| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642 (3) | |

1 / 148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

ER-1642(3) ISSUE NO. 1

WE, THE COMMISSIONERS OF CUYAHOGA COUNTY, IN FORMAL SESSION HEREBY APPROVE THESE PLANS AND CERTIFY THAT THE NECESSARY RIGHT-OF-WAY IS AVAILABLE. WE AGREE TO MAINTAIN THE PROJECT IN A MANNER SATISFACTORY TO THE DIRECTOR OF TRANSPORTATION, STATE OF OHIO, OR HIS DULY AUTHORIZED REPRESENTATIVE AND WILL MAKE AMPLE PROVISION EACH YEAR FOR SUCH MAINTENANCE.

DONE UNDER AUTHORITY OF SECTIONS 5555.02 ET SEQ. AND 5535.01 OF THE REVISED CODE OF OHIO.

BOARD COMMISSIONERS - CUYAHOGA COUNTY

8/12/74

# STATE OF OHIO
# DEPARTMENT OF TRANSPORTATION
# DENISON - HARVARD BRIDGE
## CUYAHOGA COUNTY
## CITY OF CLEVELAND
## VILLAGE OF CUYAHOGA HEIGHTS
## GRADE SEPARATION WITH
## BALTIMORE & OHIO RAILROAD CO.,
## NORFOLK & WESTERN RAILWAY CO.,
## RIVER TERMINAL RAILWAY CO. AND
## REPULBIC STEEL CORP.

REC'D. L & D 11-28-75
T.M.K.
W.O.S.
R/W
CONST.
UTIL.

Sheets 64, 110, & 111 revised 4-30-75 EBL
Sheet 64 revised 5-23-75 EBL
Sheets 78, 98, 114, 115, & 125 revised 6-9-75 EBL
Sheet 113A supersedes sheet 113. 6-9-75 EBL
Sheet 75 revised 9-5-75 EBL
Sheets 113A, 114, & 115 revised 9-26-75 E.B.L.

| SHEETS REVISED 8-22-75 | | SHEETS ADDED 8-22-75 |
|---|---|---|
| Sheet No. | Rev. by | Sheet No. |
| 134B | C.P.&W.E.B. | |
| 1 | W.E.B. | 59A |
| 58 | C.A.B. | 106A |
| 59 | W.E.B. | 107A |
| 64 | C.P.&W.E.B. | 107B |
| 105 | C.P. | |
| 106 | C.P. | |
| 107 | W.E.B. | |
| 121 | C.P.&W.E.B. | |
| 124 | C.P. | |
| 128 | C.P. | |
| 129 | C.P. | |
| 130 | C.P. | |

Sheets 106A & 107B revised 10-31-75 E.B.L.

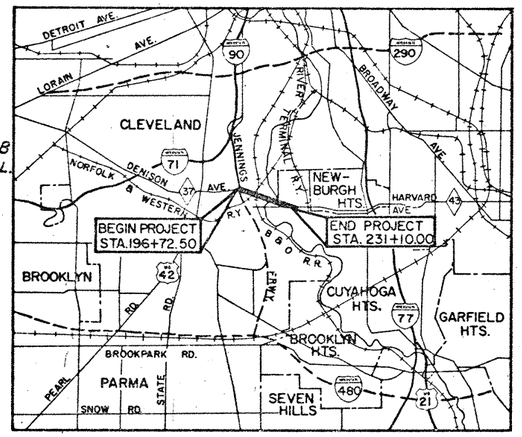
## CONVENTIONAL SIGNS

PROPERTY LINE
EXISTING RIGHT OF WAY LINE
SUBDIVISION LINE
SUBLOT LINE OR EXISTING EASEMENT LINE
ORIGINAL TOWNSHIP LOT LINE
CORPORATION LINE
SLOPE EASEMENT LINE
RIGHT OF WAY LINE
SEWER EASEMENT LINE
EXISTING STORM SEWER
EXISTING SANITARY SEWER
CENTER LINE
FENCE LINE
WATER LINE
GAS LINE
TELEPHONE CONDUIT
GUARD RAIL (EXISTING)
GUARD RAIL (PROPOSED)
RAILROAD
POWER POLES
TELEPHONE POLES
POWER AND TELEPHONE POLES
LIGHT POLES
ELECTRICAL TOWER
FIRE HYDRANT (EXISTING)
MANHOLE (EXISTING)
MANHOLE (PROPOSED STORM)
CATCH BASIN OR INLET (EXISTING)
CATCH BASIN OR INLET (PROPOSED)
WATER VALVE OR GAS VALVE (EXISTING)
ROCK CHANNEL PROTECTION
SIDEWALK
TREES (EXISTING)
PROPOSED STORM SEWER

## INDEX OF SHEETS


| | | | |
|---|---|---|---|
| Title Sheet | 1 | Drainage Details | 21-25 |
| Schematic Plan | 2 | Cross Section Layout | 26 |
| Geometric Plan | 3 | Cross Sections | 27-40 |
| Typical Sections | 4 | Lighting Plans | 41-47 |
| General Notes | 5-7 | Waterwork Plans | 48-54 |
| Computations and Sub-Summaries | 8,9 | Structure Plans | 55-134, 134A,B |
| General Summary | 10, 11 | R/W Plans | 136-148 |
| Plan-Profile | 12 | | |
| Miscellaneous Details | 13-17, 17A | | |
| Drainage Plan-Profile | 18-20 | | |

Sheet No 135 Deleted


LOCATION MAP

1 0 1 2
SCALE IN MILES

## LINE DATA

Begin Project Sta. 196+72.50
End Project Sta. 231+10.00
Total Length of Project = 3437.50 Ft. = 0.651 Miles
Add for Work
Sta. 196+55 to Sta. 196+72.50 = 17.50 Ft.
Sta. 231+10.0 to Sta. 231+40.0 = 30.0 Ft.
Total Length of Work = 3485.0 Ft. = 0.660 Miles

## SUPPLEMENTAL SPECIFICATIONS

| NUMBER | DATE | NUMBER | DATE |
|---|---|---|---|
| 805 | 1-1-71 | | |
| 808 | 1-1-71 | | |
| 836 | 1-1-71 | | |
| 839 | 11-25-70 | | |
| 903 | 1-1-69 | | |
| S628 | 1-11-74 | | |
| S713 | 1-11-74 | | |
| 1001 | 9-20-72 | | |

PREPARED AND RECOMMENDED BY
HOWARD NEEDLES TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
CLEVELAND

Browning Crow
BROWNING CROW

| FILE NO. | CUYAHOGA COUNTY<br>DATE OF LETTING<br>CONTRACT NO. |
|---|---|

PORTION TO BE IMPROVED
INTERSTATE HIGHWAY
U.S. ROUTE
COUNTY ROADS
OTHER ROADS
UNDER CONSTRUCTION

PLAN 1"=20'
CROSS SECTIONS 1"=5'
PROFILE HOR 1"=20'
PROFILE VERT 1"=5'

DESIGN DESIGNATION
Design Year ADT = 22,400
DHV = 1520
D = 50/50
T = 15%
V = 50 MPH

## STANDARD DRAWINGS

| NUMBER | DATE | NUMBER | DATE |
|---|---|---|---|
| BP-1 | 6-1-65 | | |
| BR-2-67 | 10-15-71 | HL-1 | 9-6-73 |
| CB-2-2-AEB | 6-1-65 | HL-2 | 7-27-73 |
| GR-2R | 11-9-71 | HL-3 | 7-27-73 |
| MC-1 | 6-13-69 | HL-4 | 9-6-73 |
| GR-4 | 11-9-71 | HL-5 | 9-6-73 |
| HW-1 | 6-1-65 | HL-7 | 9-6-73 |
| MC-5 | 6-1-65 | HL-8 | 9-6-73 |
| AS-1-72 | 6-30-72 | HL-9 | 9-6-73 |
| RB-1-55 | 2-2-59 | HL-15 | 4-6-73 |
| BP-3 | 1-1-71 | HL-16 | 4-6-73 |
| MC-4 | 6-13-69 | SD-1-69 Sht. 2 | 6-12-69 |
| MC-5 | 6-1-73 | | |
| L-1 | 6-1-73 | | |

## 1975 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

THE RIGHT OF WAY FOR THIS IMPROVEMENT WILL BE PROVIDED BY THE STATE OF OHIO.

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING OF THE HIGHWAY TO TRAFFIC AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

APPROVED a.s. Porter
DATE 7/16/74 CUYAHOGA COUNTY ENGINEER

APPROVED Joseph F Powell
DATE 1-12-75 DISTRICT DEPUTY DIRECTOR OF TRANSPORTATION

APPROVED Robert B Pfeifer
DATE 2-4-75 ENGINEER, BUREAU OF BRIDGES

APPROVED E J Schaffer
DATE 2-11-75 ENGINEER, BUREAU OF ROADWAY DESIGN

APPROVED William E Stoll
DATE 2-11-75 ASSISTANT DEPUTY DIRECTOR FOR HIGHWAY DESIGN

APPROVED Lee Billingsley
DATE 2/11/75 ASSISTANT DEPUTY DIRECTOR FOR REAL ESTATE

APPROVED Howard E. Nott
DATE 2-11-75 ASSISTANT DEPUTY DIRECTOR FOR PROGRAM DEVELOPMENT

APPROVED
DATE ____ CHIEF ENGINEER, DIVISION OF HIGHWAYS

APPROVED William W Forbes
DATE 2-11-75 DEPUTY DIRECTOR, DIVISION OF HIGHWAYS

APPROVED David R Weiss
DATE 2-12-75 ASSISTANT DIRECTOR, DEPARTMENT OF TRANSPORTATION

APPROVED Richard D Parker
DATE 2-12-75 DIRECTOR, DEPARTMENT OF TRANSPORTATION

THIS PLAN SHEET HAS BEEN REVISED SEE REVISION 19

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
THIS PLAN SHEET HAS BEEN REVISED
APPROVED SEE REVISION 3-19-1976
DIVISION ENGINEER DATE

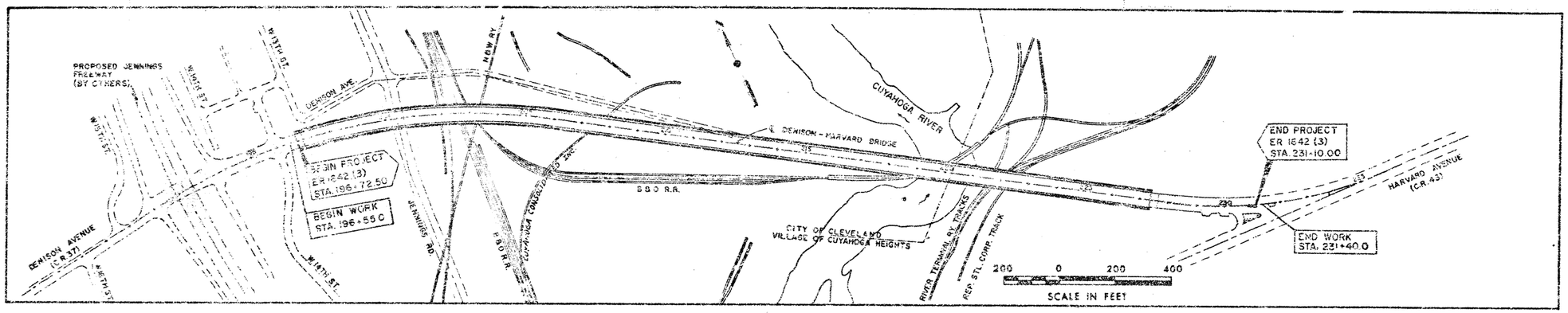
REV. W.E.B. 8-22-75

# SCHEMATIC PLAN

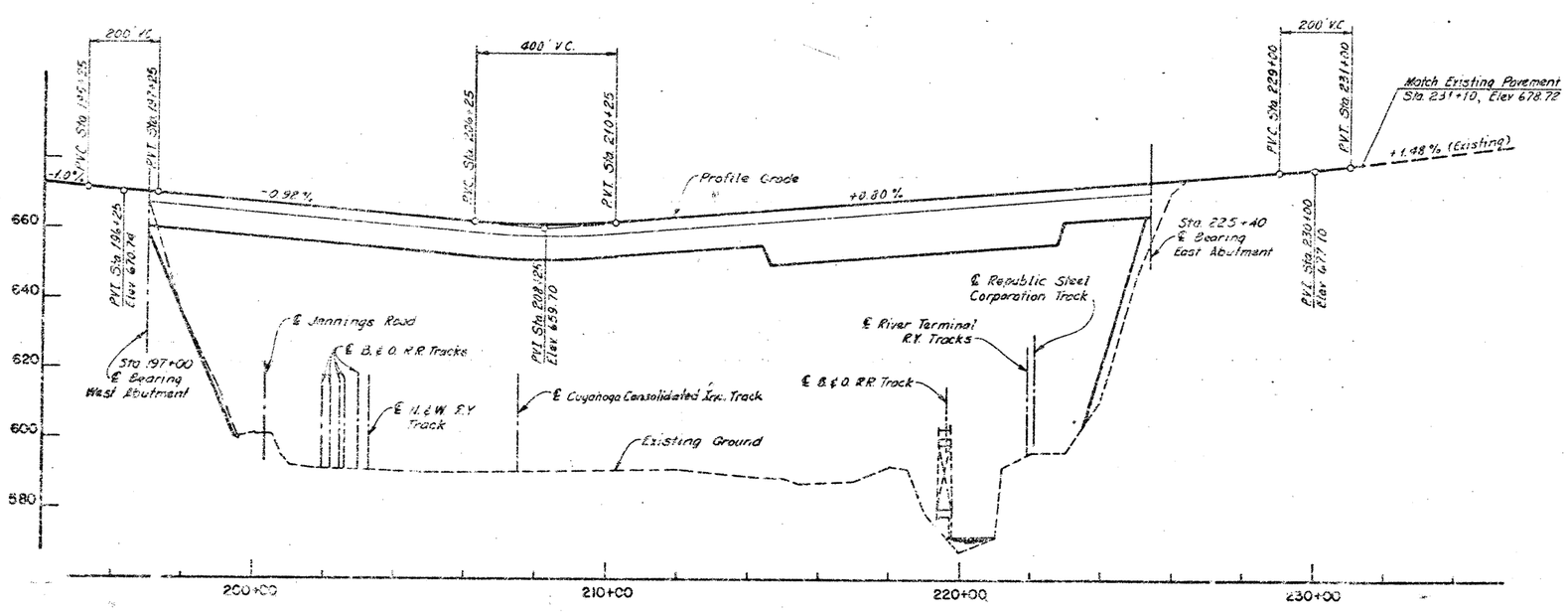
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

2/148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




PLAN




PROFILE

HORIZONTAL 200 0 200 400
VERTICAL 20 0 20 40
SCALE IN FEET

MADE JKS DATE 1-6-76
TRACED JKS DATE 3-10-76
CHECKED MAS DATE 3-12-76
SCALE AS SHOWN

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND OHIO

HNTB

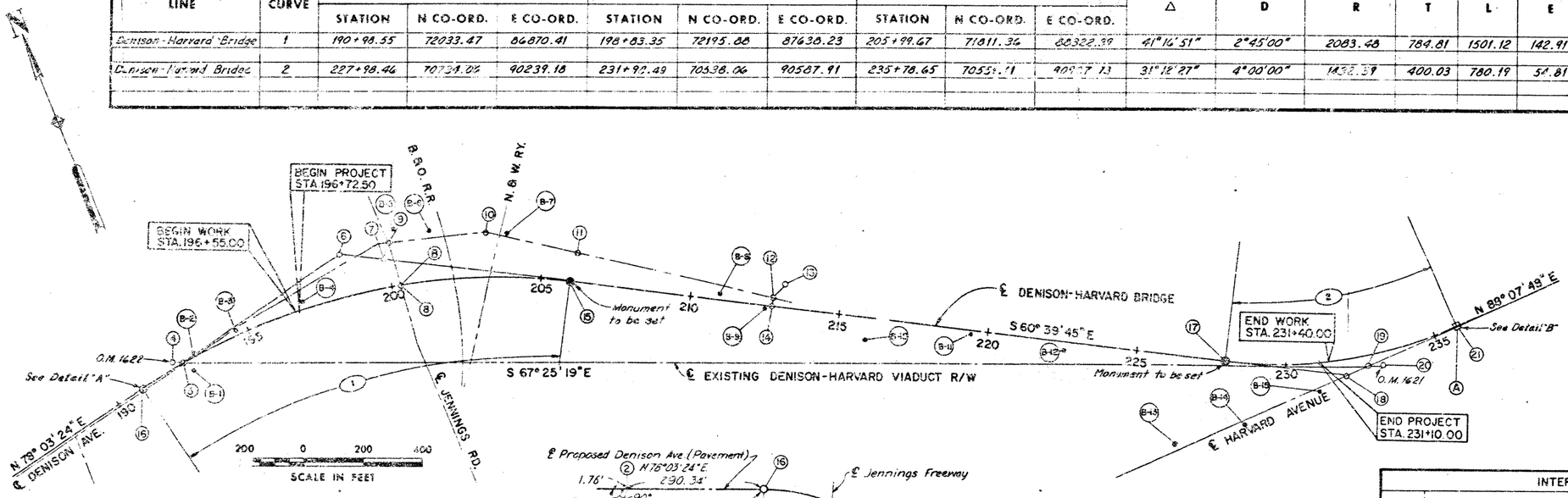
# GEOMETRIC PLAN

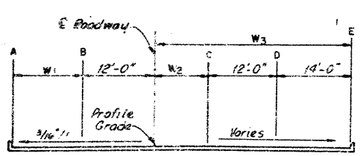
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

3 / 148

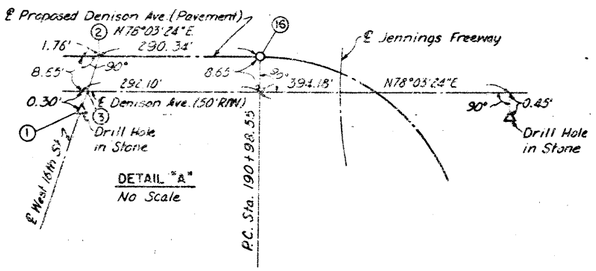
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

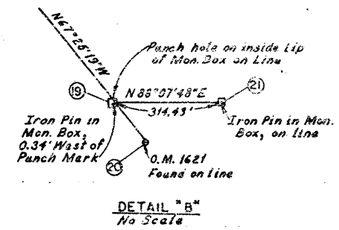
| LINE | CURVE | P.C. STATION | P.C. N CO-ORD. | P.C. E CO-ORD. | P.I. STATION | P.I. N CO-ORD. | P.I. E CO-ORD. | P.T. STATION | P.T. N CO-ORD. | P.T. E CO-ORD. | Δ | D | R | T | L | E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Denison-Harvard Bridge | 1 | 190+98.55 | 72033.47 | 86870.41 | 198+83.35 | 72195.88 | 87638.23 | 205+99.67 | 71811.36 | 88322.39 | 41°14'51" | 2°45'00" | 2083.48 | 784.81 | 1501.12 | 142.91 |
| Denison-Harvard Bridge | 2 | 227+98.46 | 70734.05 | 90239.18 | 231+92.49 | 70538.06 | 90587.91 | 235+78.65 | 70551.11 | 90937.73 | 31°12'27" | 4°00'00" | 1432.39 | 400.03 | 780.19 | 54.81 |
| | | | | | | | | | | | | | | | | |




SUPERELEVATED SECTION




DETAIL "B"
No Scale

| INTERSECTION DATA | | | | |
|---|---|---|---|---|
| POINT | LOCATION | STATION | COORDINATES NORTH | COORDINATES EAST |
| A | ℄ Denison - Harvard | 235+78.65 | 70551.11 | 90937.73 |
| | ℄ Harvard Ave. | 32+00.64 | | |
| B(8) | ℄ Denison - Harvard | 200+37.60 | 70217.73 | 87801.40 |
| | ℄ Jennings Rd. | 63+72.49 | | |

SUPERELEVATION TABLE & LONGITUDINAL JOINT LOCATION

| STATION | A | W1 | B | PROFILE GRADE | W2 | C | D | E | W3 |
|---|---|---|---|---|---|---|---|---|---|
| 227+75 | 676.39 | 14.00' | 675.41 | 675.30 | 0 | 675.30 | 675.41 | 676.39 | 26.00' |
| 228+00 | 675.39 | 14.00' | 675.31 | 675.50 | 0 | 675.50 | 675.31 | 675.08 | 26.00' |
| 228+25 | 675.29 | 14.00' | 675.51 | 675.70 | 0 | 675.70 | 675.51 | 675.29 | 26.00' |
| 228+50 | 675.49 | 14.00' | 675.71 | 675.90 | 0 | 675.90 | 675.71 | 675.49 | 26.00' |
| 228+75 | 675.69 | 14.00' | 675.91 | 676.10 | 0 | 676.10 | 675.91 | 675.69 | 26.00' |
| 229+00 | 675.89 | 14.00' | 676.11 | 676.30 | 0 | 676.30 | 676.11 | 675.89 | 26.00' |
| 229+25 | 676.10 | 14.00' | 676.32 | 676.51 | 0 | 676.51 | 676.32 | 676.10 | 26.00' |
| 229+50 | 676.33 | 14.00' | 676.12 | 676.74 | 0 | 676.74 | 676.55 | 676.33 | 26.00' |
| 229+75 | 676.55 | 14.00' | 676.34 | 677.00 | 0.08' | 677.00 | 676.81 | 676.59 | 26.08' |
| 230+00 | 676.36 | 14.00' | 677.08 | 677.27 | 0.57' | 677.27 | 677.08 | 676.86 | 26.57' |
| 230+25 | 677.16 | 14.00' | 677.38 | 677.57 | 1.51' | 677.57 | 677.38 | 677.16 | 27.51' |
| 230+45 | 677.41 | 14.00' | 677.63 | 677.82 | 2.61' | 677.82 | 677.67 | 677.28 | 28.61' |
| 230+50 | 677.61 | 14.00' | 677.[illegible] | 677.88 | 2.80' | 677.88 | 677.74 | 677.54 | 28.99' |
| 230+75 | 677.91 | 14.00' | 678.03 | 678.22 | 4.72' | 678.22 | 678.12 | 678.01 | 30.72' |
| 231+00 | 678.21 | 9.70' | 678.34 | 678.58 | 7.00' | 678.58 | 678.53 | 678.47 | 33.00' |
| 231+10 | 678.41 | 8.00' | 678.53 | 678.72 | 8.09' | 678.72 | 678.69 | 678.65 | 34.09' |
| | | | | | | | | | |

TRAVERSE POINTS

| POINT | COORDINATES NORTH | COORDINATES EAST | DISTANCE From Pt. | DISTANCE To Pt. | Length | Bearing |
|---|---|---|---|---|---|---|
| 1 | 71964.298 | 86586.522 | —— | —— | | |
| 2 | 71973.02 | 86584.64 | 1 | 2 | 9.12' | N 01° 21' 59" W |
| 3 | 71964.560 | 86586.429 | 1 | 3 | 0.30' | N 01° 21' 59" W |
| 16 | 72033.471 | 86870.411 | 2 | 16 | 290.34' | N 78° 03' 24" E |
| 5 | 72057.53 | 87025.97 | 2 | 5 | 434.93' | N 78° 03' 24" E |
| 4 | 72075.90 | 86941.79 | 5 | 4 | 47.84' | S 67° 25' 19" E |
| 6 | 72195.882 | 87638.230 | 16 | 6 | 748.81' | N 78° 03' 24" E |
| 7 | 72109.67 | 87791.63 | 6 | 7 | 175.97' | S 60° 39' 45" E |
| 9 | 72140.61 | 87820.26 | 7 | 9 | 58.43' | N 29° 20' 15" E |
| B(8) | 70217.73 | 87801.40 | 9 | 5 | 144.120' | S 07° 31' 11" W |
| 10 | 72071.13 | 88119.20 | 9 | 10 | 312.53' | S 73° 21' 50" E |
| 11 | 71891.[illegible] | 88372.39 | 10 | 11 | 310.75' | S 54° 35' 44" E |
| 12 | 71500.49 | 88922.26 | 11 | 12 | 673.88' | S 54° 35' 44" E |
| 13 | 71516.99 | 38933.85 | 12 | 13 | 20.00' | N 35° 24' 16" E |
| 14 | 71480.56 | 88910.97 | 12 | 14 | 23.08' | S 29° 20' 15" E |
| 15 | 71811.343 | 88322.385 | 14 | 15 | 675.14' | N 60° 39' 45" W |
| 17 | 70734.057 | 90239.181 | 14 | 17 | 1523.43' | S 60° 39' 45" E |
| 18 | 70538.059 | 90587.909 | 17 | 18 | 400.003' | S 60° 39' 45" E |
| 19 | 70545.036 | 90801.395 | 18 | 19 | 85.60' | N 88° 07' 48" E |
| 20 | 70518.680 | 90726.790 | 19 | 20 | 57.75' | S 67° 25' 19" E |
| 21 | 70551.113 | 90940.987 | 19 | 21 | 314.43' | N 88° 07' 48" E |

BENCH MARKS

| B.M. NO. | DESCRIPTION | ELEV. |
|---|---|---|
| B-1 | OM 1623 - 122 ft. East of ℄ W. 14th St. (South). 25 ft. South of ℄ Old Denison-Harvard Br. | 674.011 |
| B-2 | OM 1624 - 26 ft. North of ℄ Old Denison-Harvard Bridge, opposite B-1. | 673.866 |
| B-3 | Nail and "V" on C.E.I. pole No. 313782, S.W. corner existing Denison Ave. and Relocated W. 14th St. | 670.29 |
| B-4 | Nail and "V" on M.E.L.P. pole No. 41026, 10 ft. South of ℄ existing Denison Ave. and 21 ft. East of ℄ W. 13th St. | 658.55 |
| B-5 | Nail and "V" on M.E.L.P. pole No. 41013 on N.E. corner of intersection of existing Denison Ave. and Jennings Rd. | 604.34 |
| B-6 | Nail and "V" on C.E.I. pole 30 ft. North of ℄ existing Denison Ave. and 142 ft. East of ℄ Jennings Rd. at corner of National Solvent Corp. fence. | 595.89 |
| B-7 | Nut on S.W. side of base of crossing signal, second set of R.R. tracks East of Jennings Rd., 67 ft. East of angle point in ℄ existing Denison Ave. and 10 ft. North of same ℄. | 591.61 |
| B-8 | "O" in open hydrant on South side existing Denison Ave., Approximately 22 ft. North of Station 211+00 ℄ New Denison-Harvard Bridge. | 592.42 |
| B-9 | Nail in C.E.I. pole No. 546567 on South side existing Denison Ave. at East end of pavement, approximately 2 ft. South of Station 212+57.40 ℄ New Denison-Harvard Bridge. | 592.17 |
| B-10 | Nut on base of first railing post on West end of R.R. Bridge, approximately 67 ft. South of Station 215+91 ℄ New Denison-Harvard Bridge. | 594.82 |
| B-11 | Bolt at base of 30th post from East end of R.R. Bridge, approximately 5 ft. South of Station 219+38 ℄ New Denison-Harvard Bridge. | 594.51 |
| B-12 | Nail and "V" on pole approximately 37 ft. South of Sta. 222+37 ℄ New Denison-Harvard Br. | 597.43 |
| B-13 | "O" in open hydrant on North side of existing Harvard Ave., approximately 616 ft. West of P.I. ℄ New Denison-Harvard Bridge at East Drive of Roger's Trucking Co. | 655.67 |
| B-14 | Nail and "V" on C.E.I. pole No. 513462 on South side existing Harvard Ave., approx. 402 ft. West of P.I. ℄ New Denison- Harvard Bridge. | 662.99 |
| B-15 | Nail and "V" on C.E.I. pole No. 603866 on South side existing Harvard Ave., approx. 126 ft. West of P.I. ℄ New Denison-Harvard Bridge. | 675.61 |
| B-16 | OM 1621 - South side existing Harvard Ave. on ℄ Old Denison-Harvard Br. extended 58 ft. | 684.86 |

MADE JNS DATE 1-3-74
TRACED ZAK DATE 1-17-74
CHECKED MB DATE 3-1-74
SCALE AS SHOWN

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

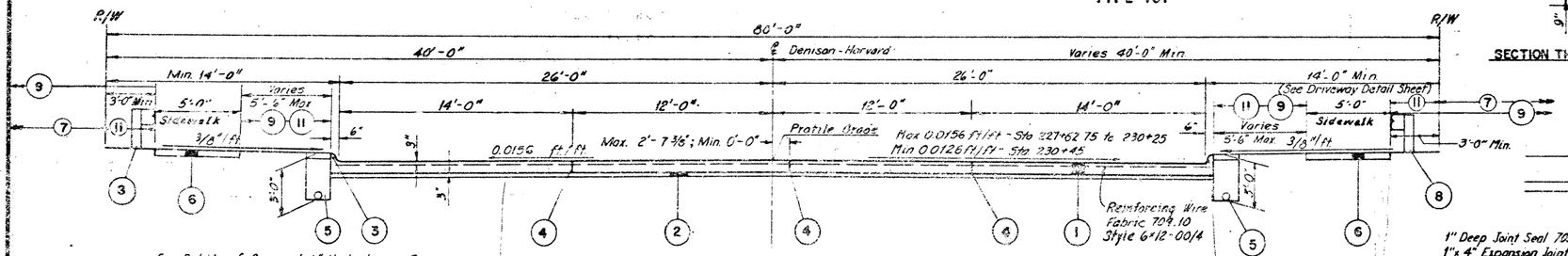
# TYPICAL SECTIONS

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

4 / 148

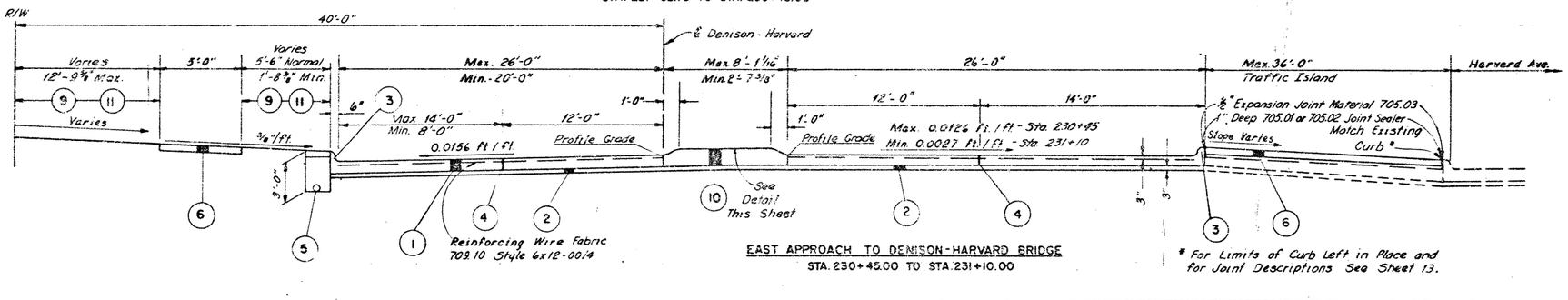
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

## TYPE 451



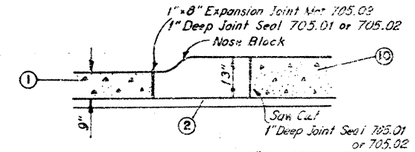

For Details of Proposed 6" Underdrains See Miscellaneous Drainage Detail-Sheet 22.

EAST APPROACH TO DENISON-HARVARD BRIDGE
STA. 227+62.75 TO STA. 230+45.00

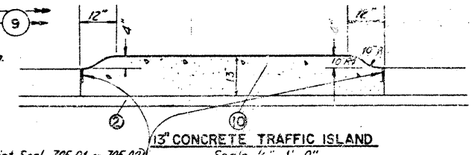



EAST APPROACH TO DENISON-HARVARD BRIDGE
STA. 230+45.00 TO STA. 231+10.00

* For Limits of Curb Left in Place and for Joint Descriptions See Sheet 13.




SECTION THROUGH NOSE BLOCK-13" CONCRETE TRAFFIC ISLAND
Scale 1/2"=1'-0"




13" CONCRETE TRAFFIC ISLAND
Scale 1/2"=1'-0"

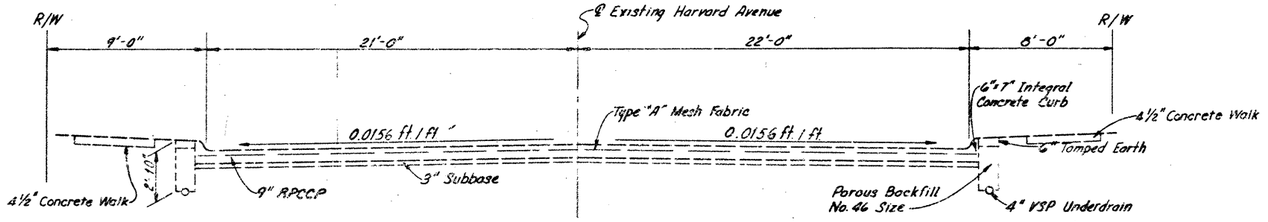
1" Deep Joint Seal 705.01 or 705.02
1"x 4" Expansion Joint Mat. 705.03

Cost of furnishing and placing the concrete required to construct the Island Nose Blocks shall be included in the unit price bid for Item 612-Concrete Traffic Island, As Per Plan.

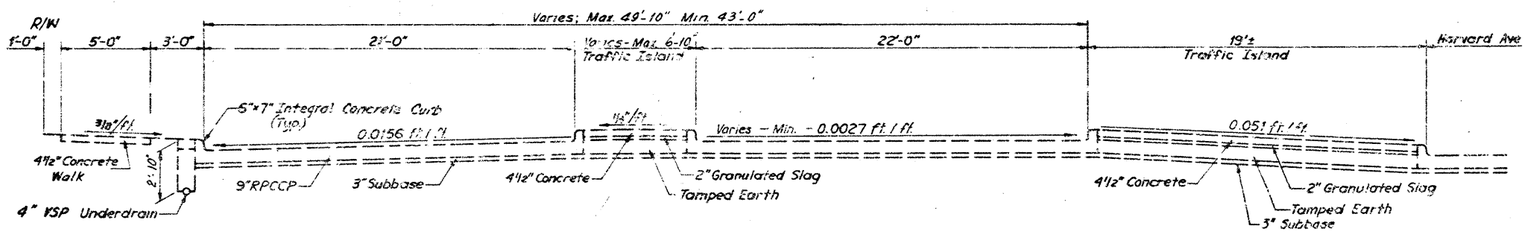
### LEGEND

(1) Item 451 - 9" Reinforced Portland Cement Concrete Pavement, as per plan
(2) Item 310 - Subbase, 703.08 or 703.10
(3) Item 609 - 6"x7" Integral Concrete Curb
(4) Standard Longitudinal Keyed Joint - Tied
(5) Item 605 - 6" Pipe Underdrain, 706.08 Perforated Bolt and Spigot, as per plan
(6) Item 608 - 4 1/2" Concrete Sidewalk (2" 703.08 Granulated Slag or 703.10 Screening Bed) As Per Plan
(7) Item 659 - Seeding and Mulching, as per plan
(8) Item 606 - Guardrail, Type 5, Begin Sta. 227+37 and End Sta. 228+62 Lt. - Begin Sta 227+37 and End Sta. 227+50 Rt.
(9) Item 653 - Topsoil Furnished and Placed
(10) Item 612-13" Concrete Traffic Island, as per plan
(11) Item 660 - Sodding

# EXISTING TYPICAL SECTIONS




EXISTING HARVARD AVENUE




EXISTING EAST APPROACH TO DENISON-HARVARD BRIDGE AT HARVARD AVENUE

MADE JJNS DATE 11-17-74
TRACED JJS DATE 11-22-74
CHECKED WSB DATE 12-2-74
SCALE 1/4"=1'-0"

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

# GENERAL NOTES

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS
MADE BY JNS DATE 6-27-74
CHECKED BY MGB DATE 6-28-74

RECD. L & D 9-5-75
W. G.
P.W.
CONST. 75 E 13
UTIL.

## GENERAL

CONTROL OF THE WORK

Dredged material will not be permitted to be placed so that it could return to the river. Special care will be given while working within the watercourse in order to minimize pollution.

Protection of pedestrians and residents in the area will be provided where necessary by fencing off potentially dangerous areas. Any additional costs shall be included in the prices bid for the various items of the project.

DESIGN SPEED

The geometric design for this project is based on a design speed of fifty (50) miles per hour as outlined by AASHO policies of geometric design.

ELEVATION DATUM

All elevations shown on these plans are in feet above the Cleveland Regional Geodetic Survey Datum Plane.

GEODETIC MONUMENTS

The contractor shall carefully remove and store any Regional Geodetic Monument castings and/or bronze markers for reuse. The Contractor shall then notify the Regional Geodetic Office so that they can pick up the salvaged monuments.

DRIVES

The numbers, location, type and grade of drives fronting on the improvements may be adjusted by the Engineer during construction.

COOPERATION BETWEEN CONTRACTORS

The Contractor shall be aware that the Proposed Jennings Freeway Project may be under construction during the construction of this project. He shall cooperate fully with the Contractor (s) of this aforementioned project in accordance with 105.07.

FIELD OFFICE

The Contractor shall provide a suitable field office having a minimum of 800 sq. ft. of floor space and, in addition to the requirements of Item 619, he shall also provide and maintain sanitary provisions in accordance with 107.06. All the above is included in the lump sum price bid for Item 619 Field Office.

UTILITIES

Any and all work required for removing, relocating, and constructing new facilities for private or public utilities will be done by and at the expense of the respective owners, unless otherwise noted in the plans.

The Contractor shall coordinate his operations with the work of the utility owners or others who may be making the relocations and shall notify the owners of the utilities of his schedule at least two (2) working days before breaking ground.

UNDERGROUND UTILITIES

The location of underground utilities are plotted according to information furnished by the utility concerned and the State of Ohio does not guarantee the accuracy thereof. The Contractor shall take all necessary precautions to avoid damage to existing underground utility lines during the construction of the Project.

UTILITY OWNERSHIP

Cleveland Electric Illuminating Co.
55 Public Square (underground and overhead)
Cleveland, Ohio 44113

East Ohio Gas Company
1717 E. Ninth Street
Cleveland, Ohio 44114

Inland Corporation
P.O. Box 139
Vandalia, Ohio 45377

The Harshaw Chemical Co.
1945 E. 97th Street
Cleveland, Ohio 44106

Standard Oil Company (Ohio)
P.O. Box 188
Vandalia, Ohio 45377

City of Cleveland
Department of Public Utilities
Division of Water and Heat
1201 Lakeside Ave.
Cleveland, Ohio 44114
Division of Light & Power

Republic Steel Corporation
Cleveland District
3100 E. 45th Street
Cleveland, Ohio 44127

The Ohio Bell Telephone Company
820 Superior Avenue N.E.
Cleveland, Ohio 44113

Laurel Pipe Line Company
P.O. Box 426
Camp Hill, Pa. 17011

ARCO Pipe Line Company
P.O. Box 225- Station A
Toledo, Ohio 43605

## GENERAL (CONT.)

EXISTING TYPICAL SECTIONS

Existing typical sections have been taken from records and are believed to represent the existing pavement, but the State of Ohio does not guarantee their accuracy.

DUST PROTECTION

The Contractor shall, when so ordered by the Engineer, protect the adjacent properties from dust. He shall keep the dust down by the use of water or calcium chloride, whichever is considered necessary by the Engineer, performed as per Item 616. The following estimated quantities are provided in the General Summary:

| | |
|---|---|
| Item 616 Calcium Chloride | 10 Ton |
| Item 616 Water | 100 M. Gal. |

TRAFFIC MAINTENANCE

Two way traffic, one lane minimum in each direction with thirteen (13) foot minimum effective lane widths, shall be maintained at all times on Jennings Road, and two way traffic, two lanes in each direction with ten (10) foot minimum effective lane widths shall be maintained at all times on Harvard Ave. by use of existing pavements. Two way Traffic, one lane in each direction, with eight (8) foot lanes shall be maintained on Denison Ave. unless otherwise directed by the Engineer.

The method of maintaining traffic which the Contractor desires to adopt shall be submitted to the Engineer for his approval. The Engineer will notify the affected municipalities two weeks prior to closing of any existing roads.

The Contractor shall maintain safe and satisfactory access to abutting properties and intersecting streets at all times during construction. This shall include the construction and removal, if necessary, of temporary by-passes, bridging, crossovers, and driveways.

The Contractor shall provide and maintain such temporary boardwalks, cinder walks, handrails adjacent to excavation, etc. as may be necessary to accomodate in a reasonable and safe manner the pedestrian traffic in the vicinity of the project.

The Contractor shall furnish and maintain all necessary safeguards and barricades, satisfactory barriers, lighting, flagmen, temporary guardrail, and such other traffic control devices as provided for in Item 614 Maintaining Traffic so as to avoid damage and/or injury to vehicles and persons using adjacent roadways during construction.

Payment for all labor and equipment required for items mentioned above shall be included in the lump sum bid price for Item 614 Maintaining Traffic.

ESTIMATED QUANTITIES FOR MAINTAINING TRAFFIC

Quantities of the following items are estimated and are included for use only when and in amounts as directed by the Engineer. The amount of these items and the location where used shall be recorded as used and payment will be included in the final pay estimate.

| | |
|---|---|
| Item 410 Traffic Compacted Surface, Type A or B | 25 C.Y. |
| Item 616 Calcium Chloride | 10 Tons |
| Item 404 Asphalt Concrete or an approved Bituminous Premixed Surface Course for Maintaining Traffic | 50 C.Y. |

ESTIMATED QUANTITIES

Specific locations and usage of estimated quantities set up on these plans to be used "as directed by the Engineer" shall be made a matter of record by incorporating into the final change order governing completion of this project.

Estimated quantities of materials shall not be ordered for delivery to the project unless authorized by the Engineer.

PROTECTION OF EXISTING STRUCTURES

The Contractor shall be completely responsible for any damage to existing structures that might possibly occur during construction. The Contractor should take specific care not to disturb the existing gabion wall and stone protection on the property of The Modern Builders Supply Company.

## GENERAL (CONT.)

PROTECTION and/or REMOVAL OF TRAFFIC CONTROL DEVICES AND STREET SIGNS

Unless otherwise provided for, the Contractor shall provide adequate protection against damage to traffic control devices such as signs, signals, signal controllers, etc., which are required to remain in place during construction of the project. Signs, etc., which interfere with construction and must be removed, shall be removed, stored in such a manner as to protect them from damage, and re-erected by the contractor when and as directed by the Engineer, in accordance with 107.12. The removal and re-erection of signals, signal controllers, flashers, etc., which interfere with construction shall be the responsibility of others, in accordance with 105.08.

## ROADWAY

CLEARING AND GRUBBING

Payment for removal of all trees and stumps within the work limits and as marked by the Engineer is included in the lump sum price bid for Item 201 Clearing and Grubbing.

Trees shall not be removed, regardless of size, unless specifically and conspicuously marked by the Engineer.

Estimated number of trees that may be removed, 16 - 18" size.

CUTTING PAVEMENT

Whenever the removal of existing concrete pavement, base, drive apron, parking well or sidewalk necessitates cutting into the slab prior to removal, the cutting shall be effected by using a suitable concrete power saw which will produce a straight and smooth finish along the sawed edge. The depth of cutting or scoring shall be such that no damage will result to the remaining slab after removal of the designated portion.

ITEM 660 SODDING

The Contractor shall place an eighteen (18) inch strip of sod along the back and across each end of the headwalls and along the unpaved side of the Type 1-2 Cutter. He shall be compensated for this work under pay Item 660 Sodding. 215 ft. x 1.5 ft. ÷ 9 = 35.8 sq. yds. - Use 36 sq. yd.

WATER POLLUTION, SOIL EROSION & SILTATION CONTROL

The following estimated quantities are to be used as directed by the Engineer for erosion control measures.

Item 207 Temporary Seeding and Mulching
.2 x 5242 sq. yds. = 1048 sq. yds. - Use 1050 sq. yds.

Item 659 Repair Seeding and Mulching
.05 x 5242 sq. yds. = 262 sq. yds.

Item 659 Commercial Fertilizer
(10 lbs. ÷ 1000 sq. ft.) x 1050 sq. yds. x 9 = 94.5 lbs.
(15 lbs. ÷ 1000 sq. ft.) x 262 sq. yds. x 9 = 35.4 lbs.
.5 x .47 tons = 0.24 tons
TOTAL = 0.31 tons

Item 207 Water
(240 gal. ÷ 1000 sq. ft.) x 1050 + 262) sq. yds. x 9 = 2884 gal. - Use 3 M Gal.

Item 207 Mowing
.25 x 5242 sq. yds. = 1310 sq. yds. = 12 M Sq. Ft.

Item 207 Temporary Benches, Dikes, Dams, and Sediment Basins
.001 x 2424 cu. yds. = 2.4 cu. yds. - Use 3.0 Cu. Yds.

Item 207 Temporary Slope Drains
20 lin. ft. / 100 ft. x 500 = 100 lin. ft.

MONUMENT BOX NO. 36-B

For details of Monument Box Number 36-B see sheet 14.

MADE JNS DATE 2-4-74
TRACED JAK DATE 2-7-74
CHECKED MGB DATE 2-8-74
SCALE None

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

Rev. 3-3-75

# GENERAL NOTES

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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QUANTITY CALCULATIONS
MADE BY JNS DATE 6-27-74
CHECKED BY MGB DATE 6-28-74

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

## GENERAL

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Camp Hill, Pa. 17011

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## GENERAL (CONT.)

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|---|---|
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## GENERAL (CONT.)

PROTECTION and/or REMOVAL OF TRAFFIC CONTROL DEVICES AND STREET SIGNS

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## ROADWAY

CLEARING AND GRUBBING

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Trees shall not be removed, regardless of size, unless specifically and conspicuously marked by the Engineer.

Estimated number of trees that may be removed, 16 - 18" size.

CUTTING PAVEMENT

Whenever the removal of existing concrete pavement, base, drive apron, parking well or sidewalk necessitates cutting into the slab prior to removal, the cutting shall be effected by using a suitable concrete power saw which will produce a straight and smooth finish along the sawed edge. The depth of cutting or scoring shall be such that no damage will result to the remaining slab after removal of the designated portion.

ITEM 660 SODDING

The Contractor shall place an eighteen (18) inch strip of sod along the back and across each end of the headwalls and along the unpaved side of the Type 1-2 Gutter. He shall be compensated for this work under pay Item 660 Sodding. 2.5 ft. x 1.5 ft. ÷ 9 = 35.8 sq. yds. - Use 36 sq. yd.

WATER POLLUTION, SOIL EROSION & SILTATION CONTROL

The following estimated quantities are to be used as directed by the Engineer for erosion control measures.

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.2 x 5242 sq. yds. = 1048 sq. yds. - Use 1050 sq. yds.
Item 659 Repair Seeding and Mulching
.05 x 5242 sq. yds. = 262 sq. yds.
Item 659 Commercial Fertilizer
(10 lbs. ÷ 1000 sq. ft.) x 1050 sq. yds. x 9 = 94.5 lbs.
(15 lbs. ÷ 1000 sq. ft.) x 262 sq. yds. x 9 = 35.4 lbs.
.5 x .47 tons = 0.24 tons
TOTAL = 0.31 tons
Item 207 Water
(240 gal. ÷ 1000 sq. ft.) x 1050 + 262 ) sq. yds. x 9 = 2884 gal. - Use 3 M Gal.
Item 207 Mowing
.25 x 5242 sq. yds. = 1310 sq. yds. = 12 M Sq. Ft.
Item 207 Temporary Benches, Dikes, Dams, and Sediment Basins
.001 x 2624 cu. yds. = 2.6 cu. yds. - Use 3.0 Cu. Yds.
Item 207 Temporary Slope Drains
20 lin. ft. / 100 ft. x 500 = 100 lin. ft.

MONUMENT BOX NO. 36-B

For details of Monument Box Number 36-B see sheet 14.

THIS PLAN SHEET HAS BEEN REVISED SEE REVISION 3-3 1975

MADE JNS DATE 2-4-74
TRACED [illegible] DATE 2-[illegible]-74
CHECKED MGB DATE 2-[illegible]-74
SCALE None

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO
HNTB

# GENERAL NOTES

| FHWA REGION | STATE | PROJECT | |
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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

## ROADWAY (CONT.)

EARTHWORK

Estimated earthwork quantities shown are based on the existing elevations at the time the plans were being prepared. Payment to the Contractor for all earthwork will be based on the existing ground at the time the work is performed.

FERTILIZER SEEDING AND SODDING

Commercial Fertilizer (12-12-12) is to be used on all seeded and sodded areas. Sod is to be used around catch basins, structures and ditches where necessary to prevent erosion as indicated on the Plans, or as directed by the Engineer. For sodding quantities described above see sheet 5.

ITEM 659 - SEEDING AND MULCHING, AS PER PLAN

Quantities for seeding are calculated for soil areas to work limits as shown on the cross sections plus 2 feet.

Payment shall not be made for seeding beyond these limits unless indicated on the Plans.

The mixture of seed to be used shall be as follows::

50% Kentucky Bluegrass
20% Illahee Fescue
20% Creeping Red Fescue
5% White Clover
5% Red Top Clover

At locations such as intersecting streets, private lawns, parks, etc., where the Project Seeding adjoins seeding of a higher type of quality, the Contractor shall, to the satisfaction of the Engineer, adjust the Project Seeding to duplicate or match the higher type seeding at no additional cost to the State.

The operation of the actual seed sowing will not be permitted from June 15 to August 15, nor will it be permitted at such other times as the Engineer deems improper for seeding.

Asphalt emulsion shall not be used to prevent displacement of mulching materials in residential and urban areas.

CURB TRANSITIONS

The Contractor shall provide the curb on the East Approach roadway with the necessary curb height and face transitions as shown on sheet 13.

PAVEMENT REMOVAL AND REPLACEMENT

Prior to opening the Denison Harvard Bridge to traffic the engineer will field inspect the existing pavement between the easterly end of the project and the existing barricade at approximately station 231+90. Any pavement that in the opinion of the Engineer is defective shall be replaced and all work done shall be paid for 100% with Issue No. 1 funds.

The following quantities are provided in the general summary for this work and shall be used as directed by the Engineer.

Item 202 Pavement Removed 200 Sq. Yds.
Item 451 9" Reinforced Portland Cement Concrete Pavement As Per Plan 200 Sq. Yds.
Item 310 Subbase (703.08 or 703.10) 17 Cu. Yds.
Item 609 6" x 7" Integral Concrete Curb 80 Lin. Ft.

MADE JNS DATE 2-1-74
TRACED JJC DATE 2-7-74
CHECKED JSS DATE 2-7-74
SCALE None

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

## PAVEMENT

ITEM 451 - REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT, AS PER PLAN

All applicable provisions of Item 451 as set forth in the Construction and Material Specifications shall apply unless modified herein and the following shall be considered as supplemental to the provisions set forth therein.

Materials

Curing material for exposed concrete shall meet the latest requirements of Federal Specification TT-C-00800 except that the unit moisture loss (in grams/sq. cm.) at 72 hours shall not exceed 0.055. The Contractor shall submit the manufacturers certified analysis for the lot or lots shipped. A fugitive dye is required.

Steel for hook bolts shall conform with 709 except that the ultimate tensile strength shall not be less than 55,000 pounds per square inch.

Bituminous Material (451.03)---------- 702.01, 702.02, or 702.04

Joints

Longitudinal key joints and key faces of existing rigid pavement shall be cleaned of foreign material and given an application of bituminous material meeting the requirements of 702.01, 702.02, 702.04 in a manner which results in a residual coating of 1/4 gallon per square yard before the adjoining slab is poured.

When not shown on the Plans, or provided for elsewhere, joints in the pavement within intersections shall be of the type shown in Standard Construction Drawings BP-3, and at such locations, as designated by the Engineer.

Unless otherwise approved by the Engineer the following method should be used. Immediately after the finishing machine has cleared the joint and prior to any hand finishing, a transverse slot 2" in depth shall be cut into the plastic concrete with a steel plate 3/8" thick and of sufficient length to cut a slot the total width of the pavement in one operation. The plate shall have the cutting edge serrated and shall be moved longitudinally in such a manner as to provide a sawing action while it is being forced into the concrete. The plate shall be reinforced in such a manner as will keep it rigid and in straight alignment and it shall be suspended and guided from a movable bridge, of an approved design, so that the plate will be held rigidly perpindicular to the surface of the slab and at right angles to the centerline of the pavement when it is inserted in the concrete.

Immediately following the removal of the steel cutting plate, a 1/4" x 2" preformed joint filler meeting the requirements of 705.03 shall be inserted in the slot so that the top edge of the filler is flush with the top edge of the concrete slab. The pavement shall then be finished as required elsewhere.

This joint shall be sawed within three (3) days with a 5/16" thick blade cutting a kerf 2" deep. Any residual preformed joint filler remaining in the slot shall be removed by a suitable means and the joint cleaned, protected and sealed with 705.11 preformed sealer.

An alternate to the above method shall be in accordance with section 451.08 of the State of Ohio Department of Transportation, Construction and Material Specifications.

See special details of transverse joints, sheet No. 16.

PLACING AND FINISHING

Approved flexible forms shall be used for construction of all circular pavement edges having a radius of 200 feet or less, circular concrete curb and concrete curb transitions of short radii, particular care shall be excercised by the Contractor in obtaining, in a uniform manner, the curb transition called for on the plans.

Hand finishing will be permitted as per section 451.09 of the General Specifications for the Reinforced Portland Cement Concrete Pavement of the following locations:

1) Intersections
2) Pavement where sharp curvatures prevent the use of finishing machine
3) Variable width lanes which in the opinion of the Engineer require hand finishing.

## PAVEMENT

Placing Reinforcement

The placing of reinforcement by vibratory means will not be permitted.

Consolidating and Finishing

Vibratory finishing will not be permitted. Unless otherwise specified the final surface texture of the pavement shall be a broom finish using a broom of an approved type, not less than 18" in width of bass or bassine fiber not more than 5" in length. The strokes shall be from edge to edge of the slab, one stroke per width of broom with adjacent strokes slightly overlapped and shall be drawn without "tearing" of the concrete and so as to produce regular corrugations approximately 1/16" in depth.

Brooms shall be washed thoroughly at frequent intervals during each day. Any coarse or long bristles which cause irregularities shall be trimmed or removed.

Protection Against Rain

In order that the concrete may be properly protected against the effects of rain before the concrete is sufficiently hardened, the Contractor will be required to have available at all times materials for the protection of the surface of the unhardened concrete. Such protective materials shall consist of standard covering material such as burlap or cotton mats, curing paper, or plastic sheeting material for the protection of the surface of the pavement. When rain appears imminent, all paving operations shall stop and all available personnel shall begin covering the surface of unhardened concrete with the protective covering.

Surface Smoothness

All sections of pavement that have been ground, repaired or replaced by the contractor shall be given a protective application of the specified curing compound.

Sealing Joints

Joints shall be sealed as per Section 451.13. Unless otherwise specified the widths of saw cuts and joint sealers for transverse joints shall be as listed in the following table.

| Type of Joint | Spacing between Jts. (Ft.) | Width of Saw Cut (In.) | Neoprene Comp. Seal Width (In.) |
|---|---|---|---|
| Contraction | 60 - 75 | 5/16 | 13/16 |
| Contraction | 30 | 1/4 | 9/16 |
| Contraction | 25 & less | 1/4 | 7/16 |
| Hinge | - | 1/4 | +7/16 |

+Hinge joints are used at the 1/3 points.

The 7/16 inch width neoprene compression seal shall meet the requirements of 705.11 except that the high temperature recovery (70 hours at 212° F under 50% deflection) shall not be less than 75%.

ITEM 611 - REINFORCED CONCRETE APPROACH SLABS, AS PER PLAN

The Contractor shall provide both the East and West Approach Slabs with the modified curb as shown on sheet 14. The Approach Slabs shall conform with Standard Drawing AS-1-72 with the exception of the modified curb shown in these plans, the jacking holes shall be omitted, and that the top reinforcing shall be 3" clear.

ITEM 402, 404, 407

For pertinent note see General Notes - Structures Over 20 Foot Span - Sheet No. 55 & 56.

# GENERAL NOTES

| FHWA REGION | STATE | PROJECT | |
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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

## DRAINAGE

DRAINAGE STRUCTURE ELEVATIONS

Normal grade for all pavement inlets and catch basins is the normal gutter elevation at the intersection of the center of the structure and the curb face. Normal Grade for all catch basins is the normal ditch elevation at the center of the structure.

MANHOLE COVERS

The Contractor shall set the frames for manhole covers at such an elevation and inclination as to place the surface of the cover in the plane of the finished surface, with the exception of the manhole at Sta. 224+30 which will be set flat as specified on sheet 20.

CATCH BASIN STEPS

Steps shall be provided in all catch basins having a depth of four (4) feet or greater, at the direction of the Engineer. Payment for steps shall be included in the contract unit price bid per each Item 604. The steps shall be built in accordance with the requirements of Item 604.

CAST IRON CONDUITS FOR STORM SEWERS

The cast iron pipe shall be furnished in accordance with A.S.A. A21.51 for Ductile Iron Pipe.

The cast iron pipe shall be installed in accordance with applicable provisions of Item 603. Payment will be made at the contract unit bid price per linear foot of Item 603 - 8" Conduit A.S.A. Class 6, Ductile Iron with Mechanical Joints which shall constitute full compensation for furnishing of all labor, materials, small tools, and equipment to complete this item of work in place.

## DRAINAGE (CONT.)

DRAINAGE FACILITIES ADJACENT TO PROPOSED PIERS

After the construction of the pier footings and columns, all proposed drainage structures and conduits located adjacent to or on the bridge piers shall be placed as shown in the drainage details.

Backfill around these pier footings and columns shall be placed and compacted as per the requirements of Item 203.12 Embankment Compaction.

Compensation for all labor and costs incurred in compacting the backfill shall be included in the unit price bid for Item 503 Structural Excavation.

ITEM 605 - PIPE UNDERDRAINS - 706.08 PERFORATED, AS PER PLAN

All applicable provisions of Item 605 as set forth in the Construction and Material Specifications shall apply unless modified herein and the following shall be considered as supplemental to the provisions set forth therein.

Unless otherwise specified on the Plans or in the Proposal 706.08 Perforated Bell and Spigot Vitrified Clay Pipe with perforations in accordance with AASHO M 65 shall be used for pipe underdrains. In addition, three lugs designed to center and align the pipe and provide a 3/8" gap between pipe lengths shall be provided in the bell end of each pipe.

## DRAINAGE (CONT.)

CONNECTIONS TO EXISTING PIPE

Where the plans provide for proposed conduit to be connected to, or to cross either over or under an existing sewer or other pipe line, it shall be the responsibility of the Contractor to locate the existing pipe both as to line and grade before he starts to lay the proposed conduit items.

Payment for all operations described above shall be included in the unit bid price for the pertinent conduit items.

PIPE CUT-OFFS

When bell and spigot pipes are used, any necessary pipe cut-offs will be made at the spigot end of the length of pipe adjacent to the end length. When tongue and groove pipe is used, the length of pipe next to the end length shall be cut and a butt joint formed with a concrete collar in accordance with Standard Construction Drawing MC-4.

LOCATIONS OF GUARDRAIL

The locations of guardrail runs as shown in these plans are subject to adjustment to assure that the planned installations will afford maximum protection for traffic.

EROSION CONTROL

Items 601 & 660 are provided in the plans for erosion control. Rock of a stable nature will not be removed in order to place any of these items. The Engineer shall check and non-perform quantities or adjust locations and quantities for these items where indicated by field conditions during construction.

OIL PIPELINES (STA 223+30 to Sta 223+50)

Extreme caution shall be exercised when working over the oil pipelines in the vicinity of Pier 15 and between Stations 223+30 to +50 since they may only have shallow cover. A Company representative should be contacted prior to work in this area to establish the exact location and depth of the lines.

MADE JNS DATE 2-5-74
TRACED AK DATE 2-5-74
CHECKED RGT DATE 3-1-74
SCALE None

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

# COMPUTATIONS AND SUB-SUMMARIES

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

8/148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43
QUANTITY CALCULATIONS

MADE BY J.N.S. DATE 1-16-74
CHECKED BY M.G.B. DATE 4-30-74

**ITEM 202 SIDEWALK REMOVED**

| STATION FROM | STATION TO | SIDE | LENGTH (L.F.) | AREA (S.F.) | REMARKS |
|---|---|---|---|---|---|
| 225+68 | 227+00 | Lt | 132.0 | 673.0 | Scaled |
| 225+72 | 227+00 | Rt | 128.0 | 644.5 | " " |
| 227+00 | 228+00 | Lt | 76.0 | 380.0 | " " |
| 227+00 | 228+00 | Rt | 101.0 | 505.0 | " " |
| 228+00 | 229+00 | Lt | 98.0 | 490.0 | " " |
| 228+00 | 229+00 | Rt | 100.0 | 500.0 | " " |
| 229+00 | 230+00 | Lt | 101.0 | 505.0 | " " |
| 229+00 | 230+00 | Rt | 53.0 | 265.0 | " " |
| 230+00 | 231+10 | Lt | 110.0 | 550.0 | " " |
| 230+00 | 231+40 | Rt | | 1345.9 | (S.R) 4[937+(Large Island) 337.0+(Small Island)143.0 |
| | | | | | |
| | | | | | |
| | | | | | |
| TOTAL: | | | | 5866.4 | |
| | | | | Use 5865 | |

**ITEM 202 MONUMENT REMOVED FOR SALVAGE**

| STATION FROM | STATION TO | SIDE | NUMBER | REMARKS |
|---|---|---|---|---|
| 229+64 | | ℄ | 1 | ℄ Reference Monument |
| 228+91 | | Lt | 1 | |
| TOTAL | | | 2 | |

**ITEM 202 PAVEMENT REMOVED**

| STATION FROM | STATION TO | AREA (S.F.) | AREA (S.Y.) | REMARKS |
|---|---|---|---|---|
| 225+65 | 227+00 | 5750.0 | 638.9 | Planimeter |
| 227+00 | 228+00 | 4200.0 | 466.7 | " " |
| 228+00 | 229+00 | 4188.0 | 465.3 | " " |
| 229+00 | 230+00 | 4150.0 | 461.1 | " " |
| 230+00 | 231+10 | 5187.5 | 576.4 | " " |
| 230+00 | 231+10 | 1400.0 | 155.6 | " " (Turnout to Harvard) |
| 227+85 | | 200.0 | 22.2 | Planimeter (Drive, Rt. Side) |
| 229+40 | | 312.5 | 34.7 | " " (Drive, Lt. Side) |
| 230+00 | | 312.5 | 34.7 | " " (Drive, Lt. Side) |
| | | | | |
| | | | | |
| | | | | |
| TOTAL: | | | 2855.6 | |
| | | | Use 2856 | |

**ITEM 310 SUBBASE (703.08 or 703.10) - 3"**

| STATION FROM | STATION TO | SIDE | AREA (S.F.) | AREA (S.Y.) | VOLUME (C.Y.) | REMARKS |
|---|---|---|---|---|---|---|
| 227+62.75 | 229+60 | Lt. & Rt. | 10454 | 1161.6 | 96.8 | (3725x53+1160x53)÷9x1/12 |
| 229+60 | 230+45 | Lt. & Rt. | 4616 | 512.9 | 42.7 | (85x27.8+85x26.5)÷9x1/12 |
| 230+45 | 231+10 | Lt. | 1618 | 179.7 | 15.0 | (30x26.5+35x23.5)÷9x1/12 |
| 230+45 | 231+40 | Rt. | 2336 | 259.5 | 21.6 | Irregular Area |
| | | Rt. | 1302 | 145.0 | 12.1 | Planimeter |
| Drive 1-A | | Rt. | 420 | 46.7 | 3.9 | See calc. this sheet |
| Drive 2-A | | Rt. | 420 | 46.7 | 3.9 | See calc. this sheet |
| East App. Slab | | Lt. & Rt. | 1300 | 144.4 | 12.0 | (52x25÷9x1/12) |
| East App. Slab | | Lt. & Rt. | 1300 | 144.4 | 12.0 | (52x25÷9x1/12) |
| | | | | | | |
| TOTAL: | | | | | 220.0 | |
| | | | | | | |

**ITEM 20[illegible] FENCE REMOVED**

| STATION FROM | STATION TO | SIDE | LENGTH (L.F.) | REMARKS |
|---|---|---|---|---|
| 227+50 | 231+10 | Lt. | 330 | To be Removed & Stored |
| 227+00 | 228+34 | Rt. | 134 | To be Removed |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| TOTAL: | | | 524 | |
| | | | | |

**ITEM 203 SUBGRADE COMPACTION**

| STATION FROM | STATION TO | SIDE | AREA (S.F.) | AREA (S.Y.) | REMARKS |
|---|---|---|---|---|---|
| 227+62.75 | 228+00 | Lt. & Rt. | 2036.0 | 231.7 | 1974+1.5x2x37.25 |
| 228+00 | 229+00 | Lt. & Rt. | 5400.0 | 622.2 | 5300+1.5x2x100 |
| 229+00 | 230+00 | Lt. & Rt. | 5400.0 | 622.2 | 5300+1.5x2x100 |
| 230+00 | 231+40 | Lt. & Rt. | 663.0 | 737.7 | 110x1.5x25x1.5x65x1.5x6335 |
| | | Rt. | 1423.5 | 158.8 | 35x1.5x30(1.5)+1302 |
| West App. Slab | | Lt. & Rt. | 1300.0 | 144.4 | |
| East App. Slab | | Lt. & Rt. | 1300.0 | 144.4 | |
| | | | | | |
| TOTAL: | | | | 2661.4 | |
| | | | | Use 2662 | |

**ITEM 451 9" R.P.C.C.P., AS PER PLAN**

| STATION FROM | STATION TO | SIDE | AREA (S.F.) | AREA (S.Y.) | REMARKS |
|---|---|---|---|---|---|
| 227+62.75 | 229+60 | Lt. & Rt. | 10454 | 1161.6 | (3725x53+1160x53)÷9 |
| 229+60 | 230+45 | Lt. & Rt. | 4616 | 512.9 | (85x27.8+85x26.5)÷9 |
| 230+45 | 231+10 | Lt. | 1618 | 179.7 | (30x26.5+35x23.5)÷9 |
| 230+45 | 231+40 | Rt. | 1976 | 219.5 | Irregular Area |
| | | Rt. | 1302 | 145.0 | Planimeter |
| | | | | | |
| | | | | | |
| | | | | | |
| TOTAL: | | | | 2218.7 | |
| | | | | Use 2219 | |

**ITEM 202 STRUCTURE REMOVED**

| STATION | | SIDE | UNIT | REMARKS |
|---|---|---|---|---|
| | | | | |
| 227+50 | | Lt. | Lump | Abandoned CEI Vault |
| | | | | |
| TOTAL: | | | Lump | |
| | | | | |

**ITEM 203 ROADWAY EXCAVATION AND EMBANKMENT**

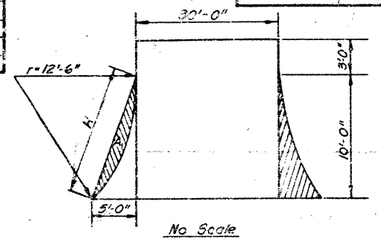
| STATION FROM | STATION TO | SIDE | EXCAVATION (C.Y.) | EMBANKMENT (C.Y.) | REMARKS |
|---|---|---|---|---|---|
| 196+72.5 | 200+00 | Lt. | 1395 | 79 | |
| 196+72.5 | 200+00 | Rt. | 938 | 181 | |
| 223+00 | 231+10 | Lt. | 2934 | 1462 | |
| 223+00 | 231+10 | Rt. | 5501 | 702 | |
| | | | | | |
| | | | | | |
| | | | | | |
| TOTAL: | | | 10,768 | 2124 | |
| | | | | | |

**ITEM 202 CURB REMOVED**

| STATION FROM | STATION TO | SIDE | LENGTH (L.F.) | REMARKS |
|---|---|---|---|---|
| 229+55 | 229+84 | Rt. | 29.0 | Scaled |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| TOTAL: | | | 29.0 | |
| | | | | |

**ITEM 451 -8" R.P.C.C.P., AS PER PLAN**

| ℄ STATION | | AREA (S.F.) | AREA (S.Y.) | REMARKS |
|---|---|---|---|---|
| 229+37 | (Driveway 1A) | 420.13 | 46.7 | See Calc. below |
| 230+00 | (Driveway 2A) | 420.13 | 46.7 | See Calc. below |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| TOTAL: | | | 93.4 | |
| | | | Use 94 | |




No Scale

$H = \sqrt{(10)^2 + (5)^2} = 11.180339'$

$H = 2r \sin \frac{1}{2}\theta \therefore \sin \frac{1}{2}\theta = \frac{11.180339}{2(12.5)} = 0.4472135$

$\frac{1}{2}\theta = 26°33'34.16"$ $\quad \theta = 53°07'48.3"$ $= 0.927118$ rad.

$A_1 = \frac{1}{2}r^2(\theta - \sin\theta)$

$A_T = 13(30) + 2[\frac{1}{2}(10)(5) - [\frac{1}{2}(12.5)^2(.92712 - .79999)]]$

$A_T = 390 + 2[25 - 9.93203]$

$A_T = 390 + 30.14$

$= 420.13$ Sq. Ft.

$= 46.7$ Sq. Yds.

