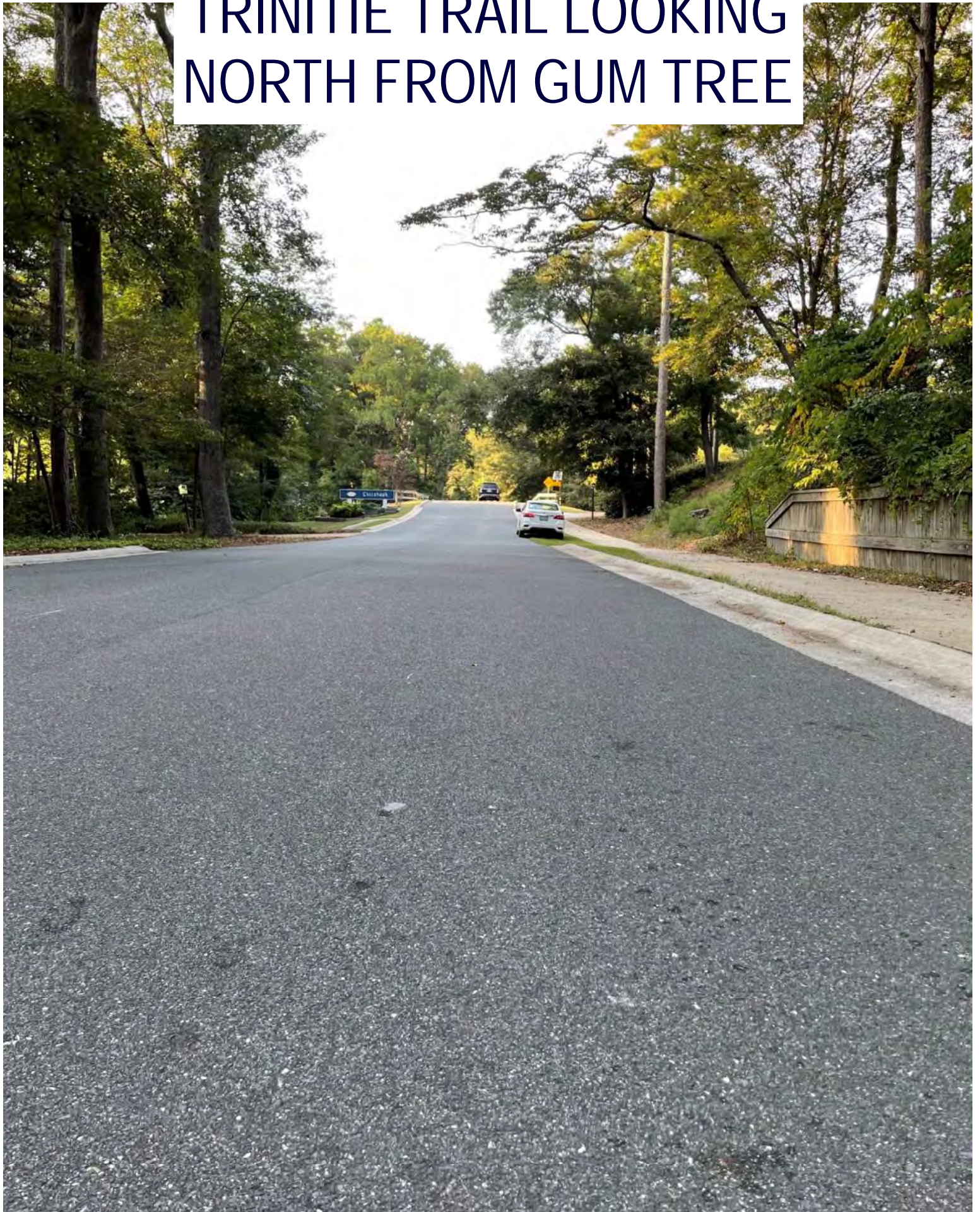


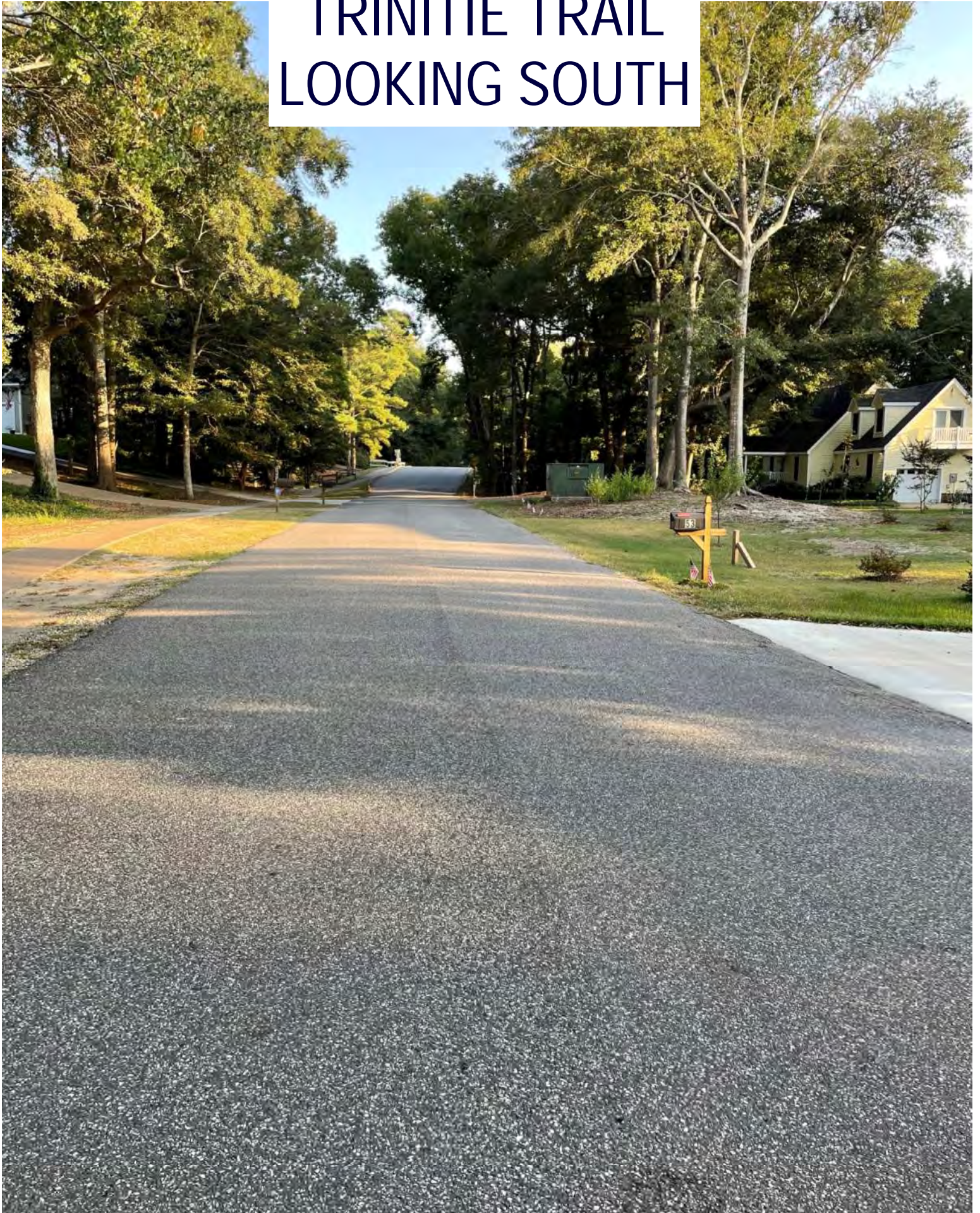
TRINITIE TRAIL PIPE ARCH REPLACEMENT



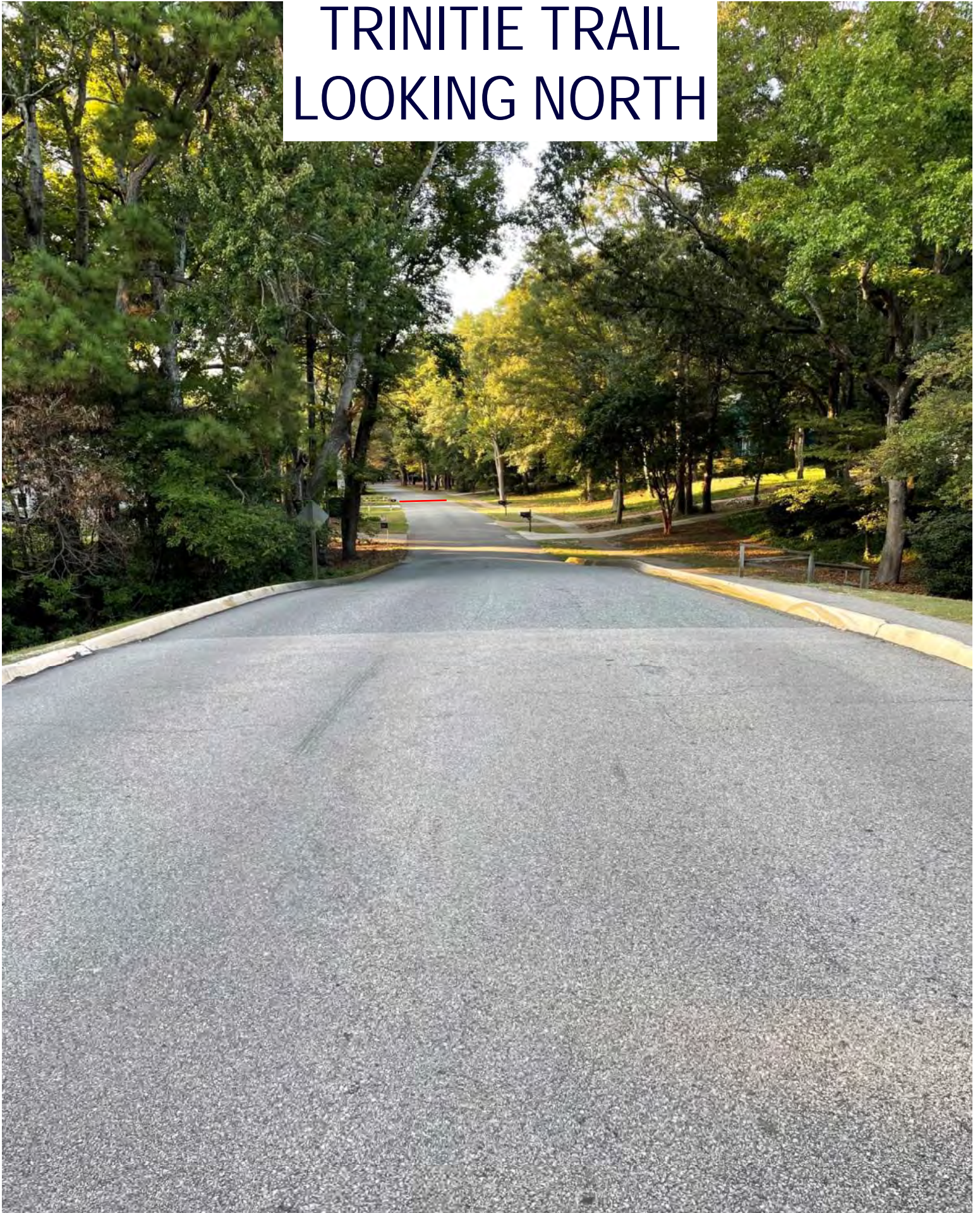
TRINITE TRAIL LOOKING NORTH FROM GUM TREE



TRINITIE TRAIL LOOKING SOUTH



TRINITIE TRAIL LOOKING NORTH



TRINITIE TRAIL LOOKING SOUTH





ALONG EXISTING PIPE ARCH LOOKING WEST



**ALONG EXISTING PIPE
ARCH LOOKING EAST**

-L-

PI Sta 12+38.89	PI Sta 15+36.52	PI Sta 17+65.63
$\Delta = 33^{\circ}14'01.1''$ (RT)	$\Delta = 0^{\circ}34'27.2''$ (RT)	$\Delta = 6^{\circ}37'55.9''$ (LT)
$D = 19^{\circ}05'54.9''$	$D = 2^{\circ}01'28.5''$	$D = 3^{\circ}34'51.6''$
$L = 174.01'$	$L = 28.36'$	$L = 185.21'$
$T = 89.53'$	$T = 14.18'$	$T = 92.71'$
$R = 300.00'$	$R = 2,830.00'$	$R = 1,600.00'$

