

SITE INSPECTION AND RECOMMENDATIONS REPORT

2016 INSPECTION OF

CUY-077-0479 [Wallings Road over CUY 77]

GROUP 1 BRIDGE IN

ODOT DISTRICT 12



Prepared by:

For:



INTRODUCTION

Bridge No. CUY-077-0479 (SFN 1805975) carries two lanes of Wallings Road traffic in each direction over IR-77 in Broadview Heights, Ohio. The bridge was built as a four span rolled beam bridge with spill through concrete abutments and wingwalls in 1969. It appears that the present wearing surface on the bridge roadway is a concrete overlay that is in good condition. However, there is no record of this in the plans or on the inventory. The spalled and deteriorated sidewalk and concrete railing appear to be original. They are in fair condition. The six feet high vandal protection fence was recently added to the railings and is in fair to good condition.

The bottom of the original concrete deck is spalled in multiple locations, revealing portions of the bottom mat of reinforcing steel. Additional bottom of deck areas may be delaminated and could potentially fall in the future.

The south column of pier 3 (east) has spalled adjacent to traffic, revealing portions of the reinforcing cage. The piers are otherwise still in good condition.

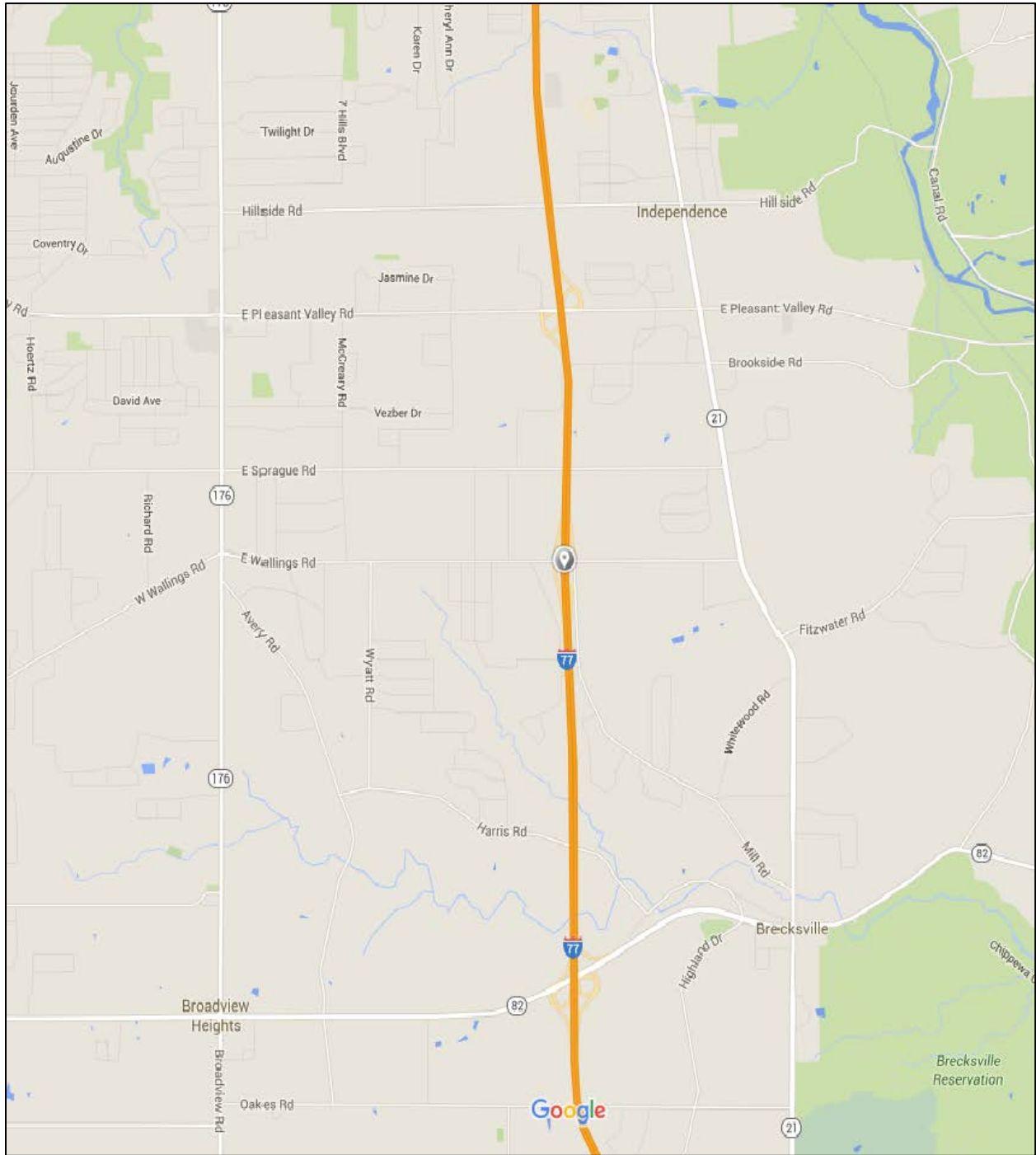
The Ohio Department of Transportation, District 12 (ODOT D12) requested that Richland Engineering Limited inspect, prepare recommendations and develop repair plans for the above referenced bridge.

INSPECTION PROCEDURE

An inspection with photos, measurements and field evaluation was performed for the various items listed in the scope of service. During the inspection deficient areas/items were identified and quantified for repairs. While some deficiencies have been identified during inspection, and are documented within this report, they were not included in the recommended repairs. The recommended repairs included herein are not intended to correct every deficiency, but rather extend the bridge's useful life. Variations with the original plans and subsequent repair plans over the years that could affect the repair details were also identified.

A location map and a copy of the bridge Site Plan (1969 plan) are included for reference. Select photos are included in the report showing the areas of deterioration and proposed repair.

Location Map



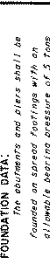
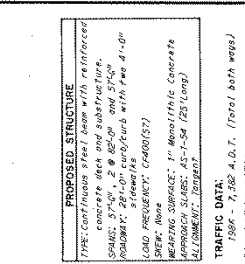
SITE INSPECTION AND RECOMMENDATIONS REPORT FOR CUY-077-0479 (Wallings Road over I-77)

CUYAHOGA COUNTY
 CUY-77-4-07

PROJECT
 DATE
 DRAWN BY
 CHECKED BY

PROPOSED STRUCTURE
 PRECAST/CAST-IN-PLACE CONCRETE WITH REINFORCED CONCRETE DECK AND SUBSTRUCTURE.
 APPROACH: 28'-0" CURB/RAIL WITH TWO 4'-0" STEELWIDE PIERS.
 ROAD FINISH: C440(157)
 WEARING SURFACE: 1" MONOLITHIC CONCRETE
 APPROACH SLABS: AS-1-54 (28' LONG)
 4" (CONCRETE) THICK

TRAFFIC DATA:
 1994 - 7,258 A.D.T. (Total both ways)
 FOUNDATION DATA:
 The abutments and piers shall be founded on spread footings with an allowable bearing pressure of 5 Tons per sq. ft.



PLAN
 SCALE: 1" = 20'-0"

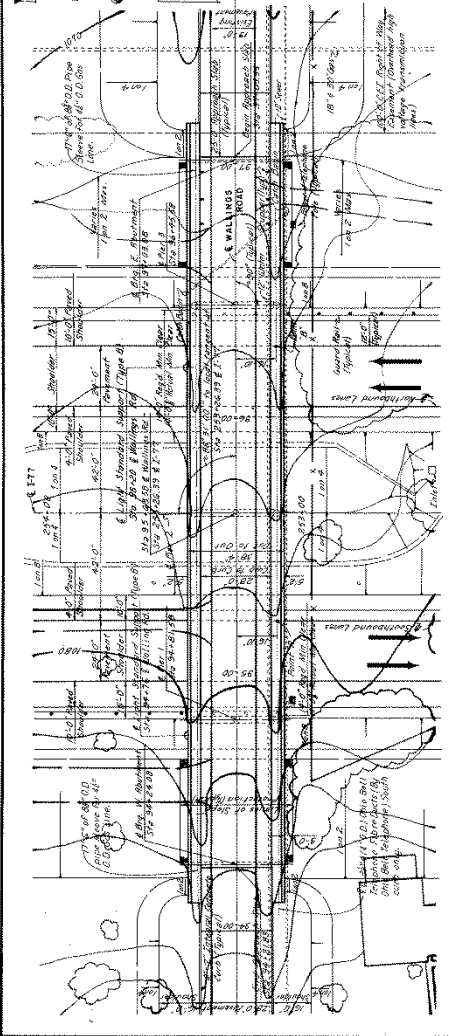
ESTIMATED QUANTITIES

ITEM	TOTAL	UNIT	DESCRIPTION
507	172	Cu. Yd.	Unclassified Excavation
508	165	Cu. Yd.	Spill Excavation
509	120,303	Pounds	Reinforcing Steel
510	380	Cu. Yd.	Class. Conc. Concrete, Superstructure
511	120	Cu. Yd.	Class. Conc. Concrete, Substructure
512	120	Cu. Yd.	Class. Conc. Concrete, Approach Slabs
513	104	Cu. Yd.	Class. Conc. Concrete, Footings
514	116,700	Pounds	Structural Steel
515	116,700	Pounds	Field Portion of Structural Steel
516	201.29	Linear Ft.	BRIDGE ROLLING IMP. 2
517	27	Linear Ft.	PIERS ROCKILL
518	28	Linear Ft.	CONCRETE CURB, EXCISEM. 202.002
519	59	Linear Ft.	PERFORATED METAL C.M.P. SECTION
520	6	BEA.	SUBGRA. IMBED. SUPPORTS
521	437	Sq. Ft.	CONCRETE CURB, EXCISEM. 202.002
522	589	Sq. Ft.	CONCRETE CURB, EXCISEM. 202.002
523	1589	Sq. Yd.	CONCRETE SURFACE TREATMENT
524	54	Linear Ft.	Joint Sealer (Cold Seal)

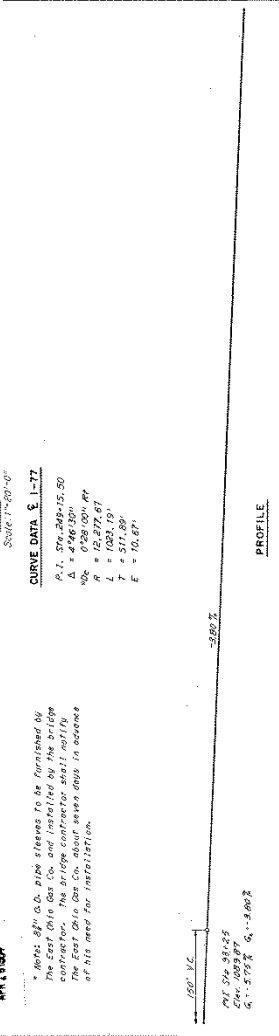
NOTE BR. NO. 13
 FORWARD DETAILS, DRAWING & REVISIONS
 CUYAHOGA COUNTY
 BR. NO. CUY-77-0480
 STA. 94+21.85
 STA. 97+05.35

SITE PLAN
 1-77 UNDER WALLINGS ROAD

CUYAHOGA COUNTY
 BR. NO. CUY-77-0480
 STA. 94+21.85
 STA. 97+05.35



CURVE DATA 1-77
 Δ = 24° 24' 55.20"
 Δ = 146° 18' 00"
 R = 0.28 (200' RP)
 R = 12,877.67'
 L = 1032.19'
 E = 10.87'



PROFILE
 SCALE: 1" = 20'-0"

Includes 427 pounds of structural steel to be sold for by East Ohio Gas Co.



Photo 1: Typical view under the bridge looking at pier 3. Note the south column deterioration.



Photo 2: Looking west over the northbound lanes at deck spalling/delaminations.



Photo 3: Looking west over the northbound lanes at deck spalling under the south fascia. The loose material should be removed, but it may be impractical to install a timber subdeck outside of the beams (north side fascia is in better condition does not appear to be a problem).



Photo 4: Looking east over the southbound lanes at deck spalling.



Photo 5: Pier 3 south column spalling and deterioration

Recommended Repairs

The following describes options to meet the repair items listed in the project scope for CUY-77-0479:

- 1. Remove delaminated concrete from the bottom of the deck.**

Single traffic lanes and shoulders can be closed one at a time while the bottom of deck is sounded and delaminated concrete is removed.

- 2. Install a timber subdeck between the beams over the I-77 northbound and southbound lanes and shoulders.**

The timber subdeck can be constructed and installed while the deck is sounded and traffic is controlled. Since the beams are the same spacing, there is no skew and the only obstacles are the parallel cross frames, prefabrication and quick installation should limit construction time.

3. Repair the south column of pier 3 behind the northbound barrier.

The spalled column area could be patched by using Supplemental Specification 843 Patching Concrete with Trowelable Mortar or 519 Patching Concrete Structures. However, there is only minimal concrete cover over the vertical column and horizontal hoop bars. Long term durability of this repair method would be questionable due to the lack of cover over the reinforcing steel. We recommend encasing the 36 inch column with 48 inch reinforced column concrete up to the pier cap. Embedded galvanic anodes could also be added in the repair area. Some shrinkage cracking typically occurs, but after epoxy-urethane sealing of the new concrete, no further repairs would be required.

Another option is to do surface patching of the piers and then applying an epoxy bonded fiber wrap system. The cost of either method is probably comparable.

Maintenance of Traffic

The recommended bridge repairs require the removal of delaminated concrete from the bottom of the deck, the installation of a timber subdeck, and the repair of the south column of pier 3 behind the northbound barrier. The existing IR 77 typical section is approximately 60 feet wide in each direction and includes three 12 feet wide travel lanes and 12 feet wide inside and outside shoulders. The recommended method of maintaining traffic is to perform part-width construction in accordance with Standard Construction Drawing MT-95.30 Closing Right or Left Lane of a Multi-Lane Divided Highway with Drums. This part width maintenance of traffic will require 2 separate phases maintaining traffic on the middle and inside lanes in each direction for bridge deck delamination removal and subdeck installation over the outside lane and outside shoulder in each direction in phase one. The first phase would also include the column repair on pier 3 in the northbound direction. Traffic will be maintained on the outside lane and outside shoulder in each direction for bridge deck delamination removal and subdeck installation over the middle lane, inside lane, and inside shoulder in each direction in the second phase.

The District 12 permitted lane closure (PLC) times allow a single lane closure (3 lanes to 2 lanes) during the following times:

Weekday:

- 6:00 PM to 3:00 PM (21 hours) in the southbound direction
- 9:00 AM to 4:00 PM and from 6:00 PM to 6:00 AM in the northbound direction

Weekend:

- 7:00 PM Friday to 3:00 PM Monday in the southbound direction
- 6:00 PM Friday to 6:00 AM Monday in the northbound direction

The District 12 permitted lane closure (PLC) times allow a 2 lane closure (3 lanes to 1 lane) during the following times:

Weekday:

- 9:00 PM to 6:00 AM in both directions

Weekend:

- 9:00 PM Friday to 9:00 AM Saturday, 8:00 PM Saturday to 11:00 AM Sunday, and 8:00 PM Sunday to 6:00 AM Monday in the southbound direction
- 9:00 PM Friday to 9:00 AM Saturday, 9:00 PM Saturday to 10:00 AM Sunday, and 8:00 PM Sunday to 6:00 AM Monday in the northbound direction

It is anticipated that these repairs can be constructed without violating the District 12 permitted lane closures.

The 2015 traffic data was taken from ODOT's Transportation Information Mapping System (TIMS) count location 24018, approximately 0.3 miles north of the CUY-77-0479 Bridge. The 2015 average annual daily traffic (AADT) was approximately 85,259 vehicles (43,348 NB; 41,911 SB) with 8% truck traffic, and a daily directional distribution (D) of approximately 51%. A conservative design hour factor (k) of 10% was assumed to estimate a design hour volume of 4,335 vehicles northbound and 4,190 vehicles southbound. Assuming a peak capacity of 1,400 vehicles per hour per lane in the MOT condition a maximum capacity of 2,800 vehicles can be carried in each direction leaving approximately 1,535 vehicles northbound and 1,390 vehicles southbound over capacity in the peak hours.

The part-width construction may cause capacity concerns in the peak hour, however an Alternate Route is not suggested since this project will not require a long term closure of the roadway.

The proposed repairs below the existing bridge deck are not anticipated to affect the Wallings Road roadway.

SITE INSPECTION AND RECOMMENDATIONS REPORT

2016 INSPECTION OF

**CUY-077-1575SN [East 14th Ramp over East TOGO East 22nd over
IR-77 Ramp]**

GROUP 1 BRIDGE IN

ODOT DISTRICT 12



Prepared by:

For:



INTRODUCTION

Bridge No. CUY-077-1575SN (SFN 1806912) carries two lanes of eastbound traffic from 14th street over a three lane IR-77 ramp in Cleveland, Ohio. The bridge was built as a three span rolled beam bridge with spill through concrete abutments and wingwalls in 1960. The bridge is on a curved left alignment with the beam lines bent and welded over the piers. 1992 plans provided for repairs, a concrete overlay on the bridge roadway and modification of the original safety curb and railing to a deflector parapet. The wearing surface and parapets are in good condition.