MADE J.N.S. DATE 1-14-74
TRACED [illegible] DATE [illegible]
CHECKED M.G.B. DATE 4-30-74
SCALE

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

# COMPUTATIONS AND SUB-SUMMARIES

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

9/148

QUANTITY CALCULATIONS
MADE BY J.N.S DATE 2-25-76
CHECKED BY M.G.B. DATE 4-26-79

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

**ITEM 402 ASPHALT CONCRETE, AS PER PLAN**

| LOCATION | DEPTH (IN.) | LENGTH (L.F.) | WIDTH (L.F.) | VOLUME (C.Y.) |
|---|---|---|---|---|
| West Approach Slab | 1½ | 25.0 | 52.0 | 6.0 |
| East Approach Slab | 1½ | 25.0 | 52.0 | 6.0 |
| TOTAL | | | | 12.0 |

**ITEM 404 RUBBERIZED ASPHALT CONCRETE, AS PER PLAN**

| LOCATION | DEPTH (IN.) | LENGTH (L.F.) | WIDTH (L.F.) | VOLUME (C.Y.) |
|---|---|---|---|---|
| West Approach Slab | 1 | 25.0 | 52.0 | 4.0 |
| East Approach Slab | 1 | 25.0 | 52.0 | 4.0 |
| TOTAL | | | | 8.0 |

**ITEM 407 TACK COAT, AS PER PLAN**

| LOCATION | LENGTH (L.F.) | WIDTH (L.F.) | AREA (S.Y.) | VOLUME (GAL.) |
|---|---|---|---|---|
| West Approach Slab | 25.0 | 52.0 | 144.4 | 14.4 |
| East Approach Slab | 25.0 | 52.0 | 144.4 | 14.4 |
| TOTAL | | | | 28.8 |
| | | | | Use 29.0 |

**ITEM 510 DOWEL HOLES**

| STATION FROM | STATION TO | LENGTH (L.F.) | NO. of HOLES (@ 30" centers) | REMARKS |
|---|---|---|---|---|
| 231+10 | | | | |
| Lt. | Rt. | 60 | 23 | |
| TOTAL: | | | 23 | |

**ITEM 606 ANCHOR ASSEMBLY**

| STATION FROM | STATION TO | SIDE | NUMBER (EACH) | REMARKS |
|---|---|---|---|---|
| 228+37.75 | 228+62.75 | Lt. | 1 | |
| 227+37.75 | 227+62.75 | Rt. | 1 | |
| TOTAL: | | | 2 | |

**ITEM 606 BRIDGE TERMINAL ASSEMBLY, AS PER PLAN**

| STATION | | SIDE | NUMBER (EACH) | REMARKS |
|---|---|---|---|---|
| 227+37.75 | | Lt. | 1 | |
| 227+37.75 | | Rt. | 1 | |
| TOTAL: | | | 2 | |

**ITEM 606 GUARDRAIL TYPE 5**

| STATION FROM | STATION TO | SIDE | LENGTH (L.F.) | REMARKS |
|---|---|---|---|---|
| 227+37.75 | 228+62.75 | Lt. | 125 | |
| 227+37.75 | 227+75.25 | Rt. | 37.5 | |
| TOTAL | | | 162.5 | |

**ITEM 608 4½" CONCRETE WALK, As Per Plan**

| STATION FROM | STATION TO | SIDE | LENGTH (L.F.) | AREA (S.F.) | REMARKS |
|---|---|---|---|---|---|
| 227+62.75 | 231+10 | Lt. | 347 | 1735 | Scaled |
| 227+62.75 | 229+00 | Rt. | 137 | 685 | " |
| 229+00 | 230+00 | Rt. | 55 | 275 | " |
| 230+00 | 230+50 | Rt. | —— | 349 | Planimeter |
| 230+50 | 231+40 | Rt. | —— | 1419 | " |
| TOTAL | | | | 4463 | |

**ITEM 608 6" CONCRETE WALK, AS PER PLAN**

| STATION FROM | STATION TO | SIDE | LENGTH (L.F.) | AREA (S.F.) | REMARKS |
|---|---|---|---|---|---|
| 196+72.5 | 196+97.5 | Lt. | 25 | 125 | Scaled |
| 196+72.5 | 196+97.5 | Rt. | 25 | 125 | " |
| 227+37.75 | 227+62.75 | Lt. | 25 | 144 | " |
| 227+37.75 | 227+62.75 | Rt. | 25 | 144 | " |
| TOTAL | | | | 538 | |

**ITEM 609 6"X7" INTEGRAL CONCRETE CURB**

| STATION FROM | STATION TO | SIDE | LENGTH (L.F.) | REMARKS |
|---|---|---|---|---|
| 227+62.75 | 229+00 | Lt. | 136.5 | Scaled |
| 227+62.75 | 229+00 | Rt. | 141.5 | " |
| 229+00 | 230+00 | Lt. | 98 | " |
| 229+00 | 230+00 | Rt. | 102 | " |
| 230+10 | 231+10 | Lt. | 110 | " |
| 230+90 | 231+40 | Rt. | 92.5 | " (Turnout) |
| | | | 112.5 | " (Island) |
| TOTAL | | | 793.0 | |

**ITEM 611 REINFORCED CONCRETE APPROACH SLABS, AS PER PLAN**

| STATION FROM | STATION TO | AREA (S.Y.) | REMARKS |
|---|---|---|---|
| 196+72.50 | 196+97.50 | 144.4 | (52 x 25 ÷ 9) |
| 227+37.75 | 227+62.75 | 144.4 | (52 x 25 ÷ 9) |
| TOTAL | | 288.8 | |
| | | Use 289 | |

**ITEM 612 CONCRETE TRAFFIC ISLAND, AS PER PLAN**

| STATION FROM | STATION TO | AREA (S.Y.) | REMARKS |
|---|---|---|---|
| 230+45 | 231+11.54 | 40.0 | (2.61+8.1) ÷ 2 x 67 ÷ 9 |
| TOTAL | | 40.0 | |

**ITEM 653 TOPSOIL FURNISHED AND PLACED**

| STATION FROM | STATION TO | SIDE | DEPTH (IN.) | VOLUME (C.Y.) | REMARKS |
|---|---|---|---|---|---|
| 196+72.5 | 200+00 | Lt. | 6 | 141.1 | Sheets 27 & 28 |
| 196+72.5 | 200+00 | Rt. | 6 | 122.2 | Sheets 29 & 30 |
| 223+00 | 231+00 | Lt. | 6 | 381.4 | Sheets 31 - 35 |
| 223+00 | 231+00 | Rt. | 6 | 326.6 | Sheets 36 - 40 |
| TOTAL | | | | 971.3 | |
| | | | | Use 971 | |

**ITEM 659 SEEDING AND MULCHING, AS PER PLAN**

| STATION FROM | STATION TO | SIDE | AREA (S.F.) | AREA (S.Y.) | REMARKS |
|---|---|---|---|---|---|
| 196+72.5 | 200+00 | Lt. | 7641 | 849 | Sheets 27 & 28 |
| 196+72.5 | 200+00 | Rt. | 6597 | 733 | Sheets 29 & 30 |
| 223+00 | 231+00 | Lt. | 16542 | 1838 | Sheets 31 - 35 |
| 222+00 | 231+00 | Rt. | 16398 | 1822 | Sheets 36 - 40 |
| TOTAL | | | 47178 | 5242 | |

**ITEM 659 COMMERCIAL FERTILIZER**

| | |
|---|---|
| Seeded Area | = 47178 S.F. |
| Sodding Area | = 5517 S.F. |
| (52,695 x 20) ÷ (1000 x 2000) | = 0.53 Tons |
| TOTAL | = 0.53 Tons |

**ITEM 659 AGRICULTURAL LIMING**

| | |
|---|---|
| Seeded Area | = 47178 S.F. |
| Sodding Area | = 5517 S.F. |
| (52,695 x 100) ÷ (1000 x 2000) | = 2.63 Tons |
| TOTAL | = 2.63 Tons |

MADE JNS DATE 2-25-76
TRACED ZAS DATE 4-27-79
CHECKED M.G.B. DATE 4-26-79
SCALE None

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO
HNTB

# GENERAL SUMMARY

QUANTITY CALCULATIONS
MADE BY JNS DATE 5-1-74
CHECKED BY M.G.B DATE 5-3-74

| FED RD DIVISION | STATE | PROJECT |
|---|---|---|
| 5 | OHIO | |

10
148

CUYAHOGA COUNTY
COUNTY ROADS 37 AND 43

TYPE CODE 7221 unless otherwise shown

| SHEET NUMBER 5 | 6 | 8 | 9 | 10 | 20 | 34 | 35 | 138 | 39 | 40 | G3 | 136 | COST PARTICIPATION 100% Proj. | 100% Issue No. | TOTAL QUANT. | UNIT | ITEM | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | ROADWAY |
| Lump | | | | | | | | | | | | | Lump | | Lump | Lump | 201 | Clearing and Grubbing |
| | 200 | 2856 | | | | | | | | | | | 2356 | 200 | 3056 | Sq. Yd. | 202 | Pavement Removed |
| | | 5865 | | | | | | | | | | | 5865 | | 5865 | Sq. Ft. | 202 | Sidewalk Removed |
| | | 29 | | | | | | | | | | | 29 | | 29 | Lin. Ft. | 202 | Curb Removed |
| | | 390 | | | | | | | | | | | 390 | | 390 | Lin. Ft. | 202 | Fence Removed for Storage |
| | | Lump | | | | | | | | | | | Lump | | Lump | Lump | 202 | Structure Removed |
| | | | | | | | | | | | Lump | | Lump | | Lump | Lump | 202 | Portions of Structures Removed |
| | | | | | | | | Lump | | | | | Lump | | Lump | Lump | 202 | Parcel No. 5WR and 5T, Removal of one 2-Story Frame Building |
| | | 2 | | | | | | | | | | | 2 | | 2 | Each | 202 | Monument Removed For Salvage |
| | | 2424 | | | | | | | | | | | 2424 | | 2424 | Cu. Yd. | 203 | Embankment |
| | | 10,768 | | | | | | | | | | | 10,768 | | 10,768 | Cu. Yd. | 203 | Excavation not Including Embankment Construction |
| | | 2662 | | | | | | | | | | | 2662 | | 2662 | Sq. Yd. | 203 | Subgrade Compaction |
| 50 | | | | | | | | | | | | | 50 | | 50 | Cu. Yd. | 404 | Asphalt Concrete or an Approved Bituminous Itemized Surface Course Per |
| 25 | | | | | | | | | | | | | 25 | | 25 | Cu. Yd. | 410 | Traffic Compacted Surface, Type A or B — Maintaining Traffic |
| | | | | | | | | | | | | 1 | 1 | | 1 | Each | 604 | Monument Assembly, Type 36-B |
| | | | | | | | | | | | | 4 | 4 | | 4 | Each | 604 | Centerline Reference Monuments |
| | | | 162.5 | | | | | | | | | | 162.5 | | 162.5 | Lin. Ft. | 606 | Guardrail, Type 5 |
| | | | 2 | | | | | | | | | | 2 | | 2 | Each | 606 | Anchor Assembly |
| | | | 2 | | | | | | | | | | 2 | | 2 | Each | 606 | Bridge Terminal Assembly, As Per Plan |
| | | | 4463 | | | | | | | | | | 4463 | | 4463 | Sq. Ft. | 608 | 4½" Concrete Walk, As Per Plan |
| | | | 538 | | | | | | | | | | 538 | | 538 | Sq. Ft. | 608 | 6" Concrete Walk, As Per Plan |
| 100 | | | | | | | | | | | | | 100 | | 100 | M. Gal. | 616 | Water |
| 20 | | | | | | | | | | | | | 20 | | 20 | Ton | 619 | Calcium Chloride |
| | | | 971 | | | | | | | | | | 971 | | 971 | Cu. Yd. | 653 | Topsoil Furnished and Placed |
| | | 134 | | | | | | | | | | | 134 | | 134 | Lin. Ft. | 202 | Fence Removed |
| | | | | | | | | | | | | | | | | | | PAVEMENT |
| | 17 | 220 | | | | | | | | | | | 220 | 17 | 237 | Cu. Yd. | 310 | Subbase, 703.08 or 703.10 |
| | | | 12 | | | | | | | | | | 12 | | 12 | Cu. Yd. | 402 | Asphalt Concrete, As Per Plan |
| | | | 8 | | | | | | | | | | 8 | | 8 | Cu. Yd. | 404 | Rubberized Asphalt Concrete, As Per Plan |
| | | | 29 | | | | | | | | | | 29 | | 29 | Gal. | 407 | Tack Coat, As Per Plan |
| | 200 | 2219 | | | | | | | | | | | 2219 | 200 | 2419 | Sq. Yd. | 451 | 9" Reinforced Portland Cement Concrete Pavement, As Per Plan |
| | | 94 | | | | | | | | | | | 94 | | 94 | Sq. Yd. | 451 | 8" Reinforced Portland Cement Concrete Pavement, As Per Plan |
| | | | 23 | | | | | | | | | | 23 | | 23 | Each | 510 | Dowel Holes |
| | 80 | | 793 | | | | | | | | | | 793 | 80 | 873 | Lin. Ft. | 609 | Concrete Curb, Integral 6"x7" |
| | | | 40 | | | | | | | | | | 40 | | 40 | Sq. Yd. | 612 | Concrete Traffic Island, As Per Plan |
| | | | 289 | | | | | | | | | | 289 | | 289 | Sq. Yd. | 611 | Reinforced Concrete Approach Slabs (T=15") As Per Plan |
| | | | | | | | | | | | | | | | | | | EROSION CONTROL TYPE CODE Y005 |
| 1050 | | | | | | | | | | | | | 1050 | | 1050 | Sq. Yd. | 207 | Temporary Seeding and Mulching |
| 100 | | | | | | | | | | | | | 100 | | 100 | Lin. Ft. | 207 | Temporary Slope Drains |
| 3 | | | | | | | | | | | | | 3 | | 3 | Cu. Yd. | 207 | Temporary Benches, Dikes, Dams and Sediment Basins |
| 3 | | | | | | | | | | | | | 3 | | 3 | M. Gal. | 207 | Watering |
| 2 | | | | | | | | | | | | | 12 | | 12 | M. Sq. Ft. | 621 | Mowing |
| | | | | 100 | 90 | | | | | | | | 190 | | 190 | Lin. Ft. | 601 | Paved Gutter, Standard Type 1-2 |
| | | | | | 5 | | | | | | | | 5 | | 5 | Cu. Yd. | 601 | Rock Channel Protection, Type B Without Bedding |
| 262 | | | | | | | | | | | | | 262 | | 262 | Sq. Yd. | 659 | Repair Seeding and Mulching |
| 0.31 | | | 0.52 | | | | | | | | | | 0.84 | | 0.84 | Ton | 659 | Commercial Fertilizer (12-12-12) |
| | | | 5242 | | | | | | | | | | 5242 | | 5242 | Sq. Yd. | 659 | Seeding and Mulching, As Per Plan |
| | | | 2.63 | | | | | | | | | | 2.63 | | 2.63 | Ton | 659 | Agricultural Liming |
| 36 | | | | | | 37 | 316 | | 183 | 41 | | | 613 | | 613 | Sq. Yd. | 660 | Sodding |

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO
HNTB

# GENERAL SUMMARY

* 100% COUNTY

QUANTITY CALCULATIONS
MADE BY J.N.S DATE 5-1-74
CHECKED BY M.G.B DATE 5-3-74

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

11/148

CUYAHOGA COUNTY
COUNTY ROADS 37 AND 43

TYPE CODE 7221 unless otherwise shown

| SHEET NUMBER | | |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS
MADE BY JNS DATE 1-22-74
CHECKED BY MGB DATE 5-3-74

PLAN — SURVEYED; PLOTTED; TRACED; CHECKED; RT OF WAY CHECKED; NOTE BOOK; NO.

Note: Payment for removing the abandoned CEI duct encasement to the limits shown hereon shall be included in the price bid for Item 202 - Structure Removed.

CEI vault and conduit to be removed by Contractor.

Construction Limits

Asphalt Wearing Course For Details See Bridge Plans

Remove Existing Fence and store for Replacement by others (Sta. 227+40 to Sta. 231+10)

Type 5 Guardrail For quantities see Sheet 9

Guardrail Anchor

Begin S.W. Taper Sta. 228+30

Guardrail Connection See Bridge Plans

Begin Roadway Taper Sta. 230+75, 24' Lt.

Begin S.W. Taper Sta. 230+75

Abandoned 10" Water

Match Existing Underdrain

Existing R/W

Existing Barricades (to be removed by others)

Match Existing Pavement

End Taper Sta. 231+10.00, 20' Lt.

CEI Anchor Pole

CEI Ducts

10" Storm

END PROJECT STA. 231+10.00

END WORK STA. 231+40.00

8" Storm (To be abandoned)

Remove Abandoned CEI Duct encasement

Manhole (To be abandoned)

Catch Basin (To be abandoned)

12" Storm (To be abandoned)

Ditch (as per plan) Sta. 227+37.75 to Sta. 227+62.75

C.B. to be Abandoned

Special #1 M.H. Sta. 227+25, 43' Rt.

Catch Basin (To be abandoned) Twin 12" Corrugated

End Approach Slab Sta. 227+32.75

Existing R/W

Type 5 Guardrail

Guardrail Anchor

Note: Existing Wingwall to be Removed Sta. 225+67 to Sta. 227+32 For Details See Bridge Plans.

4'-0" Chain Link Fence (to be removed) Sta. 227+00 to Sta. 228+34

Special #1 M.H. Sta. 227+80, 38' Rt.

Special #1 M.H. Sta. 228+30, 30.75 Rt.

Begin S.W. Taper Sta. 228+30

6"x7" Integral Conc. Curb

Existing 9"x10" Curb (To be removed)

PT South Curb Sta. 229+60.00

Elev. 676.60

Elev. 676.82

Elev. 677.29

Elev. 676.37

Elev. 676.69

Elev. 676.95

Elev. 677.28

Item 605 6" Underdrain (as per plan)

Sta. 229+37

Drive 1-A

Drive 2-A Sta. 230+00

Manh. Box to be removed

C.B. to be Abandoned

Monument to be removed

See Sheet No. 13 for Pavement Joints Detail

Existing Traffic Dividers (to be removed)

Bearing of local Tangent at Sta. 229+60.00 = S 67° 06' 29.9" E

Existing Curb & Conc. Island (to be Removed). For Details of Conc. Traffic Island See Sheet 4. Sawed Joints with Joint Sealer 705.01 or 705.02 (Typical)

Match Existing Pavement

Concrete Curb (to be removed)

Existing Pavement Joint

Saw Cut

6"x7" Integral Conc. Curb

Sawed Joint with Joint Sealer 705.01 or 705.02

½" Expansion Joint Mat. 705.03

1" Joint Seal 705.01 or 705.02

HARVARD AVE. (C.R. 43)

Match Existing Pavement

Saw Cut

End Proposed Sidewalk at existing drive

Ctr. of Existing Curve

5' Sidewalk

Existing Pole (to be relocated)

Match existing underdrain

DENISON - HARVARD

SLAG PARKING

SCALE IN FEET 20 0 20 40

PLAN

Note: Contractor shall match the existing asphalt parking lot elevations at the R/W line for all new drives.

* Vertical Sidewalk Transition

Note: The cost of applying Joint Sealer 705.01 or 705.02 to the sawed joints in this island shall be included in the unit price bid for Item 608 - 4½" Concrete Walk.

LEGEND

- CONCRETE SIDEWALK (4½")
- DRIVE PAVEMENT (CONCRETE)
- ASPHALT WEARING COURSE (AS PER PLAN)
- CONCRETE TRAFFIC ISLAND
- CONCRETE SIDEWALK (6")†

† For Details of 6" Sidewalk See Sheet 14.

Note: See Sheet No. 13 for Pavement Joint Legend

PROFILE — SURVEYED; PLOTTED; TRACED; CHECKED; NOTE BOOK; NO.

For Details of Proposed Drives and Pavement Joints see sheet 13.

200' V.C.

PVI Sta. 229+00

PVT Sta. 231+00

Elev. 677.0

+0.80%

-1.48%

Profile Grade

Existing Grade

Match Existing Grade Sta. 231+10

674.70 674.90 675.10 675.30 675.50 675.70 675.92 676.12 676.30 676.51 676.74 677.00 677.27 677.57 677.88 678.22 678.58 678.72

680

675

670

227+00 228+00 229+00 230+00 231+00

PROFILE

ITEM 202 CATCH BASIN ABANDONED

| STATION | SIDE | NUMBER | REMARKS |
|---|---|---|---|
| 227+22 | Lt. | 1 | |
| 227+61 | Lt. | 1 | |
| 227+42 | Rt. | 1 | |
| 230+07 | Lt. | 1 | |
| TOTAL | | 4 | |

ITEM 202 MANHOLE ABANDONED

| STATION | SIDE | NUMBER | REMARKS |
|---|---|---|---|
| 227+43 | Lt. | 1 | |
| TOTAL | | 1 | |

HORIZONTAL 20 0 20 40
VERTICAL 5 0 5 10
SCALE IN FEET

MADE JNS DATE 1-22-74
TRACED TAK DATE 1-24-74
CHECKED M.G.B. DATE 5-3-74
SCALE As Noted

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

STA. 227+00 TO STA. 232+10

# MISCELLANEOUS DETAILS

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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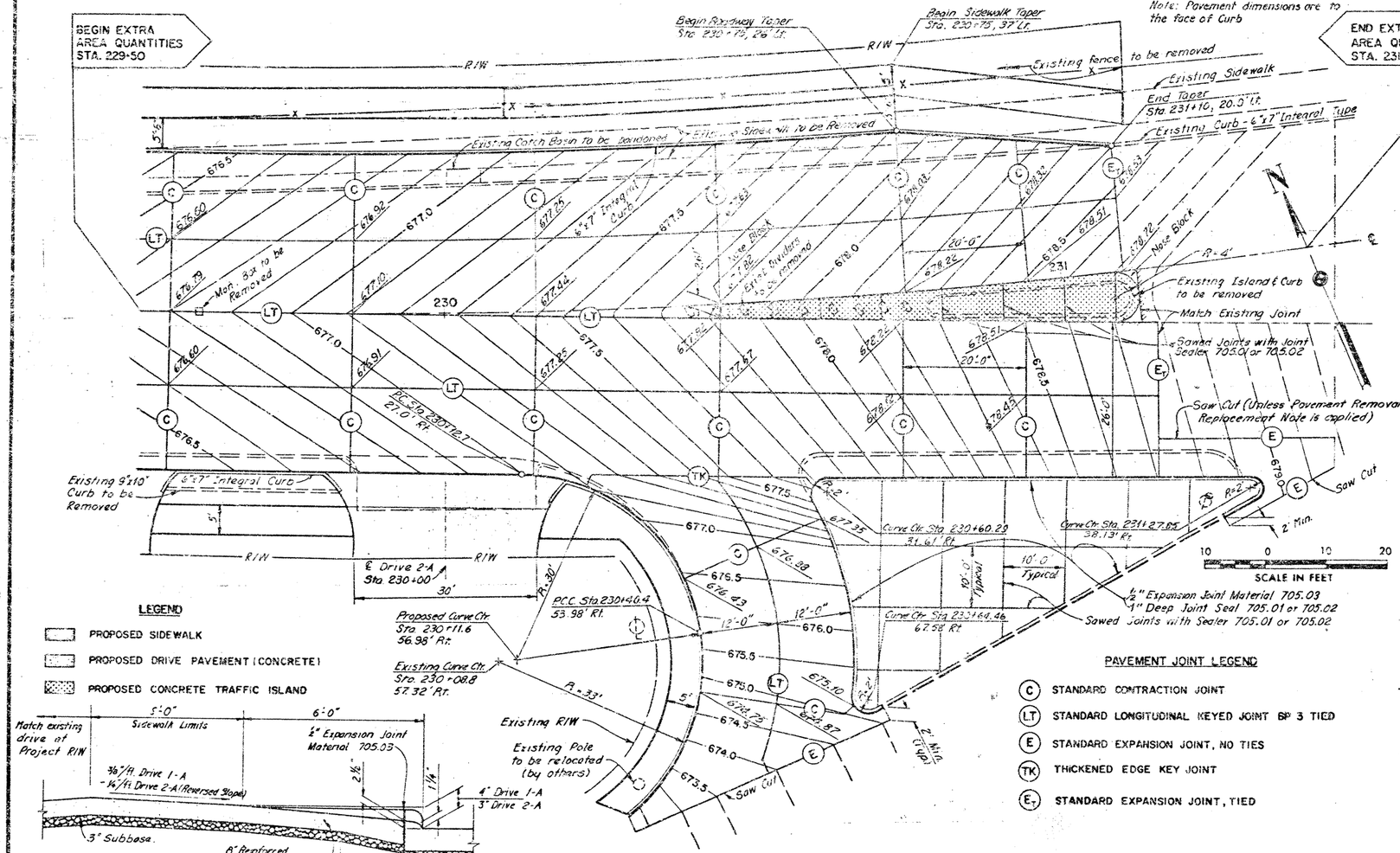
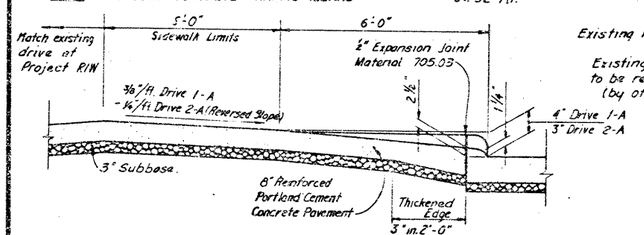
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS
MADE BY JNS DATE 9-10-74
CHECKED BY M.G.B. DATE 5-2-74



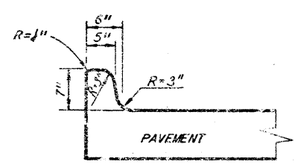

LEGEND

- PROPOSED SIDEWALK
- PROPOSED DRIVE PAVEMENT (CONCRETE)
- PROPOSED CONCRETE TRAFFIC ISLAND




APRON CURB TRANSITION AND DRIVE DETAIL
Scale: 1"=2'-0"

A satisfactory transition from the normal curb height to a 1¼" height shall be included in the unit bid price for Item 609 - 6"x7" Integral Curb.
The cost of all labor and material necessary to construct curb section and thickened edge as shown, shall be included in the contract unit bid price per sq yd. for Item 451 - 8" Reinforced Portland Cement Concrete for Drives.

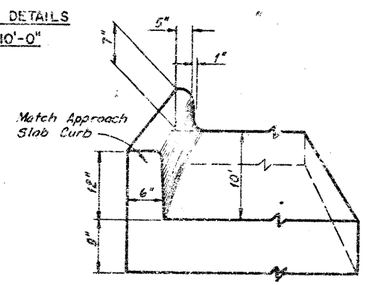



6"x7" INTEGRAL CURB
SCALE: 1"=1'-0"

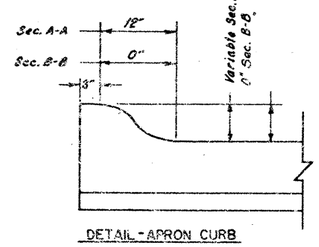
INTERSECTION DETAILS
SCALE: 1"=10'-0"

PAVEMENT JOINT LEGEND

- (C) STANDARD CONTRACTION JOINT
- (LT) STANDARD LONGITUDINAL KEYED JOINT BP 3 TIED
- (E) STANDARD EXPANSION JOINT, NO TIES
- (TK) THICKENED EDGE KEY JOINT
- ($E_T$) STANDARD EXPANSION JOINT, TIED




CURB TRANSITION
STA. 227+62.75 TO STA. 227+72.75
LEFT AND RIGHT
Scale: 1"=1'-0"




DETAIL - APRON CURB
SEC. A-A SEC. B-B
SCALE: 1"=1'-0"

(FOR INFORMATION ONLY)

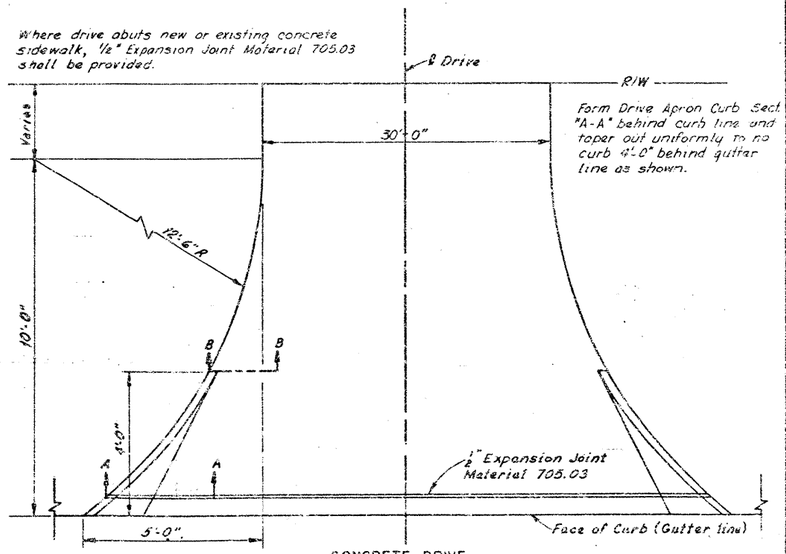
EXTRA AREA QUANTITIES *

| Item | Description | Unit | Quantity | Remarks |
|---|---|---|---|---|
| | | | | |
| 202 | Pavement Removed | Sq Yds | 862.6 | Plus mailbox |
| 202 | Pavement Removed | Sq Yds | 34.7 | Drive @ Sta 230+00 |
| 202 | Curb Removed | Lin. Ft | 29.0 | Length Scaled |
| 202 | Fence Removed for Storage | Lin. Ft | 160.0 | " " |
| 202 | Sidewalk Removed | Sq. Ft | 2313.4 | " " includes Islands |
| 203 | Excavation Including Embank Construction | Cu Yds | 178.0 | |
| 203 | Subgrade Compaction | Sq Yds | 1207.6 | |
| 310 | Subbase - 3" - 703.08 or 703.10 | Cu Yds | 104.1 | |
| 451 | 8" R.P.C.C., As Per Plan | Sq Yds | 66.1 | Drive @ Sta 230+00 |
| 451 | 9" R.P.C.C., As Per Plan | Sq Yds | 1115.6 | |
| 510 | Dowel Holes | Each | 23 | |
| | | | | |
| 608 | Concrete Walk 4" As Per Plan | Sq Ft | 2733.0 | |
| 609 | 6"x7" Integral Curb | Lin Ft | 215.0 | |
| 612 | Concrete Traffic Island, As Per Plan | Sq Yds. | 40.0 | |
| 653 | Topsoil Furnished and Placed | Cu. Yds. | 35.6 | |
| 659 | Seeding and Mulching, As Per Plan | Sq Yds. | 213.0 | |
| | | | | |
| | | | | |
| | | | | |

* All quantities shown are included in the pertinent quantity calculations shown on Sheets 8 & 9.

Note: See Superelevation Table for Joint Locations & Lane Widths. (Sheet 3)
For Section through Nose Block see sheet 4.

Where drive abuts new or existing concrete sidewalk, ½" Expansion Joint Material 705.03 shall be provided.




Form Drive Apron Curb Sect "A-A" behind curb line and taper out uniformly to no curb 4'-0" behind gutter line as shown.

Curb shall be dropped to provide a 1¼" gutter at all driveways and wherever directed by the Engineer.

CONCRETE DRIVE
SCALE: ½"=1'-0"

MADE JNS DATE 9-10-74
TRACED JNC DATE 9-11-74
CHECKED MGB DATE 5-2-74
SCALE AS SHOWN

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

# MISCELLANEOUS DETAILS

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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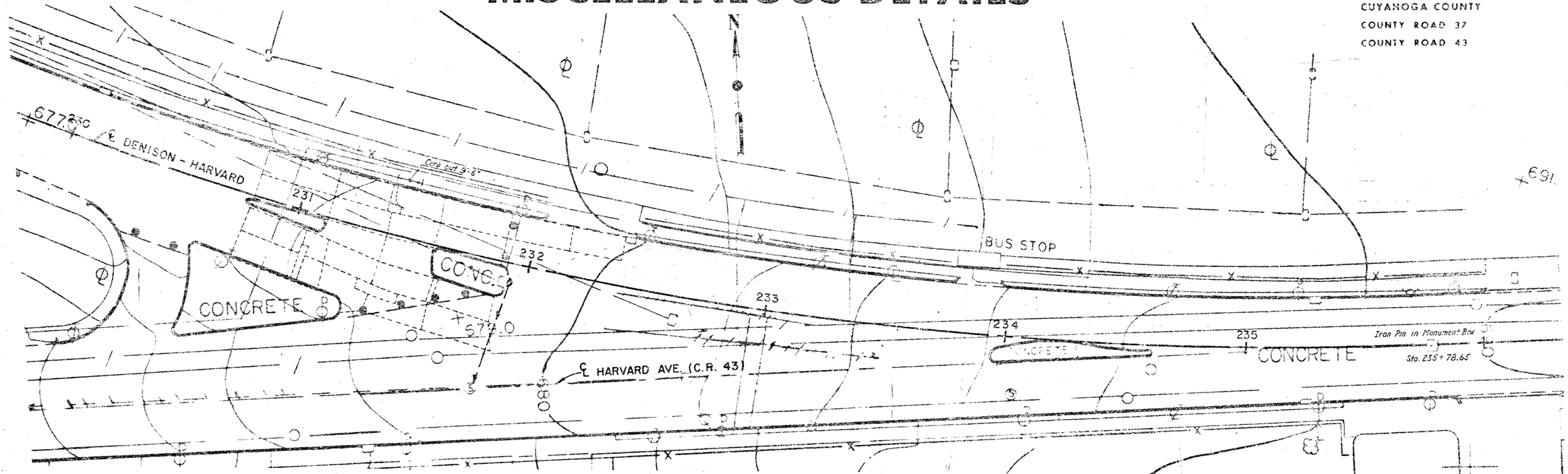
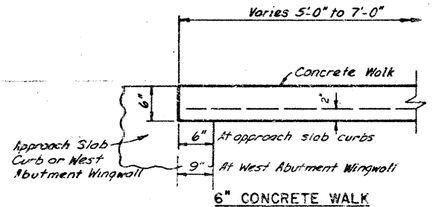
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43



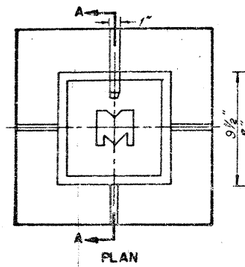

## EXISTING CONDITIONS

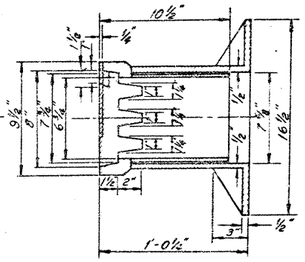
20 0 20 40
SCALE IN FEET




6" CONCRETE WALK
No Scale

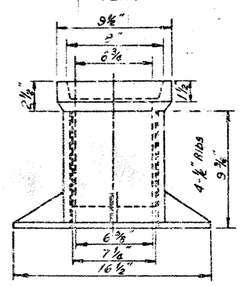
The concrete walk is to be located adjacent to the East and West Approach Slabs. Payment for furnishing and placing the 2" 703.08 Granulated Slag or 703.10 Screening Bed (East Approach Slab Base) and 6"x6"-6/6 Welded Wire Fabric 709.10, shall be included in the pay Item 608 - 6" Concrete Walk, As Per Plan.




SECTION A-A

1/8" or 1" inserts for various heights




ELEVATION

MATERIALS: Materials shall be as specified in paragraph 604.02 of Item 604.

The Manufacturer shall submit a test report certifying that the test bars used in the shop test were cast with the lot of castings in the shipment and the test bars were made in accordance with ASTM 48.

MONUMENT BOX NO. 36-B

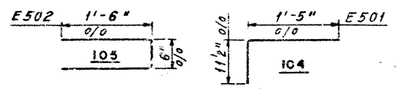
*Note:*
*For additional details of Approach Slabs, see Ohio Standard Drawing AS-1-72, dated 6-30-72.*

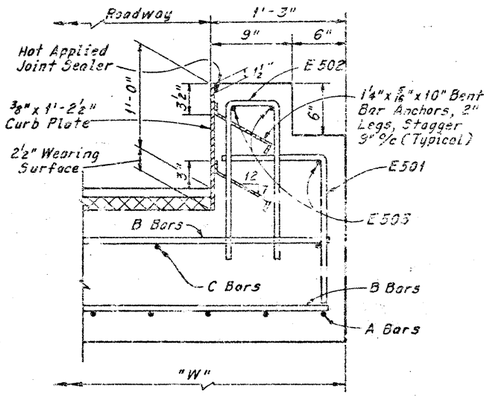
*For Wearing Surface Detail - See Bridge Plans.*

| REINFORCING STEEL - CURB AREA (FOR ONE APPROACH SLAB) | | | | |
|---|---|---|---|---|
| MARK | NO. REQ'D. | LENGTH | TYPE | WEIGHT |
| E501 | 26 | 2'-3" | 104 | 61 |
| E502 | 50 | 3'-3" | 105 | 169 |
| E503 | 6 | 24'-9" | Str. | 153 |
| | | | | |
| | | Total | = | 383 lbs |

Note:
502 bars in approach slab curbs space @ 1'-0" o/c.
501 bars in approach slab curbs space @ 2'-0" o/c.

BENDING DIAGRAMS




APPROACH SLAB CURB DETAIL

MADE JNS DATE 4-10-74
TRACED JNS DATE 4-11-74
CHECKED JWB DATE 5-22-74
SCALE AS SHOWN

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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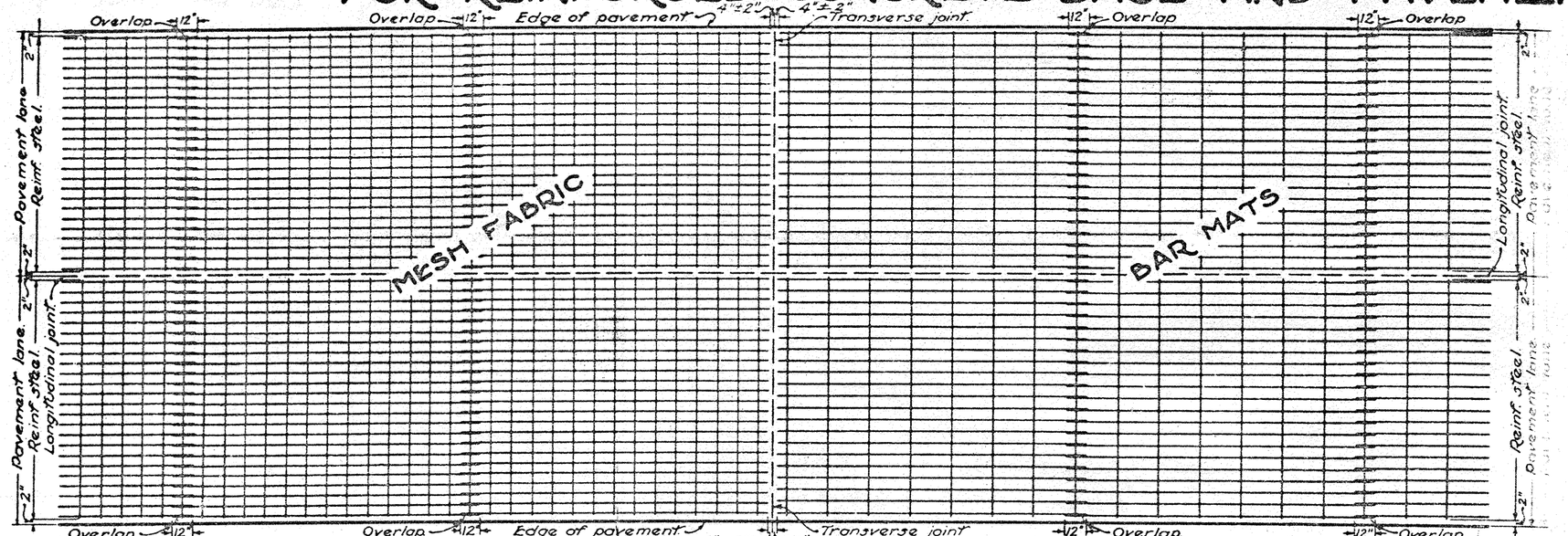
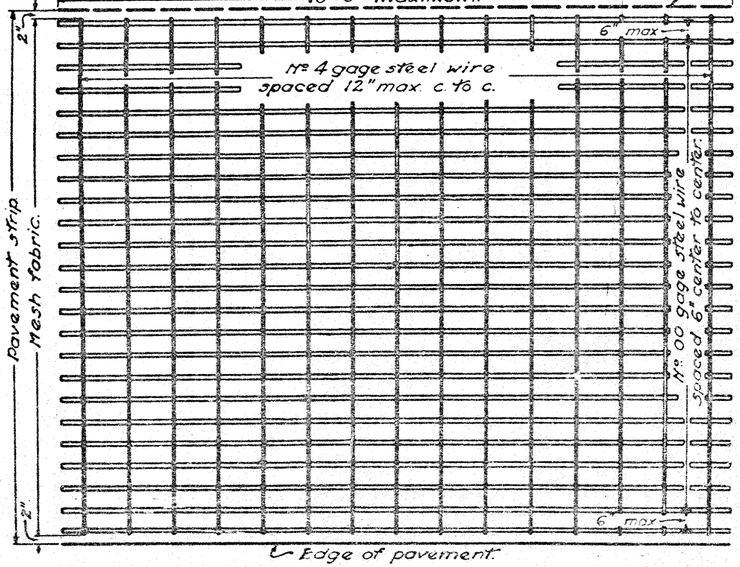
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

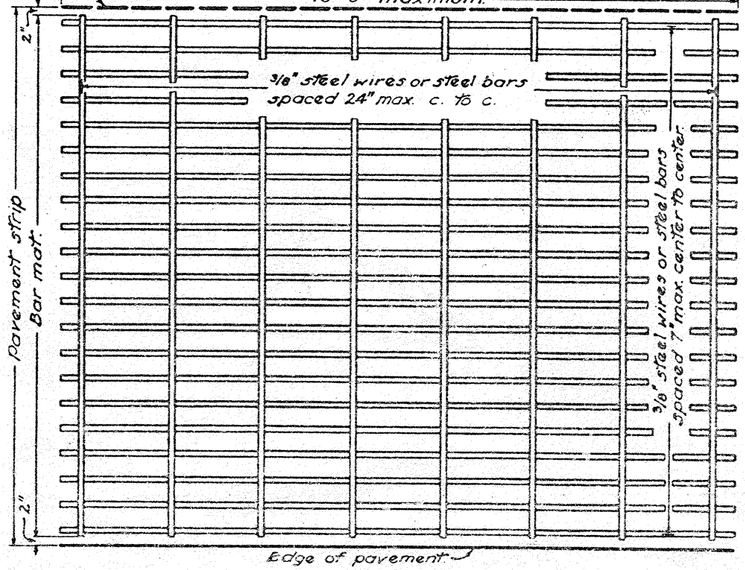
# STEEL REINFORCING
# FOR REINFORCED CONCRETE BASE AND PAVEMENT




## MESH FABRIC




## BAR MATS




## NOTES

The reinforcing for a lane in excess of 12 feet in width placed as a single operation may consist of two units. An approved hinge will be permitted in each sheet to provide for folding the sheet longitudinally. The hinge shall not be less than No. 4 gage steel wire and shall be designed to provide 7" lap when the sheets are laid flat.

The distance from the top of the concrete pavement or base course to the reinforcing steel may vary from 3 inches to T/3 + 1 inch, where T = the thickness of the concrete pavement or base course.

Adjacent sheets of the Mesh Fabric shall be lapped not less than 12 inches when the lap is made perpendicular to the centerline of the pavement and not less than 7 inches when made parallel to the centerline of the pavement.

Reinforcing Wire Fabric (Mesh) shall meet the requirements of 709.10 and shall be style 6x12 - 00/4

CUYAHOGA COUNTY ENGINEER

PAVEMENT REINFORCING

DATE 2-3-64 5-26-64

CONSTRUCTION DRAWING BP-2

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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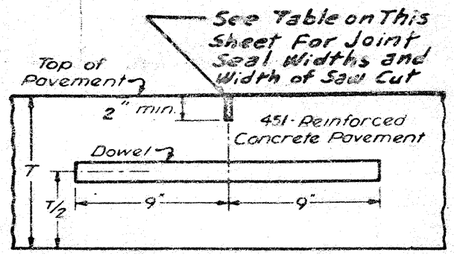
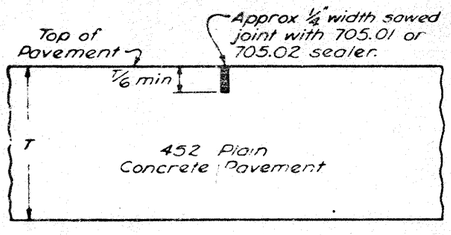
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

# TRANSVERSE JOINTS

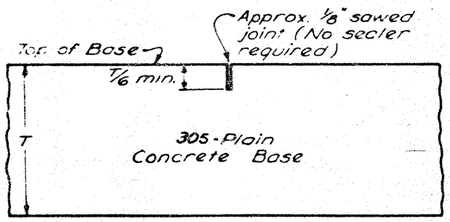
## CONTRACTION JOINTS




SECTION - 451 PAVEMENT

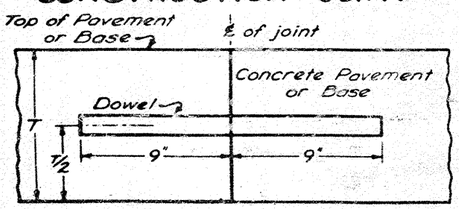



SECTION - 452 PAVEMENT



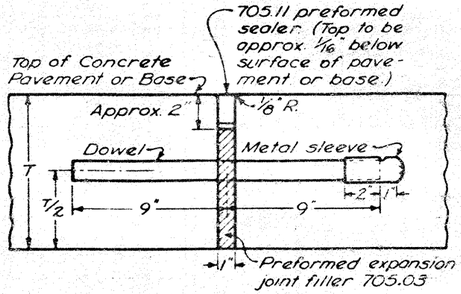

SECTION - 305

## CONSTRUCTION JOINT

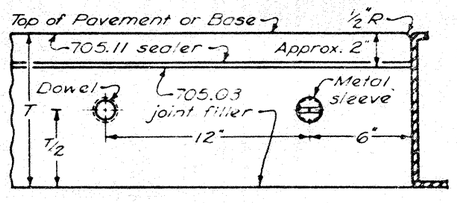



SECTION THROUGH CONSTRUCTION JOINT

## EXPANSION JOINT




SECTION THROUGH EXPANSION JOINT




SIDE ELEVATION OF EXPANSION JOINT

**GENERAL**: Notes and details shown on this drawing shall be considered in conjunction with and supplemental to the pertinent specifications for portland cement concrete pavements and bases and incidentals related thereto.

All joints shall be constructed normal to the centerline of the pavement lane unless otherwise directed.

Where dowels are specified, they shall be round, straight steel bars of the size indicated in the following table and shall be shop coated with a suitable rust inhibitor. Dowels shall be spaced at 12" centers beginning 6" from the longitudinal joint.

| DOWEL SIZE | |
|---|---|
| THICKNESS OF PAVEMENT | DIAMETER OF DOWEL |
| 8" or less | 1" |
| 9" | 1 1/8" |
| 10" | 1 1/4" |
| over 10" | as shown on plans |

**ASSEMBLY**: Each joint assembly used to hold dowels in position shall be continuous between longitudinal joints or between longitudinal joint and pavement edge. The assembly shall be firmly held in proper position by at least eight 1/2" steel pins driven at an angle to brace the assembly from lateral and vertical displacement during the placing of the concrete. These pins shall be at least 18" in length. Two of these pins shall be driven opposite each other at each end of the assembly and the remaining pins shall be driven in staggered positions on each side of the assembly. In exceptional cases where it is impractical to use the 18" length pins, such as where hardpan or rock is encountered, the Engineer may authorize use of shorter pins provided the assembly is held firmly. Where the assembly is placed on granular material which may allow settlement or distortion of the assembly, a minimum of 6 steel plates, each having a bearing area of approximately 25 square inches and a cross-section which will not bend under the imposed load shall be placed under the assembly. One plate shall be used at each of the four end pins. The remaining plates shall be spaced uniformly on each side of the assembly. The method of staking and placing bearing plates shall be approved by the Engineer.

Dowel spacing is shown for pavement lanes of even foot widths. Where other widths are specified, standard cages may be used with dowel spacings adjusted as follows:

The 6" dowel spacing shall be maintained at the longitudinal joint. The spacing at the outer edge of the lane may be increased up to 12". Where an odd width of lane occurs, a dowel shall be placed 6" from the outer edge of the lane if the standard cage would provide for a space exceeding 12". Such a dowel shall be held rigidly in proper position by a method satisfactory to the Engineer or a dowel cage of greater length than required may be used by cutting the assembly and splicing to attain the required length.

This drawing is intended for use with a uniform depth pavement. When the project involves the placing of variable depth pavement, the joint components shall be held in place in accordance with the method shown in the plan or as approved by the Engineer.

**EXPANSION JOINTS**: Expansion joint filler shall be placed at 90° to the dowels, both horizontally and vertically, and shall be held rigidly in position by the use of a metal cap which shall be removed at such a time in the finishing operation that will enable the best workmanship in finishing the joint to the dimensions specified. Joint filler shall be continuous for the full width of each lane.

Smooth dowels shall be used, and free movement shall be provided by applying a coating of an oil such as S.A.E. 140 or other approved "bond-breaking" material just prior to placing the concrete. One free end of each dowel shall be equipped, after coating, with a metal sleeve approximately 3" long, designed with crimped end and overlapping seams, fitting closely around the dowel. Each sleeve shall be provided with a depression or interior projection to act as a stop for the dowel, sufficiently distant from the crimped end to allow 1" for longitudinal dowel movement with pavement expansion. In lieu of this requirement any other means may be used if approved by the Director.

Proper size dowel holes shall be punched or drilled into the preformed expansion joint filler in order to insure tight fitting dowels.

**CONTRACTION JOINTS**: Dowels shall be used in contraction joints in 451 reinforced concrete pavement. They shall be smooth bars and free movement shall be provided by applying a coating of an oil such as S.A.E. 140 or other "bond-breaking" material just prior to placing the concrete.

Contraction joints of the type specified shall be spaced in accordance with the following table:

| CONTRACTION JOINT SPACING | |
|---|---|
| TYPES OF PAVEMENT OR BASE | MAXIMUM SPACING BETWEEN JOINTS |
| 451-Rein Concrete Pavement | 1. As per Plan<br>2. 30' or 75' when Hinge Jts are used (See Supple Specs) |
| 452 Plain Concrete Pavement | 15' |
| 305-Plain Concrete Base | 17' |
| Spc'l-Rein Concrete Base | 1. As per Plan<br>2. 30' or 75' when Hinge Jts are used (See Supple Specs) |

**CONSTRUCTION JOINTS**: Either smooth or deformed dowels shall be used in construction joints in all portland cement concrete pavement and base. Dowels shall be thoroughly cleaned of all oil or other substance that would break the bond between the steel and concrete. The joint shall be formed by using a 2" minimum thickness wood bulkhead or equal, with openings provided for dowel bars spaced at intervals not to exceed 12" as directed. The bulkhead shall be shaped to fit the typical section of the pavement or base, and dowels shall be held rigidly in position during the placing of the concrete. The concrete shall be carefully finished so as to provide a neat, tight fitting joint that will not require sealing.

Construction joints in reinforced concrete pavement shall not be located at a contraction joint, nor shall they be located closer than 10' to any other parallel joint. In plain concrete pavement or base, they shall not be located closer than 5' to another parallel joint.

**JOINTS IN INTERSECTIONS**: In all intersection areas the longitudinal and transverse joints shall be placed as shown on the Plans or as directed by the Engineer.

**JOINT FINISHING**: - A double radius edging tool shall be used in finishing Transverse Joints.

| JOINT SEAL WIDTHS | | | |
|---|---|---|---|
| Type of Joint | Spacing between Jts (ft) | Width of Saw Cut (in.) | Neoprene Comp Seal Width (in.) |
| Contraction | 60 - 75 | 5/16 | 13/16 |
| Contraction | 30 | 1/4 | 9/16 |
| Contraction | 25' & less | 1/4 | 7/16 |
| Hinge | - | 1/4 | 7/16 |

CUYAHOGA COUNTY ENGINEER

# PAVEMENT JOINTS

CONSTRUCTION DRAWING BP-4

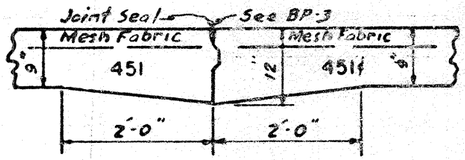
PLATE
2-2-66
11-1-66
5-2-67

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

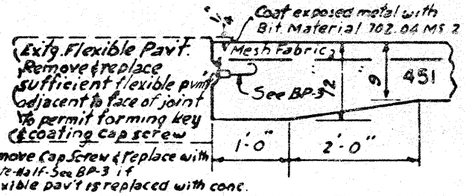
17
148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

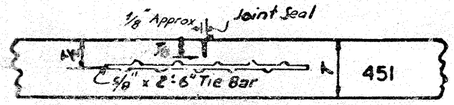
# PAVEMENT JOINTS



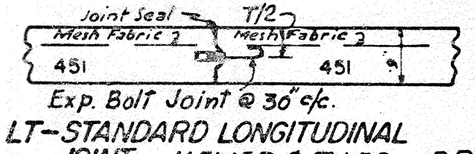

TK – THICKENED EDGE KEY JOINT



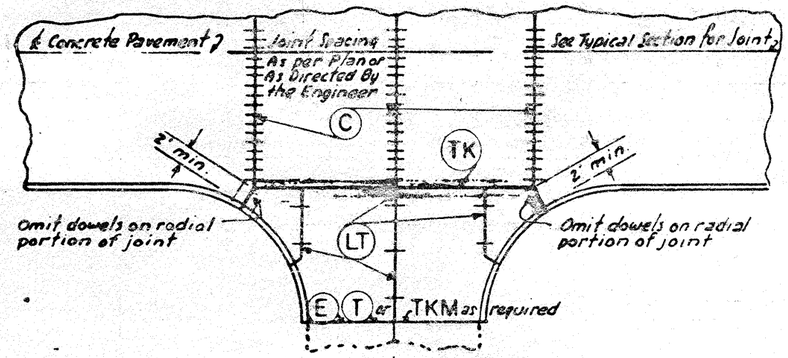

TKM THICKENED EDGE KEY JOINT MODIFIED



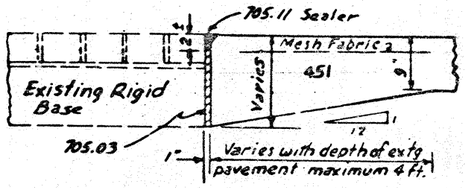

LJ-STANDARD LONGITUDINAL JOINT-SAWED & TIED-BP-3



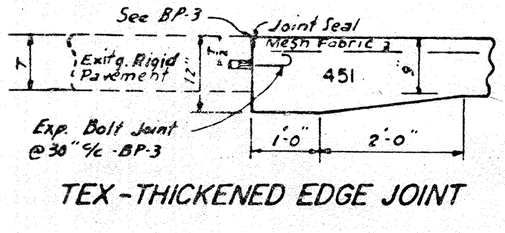

LT-STANDARD LONGITUDINAL JOINT - KEYED & TIED -BP-3



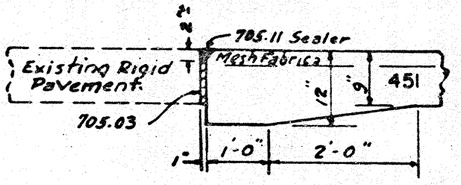

TYPICAL JOINT LAYOUT FOR CONCRETE PAVED INTERSECTION



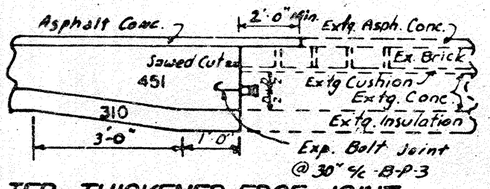

T – THICKENED EDGE JOINT




TEX-THICKENED EDGE JOINT




TE- THICKENED EDGE EXPANSION JOINT




TEB-THICKENED EDGE JOINT

LEGEND

LJ-STANDARD LONGITUDINAL JOINT
Sawed & Tied - BP-3
LT-STANDARD LONGITUDINAL JOINT
Keyed & Tied - BP-3

C - STANDARD CONTRACTION JOINT
See Standard Construction Drawing BP-4
E - STANDARD EXPANSION JOINT
See Standard Construction Drawing BP-4
TK - THICKENED EDGE KEY JOINT
TKM - THICKENED EDGE KEY JOINT - Modified
T - THICKENED EDGE JOINT
TE - THICKENED EDGE EXPANSION JOINT
TEX - THICKENED EDGE JOINT
With Expansion Bolt
TEB - THICKENED EDGE JOINT
With Expansion Bolt - See BP-3
H - HINGED JOINT - See Supp. Specs. & BP-4

General Notes

The additional quantity of concrete required for all thickened joints shall be included for payment in the contract unit price bid for Item 451 - Reinforced Portland Cement Concrete Pavement.

The material for Joint Seal shall meet the requirements of 705.01 705.02 & 705.11

CUYAHOGA COUNTY ENGINEER

PAVEMENT JOINTS

DATE
2-2-66
5-2-69
4-1-74

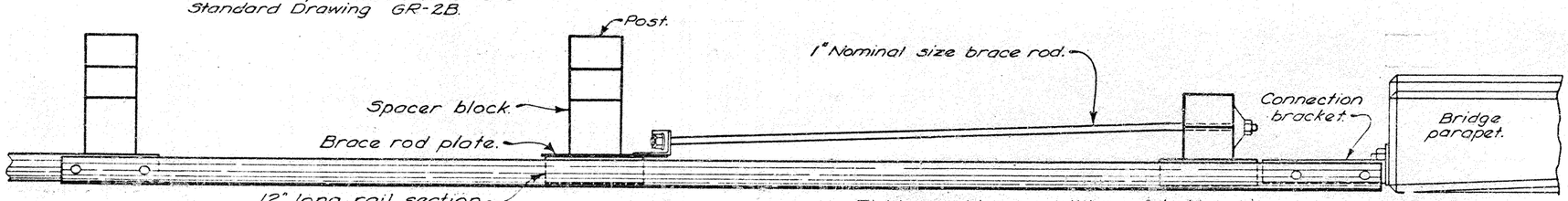
CONSTRUCTION DRAWING PJ-1

| FED. RD DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 2 | OHIO | | |

17A
14B

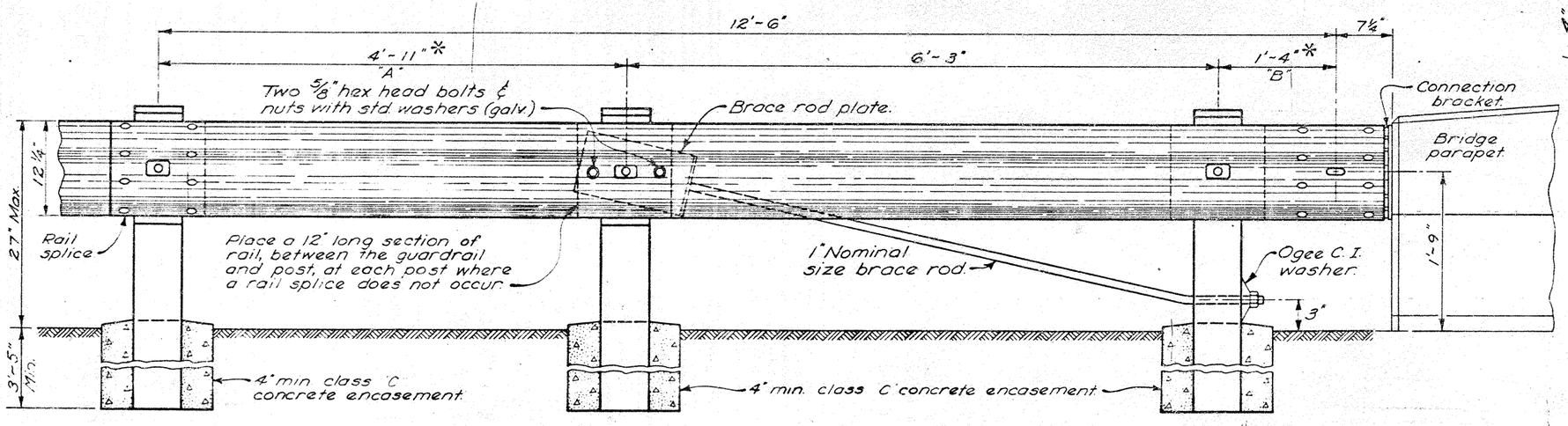
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

Posts may be round or square-sawed wood, or W6x8.5 steel. See Standard Drawing GR-2B.




PLAN VIEW

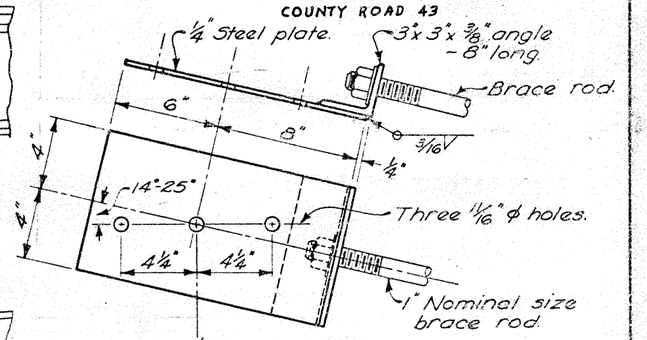
Field punching or drilling of bolt holes for the brace rod assembly shall be accomplished as provided for in 606.05.



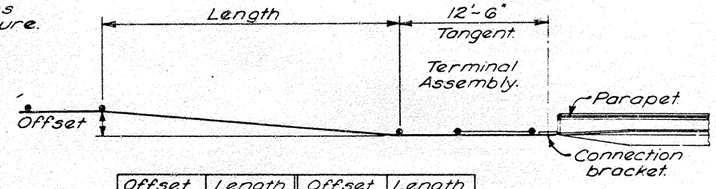

ELEVATION

## GUARDRAIL TERMINAL AT BRIDGE

* Dimension 'A' shall decrease as dimension 'B' increases to accommodate interference by the bridge substructure.




BRACE ROD PLATE




| Offset | Length | Offset | Length |
|---|---|---|---|
| 1'-0" | 25.00' | 5'-0" | 100.00' |
| 2'-0" | 50.00' | 6'-0" | 100.00' |
| 4'-0" | 100.00' | 7'-0" | 100.00' |

GUARDRAIL OFFSET DETAIL

### NOTES

BRIDGE TERMINAL ASSEMBLY, AS PER PLAN

The price bid for bridge terminal assembly, as per plan shall include the additional cost, in excess of normal guardrail cost, for concrete encasement, brace rod, brace rod plate and all component parts as detailed.

The connection bracket and anchor bolts are included with the bridge railing for payment. See Std. Dwg. BR-2-67 for connection bracket details.

Note: This Project makes no provisions for Bridge Terminal Assemblies at the West Approach of the structure. However, the Contractor is reminded to install the connection bracket and anchor bolts at this approach for future connection of Bridge Terminal Assembly as per Std. Dwg. BR-2-67. For payment, see note above.

Rev. 1-1-71

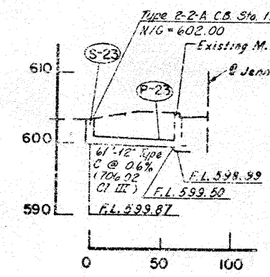
BRIDGE TERMINAL ASSEMBLY, AS PER PLAN

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

18
148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS
MADE BY JNS DATE 2-19-74
CHECKED BY MGB DATE 4-10-74



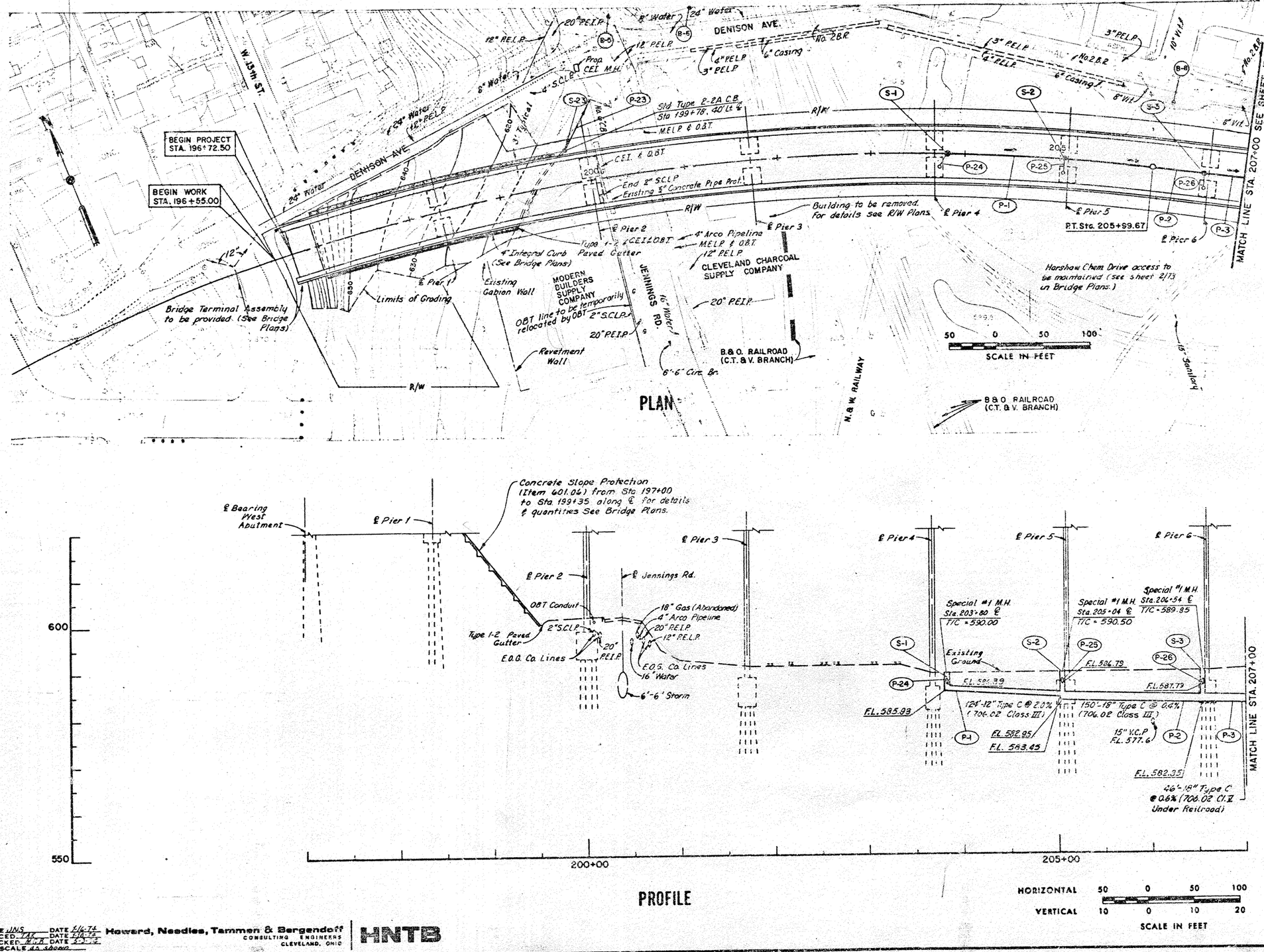

SLOPE PROTECTION
DRAINAGE CONNECTION
TO EXISTING STORM SEWER

ESTIMATED DRAINAGE QUANTITIES

| Ref. No. | Station From | Station To | Side | 603 Type C Conduit 18" (706.02) Class III | 604 Special #1 Manhole | 604 Type C Conduit as 706.02 Class V Under R.R. Ft. Pier | 604 Type 1-2 Paved Gutter | |
|---|---|---|---|---|---|---|---|---|
| S-1 | 203+80 | | ℄ | | 1 | | | |
| S-2 | 205+04 | | ℄ | | 1 | | | |
| S-3 | 206+54 | | ℄ | | | | | |
| P-2 | 206+04 | 206+54 | ℄ | 150 | | 46 | | |
| P-3 | 206+54 | 207+00 | ℄ | | | | | 3 46 |
| | | TOTAL | | | | | 100 | 100 |

ESTIMATED DRAINAGE QUANTITIES

| Ref. No. | Station From | Station To | Side | 603 Conduit Type C 18" (706.02) Class III | 604 Std. Type 2-2-A Catch Basin (706.02) Class III | 603 Conduit Type C Constant. ASA Cl. D.I. with Mech. Joints | 603 Conduit Type C 12" (706.02) Class III | |
|---|---|---|---|---|---|---|---|---|
| S-23 | 199+78 | | Lt. | | 1 | | | |
| P-23 | 199+78 | 202+20 | Lt. | | | | 61 | |
| P-24 | 203+70 | | Rt. | | | 25 | | |
| P-25 | 205+06 | | Rt. | | | 15 | | |
| P-26 | 206+56 | | Rt. | | | 15 | | |
| P-1 | 203+80 | 205+04 | ℄ | | | | 124 | |
| | 199+75 | | Lt. & Rt. | | | | | |
| | TOTAL | | | | | 55 | 185 | 1 |







MADE JNS DATE 2-14-74
TRACED TAS DATE 2-14-74
CHECKED MLH DATE 5-3-74
SCALE AS SHOWN

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO
HNTB

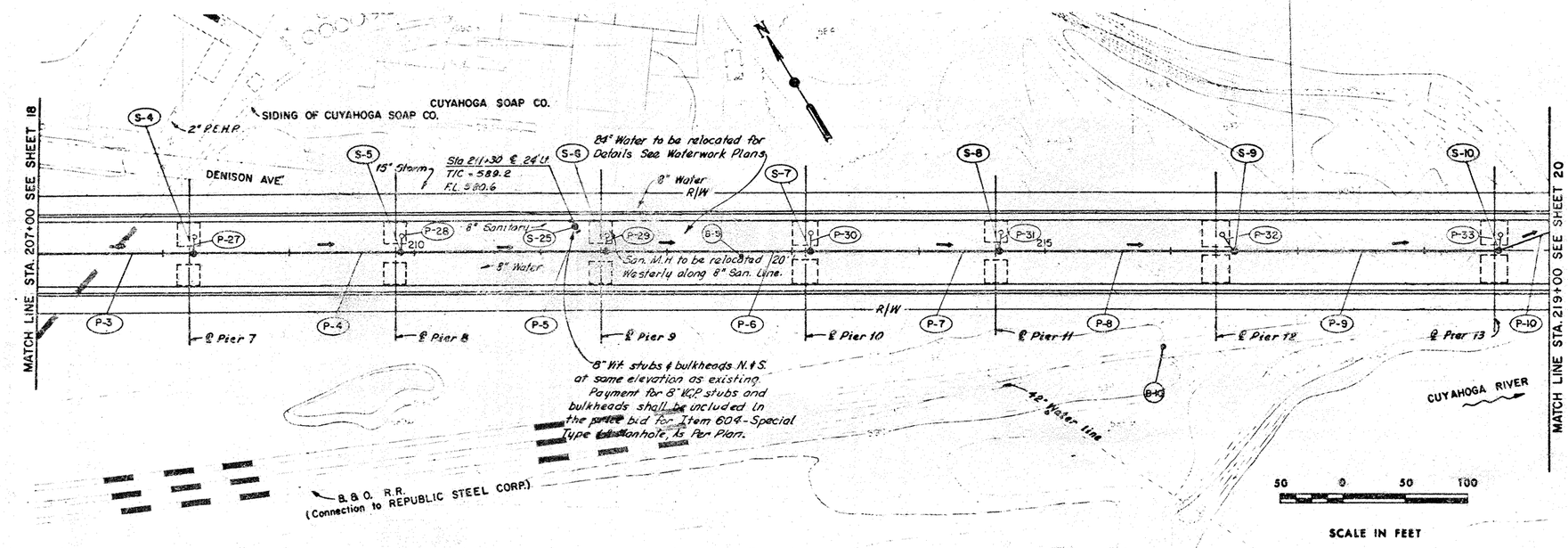
DRAINAGE PLAN AND PROFILE

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

19/148

**CUYAHOGA COUNTY**
**COUNTY ROAD 37**
**COUNTY ROAD 43**
QUANTITY CALCULATIONS

MADE BY JNS DATE 1-14-74
CHECKED BY MGB DATE 5-2-74




PLAN

## ESTIMATED DRAINAGE QUANTITIES

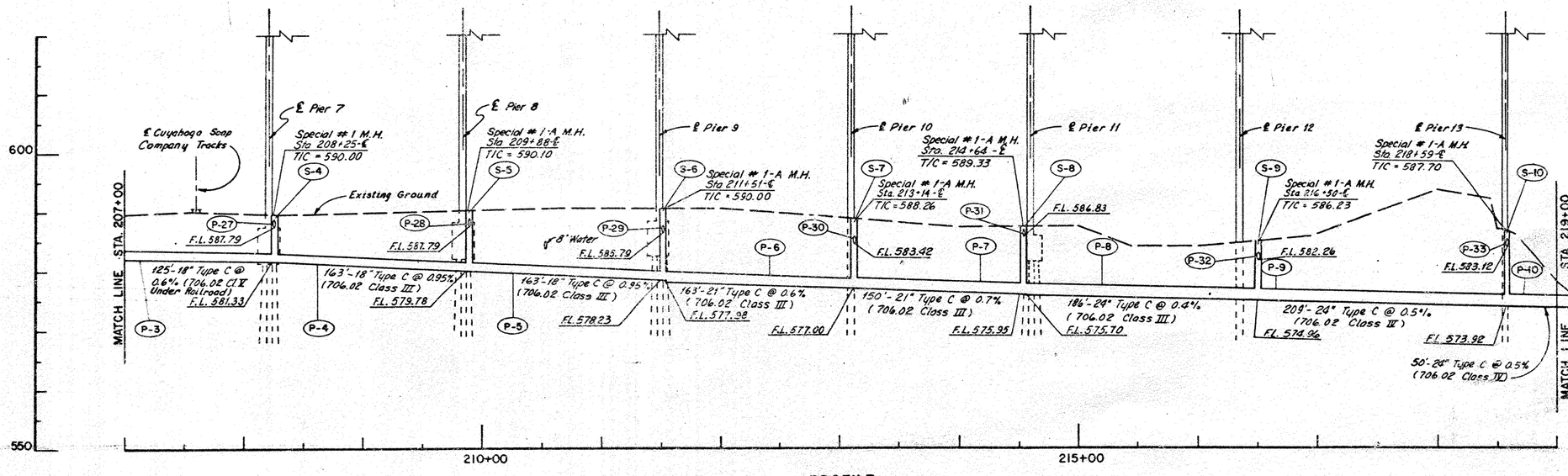
| Ref. No. | Station | | Side | 603 8" Conduit, Type C, A.S.A.C1.6 D.I. with Mech. Joints | 603 Type C Conduit 24" (706.02) Class III | 202 M H Removed | 603 Type C Conduit 24" (706.02) Class III |
|---|---|---|---|---|---|---|---|
| | From | To | | Lin. Ft. | Lin. Ft. | Each | Lin. Ft. |
| P-8 | 214+64 | 216+50 | ℄ | | | | 186 |
| P-9 | 216+50 | 218+59 | ℄ | | 209 | | |
| P-10 | 218+59 | 219+03 | Lt. | | 50 | | |
| P-27 | 208+24 | | Lt. | 15 | | | |
| P-28 | 209+87 | | Lt. | 15 | | | |
| P-29 | 211+50 | | Lt. | 15 | | | |
| P-30 | 213+13 | | Lt. | 15 | | | |
| P-31 | 214+63 | | Lt. | 16 | | | |
| P-32 | 216+38 | | Lt. | 19 | | | |
| P-33 | 218+58 | | Lt. | 16 | | | |
| | 211+51 | | Lt. | | | *1 | |
| | TOTAL | | | 111 | 259 | *1 | 186 |

*100% County (Sanitary)

## ESTIMATED DRAINAGE QUANTITIES

| Ref. No. | Station | | Side | 604 Special Type "1-A Manhole | 603 Type C Conduit 18" (706.02) Class III | 603 Type C Conduit 21" (706.02) Class III | 604 Special Type #1 M.H. |
|---|---|---|---|---|---|---|---|
| | From | To | | Each | Lin. Ft. | Lin. Ft. | Each |
| S-4 | 208+25 | | ℄ | | | | 1 |
| S-5 | 209+88 | | ℄ | 1 | | | |
| S-6 | 211+51 | | ℄ | 1 | | | |
| S-7 | 213+14 | | ℄ | 1 | | | |
| S-8 | 214+64 | | ℄ | 1 | | | |
| S-9 | 216+50 | | ℄ | 1 | | | |
| S-10 | 218+59 | | ℄ | 1 | | | |
| P-3 | 207+00 | 208+25 | ℄ | See Sheet 20 for quantity | | | |
| P-4 | 208+25 | 209+88 | ℄ | | 163 | | |
| P-5 | 209+88 | 211+51 | ℄ | | 163 | | |
| P-6 | 211+51 | 213+14 | ℄ | | | 163 | |
| P-7 | 213+14 | 214+64 | ℄ | | | 150 | |
| S-25 | 211+26 | | Lt. | *1 | | | |
| | TOTAL | | | *1 ℄ | 326 | 313 | 1 |

* 100% County (Sanitary




PROFILE

HORIZONTAL 50 0 50 100
VERTICAL 10 0 10 20
SCALE IN FEET

MADE JNS DATE 1-14-74
TRACED AK DATE 1-14-74
CHECKED MGB DATE 5-2-74
SCALE AS SHOWN

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO
HNTB

Rev. 2-11-75

DRAINAGE PLAN & PROFILE

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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142

**CUYAHOGA COUNTY**

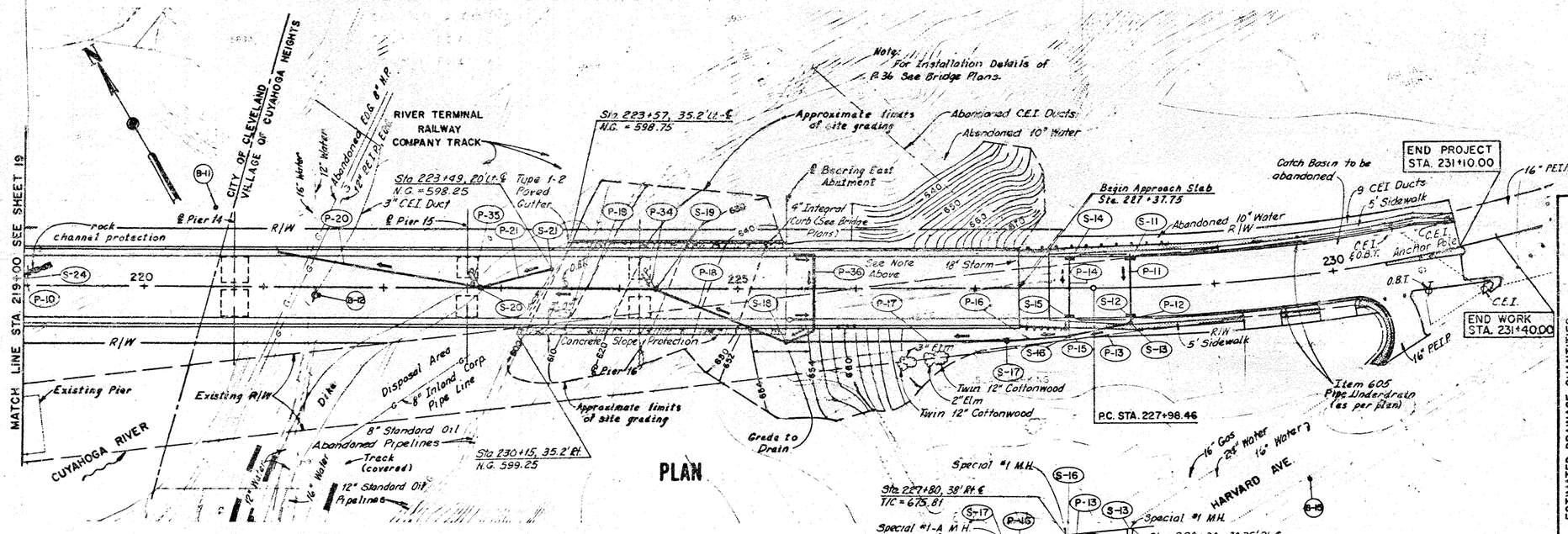
**COUNTY ROAD 37**

**COUNTY ROAD 43**

QUANTITY CALCULATIONS

MADE BY J.N.S. DATE 2-18-74

CHECKED BY M.G.B. DATE 4-30-74




ESTIMATED DRAINAGE QUANTITIES

| Ref. No. | Station From | Station To | Side | 603 8" Conduit, Class C, Cl. B, with Class IV Mod. Jackets Lin. Ft. | 603 Type C Conduit 12" 706.02 Class IV Lin. Ft. | 603 Type C Conduit 12" 706.02 Class V Lin. Ft. | 603 Type C Conduit 12" 706.02 Class III Lin. Ft. | 604 Cuyahoga County No. 3-C Type M Catch Basin Each | 604 Special Type M Manhole Each | 604 Special Type 1 Manhole Each | 604 Std. Type 2-2.A Catch Basin Each | 605 6" Underdrain (As Per Plan) Lin. Ft. | 606 Type 1-2 Paved Gutter Lin. Ft. | 607 Type B Rock Channel Protect. Cu. Yd. | 608 Concrete Masonry Cu. Yd. | 609 Conduit Type C 12" 706.02 Class III Lin. Ft. | 610 Conduit Type C 12" 706.02 Class V Lin. Ft. | 611 Type C Conduit 12" 706.02 Class IV Lin. Ft. | 612 8" Conduit, Class C, Cl. B, with Class IV Mod. Jackets Lin. Ft. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S-11 | 228+30 | | Lt. | | | | | 1 | | | | | | | | | | | |
| S-12 | 228+30 | | Rt. | | | | | 1 | | | | | | | | | | | |
| S-13 | 228+30 | | Rt. | | | | | 1 | | | | | | | | | | | |
| S-14 | 227+80 | | Lt. | | | | | 1 | | | | | | | | | | | |
| S-15 | 227+80 | | Rt. | | | | | | 1 | | | | | | | | | | |
| S-16 | 227+80 | | Rt. | | | | | | 1 | | | | | | | | | | |
| S-17 | 227+25 | | Rt. | | | | | | 1 | | | | | | | | | | |
| S-18 | 225+42 | | Rt. | | | | | | 1 | | | | | | | | | | |
| S-19 | 224+30 | | Rt. | | | | | | 1 | | | | | | | | | | |
| S-20 | 222+82 | outlet | Lt. | | | | | | 1 | | | | | | | | | | |
| S-21 | 223+49 | | Lt. | | | | | | | 1 | | | | | | | | | |
| S-24 | 219+03 | | Lt. | | | | | | | | 1 | | | | | | | | |
| | 219+03 | 219+20 | Lt. | | | | | | | | 2 | | | | | | | | |
| | 227+70 | 231+10 | Lt. Rt. | | | | | | | | 2 | | | | | | | | |
| | TOTAL | | | 18 | 17 | 183 | 125 | 4 | 4 | 1 | 4 | 622 | 50 | 4.1 | 236 | 298 | 268 | 185 | 176 |

| Ref. No. | Station From | Station To | Side | 603 Conduit, Type C 12" 706.02 Class III | 604 Type M Manhole Each | 604 Type 1 Manhole Each | 604 Std. Type 2-2.A Catch Basin Each | 605 6" Underdrain (As Per Plan) Lin. Ft. | 606 Type 1-2 Paved Gutter Lin. Ft. | 607 Type B Rock Channel Protect. Cu. Yd. | 608 Concrete Masonry Cu. Yd. | 609 Conduit Type C 12" 706.02 Class III Lin. Ft. | 610 Conduit Type C 12" 706.02 Class V Lin. Ft. | 611 Type C Conduit 12" 706.02 Class IV Lin. Ft. | 612 8" Conduit, Class C, Cl. B, with Class IV Mod. Jackets Lin. Ft. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P-3 | 207+00 | 209+25 | ℄ | | | | | | | | | | | | |
| P-11 | 228+30 | | Lt. Rt. | | | | | | | | | | | | |
| P-12 | 228+30 | | Rt. | | | | | | | | | | | | |
| P-13 | 228+30 | | Rt. | | | | | | | | | | | | |
| P-14 | 227+80 | | Lt. Rt. | | | | | | | | | | | | |
| P-15 | 227+80 | | Rt. | | | | | | | | | | | | |
| P-16 | 227+80 | 227+85 | Rt. | | | | | | | | | | | | |
| P-17 | 227+25 | 225+42 | Rt. | 183 | | | | | | | | | | | |
| P-18 | 225+42 | 224+30 | Rt. | | | | | | | | | | | | |
| P-19 | 224+30 | 222+82 | ℄ | | | | | | | | | | | | |
| P-20 | 222+82 | outlet | Lt. | | | | | | | | | | | | |
| P-21 | 223+49 | 219+03 | Lt. | | | | | | | | | | | | |
| P-34 | 224+20 | | Lt. | 18 | | | | | | | | | | | |
| P-35 | 222+18 | | Lt. | 17 | | | | | | | | | | | |
| P-36 | 225+42 | | Rt. | | | | | | | | | | | | |
| | 221+10 | | Lt. | 181 | | | | | | | | | | | |
| | 223+15 | 223+60 | Lt. Rt. | | | | | | | | | | | | |
| S-24 | 219+03 | | Lt. | | | | | | | | | | | | |
| | 219+03 | 219+20 | Lt. | | | | | | | | | | | | |
| | 227+70 | 231+10 | Lt. Rt. | | | | | | | | | | | | |
| | TOTAL | | | 176 | 185 | 298 | 268 | 622 | 50 | 4.1 | 236 | 622 | | | |

* P-3 quantity carried from Plan Sheet 19

MADE JNS DATE 1-10-74
TRACED JAK DATE 2-74
CHECKED MGB DATE 2-74
SCALE AS SHOWN

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

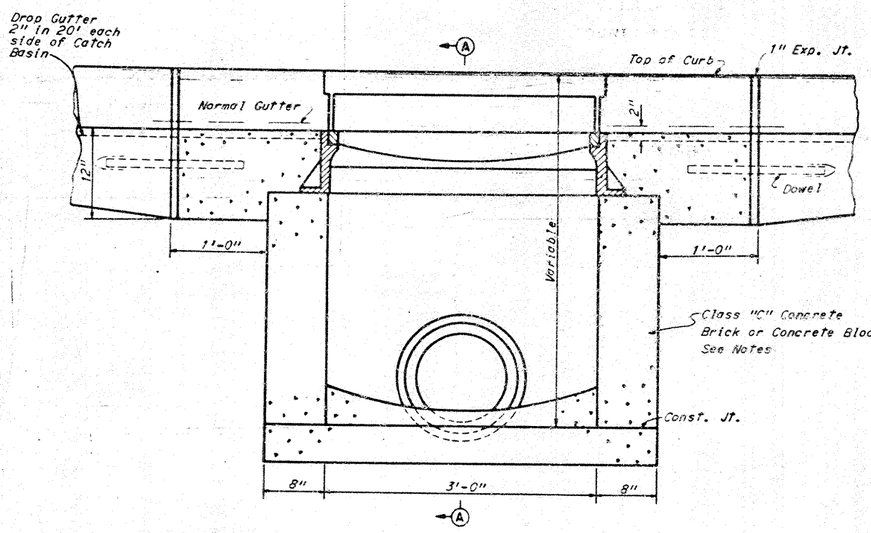
DRAINAGE PLAN & PROFILE

# CUY. CO. NO. 3-C CATCH BASIN

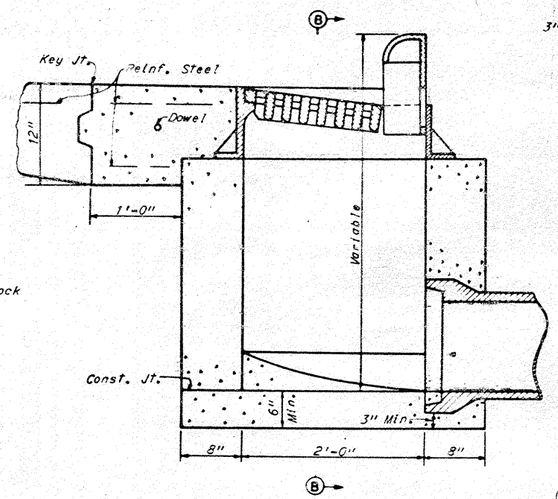
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

21/148

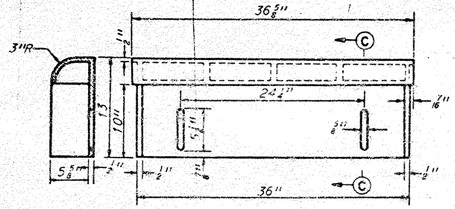
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




SECTION B-B

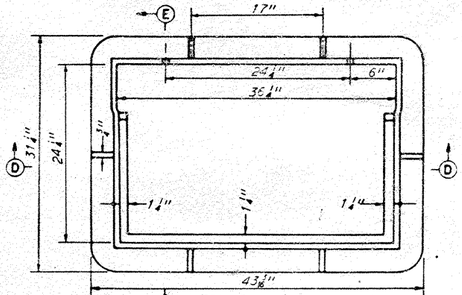



SECTION A-A

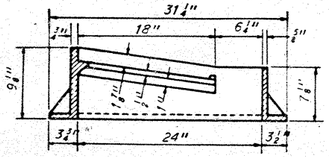



SECTION C-C

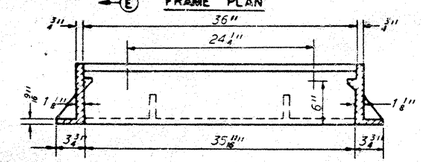
ELEVATION
RADIUS CURB BOX



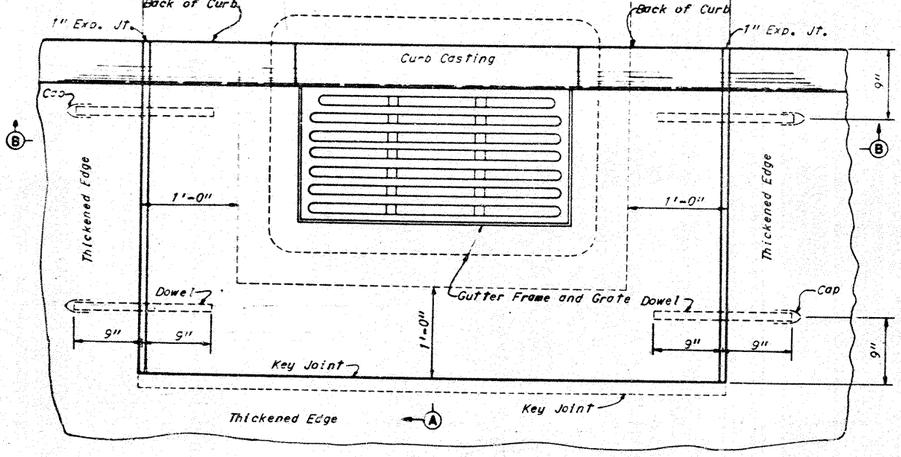

FRAME PLAN



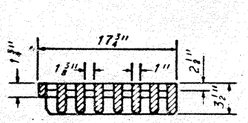

SECTION E-E



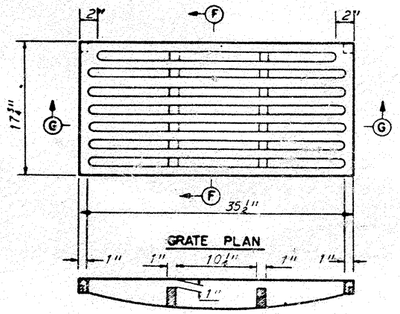

SECTION D-D




PLAN OF CATCH BASIN &
PAVEMENT JOINTS




SECTION F-F




GRATE PLAN

SECTION G-G

*Castings shall meet the requirements of Item 604. The design shall be essentially the same and equally as strong as those shown hereon.*

*Weights, minimum*

| | |
|---|---|
| *Curb casting* | *100 pounds* |
| *Gutter grate* | *200 pounds* |
| *Gutter frame* | *300 pounds* |

*Bearing Areas of frame and grate shall be so fitted and finished as to provide a firm and even seat for all portions of the grate in the frame. No projections shall exist on bearing areas of either casting and the grate shall sit in its frame without rocking. Frame and grate shall be fitted, matched and marked before delivery to the project.*

*Dowels to be 1¼ inch round, smooth bars 18 inches long spaced as shown hereon and greased.*

*Concrete cast in place to be Class "C".*

*Brick or Concrete Block side walls, when used in place of concrete, shall be 8 inches minimum in thickness.*

*Pavement: The portion blocked out of the pavement shall be placed after the casting has been set but shall be paid for as part of the pavement.*

*Expansion Joint: The 1" Expansion Material shall be omitted when Asphaltic Concrete Surface is part of the Pavement.*

*Reinforcing Steel shall meet the requirements of 709.10.*

*Payment for Reinforcing is included in the unit bid price for Item 604 and Special.*

MADE JNS DATE 2-5-74
TRACED TJC DATE 2-5-74
CHECKED TJC DATE 4-30-74
SCALE None

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

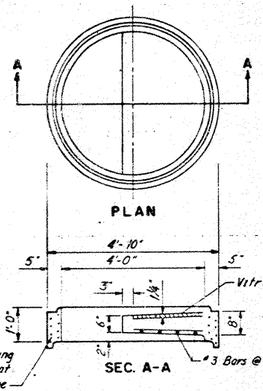
HNTB

# MISCELLANEOUS DRAINAGE DETAILS

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

22/148

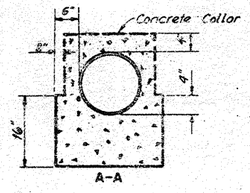
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

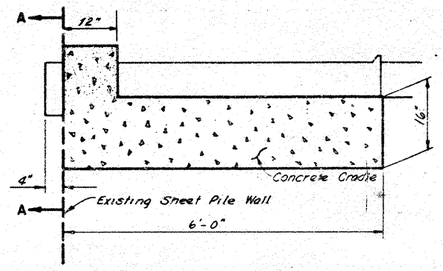



Reinforcing for the Ring shall be the same as that used in the 48" Dia. Pipe.