BEGIN PROJECT
BEGIN CONSTRUCTION
-L- PT Sta. 13+23.37

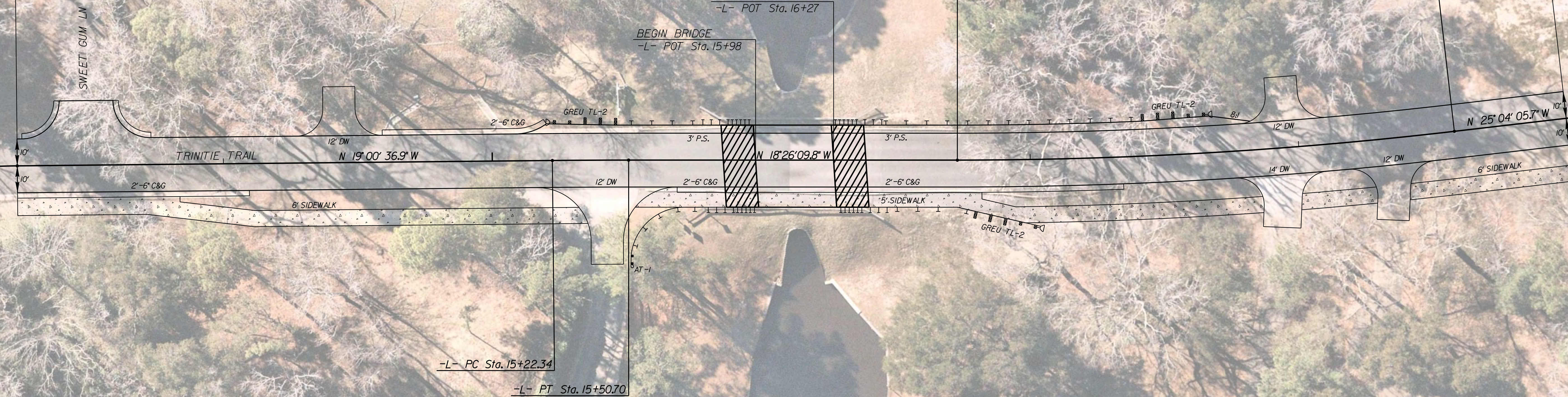
-L- PC Sta. 16+72.92

-L- PT Sta. 18+58.13

END PROJECT
END CONSTRUCTION
-L- POT Sta. 19+00.00

END BRIDGE
-L- POT Sta. 16+27

BEGIN BRIDGE
-L- POT Sta. 15+98



-L- PC Sta. 15+22.34

-L- PT Sta. 15+50.70

PLANS PREPARED BY:



424 FAYETTEVILLE STREET, SUITE 600
WALTON, NORTH CAROLINA 27157
PHONE: 919.817.2000
FAX: 919.817.2002
NC LICENSE #14-002
© 2022

INCOMPLETE PLANS
DO NOT USE FOR ACCURATE
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SEAL

INCOMPLETE PLANS
DO NOT USE FOR ACCURATE
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SEAL

NO.	DATE	REVISIONS

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.