The bottom of the original concrete deck has large spalled areas, revealing portions of the bottom mat of reinforcing steel. Additional bottom of deck areas may be delaminated and could potentially fall in the future.

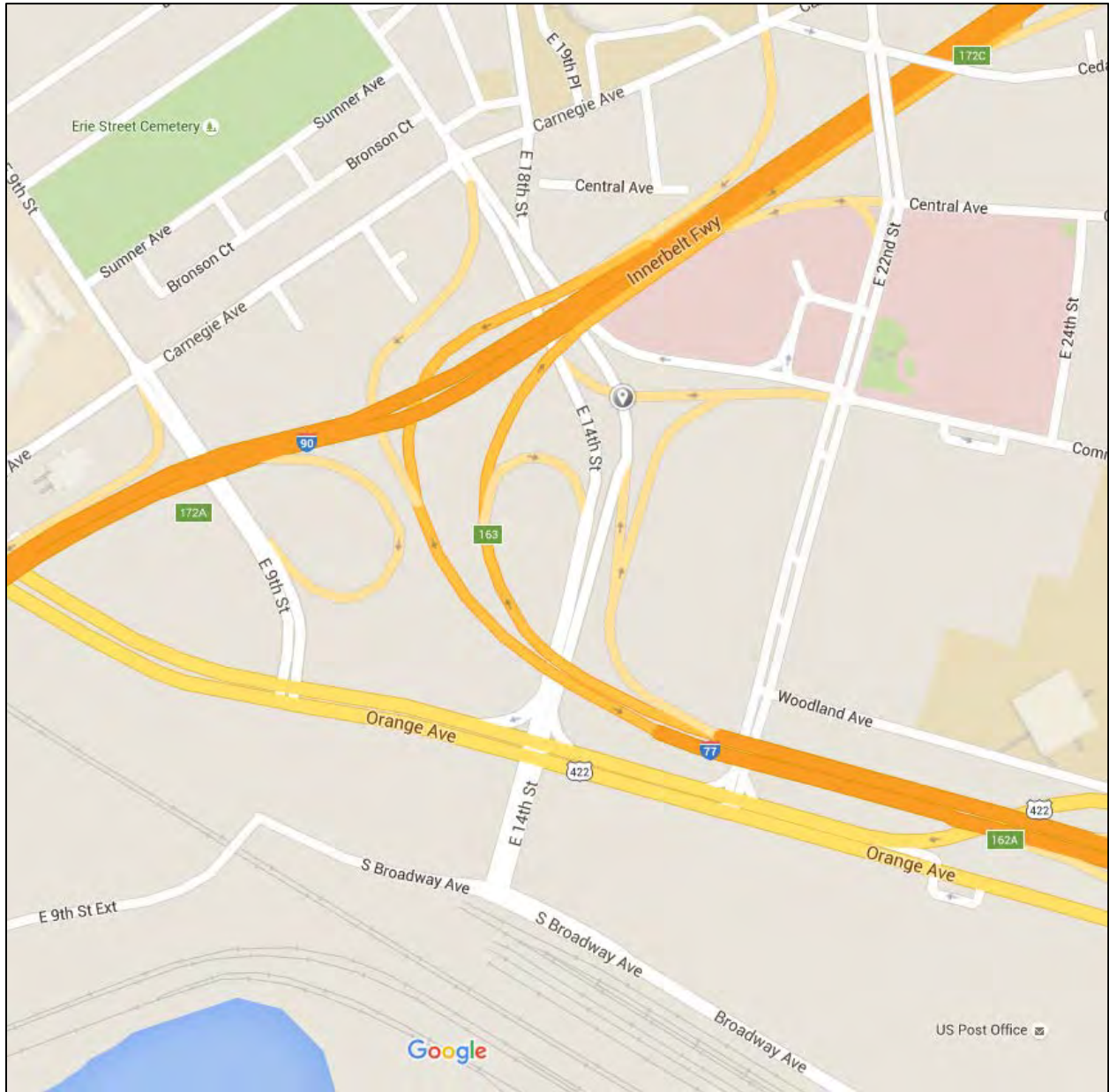
The Ohio Department of Transportation, District 12 (ODOT D12) requested that Richland Engineering Limited inspect, prepare recommendations and develop repair plans for the above referenced bridge.

INSPECTION PROCEDURE

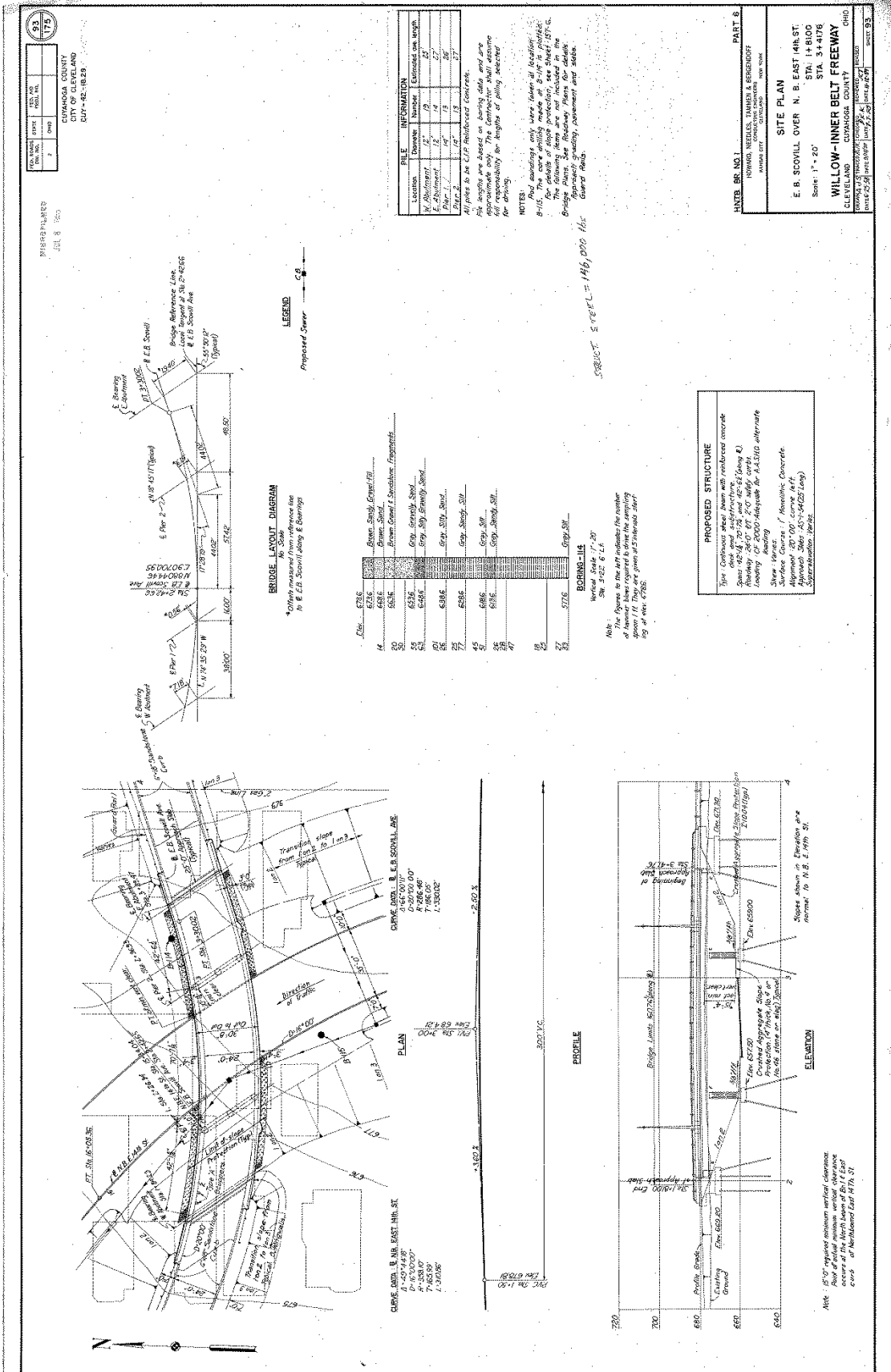
An inspection with photos, measurements and field evaluation was performed for the various items listed in the scope of service. During the inspection deficient areas/items were identified and quantified for repairs. While some deficiencies have been identified during inspection, and are documented within this report, they were not included in the recommended repairs. The recommended repairs included herein are not intended to correct every deficiency, but rather extend the bridge's useful life. Variations with the original plans and subsequent repair plans over the years that could affect the repair details were also identified.

A location map and a copy of the bridge Site Plan and Framing Plan (1960 plan) are included for reference. Select photos are included in the report showing the areas of deterioration and proposed repair.

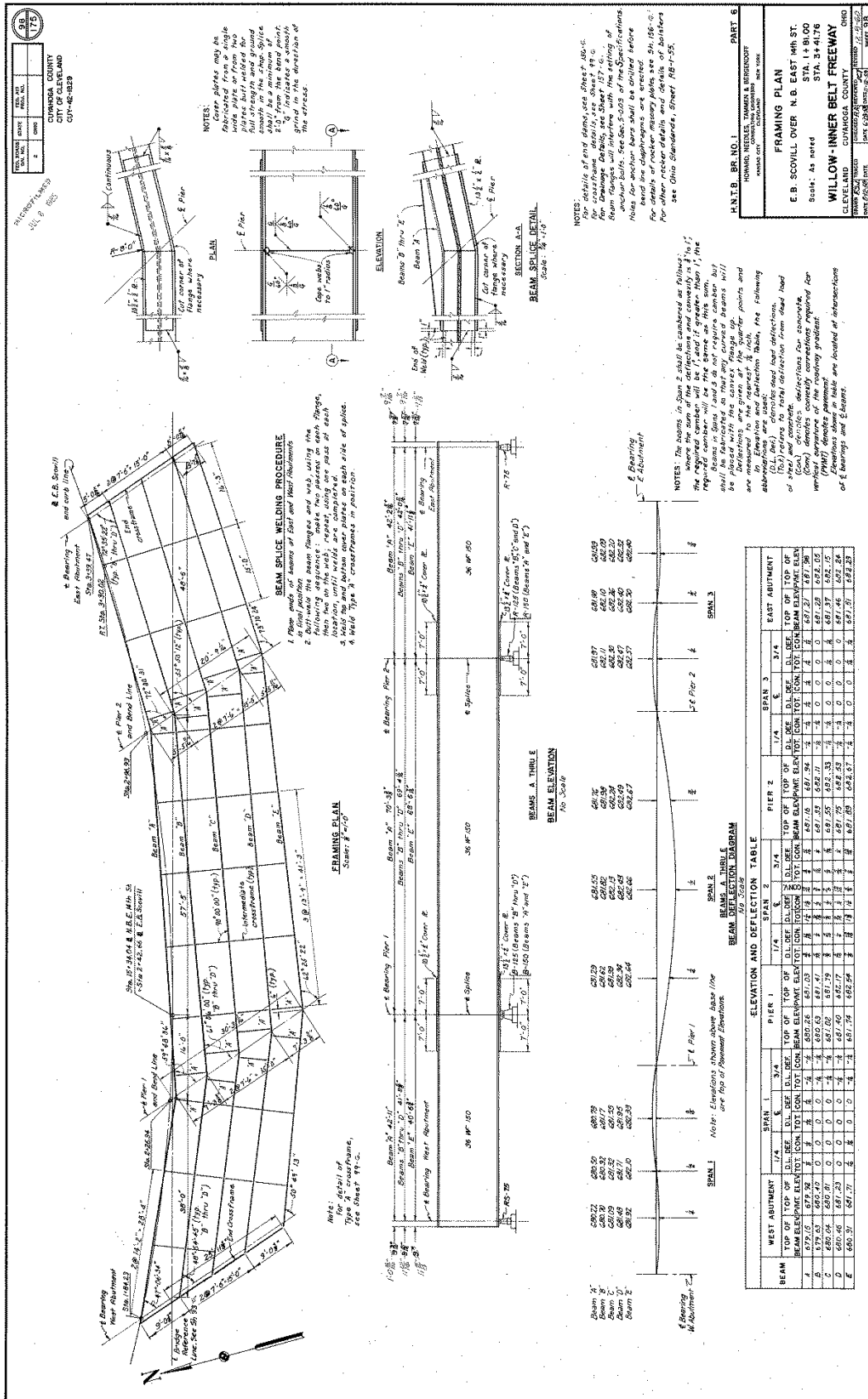
Location Map



SITE INSPECTION AND RECOMMENDATIONS REPORT FOR CUY-077-1575SN (East 14th Ramp over East TOGO East 22nd over IR-77 Ramp)



SITE INSPECTION AND RECOMMENDATIONS REPORT FOR CUY-077-1575SN (East 14th Ramp over East TOGO East 22nd over IR-77 Ramp)



SITE INSPECTION AND RECOMMENDATIONS REPORT FOR CUY-077-1575SN (East 14th Ramp over East TOGO East 22nd over IR-77 Ramp)



Photo 1: View looking east along the south parapet.



Photo 2: Looking east over the three lane north/west bound ramp at the deck spalling.



Photo 3: Looking west over traffic lanes.



Photo 4: Looking north at the three lanes under the bridge.

Recommended Repairs

The following describes options to meet the repair items listed in the project scope for CUY-77-1575SN:

1. Remove delaminated concrete from the bottom of the deck.

Single traffic lanes and shoulders can be closed one at a time while the bottom of deck is sounded and delaminated concrete is removed.

2. Install a timber subdeck between the beams over the three ramp lanes and shoulders below.

The timber subdeck can be constructed and installed while the deck is sounded and traffic is controlled. Since the beams are the same spacing, there is no skew on the portion over the traffic lanes, and the only obstacles are the parallel cross frames, prefabrication and quick installation should limit construction time. Minor areas of skewed subdecking may be required in the corners depending on exactly where the edges of the roadway and shoulders fall.

Maintenance of Traffic

The recommended bridge repairs require the removal of delaminated concrete from the bottom of the deck and the installation of a timber subdeck. The existing northbound E. 14th Street typical section is approximately 36 feet wide and includes two 11 feet wide travel lanes and one 14 feet wide travel lane with curb on each side of the roadway. The recommended method of maintaining traffic is to perform part-width construction in accordance with Standard Construction Drawing MT-95.30 Closing Right or Left Lane of a Multi-Lane Divided Highway with Drums.

This part width maintenance of traffic will require 2 separate phases maintaining traffic on the inside lane for bridge deck delamination removal and subdeck installation above the outside lane and middle lane in phase one. IR 77 exit ramp traffic entering northbound E. 14th Street traffic will be maintained as per MT-98.10 Lane Closure at Entrance Ramp during phase one work. Traffic will be maintained in the middle lane and outside lane for bridge deck delamination removal and subdeck installation above the inside lane in phase two. There are no District 12 permitted lane closure (PLC) times for this ramp area. Lane closures shall not occur during peak hours.

The 2015 traffic data was taken from ODOT's Transportation Information Mapping System (TIMS) count location 87198, approximately 0.2 miles south of the CUY-77-1575SN Bridge. The 2015 average annual daily traffic (AADT) was approximately 8,104 vehicles with 6% truck traffic. A conservative design hour factor (k) of 10% was assumed to estimate a design hour volume of 810 vehicles. The peak capacity is 1,400 vehicles per hour per lane in the MOT condition. Therefore, it appears one open lane should be adequate in maintaining the current traffic.

The proposed repairs below the existing bridge deck are not anticipated to affect the southbound E. 14th Street Ramp roadway.

SITE INSPECTION AND RECOMMENDATIONS REPORT

2016 INSPECTION OF

**CUY-090-0458 N [Clague Road over NSC RR & Knickerbocker
Road]**

GROUP 1 BRIDGE IN

ODOT DISTRICT 12



Prepared by:



RICHLAND ENGINEERING LIMITED

For:



INTRODUCTION

Bridge No. CUY-090-0458 (SFN 1807587) carries four lanes of Clague Road traffic in each direction over NSC RR & Knickerbocker Road in both Bay Village and Westlake, Ohio. The bridge was built as a six span rolled beam bridge with spill through concrete abutments and wingwalls in 1977. The original deck was replaced with a composite deck per the 1993 plans. Sealed elastomeric joints were added at that time along with backwall repairs. The sidewalk and concrete railing along with the 12 feet curved vandal protection fence also date from these plans. The sidewalk and concrete railing have some cracking and minor spalling, but are in generally good condition. The vandal protection fence is badly rusted with failed members and is in poor condition.