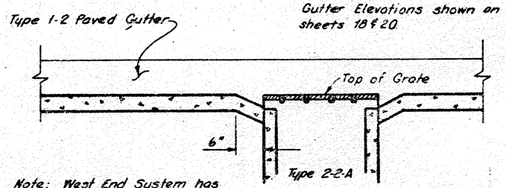
DETAIL OF BAFFLE RING
Scale: ½" = 1'-0"

Precast Reinforced Concrete Baffle Rings detailed on this drawing are to be used in connection with M.H. 1A when called for on Construction Plans.



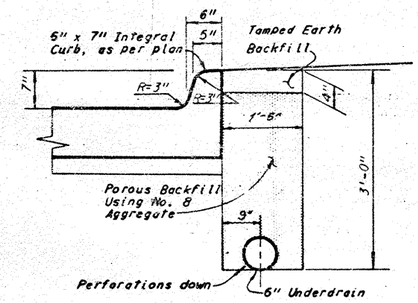




DETAIL OF DRAINAGE SYSTEM TIE TO
EXISTING SHEET PILE WALL @ STA. 221+10
Scale: 3/8" = 1'-0"



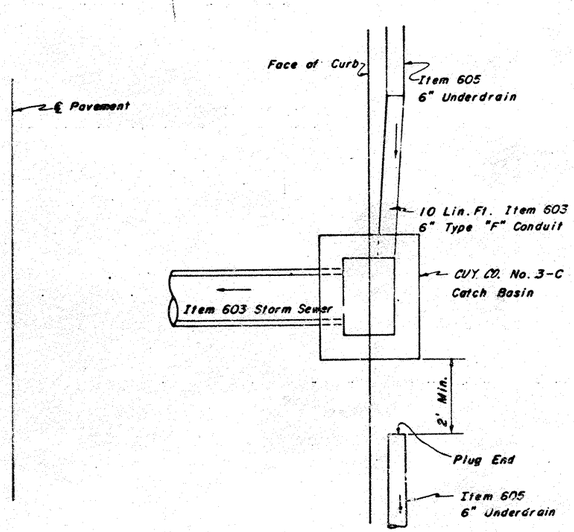

Note: West End System has opening in C.B. on south side only - East End System as shown.

DETAIL FOR CONNECTION OF TYPE 1-2
PAVED GUTTER TO THE TYPE 2-2-A CATCH BASIN
Scale: 3/8" = 1'-0




ITEM 605 6" PIPE UNDERDRAINS 706.08,
PERFORATED BELL AND SPIGOT

Note:
Underdrain 706.08 (perforated), shall have 3 centering lugs cast in bell end of the pipe. There shall also be a spacer cast in the bell end to provide a ⅜" gap between adjacent bell and spigot ends.




UNDERDRAIN TO CATCH BASIN AT CURB

MADE J.N.S. DATE 2-5-74
TRACED J.A.C. DATE 2-7-74
CHECKED W.H.S. DATE 2-20-74
SCALE AS SHOWN

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

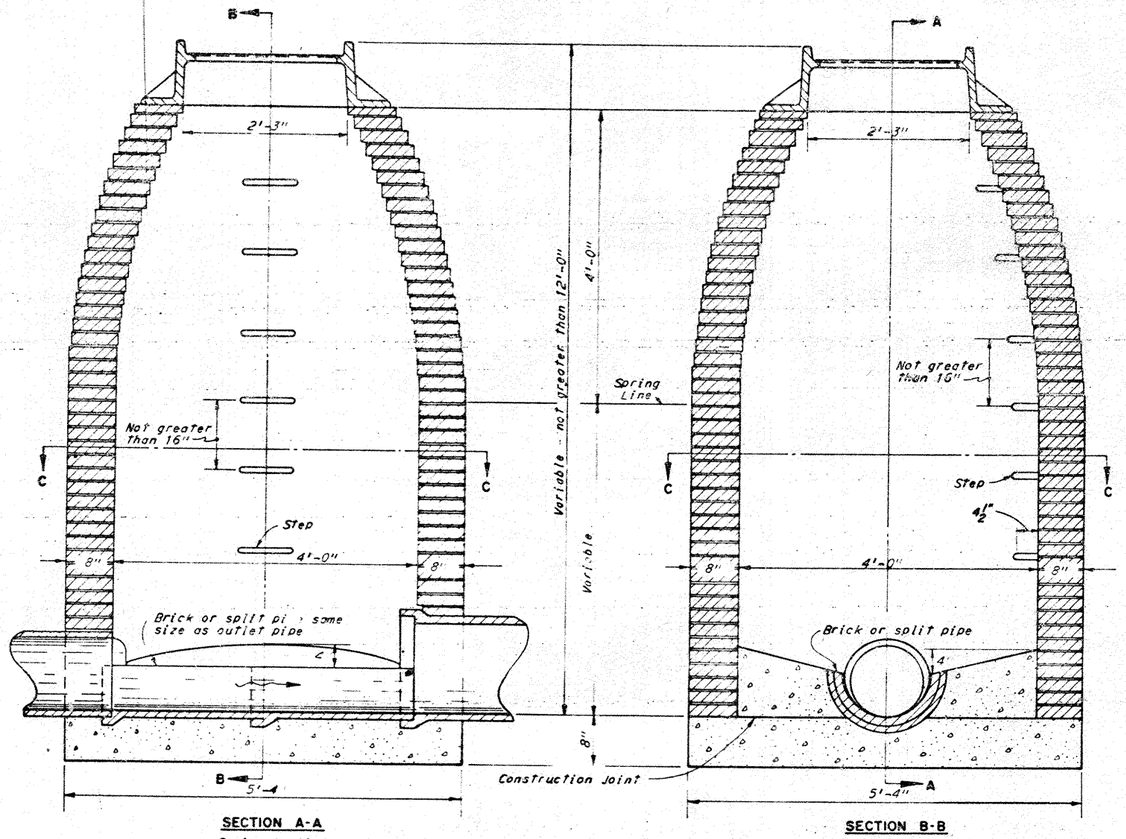
HNTB

# SPECIAL NO. 1 MANHOLE

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

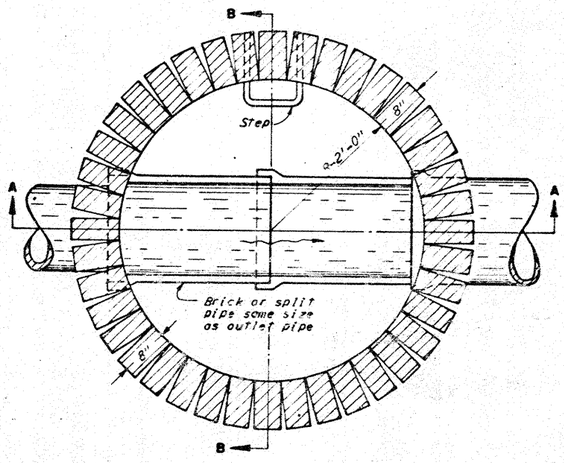
23
148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

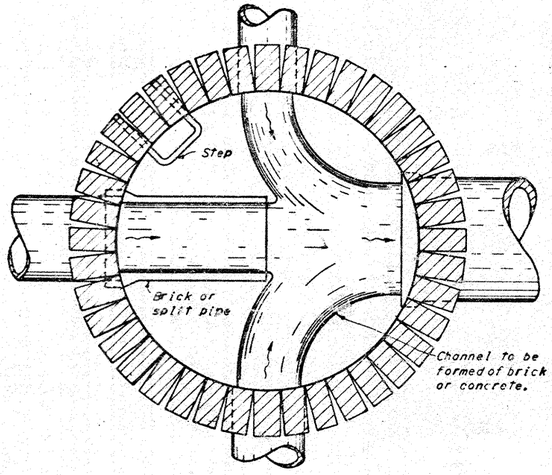



SECTION A-A
Scale: 1"=1'-0"

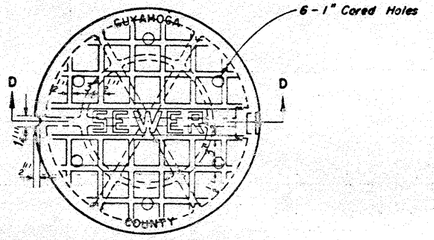
SECTION B-B
Scale: 1"=1'-0"



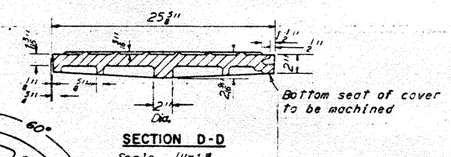

SECTION C-C



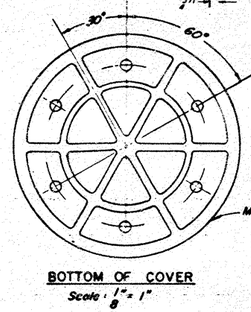

SECTION BELOW SPRING LINE SHOWING METHOD OF TURNING SIDE DRAINS



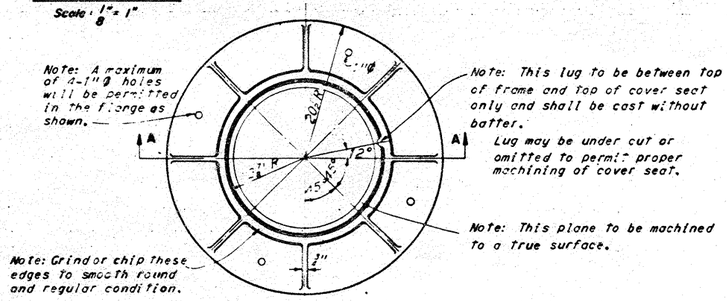

PLAN OF COVER No. 28 C



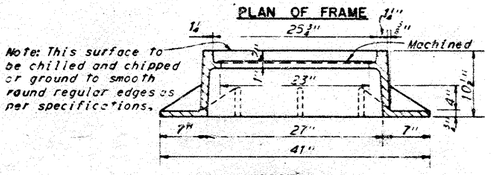

SECTION D-D
Scale 1"=1"



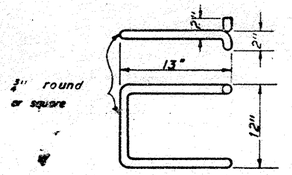

BOTTOM OF COVER
Scale 1"=1"




PLAN OF FRAME




SECTION A-A
Scale 3/32"=1"




DETAIL OF MANHOLE STEP
Scale 1½" = 1'-0"

## - NOTES -

**GENERAL** – The design shown hereon is for brick construction. If precast solid concrete blocks, , or cast in place concrete are used, the design shall be modified to fit the dimensions of the material used, except that the thickness of the wall shall not be less than 6 inches for precast solid concrete blocks or cast in place concrete construction.

**BEARING AREAS** of frame and cover shall be so fitted and finished as to provide a firm and even seat for all portions of the cover in the frame. No projections shall exist on bearing areas of either casting, and each cover shall seat in its frame without rocking. Frames and covers shall be fitted, matched and marked before delivery to the project.

**SETTING OF CASTING** – The base of the frame shall be set in a full bed of portland cement mortar, and so adjusted to conform to the finished pavement grade.

**CASTING** – Minimum weight of frame and cover 615 pounds.

Casting shall meet the requirements of 604. The design shall be essentially the same and equally as strong as those shown hereon, and on Sheet 25.

**STEPS** shall be wrought iron or nodular iron meeting the requirements of 604.

**CONSTRUCTION** – Manholes shall be built of brick, precast solid concrete blocks, or cast in place concrete. When manholes are constructed of brick, every sixth course shall be a stretcher course.

Bottom of manhole shall be Class "C" concrete.

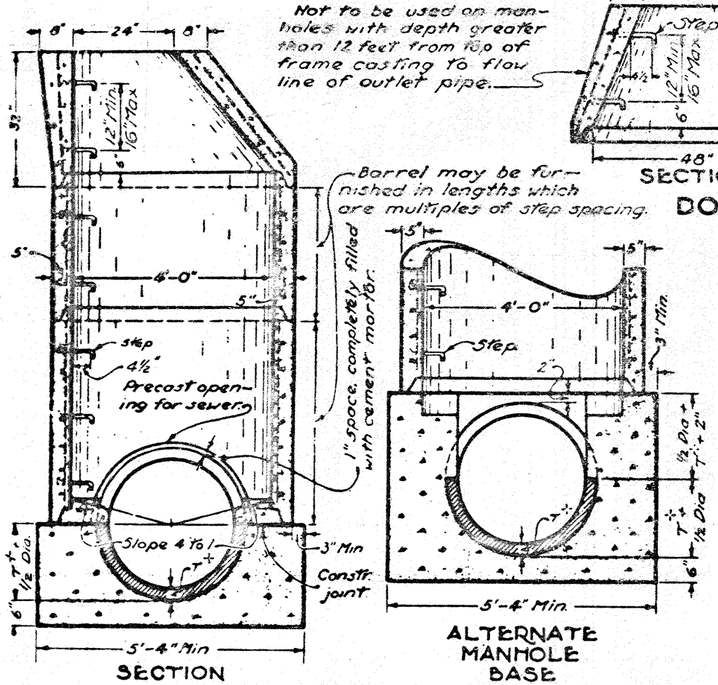
Channel sections in the manhole shall be constructed of split pipe or brick except curved sections which may be built by forming a channel in the concrete.

# SPECIAL NO. 1 A-MANHOLE

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

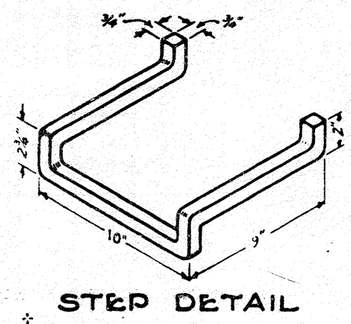
24/148

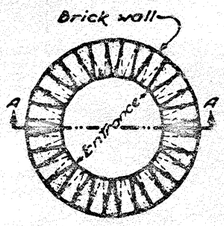
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

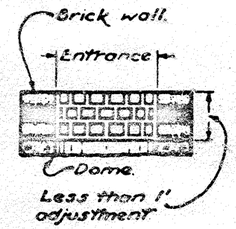


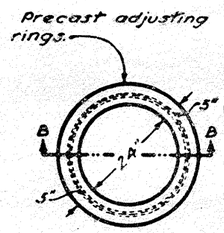


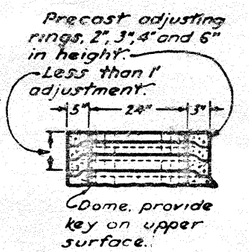




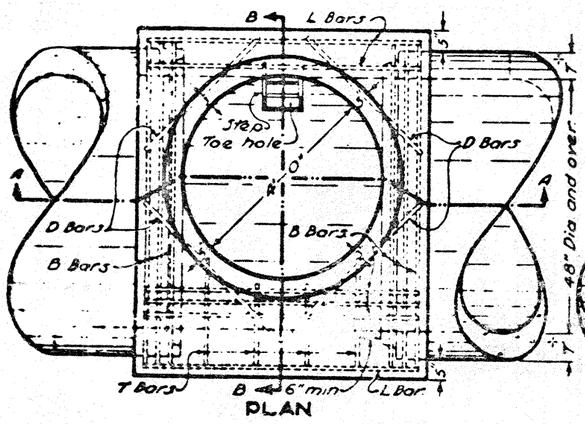



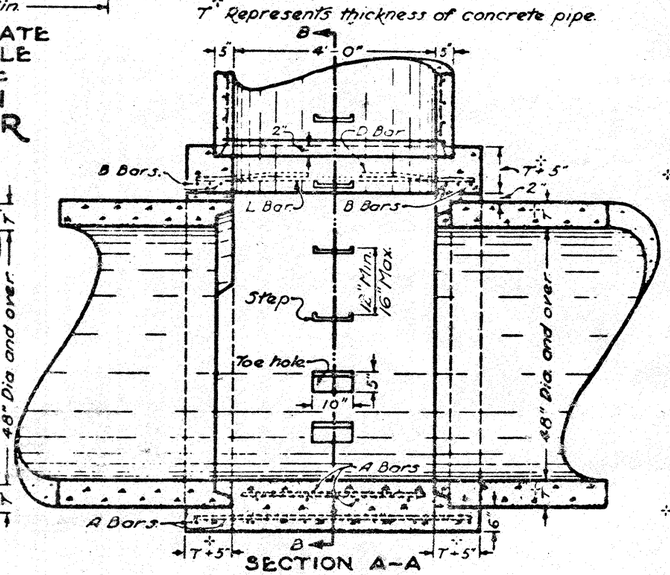



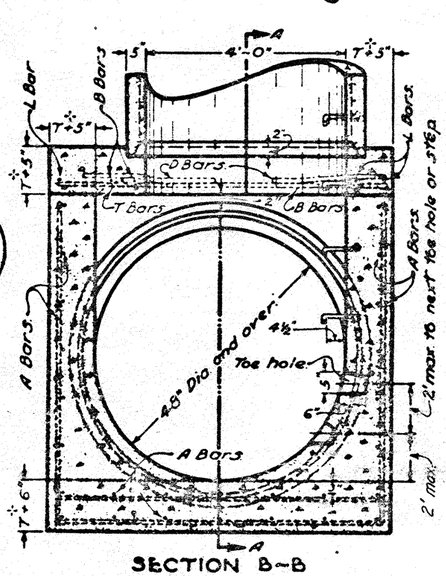




ALTERNATE METHODS OF ADJUSTING TO GRADE




CONNECTION BOX FOR PRECAST MANHOLES ON SEWERS 48" AND OVER

## NOTES

Openings for the inlet and outlet sewer pipe shall be cast in the precast ring unless, the manhole base is built to an elevation two inches above the top of the outlet pipe.

Openings for pipes 18" diameter or less entering the manhole above the spring line of the outlet sewer may be cut in the field provided the portion of the pipe (15" or 18" diam.) inside the manhole is cut to fit the circumference of the manhole. Pipes over 18" diameter entering the manhole above the spring line of the outlet sewer shall be connected to the manhole by a Tee connection precast with the barrel of the manhole.

All joints at pipe openings in the manhole shall be throughly caiked with cement mortar or other suitable material to prevent infiltration of earth into the manhole.

Drop pipes when required shall be constructed as shown on Standard Drawing MH-2.

MATERIALS:- Concrete for the manhole base and connection box shall be Class "C".

Precast reinforced concrete riser rings and domes shall comply with the requirements of 706.13 except for Minimum Designs and Marking. Minimum wall thickness shall be 5 inches and circular reinforcement shall be 0.12 sq. in per foot minimum. Concrete shall have a minimum strength of 4,000 pounds per square inch. 1¾" holes for handling may be cast in domes and rings. The following shall be clearly stenciled or impressed on each riser ring:—

a. MH
b. The date of manufacture
c. The name or trade-mark of the manufacturer and location of the plant.

STEPS shall meet the requirements of 604.

Castings shall be as specified on Sheet 25.

CONNECTION BOXES for sewers 48 inches and over in diameter shall be reinforced as shown and as specified below:—

A bars shall be spaced at 12" centers in both directions.

B bars shall be spaced at 3" centers in both directions.

A, B and L bar sizes:—
⅝" ϕ for 48" to 60" sewers.
¾" ϕ for 66" to 78" sewers.
⅞" ϕ for 84" to 96" sewers.

T bars shall be ⅝" ϕ spaced at 12" centers

D bars shall be ⅝" ϕ.

Reinforcing steel shall have 2 inch clearance except where otherwise specified.

ADJUSTING RINGS, precast, shall be reinforced with one No. 3 gage wire or equivalent.

See Sheet 22 for Baffle Rings when specified to be used with this manhole.

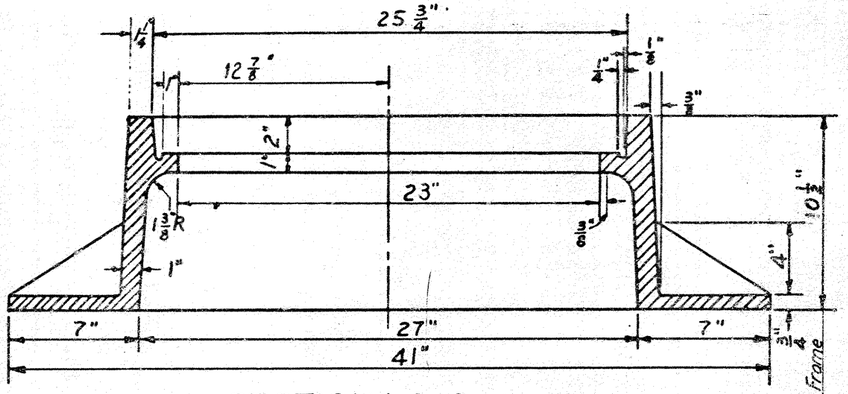
# SPECIAL MANHOLE CASTINGS

## NO. 9 FRAME & NO. 28 COVER

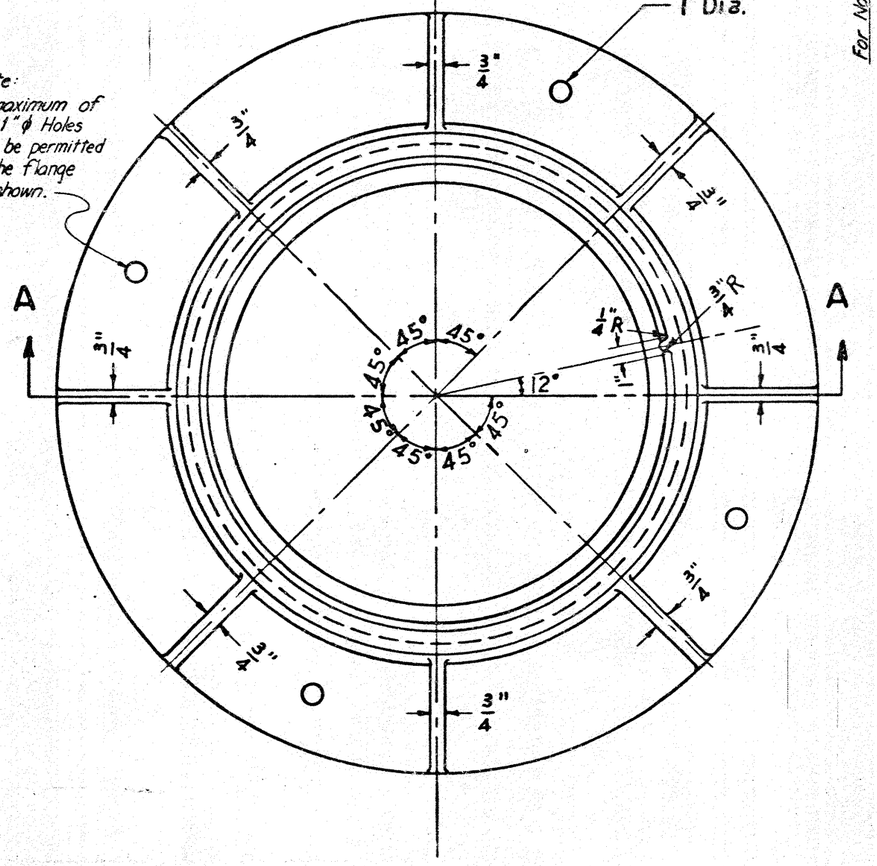
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

25/148

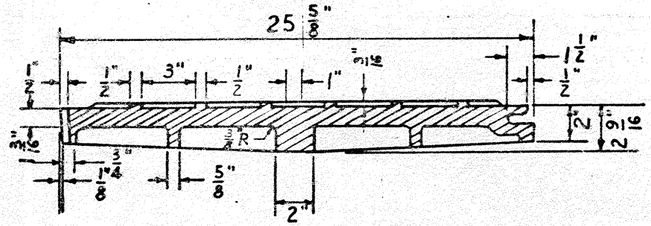
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43



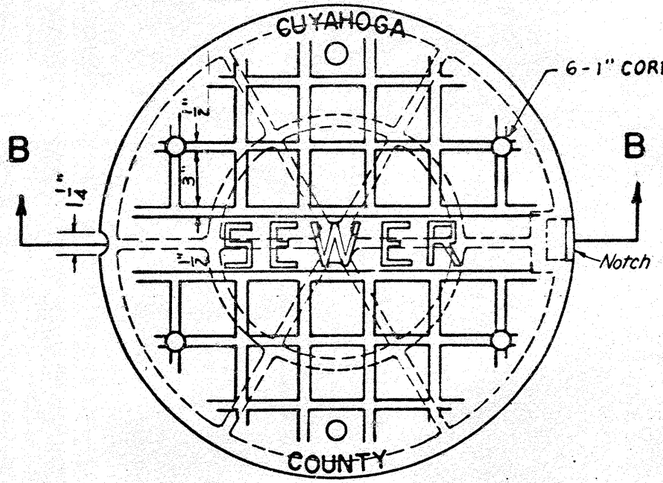

SECTION A-A



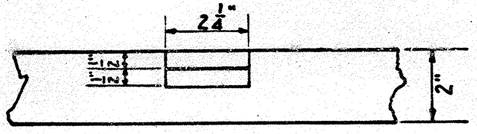

PLAN DETAIL FOR NO. 9 FRAME




SECTION B-B




PLAN NO. 28 COVER




NOTCH DETAIL

CASTINGS shall meet the requirements of Item 604 - 711.12 & 711.13 . The design shall be essentially the same and equally as strong as those shown hereon.

WEIGHTS, minimum -
Frame No. 9 = 425 lbs.,
Cover No. 28 = 190 lbs.

BEARING AREAS of frame and cover shall be so fitted and finished as to provide a firm and even seat for all portions of the cover in the frame. No projections shall exist on bearing areas of either casting and the cover shall seat in its frame without rocking. Frame and cover shall be fitted, matched and marked before delivery to the project.

HOLES - 6 - 1" Cored vent holes shall be in the cover and a maximum of 4 - 1" dia. holes will be permitted in the flange of the frame as shown.

LUG - The Lug on the frame is to be between the top of the frame and the top of the cover seat only and shall be cast without batter. The lug may be undercut or omitted to permit proper machining of the cover seat.

# CROSS SECTION LAYOUT SHEET

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

26
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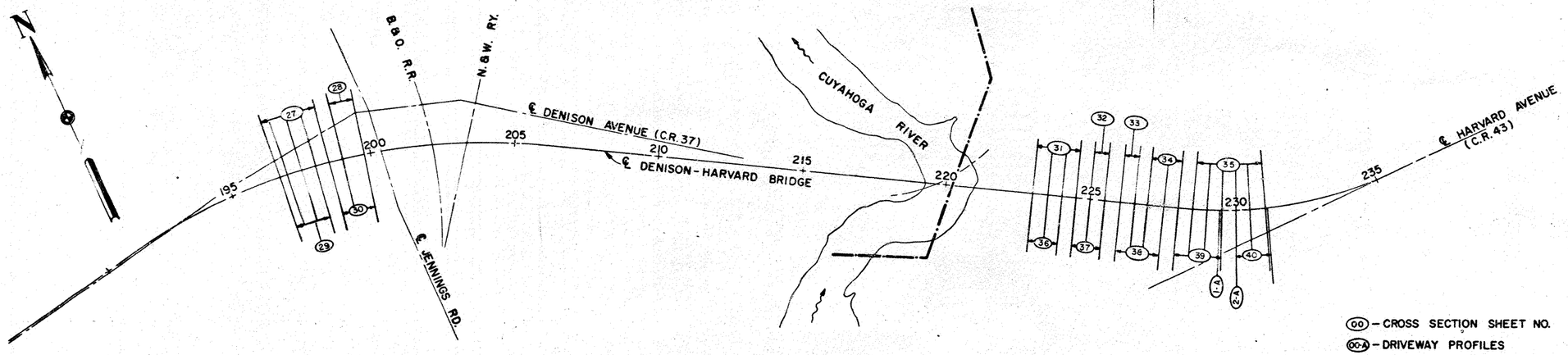
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




(00) – CROSS SECTION SHEET NO.
(00-A) – DRIVEWAY PROFILES

200 0 200 400
SCALE IN FEET

MADE LJNS DATE 1-2-73
TRACED ZAK DATE 1-11-73
CHECKED MSH DATE 5-1-73
SCALE AS SHOWN

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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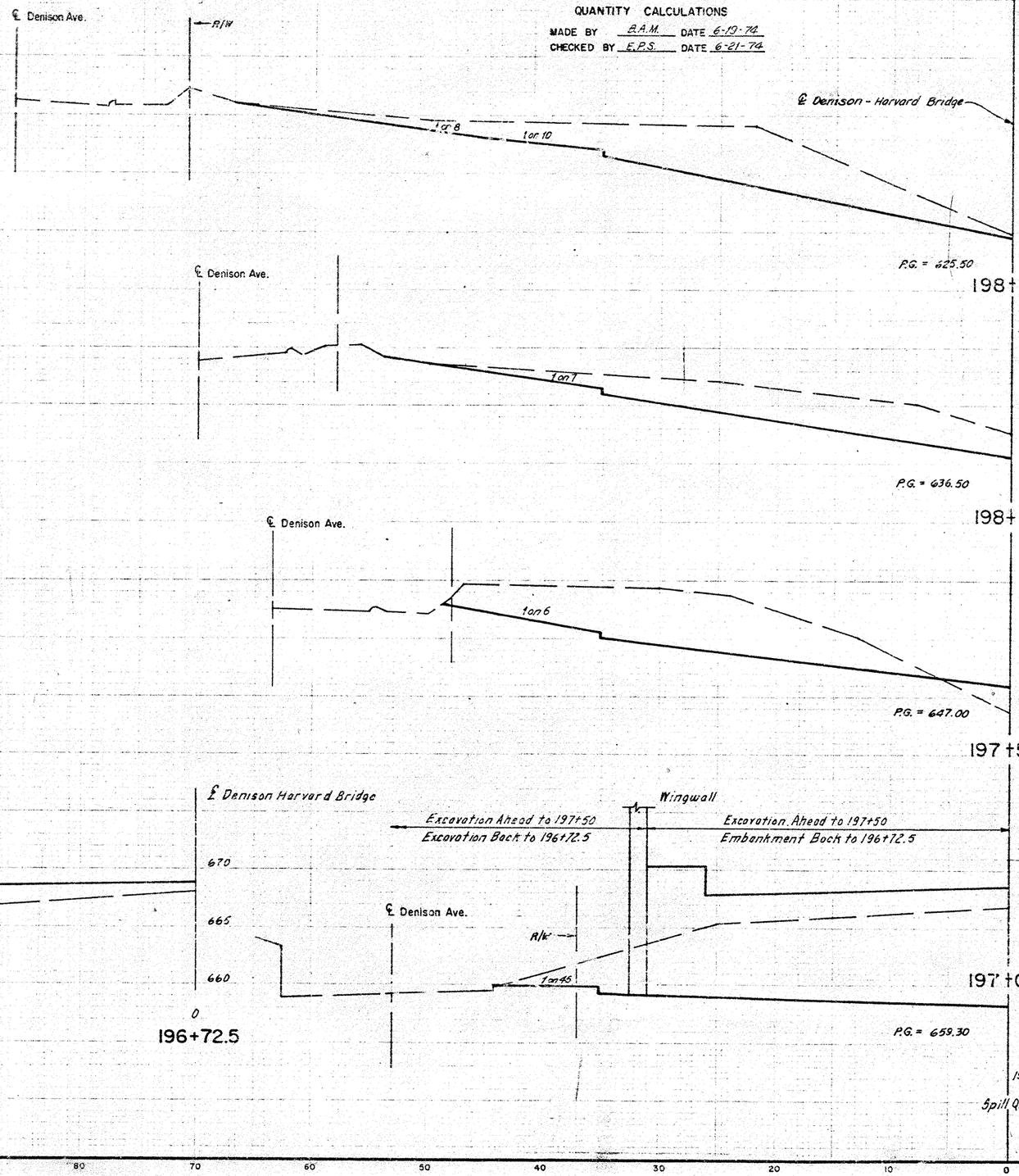
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS
MADE BY R.A.M. DATE 6-19-74
CHECKED BY E.P.S. DATE 6-21-74




| | SEEDING | TOPSOIL | EARTHWORK | | | |
|---|---|---|---|---|---|---|
| | AREA | VOLUME | END | AREA | VOLUME | |
| | S.Y. | C.Y. | EXC. | EMB. | EXC. | EMB. |
| 640 | | | | | | |
| 635 | | | | | | |
| 630 | | | | | | |
| 625 | | | | | | |
| 198+50 | | | 147 | 0 | | |
| 645 | | | | | | |
| | 169 | 28.2 | | | 234 | 0 |
| 640 | | | | | | |
| 635 | | | 106 | 0 | | |
| 198+00 | | | | | | |
| 655 | 106 | 17.7 | | | 233 | 7 |
| 650 | | | | | | |
| 645 | | | | | | |
| 197+50 | | | 146 | 8 | | |
| 640 | | | | | | |
| 670 | 78 | 13 | | | 363 | 7 |
| 665 | | | | | | |
| 197+00 | | | | | | |
| 660 | Ahead | | 246 | 0 | | |
| | Back | | 28 | 85 | | |
| 655 | 21 | 3 | | | 14 | 4.6 |
| 196+72.5 | | | 0 | 55 | | |
| | Spill Quantities | | | | 0 | 1 |

LEFT HALF
STA. 196+72.5 TO STA. 198+50

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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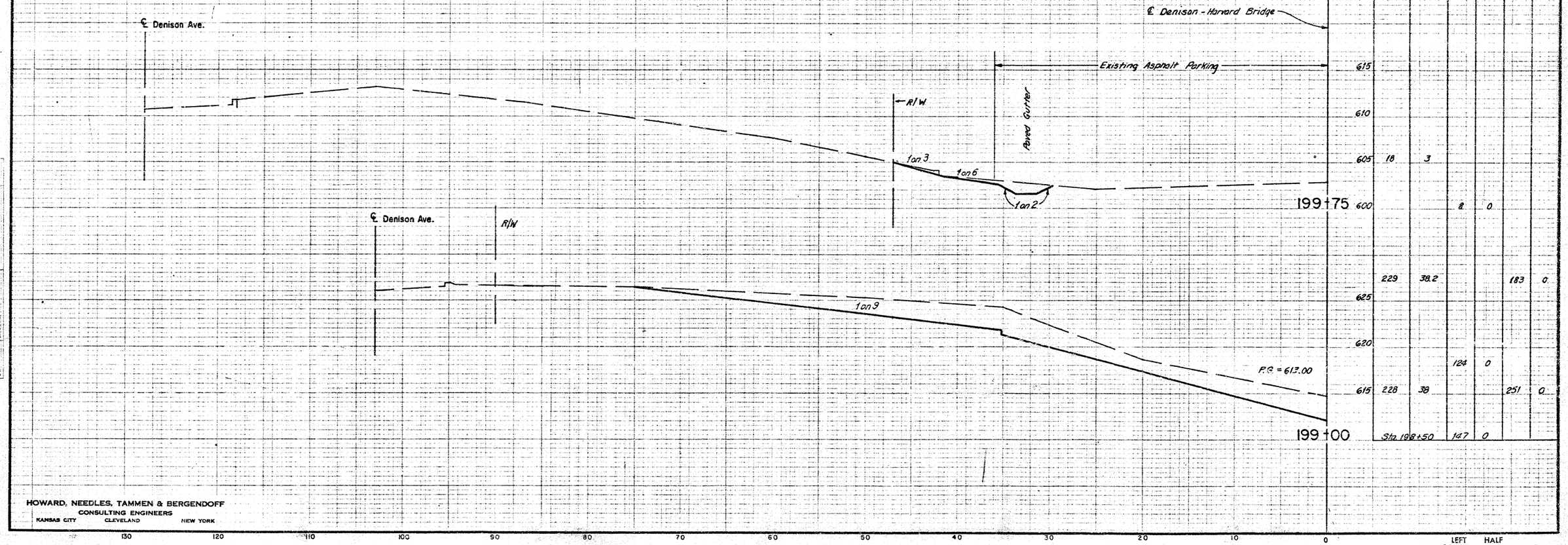
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS
MADE BY B.A.M. DATE 6-19-74
CHECKED BY E.P.S. DATE 6-21-74




| STA. | SEEDING AREA S.Y. | TOPSOIL VOLUME C.Y. | EARTHWORK END AREA EXC. | EARTHWORK END AREA EMB. | EARTHWORK VOLUME EXC. | EARTHWORK VOLUME EMB. |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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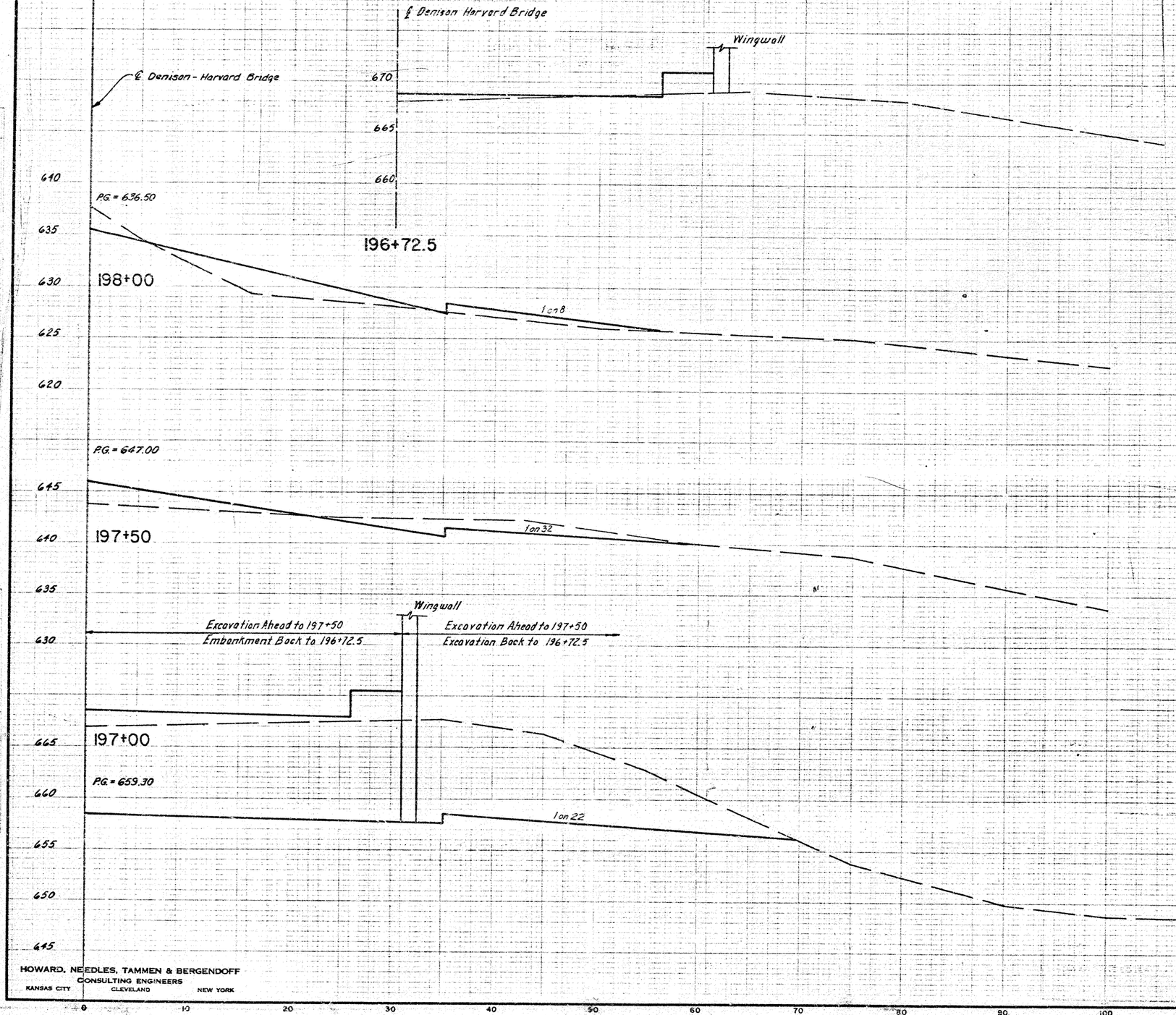
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




QUANTITY CALCULATIONS

MADE BY B.G.M. DATE 6-19-72
CHECKED BY E.P.S. DATE 6-21-72

| | SEEDING AREA S.Y. | TOPSOIL VOLUME C.Y. | EARTHWORK END AREA EXC. | EARTHWORK END AREA EMB. | EARTHWORK VOLUME EXC. | EARTHWORK VOLUME EMB. |
|---|---|---|---|---|---|---|
| | | | 6 | 46 | | |
| | 139 | 23.2 | | | 27 | 69 |
| | | | 23 | 29 | | |
| | 164 | 27.3 | | | 480 | 27 |
| Ahead | | | 495 | 0 | | |
| Back | | | 215 | 19 | | |
| | 60 | 10 | | | 110 | 17 |
| Sta. 196+72.5 | | | 0 | 15 | | |
| Spill Quantities | | | | | 0 | 1 |

RIGHT HALF
STA. 196+72.5 TO STA. 198+00

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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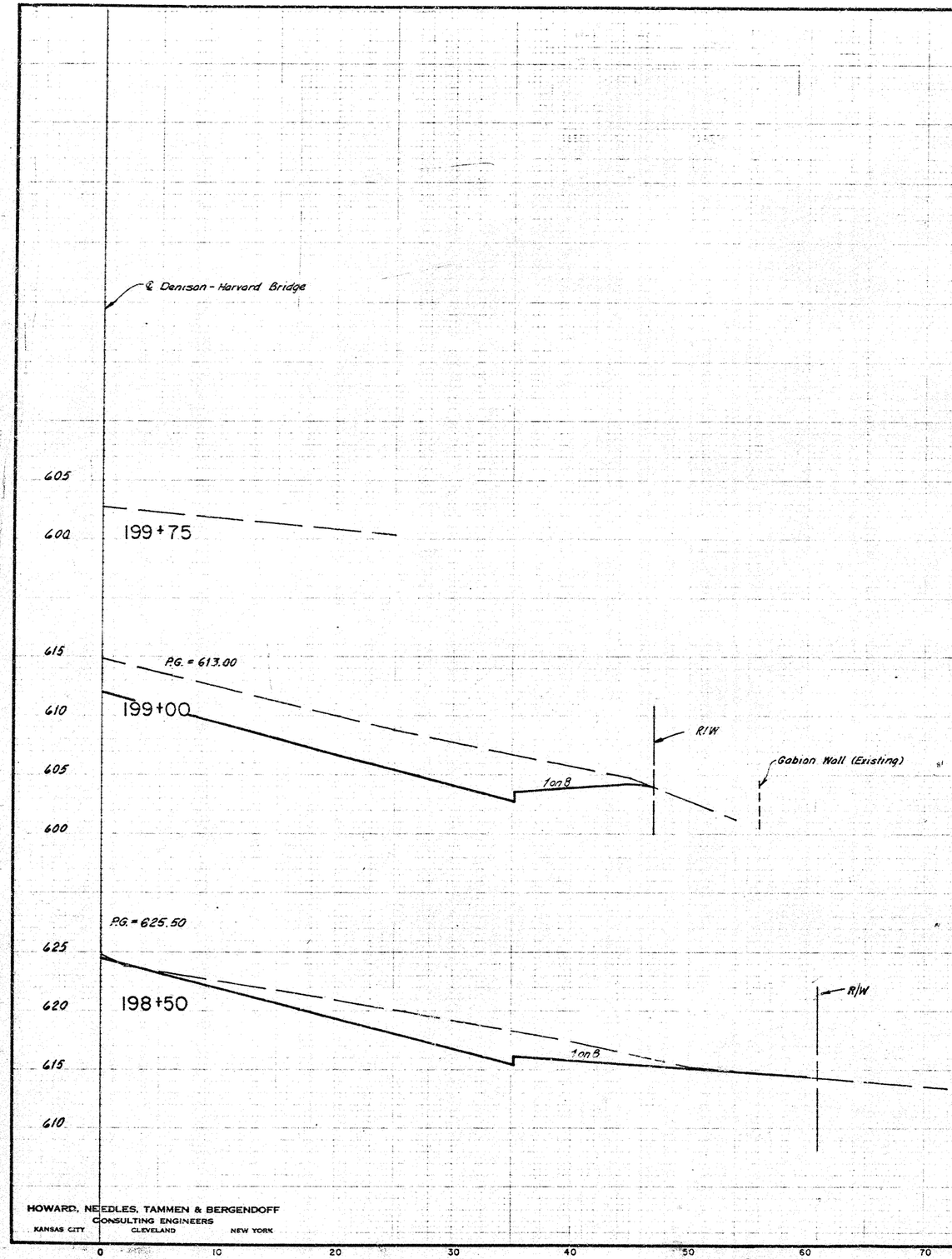
148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS

MADE BY B.A.M. DATE 6-19-74
CHECKED BY E.P.S. DATE 6-21-74




| SEEDING | TOPSOIL | EARTHWORK | | | |
|---|---|---|---|---|---|
| AREA | VOLUME | END | AREA | VOLUME | |
| S.Y. | C.Y. | EXC. | EMB. | EXC. | EMB. |
| | | 0 | 0 | | |
| 92 | 15.3 | | | 182 | 0 |
| | | 131 | 0 | | |
| 136 | 22.7 | | | 182 | 0 |
| | | 66 | 0 | | |
| 142 | 23.7 | | | 67 | 43 |
| 370 | 198.100 | 6 | 46 | | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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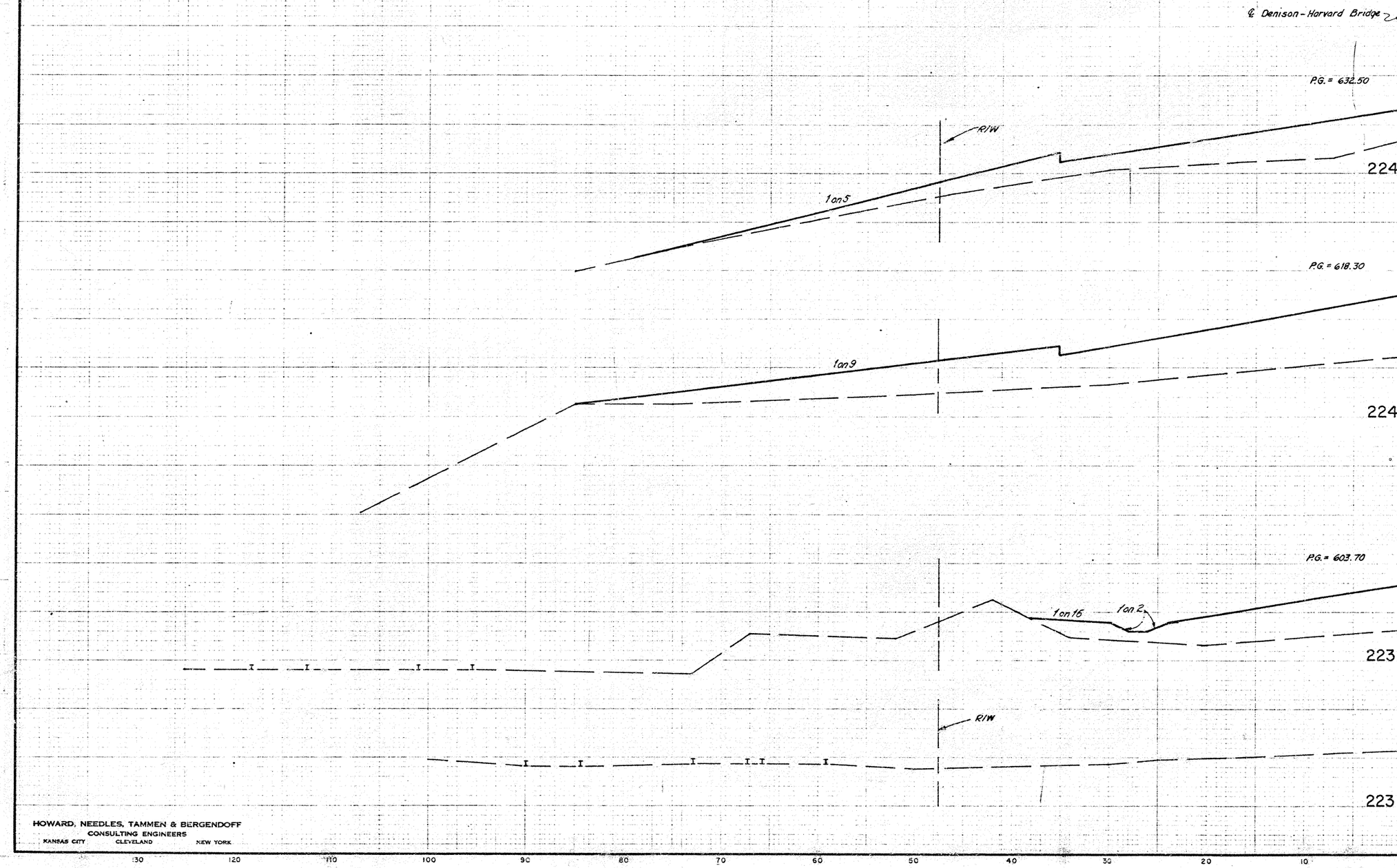
148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS
MADE BY B.A.M. DATE 6-19-74
CHECKED BY E.P.S. DATE 6-21-74




| STA. | SEEDING AREA S.Y. | TOPSOIL VOLUME C.Y. | EARTHWORK END AREA EXC. | EARTHWORK END AREA EMB. | EARTHWORK VOLUME EXC. | EARTHWORK VOLUME EMB. |
|---|---|---|---|---|---|---|
| 224+50 | | | 0 | 143 | | |
| | 275 | 45.8 | | | 0 | 401 |
| 224+00 | | | 0 | 290 | | |
| | 169 | 28.2 | | | 0 | 364 |
| | | | 0 | 103 | | |
| 223+50 | 25 | 4.2 | | | 0 | 95 |
| | | | 0 | 0 | | |
| 223+00 | | | | | | |

LEFT HALF
STA. 223+00 TO STA. 224+50

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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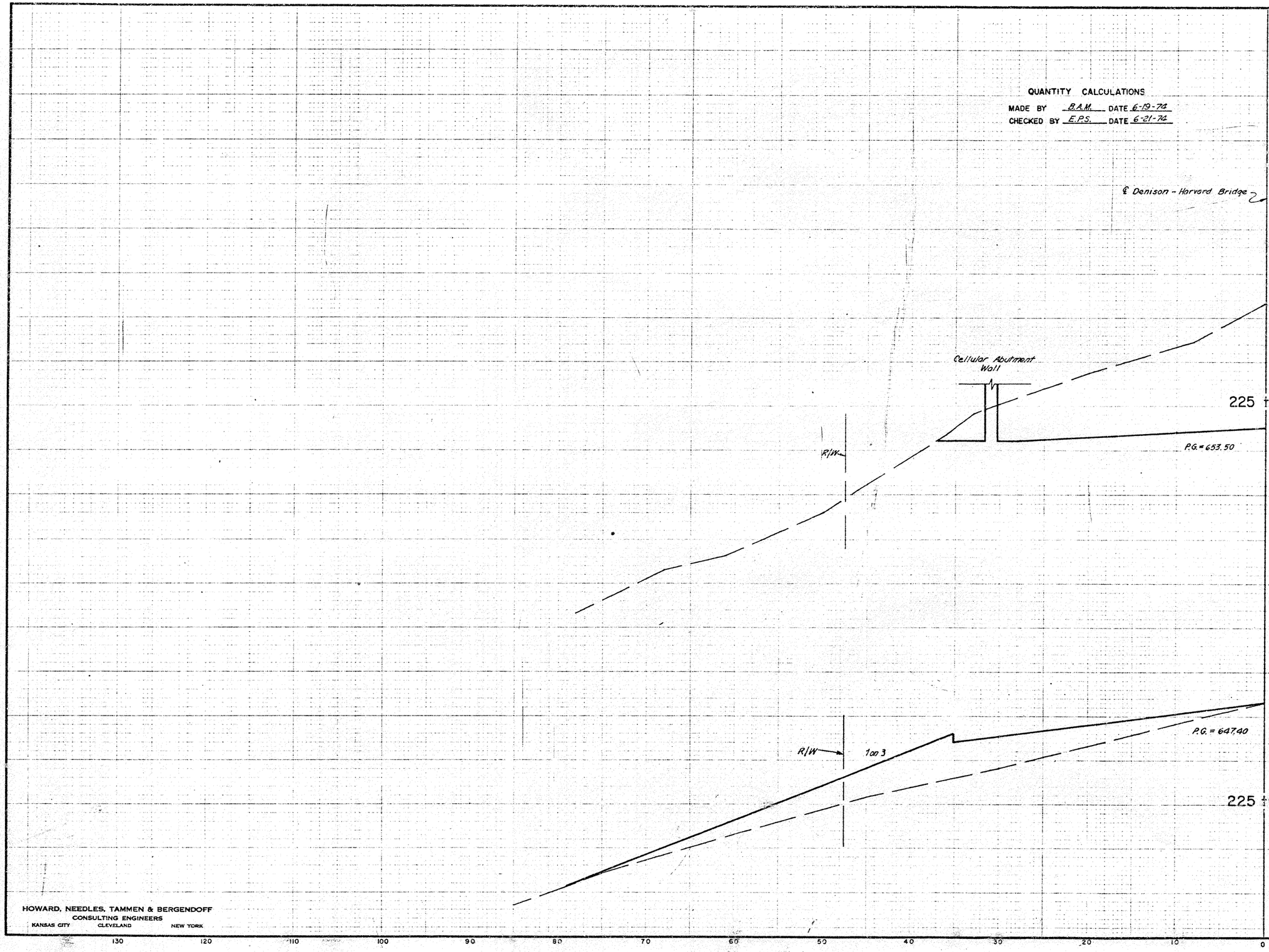
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS

MADE BY B.A.M. DATE 6-19-72
CHECKED BY E.P.S. DATE 6-21-72




| STA. | SEEDING AREA S.Y. | TOPSOIL VOLUME C.Y. | EARTHWORK END AREA EXC. | EARTHWORK END AREA EMB. | EARTHWORK VOLUME EXC. | EARTHWORK VOLUME EMB. |
|---|---|---|---|---|---|---|
| 225+50 | | | 274 | 0 | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | 156 | 26 | | | 254 | 153 |
| | | | | | | |
| | | | | | | |
| | | | 0 | 165 | | |
| 225+00 | 267 | 44.5 | | | 0 | 285 |
| Sta. 224+50 | | | 0 | 143 | | |

LEFT HALF
STA. 225+00 TO STA. 225+50

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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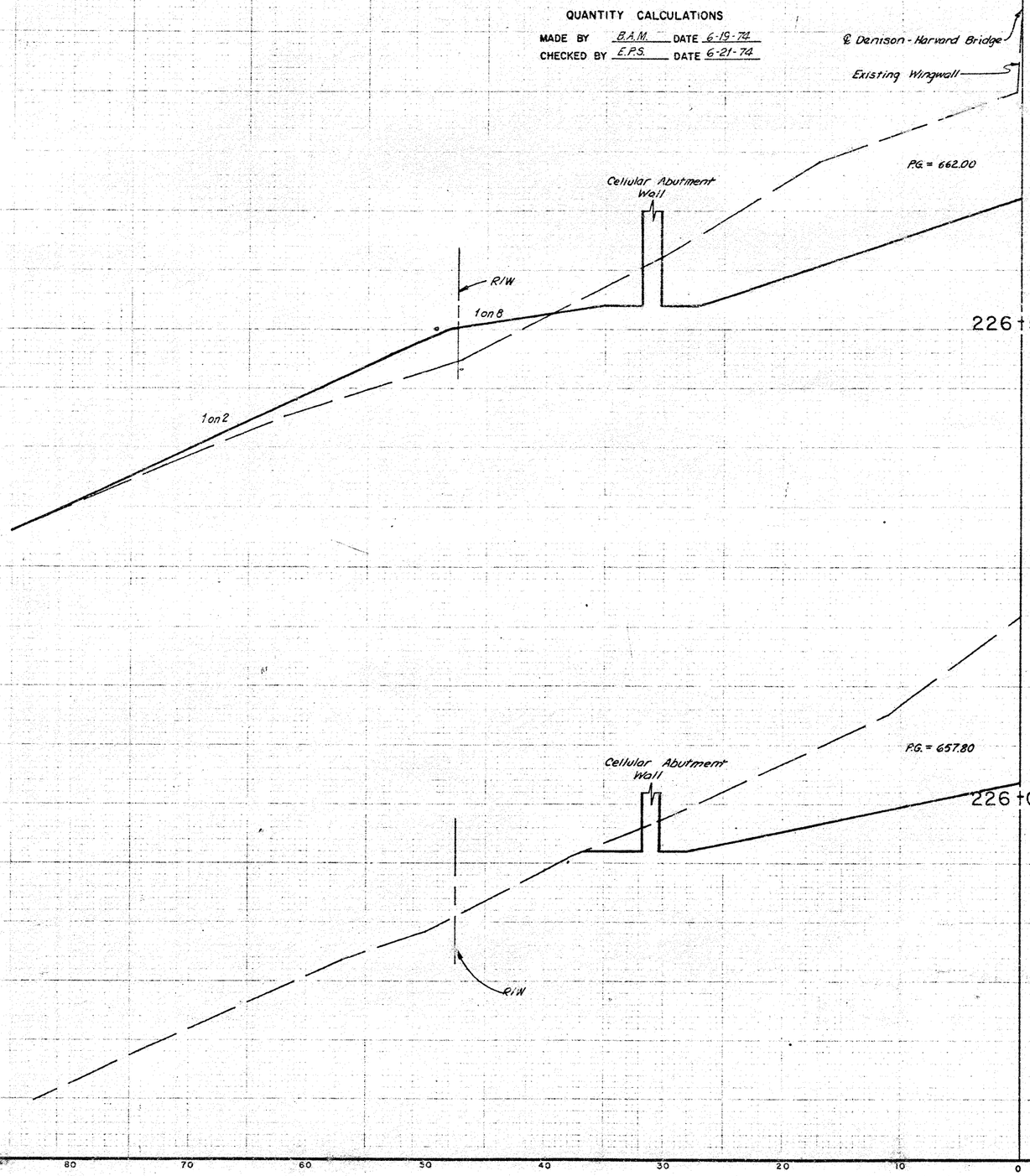
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS

MADE BY B.A.M. DATE 6-19-74
CHECKED BY E.P.S. DATE 6-21-74




| STA. | SEEDING AREA S.Y. | TOPSOIL VOLUME C.Y. | EARTHWORK END AREA EXC. | EARTHWORK END AREA EMB. | EARTHWORK VOLUME EXC. | EARTHWORK VOLUME EMB. |
|---|---|---|---|---|---|---|
| 226+50 | | | 261 | 50 | | |
| | 183 | 30.5 | | | 459 | 46 |
| 226+00 | | | 235 | 0 | | |
| | 39 | 6.5 | | | 471 | 0 |
| Sta. 225+50 | | | 274 | 0 | | |

LEFT HALF
STA. 226+00 TO STA. 226+50

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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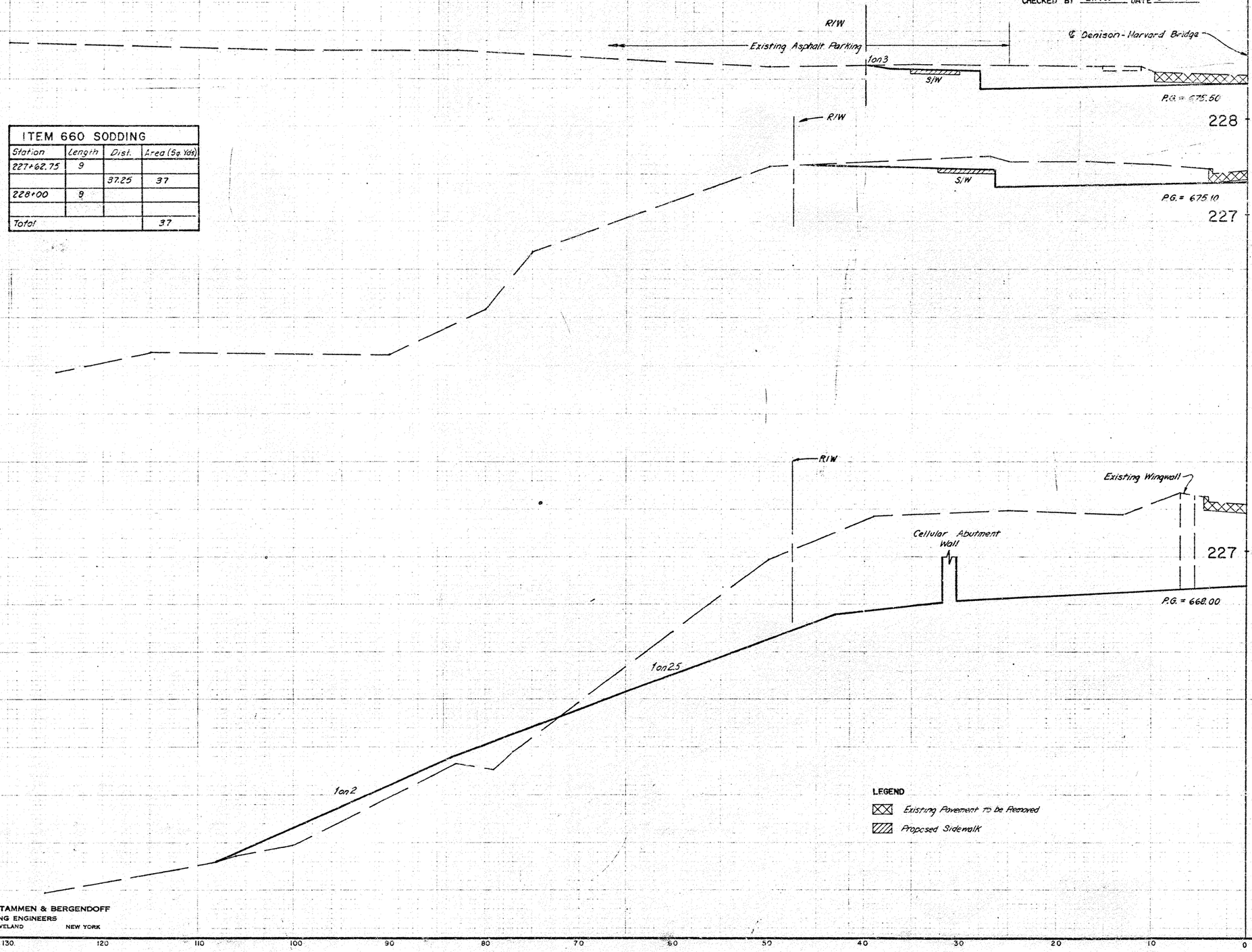
QUANTITY CALCULATIONS

MADE BY B.A.M. DATE 6-19-74

CHECKED BY E.P.S. DATE 6-21-74

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

| ITEM 660 SODDING | | | |
|---|---|---|---|
| Station | Length | Dist. | Area (Sq. Yds) |
| 227+62.75 | 9 | | |
| | | 37.25 | 37 |
| 228+00 | 9 | | |
| | | | |
| Total | | | 37 |




| | SEEDING | TOPSOIL | EARTHWORK | | | |
|---|---|---|---|---|---|---|
| | AREA | VOLUME | END AREA | | VOLUME | |
| | S.Y. | C.Y. | EXC. | EMB. | EXC. | EMB. |
| 675 | | | | | | |
| 228+00 | | | 33 | 0 | | |
| 675 | 55 | 15.3 | | | 95 | 0 |
| 227+50 670 | | | 60 | 0 | | |
| 665 | | | | | | |
| 660 | | | | | | |
| 655 | | | | | | |
| | 275 | 45.8 | | | 557 | 36 |
| 675 | | | | | | |
| 227+00 670 | | | 542 | 39 | | |
| 665 | | | | | | |
| 660 | | | | | | |
| 655 | 394 | 65.7 | | | 744 | 82 |
| 650 | | | | | | |
| 645 | | | | | | |
| Sta. 226+50 640 | | | 261 | 50 | | |
| 635 | | | | | | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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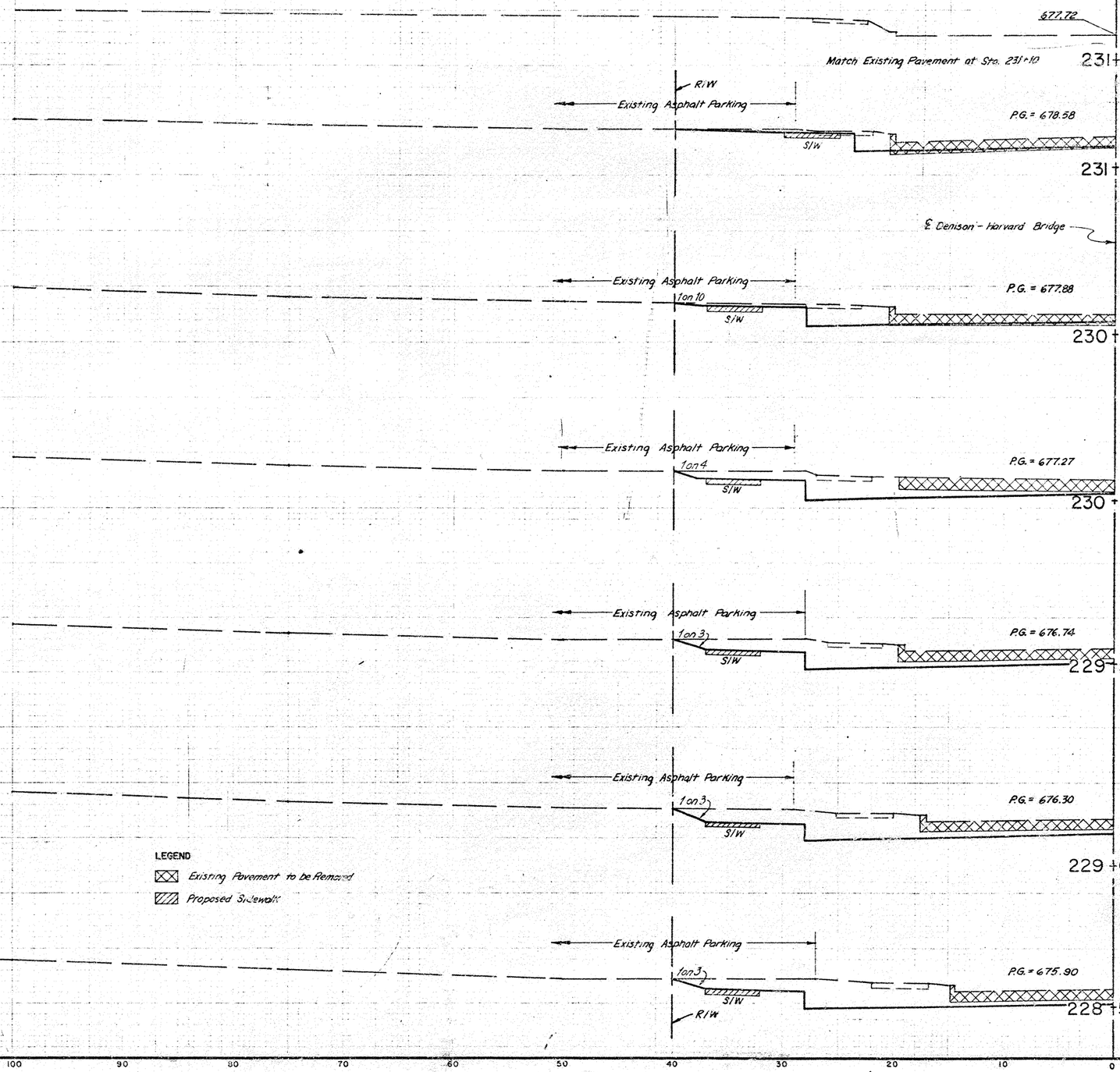
148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS
MADE BY B.A.M. DATE 6-19-74
CHECKED BY E.P.S. DATE 6-21-74