PLANS PREPARED FOR:
TOWN OF SOUTHERN SHORES

PROJECT: TRINITIE TRAIL
CULVERT REPLACEMENT
FEASIBILITY STUDY
TITLE: ALTERNATIVES 1 & 2 - BRIDGE

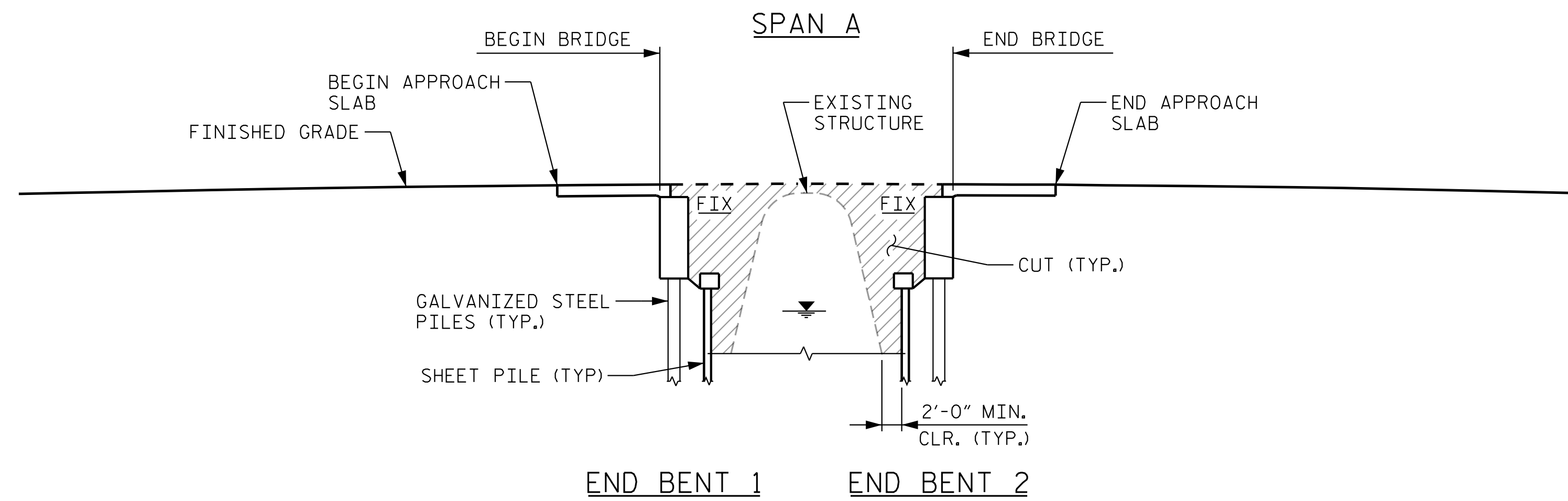
KHA PROJECT: 011541001
DATE: 09-15-2022

FEASIBILITY

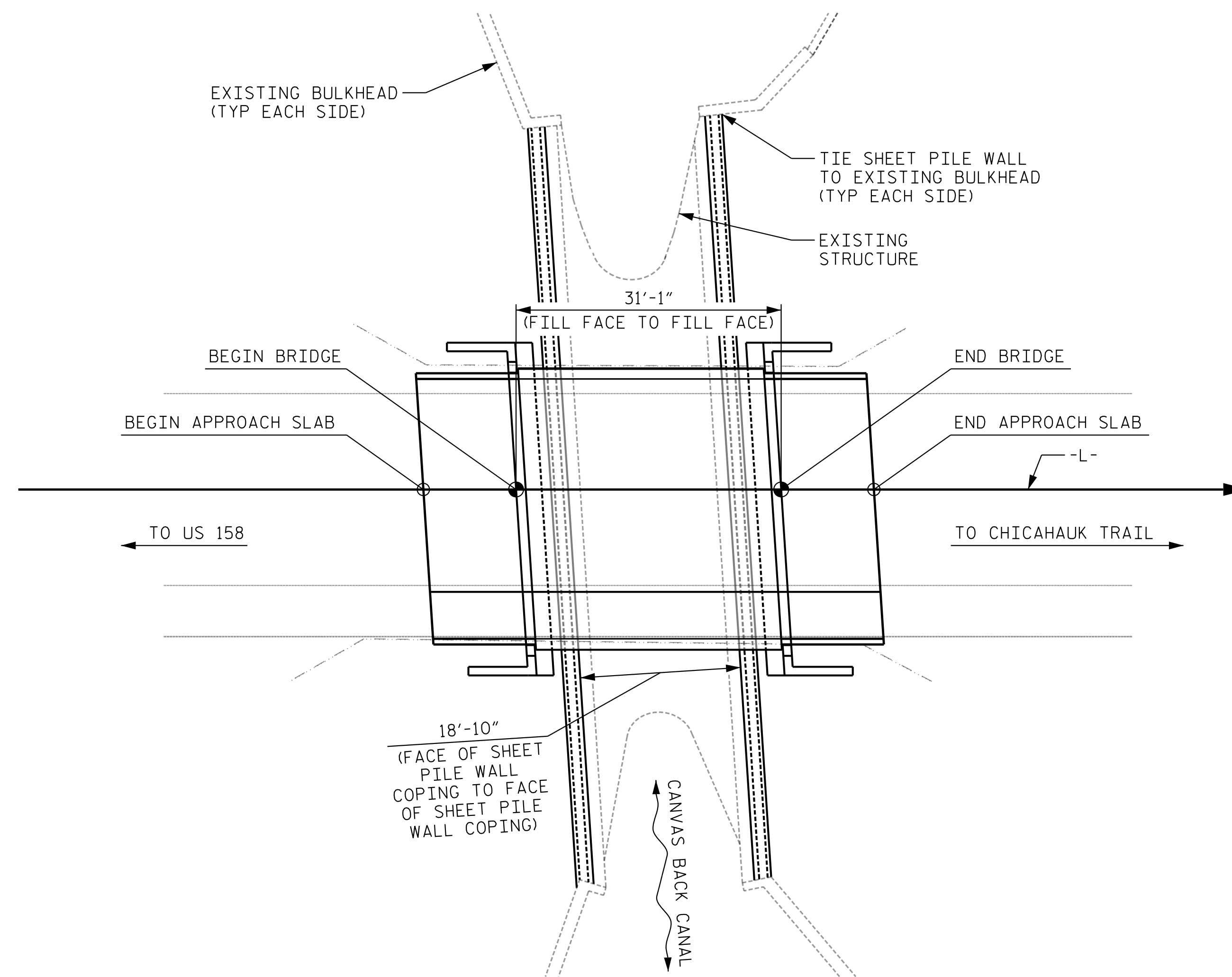
RDWY-1

K:\RAL_Roadway\011541001 - Trinitie Trail Bridge\Roadway\Pro\011541001_rdy_psb_atl&2.dgn

9/15/2022



SECTION ALONG -L-
SECTIONS AT END BENTS ARE AT RIGHT ANGLES.



PLAN
PILES NOT SHOWN IN PLAN VIEW FOR CLARITY.

K:\PDT_Structures\Bridge\WC\0154001 - Toss-Trinitie Trail\BR\Coa\Dgn\Struc_0154001_OPT2_S01.dgn

9/15/2022

REV. No.	REVISION	DATE	DRAWN BY	CHECKED BY

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc. Copyright Kimley-Horn and Associates, Inc., 2022

PREPARED IN THE OFFICE OF:

Kimley»Horn

P.O. BOX 33068 - RALEIGH, NORTH CAROLINA 27636-3068
PHONE: (919) 677-2000 FAX: (919) 677-2050 PE NO. F-0102

ALTERNATIVES #1 & #2
FLAT SLAB & CORED SLAB
PLAN & ELEVATION

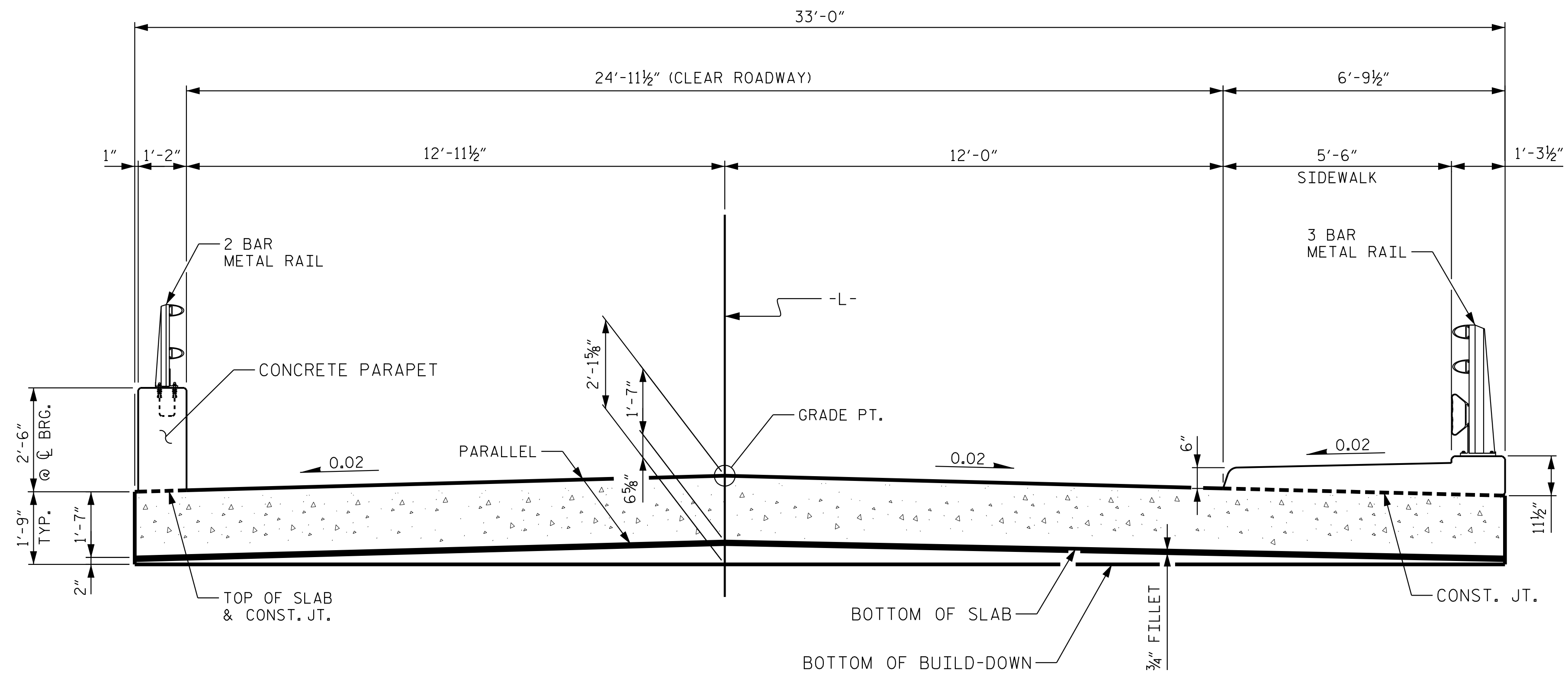
NOT TO SCALE

PROJECT:
TOWN OF SOUTHERN SHORES, NC
TRINITIE TRAIL BRIDGE REPLACEMENT

JOB NUMBER: 011541001

SHEET NUMBER: S-1

K:\RDT_Structures\Bridge\WC\01541001 - Toss-Trinitie Trail BR\Coa\Dgn\Struc_01541001_OPT_1_S02.dgn



FLAT SLAB - TYPICAL SECTION

9/15/2022

REV. No.	REVISION	DATE	DRAWN BY	CHECKED BY

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc. Copyright Kimley-Horn and Associates, Inc., 2022

PREPARED IN THE OFFICE OF:

Kimley»Horn

P.O. BOX 33068 - RALEIGH, NORTH CAROLINA 27636-3068
 PHONE: (919) 677-2000 FAX: (919) 677-2050 PE NO. F-0102

ALTERNATIVE #1
 FLAT SLAB BRIDGE
 TYPICAL SECTION

NOT TO SCALE

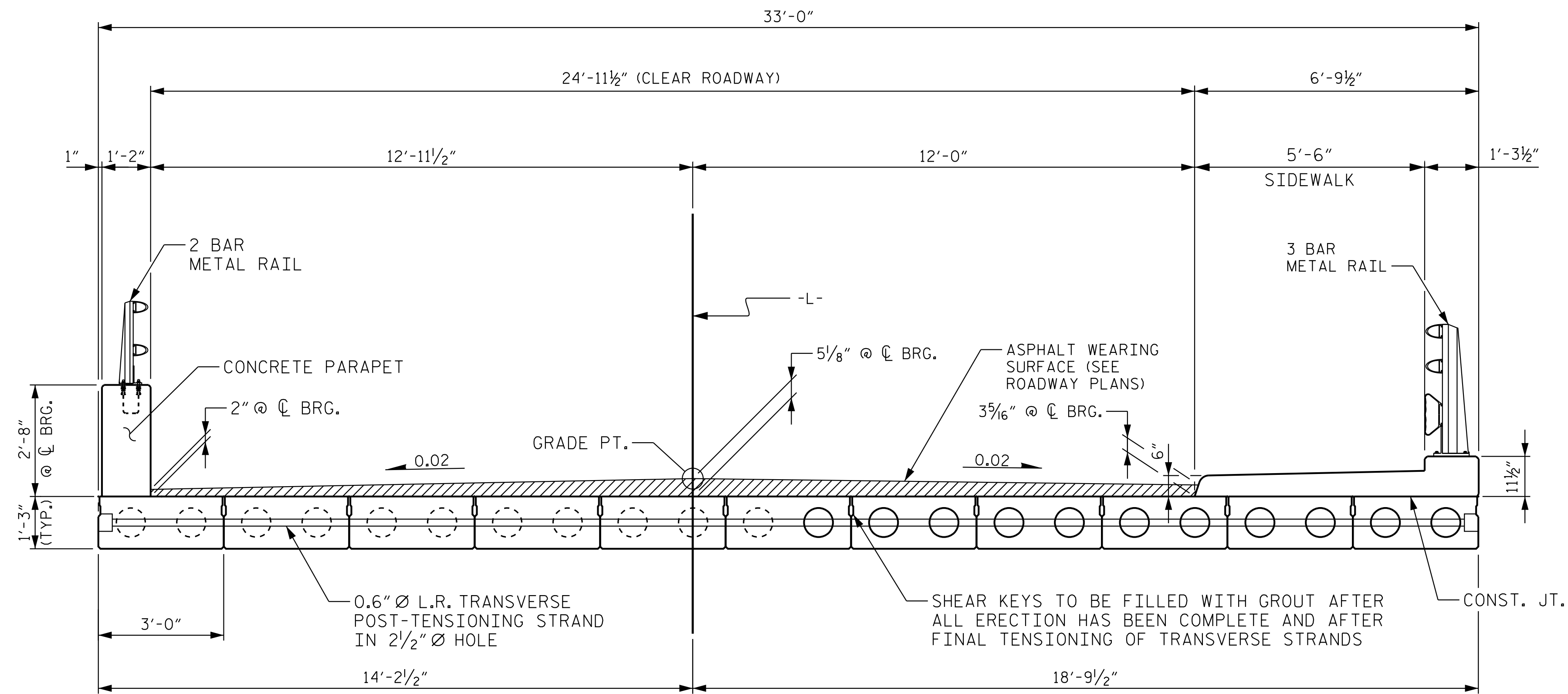
PROJECT:

TOWN OF SOUTHERN SHORES, NC
 TRINITIE TRAIL BRIDGE REPLACEMENT

JOB NUMBER: 011541001

SHEET NUMBER: S-2

K:\RDT_Structures\Bridge\WC\01541001 - Toss-Trinitie Trail BR\Coa\Dgn\Struc_01541001_OPT2_S03.dgn



CORED SLAB - TYPICAL SECTION

REV. No.	REVISION	DATE	DRAWN BY	CHECKED BY

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc. Copyright Kimley-Horn and Associates, Inc., 2022