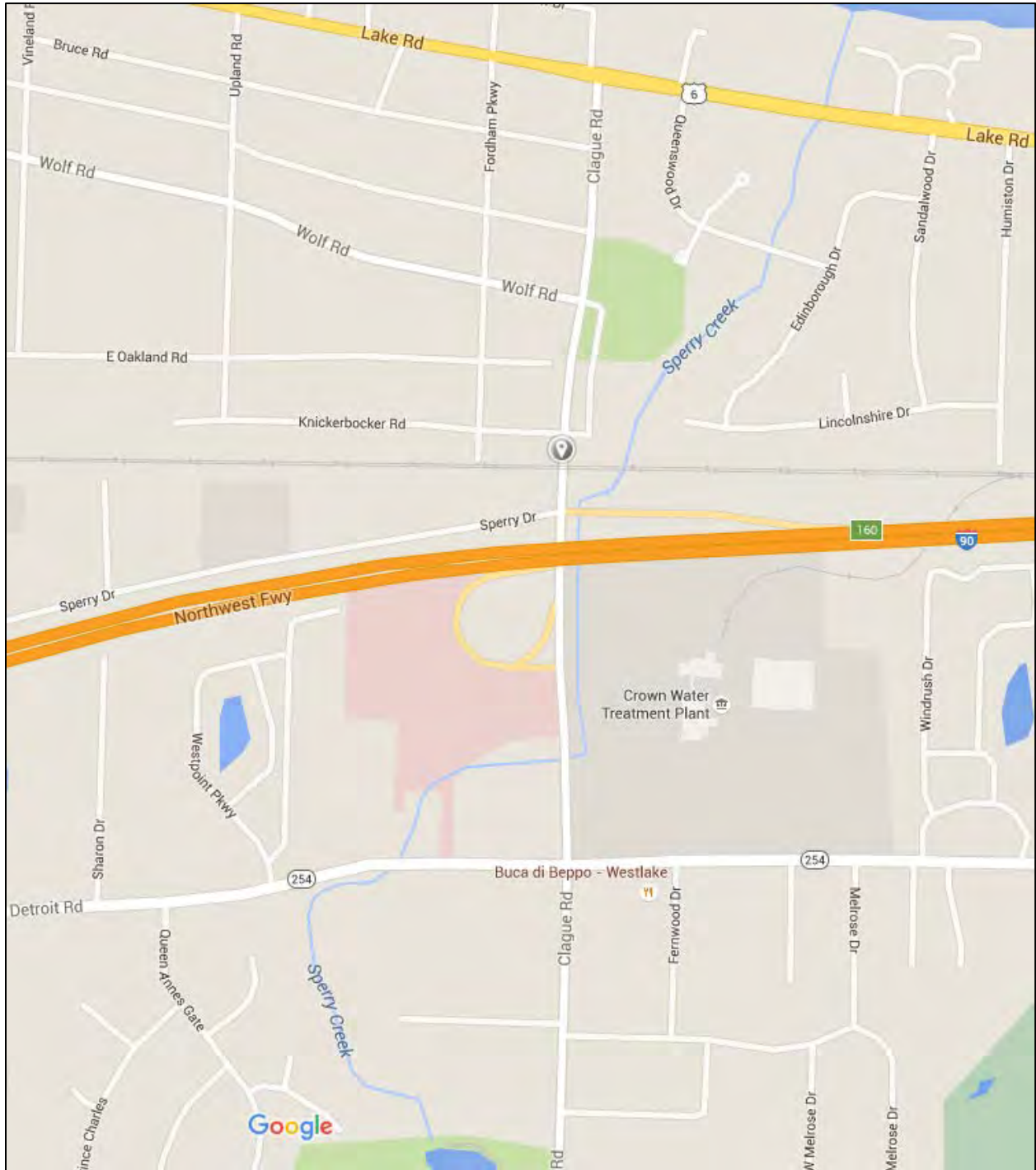
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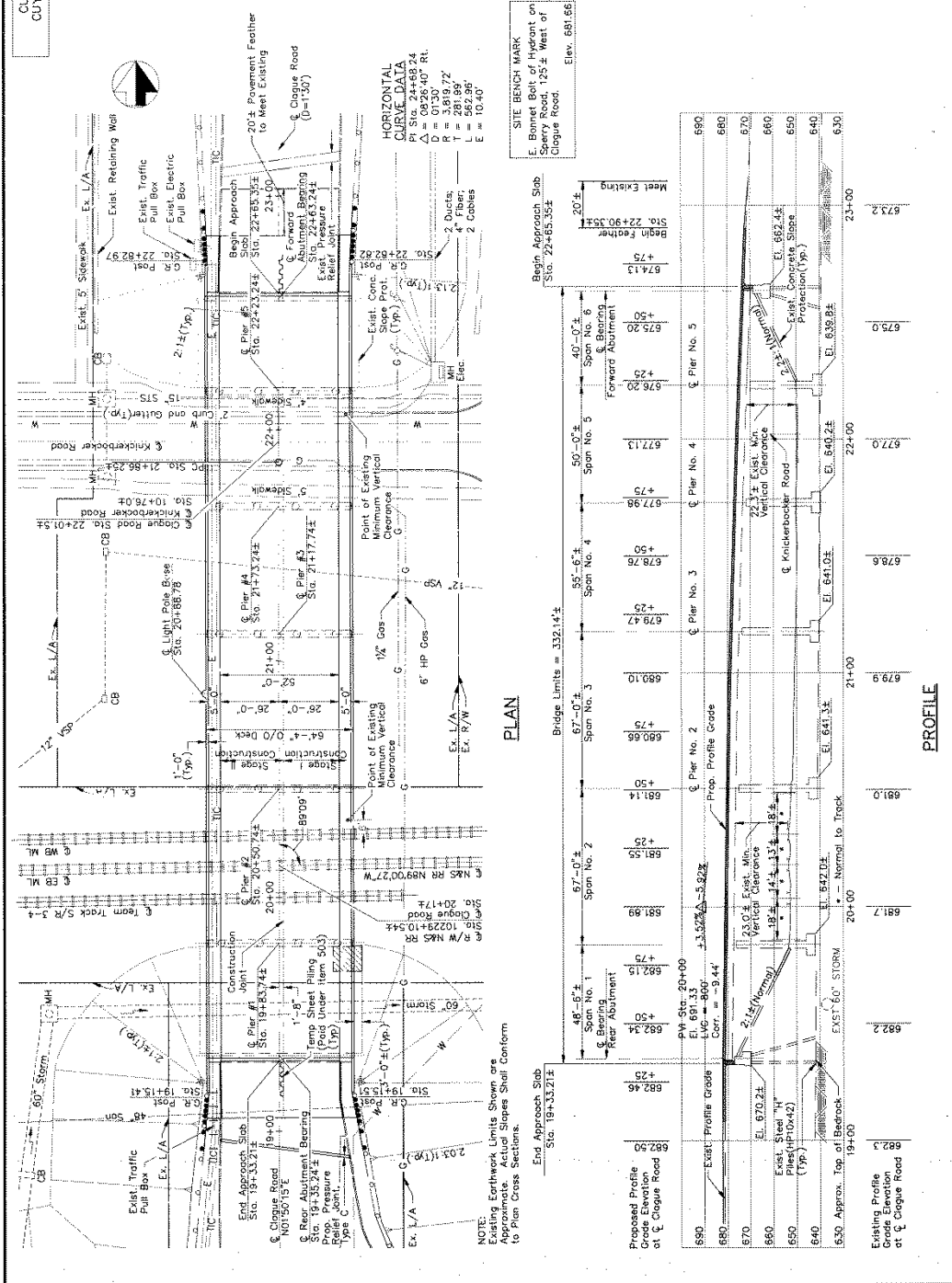
A location map and a copy of the bridge Site Plan, Wingwall Rehabilitation details and Parapet & Misc. Details (1993 plans) are included for reference. Select photos are included in the report showing the areas of deterioration and proposed repair.

Location Map

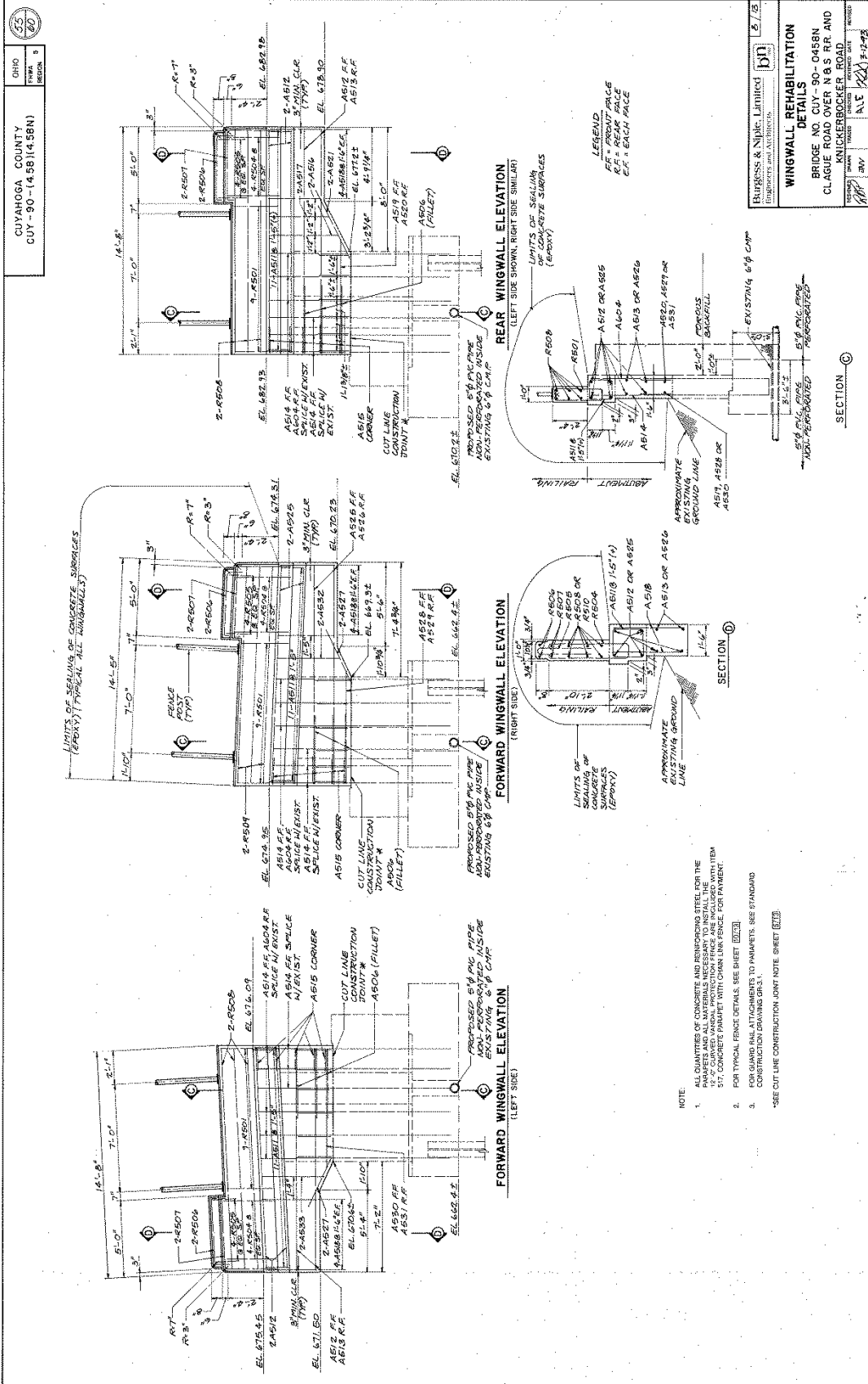


SITE INSPECTION AND RECOMMENDATIONS REPORT FOR CUY-090-0458 N (Clague Road over NSC RR & Knickerbocker Road)

<p style="text-align: center;">CUYAHOGA COUNTY CUY-90-(4-58)(4-58N)</p>	<p style="text-align: center;">TRAFFIC DATA</p> <p>EXISTING ADT (1992): 13,690 DESIGN YEAR ADT (2012): 20,350 DESIGN YEAR ADT (2022): 204</p>	<p style="text-align: center;">EXISTING STRUCTURE</p> <p>TYPE: Continuous Steel Beam with Reinforced Concrete Deck and Substructure; A36 Structural Steel</p> <p>YEAR BUILT: 1977</p> <p>SPANS: 48'-3", 67'-0", 67'-0", 55'-5"</p> <p>ROADWAY: 50'-0" C/C Bearings, 5'-0" C/Cs of 5'-0" Sides</p> <p>LOADS: AASHTO HS20-44</p> <p>ALIGNMENT: Tangent, 130' Curve to Right</p> <p>SKEW: 0%</p> <p>SURFACE COURSE: 1" Asphalt Concrete</p> <p>APPROACH SLABS: AS-1-72 (25' Long)</p> <p>S.F.N.: 1807587</p>
<p style="text-align: center;">PROP. REHABILITATED STRUCTURE</p> <p>TYPE: Ex. St. Sp. Cont. Steel Beam with New Composite Reinforced Superstitialized Concrete Deck</p> <p>PROPOSED WORK: (2 Stage Construction)</p> <ol style="list-style-type: none"> 1. Remove Existing Concrete Deck 2. Reconstruct Existing Abutment Back-wall/Retaining Wall 3. Install New Structural Steel Exp. Joints 4. Replace Existing Approach Slabs 5. Replace Existing Approach Slabs 6. Pressure Relief Joint. (Rear Only) 7. Seal Ex. / Prop. Concrete Surfaces. 8. Replace Abutment Drainage System <p>SPANS: 48'-3", 67'-0", 67'-0", 55'-5"</p> <p>ROADWAY: 50'-0" C/C Bearings, 5'-0" C/Cs of 5'-0" Sides</p> <p>LOADS: AASHTO HS20-44</p> <p>ALIGNMENT: Tangent, 130' Curve to Right</p> <p>SKEW ANGLE: 0%</p> <p>APPROACH SLAB: AS-1-81 (25' Long)</p> <p>WEARING SURFACE: Monolithic Concrete</p> <p>SURFELEVATION: VARIES</p> <p>CROWN: 3/16" / FT. BK. STA. 20+86.25</p>		
<p style="text-align: center;">SITE PLAN</p> <p>BRIDGE NO. CUY-90-0458N CLAGUE ROAD OVER NSC R.R. AND KNICKERBOCKER ROAD</p> <p style="text-align: right;">CUYAHOGA COUNTY STA. 22+65.352 PROJECT NUMBER: 15-2-22</p>		

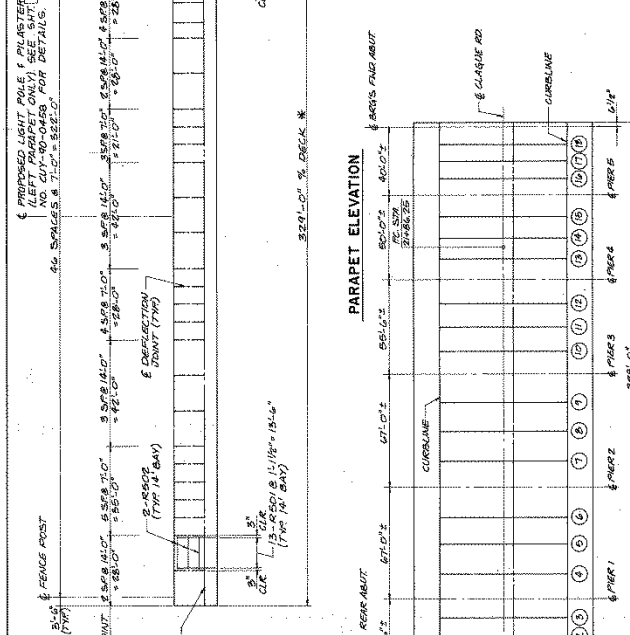
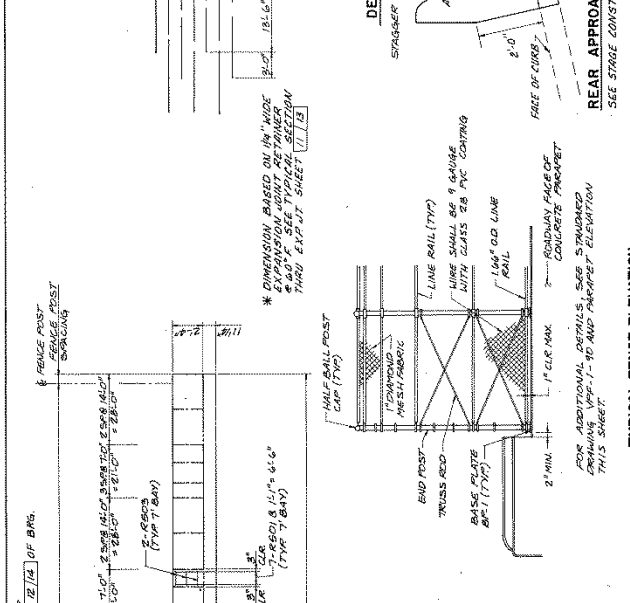