## ITEM 660 SODDING

| Station | Length | Dist. | Area (Sq Yds) |
|---|---|---|---|
| 228+00 | 9 | | |
| | | 50 | 50 |
| 228+50 | 9 | | |
| | | 50 | 50 |
| 229+00 | 9 | | |
| | | 50 | 50 |
| 229+50 | 9 | | |
| | | 50 | 50 |
| 230+00 | 9 | | |
| | | 50 | 50 |
| 230+50 | 9 | | |
| | | 25 | 25 |
| 230+75 | 9 | | |
| | | 35 | 41 |
| 231+10 | 12 | | |
| | | | |
| | | | |
| Total | | | 316 |




| Station | SEEDING AREA S.Y. | TOPSOIL VOLUME C.Y. | EARTHWORK END EXC. | EARTHWORK END EMB. | EARTHWORK AREA EXC. | EARTHWORK AREA EMB. | EARTHWORK VOLUME EXC. | EARTHWORK VOLUME EMB. |
|---|---|---|---|---|---|---|---|---|
| 231+10 | | | 0 | 0 | | | | |
| | 0 | 0 | | | 1 | 0 | | |
| 231+00 | | | 7 | 0 | | | | |
| | 0 | 13.8 | | | 24 | 0 | | |
| 230+50 | | | 19 | 0 | | | | |
| | 0 | 11.5 | | | 46 | 0 | | |
| 230+00 | | | 31 | 0 | | | | |
| | 0 | 10.2 | | | 64 | 0 | | |
| 229+50 | | | 38 | 0 | | | | |
| | 0 | 10.2 | | | 69 | 0 | | |
| 229+00 | | | 37 | 0 | | | | |
| | 0 | 10.2 | | | 72 | 0 | | |
| | | | 41 | 0 | | | | |
| | 0 | 13 | | | 78 | 0 | | |
| Sta. 228+00 | | | 43 | 0 | | | | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

130 120 110 100 90 80 70 60 50 40 30 20 10 0

LEFT STA. 228+50 HALF TO STA. 231+10

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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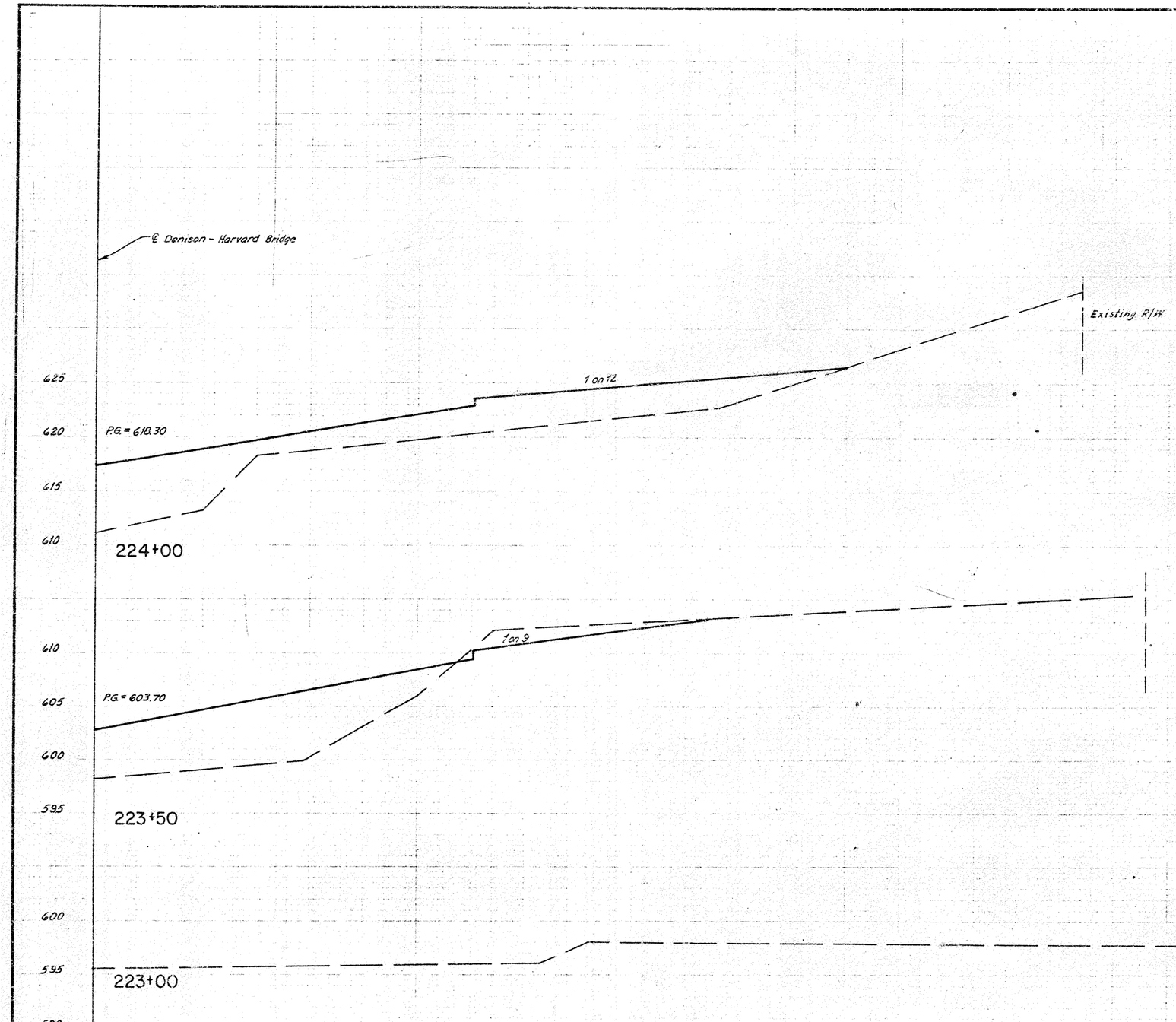
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS
MADE BY B.A.M. DATE 6-19-74
CHECKED BY E.P.S. DATE 6-21-74




| SEEDING | TOPSOIL | EARTHWORK | | | |
|---|---|---|---|---|---|
| AREA | VOLUME | END AREA | | VOLUME | |
| S.Y. | C.Y. | EXC. | EMB. | EXC. | EMB. |
| | | | | | |
| | | | | | |
| | | | | |

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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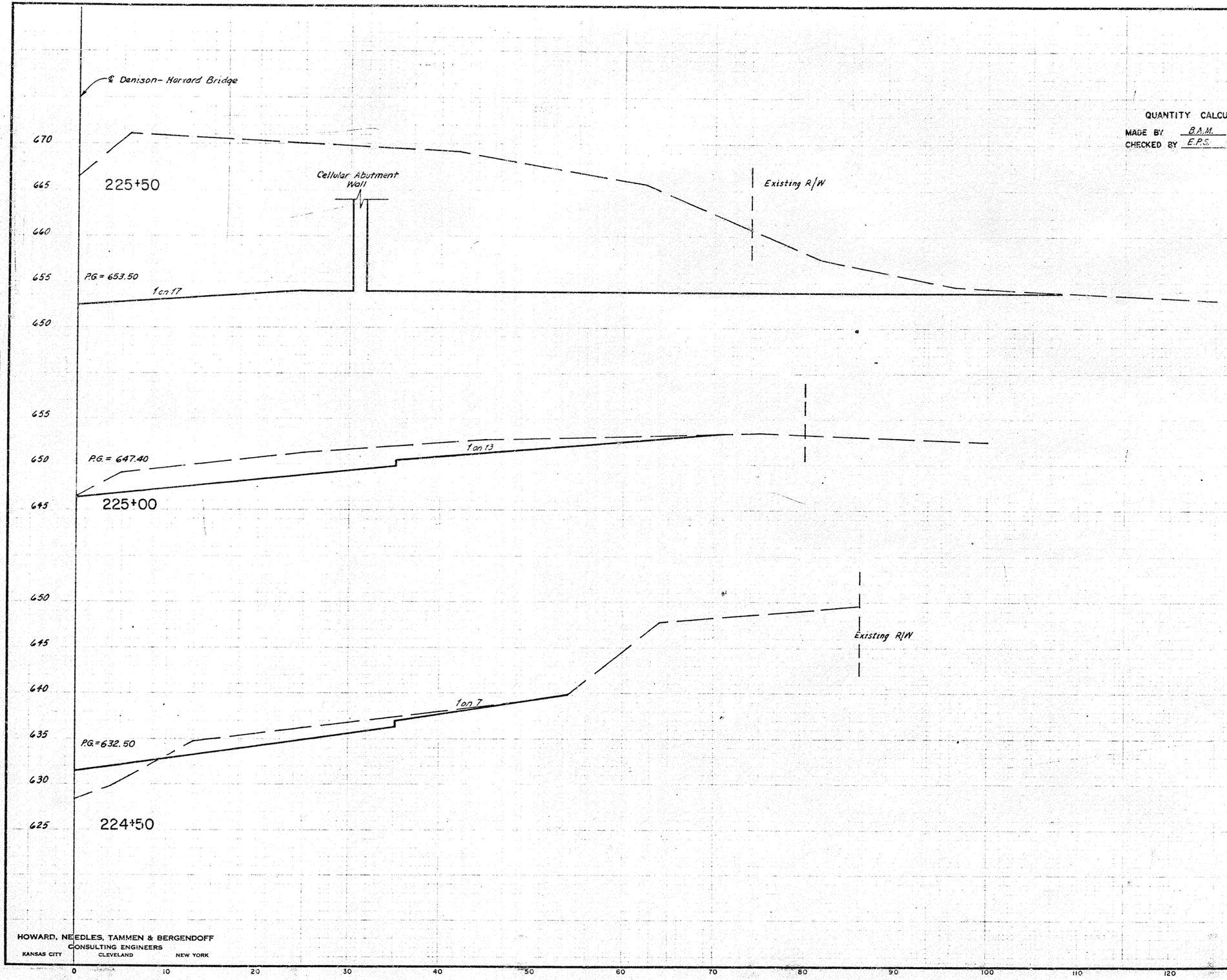
148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS
MADE BY B.A.M. DATE 6-19-74
CHECKED BY E.P.S. DATE 6-21-74




| SEEDING AREA S.Y. | TOPSOIL VOLUME C.Y. | EARTHWORK END AREA EXC. | EARTHWORK END AREA EMB. | EARTHWORK VOLUME EXC. | EARTHWORK VOLUME EMB. |
|---|---|---|---|---|---|
| | | 1160 | 0 | | |
| 319 | 53.2 | | | 1179 | 0 |
| | | 113 | 0 | | |
| 161 | 26.8 | | | 138 | 17 |
| | | 36 | 18 | | |
| 161 | 26.8 | | | 33 | 206 |
| Sta. 224+00 | | 0 | 204 | | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

RIGHT STA. 224+50 HALF TO STA. 225+50

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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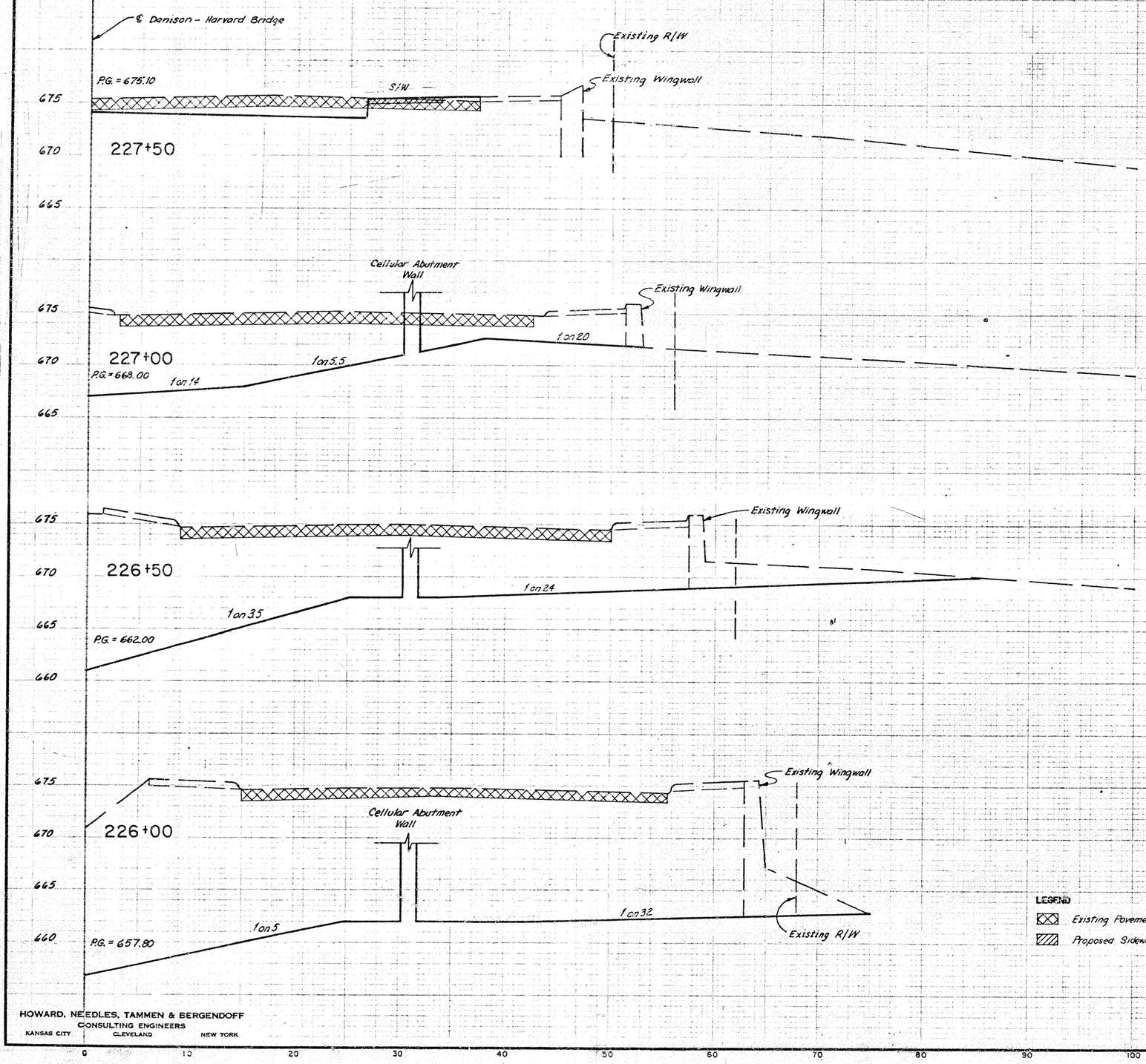
148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS

MADE BY B.A.M. DATE 6-19-74
CHECKED BY E.P.S. DATE 6-21-74




| SEEDING | TOPSOIL | EARTHWORK | | | |
|---|---|---|---|---|---|
| AREA | VOLUME | END | AREA | VOLUME | |
| S.Y. | C.Y. | EXC. | EMB. | EXC. | EMB. |
| | | 21 | 0 | | |
| 83 | 13.8 | | | 214 | 0 |
| | | 210 | 0 | | |
| 219 | 36.5 | | | 641 | 0 |
| | | 482 | 0 | | |
| 278 | 46.3 | | | 1217 | 0 |
| | | 832 | 0 | | |
| 342 | 57 | | | 1844 | 0 |
| | | Sta. 225+50 1160 | 0 | | |

LEGEND
- Existing Pavement to be Removed
- Proposed Sidewalk

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

0 10 20 30 40 50 60 70 80 90 100 110 120 130

RIGHT HALF
STA. 226+00 TO STA. 227+50

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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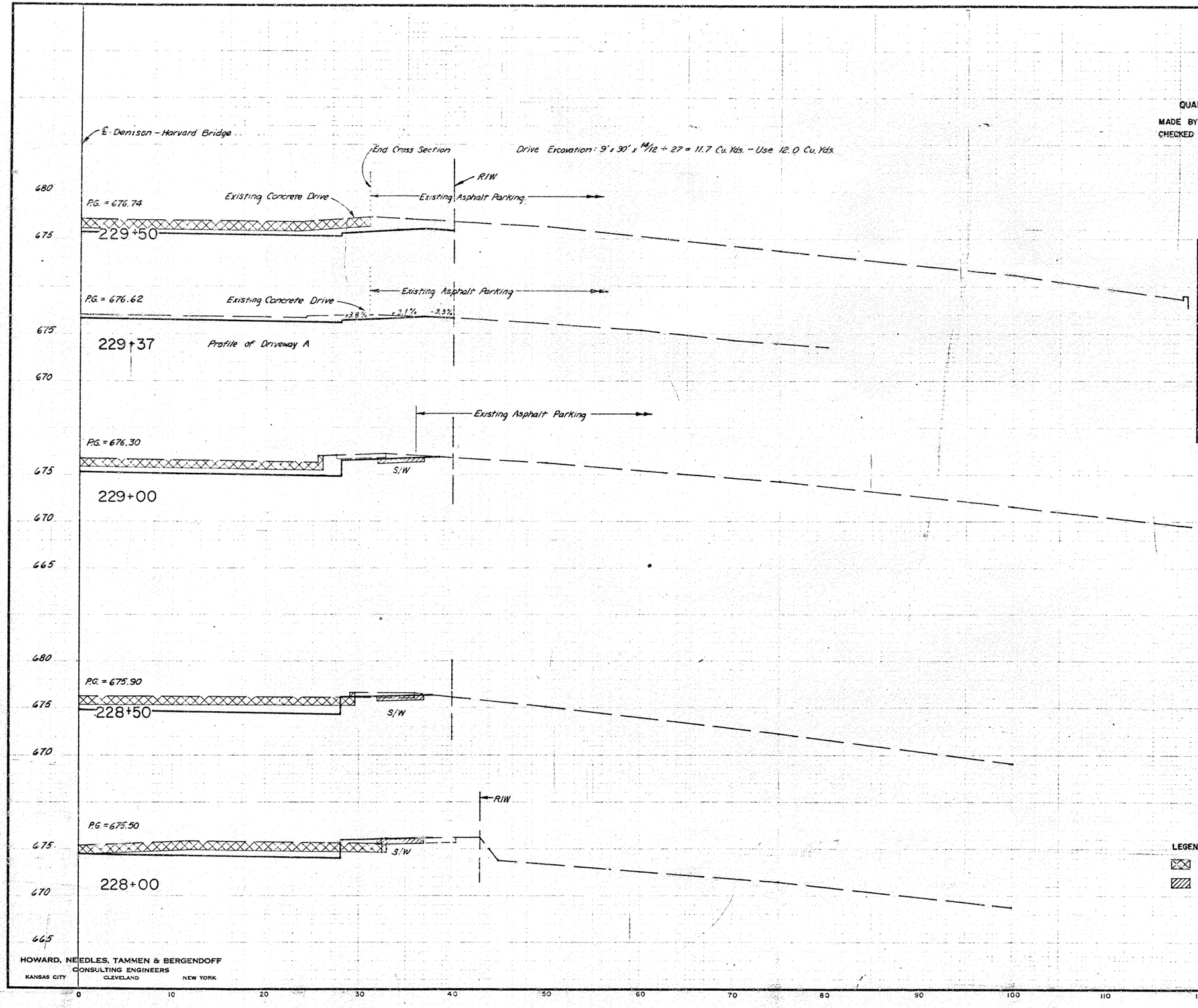
148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




QUANTITY CALCULATIONS

MADE BY B.A.M. DATE 6-19-74
CHECKED BY E.P.S. DATE 6-21-74

ITEM 660 SODDING

| Station | Length | Dist. | Area(Sq. Yds) |
|---|---|---|---|
| 227+62.75 | 15 | | |
| | | 37.25 | 54 |
| 228+00 | 10 | | |
| | | 50 | 56 |
| 228+50 | 9 | | |
| | | 50 | 50 |
| 229+00 | 9 | | |
| | | 23 | 23 |
| 229+23 | 9 | | |
| | | | |
| | | | |
| Total | | | 183 |

| SEEDING | TOPSOIL | EARTHWORK | | | |
|---|---|---|---|---|---|
| AREA | VOLUME | END | AREA | VOLUME | |
| S.Y. | C.Y. | EXC. | EMB. | EXC. | EMB. |
| | | 14 | 0 | | |
| 0 | 4.2 | | | 41 | 0 |
| | | 17 | 0 | | |
| 0 | 8.3 | | | 34 | 0 |
| | | 20 | 0 | | |
| 0 | 7.8 | | | 38 | 0 |
| | | 21 | 0 | | |
| 28 | 6.5 | | | 39 | 0 |
| Sta. 227+50 | | 21 | 0 | | |

LEGEND
- Existing Pavement to be Removed
- Proposed Sidewalk

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

RIGHT HALF
STA. 228+00 TO STA. 229+50

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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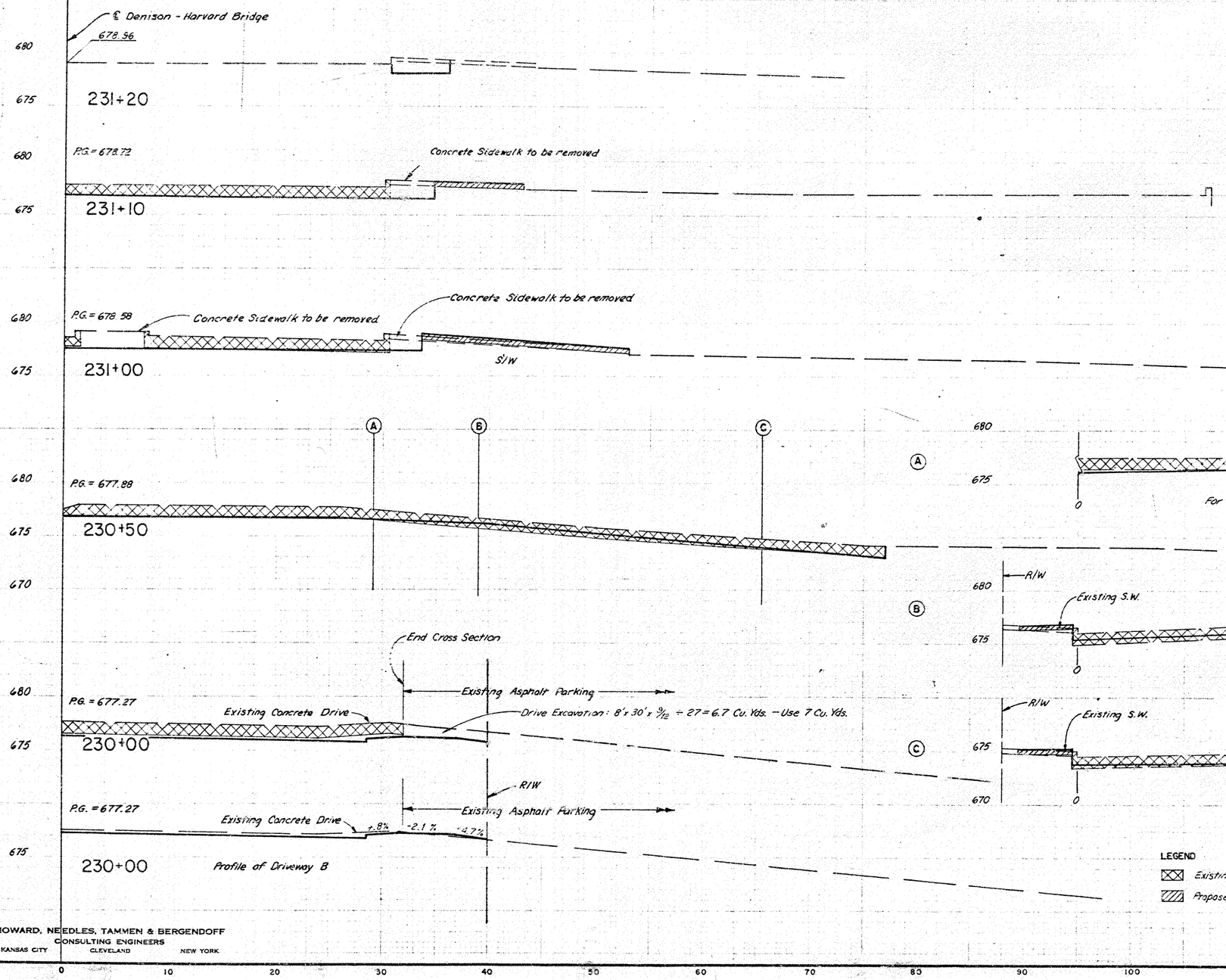
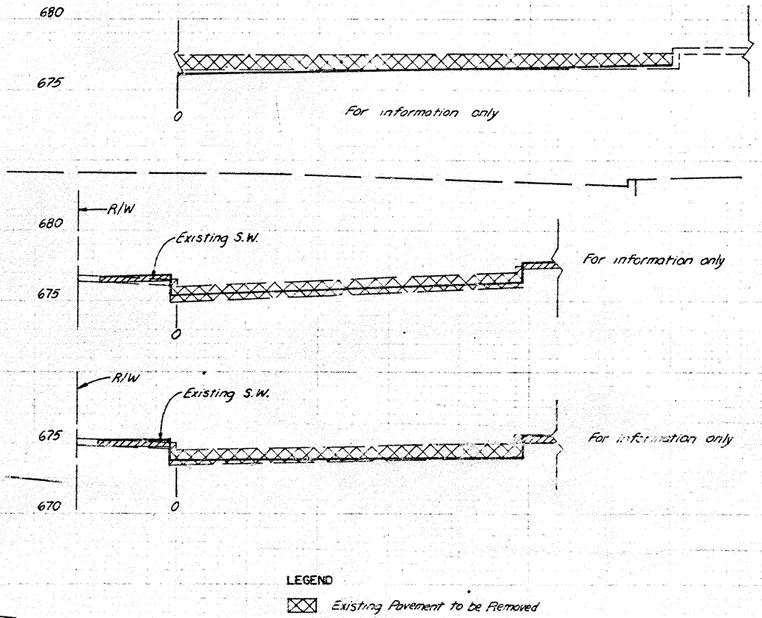
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

QUANTITY CALCULATIONS
MADE BY B.A.M. DATE 6-19-74
CHECKED BY E.P.S. DATE 6-21-74




ITEM 660 SODDING

| Station | Length | Dist. | Area (Sq Yds) |
|---|---|---|---|
| 229+50 | 9 | | |
| | | 34 | 34 |
| 230+00 Back | 9 | | |
| Ahead | 4 | | |
| | | 15 | 7 |
| 230+50 | 4 | | |
| | | | |
| | | | |
| Total | | | 41 |




| SEEDING | TOPSOIL | EARTHWORK | | | |
|---|---|---|---|---|---|
| AREA | VOLUME | END | AREA | VOLUME | |
| S.Y. | C.Y. | EXC. | EMB. | EXC. | EMB. |
| Sta. 231+25 | | 0 | 0 | | |
| 0 | 0 | | | 1 | 0 |
| | | 6 | 0 | | |
| 0 | 0 | | | 2 | 0 |
| | | 4 | 0 | | |
| 0 | 0 | | | 1 | 0 |
| | | 3 | 0 | | |
| 0 | 0 | | | 3 | 0 |
| | | 0 | 0 | | |
| 0 | 0 | | | 8 | 0 |
| | | 9 | 0 | | |
| 0 | 0 | | | 28 | 0 |
| Sta. 229+50 | | 14 | 0 | | |

LEGEND
Existing Pavement to be Removed
Proposed Sidewalk

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

RIGHT HALF
STA. 230+00 TO STA. 231+10

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | - | |

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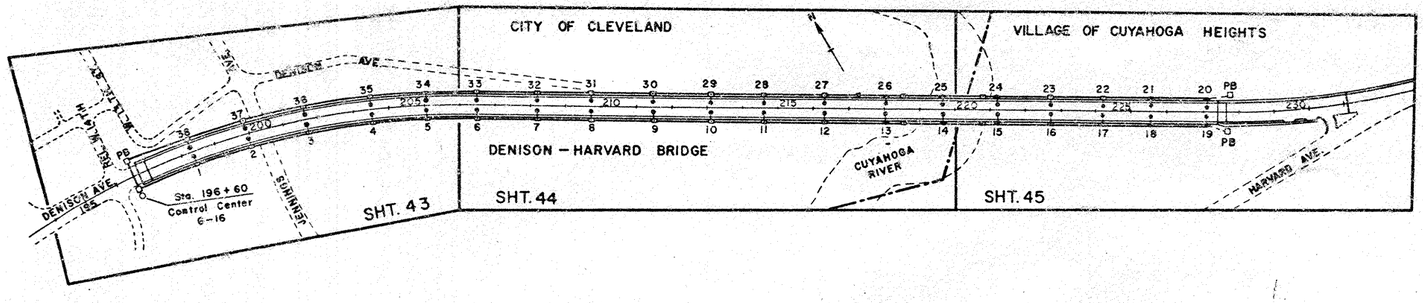
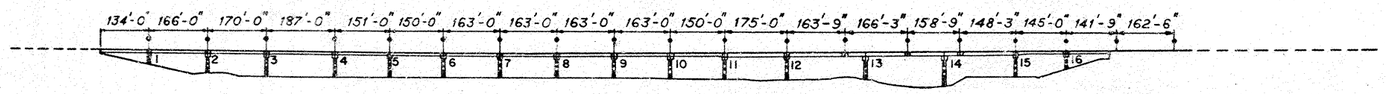
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

# LIGHTING PLAN
# CIRCUIT LAYOUT MAP




ELEVATION & DESIGN SPACING

*Structure Mounted Lighting Design Criteria: 1.4 ft.-cd (maintained) @ 3:1 uniformity*

CIRCUIT LOAD

*38 - 400 watt lamps @ 1.0 Amp = 38.0 Amps.*
*480 VAC Sec. - Connected load = 18.24 KVA.*
*Maximum Voltage Drop 3.50%*

200 0 200 400 600 800
SCALE IN FEET

MADE E.F.J. DATE 7/15/74
TRACED T.S. DATE 7/16/74
CHECKED E.F.J. DATE 7/17/74
SCALE 1"=200'

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

# LIGHTING NOTES

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

SPECIFICATIONS

These notes are supplemental to Items 625 and 713 of the State of Ohio Department of Transportation Construction and Material Specifications.

Reference shall be made to Standard Construction Drawings listed on the title sheet of these plans.

PLAN SPECIFICATION REFERENCES

References to Item 625 and 713 in these plans shall be considered to read as respective references to Items S625 and S713

GENERAL

The power supplying agency for this project is:

City of Cleveland
Department of Public Utilities
Municipal Electric Light and Power (M.E.L.P.)
1201 Lakeside Avenue
Cleveland, Ohio 44114

The Contractor will not be required to furnish or install the primary distribution lines, transformers, transformer poles, meters, meter mounts, or the primary switching. The Contractor shall provide connection to branch circuits and grounds as herein after specified.

The project has been designed on the basis of 5% maximum voltage drop permissible on branch circuits. The project will receive 480-volt secondary service from M.E.L.P.

This project has been designed on the basis of full lighting with an illumination of 1.4 ft-cd average and (maintained) with a maximum uniformity of 3.0 to 1.

CONNECTOR KITS

At the option of the Contractor, Type IX cable connections may be substituted where Type II or III cable connections are specified in hand holes or transformer bases of light poles.

Type I through Type VII cable connections in pull boxes, junction boxes, and other enclosures below ground may be accomplished by the use of either of the following:

1. A sleeve or tee cable connector conforming to the general requirements of Style "S" or "H", or other connecting device approved by the Engineer. The connector shall be installed in accordance with the manufacturer's directions and the connection shall be sealed and waterproofed with a hi-dielectric compound such as "Aqua Seal" as manufactured by Kearney, or equal approved by the Engineer. The sealing material shall be applied in accordance with the manufacturer's directions to make a watertight connection. Connections not accomplished in-line or in tee form shall be additionally protected by use of a hi-dielectric PVC, or other approved material, boot with an approved fastening device.
2. A preassembled kit, as manufactured by Joy or Bussman, or approved equal, with a waterproof or water-tight rating acceptable to the Engineer.

CONTROL CENTERS - 625.19 and 713.19

The Contractor shall furnish and install control centers, located as per plans, to serve roadway lighting circuits. The control centers shall include the control equipment, mounted as shown on lighting plan sheets, and as specified. The Contractor shall install the secondary distribution panels on the service poles, furnished and installed by M.E.L.P.

Basis of payment shall be at the lump sum bid price for Item 625 - "Control Center", complete, in place, with all materials, labor, and incidentals, installed, tested, and accepted.

LAMPS

Supplementing 625.08, and 713.14, Mercury lamps shall be of the type indicated in the plans and shall be General Electric "Bonus Line", Westinghouse "Lifeguard", Sylvania "Rough Service", or equal as approved by the Engineer.

LUMINAIRES

400-watt luminaires shall have dual rated 240/480 volt integral regulator ballasts and shall be General Electric M400, Westinghouse OV-25, McGraw-Edison "Unistyle", or equal approved by the Engineer.

CONDUIT ON STRUCTURES AND STRUCTURE GROUNDING

Expansion fittings for conduit on structures shall be OZ-Gedney Type AX, Crouse-Hinds Type XJ-4, Appleton Type XJ-4, or equal as approved by the Engineer, as indicated in the plans as Type-e for installation on Cellular Abutment section of the bridge, and OZ-Gedney Type AX-8, or equal as approved by the Engineer, as indicated in the plans as Type-E and installed in the manner detailed, for the bridge structure proper.

Each expansion fitting shall have a copper external bonding jumper to assure electrical continuity of the grounding system.

The structure grounds and expansion joints in the plans should not be considered complete in number or more than approximate in location.

LIGHT POLE ANCHOR BOLTS FOR BRIDGES AND RETAINING WALLS

Anchor bolts for mounting light poles on bridges and retaining walls shall conform to the requirements of 713.01 and details shown on the plans and standard drawings, or the approved shop drawings, for the respective poles to be placed thereon.

Payment shall be made at the unit price bid for each set of the size required and necessary to install one pole, and this payment shall constitute full compensation for furnishing and placing the bolts.

PULL BOXES - CONCRETE, AS PER PLAN

Concrete pull boxes shall be provided for roadway lighting where shown on the layouts. The construction of boxes, drains, reinforcing mesh, slots, handles, covers and openings shall be as shown in the details. Boxes may be precast or cast-in-place. The walls shall be composed of monolithic concrete as shown. All entering conduit sleeves shall be cast or grouted in place. All pull boxes shall have french drains. Reinforcing steel of No. 4 (or ½") rods at 6" centers each way shall conform to requirements of the Standard Specifications. Boxes shall be Class C concrete using No. 4 aggregate mixed and placed in conformance with Section 499 of the Standard Specifications, and shall be modified as required. Covers shall be seated with less than 0.5 in. total clearance each way.

839 - HIGH VOLTAGE DIRECT CURRENT TEST

A high voltage direct current test, as described in Supplemental Specification 839, shall be performed on all distribution cable systems installed on this project. The test shall not be performed until after all new construction, such as guard rail, fence, delineator posts, sign supports, etc., in the immediate vicinity of the location of the cable run being tested, has been completed.

Basis of payment for the performance of Item 839 "High Voltage Direct Current Test" shall be paid at the lump sum price bid, which shall be full compensation for furnishing all labor, equipment, and incidentals necessary to complete the item of work.

STANDARD CONSTRUCTION DRAWING HL-3

Pole base details shown on this drawing are essentially for galvanized steel poles. For aluminum designs, or other permitted steel material designs, variations from these details will be acceptable, as approved by the Engineer.

STANDARD CONSTRUCTION DRAWING HL-15

Weephole diameters of 1/8 inch shown on this drawing shall be increased to 1/4 inch.

MADE E.F.J. DATE 7-10-74
TRACED L.K.W. DATE 7-11-74
CHECKED E.F.J. DATE 7-13-74
SCALE

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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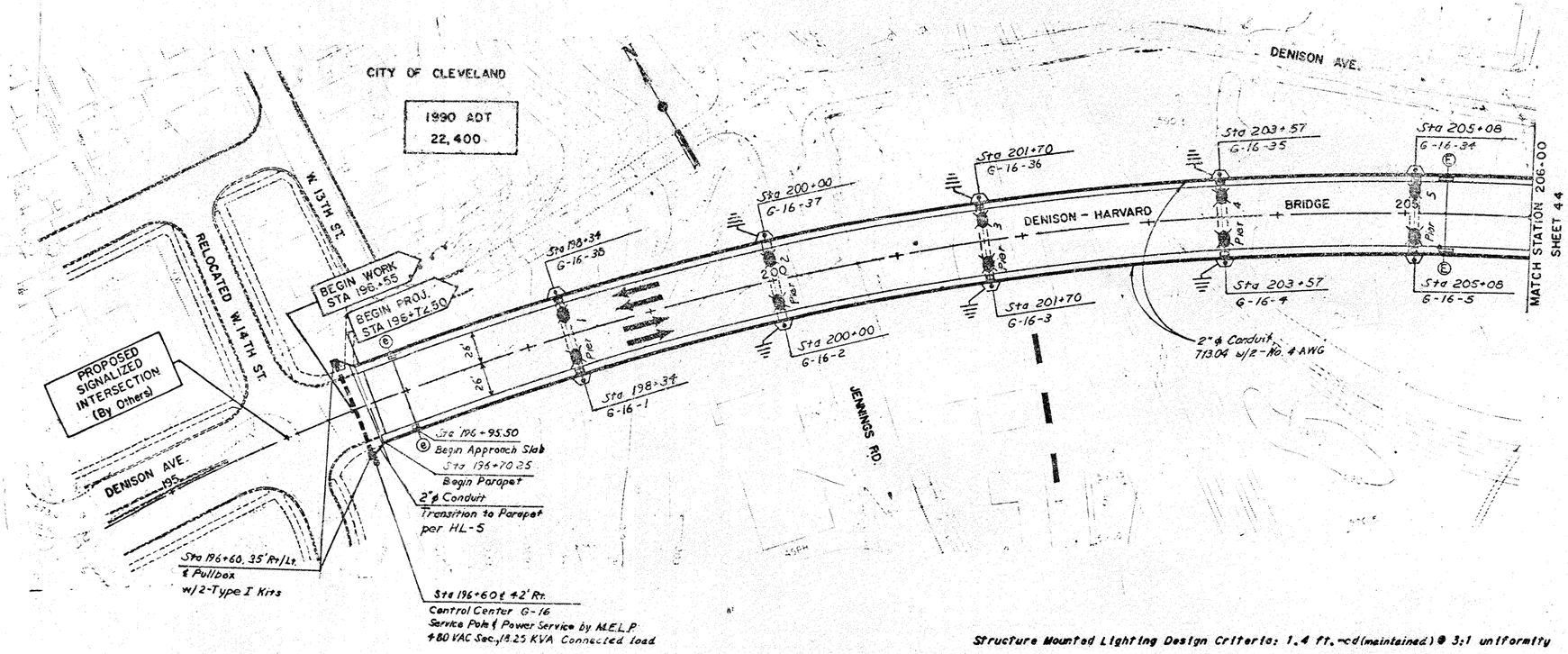
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

# LIGHTING PLAN




50 0 50 100 150 200
SCALE IN FEET

*Structure Mounted Lighting Design Criteria: 1.4 ft.-cd (maintained) @ 3:1 uniformity*

## LEGEND

- 200+00 / G-16-37 — Structure Luminaires & Junction Box Station, Light Pole Identification Circuit Number
- 400 Watt Luminaire and Clear Mercury Lamp ANSI-IES Type II-MC
- Light Pole Design A10.32.5
- Junction Box, Type I, per HL-4
- Proposed or Existing Luminaires by Others: CEI- Cleveland Electric Illuminating Co.; MELP- Municipal Electric Light & Power
- 3"ϕ Conduit, 713.04 w/2-No. 4 AWG
- 2"ϕ Conduit, 713.04 w/2-No. 4 AWG
- Pull Box, Concrete, as per plan
- Expansion Joint, Type E (See Sheet 46)
- Expansion Joint, Type e (See Notes)
- Structure Grounding
- Control Center

MADE E.F.J. DATE 7/1/74
TRACED E.S. DATE 7/2/74
CHECKED R.R.J. DATE 7/4/74
SCALE 1"=50'

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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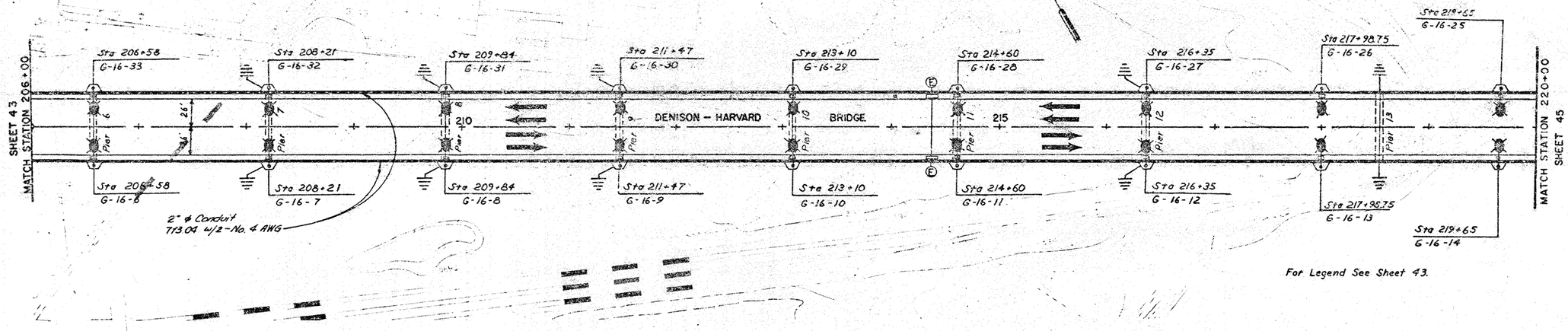
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




For Legend See Sheet 43.

50 0 50 100 150 200
SCALE IN FEET

MADE EFJ DATE 7/2/74
TRACED ES DATE 7/7/74
CHECKED EF DATE 7/15/74
SCALE 1"=50'

Howard, Needles, Tammen & Bergendoff
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LIGHTING PLAN – STA 206+00 TO 220+00

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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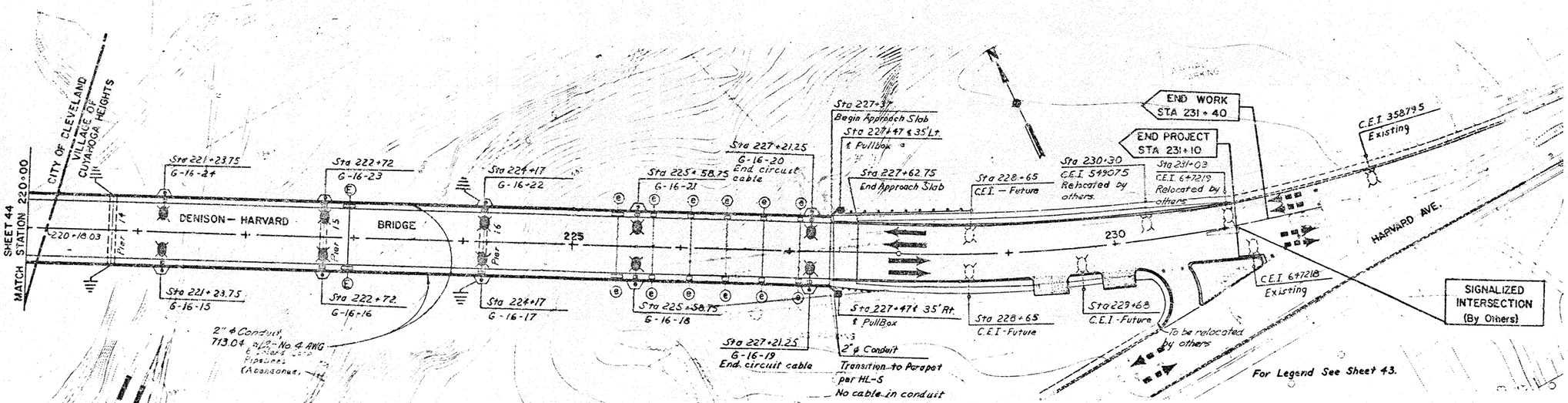
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




For Legend See Sheet 43.

50 0 50 100 150 200
SCALE IN FEET

MADE E.F.J. DATE 7/8/74
TRACED E.S. DATE 7/8/74
CHECKED E.F.J. DATE 7/8/74
SCALE 1"= 50'

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

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LIGHTING PLAN STA 220 + 00 TO 231 + 40

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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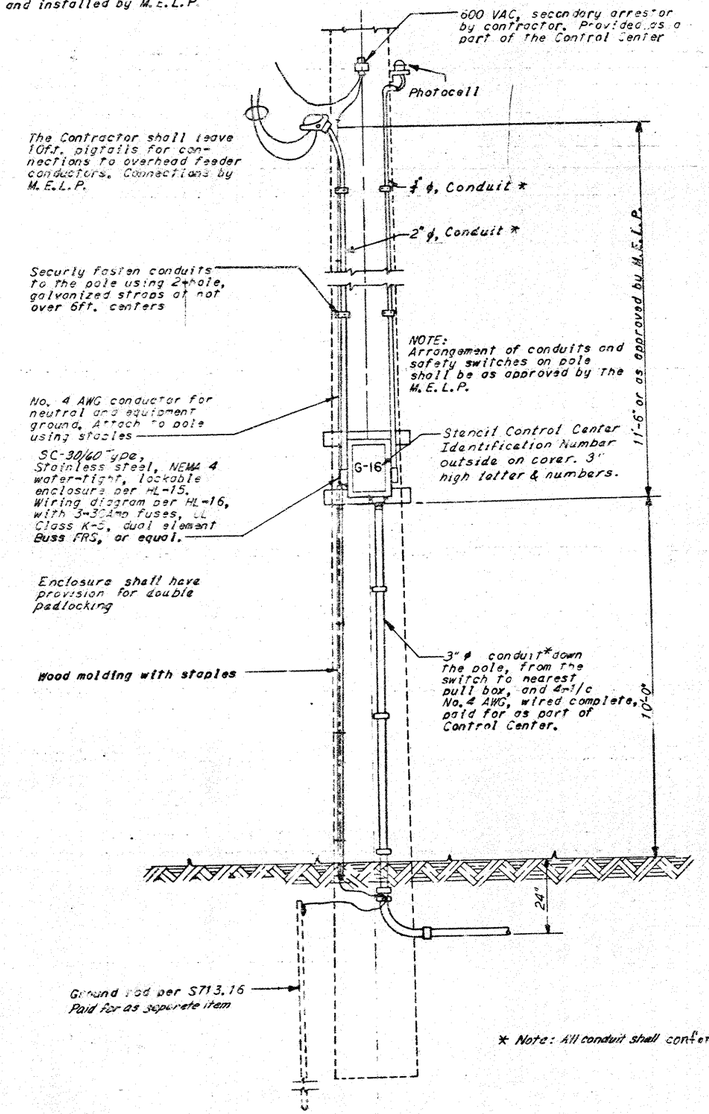
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

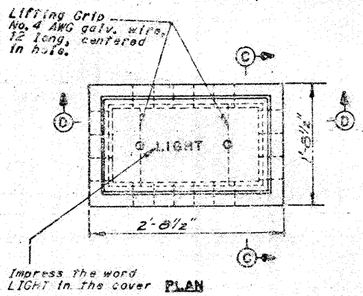
# LIGHTING DETAILS

NOTE:
Pole, primary switching controls, secondary feeder conductors, secondary rack insulators, down guys, connections, ect., will be provided and installed by M.E.L.P.

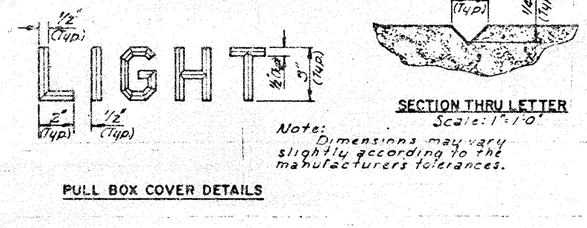



CONTROL CENTER DETAIL
No Scale

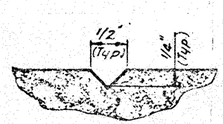
* Note: All conduit shall conform to 713.04




PLAN

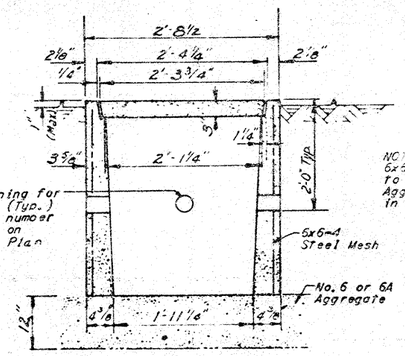



PULL BOX COVER DETAILS

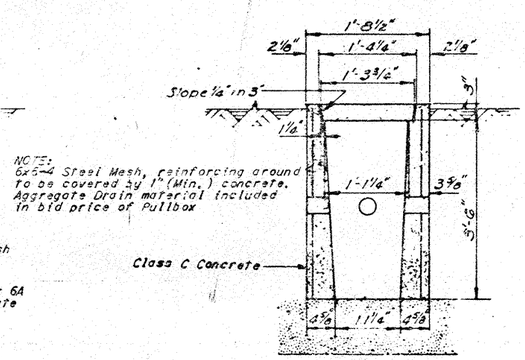



SECTION THRU LETTER
Scale: 1"=1'-0"

Note: Dimensions may vary slightly according to the manufacturers tolerances.



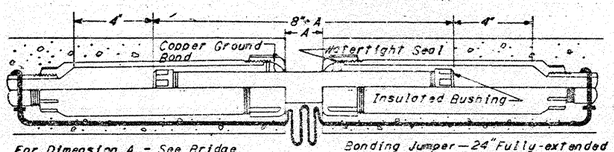

SECTION D-D




NOTE:
6x6-4 Steel Mesh, reinforcing ground to be covered by 1" (Min.) concrete. Aggregate Drain material included in bid price of Pullbox

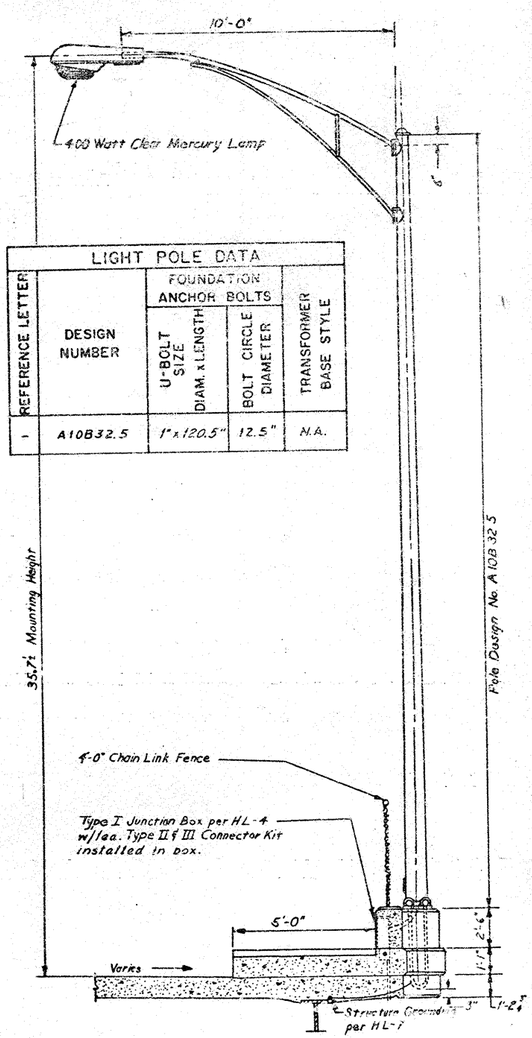
PULL BOX DETAILS
Scale: 1"=1'-0"

SECTION C-C




For Dimension A - See Bridge Plans Sheet: 46/73

TYPE E EXPANSION JOINT
No Scale




LIGHTING UNIT ON STRUCTURE
No Scale

MADE E.F.V. DATE 7/11/74
TRACED E.S. DATE 7-5-74
CHECKED E.F.V. DATE 7/11/74
SCALE AS NOTED

Howard, Needles, Tammen & Bergendoff
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| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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# LIGHTING QUANTITIES SUB SUMMARIES

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

| Reference | Station | Station | Side | 625 Light Pole S713.01 0001 Design A10832.5 Bridge Mounted | 625 Light Pole Anchor Bolts for Structure S713.01 | 625 Luminaire 400 watt, Type II S713.11 | 625 Lamp 400 watt, Clear Mercury S713.14 | 625 Pole and Bracket Cable No. 10 AWG S713.02 | 625 Distribution Cable No. 4 AWG S713.02 | 625 Connector Kit, Type I S713.15, As per plan | 625 Connector Kit, Type II S713.15, As per plan | 625 Connector Kit, Type III S713.15, As per plan | 625 Conduit 2" ϕ, S713.04 | 625 Conduit 3" ϕ, S713.04 | 625 Junction Box Type I As per plan | 625 Pullbox Concrete As per plan | 625 Ground Rod S713.16 | 625 Structure Grounding System S625.20 | 625 Trench 24" Deep | 625 Control Center G-16 | 839 High Voltage Test |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Each | Sets | Each | Each | Lin. Ft. | Lin. Ft. | Each | Each | Each | Lin. Ft. | Lin. Ft. | Each | Each | Each | Lump | Lin. Ft. | Lump | Lump |
| 1 | 196+60 | | PI. | | | | | | * 150 | * 4 | | | | * 70 | | * 2 | * 1 | Lump | * 70 | Lump | Lump |
| 2 | 196+60 | 196+70.25 | Pt. | | | | | | * 30.5 | | | | * 10 | | | | | | * 10 | | |
| 3 | 196+70.25 | 198+34 | Pt. | | | | | | 347.5 | | | | 169 | | | | | | | | |
| 4 | 198+34 | 200+00 | Pt. | 1 | 1 | 1 | 1 | 84 | 352 | | 1 | 1 | 166 | | 1 | | | | | | |
| 5 | 200+00 | 201+70 | Pt. | 1 | 1 | 1 | 1 | 84 | 350 | | 1 | 1 | 170 | | 1 | | | | | | |
| 6 | 201+70 | 203+57 | Pt. | 1 | 1 | 1 | 1 | 84 | 394 | | 1 | 1 | 187 | | 1 | | | | | | |
| 7 | 203+57 | 205+08 | Pt. | 1 | 1 | 1 | 1 | 84 | 322 | | 1 | 1 | 151 | | 1 | | | | | | |
| 8 | 205+08 | 206+00 | Pt. | 1 | 1 | 1 | 1 | 84 | 194 | | 1 | 1 | 92 | | 1 | | | | | | |
| 9 | 196+60 | 196+70.25 | Lt. | | | | | | * 30.5 | | | | * 10 | | | | | | * 10 | | |
| 10 | 196+70.25 | 198+34 | Lt. | | | | | | 347.5 | | | | 169 | | | | | | | | |
| 11 | 198+34 | 200+00 | Lt. | 1 | 1 | 1 | 1 | 84 | 352 | | 1 | 1 | 166 | | 1 | | | | | | |
| 12 | 200+00 | 201+70 | Lt. | 1 | 1 | 1 | 1 | 84 | 350 | | 1 | 1 | 170 | | 1 | | | | | | |
| 13 | 201+70 | 203+57 | Lt. | 1 | 1 | 1 | 1 | 84 | 394 | | 1 | 1 | 187 | | 1 | | | | | | |
| 14 | 203+57 | 205+08 | Lt. | 1 | 1 | 1 | 1 | 84 | 322 | | 1 | 1 | 151 | | 1 | | | | | | |
| 15 | 205+08 | 206+00 | Lt. | 1 | 1 | 1 | 1 | 84 | 194 | | 1 | 1 | 92 | | 1 | | | | | | |
| — | TOTAL | SHT. 43 | | 10 | 10 | 10 | 10 | 840 | 4160 | 4 | 10 | 10 | 1890 | 70 | 10 | 2 | 1 | Lump | 90 | Lump | Lump |
| 16 | 206+00 | 206+58 | Pt. | | | | | | 125 | | 1 | 1 | 58 | | | | | | | | |
| 17 | 206+58 | 208+21 | Pt. | 1 | 1 | 1 | 1 | 84 | 346 | | 1 | 1 | 163 | | 1 | | | | | | |
| 18 | 208+21 | 209+84 | Pt. | 1 | 1 | 1 | 1 | 84 | 346 | | 1 | 1 | 163 | | 1 | | | | | | |
| 19 | 209+84 | 211+47 | Pt. | 1 | 1 | 1 | 1 | 84 | 346 | | 1 | 1 | 163 | | 1 | | | | | | |
| 20 | 211+47 | 213+10 | Pt. | 1 | 1 | 1 | 1 | 84 | 346 | | 1 | 1 | 163 | | 1 | | | | | | |
| 21 | 213+10 | 214+60 | Pt. | 1 | 1 | 1 | 1 | 84 | 320 | | 1 | 1 | 150 | | 1 | | | | | | |
| 22 | 214+60 | 216+35 | Pt. | 1 | 1 | 1 | 1 | 84 | 370 | | 1 | 1 | 175 | | 1 | | | | | | |
| 23 | 216+35 | 217+98.75 | Pt. | 1 | 1 | 1 | 1 | 84 | 355 | | 1 | 1 | 164 | | 1 | | | | | | |
| 24 | 217+98.75 | 219+65 | Pt. | 1 | 1 | 1 | 1 | 84 | 345 | | 1 | 1 | 166 | | 1 | | | | | | |
| 25 | 219+65 | 220+00 | Pt. | 1 | 1 | 1 | 1 | 84 | 80 | | | | 35 | | 1 | | | | | | |
| 26 | 206+00 | 206+58 | Lt. | | | | | | 126 | | 1 | 1 | 58 | | | | | | | | |
| 27 | 206+58 | 208+21 | Lt. | 1 | 1 | 1 | 1 | 84 | 346 | | 1 | 1 | 163 | | 1 | | | | | | |
| 28 | 208+21 | 209+84 | Lt. | 1 | 1 | 1 | 1 | 84 | 346 | | 1 | 1 | 163 | | 1 | | | | | | |
| 29 | 209+84 | 211+47 | Lt. | 1 | 1 | 1 | 1 | 84 | 346 | | 1 | 1 | 163 | | 1 | | | | | | |
| 30 | 211+47 | 213+10 | Lt. | 1 | 1 | 1 | 1 | 84 | 346 | | 1 | 1 | 163 | | 1 | | | | | | |
| 31 | 213+10 | 214+60 | Lt. | 1 | 1 | 1 | 1 | 84 | 320 | | 1 | 1 | 150 | | 1 | | | | | | |
| 32 | 214+60 | 216+35 | Lt. | 1 | 1 | 1 | 1 | 84 | 370 | | 1 | 1 | 175 | | 1 | | | | | | |
| 33 | 216+35 | 217+98.75 | Lt. | 1 | 1 | 1 | 1 | 84 | 355 | | 1 | 1 | 164 | | 1 | | | | | | |
| 34 | 217+98.75 | 219+65 | Lt. | 1 | 1 | 1 | 1 | 84 | 345 | | 1 | 1 | 166 | | 1 | | | | | | |
| 35 | 219+65 | 220+00 | Lt. | 1 | 1 | 1 | 1 | 84 | 80 | | 1 | 1 | 35 | | 1 | | | | | | |
| — | TOTAL | SHT. 44 | | 18 | 18 | 18 | 18 | 1512 | 5960 | | 18 | 18 | 2800 | | 18 | | | | | | |
| 36 | 220+00 | 221+22 | Pt. | | | | | | 254 | | | | 122 | | | | | | | | |
| 37 | 221+22 | 222+72 | Pt. | 1 | 1 | 1 | 1 | 84 | 320 | | 1 | 1 | 150 | | 1 | | | | | | |
| 38 | 222+72 | 224+17 | Pt. | 1 | 1 | 1 | 1 | 84 | 310 | | 1 | 1 | 145 | | 1 | | | | | | |
| 39 | 224+17 | 225+56 | Pt. | 1 | 1 | 1 | 1 | 84 | 298 | | 1 | 1 | 139 | | 1 | | | | | | |
| 40 | 225+56 | 227+21.25 | Pt. | 1 | 1 | 1 | 1 | 84 | 350.5 | | 1 | 1 | 165 | | 1 | | | | * 10 | | |
| 41 | 227+21.25 | 227+37.25 | Pt. | 1 | 1 | 1 | 1 | 84 | | | 1 | 1 | 16 | | 1 | | | | | | |
| 42 | 227+37.25 | 227+47 | Pt. | | | | | | | | | | * 15 | | | * 1 | | | | | |
| 43 | 220+00 | 221+22 | Lt. | | | | | | 254 | | | | 122 | | | | | | | | |
| 44 | 221+22 | 222+72 | Lt. | 1 | 1 | 1 | 1 | 84 | 320 | | 1 | 1 | 150 | | 1 | | | | | | |
| 45 | 222+72 | 224+17 | Lt. | 1 | 1 | 1 | 1 | 84 | 310 | | 1 | 1 | 145 | | 1 | | | | | | |
| 46 | 224+17 | 225+56 | Lt. | 1 | 1 | 1 | 1 | 84 | 298 | | 1 | 1 | 139 | | 1 | | | | | | |
| 47 | 225+56 | 227+21.25 | Lt. | 1 | 1 | 1 | 1 | 84 | 350.5 | | 1 | 1 | 165 | | 1 | | | | | | |
| 48 | 227+21.25 | 227+37.25 | Lt. | 1 | 1 | 1 | 1 | 84 | | | 1 | 1 | 16 | | 1 | | | | | | |
| 49 | 227+37.25 | 227+47 | Lt. | | | | | | | | | | * 15 | | | * 1 | | | * 10 | | |
| — | TOTAL | SHT. 45 | | 10 | 10 | 10 | 10 | 840 | 3365 | | 10 | 10 | 1504 | | 10 | 2 | | | 20 | | |
| — | TOTAL | QUANTITIES | | 38 | 38 | 38 | 38 | 3192 | 13185 | 4 | 38 | 38 | 6194 | 70 | 38 | 4 | 1 | Lump | 110 | Lump | Lump |

MADE E.F.J. DATE 7/8/74
TRACED L.A.W. DATE 7/11/74
CHECKED W.G.P. DATE 7/11/74
SCALE

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

* - Roadway Quantities
All Others - Structure Quantities

QUANTITY CALCULATIONS
MADE BY W.G.P. DATE 7/10/74
CHECKED BY E.F.J. DATE 7/22/74

# SCHEMATIC WATER WORK PLAN

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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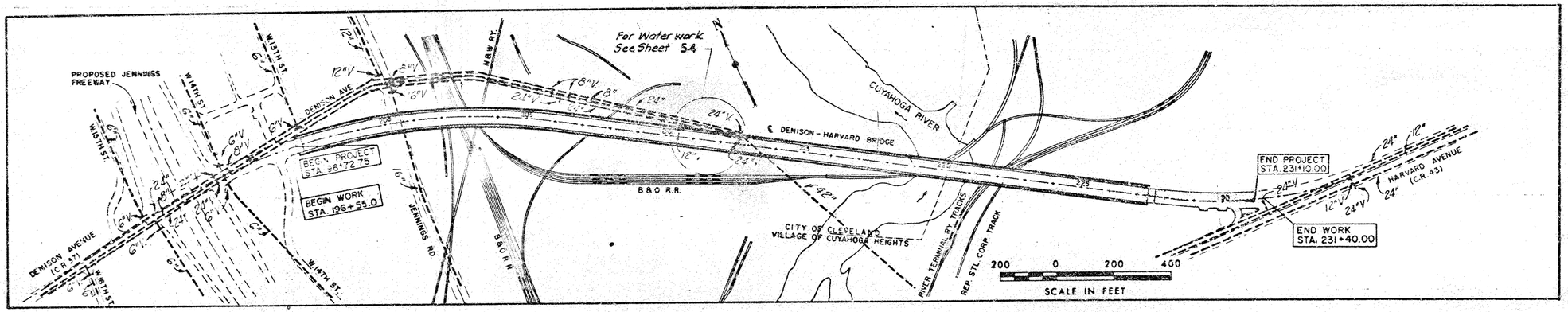
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




MADE E.P.H. DATE 9/12/74
TRACED T.R.K. DATE 2 May 75
CHECKED E.R.H. DATE 30 Aug 74
SCALE 1"=200'

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND OHIO

HNTB

APPROVED _____ DATE JAN. 9, 1975.

DIRECTOR OF PUBLIC UTILITIES

COMMISSIONER OF WATER AND HEAT

COMMISSIONER DIVISION OF UTILITIES ENGINEERING

ENGINEER OF DESIGN REVIEW

## 1ST HIGH SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITIES
DIVISION OF UTILITIES ENGINEERING
CLEVELAND, DIVISION OF WATER AND HEAT OHIO

Subject: WATERWORK FOR THE CITY OF CLEVELAND

SCHEMATIC WATER WORK PLAN

# WATERWORK NOTES

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

## GENERAL

SCOPE OF WORK

The work contemplated under this contract comprises the furnishing and installing complete with appurtenances the 24" Ductile Iron Water Main Relocation in Denison Avenue and performing other incidental work necessary to abandon the existing water facility.

DEFINITIONS

Wherever in these specifications or in other contract documents the following terms or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

THE STATE

The State is the State of Ohio acting through its authorized representative.

ENGINEER

The Engineer is District Deputy Director or District Engineer, The District Construction Engineer or the District Maintenance Engineer or the Project Engineer assigned to administer the contract, or their duly designated deputies, agents, or representatives.

THE CITY

The City is the Director, Department of Public Utilities of the City of Cleveland or their duly designated deputies, agents or representatives.

STATUS OF CITY INSPECTOR

Inspectors as designated by the Director of Public Utilities are authorized to inspect all work done and materials furnished. Such inspection may extend to all or any part of the waterwork, and to the preparation or manufacture of the materials to be used in the waterwork. The city inspector as designated by the Director of Public Utilities will make work instructions through the Project Engineer.

ACCESS TO WORK AND PLACE OF MANUFACTURE

The Contractor shall notify the Engineer and Director of Public Utilities, at least seven (7) days previous to the commencement of the manufacture of any materials, of the time and place where the manufacture is to commence, in order that a representative of the Engineer and Director may be present to inspect the manufacture. The Contractor shall provide, without charge or expense to the State and City, all necessary assistance to the Engineer and Director when required for inspection or verification of work done.

DIMENSIONS, DETAILED DRAWINGS AND ELEVATIONS

Figured dimensions on drawings shall take precedence over measurements by scale, and detailed drawings are to take precedence over general drawings and shall be considered as explanatory of them and not as indicating extra work. If, however, any of the detailed drawings show more elaborate or expensive work than is normally specified and indicated by the contract drawings, notice thereof must be given to the Engineer by the Contractor within ten (10) days after receipt of such detailed drawings in order that the drawings may be amended or the additional expense on account of such work may be adjusted and authorized. If the Engineer does not receive such notice from the Contractor within ten (10) days after the detailed drawings have been received by him, it is hereby agreed that the Contractor accepts the drawings and will execute them without claim for extra compensation.

FLOODS AND FREEZING WEATHER

Proper facilities shall be provided for protecting the work from damage by flood, rain or frost, and work done in freezing weather shall be done in such manner as the Engineer may approve. Valves shall be protected from freezing until backfilled in the completed work.

ADDITIONAL WORK

(A) - Attention is called to the fact that the work of this contract includes certain performances as incidental to the itemized requirements hereof, though not exclusive as follows: To perform all excavation, backfilling, sheeting, shoring, temporary and final repaving and to test the installation. Sand backfill shall be placed under existing and proposed pavement. For the performances herein described and for other incidental performances of like nature, the State will make no specific or separate payment or allowance, but the cost thereof shall be included in the prices stipulated to be paid for the various items of the work to be done under this contract.

(B) - Preliminary flushing: Before being placed in service all dirt and foreign matter shall be removed from the new water main or extensions to existing mains by a thorough flushing through the hydrants or by other approved means. Each valved section of newly laid pipe shall be flushed independently. This shall be done after the pressure test and may be done before or after the trench shall have been backfilled.

(C) - Chlorination: Following the preliminary flushing, the newly laid water main shall be chlorinated. The process of chlorinating, the method of procedure, the chlorinating agent and the rate of application shall be determine by the Engineer. The City of Cleveland will furnish the necessary labor and material required for such chlorination and install the necessary taps at the ends of the water main sections to be chlorinated. A charge will be assessed the Contractor for any material, labor, tools, equipment and incidentals furnished by the City of Cleveland, Division of Water. The Contractor shall furnish the necessary labor for excavation and backfilling which will be required for the installation of taps for injecting the chlorine solution, operating pumps and flushing mains.

(D) - Final flushing and test: Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe at its extremities until the replacement water throughout its length shall, upon test, both chemically and bacteriologically, be proven equal to the water quality served the public from the existing water supply system.

(E) For the performances described in paragraphs (B), (C) and (D), the State will make no specific or separate payment or allowances, but the cost thereof shall be included in the prices stipulated to be paid for each linear foot of pipe furnished and installed.

MAINTENANCE OF SERVICE AND CONNECTING RELOCATED MAINS

When the new mains have been tested and chlorinated and are ready to be connected to the old main, the Contractor shall make such connections at a time designated by the City. Prior to shutting down the existing mains, the Contractor shall take suitable precautions to assure a minimum interruption to service, including the following:

(A) Perform all necessary excavation, including bell holes exposing the existing main sufficiently for the operation of the pipe saw by the City.

(B) Remove the cap or plug from the end of the new main.

(C) Swab the inside of all pipes, bends and sleeves to be used in connection thoroughly with a chlorine solution of at least 100 p.p.m.

(D) Make up as much of the connection as possible outside the ditch to eliminate the need for caulking most of the necessary joints during the shutdown. By careful measurement all pipe cuts can be made by the Contractor prior to shutting down.

(E) Have sufficient manpower and equipment on the site to perform the operation in a minimum of time.

PAINTING

(A) - It is the intention of these specifications to provide that all metal work subject to corrosion shall be satisfactorily protected by a durable coating of paint or other approved material and that all metal surfaces not buried in earth, or in concrete shall be left clean and well painted at the completion of the contract. Unless otherwise specified, the protection shall be at least that given by three (3) coats of approved paint. The first coat is to be applied at the shop before the metal has rusted and after all grease, dirt and scale has been removed. Bolts and nuts shall not be shop coated, but shall receive three (3) coats of approved paint after installation.

(B) - All metal work which has not been coated before the arrival on the job shall be given a temporary protective coating of such a nature as to permit the ready adherence of future coatings. The temporary coating shall be a good grade asphaltic paint or other approved material. The temporary protection shall apply particularly to the valve boxes and covers, manhole rings and covers, ladders and ladder rungs and elsewhere when in the opinion of the Engineer, such protection is necessary.

(C) - All surfaces of metal which will be in contact after assembling shall be painted, at least one coat, before assembling. The final coat of paint on all exposed work shall be given shortly before the completion of the contract.

(D) - Where painting clauses appear hereinafter, they shall take precedence over this section, except that temporary protection herein described may be required.

(E) - All of this work shall be included in the price bid for the particular item requiring the painting.

TESTS, INSPECTION AND REPORTS

Notwithstanding the requirments of any other provisions of these specifications, the Contractor shall arrange for and pay all costs involved for shop inspection of all materials furnished, manufacture of all pipe, valves, fittings, etc., field and shop welds and welding, and furnish to the State and the City of Cleveland copies of all shop, fabrication, manufacture and other related inspection reports of materials furnished. This inspection shall be done by a recognized inspection laboratory, approved by the City of Cleveland. In the case of any item not specifically mentioned in the "Waterwork Notes", Ohio Department of Transportation "Construction and Material Specifications - January 1, 1973" shall govern.

HANDLING PIPE AND ACCESSORIES

(A) - Unloading: Cast iron pipe, fittings, valves, hydrants, and other accessories shall, unless otherwise directed, be unloaded at the point of delivery, hauled to and distributed at the site of the project by the Contractor. They shall at all times be handled with care to avoid damage. In loading and unloading they shall be lifted by hoists or slid, or rolled on skidways in such manner as to avoid shock. Under no circumstances shall they be dropped. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground.

(B) - At site of work: In distributing the material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench.

(C) - Protection of pipe coating: Pipe shall be handled in such manner that a minimum amount of damage to the coating will result. Any cast iron pipe or fitting, the coat of which has been damaged in shipping or handling, shall have the damaged portion well cleaned and covered with an asphalt paint, approved by the Engineer, before being placed in the work. The Contractor shall thoroughly coat all exposed parts of bolts and nuts with an approved asphalt paint, after all pipe has been laid and before backfilling has been placed. All field coating shall be furnished by the Contractor.

MADE EQH DATE 8 Mar 74
TRACED DATE
CHECKED EQH DATE 19 Aug 74
SCALE None

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

APPROVED _____ DATE JAN. 9, 1975.

William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF UTILITIES ENGINEERING
CLEVELAND, DIVISION OF WATER AND HEAT OHIO
Subject: WATERWORK FOR THE CITY OF CLEVELAND

# WATERWORK NOTES

| FHWA REGION | STATE | PROJECT | |
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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

## GENERAL

HANDLING PIPE AND ACCESSORIES (CONTINUED)

(D) - Pipe kept clean: The interior of the pipe, fittings, and other accessories shall be kept free from dirt and foreign matter at all times.

(E) - Frost protection: Valves and hydrants before installation shall be trained and stored in a manner that will protect them from damage by freezing.

CHANGES IN WATER MAINS

(A) - Whenever it becomes necessary in the opinion of the Engineer to change the locations of house connections between water main and curb cock, such changes will be done by the City. The Contractor will notify the City in ample time to permit the City to make such changes and avoid unnecessary delay in the completion of the work. The Contractor shall also cooperate with the City in making these house connections and all other changes required and shall do all excavating, backfilling and repaving as may be required. The City will furnish the piping material for and make all changes required, including tapping, in the location of existing house service connections and meters.

(B) - Whenever it becomes necessary, in the opinion of the Engineer to change the location or elevation of water mains and hydrants, and where connections are to be made between existing distribution mains and water mains under this contract, the Contractor shall remove and dispose of all existing water main and branch materials required to make the connection, and shall furnish and install complete, all the cast iron and ductile iron pipe, fittings and valves to make the connections indicated. The Contractor shall also furnish all labor, materials, tools and equipment and make the excavation, backfill and repaving for such connections. Payment for this will be included in the price bid under appropriate item for size of water main or connection to be installed. All pipes, valves, hydrants and appurtenances removed shall become the property of the Contractor.

WORK TO BE DONE BY THE CITY

(A) - The City will furnish the piping material for and make all changes required, including tapping, in the location of existing house service connections and meters, but the Contractor shall do all the necessary excavation, backfilling and repaving required therefore. A charge will be assessed the Contractor for any of the labor or materials furnished by the City.

(B) - In locations shown on the plans the Contractor will be required to sleeve-in to the existing mains. To speed up this operation, it is called to the Contractor's attention that the water department has on hand at Harvard Yards motor operated pipe cutters which are available for cutting pipe by City forces at the following rates. The prices include cost of labor, use of pipe cutting machine, and truck. The Contractor shall do all necessary excavation, backfilling and repaving and all air compressor equipment shall be furnished by the Contractor.

| SIZE OF PIPE | COST PER CUT |
|---|---|
| ~~8"~~ | ~~$30.00~~ |
| ~~10"~~ | ~~30.00~~ |
| ~~12"~~ | ~~30.00~~ |
| ~~16"~~ | ~~35.00~~ |
| 24" | 60.00 |
| ~~30"~~ | ~~8000~~ |

EXCAVATION

(A) The Contractor shall remove all existing structures, roadways, driveways and other similar materials and make all excavation necessary for the proper construction of the water main, pipe connections and appurtenant structures, including tunnel and shaft excavation. The excavation shall include the removal, handling, rehandling and disposal of materials encountered in the work and shall include all pumping, bailing, drainage, sheeting and bracing. Moreover, the Contractor must assume all responsibility for any added expense or other liability which may arise by means of quicksand, obstacles or conditions foreseen and unforeseen or encountered in the work of this contract.

