smith
November 2012

1. West approach, looking east



2. East approach, looking west



BUILT 1922
BY
THE STATE OF TEXAS
AND
FAYETTE COUNTY

ADAM TUDOR, STATE BR. ENGR.
GEORGE W. STATE BR. ENGR.
DESIGNED BY A. G. RANGER,
COMMISSIONER OF FAYETTE CO.
WILLIAMSON, CO. JUDGE
TODD, JR., COMMR. PRCT. 1
CROSTON, COMMR. PRCT. 2
L. B. SUTTON, COMMR. PRCT. 3
CAPT. A. SCHAFER, CO. ENGR.

LEAHBY JR. RES. ENGR.
LAKE ROBERTSON CONTR.

A photograph showing the underside of a concrete bridge structure. The concrete is heavily discolored with large patches of green and brown mold and mildew growth. The structure features a series of arches supported by vertical pillars. Sunlight filters through the surrounding green foliage, creating dappled light on the concrete and the ground below.

East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

5. Substructure, looking east



East Navidad River Bridge, Schulenburg vicinity, Fayette County, Texas

6. North profile from river bed, looking south



7. Primary span from river bed, looking southwest







BUILT 1922
BY
THE STATE OF TEXAS
AND
FAYETTE COUNTY

J.D. FAUNTLEROY STATE HW. ENGR.
G.G. WICKLINE, STATE BR. ENGR.
DESIGNED BY A.T. GRANGER
COMMISSIONERS COURT OF FAYETTE CO.
J.H. R. ENLINGER, CO. JUDGE
WIL. JANSSEN, COMMR. PRCT. 1
GEO. ILSE, COMMR. PRCT. 2
C.D. OSTERLOH, COMMR. PRCT. 3
J.H. BARTOS, COMMR. PRCT. 4
CAPT. A. SCHLAFLI, CO. ENGR.
J.R. KEARBY JR. RES. ENGR.
LAKE ROBERTSON CONTR.