SITE INSPECTION AND RECOMMENDATIONS REPORT FOR CUY-090-0458 N (Clague Road over NSC RR & Knickerbocker Road)



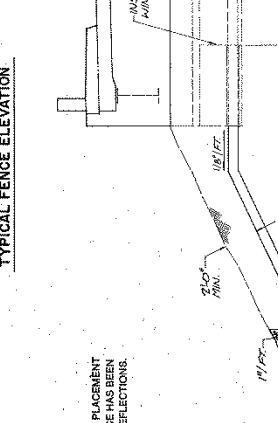
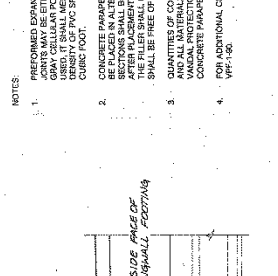
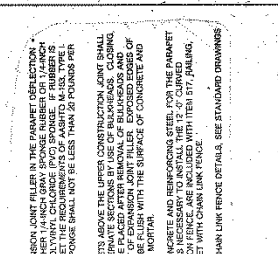
SITE INSPECTION AND RECOMMENDATIONS REPORT FOR CUY-090-0458 N (Clague Road over NSC RR & Knickerbocker Road)

OHIO
 CUYAHOGA COUNTY
 CUT - 90 - (4.58) (4.58N)



SCREEN PLAN

POINT	STATION	LEGS	STATION	LINE	JOINT	STATION	RIGHT
REAR ABUT	19+46.24	862.01	19+35.24	862.38	19+45.24	862.01	862.01
1	19+47.37	861.97	19+47.37	862.38	19+47.37	861.97	861.97
2	19+59.49	861.85	19+59.49	862.38	19+59.49	861.85	861.85
3	19+71.62	861.85	19+71.62	862.38	19+71.62	861.85	861.85
PIER 1	20+00.49	861.50	20+00.49	861.50	20+00.49	861.50	861.50
4	20+17.24	861.30	20+17.24	861.30	20+17.24	861.30	861.30
5	20+33.99	861.03	20+33.99	861.03	20+33.99	861.03	861.03
6	20+50.74	860.72	20+50.74	860.72	20+50.74	860.72	860.72
7	20+67.49	860.43	20+67.49	860.43	20+67.49	860.43	860.43
8	21+00.99	860.10	21+00.99	860.10	21+00.99	860.10	860.10
9	21+17.74	860.07	21+17.74	860.07	21+17.74	860.07	860.07
PIER 3	21+34.49	860.07	21+34.49	860.07	21+34.49	860.07	860.07
10	21+51.24	860.07	21+51.24	860.07	21+51.24	860.07	860.07
11	21+67.99	860.07	21+67.99	860.07	21+67.99	860.07	860.07
12	21+84.74	860.07	21+84.74	860.07	21+84.74	860.07	860.07
PIER 4	21+99.99	860.07	21+99.99	860.07	21+99.99	860.07	860.07
13	22+16.74	860.07	22+16.74	860.07	22+16.74	860.07	860.07
14	22+33.49	860.07	22+33.49	860.07	22+33.49	860.07	860.07
15	22+50.24	860.07	22+50.24	860.07	22+50.24	860.07	860.07
PIER 5	22+66.99	860.07	22+66.99	860.07	22+66.99	860.07	860.07
16	22+83.74	860.07	22+83.74	860.07	22+83.74	860.07	860.07
17	22+99.99	860.07	22+99.99	860.07	22+99.99	860.07	860.07
18	23+16.74	860.07	23+16.74	860.07	23+16.74	860.07	860.07
19	23+33.49	860.07	23+33.49	860.07	23+33.49	860.07	860.07
20	23+50.24	860.07	23+50.24	860.07	23+50.24	860.07	860.07
END ABUT	23+66.99	860.07	23+66.99	860.07	23+66.99	860.07	860.07



NOTES:

- CONCRETE PARAPETS ABOVE THE UPPER CONSTRUCTION JOINT SHALL BE CAST IN PLACE. JOINTS MAY BE EITHER 1/2 INCH SPONGE RUBBER OR 1/2 INCH GELULAN POLYETHYLENE (PVC) SPONGE. IF RUBBER IS USED, THE SPONGE SHALL BE PLACED AFTER REMOVAL OF SURFACES AND AFTER THE SURFACES HAVE BEEN CLEANED WITH THE SURFACE OF CONCRETE AND SHALL BE FREE OF MORTAR.
- QUANTITIES OF CONCRETE AND REINFORCING STEEL FOR THE PARAPET AND ALL MATERIALS NECESSARY TO INSTALL THE 1.5" DIA. GALVANIZED STEEL PIPE SHALL BE DETERMINED BY THE CONTRACTOR. SEE STANDARD DRAWINGS VPI-100.
- FOR ADDITIONAL CHAIN LINK FENCE DETAILS, SEE STANDARD DRAWINGS VPI-100.

PARAPET & MISC. DETAILS
 BRIDGE NO. CUY-90-0458N
 CLAGUE ROAD OVER NSC RR AND
 KNICKERBOCKER ROAD

BURGESS & NIKS, LIMITED
 ENGINEERS AND ARCHITECTS

DATE: 10/15/10
 DRAWN BY: [Signature]
 CHECKED BY: [Signature]
 APPROVED BY: [Signature]



Photo 1: Typical view of east fence and parapet. Note fence post and rail rusting and the staining of parapet.



Photo 2: Looking west at north abutment joint. Note the deflection of fence and horizontal rail members due to bridge expansion.



Photo 3: Typical fence deterioration that is primarily located in the lower portion of the fence.



Photo 4: Looking west at south abutment joint at failed fence members.

Recommended Repairs

The following describes options to meet the repair items listed in the project scope for CUY-90-0458 N:

- 1. Remove damaged and deteriorated 12 feet high curved Vandal Protection Fence.**

The existing anchor bolts for the fence base plates can likely be saved and reused with the new fence.

- 2. Install new 12 feet high curved Vandal Protection Fence.**

The new fence can be installed at the same post spacing; reusing the existing anchors to eliminate extensive anchor bolt doweling in the narrow concrete railing. Requiring a zinc repair coating on the anchor bolts would also further extend the bolts life to the life of the new fence. Improved details for expansion of the fence at the bridge joints will also be incorporated.

Maintenance of Traffic

The recommended bridge repairs require the removal and replacement of the existing 12 feet high curved Vandal Protection Fence. The existing Clague Road typical section is approximately 52 feet wide and includes a 14 feet wide outside lane and a 12 feet wide inside lane with concrete curb in each direction. The recommended method of maintaining traffic is to close the right lane of Clague Road in accordance with Standard Construction Drawing MT-95.31 Closing Right Lane of a Multi-Lane Undivided Highway with Drums. The northbound and southbound maintenance of traffic would be separate operations to limit traffic delays on Clague Road. The work zone is not anticipated to interfere with the existing traffic pattern on the north end of the bridge. The work zone on the south end of the bridge may extend to the intersection area of Clague Road at Sperry Road and the IR 90 westbound exit ramp. Standard Construction Drawing MT-95.31 addresses how to maintain traffic through intersections if needed.

SITE INSPECTION AND RECOMMENDATIONS REPORT

2016 INSPECTION OF
CUY-090-0458 [Clague Road over IR 90]
GROUP 1 BRIDGE IN
ODOT DISTRICT 12



Prepared by:

For:



INTRODUCTION

Bridge No. CUY-090-0458 (SFN 1807641) carries four lanes of Clague Road traffic (and bridge width flare at the southwest end for the ramp) in each direction over three westbound lanes and four eastbound lanes of IR 90 in Westlake, Ohio. The bridge was built as a four span rolled beam bridge with spill through concrete abutments and wingwalls in 1977. The original deck was replaced with a composite deck per the 1993 plans. Sealed elastomeric joints were added at this time along with backwall repairs. The sidewalk and concrete railing along with the 12 feet curved vandal protection fence also date from these plans. The sidewalk and concrete railing have some cracking and minor spalling, but are in generally good condition. The vandal protection fence is badly rusted with failed members and is in poor condition.

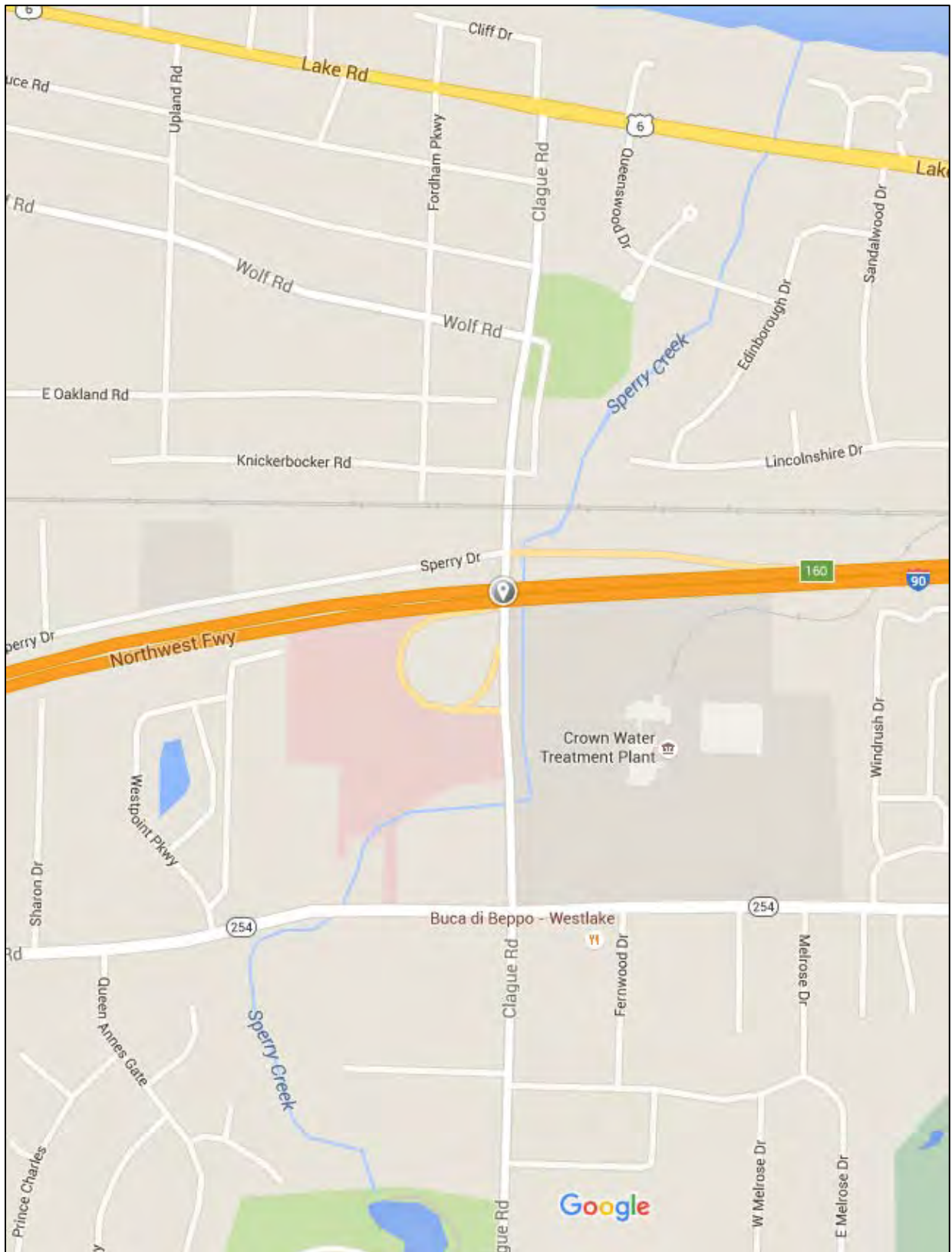
The Ohio Department of Transportation, District 12 (ODOT D12) requested that Richland Engineering Limited inspect, prepare recommendations and develop repair plans for the above referenced bridge.

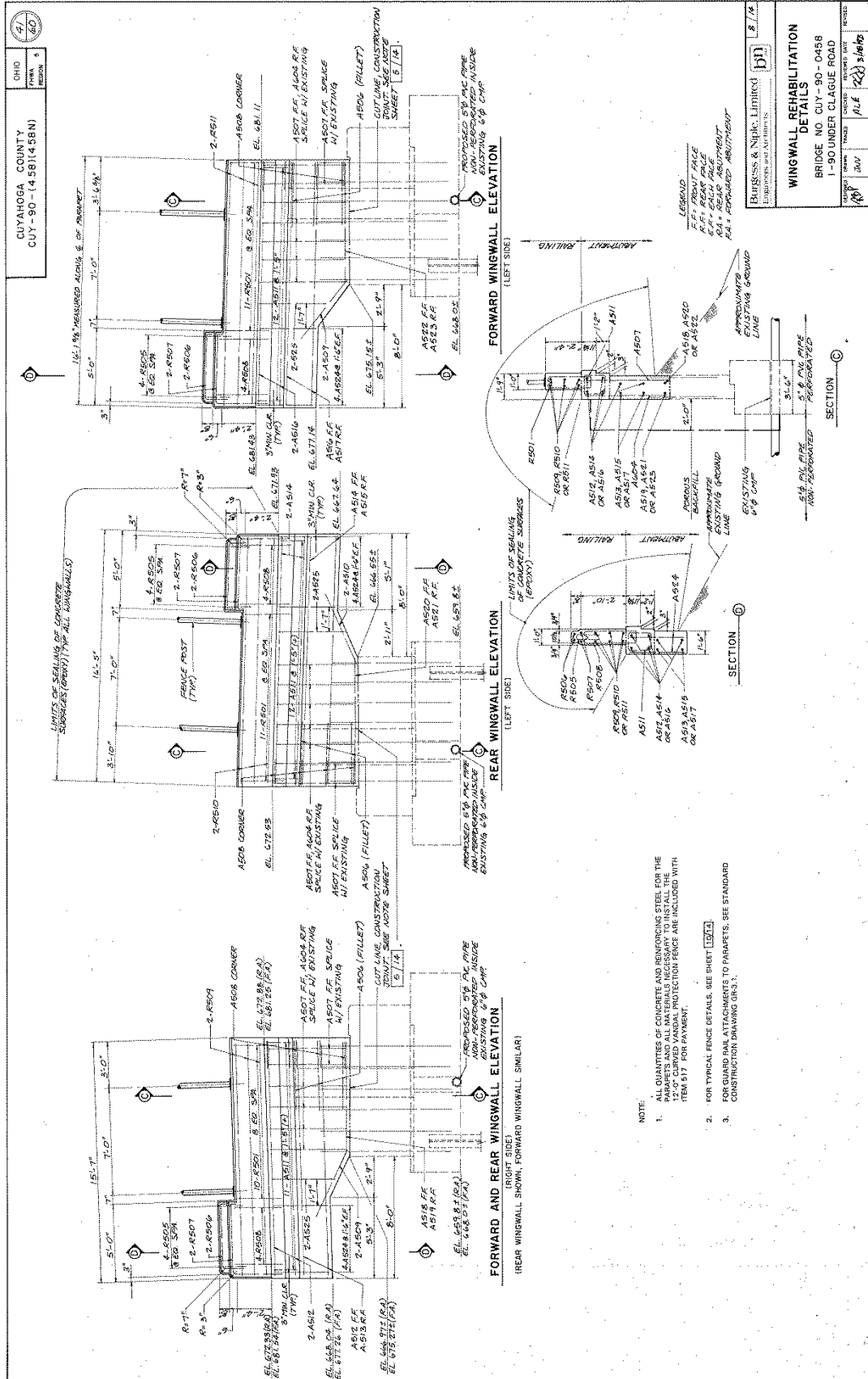
INSPECTION PROCEDURE

An inspection with photos, measurements and field evaluation was performed for the various items listed in the scope of service. During the inspection deficient areas/items were identified and quantified for repairs. While some deficiencies have been identified during inspection, and are documented within this report, they were not included in the recommended repairs. The recommended repairs included herein are not intended to correct every deficiency, but rather extend the bridge's useful life. Variations with the original plans and subsequent repair plans over the years that could affect the repair details were also identified.

A location map and a copy of the bridge Site Plan, Wingwall Rehabilitation details and Parapet & Misc. Details (1993 plan) are included for reference. Select photos are included in the report showing the areas of deterioration and proposed repair.