(B) Trenches shall in every case be of sufficient width to permit solid packing of backfill under and around pipes, and satisfactory construction of all appurtenances and for such sheeting and shoring, pumping and draining as may be necessary.

(C) - The trench shall be dug to the alignment and depth required and only so far in advance of pipe laying as the Engineer shall permit. The trench shall be so braced and drained that workmen may work therein safely and efficiently. It is essential that the discharge from pumps be led to natural drainage channels, to drains, or to sewers.

(D) - The trench width may vary with and depend upon the depth of trench and the nature of the excavated material encountered; but in any case shall be of ample width to permit the pipe to be laid and jointed properly and of the backfill to be placed and compacted properly. The minimum width of unsheeted trench shall be eighteen (18) inches and for pipe ten (10) inches or larger, at least twelve (12) inches larger than the outside diameter of the pipe for concrete pipe and eighteen (18) inches larger than the outside diameter of the pipe for cast iron and steel pipe; except by consent of the Engineer. The maximum clear width of trench shall be not more than two (2) feet greater than the outside pipe diameter. When sheeting and bracing is used, the trench width shall be increased accordingly.

(E) - The trench, unless otherwise specified, shall have a flat bottom conforming to the grade to which the pipe is to be laid. The pipe shall be laid upon sound soil cut true and even, so that the barrel of the pipe will have a bearing for its full length.

(F) - Any part of the trench excavated below grade shall be corrected with approved material, thoroughly compacted.

(G) - When the uncovered trench bottom of subgrade is soft and in the opinion of the Engineer cannot support the pipe, a further depth and or width shall be excavated and backfilled to pipe foundation grade as required under (F), or other approved means shall be adopted to assure a firm foundation for the pipe.

(H) - Ledge rock, boulders, large stones, and shale shall be removed to provide a clearance of at least six (6) inches below all parts of the pipe, valves, or fittings and a clear width of six (6) inches on each side of all concrete pipe and nine (9) inches on each side of all cast iron and steel pipe shall be provided.

(I) - Excavation below subgrade in rock, shale or in boulders shall be backfilled to subgrade with approved material, thoroughly compacted.

(J) - Bell holes of ample dimensions shall be dug in earth trenches at each joint to permit the jointing to be made properly. Adequate clearance for proper jointing pipe laid in rock shall be provided at bell holes.

(K) - The use of excavating machinery will be permitted except in places where its operation will cause damage to trees, buildings, or existing structures above or below ground; in which case hand methods shall be employed.

(L) - Trees, fences, poles and all other property shall be protected unless their removal is authorized: Any property damaged shall be satisfactorily restored by the Contractor.

(M) - Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, fire or police call boxes, or other utility controls shall be left unobstructed and accessible during the construction period.

(N) - The Contractor shall maintain all excavations in good order during the construction, so as not to hinder or injure the pipe laying, masonry or other work. He shall take all reasonable precautions to prevent movement of the sides of such excavation, and shall remove at his own expense any material sliding into the excavation.

SHEETING AND BRACING

(A) - The Contractor shall furnish and put in place such sheeting and bracing as may be required to support the sides of trenches or other excavation and shall remove such sheeting and bracing, as the trench or excavation is filled up, unless the Engineer shall order it left in place, in which case the Contractor shall cut the plank off at a height as ordered by the Engineer, or as called for on the contract drawings. That portion of the timber ordered to be left in place will be paid for at the rate of one hundred and ninety-five dollars ($195.00) per thousand feet board measure. No payment will be made for wasted ends. A quantity of 2 M.B.M. has been provided in the General Summary for Item Special,-Sheeting Left in place.

(B) - For all excavations for the work described herein, the Contractor shall furnish and place sheeting and bracing so as to reduce to a minimum the possibility of injury or damage to the same; as per State of Ohio Construction I.C. - 3-11 dated 1 Apr. 68.

(C) - If the Engineer is of the opinion that at any point sufficient or proper supports, sheeting, or bracing have not been provided, he may order additional supports, sheeting or bracing, at the expense of the Contractor, and the compliance with such orders by the Contractor shall not relieve or release him from his responsibility for sufficiency of such supports.

REMOVAL OF EXCAVATED MATERIAL

(A) - All surplus material and such other material as the Engineer may deem unfit for use as backfill shall be disposed of by the Contractor so as to give a minimum of inconvenience to the public. In case of settlement after backfill, the Contractor shall supply sufficient material satisfactory to the Engineer to make up for the deficiency.

(B) - In the storing of excavated material, which is to be used as a backfill, the Contractor shall exercise care so as to avoid inconveniencing the public. If, in the opinion of the Engineer, it is necessary to remove this excavated material from the streets or lots, the Contractor shall be required to do so.

(C) - Any material which may spill or drip from vehicles by hauling in the streets, shall be removed and the streets cleaned by the Contractor, to the satisfaction of the Director of Public Service of the City of Cleveland or the proper officials of the municipality or township in which the work is being done.

(D) - When so directed by the Engineer, the Contractor shall immediately remove all excavated materials from the site.

LAYING PIPE

(A) - Proper implements, tools, and facilities, satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. All pipe, fittings, and valves shall be carefully lowered into the trench, piece by piece, by means of derrick, proper slings, and other suitable tools or equipment, in such manner as to prevent damage to pipe or coating. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. If any defective piece is discovered while pipe is suspended or after being laid, a new piece shall be furnished and installed by the Contractor.

(B) - All foreign matter or dirt shall be removed from the inside of the pipe before it is lowered into its position in the trench, and it shall be kept clean by approved means during and after laying.

(C) - At times when pipe laying is not in progress, the open ends of pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe. No pipe shall be laid in water, or when the trench conditions or the weather is unsuitable for such work, except by permission of the Engineer.

(D) - Wherever necessary to deflect pipe from a straight line, either in the vertical or horizontal plane to avoid obstructions, to plumb stems, or for other reasons, the degree of deflection shall be approved by the Engineer.

(E) - Before laying cast iron or ductile iron pipe, all lumps, blisters and excess coal tar coating shall be removed from the bell and spigot ends of each pipe, the pipe ends shall then be kept clean until joints are made.

MADE ERH DATE 2 May 74
TRACED DATE
CHECKED ERH DATE 13 May 74
SCALE None

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

APPROVED _____ DATE JAN 9, 1975

William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF UTILITIES ENGINEERING
CLEVELAND DIVISION OF WATER AND HEAT OHIO
Subject: WATERWORK FOR THE CITY OF CLEVELAND

# WATERWORK NOTES

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COUNTY ROAD 37
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## GENERAL

LAYING PIPE (CONTINUED)

(F) - Before laying concrete pipe, the pipe ends shall be made smooth with emery cloth, file or other approved means, wire brushed and wiped until clean and dry. Pipe ends shall be kept clean until joints are made. After cleaning and drying, all contact surfaces of the gaskets and steel joint rings shall be coated with an approved flax soap before entering the spigot end into the socket. Immediately after the joint is pulled together, the pipe shall be blocked with wood blocking. A surcingle shall be installed around the joint and the pipe shall be secured with earth or sand as required, carefully tamped under and on each side up to the spring line of the pipe, including the bell holes. All blocking shall be removed when backfill has reached the spring line of the pipe.

FLOATING

The Contractor shall take every precaution against the floating of the pipe due to water coming into the trench, or through caving in, flushing or puddling. In case of such floating the Contractor shall replace the pipe at his own expense, and make wholly good any injury or damage which may have resulted.

TESTING MAINS

(A) - All pipes, valves, fittings, etc., shall be laid in such a manner as to leave all joints watertight. After the pipe is laid, and before backfill is placed around the joints, such lengths of the water main as the Engineer may determine, shall be tested under a hydrostatic pressure of seventy-five (75) pounds per square inch above the static pressure, but nowhere less than 100 pounds per square inch.

(B) - The test shall be under the direction of the Engineer and Director of Public Utilities or his designate. The Contractor may obtain water for testing by observing the rules and regulations enforced in the municipalities or townships in which the work is being done. The City will furnish a pressure gage for measuring the pressure on the water main, but the Contractor shall furnish a suitable pump, pipes, test heads and all appliances, labor, fuel and other appurtenances necessary to make these tests.

(C) - The test pressure shall be maintained for a sufficient length of time to allow for a thorough examination of joints and elimination of leakage where necessary. The pipe lines shall be made absolutely tight under the test pressure.

(D) - After a section of the water main has been tested, the Contractor shall drain the main. In case the drains are connected to valve or drain vaults, then the Contractor, within a reasonable time after the test has been completed, shall pump all water out of the vaults.

(E) - In cold weather immediately after testing a section of the water main, the Contractor shall open all valves, air cocks, by-passes and drains and properly drain bonnets of all valves in the section of the water main, and take all other precautions necessary to prevent injury to the water main and appurtenances due to freezing.

(F) - As an alternate for testing concrete and steel mains other than by the preceding method, the Contractor may choose the following procedure:

The water main shall be tested under the same hydrostatic pressure as previously noted. The test pressure shall be maintained for a period of two (2) hours by pumping additional water into the main, if necessary. The quantity of water thus pumped into the main multiplied by twelve (12) shall be taken as the leakage per twenty-four (24) hours.

(G) - The permitted leakage shall not exceed a rate of seventy-five (75) gallons per twenty-four (24) hours per mile of pipe per inch of nominal diameter.

(H) - In calculating leakage, the Engineer will make allowance for any leakage at the valves, the removeable bulkheads, etc.

(I) - In using this method of testing, the Contractor may backfill the pipe except at lead joints, flanged joints, victaulic couplings, and drain connections immediately following the laying and before the actual test has been made. In case the leakage exceeds the permissible amount mentioned above, the Contractor shall find the leak and make the joints tight. The Contractor shall furnish suitable means for determining the quantity of water lost by leakage during the test.

(J) - In order to be able to make proper allowances for leakage at valves, etc., previously noted, only such sections of water main may be selected for test as will have such valves, removable bulk-heads, etc., accessible.

(K) - The evaluation of actual leakage to standard pressure (150 lbs.) leakage is calculated by the application of the ratio determined from the square root of respective pressures, other factors being equal.

CLOSING VALVES

The closing of all gate valves on water mains for making connections, tests, or for any other cause, will be done by the City of Cleveland and sufficient notice shall be given to the City, by the Contractor, so that the work may be done with a minimum of inconvenience to the public and delay to the Contractor.

~~PLUGGING DEAD ENDS~~

~~Standard plugs with clamps shall be inserted into the bells of all dead ends of pipes, tees, or crosses, and spigot ends capped and stamped by the Contractors, on all mains constructed by him and on existing water mains where indicated in the contract drawings. Concrete piers shall be placed when called for on the contract drawings, or ordered by the Engineer. The cost of furnishing and installing the plugs in new water mains shall be included in the per linear foot price bid for the various sizes of new water mains. The cost of furnishing and installing the plug in existing water main shall be included in the unit price bid for each item "Plugging Water Mains and Branches", classified as to size as shown elsewhere in these plans. (See Sheet ___)~~

BACKFILLING

(A) - This work includes all backfilling, together with ramming, puddling, and rolling, as required; the regrading of grounds; the replacing of surface and subsurface structures; the placing and maintaining of temporary sidewalks, and driveways; the furnishing of suitable material for backfill, reseeding lawns and replacing trees and shrubbery damaged by the Contractor; and all appurtenant work incidental thereto. Pavements, curbs, sidewalks and driveways within the limits of the work shall be temporarily surfaced, maintained and finally replaced or repaved as set forth under "Road Surfaces, Sidewalks, Driveways and Curbing."

(B) - Backfill, unless otherwise specified, may be made with material excavated from trenches, providing it is satisfactory to the Engineer. If, in the opinion of the Engineer, the material excavated is unsatisfactory, then the Contractor shall furnish at his own expense other material suitable for backfill. All backfill shall be free from slag, cinders, rubbish and other objectionable material.

(C) - Before laying the pipe, the bottom of the trench shall be brought to the grade of the bottom of the pipe, except at field joints. Wherever the bottom of the trench has been excavated below the bottom of the pipe, the Contractor shall place sand, or other material satisfactory to the Engineer to bring the bottom of the trench to the grade of the bottom of the pipe. This bed shall be thoroughly tamped before the pipe is laid.

(D) - Unless otherwise specified, the backfill under, around and to a depth of one (1) foot above the top of all pipe, shall be made with material satisfactory to the Engineer, which material shall be free from stone and other objectionable material noted above. The Contractor must use special care in placing this portion of the backfill, so as to avoid injuring, distorting or moving the pipe during compaction. Above this level the backfill shall be made with material satisfactory to the Engineer. However, where specified, sand shall be used for the entire portion of the backfill. See below.

(E) - Backfilling as noted in paragraph (D) shall be tamped in thin layers, simultaneously on each side of the pipe, and thoroughly compacted so as to provide a solid backing against the external surface of the pipe.

(F) - Only after the backfill previously mentioned has been satisfactorily compacted, may work proceed in placing the remaining backfill which must be carefully placed and compacted by tamping, puddling, or rolling. All precautions must be taken to eliminate future settlement. The number of men tampingshall be not less than the number backfilling, and additional men shall be kept in the trench to spread the material.

(G) - Backfilling shall not be done in freezing weather, except by permission of the Engineer, and it shall not be made with frozen material, nor shall any fill be made where the material already in the ditch is frozen.

(H) - The entire backfill shall be made with sand where permanent pavements, curbs, driveways, or sidewalks, have been opened for or undercut by the excavation, where ordered by the Engineer.

(I) - All sand to be used for backfill shall be 703.05 State of Ohio Dept. of Transportation "Construction and Material Specifications."

(J) - Special treatment of the trench will be required where cinder or active sulphur bearing shale or clays excavation exceeding one foot measured from the top surface is encountered. Before laying the pipe, the bottom of the trench shall be dug below grade and then brought to the grade of the pipe in the following manner, a four (4) inch layer of crushed limestone shall be placed on the entire width of the bottom of the trench followed by a filler of hydrated lime and a layer of three (3) inches of sand. The crushed limestone shall be well graded from the fine to coarse and free from slag, cinders, ashes, rubbish or other objectionable material. all limestone must be capable of being passed through a $\frac{3}{4}$ inch sieve. On top of this layer of crushed stone, hydrated lime shall be supplied in the amount of $\frac{3}{4}$ of a pound per square foot of trench. This bed of crushed limestone shall be thoroughly tamped before the 3" layer of sand is placed. The backfill around and to the depth of 3" above the top the pipe shall be made with sand. The Contractor must use special care in placing this portion of the backfill so as to avoid injuring or moving the pipe when compacting same. On top of the sand the Contractor shall place another layer of crushed limestone five (5) inches thick on the entire width of the trench. On top of the compacted layer of limestone hydrated lime shall then be applied in the amount of $\frac{3}{4}$ of a pound per square foot of trench. The remaining backfill shall be made with sand, carefully placed and compacted by tamping, puddling, or rolling. All precautions shall be taken to eliminate future settlement. The treatment of the trench bottom, previously described, may be omitted where the cinder depth, measured from the top surface does not exceed 2' - 6".

ROAD SURFACES, SIDEWALKS, DRIVEWAYS, AND CURBING

(A) - The Contractor shall remove all pavements and road surfaces within the lines of excavation. After the pipe has been laid, all appurtenant work constructed and backfill completed, he shall furnish, place and maintain, wherever the pavement road surface has been removed or damaged by him, a temporary pavement in the paved portion of streets, or a temporary road surface in the unpaved portion of streets so as to provide a safe and passable roadway until such time as the final pavement or road surface is completed.

(B) - When only a portion of the street is paved and the lines of excavation are in the unpaved portion, the Contractor shall use the utmost care in preventing injury to the pavement. If, in making the excavation or for any other cause the pavement is removed or injured by the Contractor, he shall furnish, place and maintain a temporary pavement wherever the pavement has been removed or damaged, so as to provide a safe and passable roadway until such time as the final pavement is completed.

MADE EQH DATE 2/24/74
TRACED DATE
CHECKED ERP DATE 2/24/74
SCALE None

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND OHIO
HNTB

APPROVED _____ DATE JAN. 9, 1975

William A. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF UTILITIES ENGINEERING
CLEVELAND, DIVISION OF WATER AND HEAT OHIO
Subject: WATERWORK FOR THE CITY OF CLEVELAND

# WATERWORK NOTES

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

## GENERAL

ROAD SURFACES, SIDEWALKS, DRIVEWAYS, AND CURBING (CONTINUED)

(C) - All final paving of road surfaces, if so noted on the contract drawings shall be done by the contractor to the satisfaction of the Engineer and in conformity with the City of Cleveland "Standard Specifications for Construction of Pavements, Sidewalks and Sewers," dated November, 1969. The Contractor shall bear the entire cost of the work. At locations not specifically mentioned, the Contractor shall restore the same type of pavement as encountered. See Sheet 53 for Pavement Restoration Details.

(D) - All damaged or displaced curb shall be renewed or reset to the satisfaction of the Engineer. No faulty curb or curb less than 30" long will be permitted for reuse.

(E) - If prior to the expiration of this contract, any of the pavements or road surfaces within the lines of excavation or adjacent thereto, shall have been damaged or injured, due to undermining, or for any other cause which may be attributed to the work which is being done by the Contractor, then the Contractor shall remove such damaged or injured pavements or road surfaces, backfill with sand properly rammed and replace the final pavement or road surface.

(F) - If any sidewalks, driveways or curbs are removed or injured by the Contractor in the course of making excavation or handling materials, or for any other reason which may be attributed to work which has been done by the Contractor, then he shall relay same after all work, including backfilling, has been completed. If any stone sidewalks, driveways or curbs which have been removed or injured, are unfit to be relaid, then the Contractor shall furnish and relay new material. All concrete or cement sidewalks, driveways or curbs, which are removed or injured by the Contractor shall be broken up by him and he shall furnish all labor and materials and construct new sidewalks, driveways or curbs, to replace those removed or injured. At intersecting walks, drives, etc., additional concrete slabs beyond the excavation limits shall be removed and replaced with new material, in order to avoid having more joints than in the original work. All slabs replaced shall be of full width. The Contractor shall furnish, place and maintain, wherever the sidewalk has been removed or damaged by him, a temporary sidewalk so as to provide a safe and passable sidewalk until such time as the final sidewalk is completed.

(G) - All pavements, road surfaces, sidewalks, driveways, or curbs, which the Contractor is required to replace or to have replaced, shall, at the expiration of this contract, be in at least as good condition as at the time of awarding the contract.

(H) - All work which the Contractor may do in connection with the opening up or replacing of pavements, road surfaces, sidewalks, driveways, or curbs, as well as the final repaving, shall be done at his expense, in accordance with the rules and requirements of the Street or Sidewalk Departments of the City of Cleveland and in accordance with the additional requirements of these specifications. And the Contractor shall furnish evidence to the Engineer that the work has been completed to their satisfaction.

(I) - Tunneling will not be permitted without permission of the Engineer. In backfilling tunnels, sand shall be used as far as possible and balance of backfilling made with Class C concrete, rammed in place.

(J) - TheContractor shall make all pavement cuts by channeling machine, hand-operated pneumatic tools or by such other methods as will furnish a clean cut in the pavement and pavement base without undue shattering. The use of ball or weight to break the pavement will not be permitted.

(K) - No specific or separate payment will be made for all of this work, but the cost thereof shall be included in the prices bid for the various items of the work to be done under this contract. Restoration as noted above will only be required in areas where the plans do not otherwise propose new construction of pavement sidewalks and curbs, except that temporary restoration in such areas may be required by the Engineer in order to maintain traffic or local access as per 104.04 and 107.10, State of Ohio, Dept. of Trans. "Constr. and Matl. Specs."

LIST AND INVOICES

The Contractor shall furnish the Engineer with a list, in duplicate, of pieces in each shipment of pipe and specials, giving the serial number and designation of each pipe and special sent at that time.

## CAST IRON AND DUCTILE IRON PIPE AND FITTINGS

WORK INCLUDED

The Contractor shall furnish, all the materials for and shall properly construct and connect in place, at the locations shown on the drawings or as directed, all cast iron or ductile iron pipe and fittings, including all excavation work the cutting into and removal of existing pipe, backfilling, sand backfill, and repaving, all as required for the proper completion of the work included under this contract.

CAST IRON PIPE AND FITTINGS

(A) - All pit cast pipe shall be manufactured in all respects in accordance with, and shall meet the requirements of the latest "Standard Specifications for Cast Iron Pipe and Special Fittings" as adopted by the American Water Works Association which specifications except as herein modified are made a part of these specifications.

(B) - In lieu of pit cast pipe above the Contractor will be permitted to furnish either centrifugal or high strength cement lined pipe. The metal shall have a modulus of rupture of not less than 40,000 pounds and a tensile strength of not less than 18,000 pounds and shall be of class noted on the contract drawings. Pipe may be furnished in 12, 16, or 18 foot lengths. The centrifugally cast pipe shall conform to the American Standard Specification A21.6-1952 and all subsequent amendments thereto.

When noted on the contract drawings ductile iron pipe shall be supplied. All ductile iron pipe shall be manufactured in accordance with A.S.A. A21.51 or Federal Specification WWP-421B. All ductile iron fittings shall be manufactured in accordance with A.S.A. A21.10 or AWWA C 100-55. Ductile iron shall have a minimum of 60,000 psi ultimate tensile strength, 40,000 psi yield point and 10% elongation. The chemical analysis shall be as follows: Carbon 3% minimum, Phosphorus .08% maximum and Silicon 2.75% maximum. The thickness of the centrifugally cast ductile iron pipe and cast iron pipe shall conform to the following:

| CAST IRON PIPE | | | | DUCTILE IRON PIPE | | | |
|---|---|---|---|---|---|---|---|
| SIZE | WORKING PRESSURE | STANDARD THICKNESS | CLASS | SIZE | WORKING PRESSURE | STANDARD THICKNESS | CLASS |
| 4" | 250 psi | .44" | 24 | | | | |
| 6" | 250 psi | .48" | 23 | 6" | 350 psi | .43" | 6 |
| 8" | 250 spi | .52" | 23 | 8" | 350 psi | .45" | 6 |
| 10" | 250 psi | .56" | 23 | 10" | 350 psi | .47" | 6 |
| 12" | 200 psi | .56" | 23 | 12" | 350 psi | .49" | 6 |
| 12" | 250 psi | .60" | 23 | 16" | 350 psi | .52" | 6 |
| 16" | 200 psi | .63" | 23 | | | | |
| 16" | 250 spi | .71" | 23 | 24" | 350 psi | .56" | 6 |

All fittings, such as bends, tees, crosses, offsets, hydrant branches, etc. shall have bell and bell or bell and spigot ends with cast lead joints, pipe between offsets or bends and on hydrant branches, shall also be of bell end spigot type with lead joints.

(C) - All pipe shall have bell and spigot ends for lead joints or a slip-on type joint with compressed rubber ring inserts. All pipe and fittings shall be cement lined, unless otherwise noted on Contract drawings.

(D) - Gaskets shall be of rubber or other equally effective protection against uneven distortion of the gasket.

(E) - Where fittings are shown which are not covered by the above specifications, they shall conform to the dimensions and otherwise meet the specifications for the respective type which are carried in the latest revisions to the current edition of the "Handbook of Cast Iron Pipe" by the Cast Iron Pipe Research Association or which are otherwise shown on the contract drawings.

(F) - Wherever changes in line and grade of the main as shown on the drawings are not standard fitting deflections, the Contractor will be permitted to submit details using combinations of standard fittings and small deflections (not to exceed a maximum of one half (½) inch joint opening) in the adjoining lengths of pipe. Pipe to be installed with air cocks or drains shall be cast with bosses thereon, drilled and tapped for two (2) inch connections and plugged in the shop with cast iron threaded plugs before shipment.

(G) - Plugs for bell and spigot pipe and caps for lugged pipe shall be furnished with two (2) plugged two (2) inch taps for drain and air cock connections.

(H) - Closure pieces shall be accurately measured and cut in the field and installed using solid type pattern sleeves as shown or as required.

(I) - Tests, inspection, reports and analyses of tests of samples for all materials shall be furnished as set forth elsewhere in these notes.

(J) - Bitumastic coating shall be applied on the exterior of all cast iron pipe and fittings in accordance with AWWA Specifications.

CEMENT LINING

All cast iron or ductile iron pipe and fittings shall be given a double cement mortar lining at the point of manufacture. The lining shall conform to the American Standard Specification A 21.4-1964 and all subsequent amendments thereto.

MARKING

All cast iron or ductile iron pipe and fittings shall be suitably marked to denote the manufacturer, class, date, weight and other elements of identification.

LAYING

(A) - Proper and suitable tools and appliances for the safe and convenient handling and laying of the pipes and fittings shall be used. Great care shall be taken to prevent the pipe coating from being damaged particularly on the inside of pipes and fittings and any such damage shall be remedied as directed. All pipes and fittings shall be carefully examined by the Contractor for defects just before laying and no pipe or fitting shall be laid which is known to be defective.

(B) - If any defective pipe is discovered after having been laid, it shall be removed and replaced with a sound pipe or fitting in a satisfactory manner by the Contractor at his own expense. All pipes and fittings shall be thoroughly cleaned before they are laid, shall be kept clean until they are used in the completed work, and when laid, shall conform to the lines and grades given by the Engineer. Open ends of pipes shall be kept plugged with a bulkhead during construction. In no event shall any portion of the damaged pipe be permitted to remain in the line. Any approval stamps found on damaged pipe shall be removed or the pipe broken up for scrap.

(C) - Pipe laid in trench shall be laid to a firm and even bearing for its full length. Precautions shall be taken against floating.

MADE ERH DATE 3/30/74
TRACED DATE
CHECKED ERH DATE 2 Aug 74
SCALE None

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND OHIO

HNTB

APPROVED _____ DATE JAN 9, 1975

William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITIES
DIVISION OF UTILITIES ENGINEERING
CLEVELAND, DIVISION OF WATER AND HEAT OHIO
Subject: WATERWORK FOR THE CITY OF CLEVELAND

# WATERWORK NOTES AND DETAILS

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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

## CAST IRON AND DUCTILE IRON PIPE AND FITTINGS

LAYING (CONTINUED)

(D) - It is the intention of these specifications to secure first class workmanship in the placing of pipe and accessories. In such details as are not specifically mentioned herein or called for on the drawings, the Contractor will be required to conform with the applicable sections of the latest "Standard Specifications for Laying Cast Iron Pipe" as adopted by the American Water Works Association.

CUTTING PIPE

Whenever the pipes require cutting to fit into the lines, the work shall be done in a satisfactory manner so as to leave a smooth end at right angles to the axis of the pipe.. In no event shall flame cutting be used. When a piece of pipe is cut to fit into the line, no payment will be made for the portion cut off and not used in the line.

LEAD JOINTS

In jointing all bell and spigot pipe and fittings having lead joints, the spigot of each pipe shall be properly seated in the bell of the next adjacent piece and adjusted so as to give a uniform annular space. The joint shall be made with twisted hard jute and soft pig lead. Before placing the jute, it shall be sterilized either by boiling or by dipping in a concentrated solution of "HTH". The jute shall be twisted and thoroughly driven into the bell, so that the lead, after having been caulked, shall have a depth of two and one-half (2½") inches.

The furnace and melting pot shall be kept near the joint to be poured and each joint shall be made with one pouring. Dross shall not be allowed to accumulate in the melting pot. The joints shall be thoroughly caulked by competent pipe joiners and in such manner as will secure a tight joint without overstraining the iron of the bell.

RESTRAINED JOINTS

Where lugged or restrained joints are used in place of bell and bell or bell and spigot joints for cast lead joints as indicated or shown of the drawings, the contractor shall supply pipe and fittings having lugged joints or positive restrained compression locked joint in push-on or slip-on joint. Lugged joints shall in all respects, comply to the Standard AWWA Specifications and dimensions for the class of pipe and fittings specified. Positive restrained compression locked joint in push-on or slip-on joint shall have ends with positive compression locked joint in push-on or slip-on joint providing a restrained flexible joint using corrosion resistant locking so as to provide a minimum of stress in the joint, but providing a minimum of 400 pounds per inch of pipe circumference resistance to separation of joint.

Locking grooves or slots will be allowed in plain end of pipe or fitting. Thickness of pipe of fitting should not be reduced to less than that for:

1) USAS A21.6 (AWWA C106) Class 22 for Cast Iron Pipe.
2) USAS A21.5 (AWWA C151) Class 4 for Ductile Iron Pipe.

All bolt dimensions and other features shall strictly comply with those which have been established under the American Water Works Association Standards. Drawings shall be furnished in accordance with Article C-4 fully and distinctly illustrating and describing and giving complete layout and assembly direction for the joint to be furnished. Approval of the Director will be required.

All bolts and nuts shall be of the same quality as provided above for flanged joints.

PAINTING

After erection, all exposed or damaged coatings and all bolts for flanges, lugged joints and Victaulic couplings shall be cleaned and painted with three (3) field coats of Inertol 50 or Bitumastic 50 or equivalent.

DRAWINGS

(A) - The Contractor shall submit to the Engineer for approval duplicate prints of all shop drawings for pit cast iron pipe and fittings and miscellaneous details which are not standard construction, and are not mentioned in the regular catalogue of the company furnishing the pipe. No work shall be done in the shop until after the drawings have been approved.

(B) - The approval of the drawings by the Engineer shall not relieve the Contractor of any of his obligations in connection with this contract.

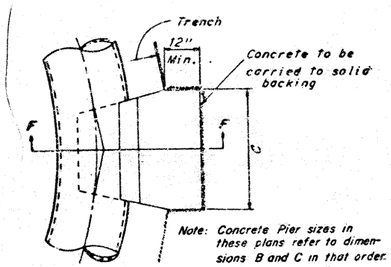
MEASUREMENT

The number of linear feet of cast iron pipe and ductile iron pipe and connections to be paid for shall be the actual number of linear feet furnished and placed in accordance with these specifications as measured along the axis of the piping including fittings and valves connected up in place. For connections between new and existing mains, measurement shall be the distance from centerline to centerline of mains and the actual length of existing main ordered to be removed to make the connection.

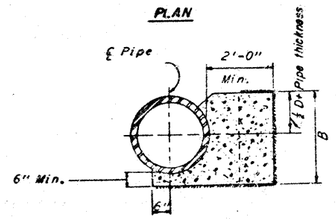
PAYMENT

The footage measured as provided above shall be paid for at the contract price bid per linear foot for "Item Special - Water Main" Classified as to size and type, which price and payment shall constitute full compensation for excavating and for furnishing, hauling, placing, cutting into and connecting the pipe, pipe bends, plug and clamps at dead ends, concrete piers, sheeting and bracing, sand backfill, water used for compaction, incidental concrete, the removal of all surplus excavation and discarded material, repaving, and for all labor, equipment, tools materials and incidentals necessary to complete this item.

The chlorination of the newly laid water mains by the City of Cleveland, Division of Water, which is described under "General - Additional Work - (C) Chlorination", will be at the expense of the Contractor.

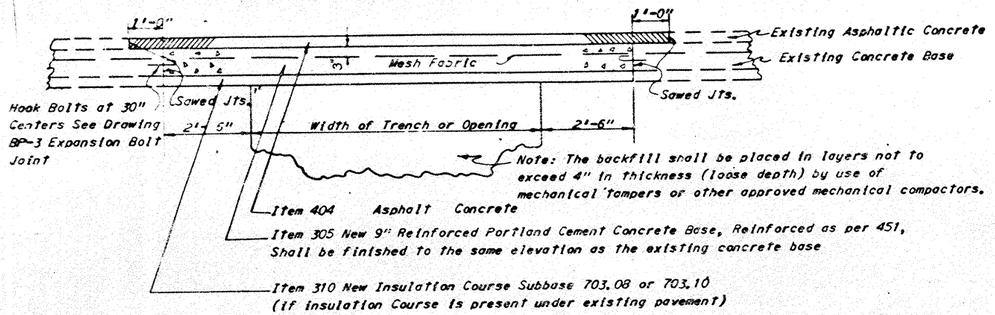



PLAN




## CONCRETE PIER FOR HORIZONTAL BENDS AND BRANCH TEES

Note: Concrete shall be Class "C" in accordance with Ohio Department of Transportation "Construction and Materials Specification 499".




Note:
This Standard is applicable to existing concrete pavement or existing pavement with concrete base surfaced with asphalt.

Existing joints shall be preserved or restored

REPAIR OF RIGID PAVEMENT OPENINGS

## PAVEMENT RESTORATION DETAIL

APPROVED _____ DATE JAN. 5, 1975.

William J. Sweeney
ENGINEER OF DESIGN REVIEW

MADE E.C.H. DATE 3-'74
TRACED MET DATE 3-'74
CHECKED ECH DATE 3-'74
SCALE NOT

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND OHIO
HNTB

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF UTILITIES ENGINEERING
CLEVELAND, DIVISION OF WATER AND HEAT OHIO
Subject: WATERWORK FOR THE CITY OF CLEVELAND

QUANTITY CALCULATIONS
MADE BY ERH DATE 10Dec74
CHECKED BY JNS DATE 11 Dec 74

| FHWA REGION | STATE | PROJECT | |
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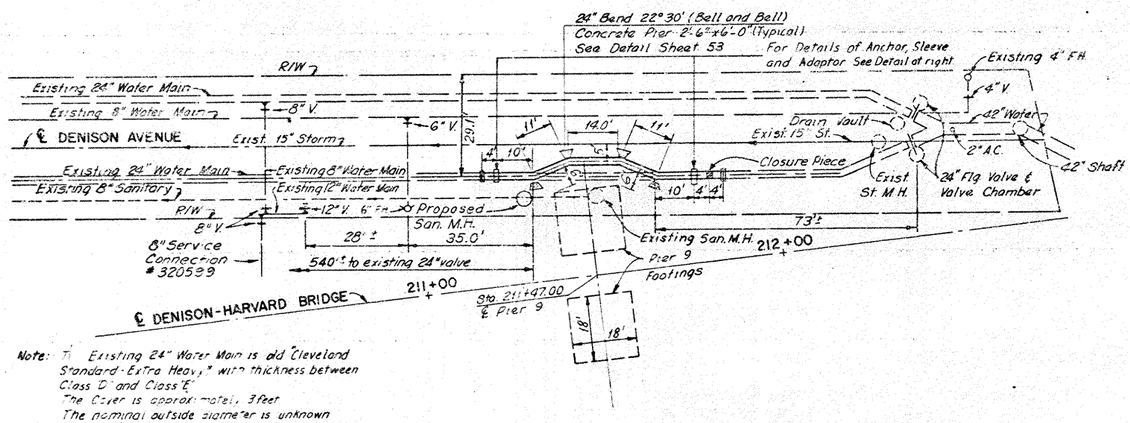
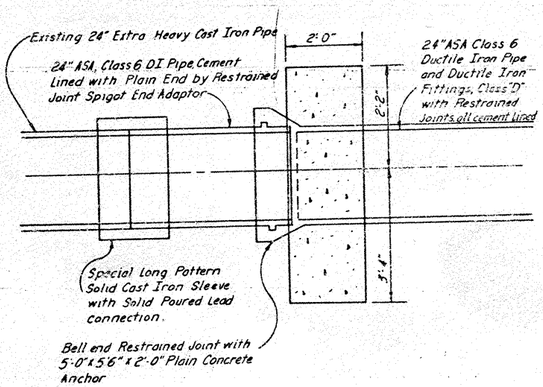
CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




Note: The Existing 24" Water Main is old Cleveland Standard "Extra Heavy" with thickness between Class D and Class E.
The Cover is approximately 3 feet
The nominal outside diameter is unknown
The Contractor shall expose the pipe and measure size before ordering any connecting pieces or Sleeves.




## PIPE JOINT DETAILS

PLAIN END BY RESTRAINED JOINT ADAPTOR WITH CONCRETE ANCHOR
NO SCALE

Note: West end connection shown; for East End Connection reverse drawing. The East End should also include closure piece between the sleeve and the bell end restrained joint.

Note: Concrete shall be Class "C" in accordance with Ohio Department of Transportation "Construction and Materials Specification 453"

### ESTIMATED QUANTITIES

| ITEM | DESCRIPTION | QUANTITY | UNIT |
|---|---|---|---|
| | | | |
| Special | 24" Water Main ASA Class 6 Ductile Iron Pipe and Ductile Iron Fittings Class "D" with Restrained Joints, Cement Lined | 68 | Lin. Ft. |
| | | | |
| | | | |
| | | | |
| | | | |

CONSTRUCTION PROCEDURE

The Contractor shall notify the Division of Utilities Engineering (3) weeks prior to starting work. Telephone 694-3346

The water work in Denison Avenue must be installed and in service prior to any work on the footings for Pier No. 9 of the proposed Denison-Harvard Bridge.

The sequence of construction for the proposed 24" water main relocation in Denison Avenue is as follows:

1. Construct the new 24" water main to points shown on the plans. Prepare for testing.
2. Chlorination and testing of the new water main shall be under the supervision of the Division of Water and Heat.
3. After chlorination and testing the new water main may be connected.
4. Close the existing 24" valves:
   a. Sta. 205+88, 88' Lt. ℄ Proposed Denison-Harvard Bridge, which valve is also 10' south of the ℄ of existing Denison Avenue in the westerly of vacated Belt Line Street.
   b. Sta. 212+40, 25' Lt. ℄ Proposed Bridge, which valve is also 15' westerly and 22' southerly from an existing 4" Fire Hydrant in Denison Avenue.
5. Close the existing 12" valve at Sta. 210+70, 28' Lt. ℄ Proposed Bridge, which valve is also 12'-1" east of the 8" service connection (320599) to the Harshaw Chemical Company.
6. After the new water main is connected, open valves Items 4a, 4b, and 5 to restore service.
7. The Division of Water and Heat Personnel will open and close all valves.
8. Abandoned pipe not removed shall be filled with sand and ends plugged with concrete.

APPROVED _____ DATE JAN. 3, 1975

William L. Lucente
ENGINEER OF DESIGN REVIEW

MADE ERH DATE 31Dec74
TRACED WET DATE 10Dec74
CHECKED ERH DATE 10Dec74
SCALE 1"=40'

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF UTILITIES ENGINEERING
CLEVELAND DIVISION OF WATER AND HEAT OHIO
Subject: WATERWORK FOR THE CITY OF CLEVELAND

24" WATER MAIN RELOCATION IN DENISON AVENUE

# GENERAL NOTES - STRUCTURES OVER 20-FT SPAN

| FHWA REGION | STATE | PROJECT | |
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| 5 | OHIO | | |

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CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

1. DESIGN SPECIFICATIONS

This structure conforms to "Standard Specifications for Highway Bridges" adopted by the American Association of State Highway Officials, 1973, and the Ohio "Supplement" to the 1965 specifications. The design loading is HS 20-44.

The class of concrete and grades of structural steel and reinforcing steel, together with the working stresses for each are as follows:

Concrete Class C - Unit stress 1200 p.s.i. for superstructure
Unit stress 1333 p.s.i. for substructure

Structural Steel - ASTM A588
Unit stress 27,000 p.s.i.
ASTM A237, Class B - Minimum Yield Point 55,000 p.s.i.
ASTM A296, Class CA-15-Minimum Yield Point 65,000 p.s.i.

Reinforcing Steel -ASTM A615, A616 or A617 - Unit stress 20,000 p.s.i.

2. SUPPLEMENTAL SPECIFICATIONS

Reference shall be made to Supplemental Specifications No. 805, Rubberized Sand - Asphalt, dated 1-1-71, No. 808, Chemical Admixture for Concrete, Type A, B or D, dated 1-1-71, No. 836, Concrete Curing and Protective Membrane, dated 1-1-71, and No. 903, Rubber Compound, dated 1-1-69.

3. REFERENCE DRAWINGS

Reference shall be made to Standard Drawings RB-1-55 revised 2-2-59, BR-2-67, revised 10-15-71, AS-1-72, dated 6-30-72 (Sheets 1 and 2) and to SD-1-69, dated 6-12-69 (Sheet 3 of 4).

4. DIMENSIONS

Dimensions given are measured horizontally and at 60° F., unless otherwise noted.

5. UTILITIES

Any existing privately owned utility facilities encountered at the site of the work which will interfere with portions of the finished roadways or structures shall be removed or replaced by the Owner unless otherwise noted on the plans. All expenses involved in relocating the affected utility lines shall be borne by the Owner. The Contractor and Owner are requested to cooperate by arranging their work in such a manner that inconvenience to either would be held to a minimum.

6. CONCRETE DECK

A. The steel beams and girders shall be fabricated with camber, as specified on the plans, to compensate for the deflections due to weight of concrete, steel and wearing course and for vertical curvature and superelevation of the roadway. The theoretical deflections are tabulated on the plans.

B. The final surface of the roadway shall confrom to the elevations shown on the plans. To compensate for deflections due to dead load of the concrete and wearing course, the screeds used to strike off the surface of the concrete to the final desired grade line shall be adjusted by amounts equal to deflections shown for this dead load. Screeds may require further adjustments due to irregularities in the fabricated steel. The theoretical top of portland cement concrete elevations at the gutter lines before the deflections from the concrete and the wearing course have occurred are tabulated in the plans.

C. The depth of concrete over each beam or girder (top of concrete to top of flange or top of web) at the supports is given on the plans. The concrete slab shall be of uniform thickness between beams or girders with adjustments obtained by varying the thickness of the haunches over the beams or girders.

D. The aforementioned depth of concrete over each beam or girder is the design dimension. The quantity of deck concrete to be paid for shall be based upon this dimension, even though deviation from it may be necessary because the top flange may not have the exact camber or conformation to place it parallel to the finished grade. Deduction shall be made for the volume of encased steel plates as per Section 511.18.

7. SEQUENCE OF PLACING DECK CONCRETE

The concrete in the deck of Units 2 and 4 shall be placed prior to placing the deck of Units 1 and 3. The placing of concrete shall proceed with a minimum of 3 spans of deck forms in place ahead of a given pour.

Blockouts shall be provided in the concrete deck, 5 ft. on each side of the Expansion Joints. Set seat area for the Elastomeric Expansion Seal after the deck (with the exception of the blocked out areas) is poured on each side of the joint. Attach the end dam material parallel to the deck surface and complete the pours in the blocked out areas.

8. REINFORCING STEEL

A. All bars are designated on the plans by bar numbers. The bar size is indicated by the first digit of three-digit numbers and the first two digits of four-digit numbers.

All bar dimensions are given out to out.

All bars of a series shall vary in length by a constant increment.

B. The clear distance between reinforcing steel and face of concrete shall be 3" in footings and in the piers, 2½" in the bar mats under shoes and 2" elsewhere unless otherwise noted on the plans.

9. BEARING DEVICES

Bearing devices shall be set in accordance with Item 516.05. Units numbered 1, 2 and 3 have three fixed piers. The fixed bearings at these piers shall be so placed that when the bridge is completed and at 60°F. the centerline of bearings will align with both girder bearing stiffeners and the pier centerlines of bearing. If the steelwork is erected at temperatures other than 60°F., adjustments will be required to insure correct longitudinal alignment of the bearings. The method of adjustment used shall be approved by the Director.

10. ITEM 401 - PLANT MIX PAVEMENTS - GENERAL, AS PER PLAN

All applicable provisions of "Item 401 Plant Mix Pavements - General" as set forth in the Construction and Materials Specifications shall apply except as noted herein.

A. Materials

The bituminous material shall be an AC-20, meeting AASHO M226 except that the penetration at 25°C (77°F), 100g., 5 Sec. shall not be less than 60. The coarse aggregate for an asphalt concrete course shall be crushed carbonate stone or crushed air-cooled slag, and shall meet the requirements of 703.05.

B. Weather Limitations

The contractor's field representative shall keep the Plant informed of unfavorable weather conditions. If, in the opinion of the Engineer, the weather conditions are such that they do not warrant a satisfactory performance of the work, he shall notify the contractor's field representative to stop delivery. The Plant, immediately upon receipt of the notification, shall stop the loading of the Asphalt Concrete. If the weather is such that steaming and other conditions occur which, in the opinion of the Engineer, prevent proper spreading and finishing, or will cause stripping, the Asphalt Concrete on trucks already on the project or in transit shall not be spread.

No asphalt concrete shall be placed when the air temperatures are below those stated in Section 401.05 except by specific permission of the Engineer. If the Engineer grants this permission it will be only under certain specific rigid requirements pertaining to spreading, finishing, compacting, bonding, and temperature control.

C. Joints

Longitudinal and transverse joints, in any course, shall be so constructed that they will be offset a minimum of 4" from the joint in the course below it.

11. ITEM 402 - ASPHALT CONCRETE, AS PER PLAN

All applicable provisions of "Item 402 Asphalt Concrete" as set forth in the Construction and Materials Specifications shall apply except the elapsed time between application of the Tack Coat, Item 407, and the Asphalt Concrete shall be established by the Engineer and 402.02 shall be modified as follows:

Coarse aggregate (No. 57) and fine aggregate shall be combined in such proportions that the resulting blend shall be as directed by the Laboratory but within the following limits.

| Sieve | Total Passing-% by Wt. |
|---|---|
| 1½ inch | 100 |
| 1 inch | 95-100 |
| ½ inch | 50-80 |
| No. 4 | 25-60 |
| No. 6 | 20-52 |
| No. 50 | 3-20 |
| No. 200 | 0-5 |

Bitumen content shall be as directed by the Laboratory within the following limits:

Bitumen (Percent of Total Mix) 4.0 to 8.5
Asphalt Cement . . . . . 702.01 AC 10 or AC 20 as directed by the Engineer. When AC 20 is used the penetration at 25°C (77°F) 100g., 5 Sec. shall not be less than 60.

12. ITEM 404 - RUBBERIZED ASPHALT CONCRETE, AS PER PLAN

All applicable provisions of "Item 404 Asphalt Concrete" as set forth in the Construction and Materials Specifications shall apply except as modified herein, and the following shall be considered supplemental to the provisions set forth therein.

A. Description

This work shall consist of constructing a surface course of aggregate and rubberized asphalt cement mixed in a central plant and spread and compacted on a prepared surface, in accordance with these specifications and in reasonably close conformity with the lines, grades and typical sections shown on the plans or established by the Engineer.

The general plant mix pavement specifications 401, as Per Plan, shall apply with deviations as noted herein.

B. Composition

Coarse aggregate (No. 8) and fine aggregate shall be combined in such proportions that the resulting blend shall be as directed by the Laboratory, but within the following limits:

| Sieve No. | Total Passing, % by Wt. |
|---|---|
| ½ inch | 100 |
| ⅜ inch | 90-100 |
| No. 4 | 45-75 |
| No. 6 | 35-65 |
| No. 50 | 3-22 |
| No. 200 | 0-8 |

The combined asphalt cement and rubber solids content shall be as directed by the Laboratory within the following limits.

Asphalt cement and rubber solids (percent of total mix), 4.5 to 9.5.

The quantity of asphalt cement and rubber compound shall be as required to produce a composition of 95 plus or minus 0.3 percent asphalt cement to 5 plus or minus 0.3 percent rubber solids by weight.

The finished mix shall contain no materials other than the approved aggregate, asphalt cement and residual rubber solids.

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GENERAL NOTES

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN C.K.B. | TRACED C.P. | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DATE 3-13-74 | DATE 3-15-74 | DATE 3-8-74 | DATE | SHEET GN 1 |

# GENERAL NOTES - STRUCTURES OVER 20-FT SPAN

| FHWA REGION | STATE | PROJECT | |
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12. ITEM 404 - RUBBERIZED ASPHALT CONCRETE, AS PER PLAN (Cont'd.)

C. Materials

Coarse Aggregate. Crushed carbonate stone or crushed air-cooled slag meeting the quality requirements of 703.05.

Fine Aggregate. Natural sand meeting the quality requirements of 703.05.

Asphalt Cement . . . . . 702.01 AC-10 or AC-20 as directed by the Engineer. When AC-20 is used the penetration at 25°C (77°F) 100g., 5 Sec. shall not be less than 60.

Rubber Compound . . . . . 903

The rubber solids content of the rubber compound shall be certified to the Laboratory prior to start of production.

D. Mixing Plants

Means shall be provided for proportioning the rubber compound into the mixer.

E. Weather Limitations

Rubberized asphalt concrete shall not be placed between October 1st and June 15th except by special permission of the Engineer.

F. Bituminous Material Preparation

The bituminous material shall be heated and delivered to the mixture within a temperature range required to produce a mixture that when discharged from the mixer will be within 335F to 370F. Bituminous material shall not be used while foaming.

. Mixing

The coarse and fine aggregate shall be mixed dry for not less than 15 seconds. Asphalt cement shall then be added in an evenly spread sheet over the full length of the mixer box and the mixing continued for a period of not less than 10 seconds and at least until aggregate is completely coated with bitumin. Rubber compound shall then be added to the coated aggregate and the mixing continued for a period of not less than 50 seconds. The length of dry mixing and wet mixing periods may vary, but under no circumstances shall the total mixing time or interval of time between the opening of the weigh box gate and the opening of the mixer gate be less than 80 seconds. The rubber compound shall be so dispersed in the asphalt of the paving mixture that there will be no remaining black rubbery particles visible to the naked eye when the mixture is tested in accordance with method 1012 on file in the Laboratory. The Rubber Compound manufacture's technical representative shall be present in order that he can observe the mixing of the asphalt cement and rubber compound. The temperature of the mixture when discharged from the mixer shall be 335F to 370F as required for good workability.

H. Spreading and Finishing

The mixture shall be spread in accordance with the thickness shown on the Plans.

Traffic shall not be permitted on the compacted mixture until it has cooled sufficiently to prevent glazing as determined by the Engineer.

I. Method of Measurement

Conversion weight to cubic yards shall be 3650 pounds.

J. Basis of Payment

The accepted quantities of rubberized asphalt concrete, complete and in place, will be paid for at the contract unit price per cubic yard for "Item 404 Rubberized Asphalt Concrete, As Per Plan".

13. ITEM 407 - TACK COAT, AS PER PLAN

All applicable provisions of "Item 407 Tack Coat" as set forth in the Construction and Materials Specifications shall apply except as modified herein.

The tack coat shall consist of a blend of bituminous material and rubber compound. The bituminous material shall be an asphalt emulsion meeting the requirements of 702.04, Type SS-1, MS-2, RS-1 or RS-2, as directed by the Engineer. The rubber compound shall be a synthetic latex in the liquid form and shall meet the requirements of Supplemental Specification No. 903.

The rubber compound shall be added to the asphalt emulsion in the distributor in the ratio of 95± 0.3 residual asphalt to 5± 0.3 percent rubber solids by weight. It shall then be circulated through the distributor until a uniform mixture is obtained. A technical representative of the rubber compound manufacture shall be present in order that he can observe the mixing of the asphalt emulsion and rubber compound. The rubberized asphalt emulsion shall be applied at the rate of 0.10 gallon per square yard and in accordance with 407.05.

14. ITEM 511 - CONCRETE SIDEWALK WEARING COURSE, AS PER PLAN

All applicable provisions of Item 511 as set forth in the Construction and Material Specifications shall apply, unless modified herein, and the following shall be considered as supplemental to the provisions set forth therein.

A. Description

This work shall consist of constructing a Portland Cement Concrete Sidewalk Wearing Course in reasonably close conformity with lines, grades and dimensions shown on the plans or established by the Engineer.

B. Materials

The materials shall conform to the following:

| | |
|---|---|
| Concrete (Class C) | 499 |
| Reinforcing Steel | 709.10 |
| Joint Sealer | 705.01 or 705.02 |
| Curing Compound Materials | 451.02 as per plan (See Pavement General Notes) |

C. Placing and Finishing

The concrete shall be deposited in a single layer. It shall be struck off with a template and smoothed with a float to produce a sandy texture. No plastering will be permitted. The surface shall be divided onto equally spaced blocks with transverse joints approximately 5'-0" on center. All transverse joints shall be filled with joint sealer in accordance with 516.06. The surface shall have a transverse slope of ¼ inch per foot, with the low side adjacent to the roadway. The reinforcing shall be 6x6 - 6/6 welded wire fabric placed in accordance with 509.

D. Curing

Exposed surfaces of the concrete sidewalk wearing course shall be cured as required in 451.10, using the curing compound specified in materials above. When the weather conditions are such that it is impractical to use the curing compound, other means for curing concrete may be used, however after conditions become favorable, the curing compound shall then be applied. Resin base curing compounds will not be permitted.

E. Waterproofing

The base slab for the concrete sidewalk wearing course shall be waterproofed in accordance with "Item 512 Concrete Deck Waterproofing, as Per Plan".

F. Method of Measurement

The sidewalk wearing course will be measured by the square feet of finished surface, complete and accepted in place.

G. Basis of Payment

The accepted quantities of concrete sidewalk wearing course, complete and in place, will be paid for at the contract unit price per square foot for Item 511 "Class C Concrete Wearing Course, As Per Plan". Reinforcing steel, joints and joint materials, curing compound, waterproofing, and other related miscellaneous items will not be paid for separately, but the cost thereof shall be included in the cost of the concrete sidewalk wearing course of which they are a part.

15. ITEM 512 - CONCRETE DECK WATERPROOFING, AS PER PLAN

All applicable provisions of Item 512 as set forth in the Construction and Material Specifications shall apply, unless modified herein, and the following shall be considered as supplemental to the provisions set forth therein.

A. Description

This item consists of furnishing the necessary labor, material and equipment required to apply two coats of an approved Rubber Sealing Compound Waterproofing in accordance with these specifications. The material shall be applied with suitable brushes. Care shall be taken to prevent dripping or running of the material beyond the areas to be waterproofed.. Concrete surfaces not covered with the waterproofing shall be protected from the spilling or otherwise marring the surface with the material.

B. Materials

The materials used shall be a non-aqueous one-part non-bituminous solution of uncured pigmented virgin nitrile rubber and resins sealing compound and a suitable thinner which will form an elastic and adhesive coating resistant to salt, water, gasoline and petroleum oils as manufactured by the following companies and meeting all aspects of these specifications.

| Manufacturer | Product |
|---|---|
| Firestone Tire and Rubber Co. | Rubber Sealing Compound - R-526<br>Thinner R-607 |
| Goodyear Tire and Rubber Co. | Rubber Sealing Compound - Pliopave L-30<br>Thinner-Methyl Ethyl Ketone |

Additional Requirements:

| | |
|---|---|
| Specific Gravity | 0.89 to 0.93 incl. |
| * Color | Light Grey or Tan |
| Viscosity (Brookfield, 77°F., cps) | 750 to 2000 incl. |
| Flash Point | 25°F. plus |
| Solids Content, (% by weight) | 24 to 27 incl. |

* The material shall be shaded in such a manner that will give adequate contrast between the first coat and second coat to assure that all areas of the deck have been properly coated with the second coat.

C. Test Certification

The Contractor shall provide a Certified Laboratory Test Report from a reliable Testing Laboratory indicating that the material he proposes to furnish will meet the requirements of these specifications. In addition, he shall submit in writing evidence that this material has been used for sealing and waterproofing concrete surfaces on structures and has performed satisfactorily for at least 5 years.

The Manufacturer shall also submit a quart sample of the Rubber Sealing Compound and a quart sample of the Thinner to the Testing Laboratory of the Ohio Department of Transportation at least one month prior to the time it is expected to be used.

The Director reserves the right to use any additional information or perform any tests deemed necessary to determine whether or not the Rubber Sealing Compound conforms to the requirements of this specification and is suitable for the purpose intended.

D. Preparation of Surface

Surfaces to be waterproofed shall have all projections dressed off, and the outside film of cement, together with all dirt removed with wire brushes and then washed off with clear water. If any grease or oil is present on the concrete surface, it shall be removed by scraping and washing with a suitable solvent and/or muriatic acid and then thoroughly flushed with clear water. No primer coat is required. The prepared surface shall be kept clean of all foreign material until the waterproofing is applied.

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GENERAL NOTES

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

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# GENERAL NOTES - STRUCTURES OVER 20-FT SPAN

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15. ITEM 512 - CONCRETE DECK WATERPROOFING, AS PER PLAN (Cont'd.)

E. Application of Waterproofing

The concrete shall be thoroughly dry before the Rubber Sealing Compound is applied. The minimum air temperature shall be not less than 50°F. The temperature of the surface to be waterproofed shall also be observed and reported to the Engineer. The Engineer shall determine if the surface temperature is appropriate to receive the waterproofing material. The waterproofing material shall not be heated and precautions shall be taken to avoid fire hazard when using the materials.

(a) First Coat - The material used shall be a 50/50 mixture of the Rubber Sealing Compound and Thinner. It shall be applied uniformally at the minimum rate of 0.10 gal. per square yard using suitable brushes and permitted to cure for at least two hours and until free from tackiness or any tendency to stick to shoes before applying the second coat.

(b) Second Coat - The material used shall be the Rubber Sealing Compound undiluted. It shall be applied uniformly at the minimum rate of 0.15 gal. per square yard using suitable brushes. The waterproofing shall be permitted to cure overnight. No traffic or further work shall be permitted on the waterproofed deck until the end of the required curing period and until, in the opinion of the Engineer, the cured membrane has acquired sufficient strength to support necessary equipment without rupturing.

(c) Patch Coat - If the surface is not satisfactory after application of the second coat, due to bubbles, holes, or insufficient thickness, or the cured membrane is damaged for any reason, additional sealing compound shall be applied as directed by the Engineer.

The Contractor shall avoid placing any unnecessary equipment or store any materials on the cured membrane. He shall proceed with the application of the tack coat and asphaltic wearing course on the roadway portion of the deck as soon as practicable without any unnecessary delays.

F. Manufacturer's Representative

The Rubber Sealing Compound manufacturer's technical representative shall be notified in order that he can provide the Engineer with recommended procedures and he shall also be present during the initial installation of the waterproofing and subsequent application of the tack coat and wearing surface.

G. Method of Measurement

The quantity of Rubber Sealing Compound Waterproofing to be paid for shall be the number of square yards complete and accepted in place.

H. Basis of Payment

The waterproofing measured as above provided shall be paid for at the contract unit price per square yard, which price shall be payment in full for furnishing all materials, labor and equipment for preparing the concrete surface and applying the coatings at the required rate.

Payment will be made under:

| Item | Units | Description |
|---|---|---|
| 512 | Square Yards | Concrete Deck Waterproofing, As Per Plan. |

16. ITEM 518, SUBDRAINAGE FOR SURFACE COURSE, AS PER PLAN

The subdrainage system shall consist of 1" ϕ plastic tubes or 1½-inch copper water tubes complying with the dimensions and weights of ASTM B88. Tubes shall be placed vertically in the slab, depressed ¼ inch below the top of the slab and projecting at least 1 inch below the bottom of the slab. They shall be placed with center of tubes 1 inch from face of curbs and spaced at approximately 6 foot intervals except that none are required along the high side of the portion of roadway that is superelevated. A tube shall be placed within one foot of each expansion joint. Wherever the discharge of water from these tubes, as specified above would drop on bridge seats or other structural members, the tubes shall be extended in such a manner as to cause the drip to be clear of such bridge seat or structural member. No tubes shall be placed over or within 4 feet of a pavement or sidewalk, or over or within 10 feet of the centerline of a railroad track. After the deck has been waterproofed, a steel angle, 1½ x 1½ x ¼ inches, shall be placed over the plastic tubes, with both legs down, forming a water course for the full length of the bridge. This element may be placed in convenient lengths with butt joints; care shall be taken to avoid displacing it as the surface course is placed. The price per linear foot of such drainage system shall include all tubes, steel angles, and labor, necessary to complete the item.

17. PAINTING STRUCTURAL STEEL

Structural steel shall not be painted except as noted elsewhere in the plans and except for the following items which shall be painted in accordance with Section 514: the curb plates, the end crossframes at the West Abutment, the access manhole to the cellular construction and all expansion joint material except steel parts under the elastomeric expansion joints and under sidewalk plate topping.

18. ELASTOMERIC COMPRESSION SEALS IN STRUCTURAL STEEL JOINTS

A. Description

These provisions are for the production, fabrication and installation control of elastomeric compression seals in structural steel joints.

B. Qualification

Each lot of compression seals, adhesives and metal surface primers furnished under these provisions shall be identified as specified, shall be products which have been tested by the Manufacturer or a Commercial Laboratory, and shall comply with these provisions.

C. Certification

Certified copies of the qualification test results for the adhesive and compression seals, indicating that the tested materials comply with these provisions, shall be submitted to the Testing Laboratory for approval. Sampling, if requested, will be in accordance with 106.03, except that where compression seals are prefabricated according to plan requirements, seal samples shall be made available prior to fabrication. From each lot and each project seal samples shall be one piece two feet long. Adhesive samples shall be one pint.

D. Acceptance

Material acceptance will be based upon laboratory evaluation of certified test results submitted, upon laboratory test of sampled material, or upon the evaluation of both certificates and tested samples.

E. Composition

Compression seals of the size, shape and tolerances shown on the plans shall be composed of an extruded vulconized elastomeric virgin polychloroprene material. The adhesive shall be a one-part moisture curing polyurethane and hydrocarbon mixture. The metal surface primer shall be Industrial Wash Primer P60G2 as manufactured by the Sherwin Williams Company of Cleveland, Ohio; Chemglaze Wash Primer 9924 as manufactured by the Hughson Chemical Company of Erie, Pennsylvania; or an approved equivalent.

F. Requirements

Except as provided herein, compression seals, adhesives and primers shall conform to the pertinent provisions of AASHTO M220.

(a) Compression seals shall be resilient and shall not soften excessively or become brittle between the temperatures of -30°F. and 160°F. They shall be furnished in one continuous piece or be prefabricated in the shop to fit the structural joint described in the plans. Cutting or stretching of the compression seals in the field to correct a misfit with the structural steel will not be permitted. Therefore, where prefabrication is necessary, the seal dimensions shall be qualified by templates which match the joint, or by preliminary shop assembly of the seal with the actual structural joint.

The seal fabricator shall also furnish seal end closures permanently fastened or vulconized to the ends of all deck joint seals. These closures shall be designed to prevent the entrance into the seals of precipitation, surface drainage or roadway debris. Such closures shall not detrimentally affect the compressive behavior of the seals or the integrity of the joint. Provisions shall also be made in the closure design to ventilate all seal compartments to insure that air pressure equilibrium is maintained throughout all compression-expansion cycles.

The adequacy of the closure devices shall be established by test. A sample compression seal with a closure device attached to each end shall be capable of withstanding 500 cycles (40% compression ± 20% compression-expansion) at room temperature (70° ± 10°F) within a 24 hour period without visible distress to the seal or the closure devices.

Sharp changes in the alignment of deck joints or of the compression seals within such joints shall be made by miter cutting and adhesive bonding. Generally, such splices shall be made in the shop. However, field splices shall be made where specified on the plans or where directed by the Engineer.

At each roadway seal miter splice, several inches of internal webbing on each side of the splice shall be removed and replaced with a single snug fitting piece of closed cell foam reinforcement. Foam inserts and the adhesive used for bonding the inserts and the seal elements together shall be as recommended by the seal manufacturer for this purpose.

Provisions shall be made to ventilate seal sections which are located between foam reinforced splices. All chambers of the seal shall be ventilated through a bottom opening located at the lowermost point of the joint seal.

The splicing adhesive and the closed cell foam shall be compatible with the other materials specified herein, and they shall be compounded to furnish similar resistance and durability characteristics.

After completion, splices shall have no visible offset on exterior surfaces, and after installation, there shall be no evidence of bond failure at the splices.

(b) Adhesives shall be stored at temperatures between 50° to 80°F. and shall be used within 270 days after the date of its manufacture. The adhesive shall be homogeneous and conform to the following physical properties:

| | |
|---|---|
| Average weight per gallon | 8.00 lbs ± 10% |
| Solids content | 72-74% by wt. |
| The adhesive shall remain fluid from | 5° to 120°F. |
| Film Strength (ASTM D -412) | 1,200 psi |
| Elongation, min. at break | 350% |
| Stromer viscosity (77°F. 500 grm wt. at 200 rpm) | 300 to 4,200 cps |

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GENERAL NOTES

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# GENERAL NOTES - STRUCTURES OVER 20-FT SPAN

| FHWA REGION | STATE | PROJECT | |
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18. ELASTOMERIC COMPRESSION SEALS IN STRUCTURAL STEEL JOINTS (Cont'd.)

(c) Primers shall not be applied to steel surfaces which will be heated to a temperature in excess of 300°F. Consequently, where heat generating operations are required adjacent to bonded areas, the primer application shall be delayed until such work is completed unless the primed area can be maintained at lesser temperatures by the use of approved cooling procedures.

(d) The primer solvents and the solvents specified as cleaning agents in these provisions are volitile, combustible and, in some instances, irritating to the skin. Containers shall be kept tightly closed and away from heat and open flames. During application, all flames, welding and smoking shall be prohibited. Prolonged breathing of vapors and contact with the skin shall be avoided. In confined areas, ventilation shall be provided during application and drying.

G. Preparation

Prior to installing compression seals in structural steel joints, steel and seal surfaces which are to be bonded together shall be carefully and thoroughly cleaned to remove all rust, mill scale, dirt, and other contaminants which would be detrimental to bonding.

The bare steel surfaces shall be prepared to Grade SA 3, ASTM D-2200: galvanized steel surfaces shall be lightly sanded. Immediately after mechanical preparation the fresh surfaces shall be wiped with methy ethyl ketone, toluene, or other suitable solvent to remove all contaminant traces. They then should be coated with primer. Cleaned and uncoated steel surfaces should not be allowed to become wet. They are highly sensitive to moisture and any corrosion may make them unsuitable for coating. It is essential, therefore, that the primer be applied before the cleaned surfaces can be dulled by oxidation, a process which can occur very quickly in humid weather.

The primer shall be applied only to clean dry surfaces. Thickness of primer shall be approximately 1.0 mil wet film, 0.40 mil dry film. Care shall be taken to insure that the complete bonding area plus at least 1 inch width of adjacent metal surface area shall be primed for field adhesion. Steel shall be maintained dry and at a temperature of 50°F. or above during seal installation.

To improve adhesion, the glossy seal surfaces which are to be bonded shall first be cleaned with solvent using clean, disposable cloths and then buffed with belt sanders, wire brushes or grinders. Cleaning and buffing may be done in the shop provided that the cleaned seals are carefully wrapped to protect them from contamination prior to installation.

H. Installation

Seal installation preferably shall follow the priming operation as soon as practicable, but not sooner than two hours after primer application nor later than one week. Just prior to seal installation, the bonding surfaces of the seal and the primed steel shall be wiped with methyl ethyl ketone, toluene or other suitable solvent. If the primed steel surface has become contaminated with construction materials or other dirt and debris which cannot be removed without damage to the primer, the contaminated primer shall be removed and the steel surface cleaned and reprimed as originally specified.

To clean and dry primed steel surfaces, adhesive shall be applied to a thickness of 1/32 (-0, + 1/32) inch. Then the clean and dry elastomeric seal shall be compressed sufficiently so that it can be inserted and allowed to expand within the joint and against the adhesive coated sides. Care shall be taken to see that the clean and dry sides of the compression seal are not contaminated during installation. After installation, a small bead of adhesive, approximately 1/4 inch in diameter, shall be applied along the top edge where the seal touches the sides of the joint.

Adhesives shall be applied only to dry surfaces and only during periods when the temperature is 50°F. or higher. Since the adhesive is moisture curing, the completed installation need not be protected from precipitation.

The joint seal shall be installed with equipment designed specifically for the installation of elastomeric joint seals. This equipment shall not elongate the seal longitudinally, cause structural damage to the seal, nor twist, distort, or cause other malformations in the completed seal. Equipment that does not provide a properly installed seal shall not be used.

Portions of the steel joint not encased in concrete, not in contact with a compression seal, and not covered by adhesives shall be cleaned and painted in conformance with 514. Unless separately itemized, cleaning and painting shall be included with this item for payment.

J. Measurement

Payment for accepted quantities shall be based upon the actual number of linear feet of compression seals complete and in place. This payment shall include the cost of furnishing, cleaning and placing the compression seals, primers and adhesives, and all other incidentals necessary to complete this work according to the plans and this specification. The steel portions of the structural joints shall be included in Item 513, Structural Steel, for payment.

K. Payment

Payment will be made at contract price for:

| Item | Unit | Description |
|---|---|---|
| Special | Lin. ft. | 1" Preformed Elastic Joint Sealer |
| Special | Lin. ft. | 2 3/4" Preformed Elastic Joint Sealer |

19. STEEL REINFORCED ELASTOMERIC EXPANSION JOINTS

A. Description

This work shall include furnishing and installing steel reinforced elastomeric expansion joints for the bridge deck in accordance with the plans and specifications. The finished joint shall be in conformity with the lines and grades shown on the Plans or established by the Engineer. The seals shall be furnished in the form of prefabricated units.

B. Materials

(a) General - The Elastomeric Expansion Joints shall be made by an established manufacturer of these products and shall consist of an integrally molded unit of elastomer and bonded metal components, cast under pressure and heat, with the option of providing an integrally molded and bonded armored wearing surface.

(b) Elastomer - The elastomer portion of the Elastomeric Expansion Joint shall be of the compound known as neoprene, which shall have the following physical properties in accordance with ASTM Method D15, Part B:

| Test Method | Min. | Max. |
|---|---|---|
| Hardness, Durometer A - ASTM D2240 | 40 Points | 50 Points |
| Tensile Strength, Minimum p.s.i. ASTM D412 | 1,800 p.s.i. | --- |
| Elongation at Break, Min. Percent | 400% | --- |
| Compression Set, 22 Hours at 158°F. ASTM D395, Method B | --- | 20% |
| Low Temperature - ASTM D746 | Not Brittle at -40% | --- |
| Ozone Resistance, Exposure to 100 PPHM Ozone for 70 hours at 100°F. Sample under 20% Strain. ASTM D1149 | No Cracks | |
| Oil Deterioration, Volume increase after immersion in ASTM oil No. 3 for 70 hours at 212°F. ASTM D470 | --- | 120% |

(c) Adhesion - The neoprene to metal bond requirements shall be as follows:

Bond made during vulcanization D429B, pounds per inch minimum . . . . . 40

(d) Other Materials - Other materials used in manufacturing and installing the joints shall meet the following requirements:

| | |
|---|---|
| Structural Steel | ASTM A570, Grade C or ASTM A36 |
| Polyurethane Sealant | Federal Specification TT-S 00230 |
| Epoxy Grout | Federal Specifications MMM-B-350A for Binder and MMM-G-650A for Grout |

(e) Tolerance - Tolerance requirements shall be in accordance with Article 2.25.4 of the "Standard Specifications for Highway Bridges" adopted by the American Association of State Highway Officials.

C. Construction Methods

(a) Preparation of Joints - Expansion joints shall be of the materials and size specified on the plans. The joints shall be fastened to the structure by threaded steel studs welded to the steel armored joints installed in the concrete slabs. The threaded studs shall be located on the joint armor, using a template in the field after the adjacent deck slabs have been poured. Immediately before placement of the sealant, the joint armor shall be thoroughly cleaned by brushing, compressed air or other means so that it is free from dust, oil, grease or other foreign materials.

(b) Installation - A Manufacturer's Representative of the Elastomeric Expansion Joint product furnished shall be present at the site at the time of installation for the purpose of advising the Contractor and the Engineer as to appropriate installation procedures. The Contractor shall be responsible for the properly sealed installation of the joint material under the direction of the Manufacturer's Representative and shall report in writing to the Director any exception taken to procedures as recommended by the Representative.

Before installation is started, The Contractor shall determine how the units shall be placed. A butt joint shall be provided at each break in pavement cross slope and no roadway section shall be cut so that it has fewer than 2 bolts on either side. Cutting of joint material shall be avoided whenever possible and all joints shall be mitered to ensure a tight fit.

All surfaces (concrete, metal and neoprene) shall be dry immediately prior to and during the installation of the elastomeric joint seal and during the application of the polyurethane sealant.

The ends, sides and bottom surfaces of the seal segments that will contact either other segments or the surfaces of the joint seal depression shall be thoroughly wire brushed in order to improve the bonding characteristics of the polyurethane sealant.

The first segment shall be installed adjacent to the centerline of the roadway, expanded or compressed as required. The clipped washers, lock washers and nuts shall be installed with the nuts tightened prior to the release of the segment as shown in the "Anchor Detail" on the plans.

The joint between the seal segment and the sides of the joint depression shall then be sealed with polyurethane sealant under pressure to insure that all joint voids are filled. Excess sealant shall be removed before it has set.

The Contractor shall wire brush cavity and cavity plug, encase exposed metal with sealant, coat surfaces of cavity and outside surfaces of cavity plug with sealant, insert cavity plug and complete installation as noted in the "Anchor Detail" on the plans.

The installation of each segment shall be completed, including the insertion of cavity plugs and cleaning, prior to or during the installation of successive segments during periods of impending precipitation.

The ends of successive joint seal segments shall be thoroughly and liberally coated with sealant. Care shall be used when installing successive segments in order to insure that adjacent surfaces are butted tight.

The Contractor shall complete the installation of all segments of each deck joint in the manner and sequence noted above and shown on the plans.

This sheet supplemented by sheet GN5A.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

GENERAL NOTES
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA 196+97.50 TO
STA 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
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| DATE 3-13-74 | DATE 3-15-74 | DATE 5-8-74 | DATE | SHEET GN4 |

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# GENERAL NOTES - STRUCTURES OVER 20 - FT SPAN

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18. ELASTOMERIC COMPRESSION SEALS IN STRUCTURAL STEEL JOINTS (Cont'd.)

(c) Primers shall not be applied to steel surfaces which will be heated to a temperature in excess of 300°F. Consequently, where heat generating operations are required adjacent to bonded areas, the primer application shall be delayed until such work is completed unless the primed area can be maintained at lesser temperatures by the use of approved cooling procedures.

(d) The primer solvents and the solvents specified as cleaning agents in these provisions are volitile, combustible and, in some instances, irritating to the skin. Containers shall be kept tightly closed and away from heat and open flames. During application, all flames, welding and smoking shall be prohibited. Prolonged breathing of vapors and contact with the skin shall be avoided. In confined areas, ventilation shall be provided during application and drying.

G. Preparation

Prior to installing compression seals in structural steel joints, steel and seal surfaces which are to be bonded together shall be carefully and thoroughly cleaned to remove all rust, mill scale, dirt, and other contaminants which would be detrimental to bonding.

The bare steel surfaces shall be prepared to Grade SA 3, ASTM D-2200: galvanized steel surfaces shall be lightly sanded. Immediately after mechanical preparation the fresh surfaces shall be wiped with methy ethyl ketone, toluene, or other suitable solvent to remove all contaminant traces. They then should be coated with primer. Cleaned and uncoated steel surfaces should not be allowed to become wet. They are highly sensitive to moisture and any corrosion may make them unsuitable for coating. It is essential, therefore, that the primer be applied before the cleaned surfaces can be dulled by oxidation, a process which can occur very quickly in humid weather.

The primer shall be applied only to clean dry surfaces. Thickness of primer shall be approximately 1.0 mil wet film, 0.40 mil dry film. Care shall be taken to insure that the complete bonding area plus at least 1 inch width of adjacent metal surface area shall be primed for field adhesion. Steel shall be maintained dry and at a temperature of 50°F. or above during seal installation.

To improve adhesion, the glossy seal surfaces which are to be bonded shall first be cleaned with solvent using clean, disposable cloths and then buffed with belt sanders, wire brushes or grinders. Cleaning and buffing may be done in the shop provided that the cleaned seals are carefully wrapped to protect them from contamination prior to installation.

H. Installation

Seal installation preferably shall follow the priming operation as soon as practicable, but not sooner than two hours after primer application nor later than one week. Just prior to seal installation, the bonding surfaces of the seal and the primed steel shall be wiped with methyl ethyl ketone, toluene or other suitable solvent. If the primed steel surface has become contaminated with construction materials or other dirt and debris which cannot be removed without damage to the primer, the contaminated primer shall be removed and the steel surface cleaned and reprimed as originally specified.

To clean and dry primed steel surfaces, adhesive shall be applied to a thickness of 1/32 (-0, + 1/32) inch. Then the clean and dry elastomeric seal shall be compressed sufficiently so that it can be inserted and allowed to expand within the joint and against the adhesive coated sides. Care shall be taken to see that the clean and dry sides of the compression seal are not contaminated during installation. After installation, a small bead of adhesive, approximately 1/4 inch in diameter, shall be applied along the top edge where the seal touches the sides of the joint.

Adhesives shall be applied only to dry surfaces and only during periods when the temperature is 50°F. or higher. Since the adhesive is moisture curing, the completed installation need not be protected from precipitation.

The joint seal shall be installed with equipment designed specifically for the installation of elastomeric joint seals. This equipment shall not elongate the seal longitudinally, cause structural damage to the seal, nor twist, distort, or cause other malformations in the completed seal. Equipment that does not provide a properly installed seal shall not be used.