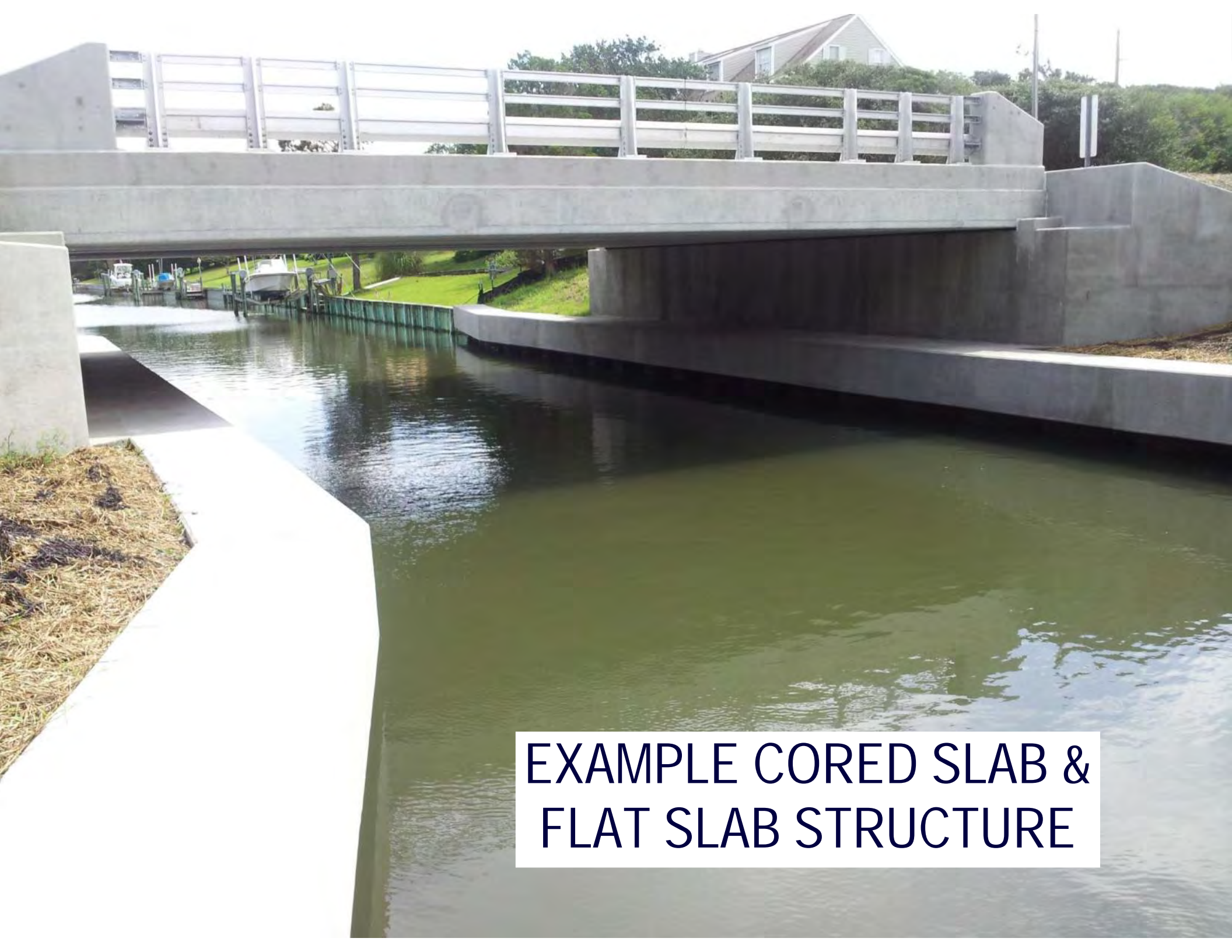
PREPARED IN THE OFFICE OF:
Kimley»Horn

P.O. BOX 33068 - RALEIGH, NORTH CAROLINA 27636-3068
 PHONE: (919) 677-2000 FAX: (919) 677-2050 PE NO. F-0102

ALTERNATIVE #2
 CORED SLAB BRIDGE
 TYPICAL SECTION

NOT TO SCALE

PROJECT: TOWN OF SOUTHERN SHORES, NC TRINITIE TRAIL BRIDGE REPLACEMENT	
JOB NUMBER: 011541001	SHEET NUMBER: S-3



**EXAMPLE CORED SLAB &
FLAT SLAB STRUCTURE**

Alternative #1: Flat Slab Bridge

The flat slab bridge alternative will require permanent sheet pile wall with reinforced concrete coping on top to be driven directly outside the limits of the existing structure. These walls will extend the full length of the existing structure and tie to existing bulkheads both to the east and west of Trinitie Trail. Cast-in-place concrete end bent caps and turned back wingwalls will be used to support the surrounding soil at the begin and end bridge. Due to the nature of this type of construction, it is anticipated that the canal will be closed for a longer duration since the above water work will be more substantial than any of the other alternatives.

The bridge length for this option is set based on the assumed limits of the existing structure. We assumed a 2' offset from the limits of the existing pipe arch to the proposed sheet pile bulkhead; from there the bridge is founded on a 6.5' tall end bent caps to reduce the overall structure length. By minimizing the length of bridge, we are able to limit the overall roadway impacts by reducing the amount of overall roadway length needing grading. The bridge height, and likewise the vertical canal opening was set to maintain the existing vertical clearance at the existing pipe arch. Based on previous experience within navigable waterways with the Coast Guard and without having any existing boating data for the crossing, we do not believe that lowering the opening is a viable option at this time.

Alternative #2: Cored Slab Bridge

The cored slab bridge alternative will also require permanent sheet pile wall with reinforced concrete coping on top to be driven directly outside the limits of the existing structure. Similarly, these walls will extend the full length of the existing structure and tie to existing bulkheads both to the east and west of Trinitie Trail. Cast-in-place end bent caps and earth retaining wingwalls will be formed, poured, and stripped at begin and end bridge. It is anticipated that the end bent caps will need to be supported on deep foundations based on past performance of the existing structure. Construction of the precast cored slab superstructure will require crane operation and rigging coordination to pick and set each of the precast units. Note, it is anticipated that a shorter term shut down of the canal will be necessary to construct the cored slab bridge than would be necessary for the other alternatives.