Location Map





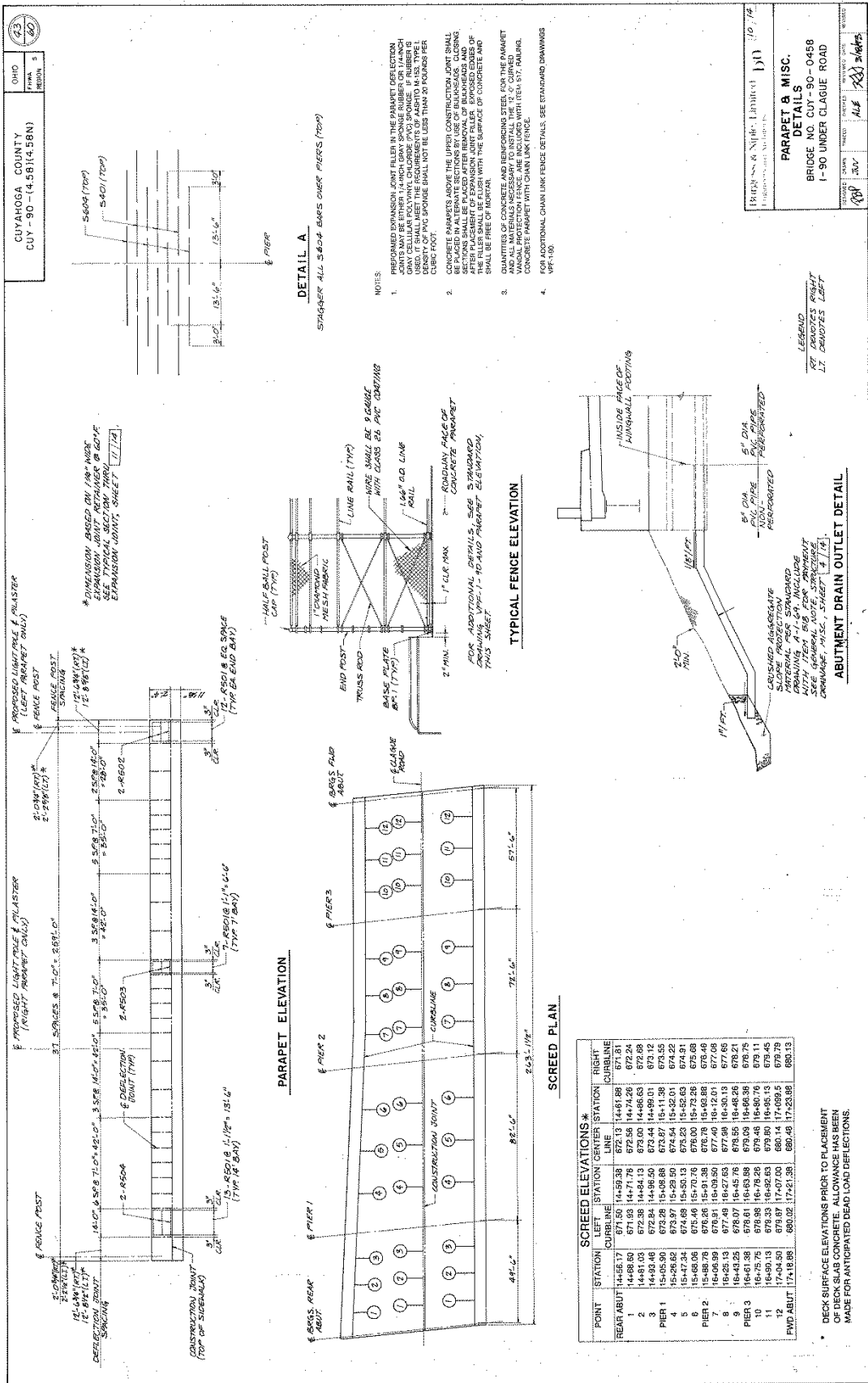




Photo 1: Typical view of east fence and parapet. Note fence post and rail rusting.



Photo 2: Looking at north abutment joint west railing. Note the deflection of fence and horizontal rail members due to bridge expansion.



Photo 3: Looking north along east sidewalk and railing.



Photo 4: Light pole on east parapet (there is also a light pole on the west parapet).

Recommended Repairs

The following describes options to meet the repair items listed in the project scope for CUY-90-0458:

- 1. Remove damaged and deteriorated 12 feet high curved Vandal Protection Fence.**

The existing anchor bolts for the fence base plates can likely be saved and reused with the new fence.

- 2. Install new 12 feet high curved Vandal Protection Fence.**

The new fence can be installed at the same post spacing reusing the existing anchors to eliminate extensive anchor bolt doweling in the narrow concrete railing. Requiring a zinc repair coating on the anchor bolts would also further extend the bolts life to the life of the new fence. Improved details for expansion of the fence at the bridge joints will also be incorporated.

Maintenance of Traffic

The recommended bridge repairs require the removal and replacement of the existing 12 feet high curved Vandal Protection Fence. The existing Clague Road typical section is approximately 52 feet wide and includes a 14 feet wide outside lane and 12 feet wide inside lane with concrete curb in each direction. The recommended method of maintaining traffic is to close the right lane of Clague Road in accordance with Standard Construction Drawing MT-95.31 Closing Right Lane of a Multi-Lane Undivided Highway with Drums. The northbound and southbound maintenance of traffic would be separate operations to limit traffic delays on Clague Road. The work zone may interfere with the existing traffic pattern on the north end of the bridge at the intersection of Clague Road at Sperry Road and the ramp from IR 90 westbound to Clague Road. Standard Construction Drawing MT-95.31 addresses how to maintain traffic through intersections if needed. The work zone on the south end of the bridge may extend into the ramp area of the ramp from southbound Clague Road to eastbound IR 90. Traffic from Clague Road to the IR 90 entrance ramp will need to be maintained during construction in accordance with MT-98.20 Lane Closure at Exit Ramp Using Drums.

SITE INSPECTION AND RECOMMENDATIONS REPORT

2016 INSPECTION OF

CUY-090-1391 [CUY 90 over Fulton Road]

GROUP 1 BRIDGE IN

ODOT DISTRICT 12



Prepared by:

For:



INTRODUCTION

Bridge No. CUY-090-1391 (SFN 1807854) carries five lanes of IR 90 traffic in each direction over two lanes of Fulton Road in Cleveland, Ohio. The bridge was built as a three span rolled beam bridge with spill through concrete abutments and wingwalls in 1975. The present wearing surface on the bridge roadway is the second concrete overlay (2005 plans) and is in generally good condition. There is an open joint between the center median parapets. The eastbound and westbound superstructures are not connected.

The bottom of the original concrete deck has spalled in multiple locations, revealing portions of the bottom mat of reinforcing steel. Additional bottom of deck areas may be delaminated and could potentially fall in the future.

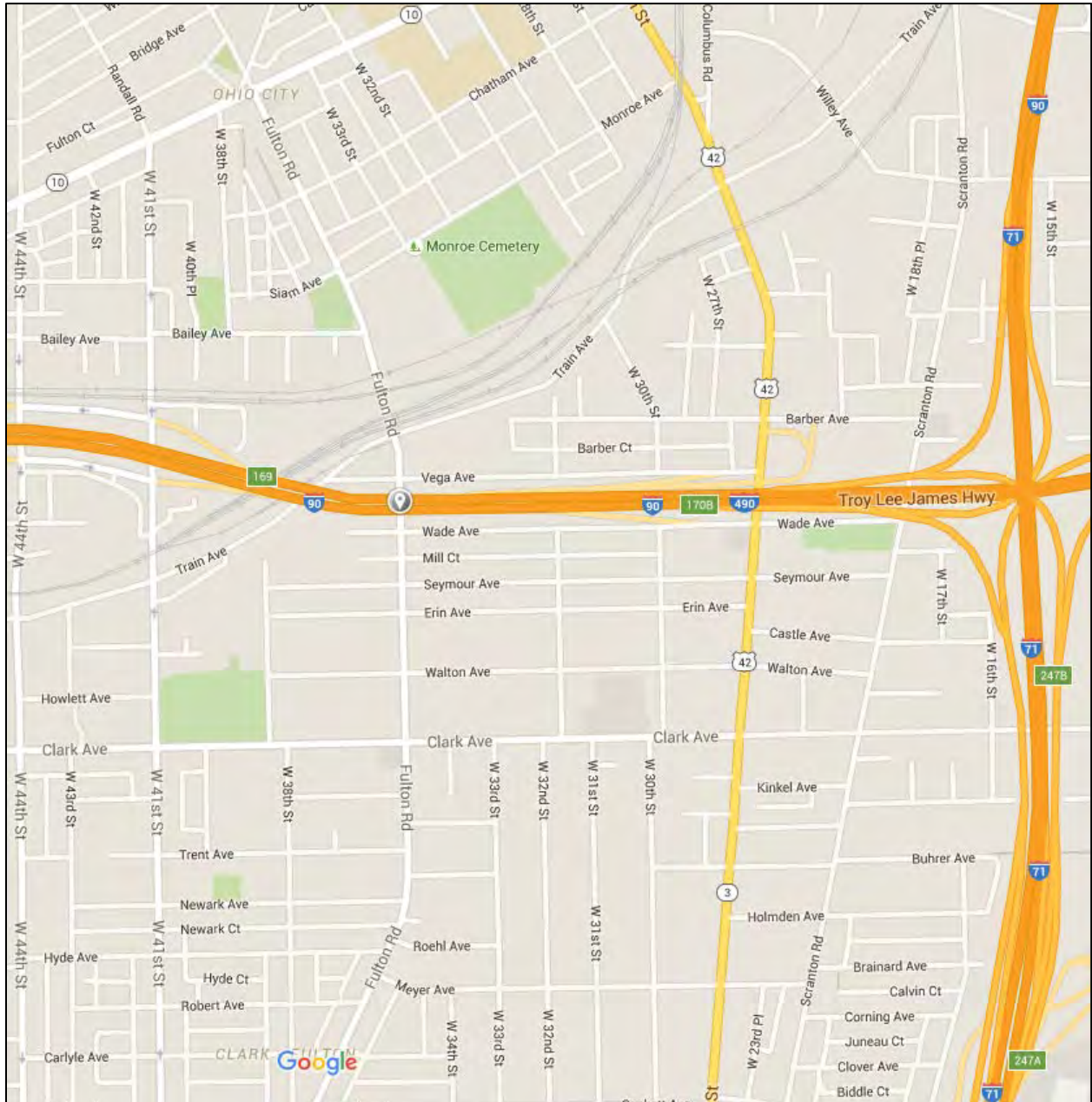
The Ohio Department of Transportation, District 12 (ODOT D12) requested that Richland Engineering Limited inspect, prepare recommendations and develop repair plans for the above referenced bridge.

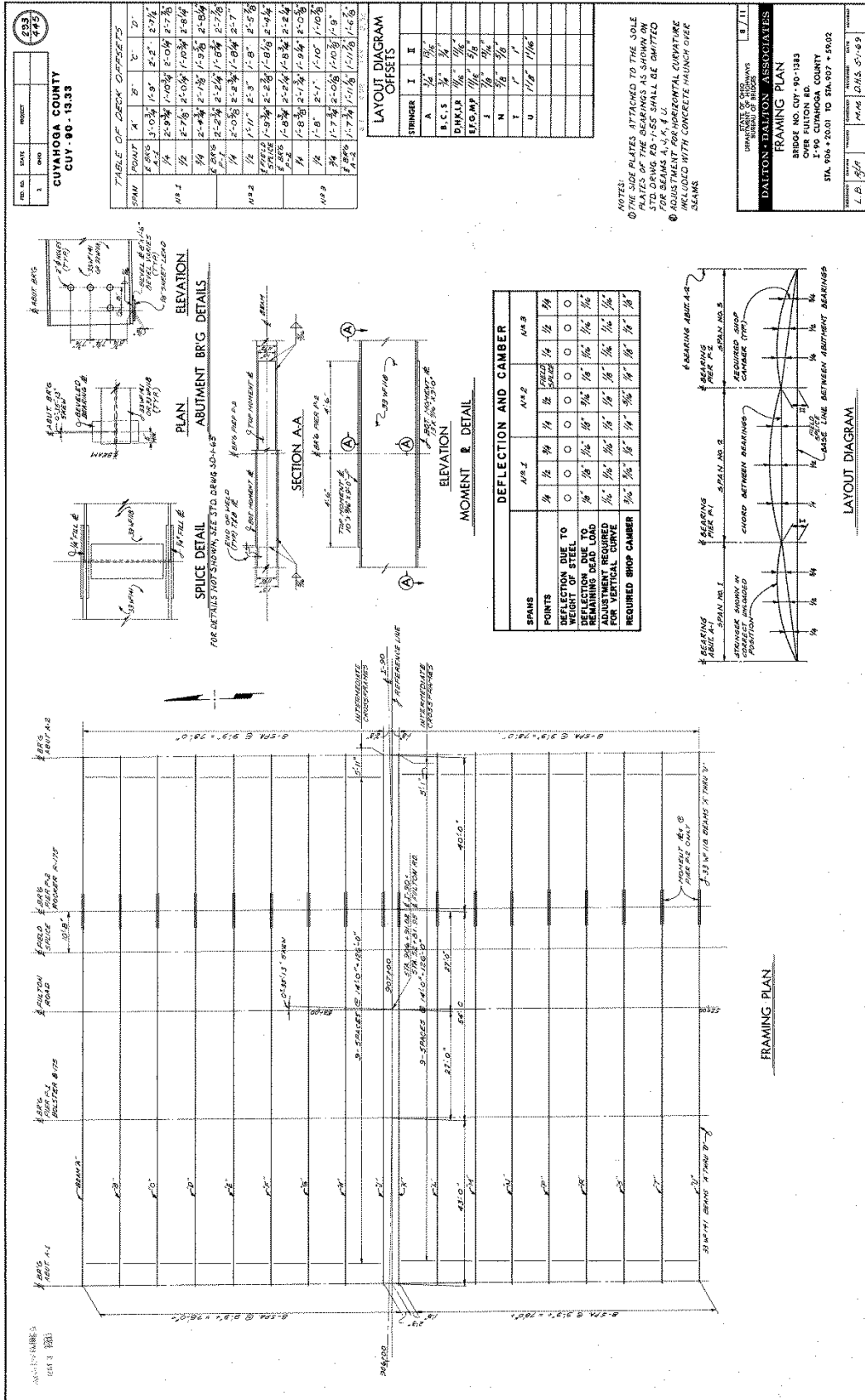
INSPECTION PROCEDURE

An inspection with photos, measurements and field evaluation was performed for the various items listed in the scope of service. During the inspection deficient areas/items were identified and quantified for repairs. While some deficiencies have been identified during inspection, and are documented within this report, they were not included in the recommended repairs. The recommended repairs included herein are not intended to correct every deficiency, but rather extend the bridge's useful life. Variations with the original plans and subsequent repair plans over the years that could affect the repair details were also identified.

A location map and a copy of the bridge Site Plan and Framing Plan (1970 plan) are included for reference. Select photos are included in the report showing the areas of deterioration and proposed repair.

Location Map





NOTES: 1. ALL PLATES ATTACHED TO THE SOLE PLATES OF THE BEARINGS AS SHOWN ON STD. DRAWING R2-1-55 SHALL BE OMITTED FOR BEAMS A, J, K, & U. 2. ADJUSTMENT FOR HORIZONTAL CURVATURE SHALL BE MADE WITH CONCRETE FINISHER SIZE SEAMS.

DALTON BRIDGES ASSOCIATES
 BRIDGE NO. CUY-90-1393
 FULTON ROAD
 CUYAHOGA COUNTY
 STA. 90+20.01 TO STA. 90+59.02

DATE: 1/11/89
 DRAWN BY: J.M.S.
 CHECKED BY: J.M.S.
 SCALE: AS SHOWN



Photo 1: Typical view under the bridge looking east under south portion of eastbound lanes.



Photo 2: Typical view under the bridge looking east under center of eastbound lanes.



Photo 3: Looking at open center median joint between east and westbound superstructures.



Photo 4: Looking at the center of the westbound lanes.



Photo 5: View under the bridge looking east under north portion of westbound lanes.

Recommended Repairs

The following describes options to meet the repair items listed in the project scope for CUY-90-1391:

1. Remove delaminated concrete from the bottom of the deck.

Single traffic lanes and shoulders can be closed one at a time while the bottom of deck is sounded and delaminated concrete is removed.

2. Install a timber subdeck between the beams over the Fulton Road lanes and shoulders.

The timber subdeck can be constructed and installed while the deck is sounded and traffic is controlled. Since the beams are the same spacing, there is no skew and the only obstacles are the parallel cross frames, prefabrication and quick installation should limit construction time.

Maintenance of Traffic

The recommended bridge repairs require the removal of delaminated concrete from the bottom of the deck and the installation of a timber subdeck. The existing Fulton Road typical section is approximately 38 feet wide and includes two 19 feet wide travel lanes with curb and approximately 12 feet wide sidewalk on each side of the roadway. We assume a complete closure of Fulton Road with a detour is not desired for this repair work. The recommended method of maintaining a minimum of one lane of traffic is to close one lane of Fulton Road in accordance with Standard Construction Drawing MT-97.10 Flagger Closing (or Portable Traffic Signal) 1 Lane of a 2 Lane Highway – Stationary Operation. Lane closures and possible detours shall be as coordinated with the City of Cleveland. If a detour is not desired, work will be completed in two phases. The work zone would extend to the intersection of Fulton Road at Vega Avenue to the north. The work zone will extend to the intersection of Fulton Road at Wade Avenue to the south. MT-97.10 addresses how to maintain traffic through intersections, if needed.