Portions of the steel joint not encased in concrete, not in contact with a compression seal, and not covered by adhesives shall be cleaned and painted in conformance with 514. Unless separately itemized, cleaning and painting shall be included with this item for payment.

J. Measurement

Payment for accepted quantities shall be based upon the actual number of linear feet of compression seals complete and in place. This payment shall include the cost of furnishing, cleaning and placing the compression seals, primers and adhesives, and all other incidentals necessary to complete this work according to the plans and this specification. The steel portions of the structural joints shall be included in Item 513, Structural Steel, for payment.

K. Payment

Payment will be made at contract price for:

| Item | Unit | Description |
|---|---|---|
| Special | Lin. ft. | 1" Preformed Elastic Joint Sealer |
| Special | Lin. ft. | 2 3/8" Preformed Elastic Joint Sealer |

19. STEEL REINFORCED ELASTOMERIC EXPANSION JOINTS

A. Description

This work shall include furnishing and installing steel reinforced elastomeric expansion joints for the bridge deck in accordance with the plans and specifications. The finished joint shall be in conformity with the lines and grades shown on the Plans or established by the Engineer. The seals shall be furnished in the form of prefabricated units.

B. Materials

(a) General - The Elastomeric Expansion Joints shall be made by an established manufacturer of these products and shall consist of an integrally molded unit of elastomer and bonded metal components, cast under pressure and heat, with the option of providing an integrally molded and bonded armored wearing surface.

(b) Elastomer - The elastomer portion of the Elastomeric Expansion Joint shall be of the compound known as neoprene, which shall have the following physical properties in accordance with ASTM Method D15, Part B:

| Test Method | Min. | Max. |
|---|---|---|
| Hardness, Durometer A - ASTM D2240 | 40 Points | 50 Points |
| Tensile Strength, Minimum p.s.i. ASTM D412 | 1,800 p.s.i. | --- |
| Elongation at Break, Min. Percent | 400% | --- |
| Compression Set, 22 Hours at 158°F. ASTM D395, Method B | --- | 20% |
| Low Temperature - ASTM D746 | Not Brittle at -40% | --- |
| Ozone Resistance, Exposure to 100 PPHM Ozone for 70 hours at 100°F. Sample under 20% Strain. ASTM D1149 | No Cracks | |
| Oil Deterioration, Volume increase after immersion in ASTM oil No. 3 for 70 hours at 212°F. ASTM D470 | --- | 120% |

(c) Adhesion - The neoprene to metal bond requirements shall be as follows:

Bond made during vulcanization D4298, pounds per inch minimum . . . . . 40

(d) Other Materials - Other materials used in manufacturing and installing the joints shall meet the following requirements:

| | |
|---|---|
| Structural Steel | ASTM A570, Grade C or ASTM A36 |
| Polyurethane Sealant | Federal Specification TT-S 00230 |
| Epoxy Grout | Federal Specifications MMM-G-350A for Binder and MMM-G-650A for Grout |

(e) Tolerance - Tolerance requirements shall be in accordance with Article 2.25.4 of the "Standard Specifications for Highway Bridges" adopted by the American Association of State Highway Officials.

C. Construction Methods

(a) Preparation of Joints - Expansion joints shall be of the materials and size specified on the plans. The joints shall be fastened to the structure by threaded steel studs welded to the steel armored joints installed in the concrete slabs. The threaded studs shall be located on the joint armor, using a template in the field after the adjacent deck slabs have been poured. Immediately before placement of the sealant, the joint armor shall be thoroughly cleaned by brushing, compressed air or other means so that it is free from dust, oil, grease or other foreign materials.

(b) Installation - A Manufacturer's Representative of the Elastomeric Expansion Joint product furnished shall be present at the site at the time of installation for the purpose of advising the Contractor and the Engineer as to appropriate installation procedures. The Contractor shall be responsible for the properly sealed installation of the joint material under the direction of the Manufacturer's Representative and shall report in writing to the Director any exception taken to procedures as recommended by the Representative.

Before installation is started, The Contractor shall determine how the units shall be placed. A butt joint shall be provided at each break in pavement cross slope and no roadway section shall be cut so that it has fewer than 2 bolts on either side. Cutting of joint material shall be avoided whenever possible and all joints shall be mitered to ensure a tight fit.

All surfaces (concrete, metal and neoprene) shall be dry immediately prior to and during the installation of the elastomeric joint seal and during the application of the polyurethane sealant.

The ends, sides and bottom surfaces of the seal segments that will contact either other segments or the surfaces of the joint seal depression shall be thoroughly wire brushed in order to improve the bonding characteristics of the polyurethane sealant.

The first segment shall be installed adjacent to the centerline of the roadway, expanded or compressed as required. The clipped washers, lock washers and nuts shall be installed with the nuts tightened prior to the release of the segment as shown in the "Anchor Detail" on the plans.

The joint between the seal segment and the sides of the joint depression shall then be sealed with polyurethane sealant under pressure to insure that all joint voids are filled. Excess sealant shall be removed before it has set.

The Contractor shall wire brush cavity and cavity plug, encase exposed metal with sealant, coat surfaces of cavity and outside surfaces of cavity plug with sealant, insert cavity plug and complete installation as noted in the "Anchor Detail" on the plans.

The installation of each segment shall be completed, including the insertion of cavity plugs and cleaning, prior to or during the installation of successive segments during periods of impending precipitation.

The ends of successive joint seal segments shall be thoroughly and liberally coated with sealant. Care shall be used when installing successive segments in order to insure that adjacent surfaces are butted tight.

The Contractor shall complete the installation of all segments of each deck joint in the manner and sequence noted above and shown on the plans.

THIS PLAN SHEET HAS BEEN REVISED SEE REVISION 8-22-75

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

GENERAL NOTES

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA 196+97.50 TO
STA 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
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| DATE 3-13-74 | DATE 3-15-74 | DATE 5-8-74 | DATE | SHEET GN 4 |

# GENERAL NOTES - STRUCTURES OVER 20-FT SPAN

| FHWA REGION | STATE | PROJECT | |
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19. STEEL REINFORCED ELASTOMERIC EXPANSION JOINTS (Cont'd.)

D. Certification
The Contractor shall furnish to the Director certified copies of the Manufacturer's test reports and a certification by the Manufacturer that the seals furnished conform to all the requirements shown on the plans and as stipulated herein.

E. Measurement
Payment for accepted quantities shall be based on the actual number of lineal feet of elastomeric expansion joints measured in place along the centerline top surface of the joint, complete and in place.
The steel portions of the structural joints, excluding the seal reinforcement, installation studs and hardware, shall be included in Item 513, Structural Steel, for payment.

F. Basis of Payment
Payment will be made at contract price for:

| Item | Unit | Description |
|---|---|---|
| Special | Lin.ft. | Expansion Joint, Transflex Model 900 Waboflex Model SR9, or Approved Equal |
| Special | Lin.ft. | Expansion Joint, Transflex Model 1300, Waboflex Model SR13, or Approved Equal |

20. PROTECTIVE COATING OF CONCRETE SURFACE
All visible surfaces of the piers and abutments which will be exposed to rust-laden water from corrosion resistant steel during initial weathering shall receive a clear vinyl resin coating to protect against absorptive staining. The coating shall be applied after the concrete has received a final surface finish including any grout cleaning or rubbing and before the erection of the structural steel.
Waterproof membrane curing compound and concrete curing and protective membrane, Supplemental Specification 836, shall not be used on the surfaces coated with clear protective coating. Such surfaces shall be water cured or, at the Contractor's option, two full coats of clear protective coating, each approximately 1-1/3 mils dry film thickness, may be applied to act as a combination curing compound and antistaining agent.
The agent shall be applied by brush or roller, or by spraying, so that the surface of the concrete is completely and uniformly coated at the rate of one gallon per 200 square feet. This rate of application will provide a dry film thickness of 1-1/3 mils. If running or sagging occurs, the material shall be applied in two or more coats of approximately equal thickness. Not less than 10 minutes shall elapse between applications. When applied by spraying, the coating material may be thinned with not more than 10% toluene.
The composition of the clear protective coating shall be as follows:

| | Percent by Weight |
|---|---|
| *Vinyl Resin | 25.0 min. |
| Methyl Ethyl Ketone Solvent | 37.0 min. |
| Toluene Solvent | 37.0 min. |

*The resin shall be a vinyl chloride-acetate copolymer containing 86% vinyl chloride and 14% vinyl acetate. The viscosity of 22% by weight solution of resin in a solvent, consisting of equal parts of Methyl Isobutyl Ketone and Toluene, shall be 250-500 centipoises at 77°F. The resin shall be Union Carbide's VYHH grade, or approved equal.

| Coating Properties: | |
|---|---|
| Weight per gallon at 77°F., lb. | 7.6 min. |
| Consistency, Viscosity at 77°F., KU | 60-70 |
| Color | Clear and Colorless |
| Drying Time, Hr. | 1 max. |

21. PILES TO ROCK
Piles shall be driven to refusal on bedrock or to 20 blows per inch for the last few inches of penetration. The design load is 55 tons per pile for the West Abutment and 70 tons per pile for the Pier piles and East Abutment including Cellular Construction.

22. RAILROAD AERIAL LINES
Railroad aerial lines will be relocated by the Railroad. The Contractor shall use all precautions necessary to see that the lines are not disturbed during the construction stage and shall cooperate with the Railroad in the relocation of these lines. The cost of the relocation shall be included in the railroad force account work.

23. EMBANKMENT CONSTRUCTION
The embankments shall be constructed to the level of the subgrade for a minimum distance of 200 feet back of the abutments. Excavation shall then be made for the Abutments and for Pier 1 and Pier 16.

24. CONSTRUCTION ADJACENT TO RAILROAD TRACKS
Construction clearance of 23'-0" vertically above the top of the railroad rails and 8'-0" horizontally from the center of tracks shall be maintained at all times.

25. ITEMS NOT INCLUDED IN BRIDGE PLANS
The following items are not included in the Bridge Plans. See Roadway Plans for Details.
(1) Removals, grading, approach pavement, approach slabs and approach sidewalks.
(2) Relocation or removal of existing utilities.
(3) Lighting.
(4) Underground drainage.

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GENERAL NOTES
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

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# GENERAL NOTES - STRUCTURES OVER 20-FT SPAN

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CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

19. STEEL REINFORCED ELASTOMERIC EXPANSION JOINTS (Cont'd.)

D. Certification

The Contractor shall furnish to the Director certified copies of the Manufacturer's test reports and a certification by the Manufacturer that the seals furnished conform to all the requirements shown on the plans and as stipulated herein.

E. Measurement

Payment for accepted quantities shall be based on the actual number of lineal feet of elastomeric expansion joints measured in place along the centerline top surface of the joint, complete and in place.

The steel portions of the structural joints, excluding the seal reinforcement, installation studs and hardware, shall be included in Item 513, Structural Steel, for payment.

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Payment will be made at contract price for:

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All visible surfaces of the piers and abutments which will be exposed to rust-laden water from corrosion resistant steel during initial weathering shall receive a clear vinyl resin coating to protect against absorptive staining. The coating shall be applied after the concrete has received a final surface finish including any grout cleaning or rubbing and before the erection of the structural steel.

Waterproof membrane curing compound and concrete curing and protective membrane, Supplemental Specification 836, shall not be used on the surfaces coated with clear protective coating. Such surfaces shall be water cured or, at the Contractor's option, two full coats of clear protective coating, each approximately 1-1/3 mils dry film thickness, may be applied to act as a combination curing compound and antistaining agent.

The agent shall be applied by brush or roller, or by spraying, so that the surface of the concrete is completely and uniformly coated at the rate of one gallon per 200 square feet. This rate of application will provide a dry film thickness of 1-1/3 mils. If running or sagging occurs, the material shall be applied in two or more coats of approximately equal thickness. Not less than 10 minutes shall elapse between applications. When applied by spraying, the coating material may be thinned with not more than 10% toluene.

The composition of the clear protective coating shall be as follows:

| | Percent by Weight |
|---|---|
| *Vinyl Resin | 25.0 min. |
| Methyl Ethyl Ketone Solvent | 37.0 min. |
| Toluene Solvent | 37.0 min. |

*The resin shall be a vinyl chloride-acetate copolymer containing 86% vinyl chloride and 14% vinyl acetate. The viscosity of 22% by weight solution of resin in a solvent, consisting of equal parts of Methyl Isobutyl Ketone and Toluene, shall be 250-500 centipoises at 77°F. The resin shall be Union Carbide's VYHH grade, or approved equal.

| | | |
|---|---|---|
| Coating Properties: | Weight per gallon at 77°F., lb. | 7.6 min. |
| | Consistency, Viscosity at 77°F., KU | 60-70 |
| | Color | Clear and Colorless |
| | Drying Time, Hr. | ½ max. |

21. PILES TO ROCK

Piles shall be driven to refusal on bedrock or to 20 blows per inch for the last few inches of penetration. The design load is 55 tons per pile for the West Abutment and 70 tons per pile for the Pier piles and East Abutment including Cellular Construction.

22. RAILROAD AERIAL LINES

Railroad aerial lines will be relocated by the Railroad. The Contractor shall use all precautions necessary to see that the lines are not disturbed during the construction stage and shall cooperate with the Railroad in the relocation of these lines. The cost of the relocation shall be included in the railroad force account work.

23. EMBANKMENT CONSTRUCTION

The embankments shall be constructed to the level of the subgrade for a minimum distance of 200 feet back of the abutments. Excavation shall then be made for the Abutments and for Pier 1 and Pier 16.

24. CONSTRUCTION ADJACENT TO RAILROAD TRACKS

Construction clearance of 23'-0" vertically above the top of the railroad rails and 8'-0" horizontally from the center of tracks shall be maintained at all times.

25. ITEMS NOT INCLUDED IN BRIDGE PLANS

The following items are not included in the Bridge Plans. See Roadway Plans for Details.

(1) Removals, grading, approach pavement, approach slabs and approach sidewalks.
(2) Relocation or removal of existing utilities.
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THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 8-22-1975

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

GENERAL NOTES

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
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# GENERAL NOTES - STRUCTURES OVER 20-FT SPAN

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26. DELASTIFLEX PREFABRICATED MODULAR JOINT SEAL SYSTEM

A. Description

This work shall include furnishing and installing in the bridge deck at intermediate expansion joints delastiflex prefabricated modular joint seal systems in accordance with the plans and specifications. The finished joints shall be in conformity with the lines and grades shown on the plans or established by the Engineer.

B. Material

The Delastiflex Prefabricated Modular Joint Seal Systems shall be manufactured by the D. S. Brown Company and shall consist of the following components and/or utilize the following material:

(a) L-Frames, I-Rails and Support Bars — The L-frames, I-rails and support bars shall be extruded aluminum 6061-T6 conforming to Federal Specification QQA200/8.

(b) Compression Springs — The compression springs shall be stainless steel No. 302 ASTM A313.

(c) Anchor Bolts — The anchor bolts shall be ASTM A307 and shall be zinc plated.

(d) Preformed Sealer — The preformed sealer shall be of a compound known as Neoprene and shall have the following physical properties:

| DESCRIPTION | | ASTM TEST |
|---|---|---|
| Tensile Strength, psi, Min. | 2000 | D-412 |
| Elongation at Break, %, Min. | 175 | D-412 |
| Hardness. Durometer A | 70±5 | D-2240 |
| Oven Aging, 70 hours @ 212°F | | D-573 |
| Tensile Strength, % change | -30 max. | |
| Elongation, % change | -40 max. | |
| Hardness, points change | 0 to +10 | |
| Ozone Resistance, 70 hours @ 104° F, 20% strain, 300 pphm in air | No Cracks | D-1149 |
| Oil Swell, ASTM Oil #3, 70 hours @ 212° F | | D-471 |
| Volume Change, %, max. | 80 | |
| Weight Change, %, max. | 45 | |
| Compression Set | | D-395 |
| 22 hours @ 158° F, %, max. | 15 | Method B |
| 70 hours @ 212° F, %, max. | 30 | |
| Low Temperature | Not brittle at -40° F. | D-746 |

(e) Seal End Closures - The seal end closure shall be closed cell Neoprene sponge meeting the requirements of ASTM C509.

(f) Urethane Grommets - The urethane grommets shall have the following physical properties:

| DESCRIPTION | | ASTM TEST |
|---|---|---|
| Tensile Strength, psi, Min. | 4200 | D-412 |
| Elongation at Break, % | 400 | D-412 |
| Hardness, Durometer A | 85±5 | D-2240 |
| 100% modulus, psi | 800 | D-412 |
| 300% modulus, psi | 1400 | D-412 |
| Tear strength, Lb/in | 50 | D-470 |
| Compression set | | |
| 22 hrs. at 158°F, % Max. | 24 | D-395 (Method B) |
| Brittle point | -80°F | |

(g) Bituminous Paint - The bituminous paint shall meet the requirements of Federal Specifications TTV51.

C. Certification

The Contractor shall furnish to the Director certified copies of Manufacturer's test reports and a certification by the Manufacturer that the systems furnished conform to all the requirements shown on the plans and as stipulated herein.

D. Installation

A Manufacturer's representative of the system shall be present at the site of the time of installation for the purpose of advising the Contractor as to appropriate installation procedures. The Contractor shall install the system under the direction and to the complete satisfaction of the Manufacturer's representative and shall report in writing to the Director any exception taken to the procedures as recommended by the representative.

E. Guarantee

The D. S. Brown Company guarantees the Delastiflex Preformed Modular Joint Seal System for a period of three years from the time the bridge is opened to normal vehicular traffic or for a period of six years after the acceptance of the bridge, whichever occurs first. The guarantee covers water leakage through the system or structural damage to the system's components, except for snow plow damage, damage resulting from vehicular use of the bridge after the acceptance of the bridge and prior to opening to normal vehicular traffic, or damage resulting from accidents. The D. S. Brown Company reserves the right to completely inspect the System, including all structural components, prior to opening the bridge to normal vehicular traffic.

F. Measurement

Payment for accepted quantities shall be based on the actual number of linear feet of the system measured in place along the centerline top surface of the system, complete and in place.

G. Basis of Payment

Payment will be made at contract price for:

| ITEM | UNIT | DESCRIPTION |
|---|---|---|
| Special | Lin. Ft. | Expansion Joint, Transflex Model 900, Waboflex Model SR9, or Approved Equal |
| Special | Lin. Ft. | Expansion Joint, Transflex Model 1300, Waboflex Model SR13, or Approved Equal |

This sheet added 8-22-75. It supplements Sheet GN4.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

GENERAL NOTES

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.A.B. | C.F.D. | V.E.S. | C.A.B. | |
| DATE 8-22-75 | DATE 8-22-75 | DATE 8-22-75 | DATE 9-8-75 | SHEET GN 5A |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OH10 | | |

60
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## PROPOSED STRUCTURE

**TYPE:** Continuous Welded Steel Girder with Floor System and Reinforced Concrete Deck and Substructure.

**SPANS:** Spans are measured along ℄ Bridge.
UNIT 1- 134'-0", 166'-0", 170'-0", 187'-0", 151'-0", and 23'-0" Cantilever
UNIT 2- 127'-0", 4 @ 163'-0" and 127'-0"
UNIT 3- 23'-0" Cantilever, 175'-0" 2 @ 220'-0", 197'-0" and 221'-0" Cantilever.
UNIT 4- 2 @ 123'-0"
Cellular Construction- 16'-0", 10 @ 16'-3 and 16'-6"

**ROADWAY:** 52'-0" Curb to Curb with 2- 5'-0" Sidewalks

**LOADING:** HS 20-44

**SKEW:** None

**WEARING SURFACE:** 2½" Asphalt Concrete

**APPROACH SLAB:** AS-1-72 (25' Long)

**ALIGNMENT:** 2°45' Right and Tangent

**SUPERELEVATION:** Varies (See sheet 61 / 73)

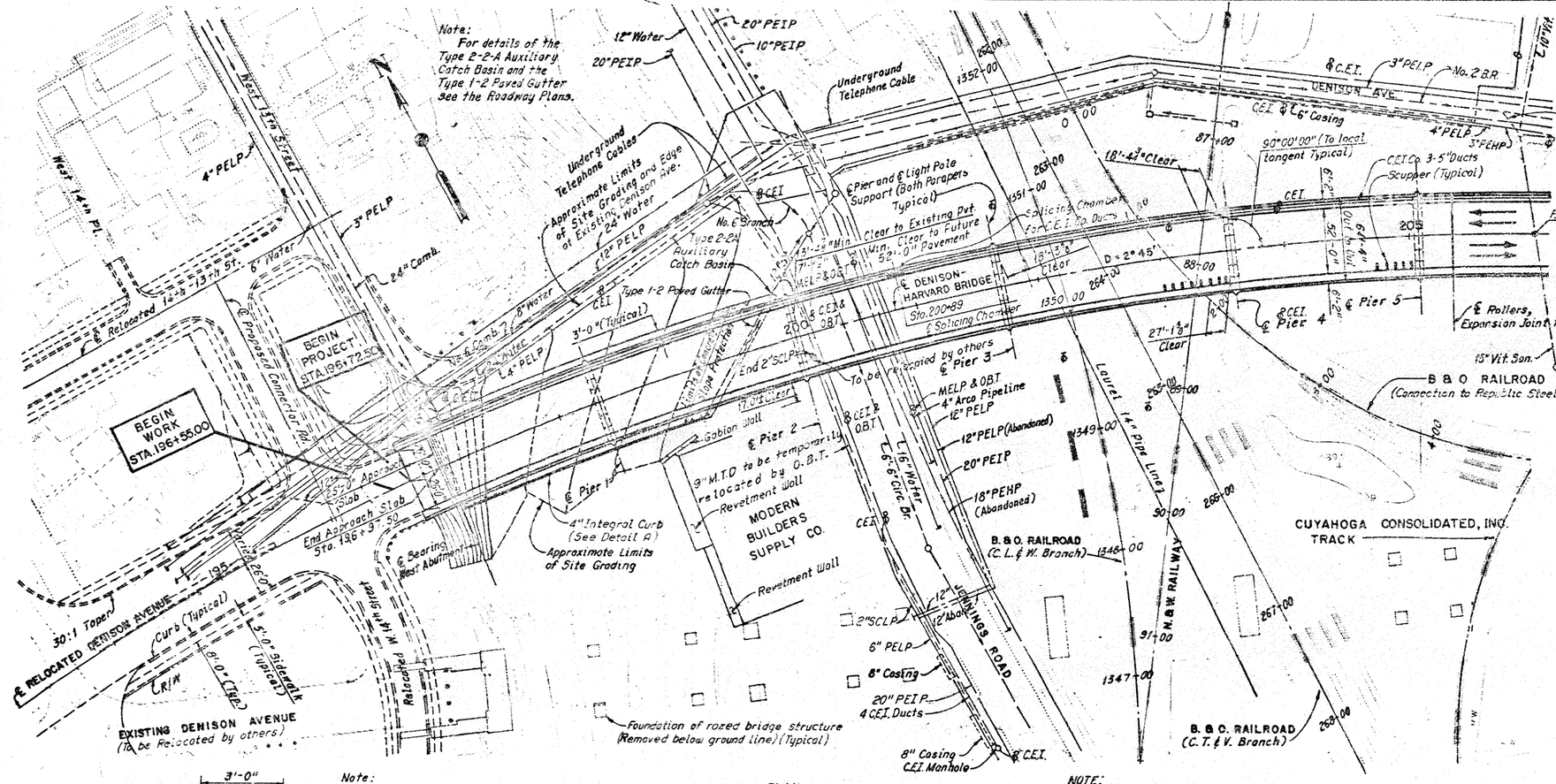
**TRAFFIC DATA:** (1990)
22,400 A. D. T.
1,520 D. D. H. V.

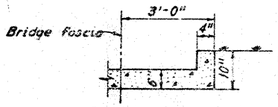
**CURVE DATA - DENISON-HARVARD BRIDGE**
P. I. = Sta. 198+33.35
Δ = 41°16'51"
Dc = 2°45'00" Right
R = 2,083.48'
T = 784.81'
L = 1,501.12'
E = 142.91'

**MAINTENANCE OF TRAFFIC**

Two lanes of traffic with a minimum vertical clearance of 14'-6" and a minimum horizontal width of 26'-0" on Jennings Road shall be maintained at all times.
A minimum vertical clearance of 14'-6" and a minimum horizontal width of 16'-0" on Denison Ave. shall be maintained at all times.

Note:
For General Notes and Index of Sheets see Sheet GN1 thru GN5.

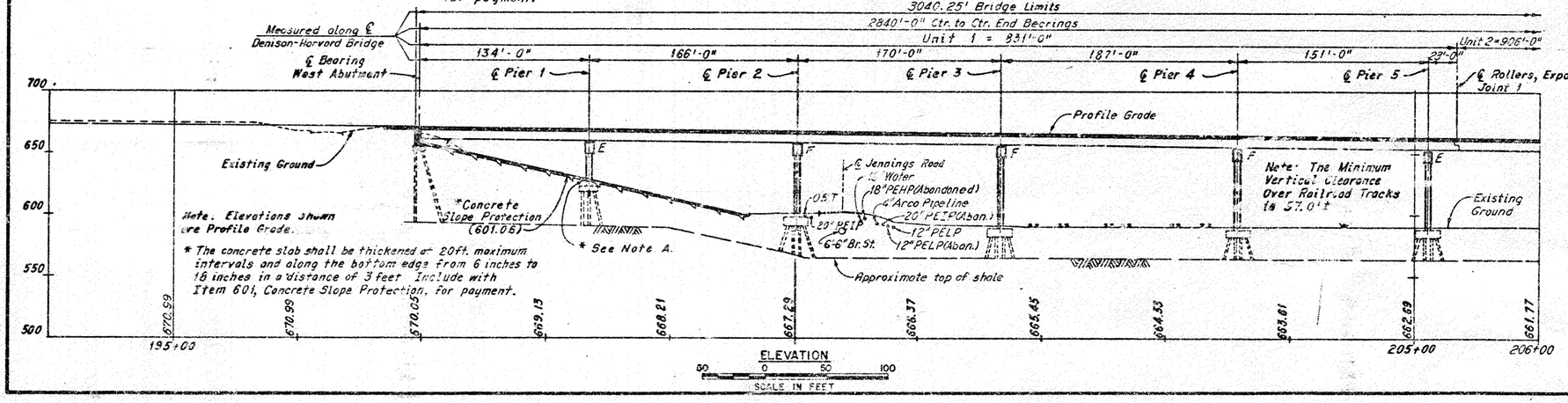



Note:
The 4" Integral Curb shall be included with Concrete Slope Protection for payment.

DETAIL A

Note A:
A 6 inch width shall be blocked-out around each pier column. The blocked-out area shall be filled with Bituminous Cold Mix, Item 405, hand tamped. Include with Item 601, Concrete Slope Protection, for payment.




HOWARD, NEED LES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

## SITE PLAN

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

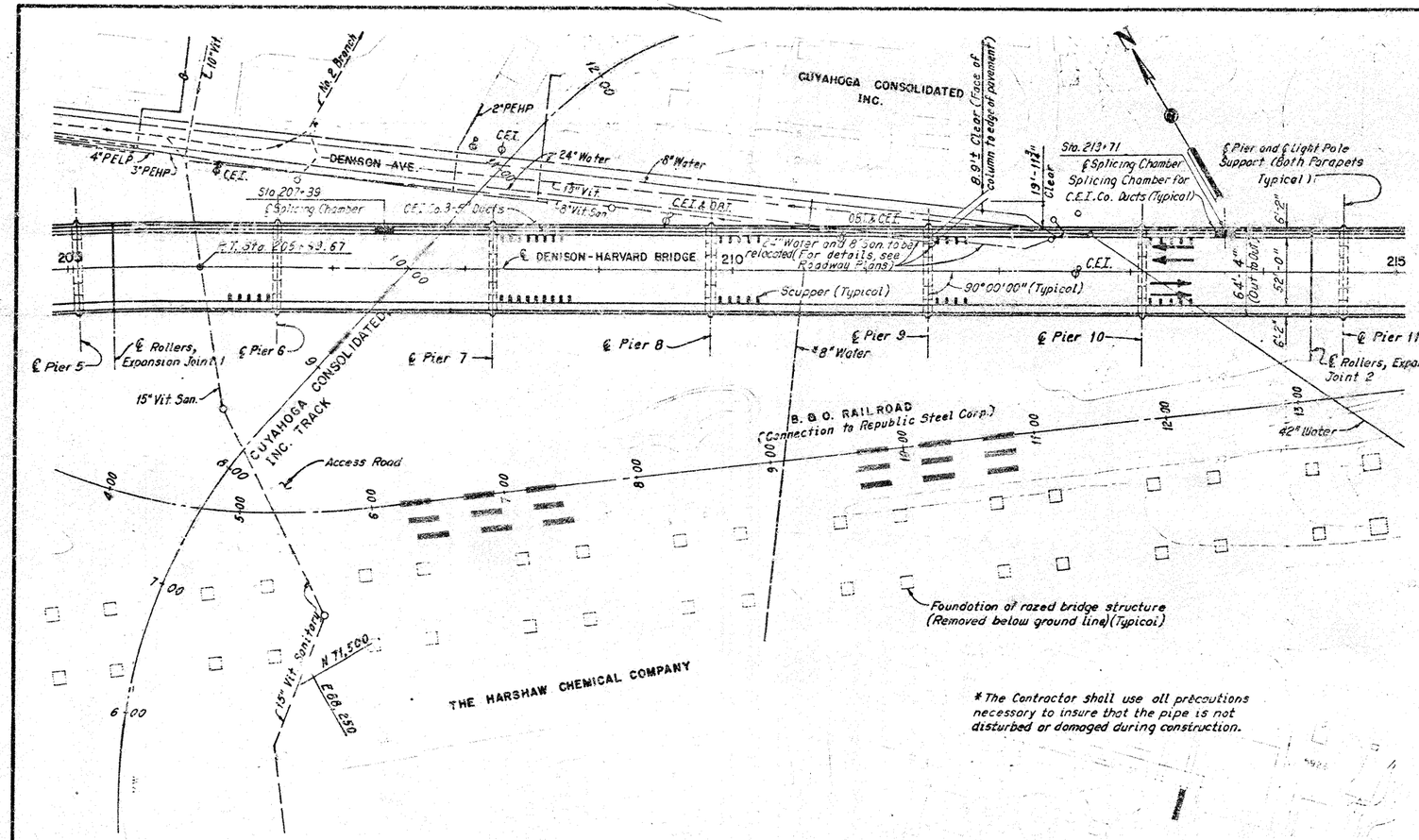
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| CKB | C.P. | L.H.S. | CAB | |
| DATE 8-9-71 | DATE 8-9-71 | DATE 5-1-74 | DATE 5-2-74 | SHEET 1 / 73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

61/148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




*The Contractor shall use all precautions necessary to insure that the pipe is not disturbed or damaged during construction.

The Contractor shall maintain the twenty foot wide existing access road between The Harshaw Chemical Company and Denison Ave. in service at all times. A slight relocation may be required during Construction of Pier 6. Cost of any required relocation shall be included with Item 503, Unclassified Excavation, for payment.

PLAN
50 0 50 100
SCALE IN FEET

Note:
The information shown on this drawing concerning type and location of underground utilities is not guaranteed to be accurate or all inclusive. The Contractor is responsible for making his own determinations as to the type and location of underground utilities as may be necessary to avoid damage thereto.

## FOUNDATION DATA

Piers 10, 12, 13, and 14 are founded in shale with an allowable design load of 6 tons per sq. ft.

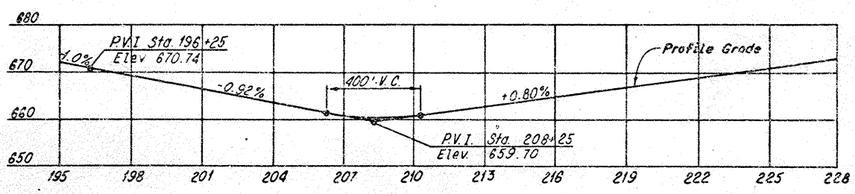
The West Abutment is founded on HP10x42 bearing piles. Piers 1 thru 9, 11, 15, 16 and the front wall and cellular construction at the East Abutment are founded on HP12x53 bearing piles. The allowable design loads are:

| | |
|---|---|
| West Abutment | 55 tons per pile |
| Piers and East Abutment including Cellular Construction | 70 tons per pile |

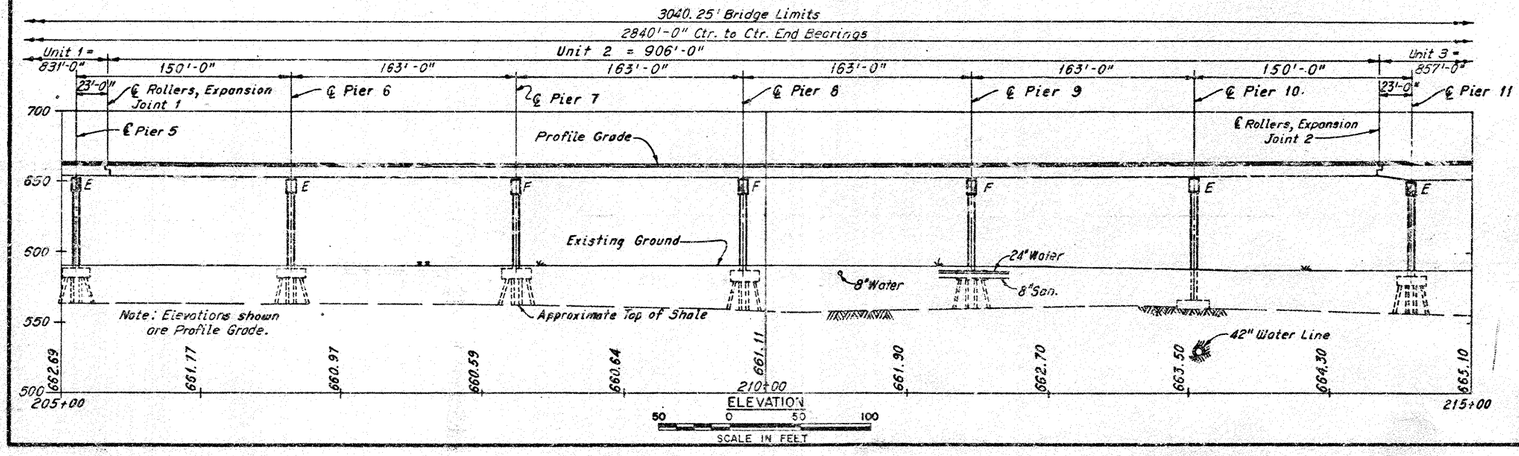
The following tabulation gives the estimated average pay lengths for piles:

| | |
|---|---|
| West Abutment | 65 Feet (Ave.) |
| Pier 1 | 29 Feet (Ave.) |
| Pier 2 | 30 Feet |
| Pier 3 | 25 Feet |
| Pier 4 | 26 Feet |
| Pier 5 & 9 | 27 Feet |
| Pier 6 & 7 | 28 Feet |
| Pier 8 | 29 Feet |
| Pier 11 | 37 Feet |
| Pier 15 | 32 Feet |
| Pier 16 | 59 Feet (Ave.) |
| East Abutment | 97 Feet (Ave.) |
| Cellular Construction | 136 Feet |

Note:
Roadway Excavation in cut section shall be completed and embankment shall be placed and compacted to the finished spill-thru slopes and to the level of the subgrades or final grades, as shown on the plans before excavating or driving piles for the West Abutment, Pier 1, Pier 16, East Abutment and Cellular Construction.




PROFILE DENISON-HARVARD BRIDGE




ELEVATION
50 0 50 100
SCALE IN FEET

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# SITE PLAN

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

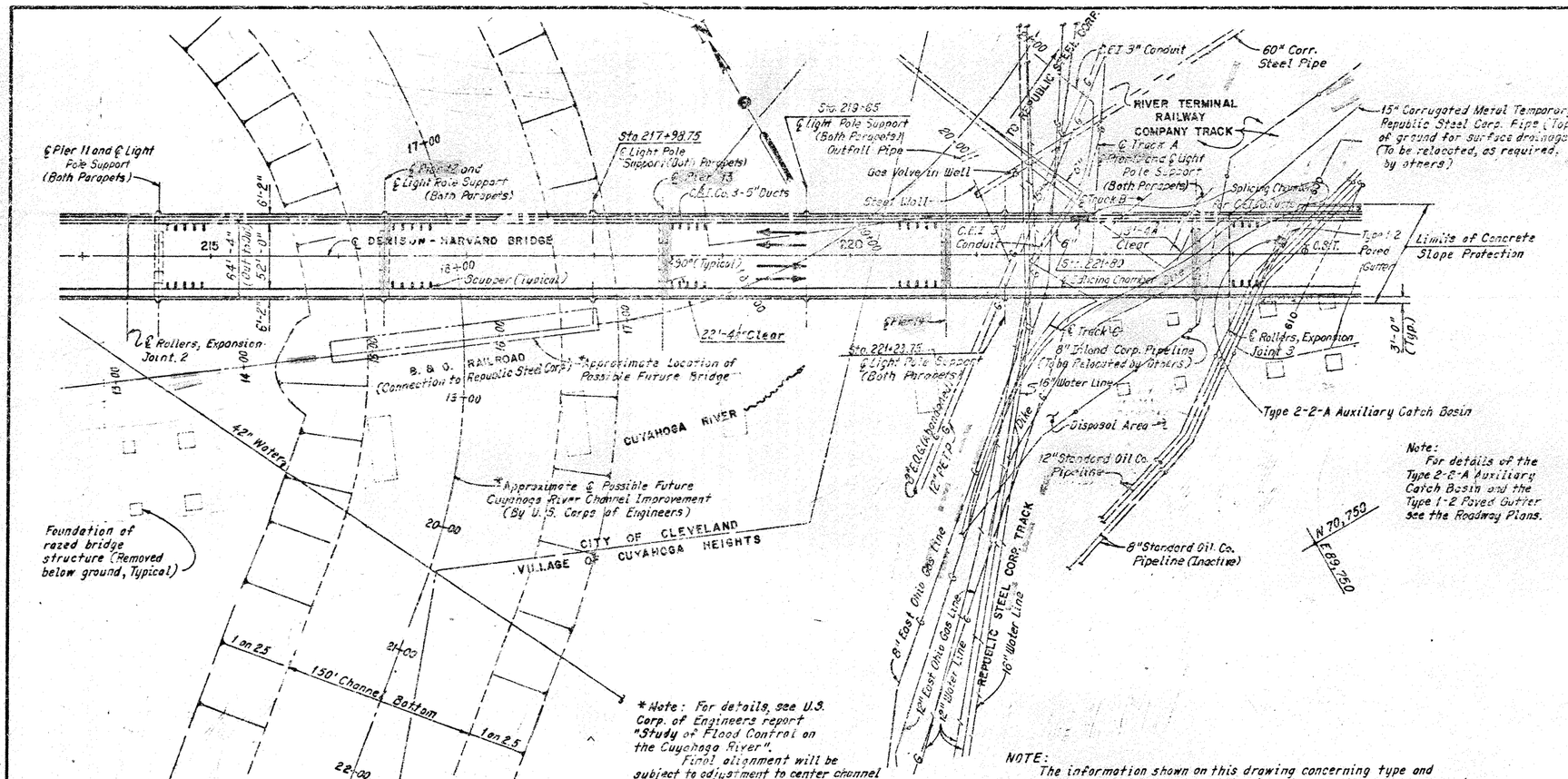
CUYAHOGA COUNTY OHIO

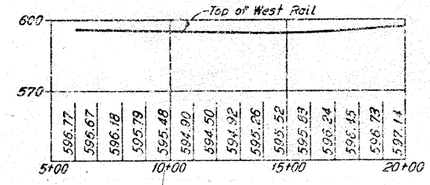
| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| F.S.J. C.E.B. | C.P. | P.H.S. | C.A.B. | |
| DATE 8-6-71 | DATE 8-9-71 | DATE 8-1-74 | DATE 5-4-74 | SHEET 2/13 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

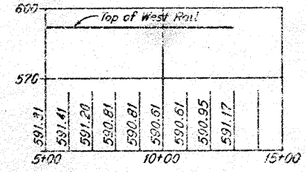
62
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

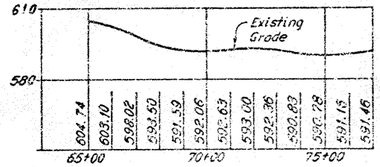


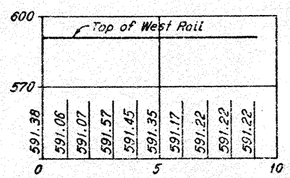

PROFILE - RIVER TERMINAL RAILWAY (H.N.T.B. TRACK C)
(Looking East)

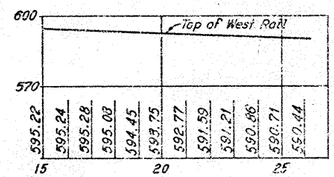



PROFILE - CUYAHOGA CONSOLIDATED, INC. TRACKS




PROFILE - JENNINGS ROAD
(Looking East)

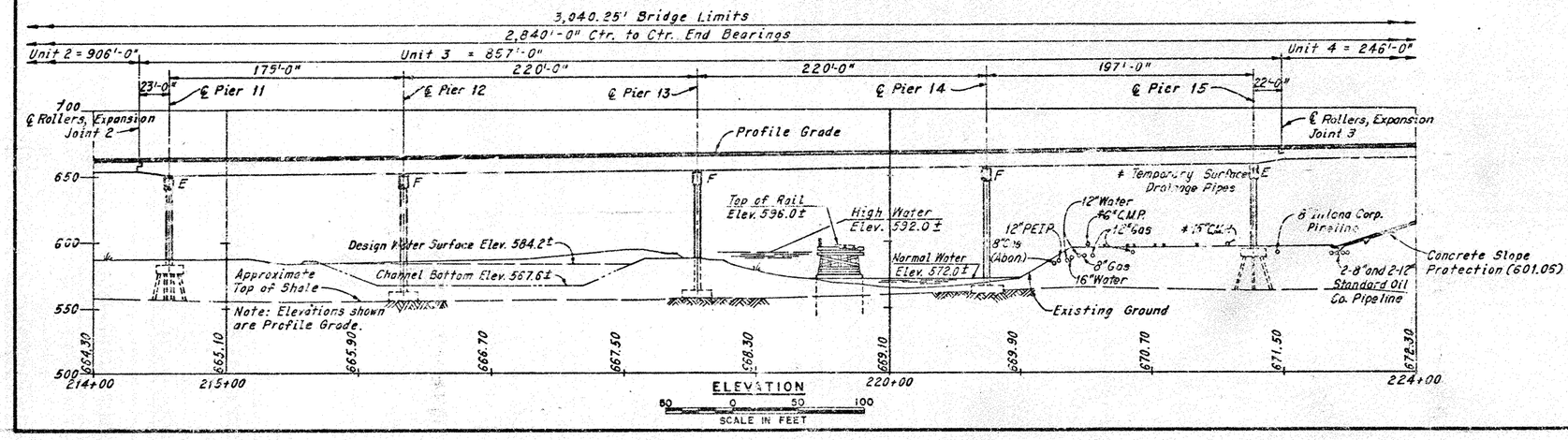



PROFILE - B. & O. RAILROAD (CONNECTION TO REPUBLIC STEEL CORP.)

Note: Station 5+00 above = Station 1+41.70 B.℄ O. Railroad (Connection to Republic Steel Corp.)

Note: Station 20+00 above = Station 20+00 B.℄ O. Railroad (Connection to Republic Steel Corp.)




ELEVATION
50 0 50 100
SCALE IN FEET

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# SITE PLAN

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

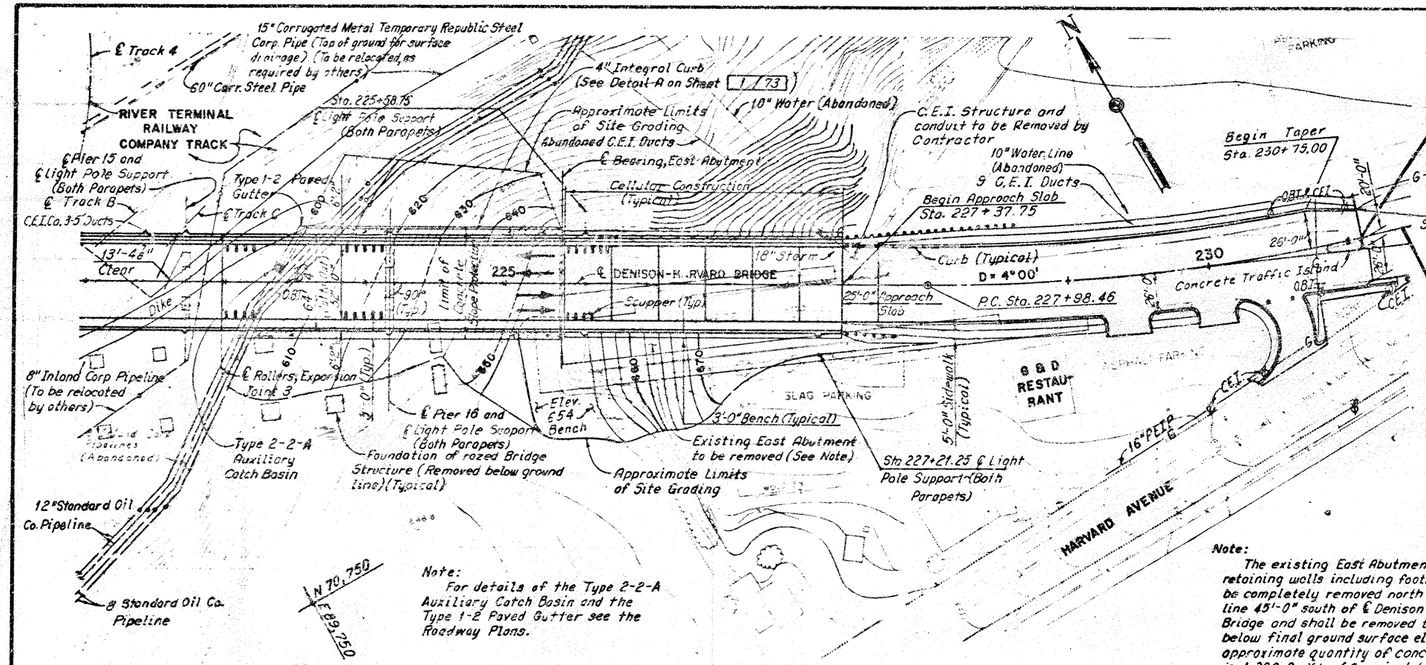
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| FSJ CKB | C.P. | A.H.S. | C.A.B. | |
| DATE 8-9-71 | DATE 8-9-71 | DATE 5-2-74 | DATE 5-4-74 | SHEET 3/73 |

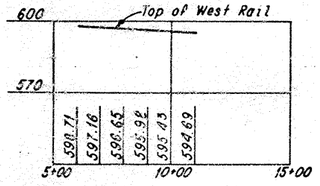
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

63/148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



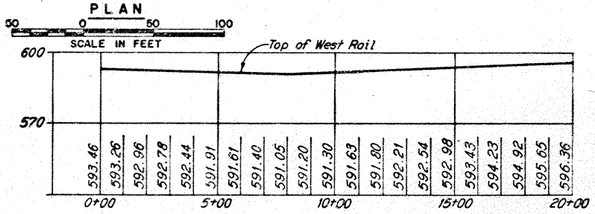

Note:
For details of the Type 2-2-A Auxiliary Catch Basin and the Type 1-2 Paved Gutter see the Roadway Plans.




Note:
The existing East Abutment, and retaining walls including footings shall be completely removed north of a line 45'-0" south of ℄ Denison-Harvard Bridge and shall be removed to one foot below final ground surface elsewhere. The approximate quantity of concrete removal is 1,260 Cu. Yds. (Carried to General Summary on Sheet 10 as Item 202. Lump Sum, Portions of Structures Removed)

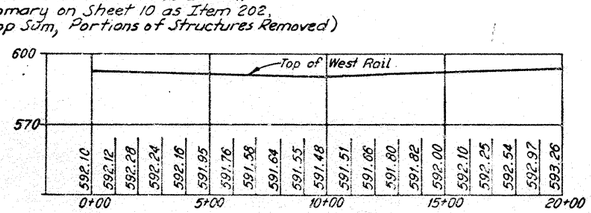
PROFILE - REPUBLIC STEEL CORP. TRACK
Looking East

PLAN
50 0 50 100
SCALE IN FEET




PROFILE - N. & W. RAILWAY

Note: Station 10+00 above = Station 87+91.86 N.℄ W. Railway

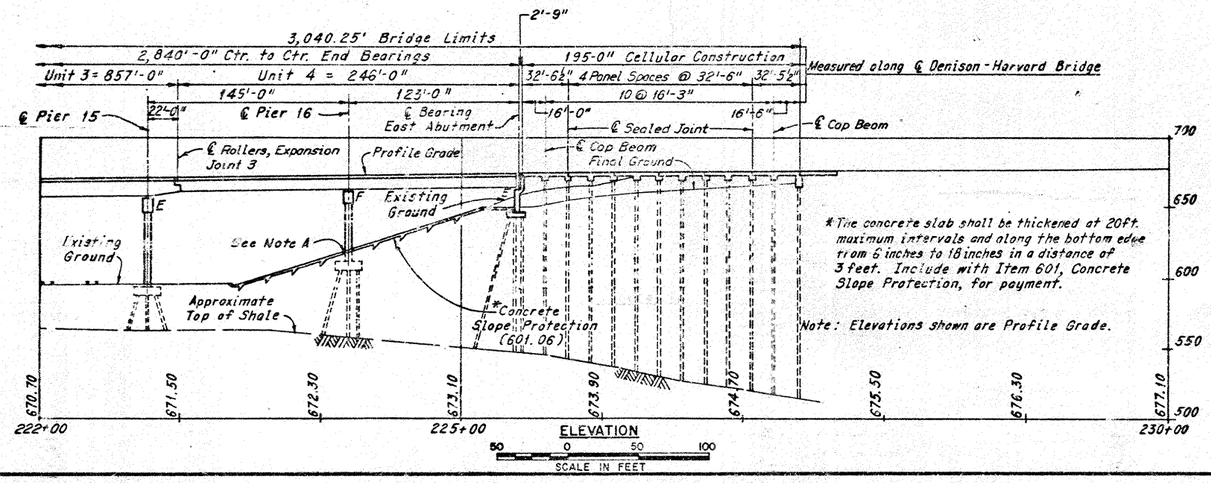


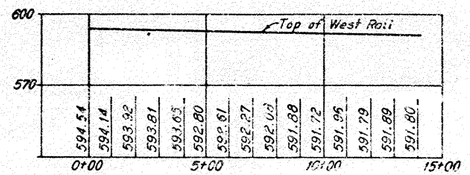

PROFILE - B. & O. RAILROAD (C. T. & V. BRANCH)

Note: Station 10+00 above = Station 263+91.90 B.℄ O. Railroad (C.T.℄ V. Branch)

Note:
The information shown on this drawing concerning type and location of underground utilities is not guaranteed to be accurate or all inclusive. The Contractor is responsible for making his own determinations as to the type and location of underground utilities as may be necessary to avoid damage thereto.

Note A:
A 6 inch width shall be blocked-out around each pier column. The blocked-out area shall be filled with Bituminous Cold Mix, Item 405, hand tamped. Include with Item 601, Concrete Slope Protection, for payment.




PROFILE - B. & O. RAILROAD (C. L. & W. BRANCH)

Note: Station 10+00 above = station 1350+30.90 B.℄ O. Railroad (C.L.℄ W. Branch)

DENISON-HARVARD BRIDGE - JENNINGS ROAD
Sta. 207+37.60 ℄ Denison-Harvard Bridge=
Sta. 66+67.73 ℄ Jennings Road
Skew Angle = 6°21'39" Right Forward at local tangent

DENISON-HARVARD BRIDGE - B. & O. RAILROAD
(C. L. & W. Branch)
Sta. 202+16.87 ℄ Denison-Harvard Bridge=
Sta. 1350+30.90 ℄ B. & O. Railroad
Skew Angle = 8°01'50" Right Forward at local tangent

DENISON-HARVARD BRIDGE - B. & O. RAILROAD
(C. T. & V. Branch)
Sta. 202+52.70 ℄ Denison-Harvard Bridge=
Sta. 263+91.90 ℄ B. & O. Railroad
Skew Angle = 18°24'23" Right Forward at local tangent

DENISON-HARVARD BRIDGE - B. & O. RAILROAD
(Connection to Republic Steel Corp.)
Sta. 203+06.73 ℄ Denison-Harvard Bridge=
Sta. 1+41.70 ℄ B. & O. Railroad
Skew Angle = 33°13'53" Right Forward at local tangent
Sta. 219+66.25 ℄ Denison-Harvard Bridge=
Sta. 18+51.82 ℄ B. & O. Railroad
Skew Angle = 61°16'21" Left Forward

DENISON-HARVARD BRIDGE - CUYAHOGA CONSOLIDATED INC. TRACK
Sta. 207+55.86 ℄ Denison-Harvard Bridge=
Sta. 10+00.00 ℄ Cuyahoga Consolidated Inc. Track
Skew Angle = 42°13'50" Left Forward

DENISON-HARVARD BRIDGE - N. & W. RAILWAY
Sta. 203+31.18 ℄ Denison-Harvard Bridge=
Sta. 87+91.86 ℄ N. & W. Railway
Skew Angle = 13°45'11" Left Forward at local tangent

DENISON-HARVARD BRIDGE - RIVER TERMINAL RAILWAY
Track A
Sta. 221+61.26 ℄ Denison-Harvard Bridge=
Sta. 10+00.00 ℄ Track A (Assumed)
Skew Angle = 23°27'20" Left Forward

Track B
Sta. 221+81.22 ℄ Denison-Harvard Bridge=
Sta. 10+00.00 ℄ Track B (Assumed)
Skew Angle = 43°47'45" Left Forward

Track C
Sta. 222+02.35 ℄ Denison-Harvard Bridge=
Sta. 10+00.00 ℄ Track C (Assumed)
Skew Angle = 45°39'45" Left Forward

DENISON-HARVARD BRIDGE - REPUBLIC STEEL CORP. TRACK
Sta. 222+34.77 ℄ Denison-Harvard Bridge=
Sta. 10+00.00 ℄ Republic Steel Corp. Track (Assumed)
Skew Angle = 38°52'10"

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# SITE PLAN

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN FSJ & CKB | TRACED C.P. | CHECKED A.H.S. | REVIEWED C.A.S. | REVISED |
|---|---|---|---|---|
| DATE 8-8-71 | DATE 8-9-71 | DATE 5-2-74 | DATE 5-4-74 | SHEET 4/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

64/148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## ESTIMATED QUANTITIES

| ITEM | TOTAL | UNIT | DESCRIPTION | ABUTMENTS | CELLULAR CONSTRUCTION | PIERS | SUPER-STRUCTURE | GENERAL | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 402 ©730 | ~~731~~ | Cu. Yd. | Asphalt Concrete, As Per Plan | | 47 | | 684 | ©683 | | |
| 404 | 485 | Cu. Yd. | Rubberized Asphalt Concrete, As Per Plan | | 31 | | 454 | | | |
| 407 ©1,753 | ~~1,754~~ | Gallons | Tack Coat, As Per Plan | | 113 | | (1,641) | ©1,640 | | |
| 503 | 8,302 | Cu. Yd. | Unclassified Excavation | 443 | 220 | 7,639 | | | | |
| 503 | 212 | Cu. Yd. | Shale Excavation | | | 212 | | | | |
| 503 | Lump Sum | Lump Sum | Cofferdams, Cribs and Sheeting | | | | | Lump Sum | | |
| 505 | Lump Sum | Lump Sum | Test Pile | | | | | Lump Sum | | |
| 506 | Lump Sum | Lump Sum | Pile Test Load | | | | | Lump Sum | | |
| 506 | 3 | Each | Subsequent Pile Test Load | | | | | | | |
| 507 | 1,704 | Lin. ft. | Steel Piles, HP10x42 | 1,704 | | | | | | |
| 507 | 31,422 | Lin. ft. | Steel Piles, HP12x53 | 2,270 | 11,258 | 17,894 | | | | |
| 507 | 516 | Each | Steel Points | | | 516 | | | | |
| 507 | 25 | Lin. ft. | Prebored Holes | | | 25 | | | | |
| 509 ©3,373,905 | 3,376,848 | Pounds | Reinforcing Steel | 46,430 | 182,964 | 1,327,862 | 1,819,592 | ©516,649 | | |
| 511 ©1,744 | ~~1,745~~ | Cu. Yd. | Class C Concrete, Superstructure | | 742 | | (1,003) | ©1,002 | | |
| 511 ©30,366 | 30,350 | Sq. ft. | Class C Concrete Sidewalk Wearing Course, As Per Plan | | 1,950 | | (28,400) | ©28,433 | | |
| 511 | 5,392 | Cu. Yd. | Class C Concrete, Piers Above Footings | | | 5,392 | | | | |
| 511 | 253 | Cu. Yd. | Class C Concrete, Abutments Above Footings | 253 | | | | | | |
| 511 | 2,516 | Cu. Yd. | Class C Concrete, Footings | 159 | | 2,357 | | | | |
| 511 | 391 | Cu. Yd. | Class C Concrete, Walls | | 391 | | | | | |
| 512 ©20,910 | (20,914) | Sq. Yd. | Concrete Deck Waterproofing, As Per Plan | | 1,350 | | (19,564) | ©19,562 | | |
| 512 | 148 | Sq. Yd. | Type "A" Waterproofing | 148 | | | | | | |
| 512 | 20 | Lin. ft. | Premolded Sealing Strip | 20 | | | | | | |
| 513 (1,430,050) (1,455,647) ©7,437,664 | (1,462,923) | Pounds | *Structural Steel (ASTM A588 Unpainted, Except As Noted) | 136 | 25,461 | | 7,437,326 | ©7,413,207 ©7,413,050 | | |
| 514 ©155,775 | (153,371) | Pounds | Field Painting Of Structural Steel | | | | | 153,371 | ©151,755 | |
| 516 | 102 | Sq. ft. | 1" Preformed Expansion Joint Filler | | | 102 | | | | |
| 516 | 204 | Sq. ft. | 1" Preformed Expansion Joint Filler | 123 | 81 | | | | | |
| 517 | 6,127 | Lin. ft. | Railing (Concrete Parapet with Chain-Link Fence, Aluminum Alloy Fabric, Sec. 710.03) | 57 | 390 | | 5,680 | | | |
| 518 | 98 | Cu. Yd. | Porous Backfill | 98 | | | | | | |
| 518 | 56 | Lin. ft. | 6"ψ Perforated Helical C.M.P. (707.01) | 56 | | | | | | |
| 518 | 84 | Lin. ft. | 6"ψ Non-Perforated Helical C.M.P. Including Specials (707.01) | 84 | | | | | | |
| 518 | 185 | Lin. ft. | 6"ϕ Pipe, Horizontal Conductors Including Supports | | | | | 185 | | |
| 518 | 837 | Lin. ft. | 8"ϕ Pipe, Horizontal Conductors Including Supports | | | | | 837 | | |
| 518 | 1,367 | Lin. ft. | 8"ϕ Pipe, Downspouts Including Supports | | | | | 1,367 | | |
| 518 | 131 | Each | Scuppers, Including Supports | | | | | | | |
| 518 ©5007 | (3,096) | Lin. ft. | Subdrainage for Surface Course, As Per Plan | | 10 | | 121 | | | |
| | | | | | 390 | | (4,706) | ©4,704 | | |
| 601 | 3,561 | Sq. Yd. | Concrete Slope Protection (601.06) | 3,561 | | | | | | |
| 625 | | | For Lighting Quantities see Lighting Plans | | | | | | | |
| 808 ©7744 | (7,745) | Units | Chemical Admixture for Concrete Type A, B, or D | | 742 | | (7,003) | ©7,002 | | |
| Special | 335 | Lin. ft. | 1" Preformed Elastic Joint Sealer | | | | | | | |
| Special | 67 | Lin. ft. | 2½" Preformed Elastic Joint Sealer | | 335 | | | | | |
| Special | 64 | Lin. ft. | Expansion Joint, Transflex Model 900, Waboflex Model S99, or Approved Equal ⊙ | 67 | | | | | | |
| Special | 128 | Lin. ft. | Expansion Joint, Transflex Model 1300, Waboflex Model SR13, or Approved Equal ⊙ | | | | 64 | | | |
| Special | 8,526 | Sq. Yd. | Protective Coating of Concrete Surface | | | | 128 | | | |
| Special | 14 | Each | Louvered Air Vents Including Screens, Complete As Per Plan | 288 | | 8,238 | | | | |
| Special | 1 | Each | Rolling Steel Door With Hardware, Including Field Painting, Complete As Per Plan | 4 | 10 | | | | | |
| ‡Special | 4 | Each | ‡CEI Co. Splicing Chamber Complete, As Per Plan | | 1 | | | | | |
| #Special | 9,093 | Lin. ft. | # Installing 5"ϕ CEI Plastic Ducts | | | | | 4 | | |
| | | | | | | | | 9,093 | | |

* The Class B Steel Forgings shall have a minimum yield point of 55,000 p.s.i. and the corrosion resistance and coloring characteristics of ASTM A 588 steel.

The parts of the structure listed below shall be Class B Steel Forgings.

Expansion Bearings at Piers (Sheet 50/73)
The sole plate, the part of the rocker in contact with the sole plate, the part of the rocker in contact with the base plate, and the base plate.

con't →

104,500

• Item 513 Structural Steel includes (38,100) pounds of ASTM A237, Class B steel forgings and (78,100) pounds of ASTM A296 Class CA-15 steel castings. 96,000

‡ Item Special, CEI Co. Splicing Chamber Complete, As Per Plan, includes structural steel, added reinforcement in the parapet, hot poured joint sealer around the splicing chamber and the 4" topping. To be paid for by the Cleveland Electric Illuminating Company.

# Item Special, Installing 5"ϕ CEI Plastic Ducts: Ducts shall be furnished by the CEI Co. and installed by the Contractor. To be paid for by the Cleveland Electric Illuminating Company.

⊙ Delastiflex DL-1350 and DL-300 have been approved as equals for this Project.

* Rollers at the West Abutment (Sheet 50/73)
The sole plate, roller and base plate.
Fixed Bearings at Piers (Sheet 51/73)
The pin.
Intermediate Expansion Joint Bearings (Sheet 45/73)
The sole plate, roller, gear plates and base plate.

Revised
5-23-75
3-19-76

©Note:
The changes shown in this revision were made necessary because the Contractor elected to furnish an expansion joint device significantly different than anticipated in the original design.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

ESTIMATED QUANTITIES

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN D.W.S | TRACED S.J.S | CHECKED A.H.S | REVIEWED | REVISED 4-30-75 |
|---|---|---|---|---|
| DATE 3-20-74 | DATE 3-20-74 | DATE 5-9-74 | DATE 10-4-74 | SHEET 51/73 |

REV. C.E. & W.E.S. 5-22-75

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

64
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## ESTIMATED QUANTITIES

| ITEM | TOTAL | UNIT | DESCRIPTION | ABUTMENTS | CELLULAR CONSTRUCTION | PIERS | SUPER-STRUCTURE | GENERAL |
|---|---|---|---|---|---|---|---|---|
| 402 ©730 | (731) | Cu. Yd. | Asphalt Concrete, As Per Plan | | 47 | | (684) ©693 | |
| 404 | 485 | Cu. Yd. | Rubberized Asphalt Concrete, As Per Plan | | 31 | | 454 | |
| 407 ©1,753 | (1,754) | Gallons | Tack Coat, As Per Plan | | 113 | | (1,641) ©1,640 | |
| | | | | | | | | |
| 503 | 8,302 | Cu. Yd. | Unclassified Excavation | 443 | 220 | 7,639 | | |
| 503 | 212 | Cu. Yd. | Shale Excavation | | | 212 | | |
| 503 | Lump Sum | Lump Sum | Cofferdams, Cribs and Sheeting | | | | | Lump Sum |
| 505 | Lump Sum | Lump Sum | Test Pile | | | | | Lump Sum |
| 506 | Lump Sum | Lump Sum | Pile Test Load | | | | | Lump Sum |
| 506 | 3 | Each | Subsequent Pile Test Load | | | | | |
| 507 | 1,704 | Lin. ft. | Steel Piles, HP10x42 | 1,704 | | | | |
| 507 | 31,422 | Lin. ft. | Steel Piles, HP12x53 | 2,270 | 11,258 | 17,894 | | |
| 507 | 516 | Each | Steel Points | | | 516 | | |
| 507 | 25 | Lin. ft. | Prebored Holes | | | 25 | | |
| 509 | (3,376,848) | Pounds | Reinforcing Steel | 46,430 | 182,964 | 1,327,862 | 1,819,592 ©1,816,649 | |
| 511 ©7,744 | (7,745) | Cu. Yd. | Class C Concrete, Superstructure | | 742 | | (7,003) ©7,002 | |
| 511 ©30,386 | (30,350) | Sq. ft. | Class C Concrete Sidewalk Wearing Course, As Per Plan | | 1,950 | | (28,400) ©28,436 | |
| 511 | 5,392 | Cu. Yd. | Class C Concrete, Piers Above Footings | | | 5,392 | | |
| 511 | 253 | Cu. Yd. | Class C Concrete, Abutments Above Footings | 253 | | | | |
| 511 | 2,516 | Cu. Yd. | Class C Concrete, Footings | 159 | | 2,357 | | |
| 511 | 391 | Cu. Yd. | Class C Concrete, Walls | | 391 | | | |
| 512 ©20912 | (20,914) | Sq. Yd. | Concrete Deck Waterproofing, As Per Plan | | 1,350 | | (19,564) ©19,562 | |
| 512 | 148 | Sq. Yd. | Type "A" Waterproofing | 148 | | | | |
| 512 | 20 | Lin. ft. | Premolded Sealing Strip | 20 | | | | |
| 513 | (1,462,923) | Pounds | *Structural Steel (ASTM A588 Unpainted, Except As Noted) | 136 | 25,461 | | (1,437,328) | 7,412,067 7,431,050 |
| 514 ©151,755 | (153,371) | Pounds | Field Painting Of Structural Steel | | | | | (153,371) ©151,755 |
| 516 | 102 | Sq. ft. | 2" Preformed Expansion Joint Filler | | | 102 | | |
| 516 | 204 | Sq. ft. | 1" Preformed Expansion Joint Filler | 123 | 81 | | | |
| 517 | 6,127 | Lin. ft. | Railing (Concrete Parapet with Chain-Link Fence, Aluminum Alloy Fabric, Sec. 710.03) | 57 | 390 | | 5,680 | |
| 518 | 98 | Cu. Yd. | Porous Backfill | 98 | | | | |
| 518 | 56 | Lin. ft. | 6"ϕ Perforated Helical C.M.P. (707.01) | 56 | | | | |
| 518 | 84 | Lin. ft. | 6"ϕ Non-Perforated Helical C.M.P. Including Specials (707.01) | 84 | | | | |
| 518 | 185 | Lin. ft. | 6"ϕ Pipe, Horizontal Conductors Including Supports | | | | | 185 |
| 518 | 837 | Lin. ft. | 8"ϕ Pipe, Horizontal Conductors Including Supports | | | | | 837 |
| 518 | 1,367 | Lin. ft. | 8"ϕ Pipe, Downspouts Including Supports | | | | | 1,367 |
| 518 | 131 | Each | Scuppers, Including Supports | | 10 | | 121 | |
| 518 ©5,094 | (5,096) | Lin. ft. | Subdrainage for Surface Course, As Per Plan | | 390 | | (4,706) ©4,704 | |
| | | | | | | | | |
| 601 | 3,561 | Sq. Yd. | Concrete Slope Protection (601.06) | 3,561 | | | | |
| | | | | | | | | |
| S625 | | | For Lighting Quantities see Lighting Plans | | | | | |
| | | | | | | | | |
| 808 ©7744 | (7,745) | Units | Chemical Admixture for Concrete Type A, B, or D | | 742 | | (7,003) ©7,002 | |
| Special | 335 | Lin. ft. | 1" Preformed Elastic Joint Sealer | | 335 | | | |
| Special | 67 | Lin. ft. | 2½" Preformed Elastic Joint Sealer | 67 | | | | |
| Special | 64 | Lin. ft. | Expansion Joint, Transflex Model 900, Waboflex Model SR9, or Approved Equal ⊙ | | | | 64 | |
| Special | 128 | Lin. ft. | Expansion Joint, Transflex Model 1300, Waboflex Model SR13, or Approved Equal ⊙ | | | | 128 | |
| Special | 8,526 | Sq. Yd. | Protective Coating of Concrete Surface | 288 | | 8,238 | | |
| Special | 14 | Each | Louvered Air Vents Including Screens, Complete As Per Plan | 4 | 10 | | | |
| Special | 1 | Each | Rolling Steel Door With Hardware, Including Field Painting, Complete As Per Plan | | 1 | | | |
| ‡Special | 4 | Each | ‡CEI Co. Splicing Chamber Complete, As Per Plan | | | | | 4 |
| #Special | 9,093 | Lin. ft. | # Installing 5"ϕ CEI Plastic Ducts | | | | | 9,093 |

3,373,905

1,430,050
1,455,647
7,437,664

104,500
* Item 513 Structural Steel includes (38,100) pounds of ASTM A237, Class B steel forgings and (98,100) pounds of ASTM A296 Class CA-15 steel castings. — 96,000

‡ Item Special, CEI Co. Splicing Chamber Complete, As Per Plan, includes structural steel, added reinforcement in the parapet, hot poured joint sealer around the splicing chamber and the 1" topping. To be paid for by the Cleveland Electric Illuminating Company.

# Item Special, Installing 5" ϕ CEI Plastic Ducts: Ducts shall be furnished by the CEI Co. and installed by the Contractor. To be paid for by the Cleveland Electric Illuminating Company.

⊙ Delastiflex DL-1350 and DL-900 have been approved as equals for this bridge.

©Note:
The changes shown in this revision were made necessary because the Contractor elected to furnish an expansion joint device significantly different than anticipated in the original design.

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 3-19 1976

Revised 5-23-75

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

ESTIMATED QUANTITIES

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN D.H.S | TRACED S.J.S | CHECKED A.R.S | REVIEWED C.A.S | REVISED 4-30-75 |
|---|---|---|---|---|
| DATE 3-20-74 | DATE 3-20-74 | DATE 5-3-74 | DATE 5-4-74 | SHEET 5/13 |

©REV. C.P. & W.E.B. 8-22-75

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

64
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## ESTIMATED QUANTITIES

| ITEM | TOTAL | UNIT | DESCRIPTION | ABUTMENTS | CELLULAR CONSTRUCTION | PIERS | SUPER-STRUCTURE | GENERAL | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 402 | 731 | Cu. Yd. | Asphalt Concrete, As Per Plan | | 47 | | 684 | | | |
| 404 | 485 | Cu. Yd. | Rubberized Asphalt Concrete, As Per Plan | | 31 | | 454 | | | |
| 407 | 1,754 | Gallons | Tack Coat, As Per Plan | | 113 | | 1,641 | | | |
| | | | | | | | | | | |
| 503 | 8,302 | Cu. Yd. | Unclassified Excavation | 443 | 220 | 7,639 | | | | |
| 503 | 212 | Cu. Yd. | Shale Excavation | | | 212 | | | | |
| 503 | Lump Sum | Lump Sum | Cofferdams, Cribs and Sheeting | | | | | Lump Sum | | |
| 505 | Lump Sum | Lump Sum | Test Pile | | | | | Lump Sum | | |
| 506 | Lump Sum | Lump Sum | Pile Test Load | | | | | Lump Sum | | |
| 506 | 3 | Each | Subsequent Pile Test Load | | | | | | | |
| 507 | 1,704 | Lin. ft. | Steel Piles, HP10x42 | 1,704 | | | | | | |
| 507 | 31,422 | Lin. ft. | Steel Piles, HP12x53 | 2,270 | 11,258 | 17,894 | | | | |
| 507 | 516 | Each | Steel Points | | | 516 | | | | |
| 507 | 25 | Lin. ft. | Prebored Holes | | | 25 | | | | |
| 509 | 3,376,848 | Pounds | Reinforcing Steel | 46,430 | 182,961 | 1,327,862 | 1,819,592 | | | |
| 511 | 7,745 | Cu. Yd. | Class C Concrete, Superstructure | | 742 | | 7,003 | | | |
| 511 | 30,350 | Sq. ft. | Class C Concrete Sidewalk Wearing Course, As Per Plan | | 1,950 | | 28,400 | | | |
| 511 | 5,392 | Cu. Yd. | Class C Concrete, Piers Above Footings | | | 5,392 | | | | |
| 511 | 253 | Cu. Yd. | Class C Concrete, Abutments Above Footings | 253 | | | | | | |
| 511 | 2,516 | Cu. Yd. | Class C Concrete, Footings | 159 | | 2,357 | | | | |
| 511 | 391 | Cu. Yd. | Class C Concrete, Walls | | 391 | | | | | |
| 512 | 20,914 | Sq. Yd. | Concrete Deck Waterproofing, As Per Plan | | 1,350 | | 19,564 | | | |
| 512 | 148 | Sq. Yd. | Type "A" Waterproofing | 148 | | | | | | |
| 512 | 20 | Lin. ft. | Premolded Sealing Strip | 20 | | | | | | |
| 513 | (1,462,923) | Pounds | *Structural Steel (ASTM A588 Unpainted, Except As Noted) | 136 | 25,461 | | (1,437,326) | 7,430,050 | | |
| 514 | 153,371 | Pounds | Field Painting Of Structural Steel | | | | | 153,371 | | |
| 516 | 102 | Sq. ft. | 1/2" Preformed Expansion Joint Filler | | | 102 | | | | |
| 516 | 204 | Sq. ft. | 1" Preformed Expansion Joint Filler | 123 | 81 | | | | | |
| 517 | 6,127 | Lin. ft. | Railing (Concrete Parapet with Chain-Link Fence, Aluminum Alloy Fabric, Sec. 710.03) | 57 | 390 | | 5,680 | | | |
| 518 | 98 | Cu. Yd. | Porous Backfill | 98 | | | | | | |
| 518 | 56 | Lin. ft. | 6"ϕ Perforated Helical C.M.P. (707.01) | 56 | | | | | | |
| 518 | 84 | Lin. ft. | 6"ϕ Non-Perforated Helical C.M.P. Including Specials (707.01) | 64 | | | | | | |
| 518 | 185 | Lin. ft. | 6"ϕ Pipe, Horizontal Conductors Including Supports | | | | | 185 | | |
| 518 | 837 | Lin. ft. | 8"ϕ Pipe, Horizontal Conductors Including Supports | | | | | 837 | | |
| 518 | 1,367 | Lin. ft. | 8"ϕ Pipe, Downspouts Including Supports | | | | | 1,367 | | |
| 518 | 131 | Each | Scuppers, Including Supports | | 10 | | 121 | | | |
| 518 | 5,096 | Lin. ft. | Subdrainage for Surface Course, As Per Plan | | 390 | | 4,706 | | | |
| | | | | | | | | | | |
| 601 | 3,561 | Sq. Yd. | Concrete Slope Protection (601.06) | 3,561 | | | | | | |
| | | | | | | | | | | |
| S625 | | | For Lighting Quantities see Lighting Plans | | | | | | | |
| | | | | | | | | | | |
| 808 | 7,745 | Units | Chemical Admixture for Concrete Type A, B, or D | | 742 | | 7,003 | | | |
| | | | | | | | | | | |
| Special | 335 | Lin. ft. | 1" Preformed Elastic Joint Sealer | | 335 | | | | | |
| Special | 67 | Lin. ft. | 2½" Preformed Elastic Joint Sealer | 67 | | | | | | |
| Special | 64 | Lin. ft. | Expansion Joint, Transflex Model 900, Waboflex Model SR9, or Approved Equal | | | | 64 | | | |
| Special | 128 | Lin. ft. | Expansion Joint, Transflex Model 1300, Waboflex Model SR13, or Approved Equal | | | | 128 | | | |
| Special | 8,526 | Sq. Yd. | Protective Coating of Concrete Surface | 288 | | 8,238 | | | | |
| Special | 14 | Each | Louvered Air Vents Including Screens, Complete As Per Plan | 4 | 10 | | | | | |
| Special | 1 | Each | Rolling Steel Door With Hardware, Including Field Painting, Complete As Per Plan | | 1 | | | | | |
| ‡Special | 4 | Each | ‡CEI Co. Splicing Chamber Complete, As Per Plan | | | | | 4 | | |
| #Special | 9,093 | Lin. ft. | # Installing 5"ϕ CEI Plastic Ducts | | | | | 9,093 | | |

7,430,050
7,455,647

104,500

* Item 513 Structural Steel includes (38,100) pounds of ASTM A237, Class B steel forgings and (98,100) pounds of ASTM A296 Class CA-15 steel castings. 96,000

‡ Item Special, CEI Co. Splicing Chamber Complete, As Per Plan, includes structural steel, added reinforcement in the parapet, hot poured joint sealer around the splicing chamber and the 4" topping. To be paid for by the Cleveland Electric Illuminating Company.