The bridge length for this option is set based on the assumed limits of the existing structure. We assumed a 2' offset from the limits of the existing pipe arch to the proposed sheet pile bulkhead; from there the bridge is founded on a 6.5' tall end bent caps to reduce the overall structure length. By minimizing the length of bridge, we are able to limit the overall roadway impacts by reducing the amount of overall roadway length needing grading. The bridge height, and likewise the vertical canal opening was set to maintain the existing vertical clearance at the existing pipe arch. Based on previous experience within navigable waterways with the Coast Guard and without having any existing boating data for the crossing, we do not believe that lowering the opening is a viable option at this time.

K:\RAL_Roadway\01541001 - Trinitie Trail Bridge\Roadway\Pro\01541001_rdy_psb_at3.dgn

9/15/2022

-L-		
PI Sta 12+38.89	PI Sta 15+36.52	PI Sta 17+65.63
$\Delta = 33^{\circ}14'01.1''$ (RT)	$\Delta = 0^{\circ}34'27.2''$ (RT)	$\Delta = 6^{\circ}37'55.9''$ (LT)
D = 19'05'54.9"	D = 2'01'28.5"	D = 3'34'51.6"
L = 174.01'	L = 28.36'	L = 185.21'
T = 89.53'	T = 14.18'	T = 92.71'
R = 300.00'	R = 2,830.00'	R = 1,600.00'

BEGIN PROJECT
BEGIN CONSTRUCTION
-L- PT Sta. 13+23.37

SWEET GUM LN

12" DW

6" SIDEWALK

TRINITIE TRAIL

N 19°00'36.9" W

12" DW

2'-6" C&G

6" SIDEWALK

-L- PC Sta. 15+22.34

-L- PT Sta. 15+50.70

BEGIN CULVERT
-L- POT Sta. 15+97

END CULVERT
-L- POT Sta. 16+27

-L- PC Sta. 16+72.92

GREU TL-2

GREU TL-2

N 18°26'09.8" W

12" DW

2'-6" C&G

2'-6" C&G

5" SIDEWALK

GREU TL-2

12" DW

14" DW

12" DW

6" SIDEWALK

END PROJECT
END CONSTRUCTION
-L- POT Sta. 19+15.00

-L- PT Sta. 18+58.13

N 25°04'05.7" W

PLANS PREPARED BY:

Kimley»Horn
424 FAYETTEVILLE STREET, SUITE 600
WALTONVILLE, ALABAMA 36887
PHONE: 334.867.2000
FAX: 334.867.2002
N.C. LICENSE #4-0022
© 2022

INCOMPLETE PLANS
DO NOT USE FOR ACCURATE
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SEAL

INCOMPLETE PLANS
DO NOT USE FOR ACCURATE
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SEAL

NO.	DATE	REVISIONS

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND AS AN INSTRUMENT OF SERVICE. IT IS NOT TO BE USED FOR ANY OTHER PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.

PLANS PREPARED FOR:



PROJECT:

TRINITIE TRAIL
CULVERT REPLACEMENT
FEASIBILITY STUDY

KHA PROJECT:

011541001

DATE:

09-15-2022

TITLE:

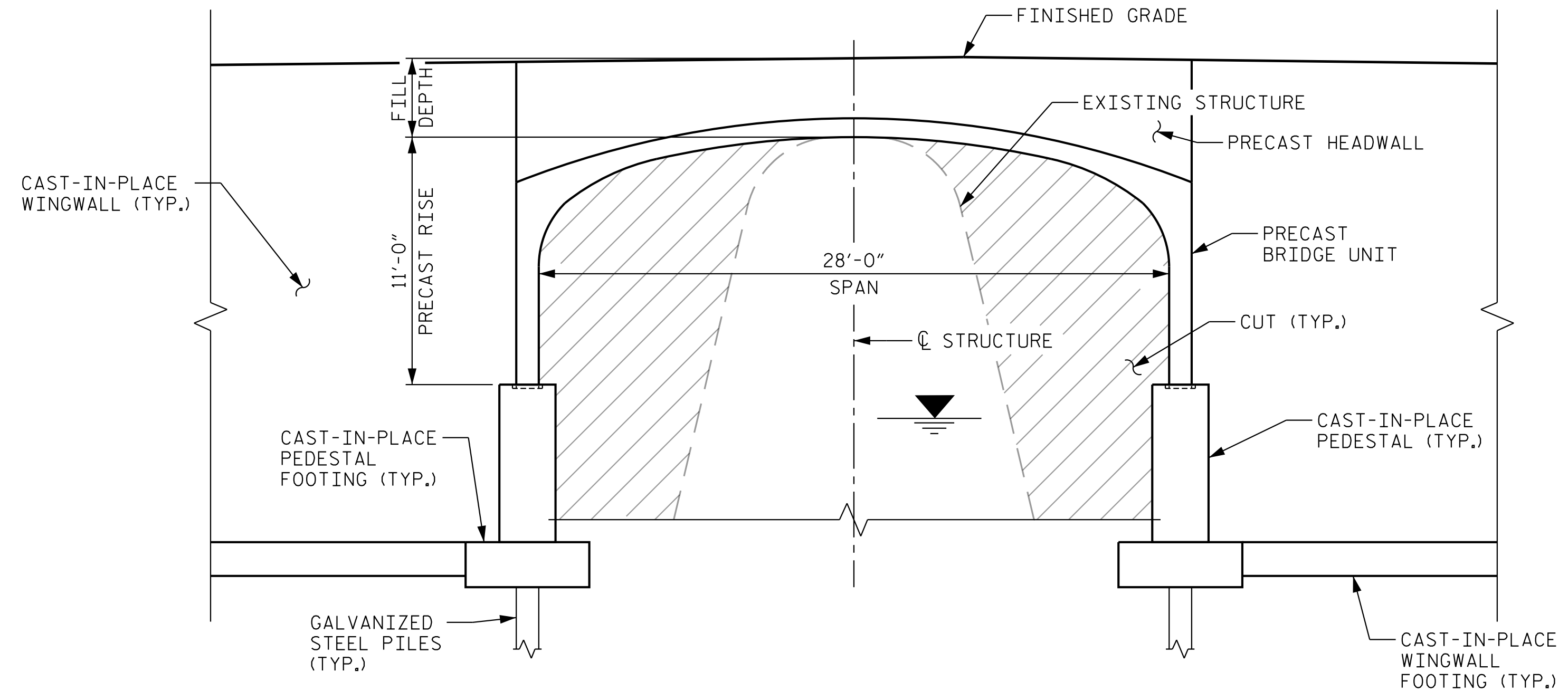
ALTERNATIVE 3 - CULVERT

FEASIBILITY

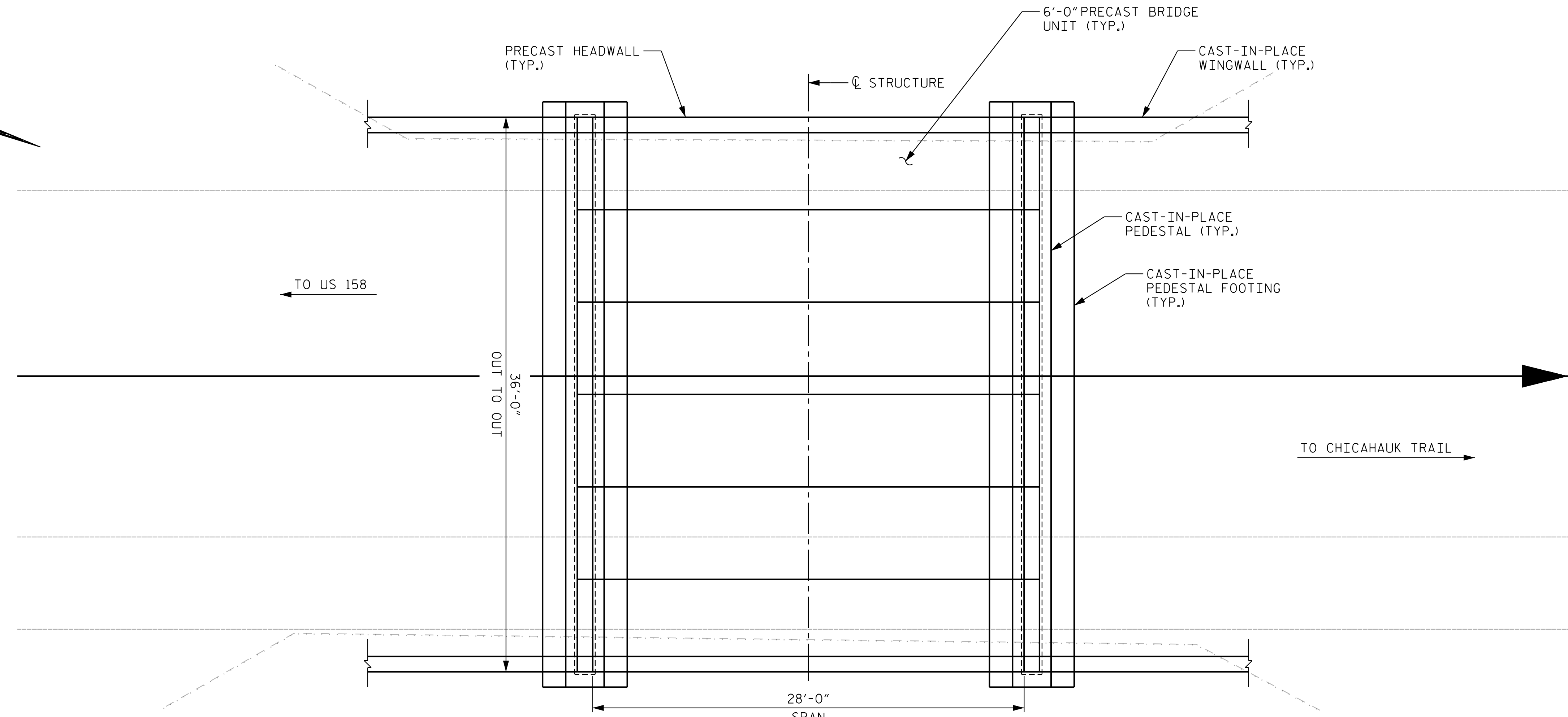
RDWY-2

K:\PDT_Structures\Bridge\WC\01541001 - Toss-Trinitie Trail BR\Coa\Dgn\Struc_01541001_OPT3_S04.dgn

9/15/2022



ELEVATION
GUARDRAIL NOT SHOWN FOR CLARITY.



PLAN

PROPOSED PILES AND EXISTING STRUCTURE & BULKHEAD NOT SHOWN FOR CLARITY.

REV. No.	REVISION	DATE	DRAWN BY	CHECKED BY

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc. Copyright Kimley-Horn and Associates, Inc., 2022.

PREPARED IN THE OFFICE OF:

Kimley»Horn

P.O. BOX 33068 - RALEIGH, NORTH CAROLINA 27636-3068
 PHONE: (919) 677-2000 FAX: (919) 677-2050 PE NO. F-0102

ALTERNATIVE #3
PRECAST ARCH
PLAN & ELEVATION

NOT TO SCALE

PROJECT:	
TOWN OF SOUTHERN SHORES, NC TRINITIE TRAIL BRIDGE REPLACEMENT	
JOB NUMBER:	SHEET NUMBER:
011541001	S-4

Alternative #3: Precast Arch

The precast arch alternative will also require permanent sheet pile wall to be driven directly outside the limits of the existing structure. These walls will extend from the precast arch to the existing bulkheads both to the east and west of Trinitie Trail. Cast-in-place pedestal footings, pedestals, and earth retaining wingwalls and headwalls will be formed, poured, and stripped at begin and end bridge. It is anticipated that the pedestal and wingwall footings will need to be supported on deep foundations based on past performance of the existing structure. Construction of the precast arch will require crane operation and rigging coordination to pick and set each of the precast units. Note, it is anticipated that a shorter term shut down of the canal will be necessary to construct the precast arch than would be necessary for the flat slab bridge alternative.

The precast arch span was set based on the assumed limits of the existing structure. We assumed a 2' offset from the limits of the existing pipe arch to the proposed temporary shoring needed to construct the cast-in-place concrete pedestal and footing. The precast arch height, and likewise the vertical canal opening was set to maintain the existing vertical clearance at the existing pipe arch. Based on previous experience within navigable waterways with the Coast Guard and without having any existing boating data for the crossing, we do not believe that lowering the opening is a viable option at this time. One of the major difference with this alternative is the cast-in-place concrete wingwalls that are used to retain the roadway fill above and behind the arch. These walls will be full depth (pedestal footing to roadway grade) and therefore will require additional shoring during construction.

EXAMPLE PRECAST ARCH STRUCTURE