SITE INSPECTION AND RECOMMENDATIONS REPORT

2016 INSPECTION OF

CUY-480-0335 [Butternut Ridge Road over IR 480]

GROUP 1 BRIDGE IN

ODOT DISTRICT 12



Prepared by:

For:



INTRODUCTION

Bridge No. CUY-480-0335 (SFN 1814095) carries two lanes of Butternut Ridge Road traffic in each direction over three westbound lanes and three eastbound lanes of IR 480 in North Olmsted, Ohio. The bridge was built as a four span rolled beam bridge with spill through concrete abutments and wingwalls in 1980. Patching of the concrete railing and sidewalk has been done per the 2007 plans. Although these plans do not list that this bridge was to receive a concrete deck overlay, the field inspection indicates that this appears to be the case. The south sidewalk and concrete railing have some cracking and minor spalling, but are in generally good condition (about 16 linear feet of concrete patching of the inside railing face will be required). The north concrete railing is in similar condition (about 10 linear feet of concrete patching of the inside railing face). The north sidewalk and curb has been patched numerous times and is in extremely poor condition.

The four foot high vandal protection fence (on 2'-4" concrete railing) is badly rusted with failed vertical and horizontal members and is in poor condition.

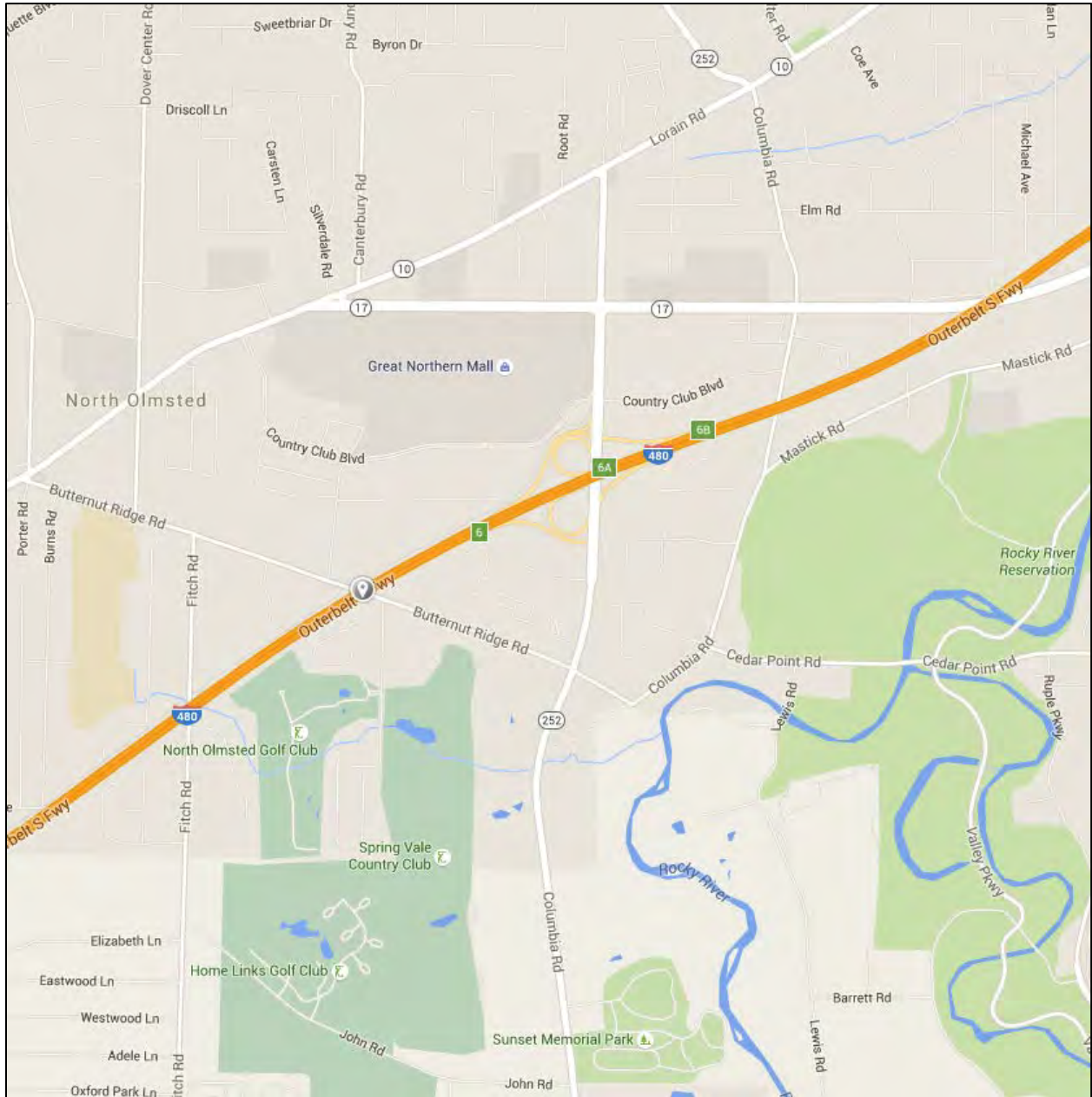
The Ohio Department of Transportation, District 12 (ODOT D12) requested that Richland Engineering Limited inspect, prepare recommendations and develop repair plans for the above referenced bridge.

INSPECTION PROCEDURE

An inspection with photos, measurements and field evaluation was performed for the various items listed in the scope of service. During the inspection deficient areas/items were identified and quantified for repairs. While some deficiencies have been identified during inspection, and are documented within this report, they were not included in the recommended repairs. The recommended repairs included herein are not intended to correct every deficiency, but rather extend the bridge's useful life. Variations with the original plans and subsequent repair plans over the years that could affect the repair details were also identified.

A location map and a copy of the bridge Site Plan, General Plan and Superstructure Details (1978 plan) are included for reference. Select photos are included in the report showing the areas of deterioration and proposed repair.

Location Map



SITE INSPECTION AND RECOMMENDATIONS REPORT FOR CUY-480-0335 (Butternut Ridge Road over IR 480)

DATE	NO.	REVISION
7/11/77	2	OHIO COUNTY CUY-480-190

Butternut Ridge Rd (Symmetrical about E), except as noted.

NOTES:

- * Each longitudinal bar shall be placed reinforcing in the top of the deck over the bars, shall be comprised of #3, #5, #6, and #8 bars at 18" spacing and 1-#8 500K bars lapped a minimum of 1-1'.
- * Deck slab depth: The distance shown from top of deck slab to top of steel beam is the design depth. The actual depth of the slab shall be based on this dimension, even though deviation from it may be necessary because the top flange of the beam may not have the exact camber or camber finished grade place if partial depth which is 9" shall be quantity of concrete. However, the depth of concrete shall be such that the slab shall be not more than 1/4" for a haunch less than 5-1/2" width.
- * Longitudinal reinforcing steel shall be with supports.
- * For transverse slab reinforcing see Sht 6.7.1.
- * Field bend transverse bars to fit crown field bending SECTION S-3.1 for fence post spacing see general plan Sht No. 6.7.1.1.
- * Concrete parapets are included for payment with Item 5.17, Bailing.
- * BRIDGE DECK FINISH: In lieu of being finished as specified in 5.16.11, the bridge deck shall be finished transversely to provide a relatively uniform pattern of grooves spaced an approximately 2" centers. Grooves shall be approximately 0.15 inches deep and 0.10 inches wide. A strip of surface to 1/2" inches from adjacent to curbs shall not be textured.
- * For bridge sidewalk fence details, see sh. No. 404.

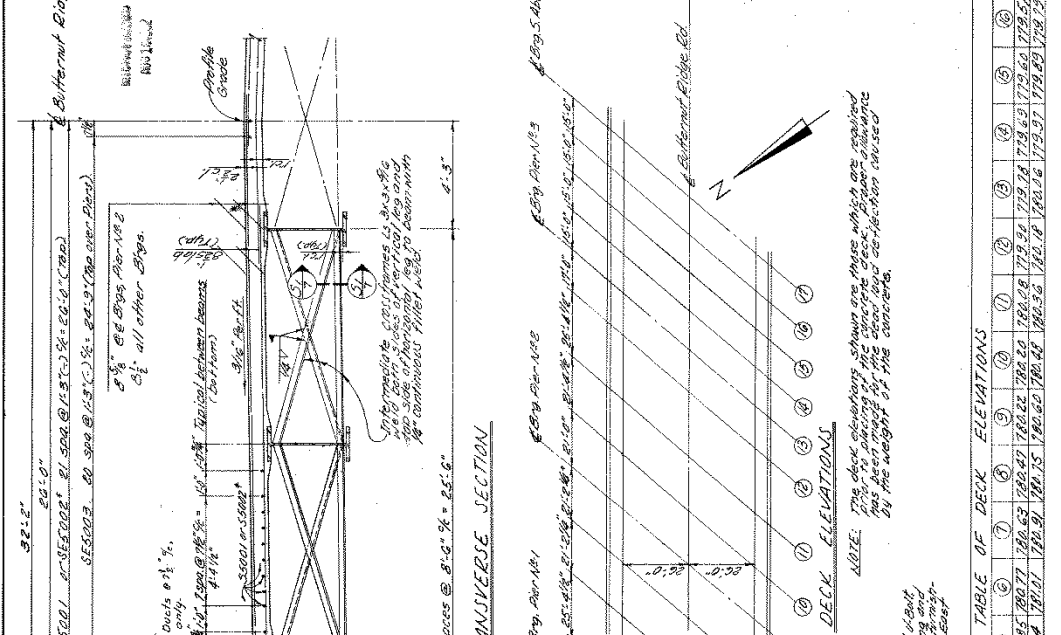


TABLE OF DECK ELEVATIONS

LINE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
ELEV. 21'	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02
ELEV. 20'	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02	78.02

7/11

ELDEN E. TILSON & ASSOCIATES, LIMITED
CONSULTING ENGINEERS
COLUMBUS, OHIO

SUPERSTRUCTURE DETAILS
BUTTERNUT RIDGE ROAD
OVER I-480

CUYAHOGA COUNTY STA. 6+18.61
PROJECT NO. CUY-480-0335

DATE: 7/11/77
BY: S.P.A. (G.M.)
CHECKED: S.P.A.



Photo 1: View of north fence and railing at west joint.



Photo 2: Looking at north railing. Note sidewalk and curb deterioration.



Photo 3: Looking at the north railing and deteriorated curb near the center of the bridge.



Photo 4: East end of the north railing and sidewalk. This is the worst curb deterioration on the structure.

Recommended Repairs

The following describes options to meet the repair items listed in the project scope for CUY-480-0335:

1. Remove damaged and deteriorated four feet high Vandal Protection Fence.

Since the proposed fence will be higher and the existing plates and anchor bolts are very rusty, the existing anchor bolts for the fence base plates will be cut off flush with the top of the concrete railing and replaced.

2. Install new Vandal Protection Fence.

For structures with sidewalks, the BDM (305.3) requires a minimum height of 8 feet above the sidewalk. Typical installations in the area for this type of situation might be a curved 10 or 12 feet high vandal protection fence (VPF-1-90). This will involve using base plate type BP-3 (adhesive anchors) or BP-4 (horizontal through bolts) for the higher fences.

3. Patch the inside of the concrete railing on both north and south sides and seal with epoxy-urethane.

There is a total of about 26 linear feet of 2'- 4" high concrete railing that needs repaired. There is periodic cracking (mostly vertical shrinkage type cracks) in the railing that appears to be fairly tight. The surfaces of the railing will be sealed with an epoxy-urethane sealer to prevent further deterioration.

4. Replace the north sidewalk and curb.

Due to the very poor condition of the north sidewalk and curb, we recommend cutting back the five feet wide sidewalk to the edge of the railing (minimum 6" depth), and placing concrete a minimum of 6 inches thick the full length of the north sidewalk. The concrete would thicken up to the full depth of the curb (about 11 inches) at a minimum of 15 inches from the face. The sidewalk and curb surface will then be sealed with an epoxy-urethane sealer to prevent further deterioration.

Maintenance of Traffic

The recommended bridge repairs require the removal and replacement of the existing 4 feet high Vandal Protection Fence, patching of the inside of the concrete railing on both sides of the bridge, and the replacement of the sidewalk and curb on the north side of the bridge. The existing Butternut Ridge Road typical section is approximately 50 feet wide roadway and

includes two approximately 12 feet wide travel lanes in the westbound direction, one approximately 12 feet wide travel lane and one approximately 14 feet wide travel lane in the eastbound direction with concrete curb and gutter in each direction. The recommended method of maintaining traffic is to close the right lane of Butternut Ridge Road in accordance with Standard Construction Drawing MT-95.31 Closing Right Lane of a Multi-Lane Undivided Highway with Drums. The northbound and southbound maintenance of traffic would be separate operations to limit traffic delays on Butternut Ridge Road.

The work zone may interfere with the existing traffic pattern on both ends of the bridge since the right lane is a dedicated right turn lane. While traffic is being maintained, the existing dedicated through lane will become a through/right turn lane. It is anticipated that the work zone may interfere with the intersection of Butternut Ridge Road at Canterbury Road to the east and Butternut Ridge Road at Kennedy Ridge Road to the west. Standard Construction Drawing MT-95.31 addresses how to maintain traffic through intersections, if needed.

SITE INSPECTION AND RECOMMENDATIONS REPORT

2016 INSPECTION OF

CUY-480-0727 [Grayton Road over IR 480]

GROUP 1 BRIDGE IN

ODOT DISTRICT 12



Prepared by:

For:



INTRODUCTION

Bridge No. CUY-480-0727 (SFN 1814184) carries two lanes of Grayton Road traffic in each direction over five westbound lanes and five eastbound lanes of IR 480 (including ramps in each direction) in Cleveland, Ohio. The bridge was built as a four span girder bridge with spill through concrete abutments and wingwalls in 1980. The bridge is on a curved left alignment with the beam lines bent at the splices. This bridge received a concrete deck overlay per the 2002 plans. Patching of the concrete railing and sidewalk has been done per the 2006 plans.

The east sidewalk curb has a minor spall, but the west sidewalk curb has about 100 feet of curb with deterioration, cracking or delamination that could be repaired near the south end of the bridge. The west concrete railing has extensive cracking and considerable spalling and delaminated concrete, (requiring approximately 72 linear feet of concrete patching of the inside railing face). The east concrete railing is in similar condition (about 66 linear feet of concrete patching of the inside railing face). The rusty and deteriorated vandal protection fence has stained the concrete railing surface.

The bottom of the original concrete deck has spalled in multiple locations, revealing portions of the bottom mat of reinforcing steel. Additional bottom of deck areas may be delaminated and could potentially fall in the future.

The four foot high vandal protection fence (on 2'-4" concrete railing) is badly rusted with failed vertical and horizontal members and is in poor condition.