# Item Special, Installing 5"ϕ CEI Plastic Ducts: Ducts shall be furnished by the CEI Co. and installed by the Contractor. To be paid for by the Cleveland Electric Illuminating Company.

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 8-22 1975

Revised 5-23-75

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

ESTIMATED QUANTITIES

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN D.H.S. | TRACED S.J.S. | CHECKED A.H.S. | REVIEWED C.A.B. | REVISED 4-30-75 |
|---|---|---|---|---|
| DATE 3-20-74 | DATE 3-20-74 | DATE 5-9-74 | DATE 12-4-74 | SHEET 5/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

64/146

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## ESTIMATED QUANTITIES

| ITEM | TOTAL | UNIT | DESCRIPTION | ABUTMENTS | CELLULAR CONSTRUCTION | PIERS | SUPER-STRUCTURE | GENERAL |
|---|---|---|---|---|---|---|---|---|
| 402 | 731 | Cu. Yd. | Asphalt Concrete, As Per Plan | | 47 | | 684 | |
| 404 | 485 | Cu. Yd. | Rubberized Asphalt Concrete, As Per Plan | | 31 | | 454 | |
| 407 | 1,754 | Gallons | Tack Coat, As Per Plan | | 113 | | 1,641 | |
| | | | | | | | | |
| 503 | 8,302 | Cu. Yd. | Unclassified Excavation | 443 | 220 | 7,639 | | |
| 503 | 212 | Cu. Yd. | Shale Excavation | | | 212 | | |
| 503 | Lump Sum | Lump Sum | Cofferdams, Cribs and Sheeting | | | | | Lump Sum |
| 505 | Lump Sum | Lump Sum | Test Pile | | | | | Lump Sum |
| 506 | Lump Sum | Lump Sum | Pile Test Load | | | | | Lump Sum |
| 506 | 3 | Each | Subsequent Pile Test Load | | | | | |
| 507 | 1,704 | Lin. ft. | Steel Piles, HP10x42 | 1,704 | | | | |
| 507 | 31,422 | Lin. ft. | Steel Piles, HP12x53 | 2,270 | 11,258 | 17,894 | | |
| 507 | 516 | Each | Steel Points | | | 516 | | |
| 507 | 25 | Lin. ft. | Prebored Holes | | | 25 | | |
| 509 | 3,376,848 | Pounds | Reinforcing Steel | 46,430 | 182,964 | 1,327,862 | 1,819,592 | |
| 511 | 7,745 | Cu. Yd. | Class C Concrete, Superstructure | | 742 | | 7,003 | |
| 511 | 30,350 | Sq. ft. | Class C Concrete Sidewalk Wearing Course, As Per Plan | | 1,950 | | 28,400 | |
| 511 | 5,392 | Cu. Yd. | Class C Concrete, Piers Above Footings | | | 5,392 | | |
| 511 | 253 | Cu. Yd. | Class C Concrete, Abutments Above Footings | 253 | | | | |
| 511 | 2,516 | Cu. Yd. | Class C Concrete, Footings | 159 | | 2,357 | | |
| 511 | 391 | Cu. Yd. | Class C Concrete, Walls | | 391 | | | |
| 512 | 20,914 | Sq. Yd. | Concrete Deck Waterproofing, As Per Plan | | 1,350 | | 19,564 | |
| 512 | 148 | Sq. Yd. | Type "A" Waterproofing | 148 | | | | |
| 512 | 20 | Lin. ft. | Premolded Sealing Strip | 20 | | | | |
| 513 | (7,462,923) | Pounds | *Structural Steel (ASTM A588 Unpainted, Except As Noted) | 136 | 25,461 | | (1,437,326) | 7,430,050 |
| 514 | 153,371 | Pounds | Field Painting Of Structural Steel | | | | | 153,371 |
| 516 | 102 | Sq. ft. | 2" Preformed Expansion Joint Filler | | | 102 | | |
| 516 | 204 | Sq. ft. | 1" Preformed Expansion Joint Filler | 123 | 81 | | | |
| 517 | 6,127 | Lin. ft. | Railing (Concrete Parapet with Chain-Link Fence, Aluminum Alloy Fabric, Sec. 710.03) | 57 | 390 | | 5,680 | |
| 518 | 98 | Cu. Yd. | Porous Backfill | 98 | | | | |
| 518 | 56 | Lin. ft. | 6"ϕ Perforated Helical C.M.P. (707.01) | 56 | | | | |
| 518 | 84 | Lin. ft. | 6"ϕ Non-Perforated Helical C.M.P. Including Specials (707.01) | 84 | | | | |
| 518 | 185 | Lin. ft. | 6"ϕ Pipe, Horizontal Conductors Including Supports | | | | | 185 |
| 518 | 837 | Lin. ft. | 8"ϕ Pipe, Horizontal Conductors Including Supports | | | | | 837 |
| 518 | 1,367 | Lin. ft. | 8"ϕ Pipe, Downspouts Including Supports | | | | | 1,367 |
| 518 | 131 | Each | Scuppers, Including Supports | | 10 | | 121 | |
| 518 | 5,096 | Lin. ft. | Subdrainage for Surface Course, As Per Plan | | 390 | | 4,706 | |
| | | | | | | | | |
| 601 | 3,561 | Sq. Yd. | Concrete Slope Protection (601.06) | 3,561 | | | | |
| | | | | | | | | |
| S625 | | | For Lighting Quantities see Lighting Plans | | | | | |
| | | | | | | | | |
| 808 | 7,745 | Units | Chemical Admixture for Concrete Type A, B, or D | | 742 | | 7,003 | |
| | | | | | | | | |
| Special | 335 | Lin. ft. | 1" Preformed Elastic Joint Sealer | | 335 | | | |
| Special | 67 | Lin. ft. | 2½" Preformed Elastic Joint Sealer | 67 | | | | |
| Special | 64 | Lin. ft. | Expansion Joint, Transflex Model 900, Waboflex Model SR9, or Approved Equal | | | | 64 | |
| Special | 128 | Lin. ft. | Expansion Joint, Transflex Model 1300, Waboflex Model SR13, or Approved Equal | | | | 128 | |
| Special | 8,526 | Sq. Yd. | Protective Coating of Concrete Surface | 288 | | 8,238 | | |
| Special | 14 | Each | Louvered Air Vents Including Screens, Complete As Per Plan | 4 | 10 | | | |
| Special | 1 | Each | Railing Steel Door With Hardware, Including Field Painting, Complete As Per Plan | | 1 | | | |
| #Special | 4 | Each | #CEI Co. Splicing Chamber Complete, As Per Plan | | | | | 4 |
| #Special | 9,093 | Lin. Ft. | # Installing 5"ϕ CEI Plastic Ducts | | | | | 9,093 |

7,430,050

104,500

96,000

* Item 513 Structural Steel includes (38,100) pounds of ASTM A237, Class B steel forgings and (78,100) pounds of ASTM A296 Class CA-15 steel castings.

# Item Special, CEI Co. Splicing Chamber Complete, As Per Plan, includes structural steel, added reinforcement in the parapet, hot poured joint sealer around the splicing chamber and the 4" topping. To be paid for by the Cleveland Electric Illuminating Company.

* Item Special, Installing 5" ϕ CEI Plastic Ducts: Ducts shall be furnished by the CEI Co. and installed by the Contractor. To be paid for by the Cleveland Electric Illuminating Company.

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 5-23 1975

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

ESTIMATED QUANTITIES

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

| CUYAHOGA COUNTY | | | | | OHIO |
|---|---|---|---|---|---|
| DRAWN D.H.S. | TRACED S.J.S | CHECKED A.H.S | REVIEWED C.A.B | REVISED 4-30-75 | |
| DATE 3-20-74 | DATE 3-20-74 | DATE 5-9-74 | DATE 12-4-74 | SHEET 5 of 23 | |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 8 | OHIO | | |

64
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## ESTIMATED QUANTITIES

| ITEM | TOTAL | UNIT | DESCRIPTION | ABUTMENTS | CELLULAR CONSTRUCTION | PIERS | SUPER-STRUCTURE | GENERAL | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 402 | 731 | Cu. Yd. | Asphalt Concrete, As Per Plan | | 47 | | 684 | | | |
| 404 | 485 | Cu. Yd. | Rubberized Asphalt Concrete, As Per Plan | | 31 | | 454 | | | |
| 407 | 1,754 | Gallons | Tack Coat, As Per Plan | | 113 | | 1,641 | | | |
| | | | | | | | | | | |
| 503 | 8,302 | Cu. Yd. | Unclassified Excavation | 443 | 220 | 7,639 | | | | |
| 503 | 212 | Cu. Yd. | Shale Excavation | | | 212 | | | | |
| 503 | Lump Sum | Lump Sum | Cofferdams, Cribs and Sheeting | | | | | Lump Sum | | |
| 505 | Lump Sum | Lump Sum | Test Pile | | | | | Lump Sum | | |
| 506 | Lump Sum | Lump Sum | Pile Test Load | | | | | Lump Sum | | |
| 506 | 3 | Each | Subsequent Pile Test Load | | | | | | | |
| 507 | 1,704 | Lin. ft. | Steel Piles, HP10x42 | 1,704 | | | | | | |
| 507 | 31,422 | Lin. ft. | Steel Piles, HP12x53 | 2,270 | 11,258 | 17,894 | | | | |
| 507 | 516 | Each | Steel Points | | | 516 | | | | |
| 507 | 25 | Lin. ft. | Prebored Holes | | | 25 | | | | |
| 509 | 3,376,848 | Pounds | Reinforcing Steel | 46,430 | 182,964 | 1,327,862 | 1,819,592 | | | |
| 511 | 7,745 | Cu. Yd. | Class C Concrete, Superstructure | | 742 | | 7,003 | | | |
| 511 | 30,350 | Sq. ft. | Class C Concrete Sidewalk Wearing Course, As Per Plan | | 1,950 | | 28,400 | | | |
| 511 | 5,392 | Cu. Yd. | Class C Concrete, Piers Above Footings | | | 5,392 | | | | |
| 511 | 253 | Cu. Yd. | Class C Concrete, Abutments Above Footings | 253 | | | | | | |
| 511 | 2,516 | Cu. Yd. | Class C Concrete, Footings | 159 | | 2,357 | | | | |
| 511 | 391 | Cu. Yd. | Class C Concrete, Walls | | 391 | | | | | |
| 512 | 20,914 | Sq. Yd. | Concrete Deck Waterproofing, As Per Plan | | 1,350 | | 19,564 | | | |
| 512 | 148 | Sq. Yd. | Type "A" Waterproofing | 148 | | | | | | |
| 512 | 20 | Lin. ft. | Premolded Sealing Strip | 20 | | | | | | |
| 513 | 7,462,925 | Pounds | *Structural Steel (ASTM A588 Unpainted, Except As Noted) | 136 | 25,461 | | 7,437,326 | | | |
| 514 | 153,371 | Pounds | Field Painting Of Structural Steel | | | | | 153,371 | | |
| 516 | 102 | Sq. ft. | ½" Preformed Expansion Joint Filler | | | 102 | | | | |
| 516 | 204 | Sq. ft. | 1" Preformed Expansion Joint Filler | 123 | 81 | | | | | |
| 517 | 6,127 | Lin. ft. | Railing (Concrete Parapet with Chain-Link Fence, Aluminum Alloy Fabric, Sec. 710.03) | 57 | 390 | | 5,680 | | | |
| 518 | 98 | Cu. Yd. | Porous Backfill | 98 | | | | | | |
| 518 | 56 | Lin. ft. | 6"ϕ Perforated Helical C.M.P. (707.01) | 56 | | | | | | |
| 518 | 84 | Lin. ft. | 6"ϕ Non-Perforated Helical C.M.P. Including Specials (707.01) | 84 | | | | | | |
| 518 | 185 | Lin. ft. | 6"ϕ Pipe, Horizontal Conductors Including Supports | | | | | 185 | | |
| 518 | 837 | Lin. ft. | 8"ϕ Pipe, Horizontal Conductors Including Supports | | | | | 837 | | |
| 518 | 1,367 | Lin. ft. | 8"ϕ Pipe, Downspouts Including Supports | | | | | 1,367 | | |
| 518 | 131 | Each | Scuppers, Including Supports | | 10 | | 121 | | | |
| 518 | 5,096 | Lin. ft. | Subdrainage for Surface Course, As Per Plan | | 390 | | 4,706 | | | |
| | | | | | | | | | | |
| 601 | 3,561 | Sq. Yd. | Concrete Slope Protection (601.06) | 3,561 | | | | | | |
| | | | | | | | | | | |
| 625 | | | For Lighting Quantities see Lighting Plans | | | | | | | |
| | | | | | | | | | | |
| 808 | 7,745 | Units | Chemical Admixture for Concrete Type A, B, or D | | 742 | | 7,003 | | | |
| | | | | | | | | | | |
| Special | 335 | Lin. ft. | 1" Preformed Elastic Joint Sealer | | 335 | | | | | |
| Special | 67 | Lin. ft. | 2⅜" Preformed Elastic Joint Sealer | 67 | | | | | | |
| Special | 64 | Lin. ft. | Expansion Joint, Transflex Model 900, Waboflex Model SP9, or Approved Equal | | | | 64 | | | |
| Special | 128 | Lin. ft. | Expansion Joint, Transflex Model 1300, Waboflex Model SP13, or Approved Equal | | | | 128 | | | |
| Special | 8,526 | Sq. Yd. | Protective Coating of Concrete Surface | 288 | | 8,238 | | | | |
| Special | 14 | Each | Louvered Air Vents Including Screens, Complete As Per Plan | 4 | 10 | | | | | |
| Special | 1 | Each | Rolling Steel Door With Hardware, Including Field Painting, Complete As Per Plan | | 1 | | | | | |
| ‡Special | 4 | Each | ‡C.E.I. Co. Splicing Chamber Complete, As Per Plan | | | | | 4 | | |
| #Special | 9,093 | Lin. Ft. | #Installing 5"ϕ CEI Plastic Ducts | | | | | 9,093 | | |

* **Item 513 Structural Steel** includes 132,100 pounds of ASTM A237, Class B steel forgings and 78,100 pounds of ASTM A296 Class CA-15 steel castings.

‡ **Item Special, CEI Co. Splicing Chamber Complete, As Per Plan, includes structural steel, added reinforcement in the parapet, hot poured joint sealer around the splicing chamber and the 1" topping.** To be paid for by the Cleveland Electric Illuminating Company.

# Item Special, Installing 5"ϕ CEI Plastic Ducts: Ducts shall be furnished by the CEI Co. and installed by the Contractor. To be paid for by the Cleveland Electric Illuminating Company.

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 4-30 1975

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

**ESTIMATED QUANTITIES**

**DENISON-HARVARD BRIDGE**
**OVER CUYAHOGA RIVER VALLEY**

STA. 196+97.50 TO
STA. 227+37.75

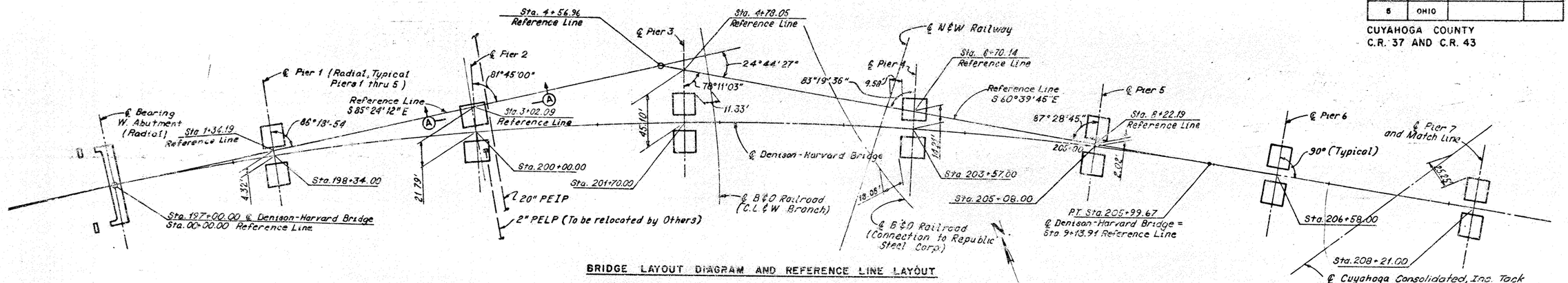
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| D.W.S | S.J.S | A.H.S | C.A.S | |
| DATE 3-20-74 | DATE 3-20-74 | DATE 5-9-74 | DATE 4-7-74 | SHEET 5 173 |

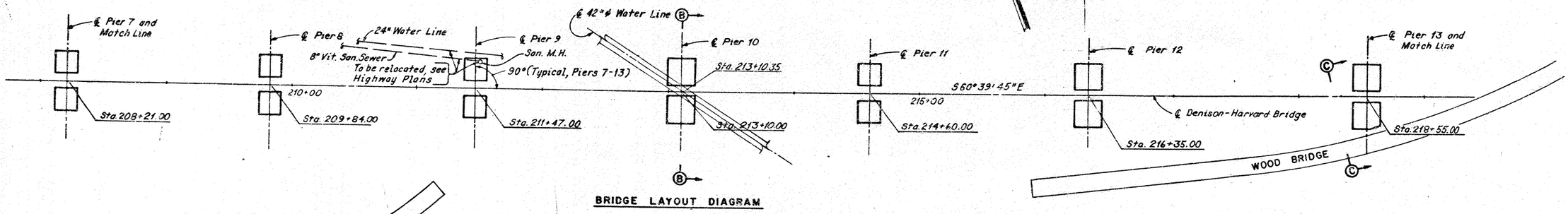
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

65/148

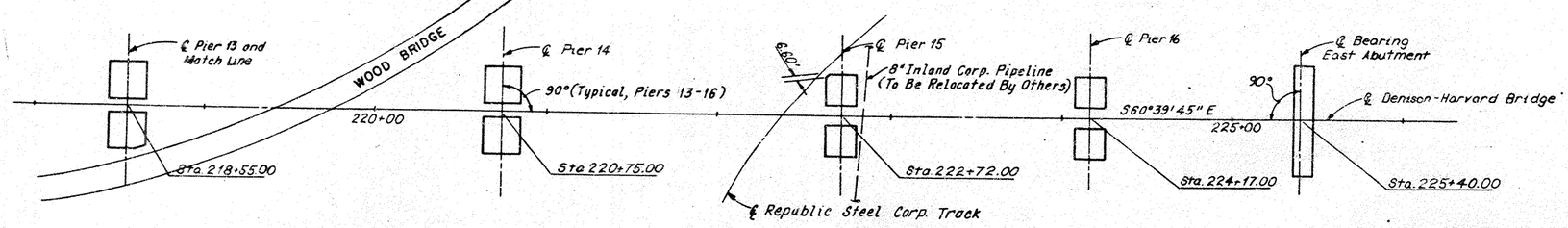
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



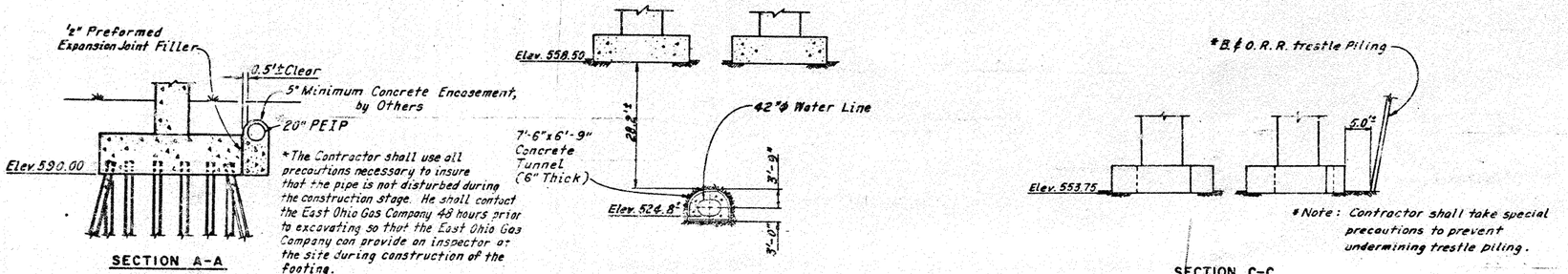

BRIDGE LAYOUT DIAGRAM AND REFERENCE LINE LAYOUT




BRIDGE LAYOUT DIAGRAM




BRIDGE LAYOUT DIAGRAM




SECTION A-A
PIER 2

SECTION B-B
PIER 10

SECTION C-C
PIER 13

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# BRIDGE LAYOUT DIAGRAM

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

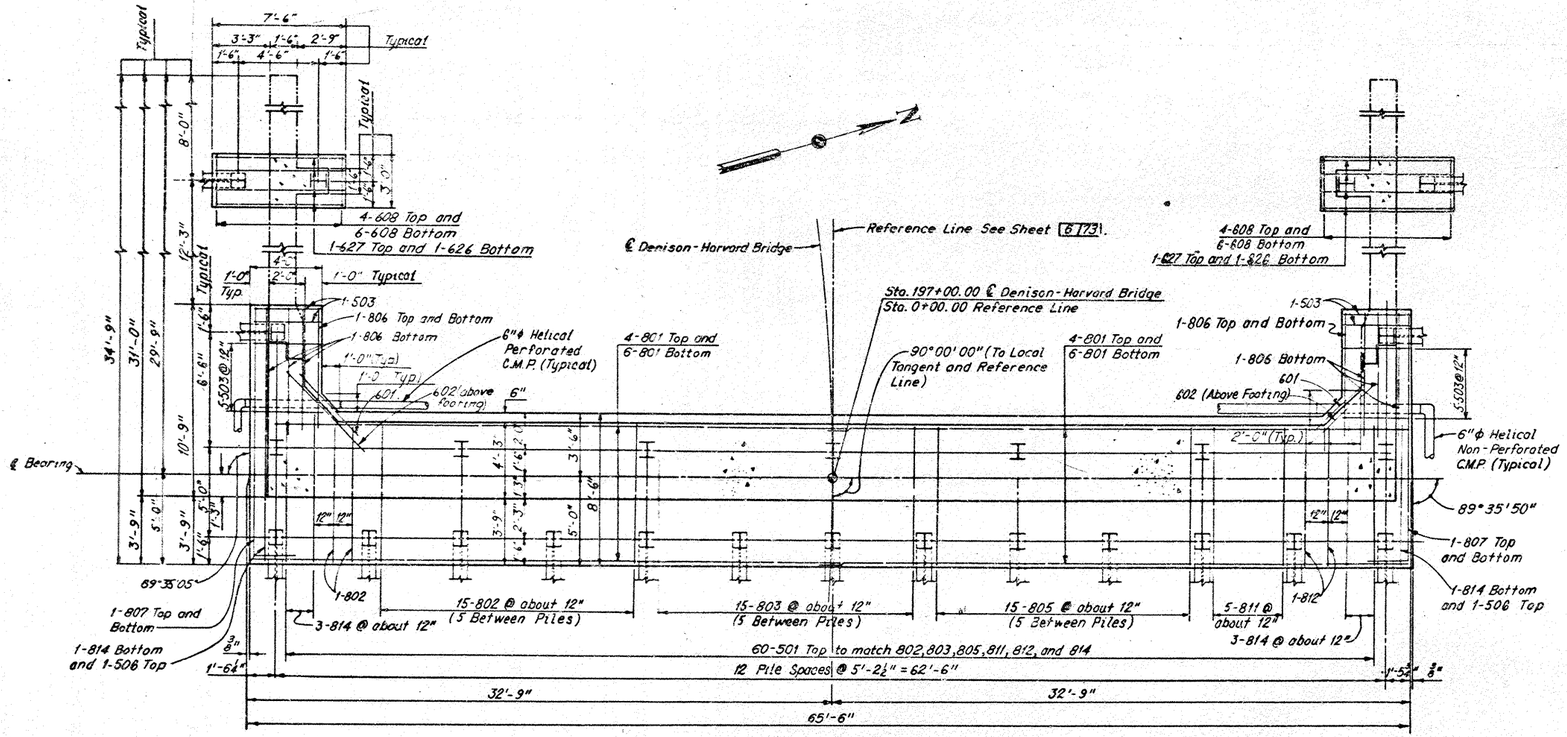
CUYAHOGA COUNTY OHIO

| DRAWN DHS | TRACED SJS | CHECKED AHS | REVIEWED C.A.B. | REVISED |
|---|---|---|---|---|
| DATE 10-5-73 | DATE 10-11-73 | DATE 2-19-74 | DATE 3-25-74 | SHEET 6/173 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

66
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




FOOTING PLAN

Notes:
All abutment piles are HP10x42.
All battered piles shall be inclined 4 in 12 in the direction shown.
For west abutment plan and elevation see sheet 8/73.
For wingwall elevations see sheet 9/73.
The following abbreviations are used
nf = near face
ff = far face
ef = each face
Typ. = Typical
Elev. = Elevation
For reinforcement schedule see Sheet 63/73.

Note: All reinforcing bar marks shall be prefixed AW.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# WEST ABUTMENT FOOTING

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN W.H.L. | TRACED S.J.S | CHECKED A.H.S | REVIEWED C.A.B. | REVISED |
|---|---|---|---|---|
| DATE 9-1573 | DATE 10-11-73 | DATE 10-24-73 | DATE 4-6-74 | SHEET 7/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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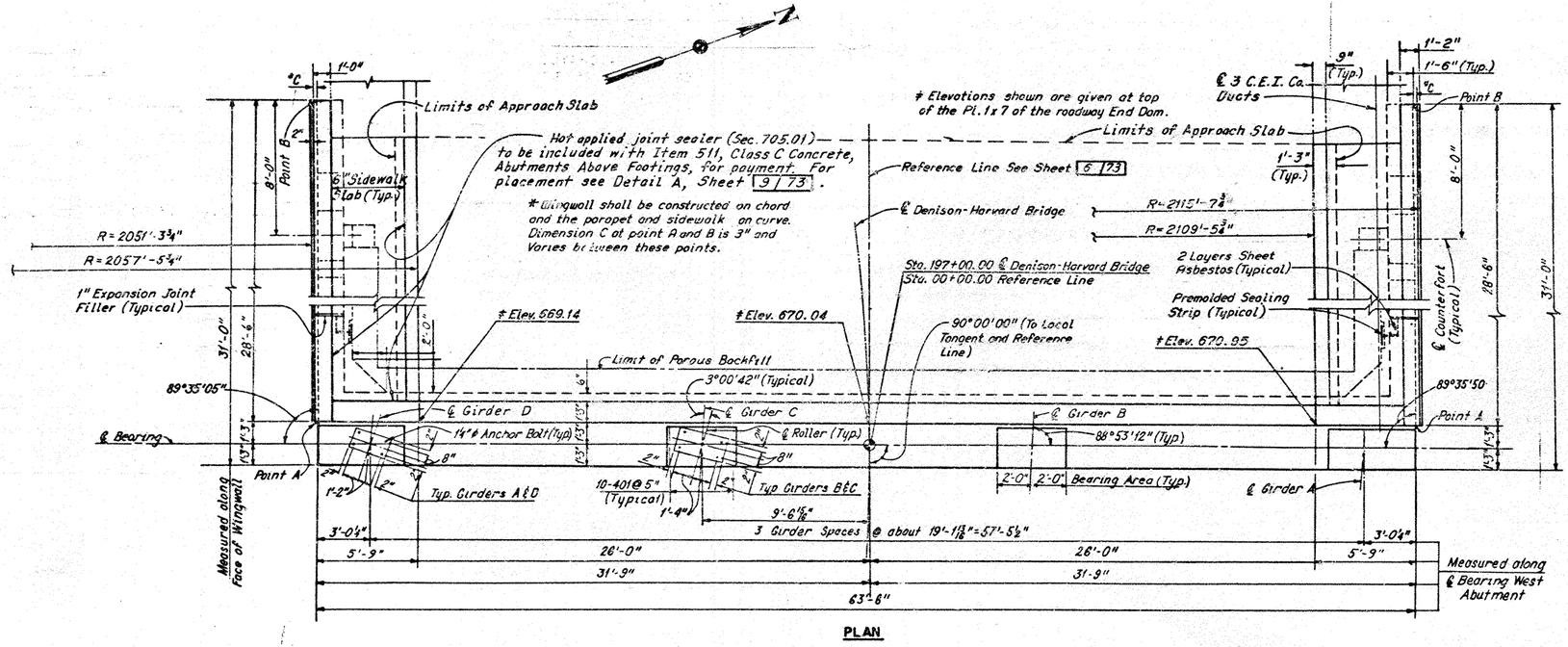
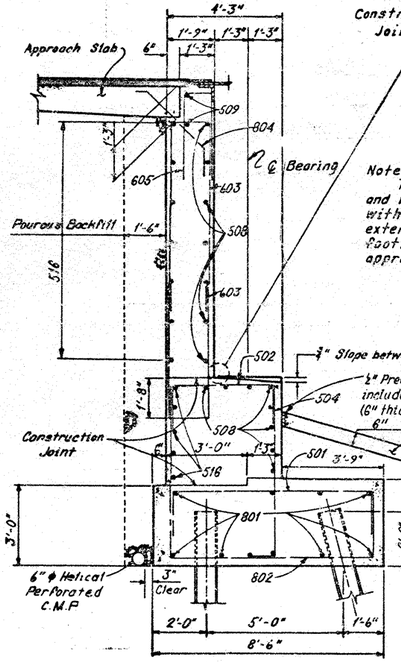
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




SECTION A–A

BRIDGE SEAT NOTCH AT BEARING AREAS

Note:
The back face of the abutment and wingwalls shall be coated with Type A Waterproofing, extending from the top of the footing to the bottom of the approach slab or sidewalk.

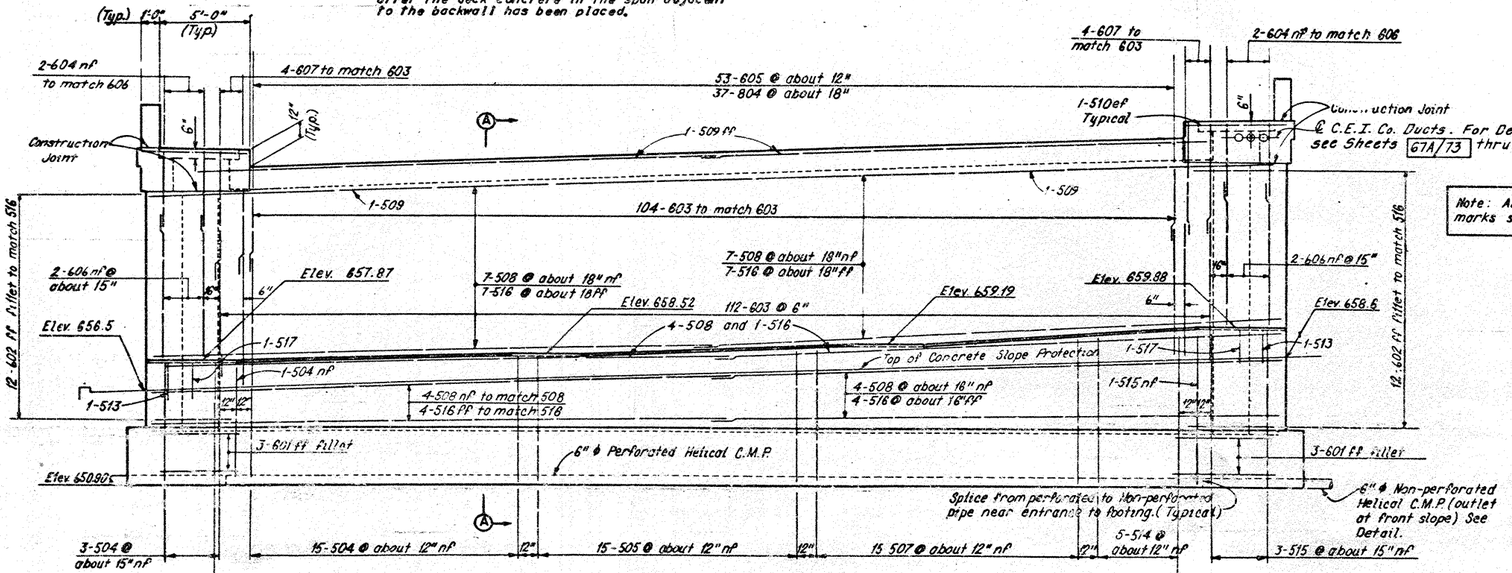
¾" Slope between Bridge Seats

½" Preformed Expansion Joint filler included with concrete slope protection (6" thick) for payment.

Concrete Slope Protection (See 601.06)

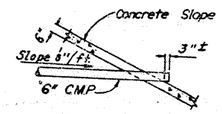
Note:
In addition to the provisions of 511.08, backwall concrete shall not be placed until after the deck concrete in the span adjacent to the backwall has been placed.

Note: In addition to the provisions of 511.08, backwall concrete shall not be placed until after the deck concrete in the span adjacent to the backwall has been placed.




ELEVATION
(Piles not shown)

Note: All reinforcing bar marks shall be prefixed AW.




TERMINATION OF 6" ϕ C.M.P. AT THE FRONT SLOPE

Notes:
For notes see Sheet 7 / 73.
For Roadway End Dam Details see Sheets 43 / 73 and 44 / 73.
For Hot Applied Joint Sealer Detail see Sheet 64 / 73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# WEST ABUTMENT PLAN AND ELEVATION -DENISON-HARVARD BRIDGE OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

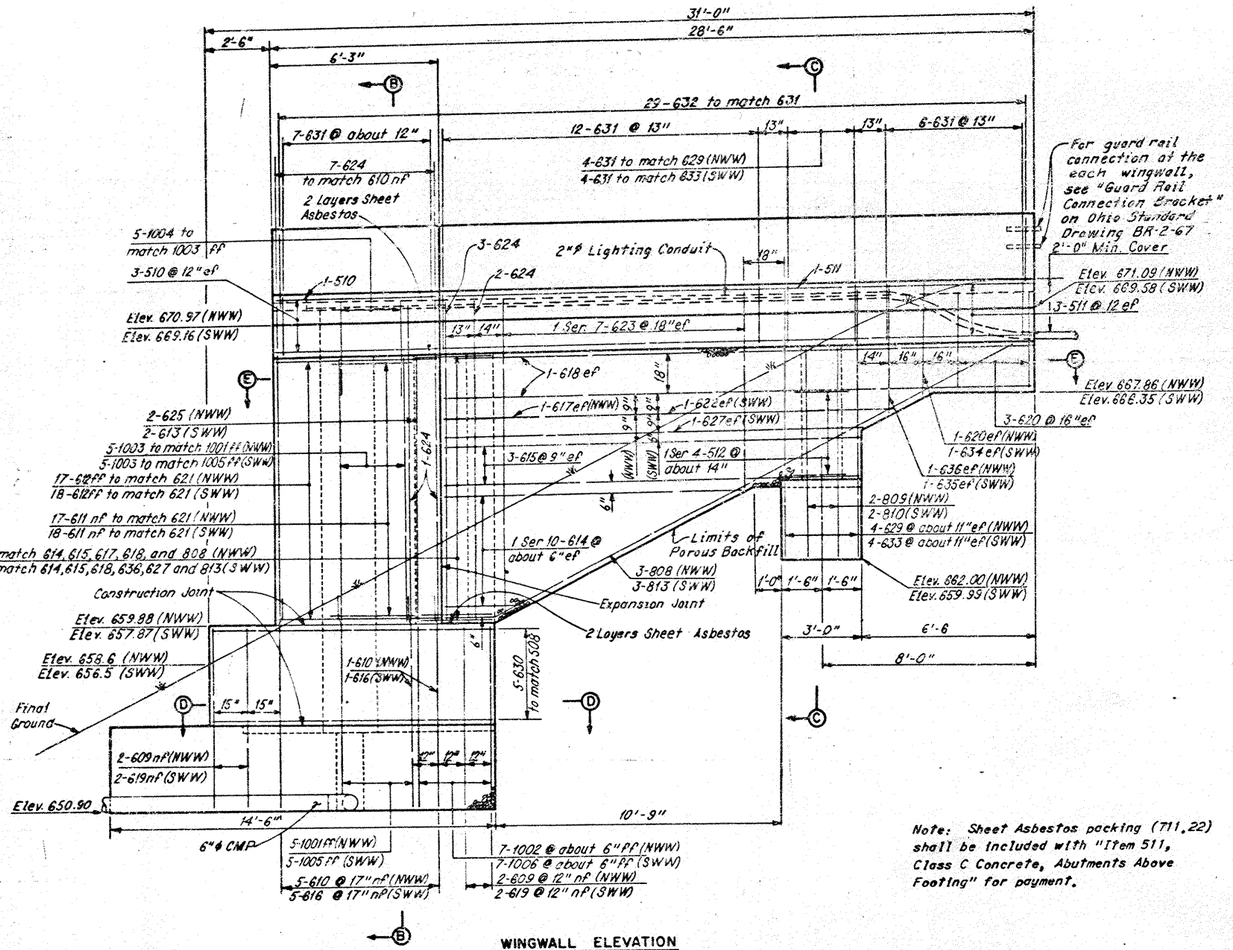
CUYAHOGA COUNTY OHIO

| DRAWN WHL | TRACED JJS | CHECKED AHS | REVIEWED CAB | REVISED |
|---|---|---|---|---|
| DATE 9-11-73 | DATE 10-19-73 | DATE 11-6-73 | DATE 4-7-74 | SHEET 8 / 73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

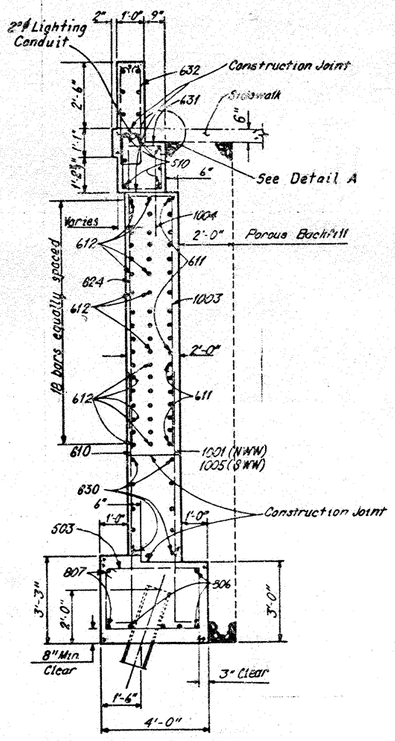
68
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



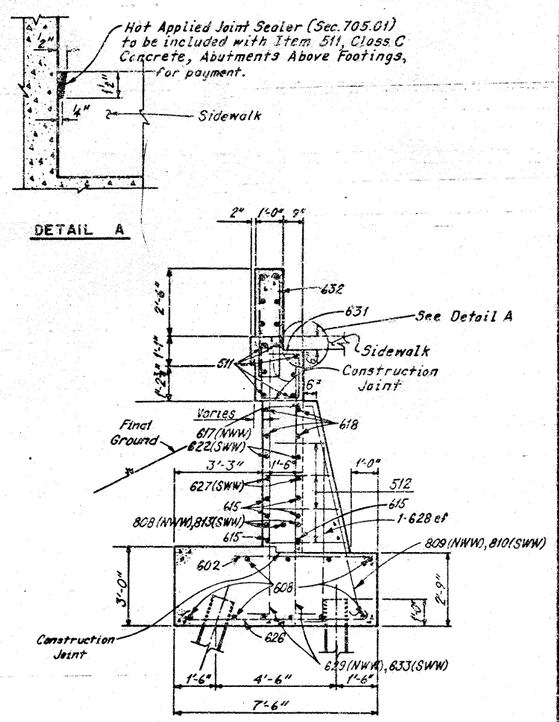

WINGWALL ELEVATION
(Piles and Fence not shown)

Note: Sheet Asbestos packing (711.22) shall be included with "Item 511, Class C Concrete, Abutments Above Footing" for payment.




SECTION B-B

( South Wingwall shown, North Wingwall similar except as noted. Fence not shown.)




DETAIL A

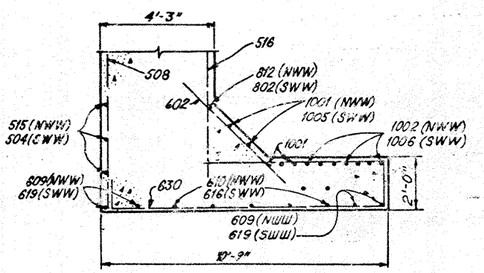



SECTION C-C

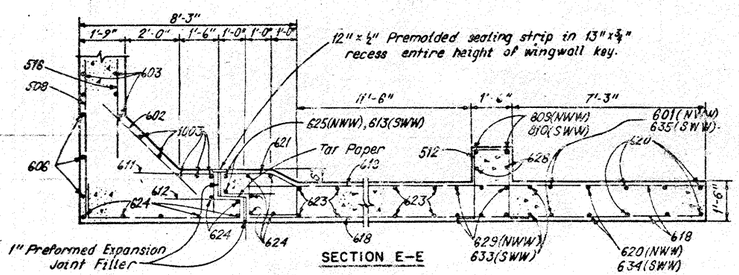
( South Wingwall shown North Wingwall similar except as noted. Fence not shown.)

Notes:
For longitudinal reinforcement in the parapets and fence post spacing see sheet 62/73
The following abbreviations are used:
NWW = North Wingwall
SWW = South Wingwall
For additional notes see sheet 7/73

Note: All reinforcing bar marks shall be prefixed AW.




SECTION D-D




SECTION E-E

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# WEST ABUTMENT WINGWALLS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN NHL | TRACED SJS | CHECKED AHS | REVIEWED C.A.B. | REVISED |
|---|---|---|---|---|
| DATE 9-18-73 | DATE 10-18-73 | DATE 11-6-73 | DATE 4-7-74 | SHEET 9/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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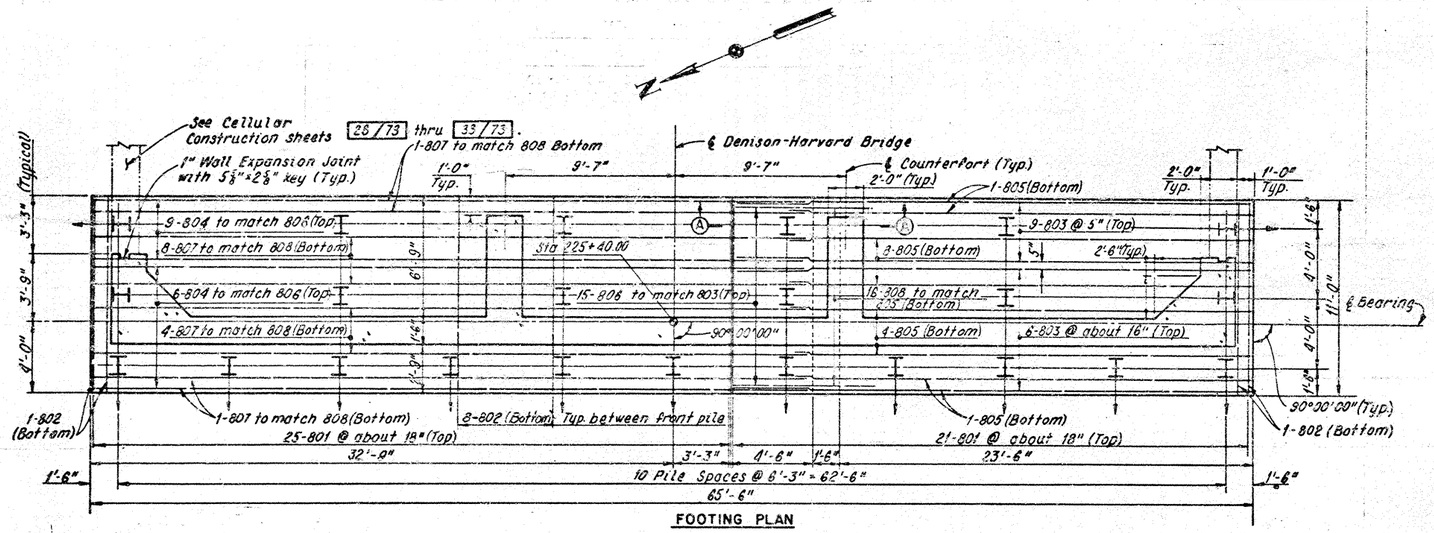
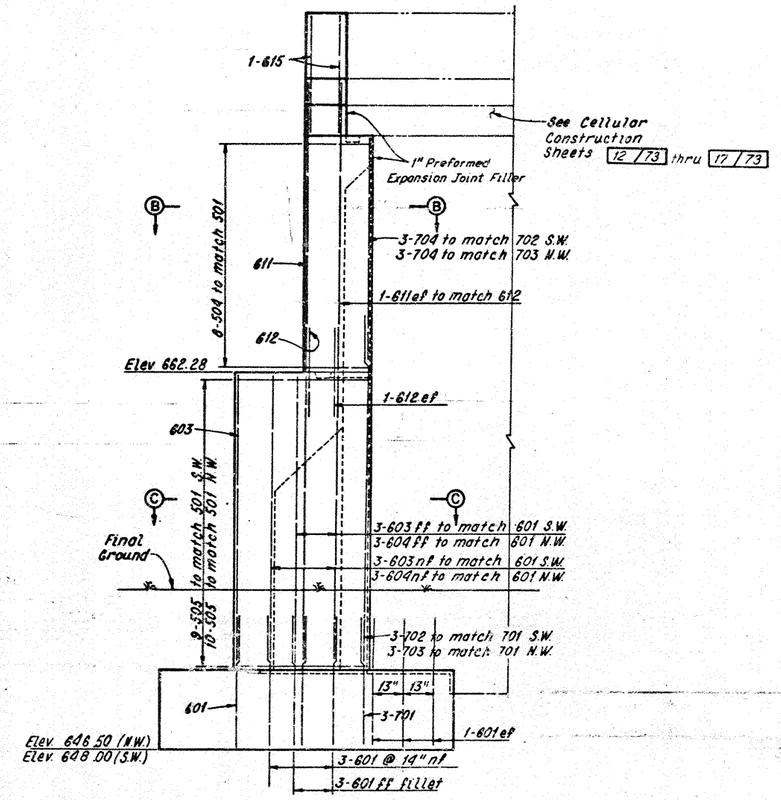
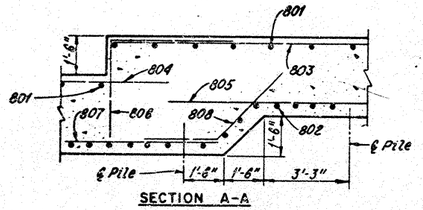
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



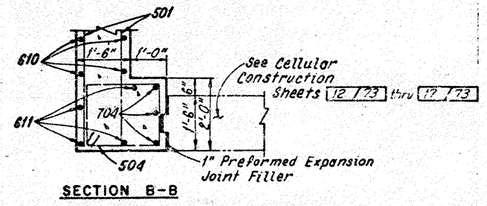

FOOTING PLAN




SOUTH END ELEVATION
(North Similar except as noted)
(Piles and Fence not shown)

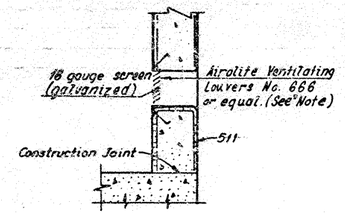



SECTION A-A



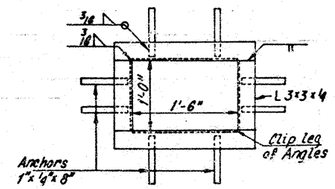

SECTION B-B

Note: All reinforcing bar marks shall be prefixed AE.

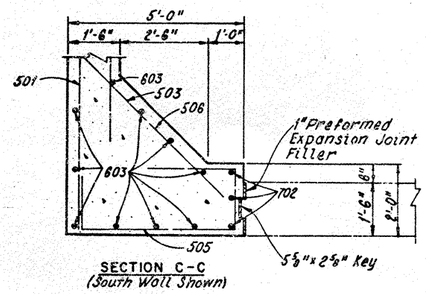



VENT OPENING

*Note: Fixed wall louver, 4" deep, 16 gauge cold rolled steel. To be hardenized and finished with a baked Epon primer and two coats of baked enamel, grey in color. Louvers to be adequately fastened to angles and concrete by means of ½" expansion bolts.




ELEVATION OF LOUVER FRAME
Louver frames shall be included with "Item 513, Structural Steel", for payment




SECTION C-C
(South Wall Shown)

Notes:
All piles are HP12x53
All battered piles shall be inclined 3 in 12 in the direction shown.
For East Abutment Plan and Elevation see sheet 11/73.
The following abbreviations are used:
Elev. = elevation
N.C. = North Counterfort
S.C. = South Counterfort
nf = near face
ef = each face
ff = far face
Typ. = typical
N.W. = North Wall
S.W. = South Wall
For Reinforcement Schedule, see Sheet 68/73

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# EAST ABUTMENT FOOTING AND WINGWALL

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN AHS | TRACED SJS | CHECKED DHS | REVIEWED CAB | REVISED |
|---|---|---|---|---|
| DATE 1-15-74 | DATE 1-18-74 | DATE 2-12-74 | DATE 4-7-74 | SHEET 10/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 8 | OHIO | | |

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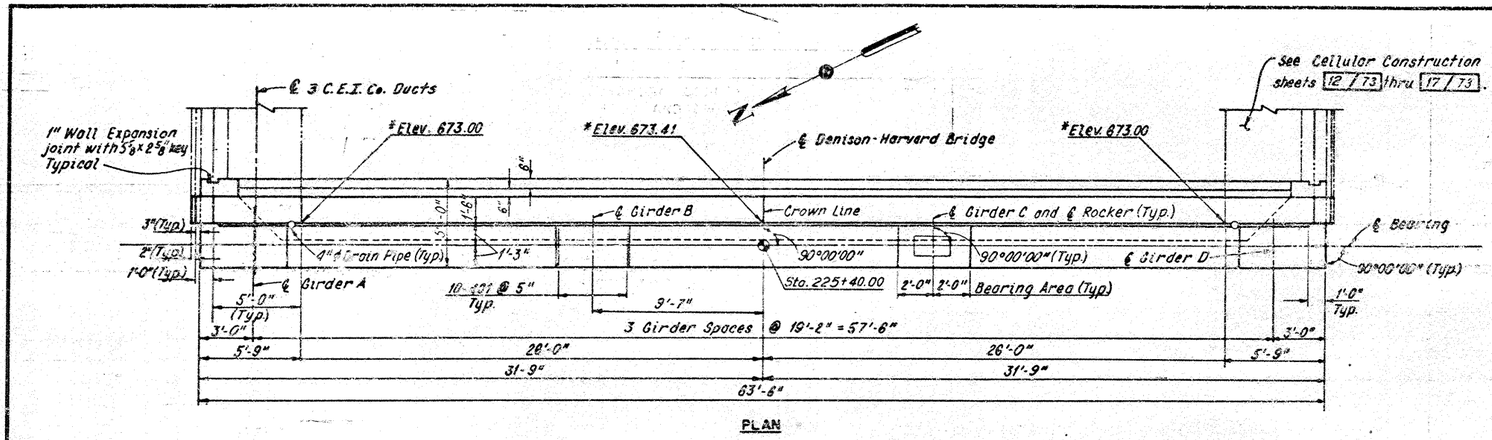
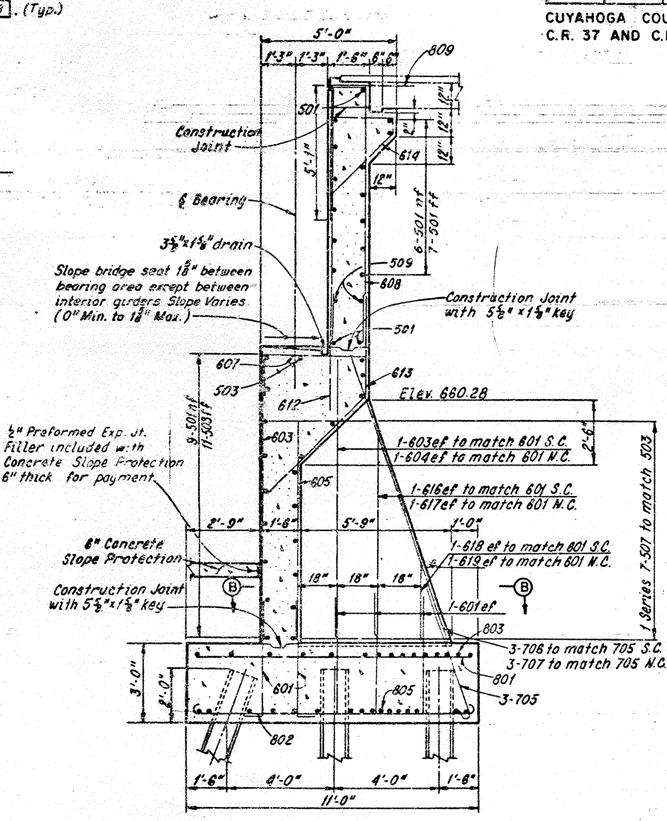
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




PLAN

*Elevations shown are given at the top of the ∠7x4x⅝ of the roadway end dam.

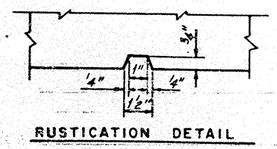



SECTION A-A

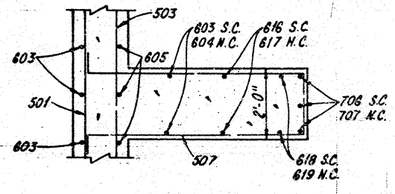



ELEVATION
(Piles and Fence not shown)

Note: All reinforcing bar marks shall be prefixed AE.




RUSTICATION DETAIL




SECTION B-B

Notes:
For Footing Plan, Wall Elevation, Louvered Air Vent Details and additional notes see sheet 10/73
For Roadway End Dam Details see sheet 48/73

For Drainage behind abutment see Drainage Details sheet 60/73

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# EAST ABUTMENT
# PLAN AND ELEVATION
## DENISON-HARVARD BRIDGE
## OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN AHS | TRACED SJS | CHECKED DHS | REVIEWED C.A.B. | REVISED |
|---|---|---|---|---|
| DATE 1-15-74 | DATE 1-18-74 | DATE 1-30-74 | DATE 4-7-74 | SHEET 11/73 |

| FHWA REGION | STATE | PROJECT | | |
|---|---|---|---|---|
| 5 | OHIO | | | |

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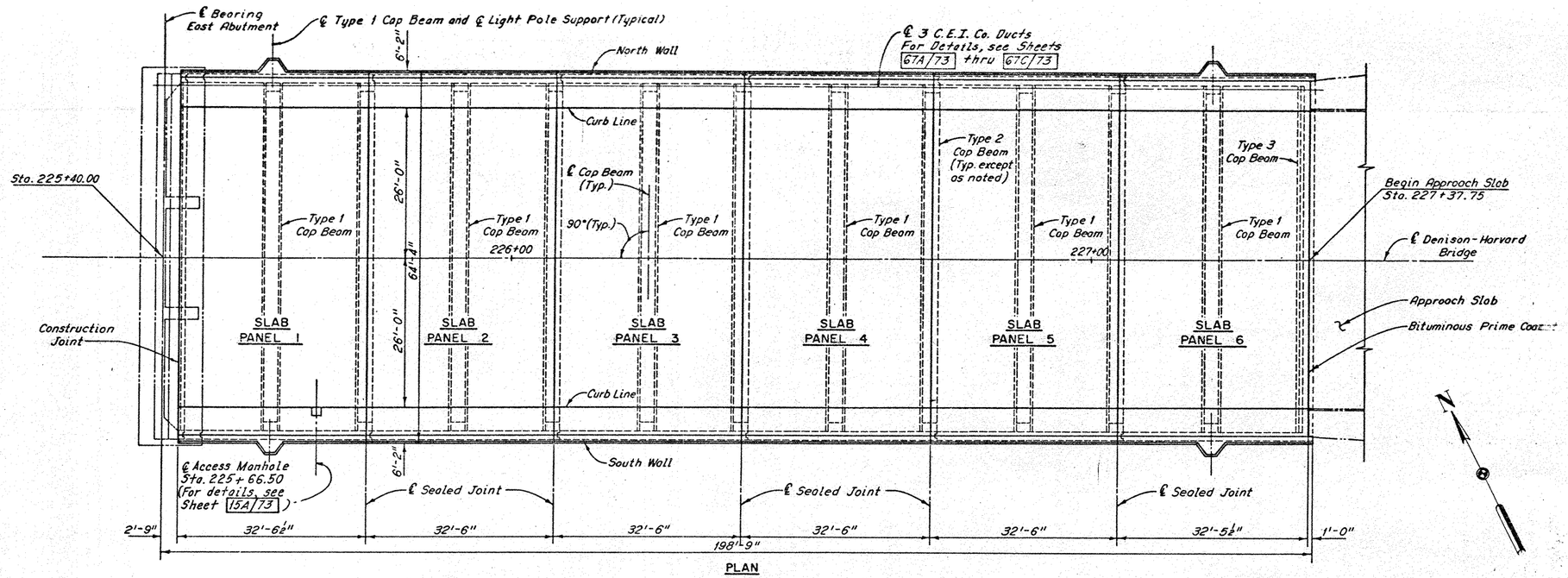
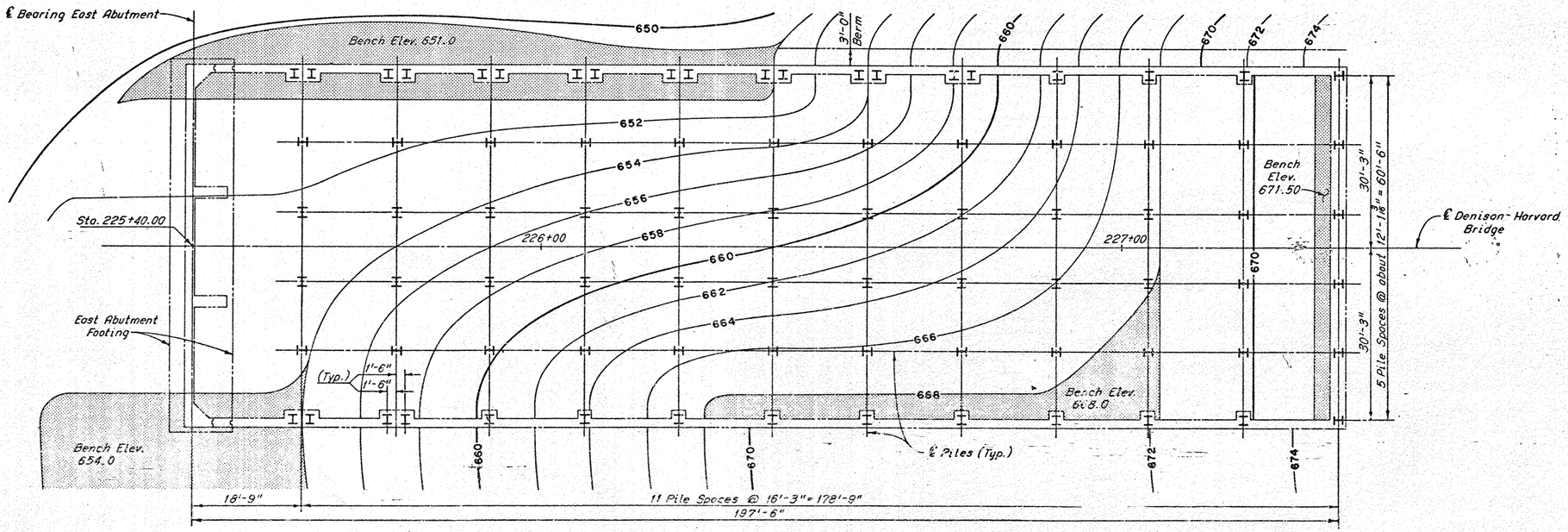
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




PLAN




PILE LAYOUT AND CONTOUR PLAN
(East Abutment Piling not shown)

Notes:
All piles are HP12x53 bearing piles.
For Slab and Cap Beam Details, see Sheets 16/73 and 17/73.
For Sealed Joint Details, see Sheet 49/73.
For Wall Elevations and Details, see Sheets 13/73 thru 15/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# CELLULAR CONSTRUCTION PLAN AND LAYOUT
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

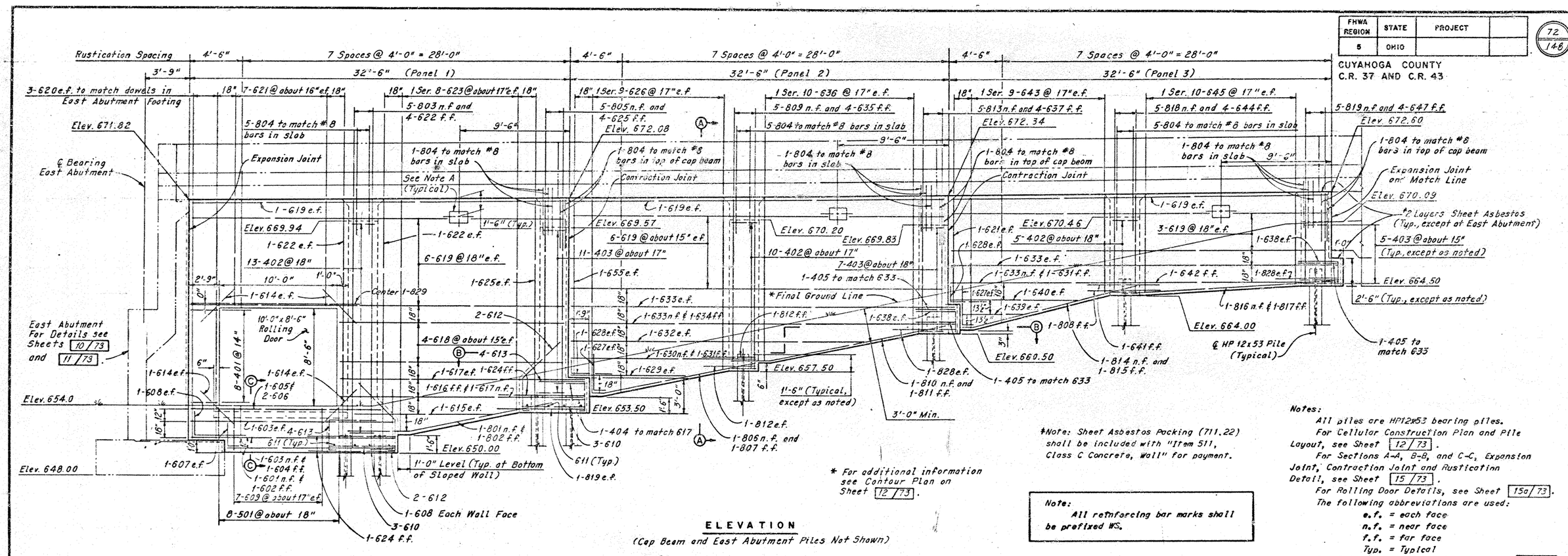
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | SUPERVISED | REVISED |
|---|---|---|---|---|
| DHS | DHS | | | |
| DATE 1-22-74 | DATE 1-22-74 | DATE 2-4-74 | DATE 4-5-74 | SHEET 12/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

72
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




**ELEVATION**

(Cap Beam and East Abutment Piles Not Shown)

* For additional information see Contour Plan on Sheet 12/73.

†Note: Sheet Asbestos Packing (711.22) shall be included with "Item 511, Class C Concrete, Wall" for payment.

**Note:**
All reinforcing bar marks shall be prefixed WS.

**Notes:**

All piles are HP12x53 bearing piles.

For Cellular Construction Plan and Pile Layout, see Sheet 12/73.

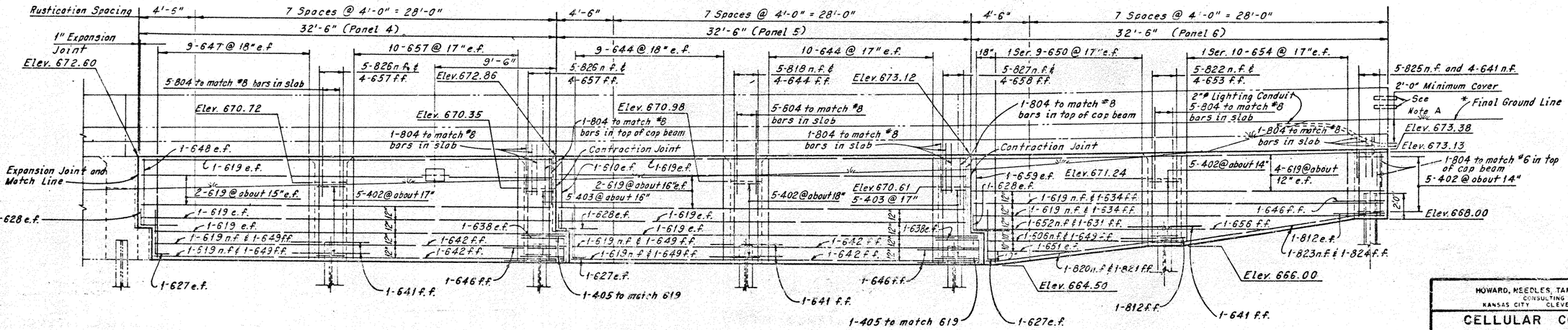
For Sections A-A, B-B, and C-C, Expansion Joint, Contraction Joint and Rustication Detail, see Sheet 15/73.

For Rolling Door Details, see Sheet 15a/73.

The following abbreviations are used:

e.f. = each face
n.f. = near face
f.f. = far face
Typ. = Typical

For Reinforcement Schedule, see Sheet 71/73.




**ELEVATION**

(Cap Beam and East Abutment Piles Not Shown)

Note A: For Louvered Air Vent Details, see Sheet 10/73. Field cut wall reinforcing steel as required.

**Note A:**
For guard rail connection, see "Guard Rail Connection Bracket" on Ohio Standard Drawing BR-2-67. Shim 5 x ½ x 1'-0" bar, as required, to align the bracket with the guard rail.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# CELLULAR CONSTRUCTION SOUTH WALL ELEVATION

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

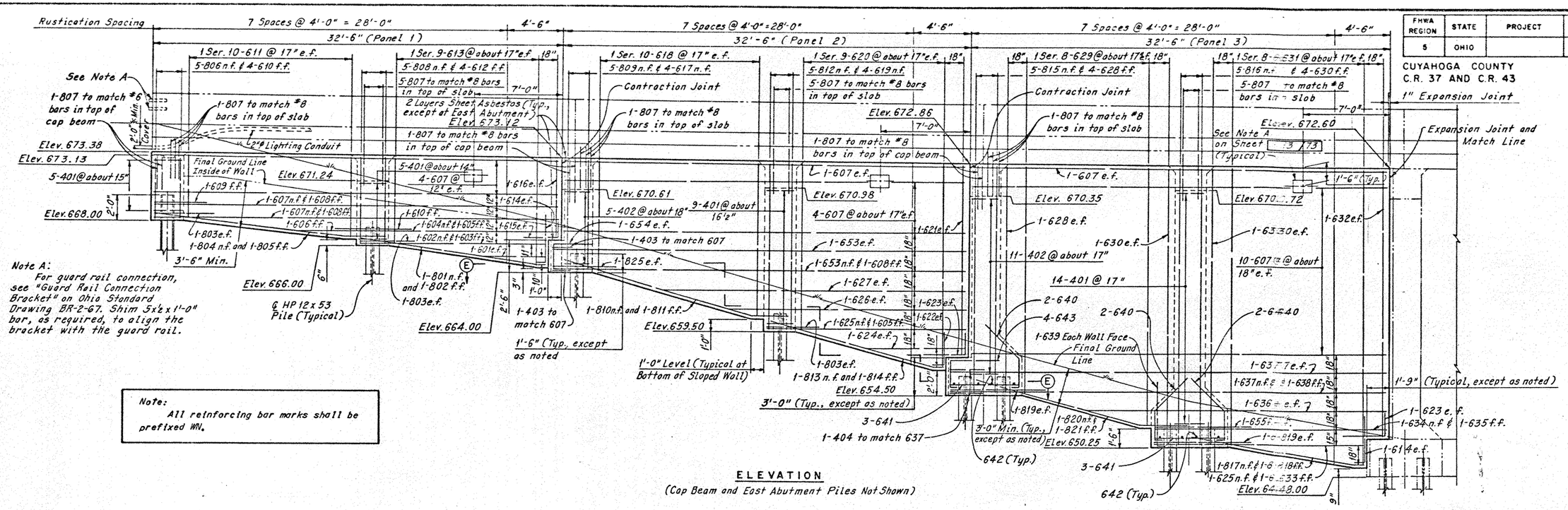
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.P. | C.P. | A.H.S. | C.A.B. | |
| DATE 2-4-74 | DATE 2-12-74 | DATE 2-13-74 | DATE 4-8-74 | SHEET 13/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

73
148

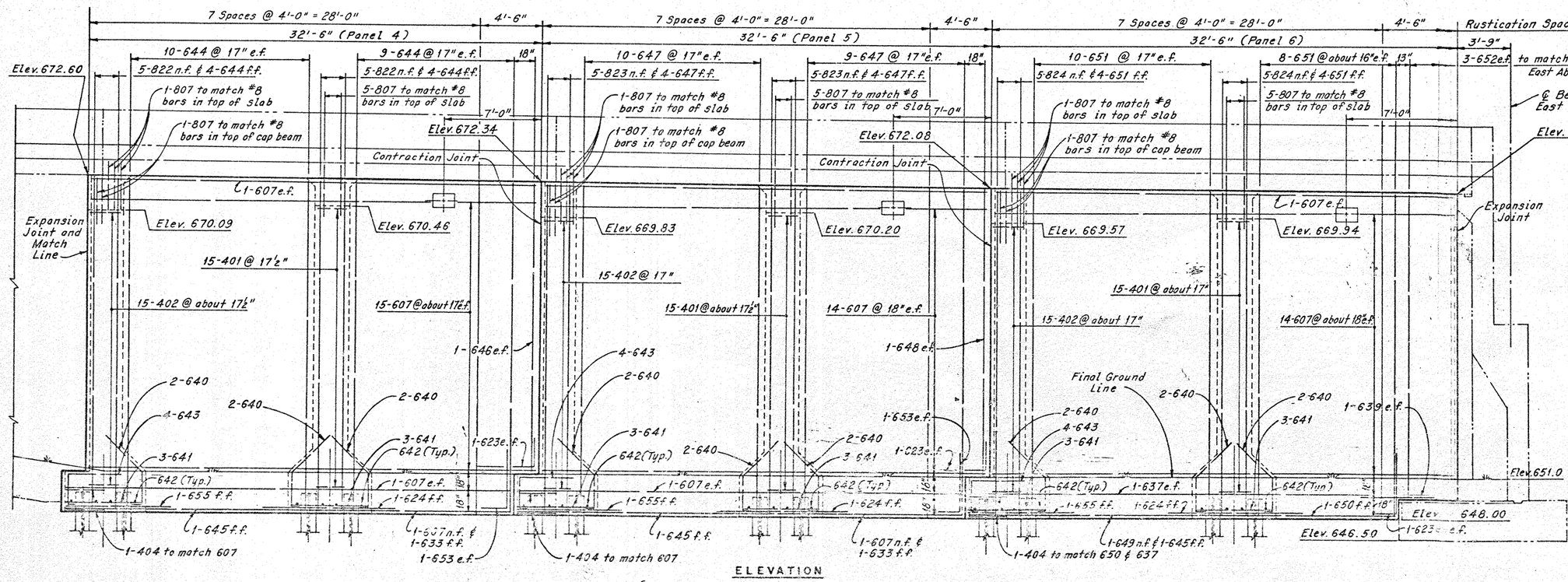
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




Note A:
For guard rail connection, see "Guard Rail Connection Bracket" on Ohio Standard Drawing BR-2-67. Shim 5"x2"x1'-0" bar, as required, to align the bracket with the guard rail.

Note:
All reinforcing bar marks shall be prefixed WN.

**ELEVATION**
(Cap Beam and East Abutment Piles Not Shown)




**ELEVATION**
(Cap Beam and East Abutment Piles Not Shown)

Notes:
For Section E-E, see Sheet 15/73.
The following abbreviations are used:
e.f. = each face
n.f. = near face
f.f. = far face
Typ. = Typical
For additional notes, see Sheet 13/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

**CELLULAR CONSTRUCTION**
**NORTH WALL ELEVATION**
DENISON-HAVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

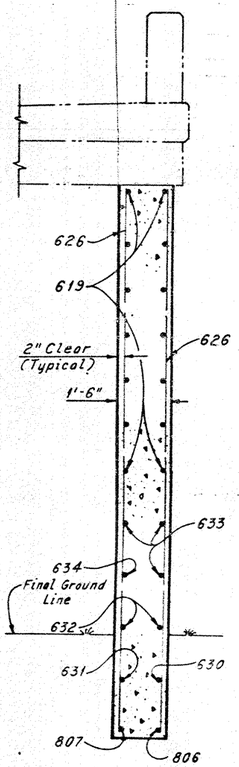
CUYAHOGA COUNTY OHIO

DRAWN C.P. | TRACED C.P. | CHECKED J.A.S. | VIEWED E.S.B. | REVISED
DATE 2-11-74 | DATE 2-20-74 | DATE 3-12-74 | DATE 4-8-74 | SHEET 12/73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

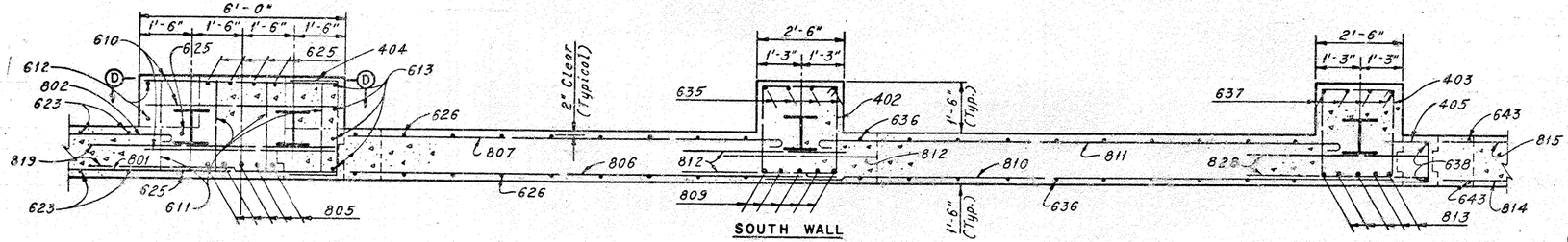
74
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



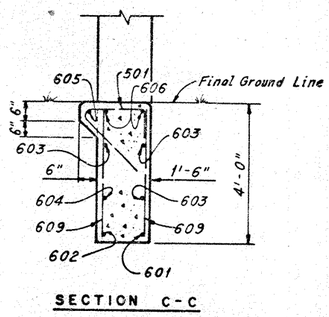

SECTION A - A

(South Wall Shown, North Wall Similar, Except Reinforcing Bar Marks)

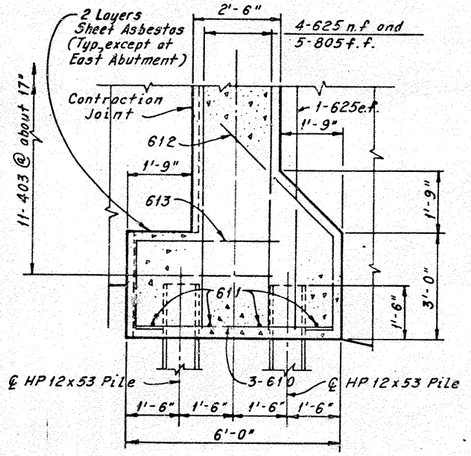



SOUTH WALL
SECTION B - B

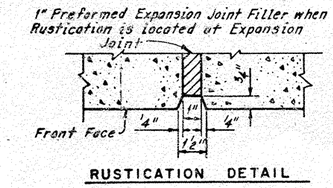
(Bottom and Vertical reinforcing bars shown)



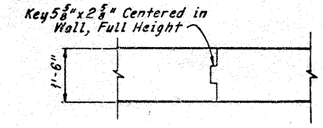

SECTION C - C



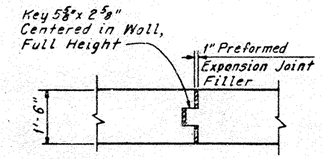

SECTION D - D
(South Wall Shown, North Wall Similar, Except Reinforcing Bar Marks)




RUSTICATION DETAIL



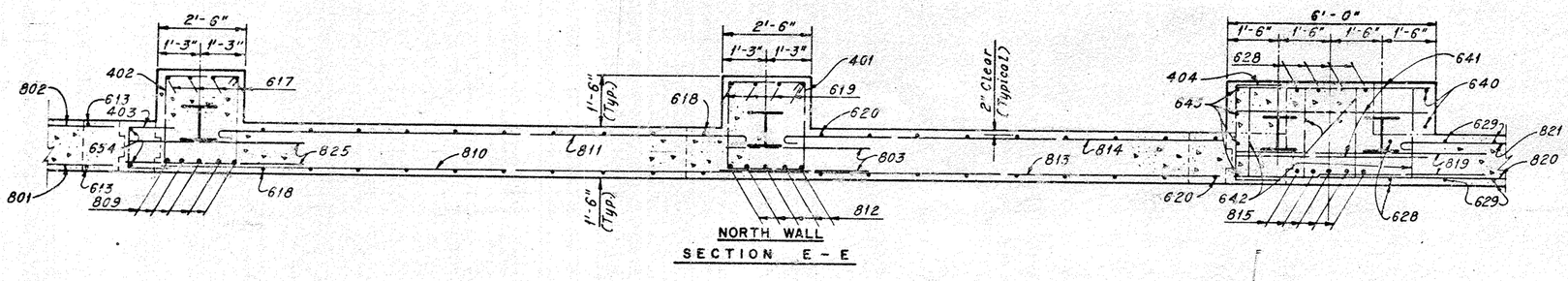

WALL CONTRACTION JOINT DETAIL




WALL EXPANSION JOINT DETAIL

Note:
All reinforcing bar marks shall be prefixed as follows:
South Wall = WS
North Wall = WN

Notes:
For location of Sections A-A, B-B, and C-C, see Sheet 13/73.
For location of Section E-E, see Sheet 14/73.
For additional notes, see Sheet 13/73.