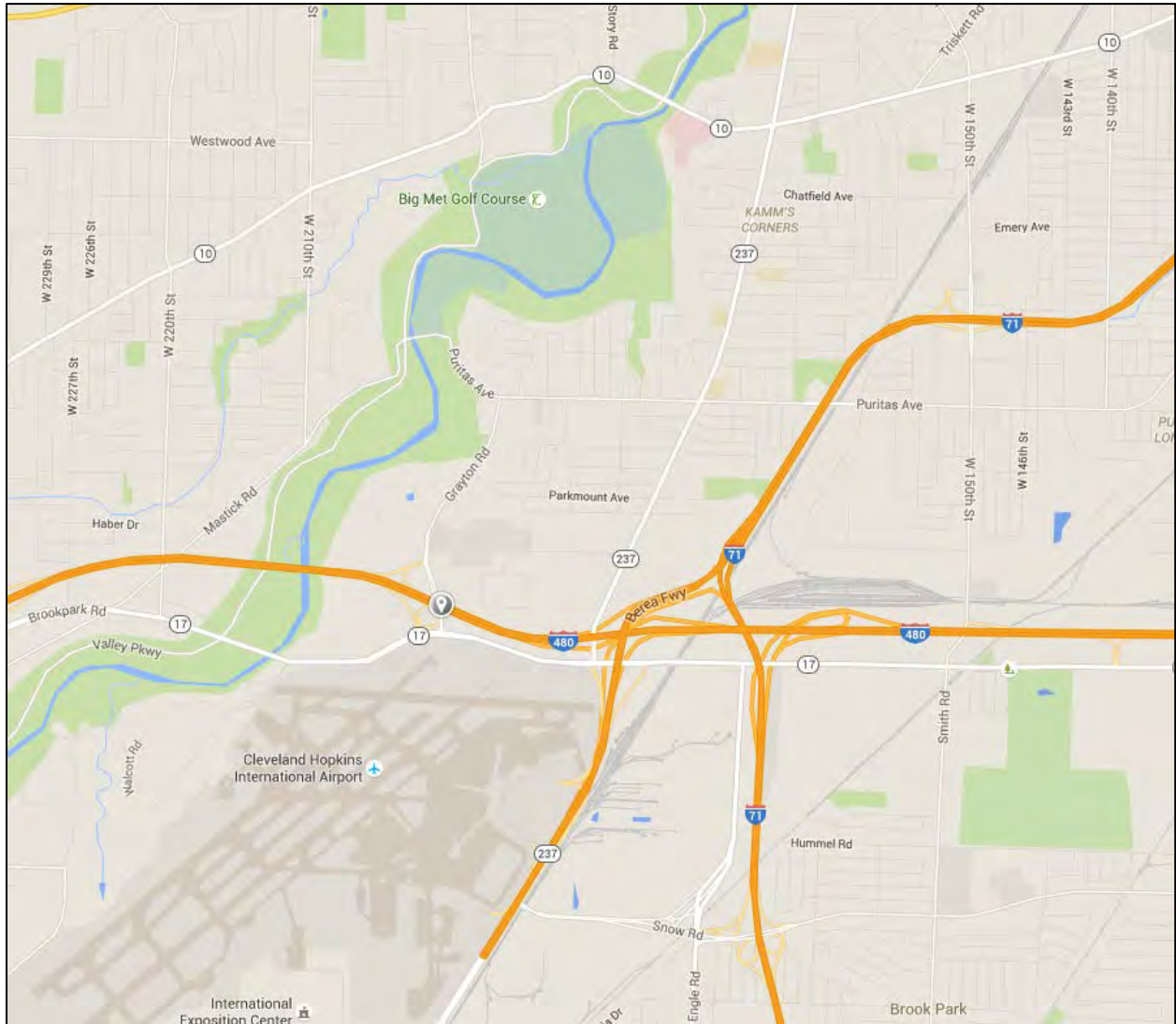
The Ohio Department of Transportation, District 12 (ODOT D12) requested that Richland Engineering Limited inspect, prepare recommendations and develop repair plans for the above referenced bridge.

INSPECTION PROCEDURE

An inspection with photos, measurements and field evaluation was performed for the various items listed in the scope of service. During the inspection deficient areas/items were identified and quantified for repairs. While some deficiencies have been identified during inspection, and are documented within this report, they were not included in the recommended repairs. The recommended repairs included herein are not intended to correct every deficiency, but rather extend the bridge's useful life. Variations with the original plans and subsequent repair plans over the years that could affect the repair details were also identified.

A location map and a copy of the bridge Site Plan, General Plan, Abutment Details and Superstructure Details (1978 plan) are included for reference. Select photos are included in the report showing the areas of deterioration and proposed repairs.

Location Map



SITE INSPECTION AND RECOMMENDATIONS REPORT FOR CUY-480-0727 (Grayton Road over IR 480)

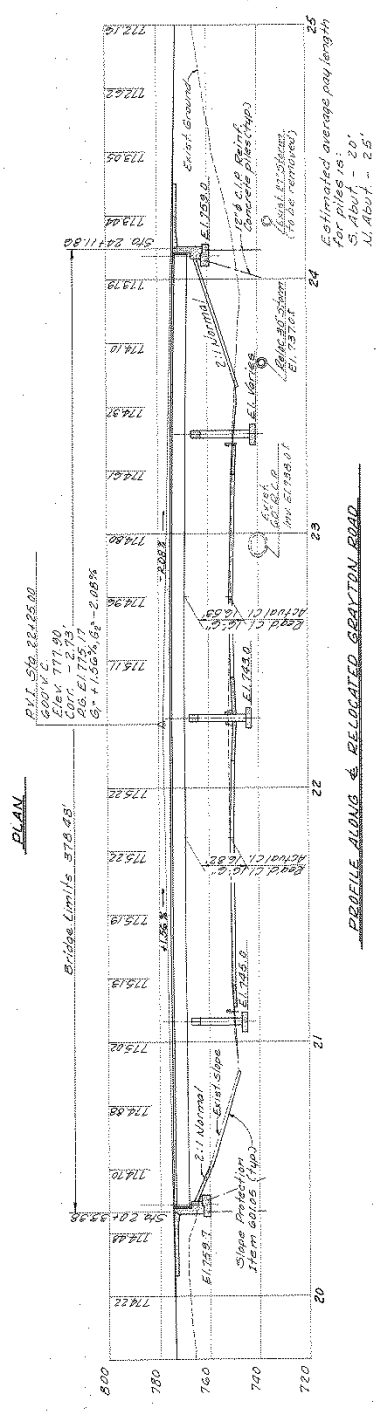
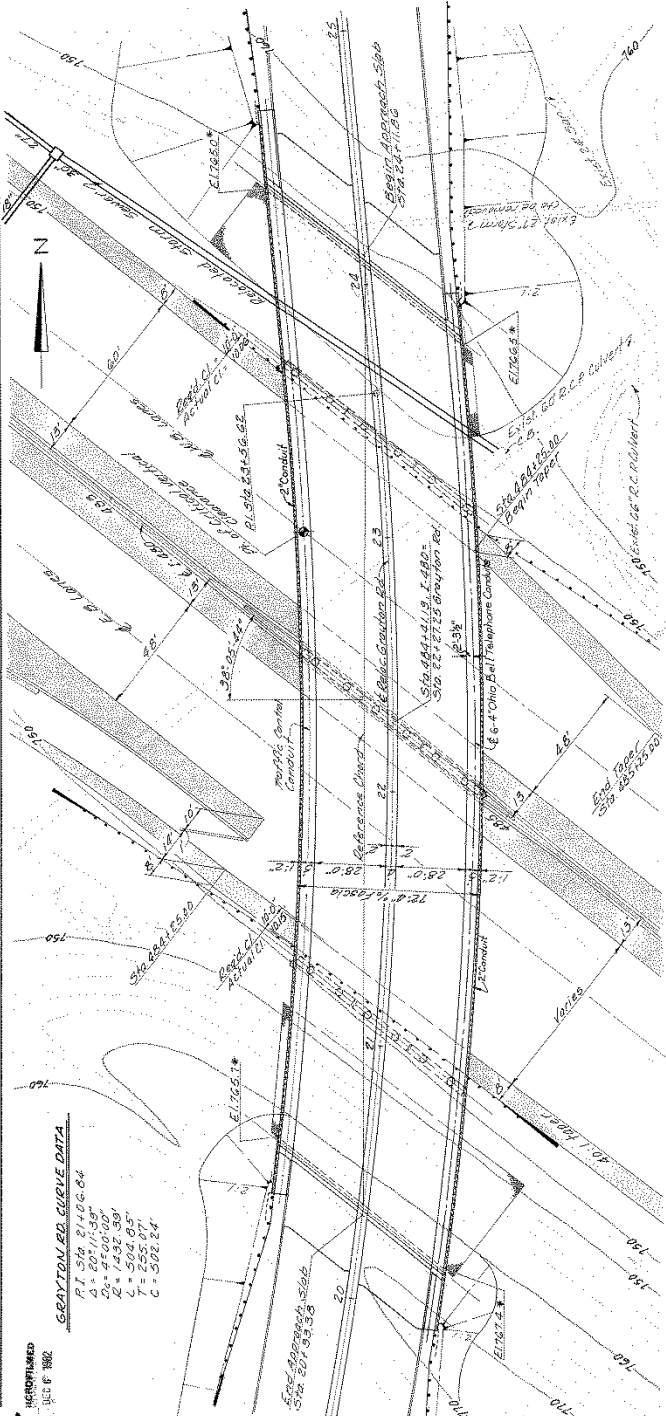
PROJECT	NO. 2
DATE	10/17/80
CITY/TOWNSHIP	CUYAHOGA COUNTY CUT-480-6.78

NOTES:
 Earthwork limits shown are subjective. Actual slopes shall conform to plan cross sections.
 The 24' span bridge sewer and the culvert shall remain as shown.
 For detail of Relocated Storm Sewer see Sht. 27
 * Top of slope elevation at face of abutment.
 For description of Reference Chord see Sht. 3177

PROPOSED STRUCTURE
 TYPE: Continuous steel girders and Substructure
 SPANS: 21'-0", 19'-3", 11'-6", 10'-0"
 BRIDGES: 2 spans along 4800 Grayton Rd. works with Concrete Piers and 4' 0" Chord link frame and 4' 0" curved metal.
 LOADS: HS 20-44 and The Alternate Military Loading (see design notes)
 WEAR SURFACE: 4" E-1 Asphalt concrete
 SKEN: 33'-05" left-hand with Reference Chord
 ALIGNMENT: 8'-10" curve left-hand
 APPROACH SLAB: 45'-02" (105' long)
 SUPERELEVATION: varies

TRAFFIC ESTIMATE
 Design Year: 1980
 ADTT: 18,400
 A.D.T.T.: 520

ALVIN E. STILSON & ASSOCIATES, LIMITED CLEVELAND, OHIO CONSULTING ENGINEERS WESTINGHOUSE BUILDING, N. W. VA.	
SITE PLAN	
BRIDGE NO CUY-480-0727	
1-480 UNDER RELOCATED GRAYTON ROAD	
CUYAHOGA COUNTY	STA. 20 + 33.38
MEM. C.W.M. / J.S.	STA. 24 + 11.85



GRAYTON RD. CURVE DATA
 P.T. Sta 2140.64
 Δ = 207°11'39"
 Δ = 149°2'39"
 L = 504.85'
 T = 255.07'
 C = 302.24'

76



Photo 1: Looking north at east fence and railing. Note rusty fence, railing cracking and previous patching.



Photo 2: Looking at northwest corner of east railing. Note the fence post pipe sleeves embedded in the concrete railing and no base plates.



Photo 3: Looking south over westbound lanes at deck delamination and the exposed bottom mat of reinforcing steel.



Photo 4: Looking north over eastbound lanes at deck delamination. Generally, the south end is not in as bad of condition as the north portion of bridge.

Recommended Repairs

The following describes options to meet the repair items listed in the project scope for CUY-480-0727:

- 1. Remove delaminated concrete from the bottom of the deck.**

Single traffic lanes and shoulders can be closed one at a time while the bottom of deck is sounded and delaminated concrete is removed.

- 2. Install a timber subdeck between the beams over the IR 480 lanes and shoulders.**

The timber subdeck can be constructed and installed while the deck is sounded and traffic is controlled. The sections over the lanes have the same spacing, there is no skew and the only obstacles are the parallel cross frames. Prefabrication and quick installation should

limit construction time. However, the areas over the shoulder have variable widths and changes in skew. This will require more time consuming customized forming.

3. Remove damaged and deteriorated four feet high Vandal Protection Fence.

Since the proposed fence will be higher and the fence post pipe sleeves in the concrete railing are very rusty (there are no base plates or anchor bolts to reuse), the existing pipe sleeves for the fence will be cut off flush with the top of the concrete railing.

4. Install new Vandal Protection Fence.

For structures with sidewalks, the BDM (305.3) requires a minimum fence height of 8 feet above the sidewalk. Typical installations in the area for this type of situation might be a curved 10 or 12 feet high vandal protection fence (VPF-1-90). This will involve using base plate type BP-3 (adhesive anchors) or BP-4 (horizontal through bolts) for the higher fences.

5. Patch the inside of the concrete railing on both north and south sides and seal with epoxy-urethane.

There is a total of approximately 138 linear feet of 2'- 4" high concrete railing that needs repaired. There is periodic cracking (mostly vertical shrinkage type cracks) in the railing that appears to be fairly tight. The surfaces of the railing will be sealed with an epoxy-urethane sealer to prevent further deterioration.

6. Patch the west sidewalk and curb.

Although not in the scope, the south end of the west curb could be patched and repaired since there some is cracking and spalling. The sidewalk and curb surface should then be sealed with an epoxy-urethane sealer to prevent further deterioration.

Maintenance of Traffic

The recommended bridge repairs require the removal of delaminated concrete from the bottom of the deck, the installation of a timber subdeck, removal and replacement of the four feet tall vandal protection fence, patching of the inside of the concrete railing and the patching of the west sidewalk and curb. The existing IR 480 typical section is approximately 70 feet wide in each direction and includes 4 approximately 12 feet wide travel lanes, approximately 11 feet wide inside and outside shoulders.

The recommended method of maintaining traffic is to perform part-width construction along IR 480 in accordance with Standard Construction Drawing MT-95.31 Closing Right Lane of a Multi-Lane Undivided Highway with Drums and Standard Construction Drawing MT-95.32

Closing Left Lane of a Multi-Lane Undivided Highway with Drums. This part with maintenance of traffic will require 2 separate phases maintaining traffic on the two inside lanes in each direction for bridge deck delamination removal and subdeck installation above the two outside lanes and outside shoulder in each direction in phase one. Traffic will be maintained on the two outside lanes in each direction for bridge deck delamination removal and subdeck installation two inside lanes and inside shoulder in each direction in the second phase.

The District 12 permitted lane closure (PLC) times permit a single lane closure (4 lanes to 3 lanes) during the following times:

Weekday:

- 9:00 AM to 6:00 AM (20 hours) in the eastbound direction
- 7:00 PM to 3:00 PM (20 hours) in the westbound direction

Weekend:

- 7:00 PM Friday to 6:00 AM Monday in the eastbound direction
- 7:00 PM Friday to 3:00 PM Monday in the westbound direction

The District 12 permitted lane closure (PLC) times permit a 2 lane closure (4 lanes to 2 lanes) during the following times:

Weekday:

- 10:00 AM to 2:00 PM and from 7:00 PM to 6:00 AM in the eastbound direction
- 9:00 AM to 1:00 PM and from 7:00 PM to 7:00 AM in the westbound direction

Weekend:

- 7:00 PM Friday to 12:00 PM Saturday, 6:00 PM Saturday to 2:00 PM Sunday, and 6:00 PM Sunday to 6:00 AM Monday in the eastbound direction
- 8:00 PM Friday to 11:00 AM Saturday, 6:00 PM Saturday to 12:00 PM Sunday, and 5:00 PM Sunday to 6:00 AM Monday in the westbound direction

It is anticipated that these repairs can be constructed without violating the District 12 permitted lane closures.

The 2015 traffic data was taken from ODOT's Transportation Information Mapping System (TIMS) count location 92618, approximately 0.8 miles west of the CUY-480-0727 Bridge. The 2015 average annual daily traffic (AADT) was approximately 109,150 vehicles (54,850 EB; 54,303 WB) with 5% truck traffic, and a daily directional distribution (D) of approximately 50%. A conservative design hour factor (k) of 10% was assumed to estimate a design hour volume of 5,485 vehicles eastbound and 5,430 vehicles southbound. Assuming a peak capacity of 1,400

vehicles per hour per lane in the MOT condition a maximum capacity of 2,800 vehicles can be carried in each direction leaving approximately 2,685 vehicles eastbound and 2,630 vehicles westbound over capacity in the peak hours.

The part-width construction may create some capacity concerns along IR 480. However, an Alternate Route is not suggested since this project will not require long term closure of the roadway.

SITE INSPECTION AND RECOMMENDATIONS REPORT

2016 INSPECTION OF

LAK-002-1141 [Hendricks Road over SR 2]

GROUP 1 BRIDGE IN

ODOT DISTRICT 12



Prepared by:

For:



INTRODUCTION

Bridge No. LAK-002-1141 (SFN 4301110) carries two lanes of Hendricks Road traffic in each direction over six lanes of SR 2 in Mentor, Ohio. The bridge was built as a four span rolled beam bridge with spill through concrete abutments and wingwalls in 1961. The bridge has a straight alignment and is skewed 30 degrees left forward. Per the 2001 plans the present wearing surface on the bridge roadway is a concrete overlay. The plans also included concrete repairs and a vandal protection fence. The wearing surface is in good condition.

The bottom of the original concrete deck has spalled in multiple locations, revealing portions of the bottom mat of reinforcing steel. Additional bottom of deck areas may be delaminated and could potentially fall in the future.

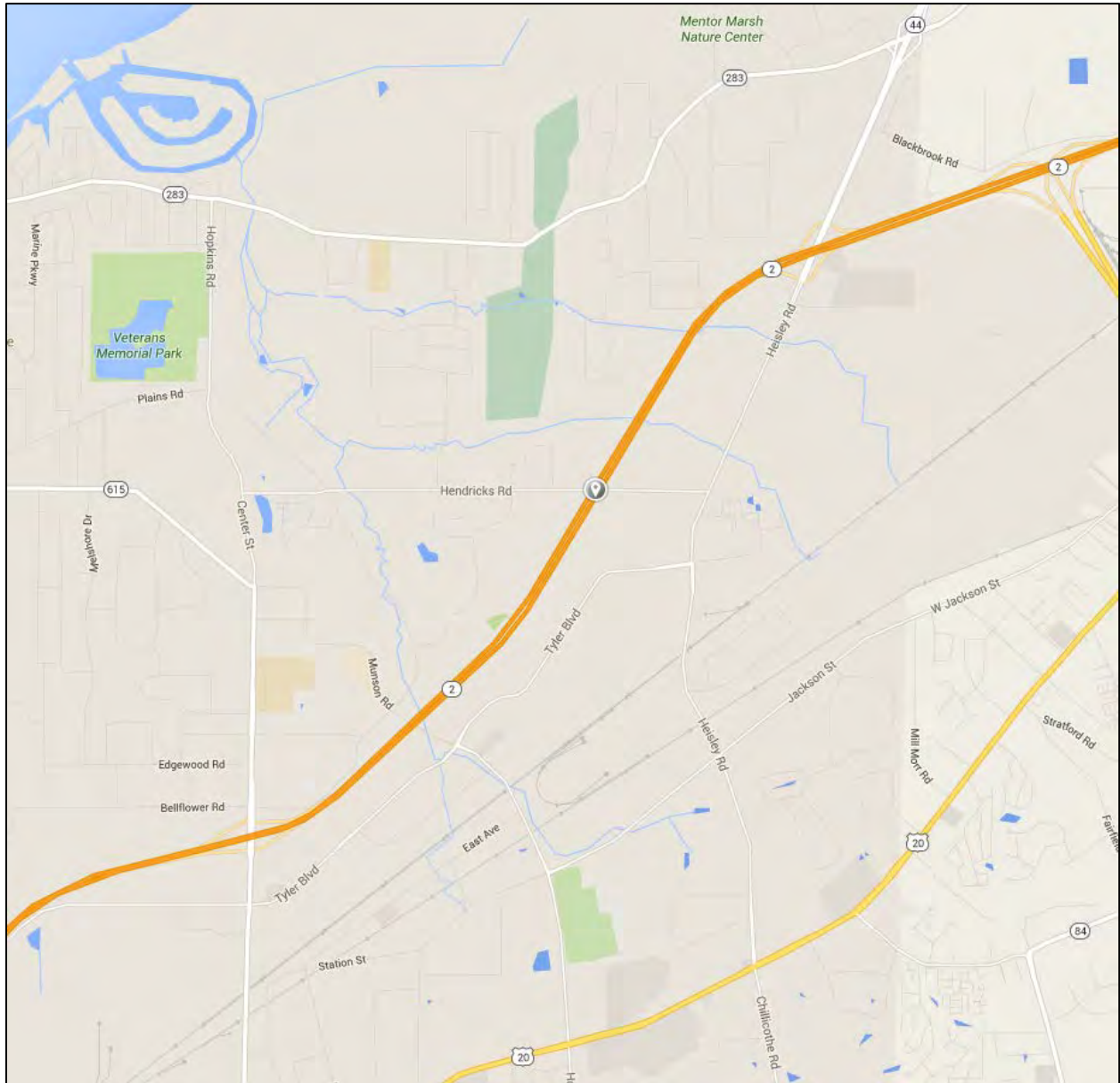
The Ohio Department of Transportation, District 12 (ODOT D12) requested that Richland Engineering Limited inspect, prepare recommendations and develop repair plans for the above referenced bridge.

INSPECTION PROCEDURE

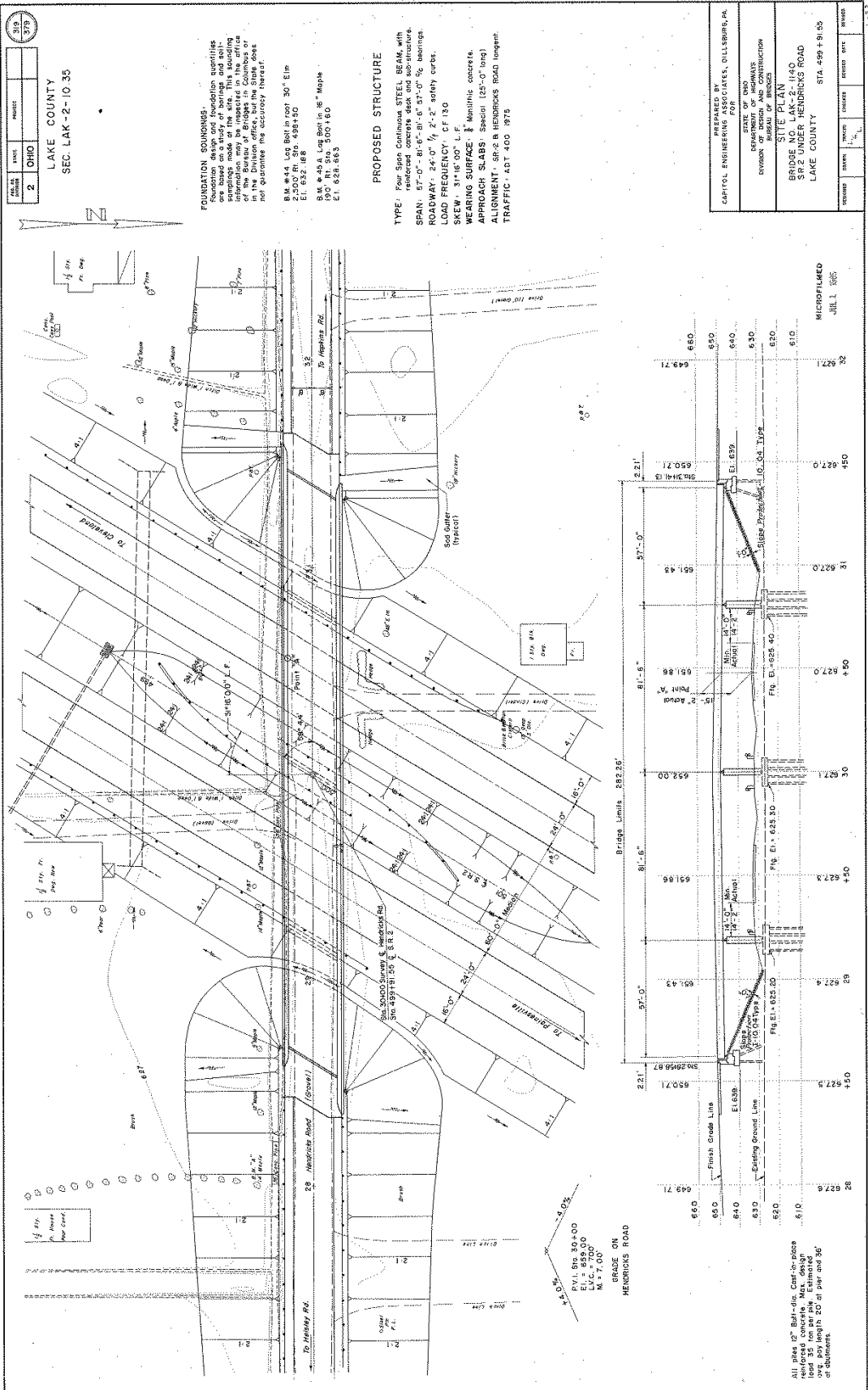
An inspection with photos, measurements and field evaluation was performed for the various items listed in the scope of service. During the inspection deficient areas/items were identified and quantified for repairs. While some deficiencies have been identified during inspection, and are documented within this report, they were not included in the recommended repairs. The recommended repairs included herein are not intended to correct every deficiency, but rather extend the bridge's useful life. Variations with the original plans and subsequent repair plans over the years that could affect the repair details were also identified.

A location map and a copy of the bridge Site Plan and framing plan (1961 plan) are included for reference. Select photos are included in the report showing the areas of deterioration and proposed repair.

Location Map



SITE INSPECTION AND RECOMMENDATIONS REPORT FOR LAK-002-1141 (Hendricks Road over SR2)



DATE	PROJECT
2/22/07	
2	OHIO

LAKE COUNTY
SEC. LAK-2-10.35

NOTES

PAINTING. After the steel work has been placed and, where necessary, supported in accordance with Sec. 8.04, an additional coat of the outside face of the outside steel beams and all sides of the bottom flange.

DECK. The quantity of concrete to be placed in the deck shall be based on this dimension, even though deviation of the beam may not have the exact camber or contribution required to place it parallel to the center line.

BEAM SPLICE WELDING PROCEDURE

1. Flare end of beam of Pier No. 2.
2. Bolt and beam through end web of Pier No. 1.
3. Weld top and bottom flange connecting plates of each flange, then the web, except, using one piece of concrete shall progress upward. This side may be welded in two pieces, one piece of Pier No. 1.
4. Make splice of Pier No. 2 and 3 in the same manner.
5. Make splice of Pier No. 2 and 3 in the same manner.

CONCRETE shall be Class C.

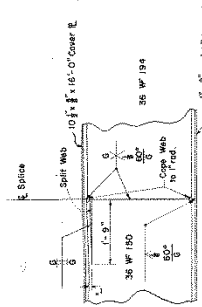
CONCRETE and reinforcing steel shall be placed construction All Reinforcing Steel shall have 2" of cover from all faces except as otherwise shown.

CONCRETE REEF PLACING in order to facilitate water concrete shall progress upward. This side may be welded in two pieces, one piece of Pier No. 1.

plates which are parallel to transverse reinforcing steel and are located near the center of any span.

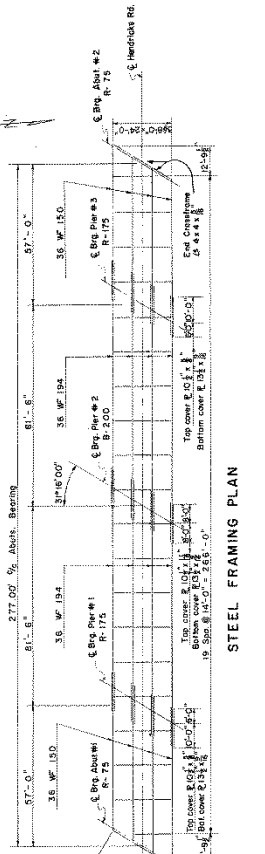
REFERENCE shall be made to Standard Drawing CB-2-56, Piers, Towers, Risk Transverse plates and end connections, reverse 2-2-53 for details of rollers and bearings.

REFERENCE shall be made to Standard Drawing RB-1-55, Reverse 2-2-53 for details of aluminum railing, Type X, and concrete parapet details.

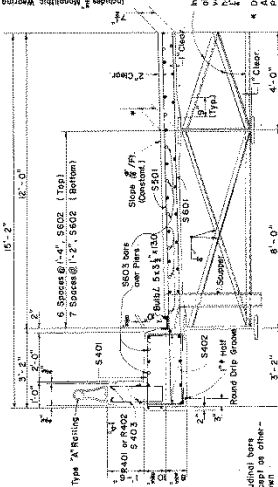


BEAM SPLICE DETAIL (AT PIER #1 & #3)
For Beam Splice Details @ Pier No. 2 see Std. Draw. No. CB-2-56 sheet 3 of 6 reverse 2-2-59.

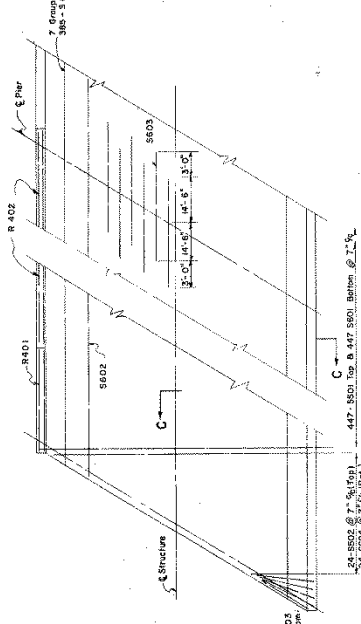
DEFLECTION AND CAMBER	
LOCATION	SPAN 1: SPAN 2: SPAN 3: SPAN 4:
Deflection due to	1" 1" 1" 1"
Deflection due to	1" 1" 1" 1"
Remaining dead load	1" 1" 1" 1"
Sum of Deflection	1" 1" 1" 1"
Required Camber	1" 2" 2" 2"



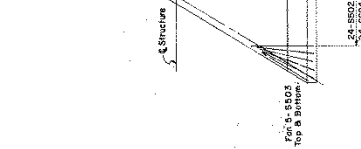
STEEL FRAMING PLAN



SECTION A-A



SECTION B-B



PART DECK PLAN

SEC. L-33	PREPARED BY	REVIEWED
CAPITOL ENGINEERING ASSOCIATES, DILLERSVILLE, PA	DATE	DATE
DEPARTMENT OF HIGHWAYS	DATE	DATE
DIVISION OF DESIGN AND CONSTRUCTION	DATE	DATE
SUBSTRUCTURE AND APPROACH SLAB DETAILS	DATE	DATE
BRIDGE NO. LAK-2-1140	DATE	DATE
SR 2 UNDER HENDRICKS ROAD	DATE	DATE
LAKE COUNTY	DATE	DATE
STA. 499+91.55	DATE	DATE



Photo 1: Typical view under the bridge looking north across the eastbound lanes.



Photo 2: Looking north over the eastbound lanes at deck spalling. This appears to be the worst area.



Photo 3: Looking north over the westbound lanes at deck spalling.

Recommended Repairs

The following describes options to meet the repair items listed in the project scope for LAK-002-1141:

- 1. Remove delaminated concrete from the bottom of the deck.**

Single traffic lanes and shoulders can be closed one at a time while the bottom of deck is sounded and delaminated concrete is removed.

- 2. Install a timber subdeck between the beams over the SR 2 east and westbound lanes and shoulders.**

The timber subdeck can be constructed and installed while the deck is sounded and traffic is controlled. Staggered timber subdeck areas will be used in the beam bays adjacent to the piers due to the skew to fully cover the shoulders. Since the beams are the same spacing and the only obstacles are the parallel cross frames, prefabrication and quick installation should limit construction time.

Maintenance of Traffic

The recommended bridge repairs require the removal of delaminated concrete from the bottom of the deck and the installation of a timber subdeck. The existing State Route 2 typical section is approximately 58 feet wide in each direction and includes three 12 feet wide travel lanes, an approximately 11 feet wide inside shoulder, and an approximately 11 feet wide outside shoulder in each direction.

The recommended method of maintaining traffic is to perform part-width construction in accordance with Standard Construction Drawing MT-95.30 Closing Right or Left Lane of a Multi-Lane Divided Highway with Drums. This part width maintenance of traffic will require two separate phases maintaining traffic on the inside lane and middle lane for bridge deck delamination removal and subdeck installation above the outside lane and outside shoulder in phase one. Traffic will be maintained on the outside lane and outside shoulder in each direction for bridge deck delamination removal and subdeck installation over the inside lane, middle lane and inside shoulder in each direction in the second phase.

The District 12 permitted lane closure (PLC) times allow a single lane closure (3 lanes to 2 lanes) during the following times:

Weekday:

- 6:00 PM to 4:00 PM (22 hours) in the eastbound direction
- 8:30 AM to 6:30 AM (22 hours) in the westbound direction

Weekend:

- 7:00 PM Friday to 4:00 PM Monday eastbound direction
- 8:30 AM Friday to 6:30 AM Monday in the westbound direction

The District 12 permitted lane closure (PLC) times allow a 2 lane closure (3 lanes to 1 lane) during the following times:

Weekday:

- 8:00 PM to 7:00 AM in the eastbound direction
- 7:00 PM to 6:00 AM in the westbound direction

Weekend:

- 8:00 PM Friday to 10:00 AM Saturday, 7:00 PM Saturday to 11:00 AM Sunday, and 6:00 PM Sunday to 6:30 AM Monday in the eastbound direction
- 7:30 PM Friday to 10:00 AM Saturday, 7:00 PM Saturday to 12:00 PM Sunday, and 8:00 PM Sunday to 6:00 AM Monday in the westbound direction

It is anticipated that these repairs can be constructed without violating the District 12 permitted lane closures.

The 2015 traffic data was taken from ODOT's Transportation Information Mapping System (TIMS) count location 30343, approximately 0.2 miles south of the LAK-002-1141 Bridge. The 2015 average annual daily traffic (AADT) was approximately 54,395 vehicles (27,123 EB; 27,272 WB) with 3% truck traffic, and a daily directional distribution (D) of approximately 50%. A conservative design hour factor (k) of 10% was assumed to estimate a design hour volume of 2,715 vehicles eastbound and 2,730 vehicles westbound. Assuming a peak capacity of 1,400 vehicles per hour per lane in the MOT condition a maximum capacity of 2,800 vehicles can be carried in each direction. It is anticipated that 2 lanes will need to be maintained in each direction in order to provide the necessary capacity in the MOT condition.

The proposed repairs below the existing bridge deck are not anticipated to affect the Hendricks Road roadway.