NORTH WALL
SECTION E - E

(Bottom and Vertical reinforcing bars shown)

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# CELLULAR CONSTRUCTION WALL DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

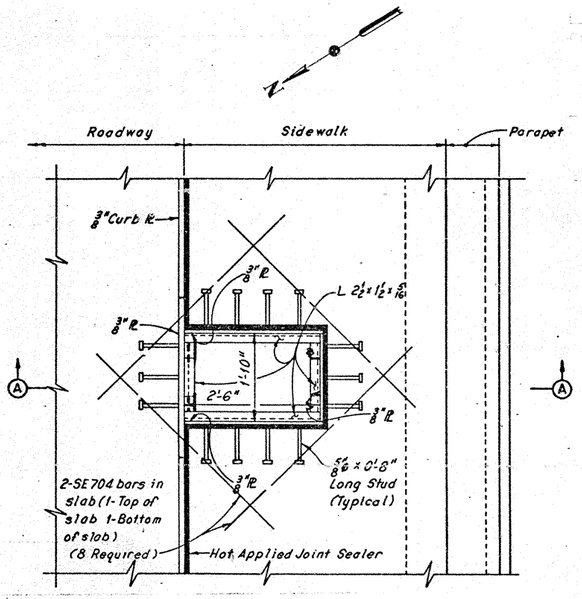
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.E.P. | C.E.P. | D.H.S. | E.A.B. | |
| DATE 3-1-74 | DATE 3-4-74 | DATE 3-22-74 | DATE 4-8-74 | SHEET 15/73 |

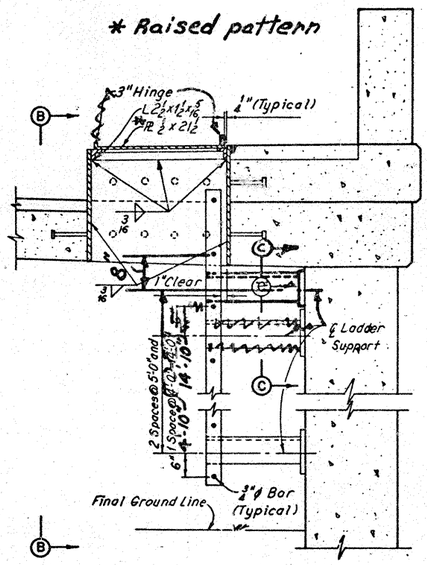
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

75/140

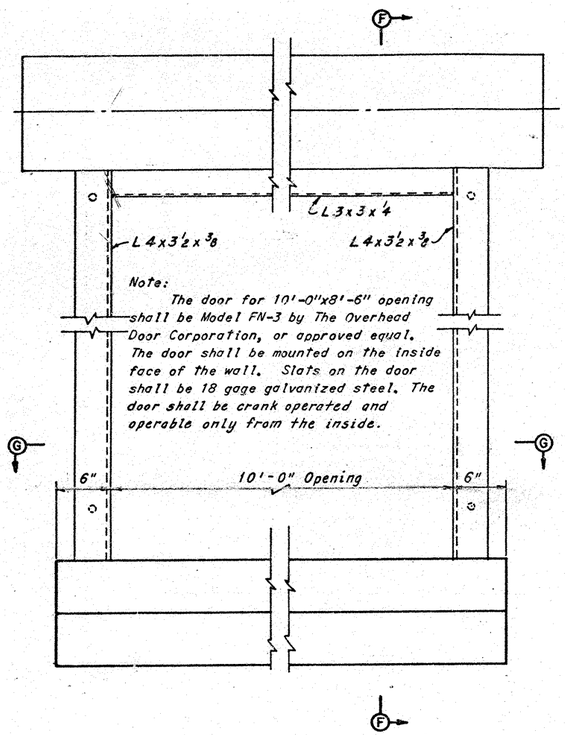
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



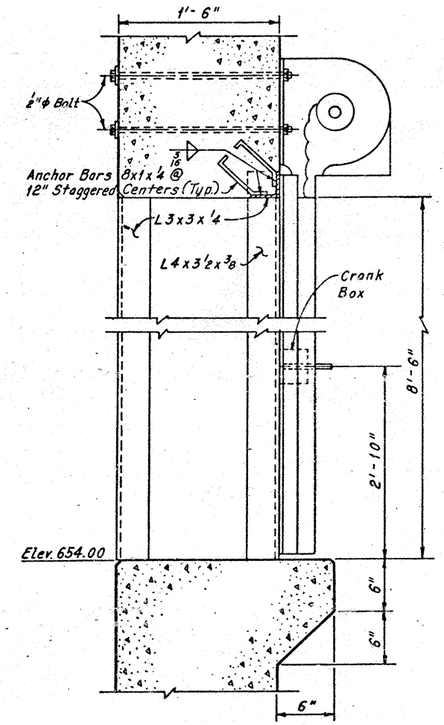

PLAN
(Door and ladder not shown)




SECTION A-A
(Fence not shown)



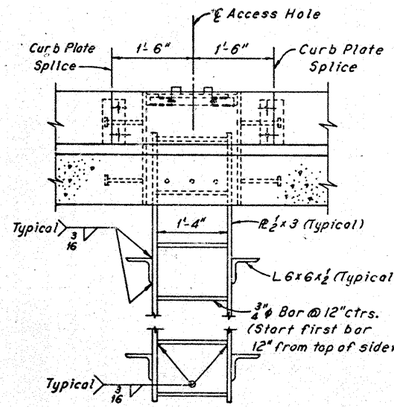

ELEVATION
(From Inside)



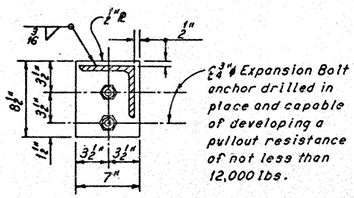

SECTION F-F

Note: Door frame angles and anchor bars are included with "Item 513, Structural Steel" for payment.

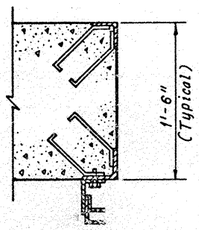
Note:
Where access hole interferes with placement of transverse and longitudinal reinforcement, bars shall be field cut. Field cutting of reinforcement to be included with "Item 509, Reinforcing Steel", for payment.

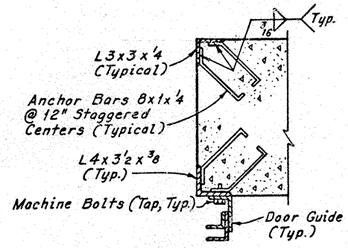



SECTION B-B

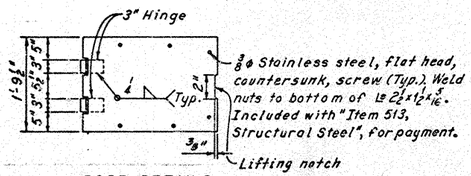



SECTION C-C




SECTION G-G




DOOR DETAILS

ROLLING DOOR DETAILS

Notes:
For location of Access Manhole, see Sheet 12/73.
For location of Rolling Door, see Sheet 13/73.
For Reinforcement Schedule, see Sheet 12/73.

MANHOLE DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# CELLULAR CONSTRUCTION ACCESS DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

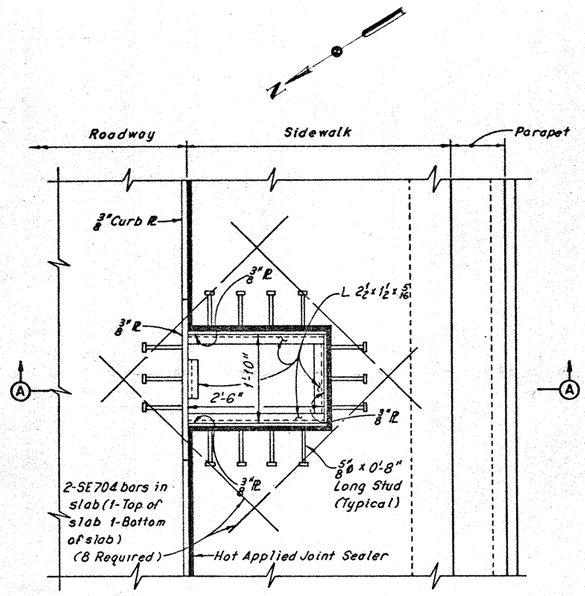
CUYAHOGA COUNTY OHIO

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| DRAWN C.K.B | TRACED R.C.K | CHECKED D.W.S | REVIEWED E.L.S | REVISED 9-5-75 |
| DATE 7-17-74 | DATE 7-18-74 | DATE 7-18-74 | DATE 7-18-74 | SHEET 15A/73 |

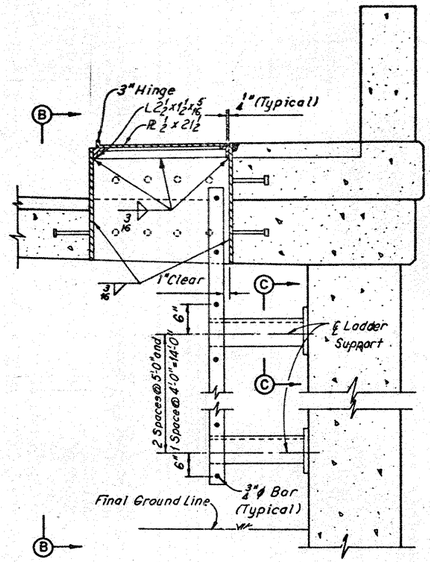
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

75
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

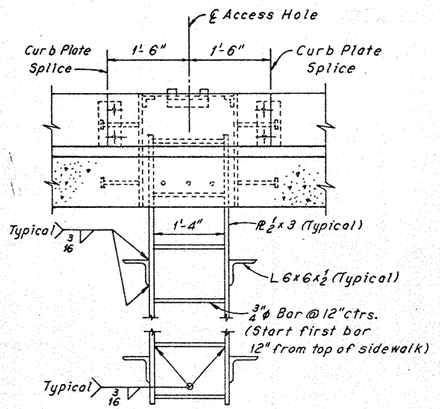



PLAN
(Door and ladder not shown)



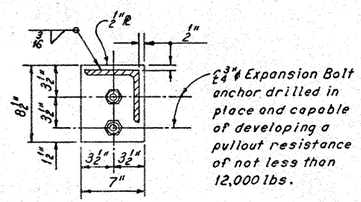

SECTION A-A
(Fence not shown)

Note:
Where access hole interferes with placement of transverse and longitudinal reinforcement, bars shall be field cut. Field cutting of reinforcement to be included with "Item 509, Reinforcing Steel", for payment.

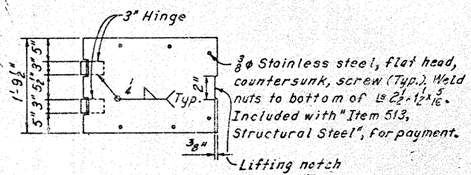



SECTION B-B

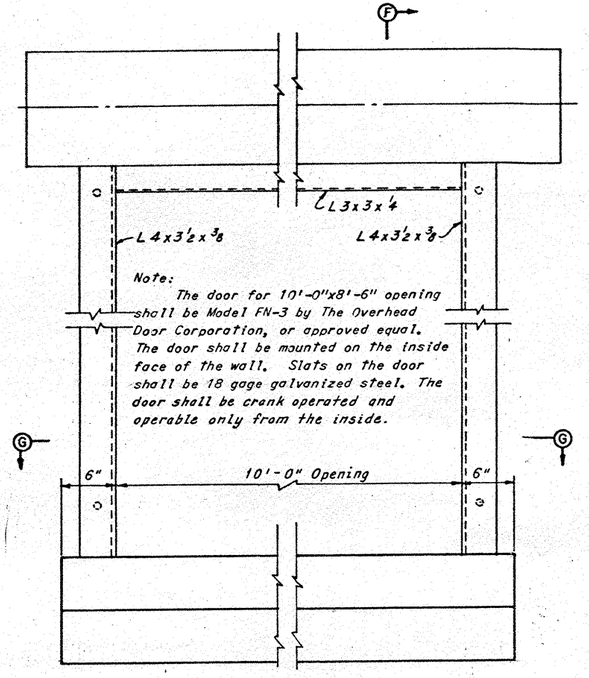
MANHOLE DETAILS



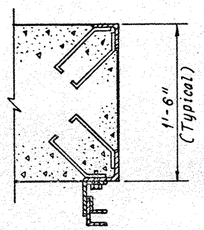

SECTION C-C

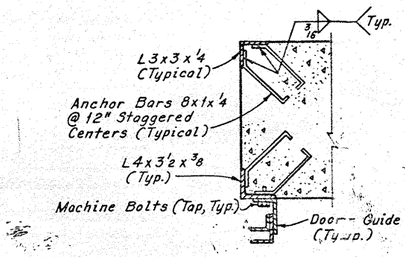



DOOR DETAILS



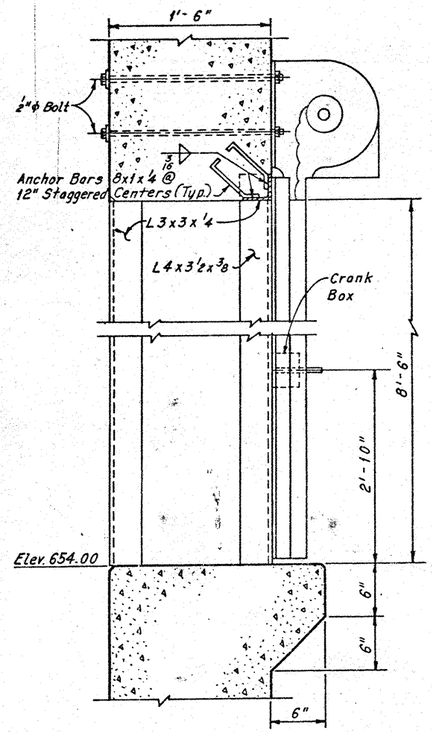

ELEVATION
(From Inside)




SECTION G-G

ROLLING DOOR DETAILS




SECTION F-F

Note: Door frame angles and anchor bars are included with "Item 513, Structural Steel" for payment.

Notes:
For location of Access Manhole, see Sheet 12/73 .
For location of Rolling Door, see Sheet 13/73 .
For Reinforcement Schedule, see Sheet 7a/73 .

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 9-5 1975

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

CELLULAR CONSTRUCTION
ACCESS DETAILS
DENISON-HYARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

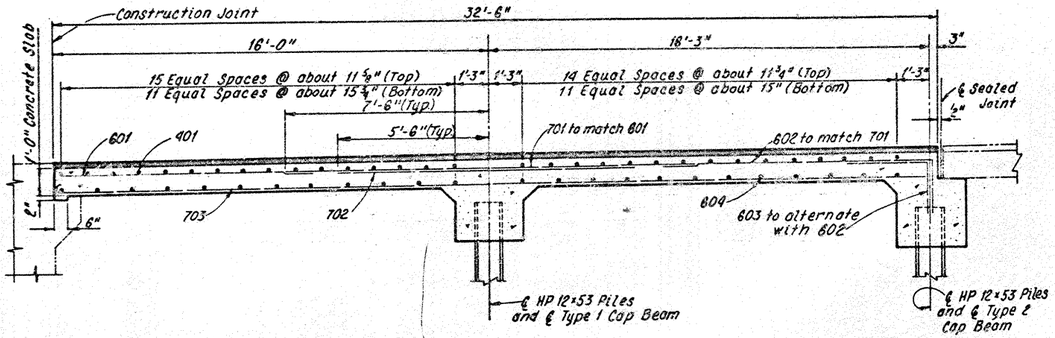
CUYAHOGA COUNTY OHIO

| DRAWN C.K.B. | TRACED R.C.A. | CHECKED | REVIEWED | SUPERVISED | SHEET 15A/73 |
|---|---|---|---|---|---|
| DATE 7-17-74 | DATE 7-16-74 | DATE | DATE | DATE | |

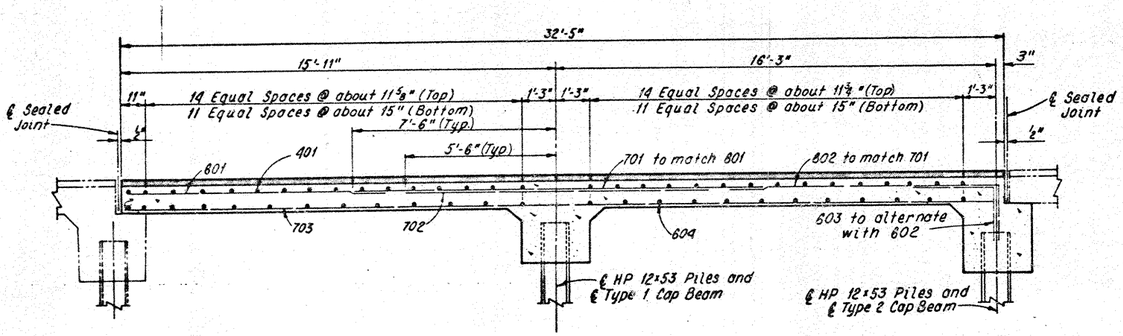
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

76 / 148

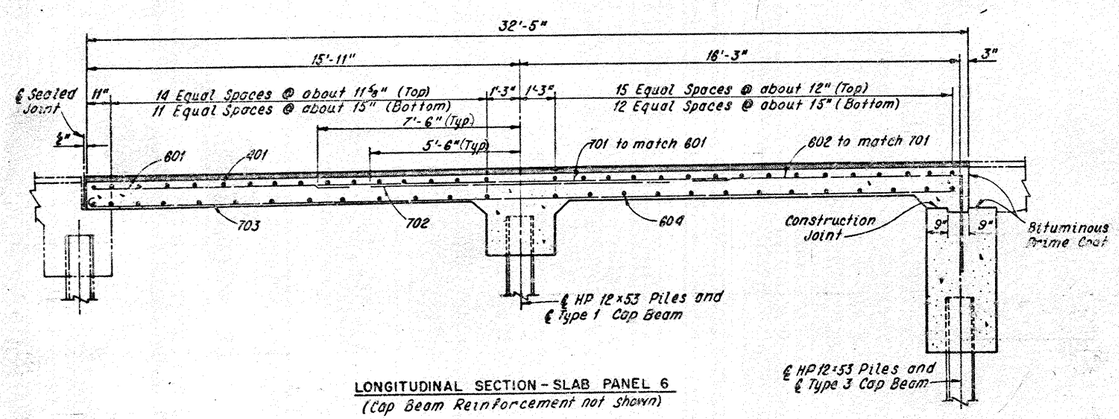
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



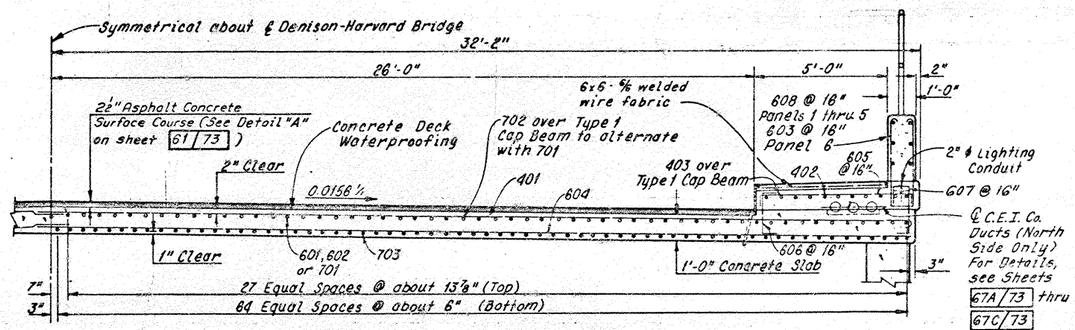

LONGITUDINAL SECTION - SLAB PANEL 1
(Cap Beam Reinforcement not shown)




LONGITUDINAL SECTION - SLAB PANELS 2 THRU 5
(Cap Beam Reinforcement not shown)



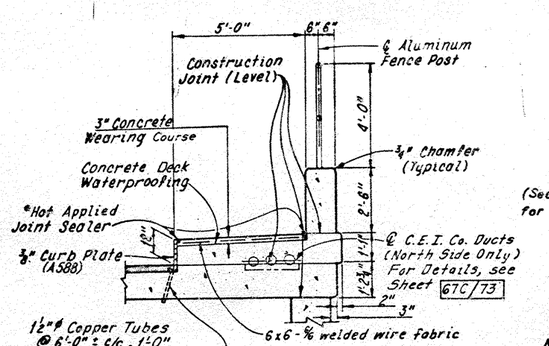

LONGITUDINAL SECTION - SLAB PANEL 6
(Cap Beam Reinforcement not shown)




Note: For Sidewalk and Parapet dimensions and Details see Sidewalk and Parapet Detail.

TYPICAL TRANSVERSE CROSS SECTION
(Wall Reinforcement not shown)

Note:
The HP12x53 piles shall be painted from the bottom of cap beams to final ground line as per Sec. 507.11.




SIDEWALK AND PARAPET DETAIL
(For Curb Plate Details, see sheet 64/73)

* Hot Applied Joint Sealer (Sec. 705.01) to be included for payment with "Item 511".

Notes:
For Sealed Joint Details, see sheet 49/73.
For Cap Beam Details, see sheet 17/73.
For Parapet and Aluminum fence Details, see sheet 63/73.
For Location of Slab Panels, see sheet 12/73.
For Reinforcement Schedule, see sheet 72/73.

Note:
All Reinforcing Bar Marks shall be prefixed:
Slab Panel 1 - SE
Slab Panel 2 - SF
Slab Panel 3 - SG
Slab Panel 4 - SH
Slab Panel 5 - SJ
Slab Panel 6 - SK

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# CELLULAR CONSTRUCTION
# TYPICAL SLAB PANEL SECTIONS
## DENISON-HARVARD BRIDGE
## OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

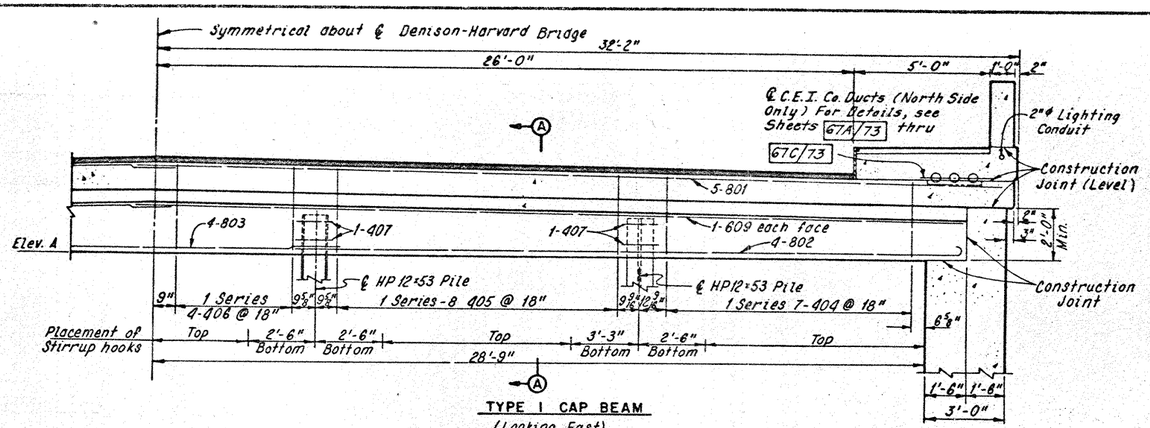
CUYAHOGA COUNTY OHIO

| DRAWN A.H.S. | TRACED S.J.S. | CHECKED D.H.S. | REVIEWED G.A.B. | REVISED |
|---|---|---|---|---|
| DATE 1-18-74 | DATE 1-25-74 | DATE 2-12-74 | DATE 4-7-74 | SHEET 16/73 |

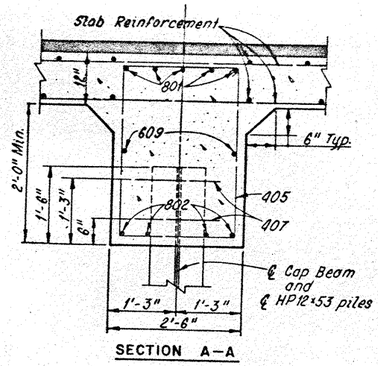
| FHWA REGION | STATE | PROJECT | | |
|---|---|---|---|---|
| 5 | OHIO | | | |

77
148

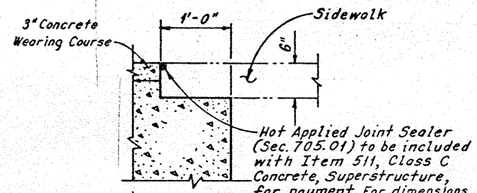
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



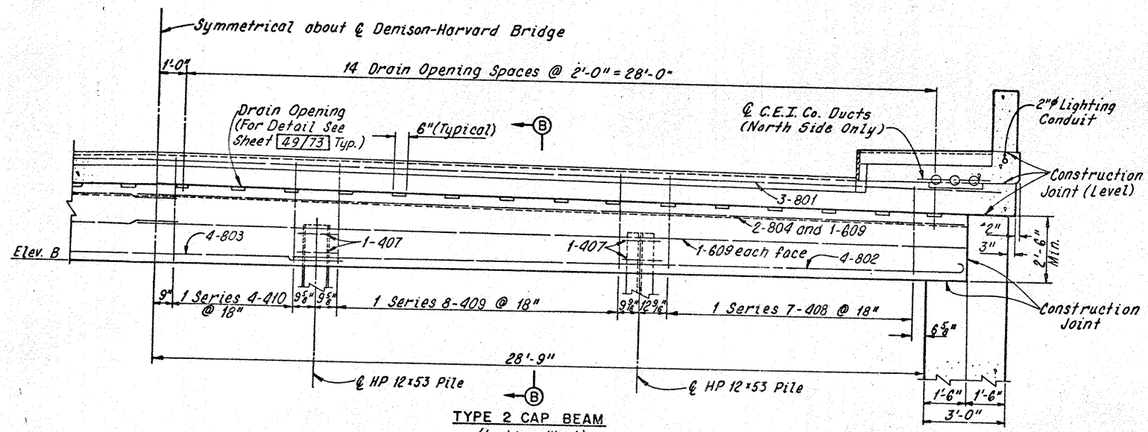

TYPE 1 CAP BEAM
(Looking East)
(Slab, Sidewalk, Parapet and Wall Reinforcement not shown)



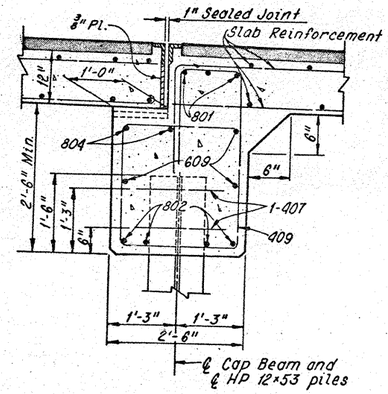

SECTION A–A




SECTION D–D
(Reinforcement not shown)



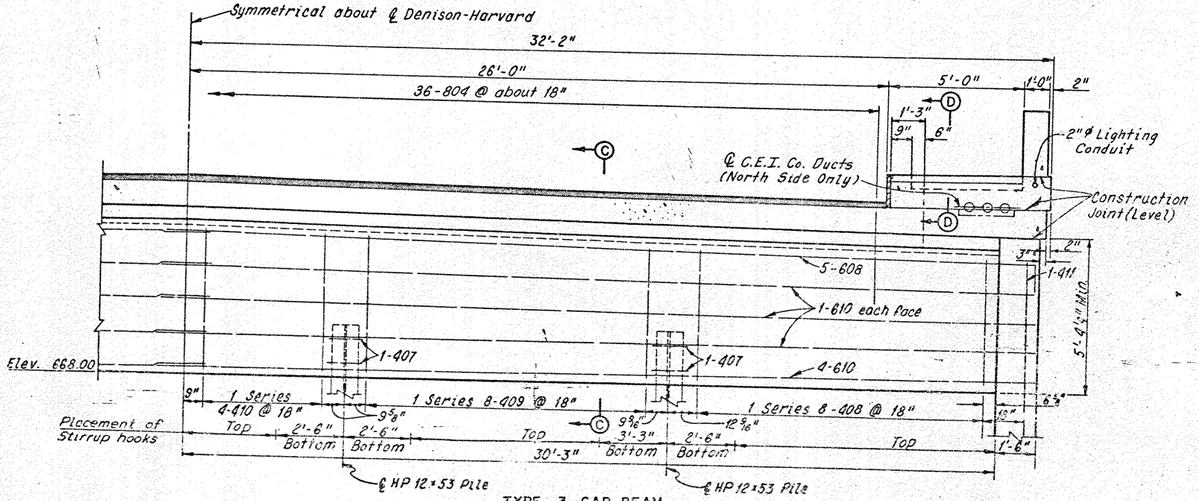

TYPE 2 CAP BEAM
(Looking West)
(Slab, Sidewalk, Parapet and Wall Reinforcement not shown)



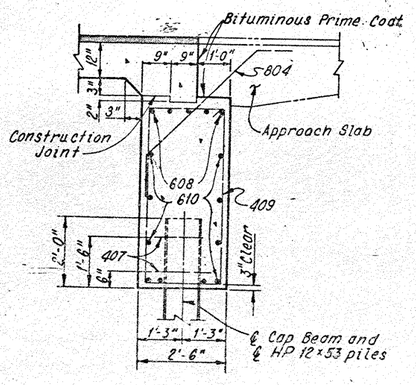

SECTION B–B

| BOTTOM OF CAP BEAM ELEVATION | | |
|---|---|---|
| Slab Panel | Elev A | Elev B |
| 1 | 669.94 | 669.57 |
| 2 | 670.20 | 669.83 |
| 3 | 670.46 | 670.09 |
| 4 | 670.72 | 670.35 |
| 5 | 670.98 | 670.61 |
| 6 | 671.24 | —— |

Note:
All Reinforcing Bar Marks shall be prefixed:
Slab Panel 1–SE
Slab Panel 2–SF
Slab Panel 3–SG
Slab Panel 4–SH
Slab Panel 5–SJ
Slab Panel 6–SK




TYPE 3 CAP BEAM
(Looking East)
(Slab, Sidewalk, Parapet and Wall Reinforcement not shown)




SECTION C–C
(Slab Reinforcement not shown)

Notes:
For Slab, Sidewalk and Parapet Details see sheet 16/73.
For Wall Details see sheets 13/73 thru 15/73.
For Sealed Joint Details at Type 2 Cap Beam see sheet 49/73.
For Reinforcement Schedule see sheet 72/73.
For Hot Applied Joint Sealer Detail, see sheet 64/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# CELLULAR CONSTRUCTION
# CAP BEAM DETAILS
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | QUANTITIES VERIFIED | REVISED |
|---|---|---|---|---|
| AHS | S.J.S | | CAR | |
| DATE 1-31-74 | DATE 2-14-74 | DATE 2-13-74 | DATE 2-14-74 | SHEET 17/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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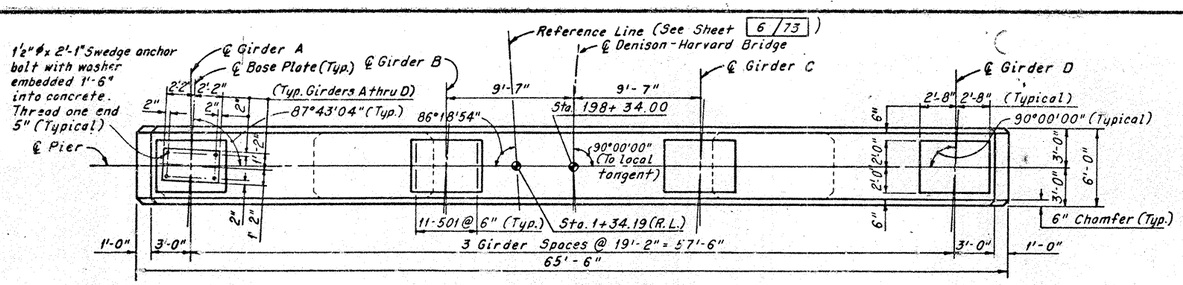
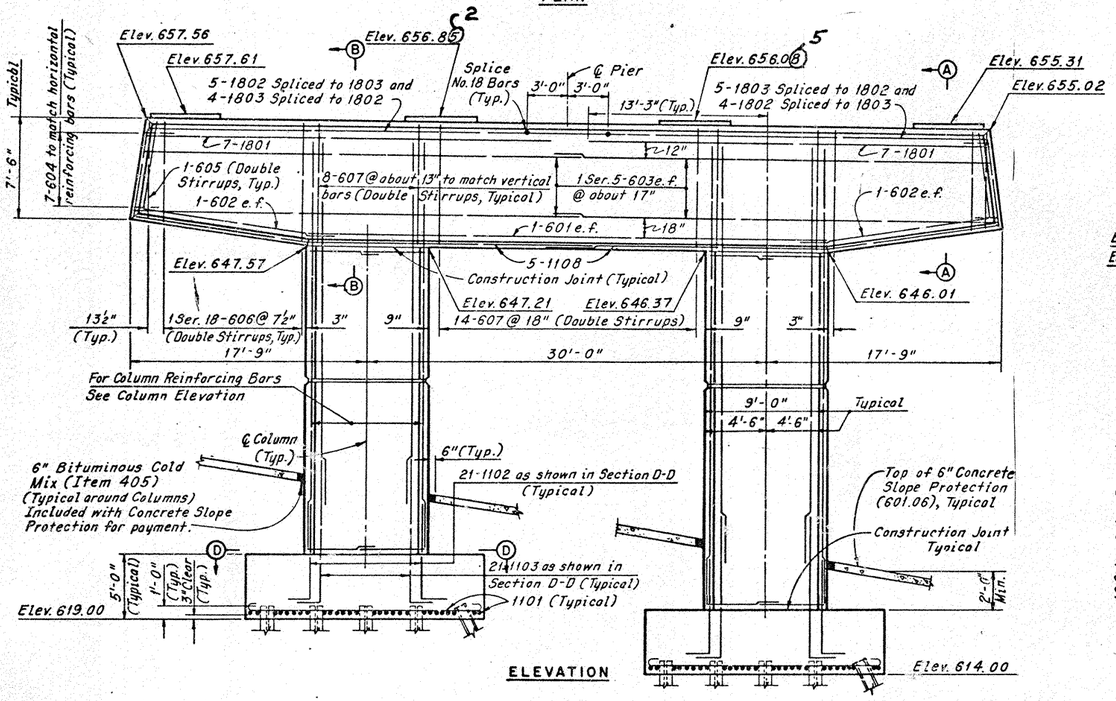
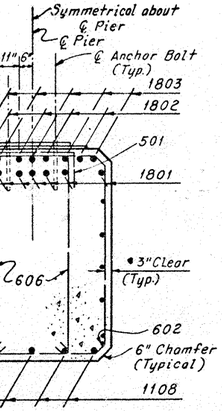
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




PLAN



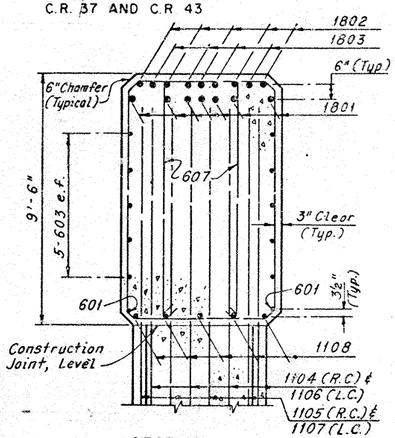

ELEVATION



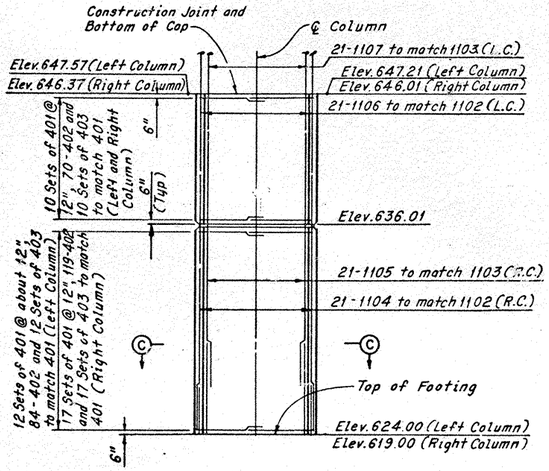

Note: All reinforcing bar marks shall be prefixed PA.



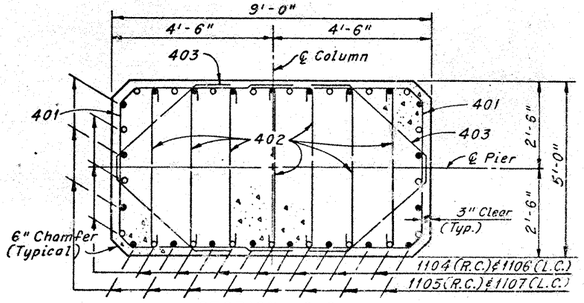

SECTION A-A



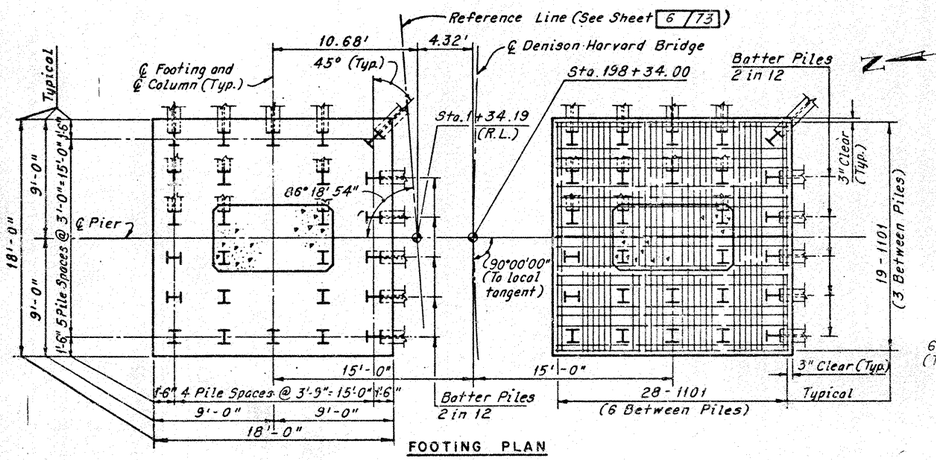

SECTION B-B



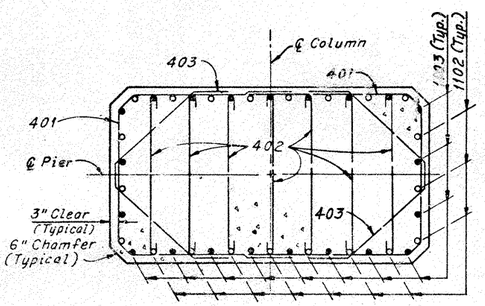

TYPICAL COLUMN ELEVATION




SECTION C-C

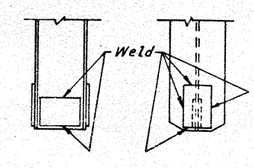



FOOTING PLAN




SECTION D-D
(For dimensions see Section C-C)

Note: Web plates welded top and bottom edges only; flange plates welded all around.




PILE POINT DETAIL

Notes:

For footing locations see Bridge Layout Diagram, Sheet 6/73.

All pier piles are HP12x53 bearing piles. H-Pile Points, (BP75750, manufactured by Associated Pile and Fitting Corp., 262 Rutherford Blvd., Clifton, New Jersey, or fabricated as shown in detail, or approved equal) shall be provided, except at Pier 16.

All battered piles shall be inclined 3 in 12 in the direction shown, except as noted.

Pile layout dimensions are measured along bottom of footing.

For Rustication Detail, see Sheet 19/73.

All stirrup hooks shall be placed on the bottom side of pier cap.

A set consists of two bars.

For Reinforcement Schedule see Sheet 69/73 and 70/73.

The following abbreviations are used:

e.f. = each face Typ. = Typical
R.C. = Right Column R.L. = Reference Line
L.C. = Left Column

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PIER 1

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

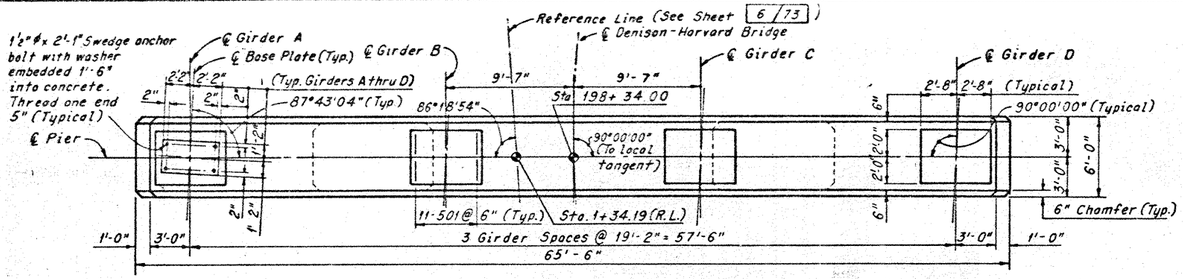
| DRAWN C.P. | TRACED C.P. | CHECKED A.H.S. | REVIEWED C.A.B. | REVISED 6-3-75 |
|---|---|---|---|---|
| DATE 11-1-73 | DATE 11-2-73 | DATE 11-5-73 | DATE 4-8-74 | SHEET 18/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

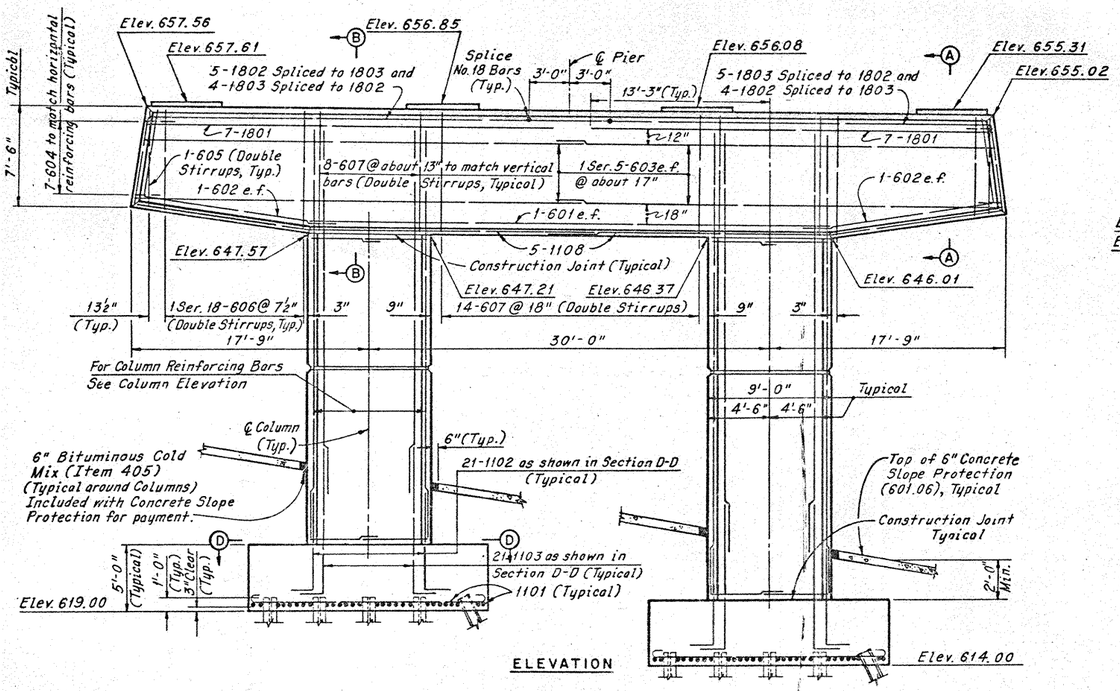
78 / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

1½"ø x 2'-1" Swedge anchor bolt with washer embedded 1'-6" into concrete. Thread one end 5" (Typical)



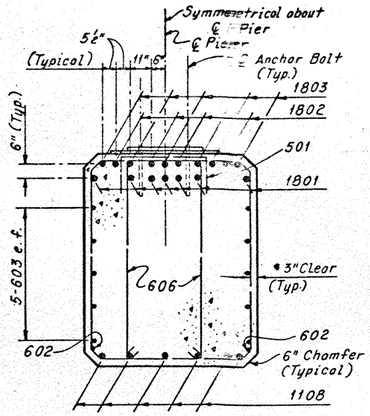

PLAN



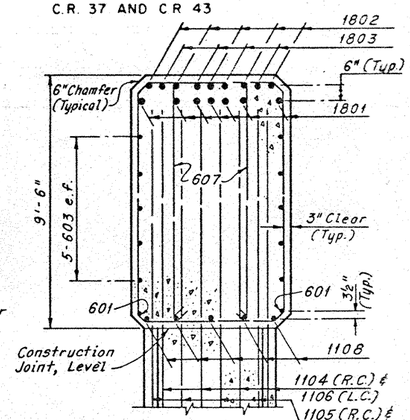

ELEVATION

Note: Anchor bolts shall be set in formed holes after the steel is erected.

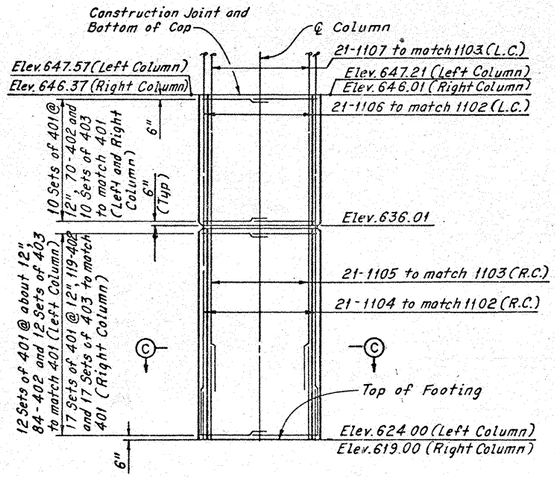
Note: All reinforcing bar marks shall be prefixed PA.



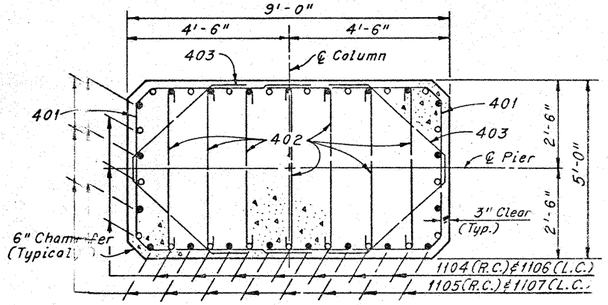

SECTION A-A



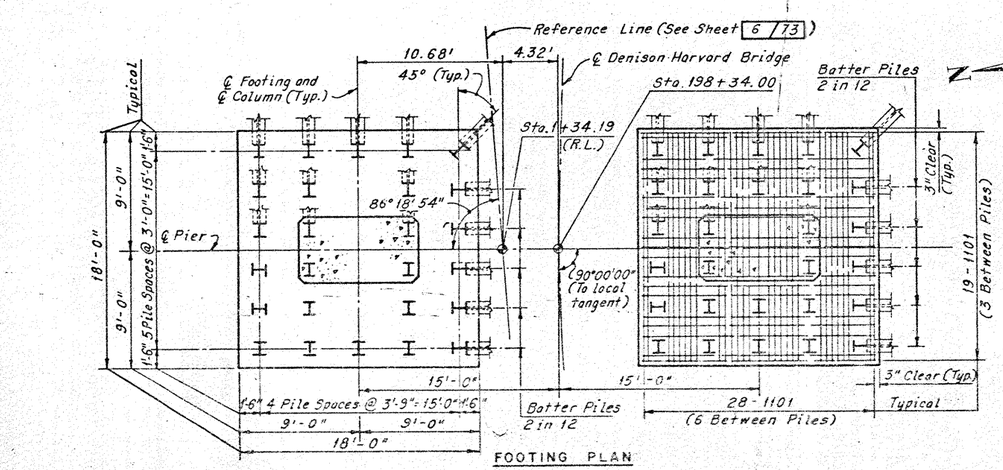

SECTION B-B



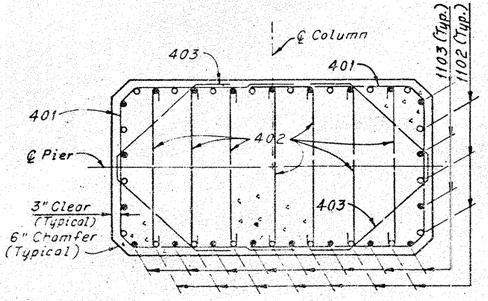

TYPICAL COLUMN ELEVATION




SECTION C-C

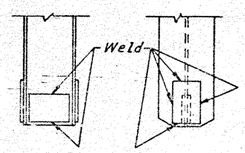



FOOTING PLAN




SECTION D-D
(For dimensions see Section C-C)

Note: Web plates welded top and bottom edges only; flange plates welded all around.




PILE POINT DETAIL

THIS PLAN SHEET HAS BEEN REVISED SEE REVISION 6-9 1975

Notes:

For footing locations see Bridge Layout Diagram, Sheet 6/73.

All pier piles are HP12x53 bearing piles. H-Pile Points, (BP75750, manufactured by Associated Pile and Fitting Corp., 26262 Rutherford Blvd., Clifton, New Jersey, or fabricated as shown in detail, or approved equal) shall be provided, except at Pier 16.

All battered piles shall be inclined 3 in 12 in the direction shown, except as noted.

Pile layout dimensions are measured along bottom of footing.

For Rustication Detail, see Sheet 19/73.

All stirrup hooks shall be placed on the bottom side of pier cap.

A set consists of two bars.

For Reinforcement Schedule see Sheet 69/73 and 70/73.

The following abbreviations are used:

e.f. = each face  Typ. = Typical
R.C. = Right Column  R.L. = Reference Line
L.C. = Left Column

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PIER 1

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.P. | C.P. | | C.A.B. | |
| DATE 11-1-73 | DATE 11-2-73 | DATE 11-5-73 | DATE 11-6-73 | SHEET 18 73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

73
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

1½"ϕ x 2'-1" Swedge anchor bolt, embedded 1'-6" into concrete. Thread one end 5" (Typical)

Reference Line (See Sheet 6/73)

℄ Girder A and ℄ Base Plate (Typ.)

℄ Girder B

℄ Denison-Harvard Bridge

℄ Girder C

℄ Girder D

1'-4" 1'-4" (Typ Girders A and D)

9'-7"

9'-7" 1'-5" 1'-5" (Typ Girde B and C)

2'-8" 2'-8" (Typical)

3" 3" 3" 3" 4" 1'-4" 6" 2'-8" 2'-8"

Sta 3+02.09 (R.L.)

Sta. 200+00.00

90°00'00" (Typ.)

90°00'00" (To local tangent)

81°45'00"

3'-0" 3'-0" 6'-0"

4" 1'-1" 4" 1'-4" 6" 2'-0" 2'-0"

11-501@6" (Typical)

6" Chamfer (Typical)

1'-0" 3'-0" 3 Girder Spaces @ 19'-2" = 57'-6" 3'-0" 1'-0"

65'-6"

PLAN

Note: Anchor bolts shall be set in formed holes after the steel is erected.

Note: All reinforcing bar marks shall be prefixed PB.

Elev. 656.67

Elev. 656.72

Elev. 655.95

Splice No.18 Bars (Typ.)

℄ Pier

3'-0" 3'-0"

Elev. 655.19

Elev. 654.42

Elev. 654.13

5-1802 Spliced to 1803 and 4-1803 Spliced to 1802

13'-3" (Typ.)

5-1803 Spliced to 1802 and 4-1802 Spliced to 1803

Typical 7'-6" 7-604 to match horizontal reinforcing bars (Typical)

7-1801

2-12"

7-1801

1-605 (Double Stirrups, Typ.)

1-602 e.f.

8-607 bars (Double Stirrups, Typical)

to match vertical

1 Ser. 5-603 e.f. @ about 17"

1-602 e.f.

1-601 e.f.

2-18"

Elev. 646.68

5-1102

Construction Joint (Typical)

Elev. 646.32

Elev. 645.48

Elev. 645.12

13½" (Typ.)

15 Ser. 18-606 @ 7½" (Double Stirrups, Typ.)

3" 9" 14-607 @ 18" (Double Stirrups) 9" 3"

17'-9" 30'-0" 17'-9"

9'-0"

4'-6" 4'-6"

Typical

For Column Reinforcing Bars See Column Elevation

℄ Column (Typical)

16-1806 as shown in Section D-D (Typical)

22'-0" (Typical) (1806 Bars stop at this point)

Splice No. 18 Bars (Typ., except for 1806 bars)

Construction Joint Typical

12-1805 as shown in Section D-D (Typical)

Existing and Final Ground Line (Typical)

2'-0" Min. (Typ.)

3'-0" (Typ.) 6'-0" (Typ.)

6'-0" 2'-0" (Typ.) 3" Clear (Typ.)

801 (Typ.)

12-1804 as shown in Section D-D (Typical)

1101 (Typ.)

Elev. 590.00 (Typical)

ELEVATION

Symmetrical about ℄ Pier

5½" (Typical) 11" ℄ Anchor Bolt (Typ.)

1803 1802 501 1801

6" (Typ.) 5-603 e.f.

606

3" Clear (Typ.)

602 602 6" Chamfer (Typical) 1102

SECTION A-A

1803 1802

6" Chamfer (Typical)

6" (Typ.) 1801

9'-6" 5-603 e.f.

607

3" Clear (Typ.)

601 601 3½" (Typ.) 1102

Construction Joint, Level

1809 R.C. & 1811 L.C.

1808 R.C. & 1810 L.C.

SECTION B-B

Construction Joint and Bottom of Cap

℄ Column

Elev. 646.68 (Left Column)

Elev. 645.48 (Right Column)

12-1811 to match 1807 (L.C.)

Elev. 646.32 (Left Column)

Elev. 645.12 (Right Column)

12-1810 to match 1807 (L.C.)

6"

12 Sets of 401 @ about 11", 72-402 and 12 Sets of 403 to match 401 (L.C.)

10 Sets of 401 @ 12", 60-402 and 10 Sets of 403 to match 401 (Right Column)

Elev. 635.12

12-1809 to match 1807 (R.C.)

12-1808 to match 1807 (R.C.)

16 Sets of 401 @ 12", 96-402 and 16 Sets of 403 to match 401

Splice No.18 Bars (Typical)

6'-0" (Typ.) 3'-0" (Typ.)

Optional Construction Joint

Elev. 619.12

16 Sets of 401 @ 12", 96-402 and 16 Sets of 403 to match 401

Note: 1806 bars not shown in this view.

6" (Typ.)

12-1807 to match 1805

Elev. 603.12

8 Sets of 401 @ about 10", 48-402 and 8 Sets of 403 to match 401

6"

12-1807 to match 1804

Top of Footing

Elev. 596.00

TYPICAL COLUMN ELEVATION

1809 (R.C.) & 1811 (L.C.)

1808 (R.C.) & 1810 (L.C.)

6" Chamfer (Typ.)

403

℄ Pier

2'-6" 5'-0" 2'-6"

3" Clear (Typ.)

401 403 402 ℄ Column 401

4'-6" 4'-6"

9'-0"

SECTION C-C

1805 (Typ.)

1804 (Typ.)

1806 (Typ.)

6" Chamfer (Typical)

3" Clear (Typ.)

℄ Pier

403

401 403 402 ℄ Column 401

SECTION D-D

(For dimensions see Section C-C)

Reference Line (See Sheet E/73)

21.79'

6.79' ℄ Column (Typ.)

℄ Denison-Harvard Bridge

Sta. 200+00.00

℄ 20" PEIP. To be encased in concrete by others.

½" Preformed Expansion Joint Filler

5°32'12" (North Footing)

0°00'00" (South Footing)

20'-9" (North Footing) 21'-0" (South Footing)

10'-3" (N) 10'-6" (S) 10'-6" (Typical) 11'-6"

3'-0" 4'-0" 4'-0" 4'-0" 3'-0" 1'-6" 1'-3" 1'-6"

(N) (S) (Typ.)

81°45'00" (To R.L.)

90° (Typ.)

℄ Pier

℄ Footing (Typical)

Sta 3+02.09 (R.L.)

90°00'00" (To local tangent)

22-801 (3 Between 3'-0" Pile Spaces) (4 Between 4'-0" Pile Spaces)

3" Clear (Typ.)

15'-0" 15'-0"

34-1103 (N) 34-1101 (S) (6 Between 3'-0" Pile Spaces) (8 Between 4'-0" Pile Spaces)

3" Clear Typical

Typical 1'-6" 3'-0" 4'-0" 4'-0" 3'-0" 1'-6" 8'-6" 8'-6" 17'-0"

FOOTING PLAN

Optional Construction Joint (At location as noted)

5¼" 3'-8" 5'-8" 3¼"

RUSTICATION DETAIL

Notes:
Piles shown thus, ⊠, shall be prebored to - Elev. 585.0.
For cross - section through 20" PEIP, see Sheet 6/73.
For additional notes, see Sheet 13/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PIER 2

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY C-1-0

DRAWN C.P. | TRACED C.P. | HOWARD, NEEDLES, TAMMEN & BERGENDOFF CHECKED | REVISED

DATE 12-27-74 | DATE 1-22-74 | DATE 4-25-74 | DATE 4-6-74 | SHEET 13/73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

80 / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

1½"ø x 2'-1" Swedge anchor bolt, embedded 1'-6" into concrete. Thread one end 5" (Typical)

℄ Girder A and ℄ Base Plate (Typ.) ℄ Girder B ℄ Denison-Harvard Bridge ℄ Girder C (Girders B and C) ℄ Girder D

1'-4" 1'-4" (Typ Girders A and D) 9'-7" Sta. 201+70.00 9'-7" 1'-6" 1'-6" (T 2'-8" 2'-8" (Typical)

3" 3" 3" 3" 3" 3" 6" 90°00'00" (Typical)

℄ Pier 78°11'03" Sta. 4+78.05 (R.L.) 90°00'00" (To local tangent) 2'-0" 3'-0" 3'-0" 6'-0"

℄ Reference Line (See Sheet 6/73) 11-501@ 6" (Typical) 6" Chamfer (Typ.)

1'-0" 3'-0" 3 Girder Spaces @ 19'-2" = 57'-6" 3'-0" 1'-0"

65'-6"

**PLAN**

Note: Anchor bolts shall be set in formed holes after the steel is erected.

Note: All reinforcing bar marks shall be prefixed PC.

Symmetrical about ℄ Pier

5½" (Typical) 11"-6" ℄ Anchor Bolt (Typ.)

1803 1802 501 1801 3" Clear (Typ.) 606 602 6" Chamfer (Typical) 1109

6" (Typ.) 5-603 e.f. 602

**SECTION A-A**

1803 1802 6" Chamfer (Typical) 6" (Typ.) 1801 9'-6" 5-603 e.f. 607 3" Clear (Typ.) 601 3½" (Typ.) 1109 1105 (R.C.) 1107 (L.C.) 1106 (R.C.) 1108 (L.C.)

Construction Joint, Level

**SECTION B-B**

Elev. 655.07 Elev. 655.12 Elev. 654.35 Elev. 653.58 Elev. 652.82 Elev. 652.53

5-1802 Spliced to 1803 and 4-1803 Spliced to 1802 Splice No. 18 Bars (Typ.) 5-1803 Spliced to 1802 and 4-1802 Spliced to 1803

Typical 7'-6" 7-604 to match horizontal reinforcing bars (Typical) 7-1801 1-605 (Double Stirrups, Typ.) 1-602 e.f. 8-607 @ about 13" to match vertical bars (Double Stirrups, Typical) 1 Ser. 5-603 e.f. @ about 17" 1-601 e.f. 2-12" 2-18" 7-1801 1-602 e.f. 5-1109

Elev. 645.08 Construction Joint (Typical) Elev. 644.72 Elev. 643.88 14-607 @ 18" (Double Stirrups) Elev. 643.52

13½" (Typ.) 1 Ser. 18-606 @ 7½" (Double Stirrups, Typ.) 17'-9" 3" 9" 9" 3" 30'-0" 17'-9"

9'-0" 4'-6" 4'-6" Typical

For Column Reinforcing Bars See Column Elevation ℄ Column (Typical)

Construction Joint Typical 21-1102 as shown in Section D-D (Typical)

Existing and Final Ground Line (Typical) 2'-0" Min. (Typ.) (Typical) 5'-0" 1'-0" (Typ.) 3" Clear (Typ.) 21-1103 as shown in Section D-D (Typical) 1101 (Typical) Elev. 584.00 (Typical)

**ELEVATION**

Construction Joint and Bottom of Cap ℄ Column

Elev. 645.08 (Left Column) Elev. 643.88 (Right Column) 21-1108 to match 1104 (L.C.) Elev. 644.72 (Left Column) Elev. 643.52 (Right Column) 21-1107 to match 1104 (L.C.)

12 Sets of 401 @ about 11" & 4 Sets of 403 & 12 Sets of 403 to match 401 (L.C.) 10 Sets of 401 @ 12", 2 - 402 and 10 Sets of 403 to match 401 (Right Column) 6"

Elev. 633.52

16 Sets of 401 @ 12" 112-402 and 16 Sets of 403 to match 401

21-1106 to match 1104 (R.C.) 21-1105 to match 1104 (R.C.)

Optional Construction Joint Elev. 617.52

16 Sets of 401 @ 12", 112-402 and 16 Sets of 403 to match 401

℄ 21-1104 to match 1102 6" (Typ.) 21-1104 to match 1103 Elev. 601.52

13 Sets of 401 @ about 11", 91-402 and 13 Sets of 403 to match 401 6" Top of Footing Elev. 589.00

**TYPICAL COLUMN ELEVATION**

9'-0" 4'-6" 4'-6" 403 ℄ Column 401 403 402 1104 (Typical) ℄ Pier 2'-6" 5'-0" 2'-6" 6" Chamfer (Typical) 3" Clear (Typ.)

**SECTION C-C**

1103 (Typ.) 1102 (Typ.) ℄ Column 403 401 402 401 403 ℄ Pier 3" Clear (Typical) 6" Chamfer (Typical)

**SECTION D-D**
(For dimensions see Section C-C)

Reference Line (See Sheet 6/73) ℄ Footing and ℄ Column (Typical) ℄ Denison-Harvard Bridge Sta. 201+70.00

78°11'03" Sta. 4+78.05 (R.L.) 18'-0" 9'-0" 9'-0" 1'-6" 4 Pile Spaces @ 3'-9" = 15'-0" 1'-6" 90°00'00" (To local tangent) 3" Clear (Typ.) ℄ Pier 20-1101 (4 Between Piles)

30.10' 15'-0" 15'-0" 3" Clear (Typ.) 28-1101 (6 Between Piles) Typical

1'-6" 4 Pile Spaces @ 3'-9" = 15'-0" 1'-6" Typical 9'-0" 9'-0" 18'-0" 45.10'

**FOOTING PLAN**

Note: For Notes, see Sheet 18/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PIER 3

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

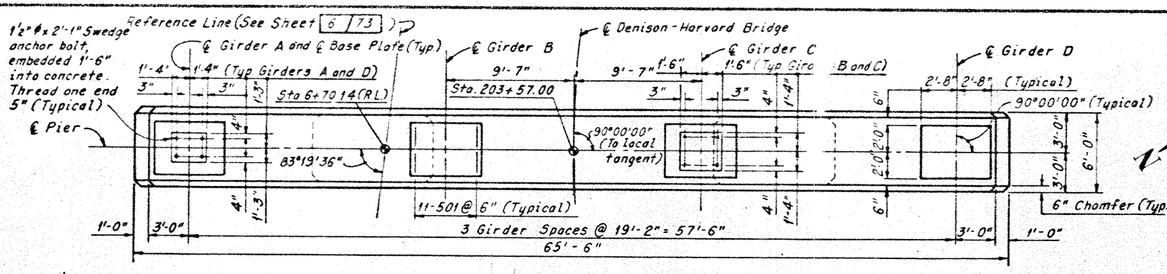
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | APPROVED | REVISED |
|---|---|---|---|---|
| C.P. | C.P. | A.M.S. | C.A.B. | |
| DATE 11-15-73 | DATE 11-17-73 | DATE 11-23-73 | DATE 1-8-74 | SHEET 20/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

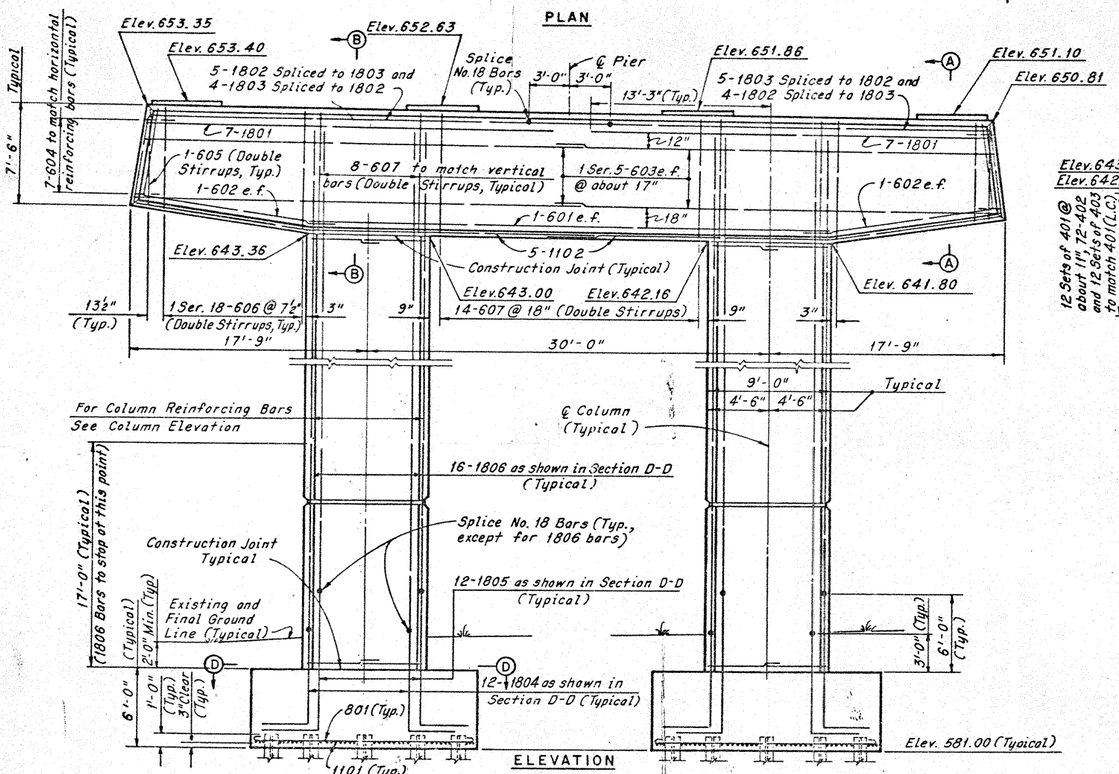
Sheet 21 / 141



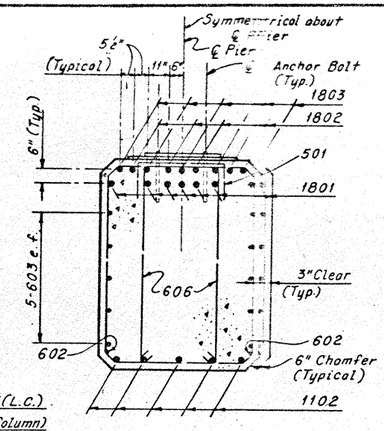

PLAN

Note: Anchor bolts shall be set in formed holes after the steel is erected.

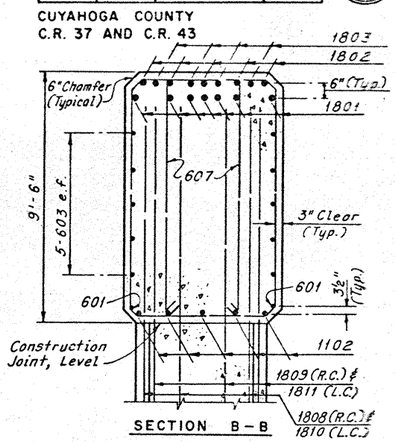
Note: All reinforcing bar marks shall be prefixed PD.



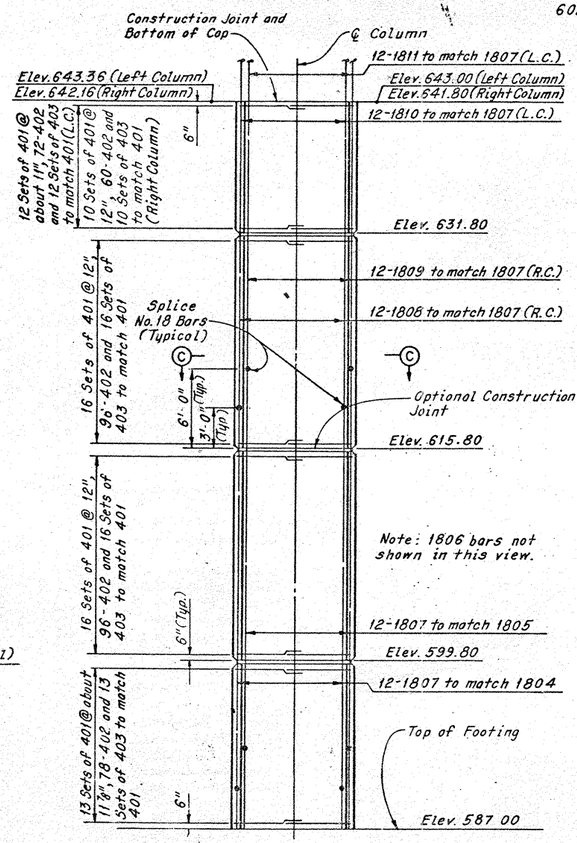

ELEVATION



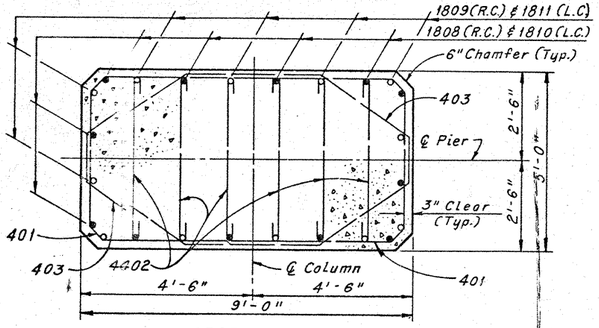

SECTION A-A



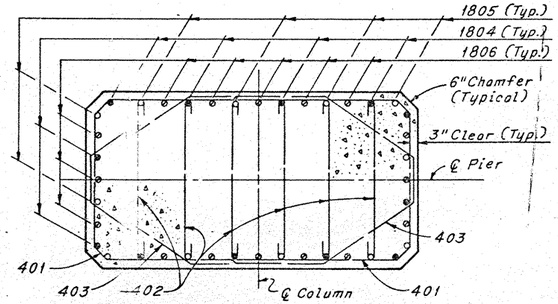

SECTION B-B




TYPICAL COLUMN ELEVATION

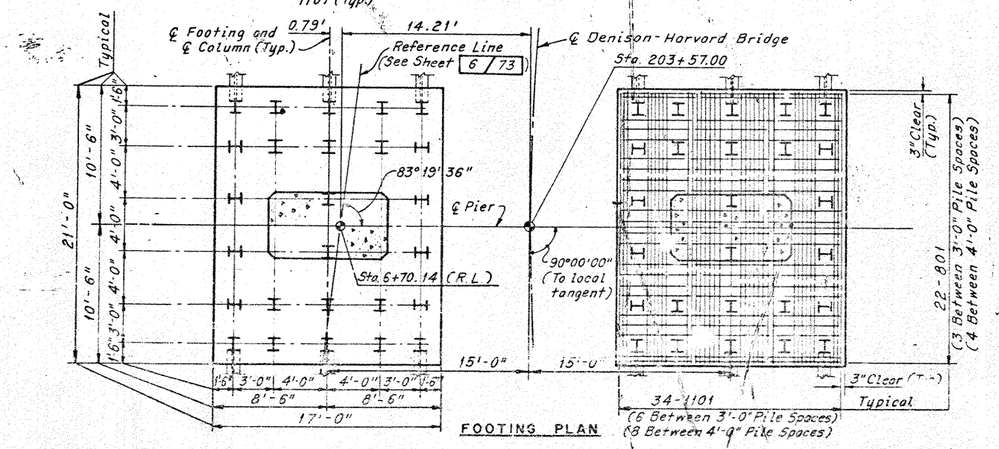



SECTION C-C




SECTION D-D

(For dimensions see Section C-C)




FOOTING PLAN

Note:
For Notes, see Sheet 18 / 73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PIER 4

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

| CUYAHOGA COUNTY | | | | OHIO |
|---|---|---|---|---|
| DRAWN C.P. | TRACED C.P. | CHECKED A.H. | REVIEWED C.A.B. | REVISED |
| DATE 11-5-73 | DATE 11-6-73 | DATE 11-17-73 | DATE 4-8-74 | SHEET 21 / 73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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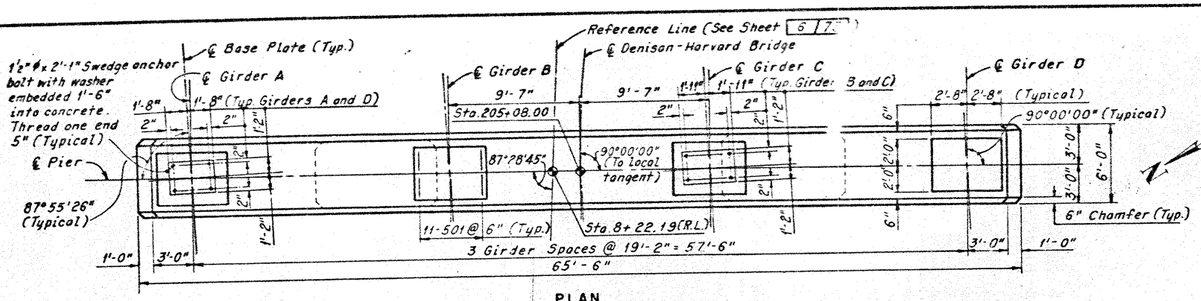
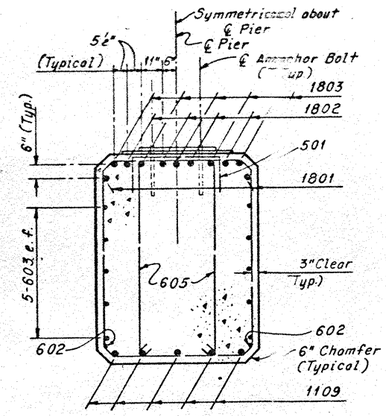
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

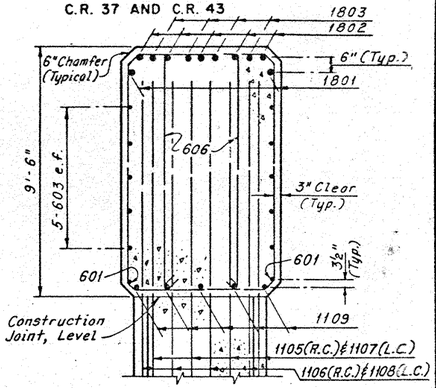



Note:
Anchor bolts shall be set in formed holes after the steel is erected.

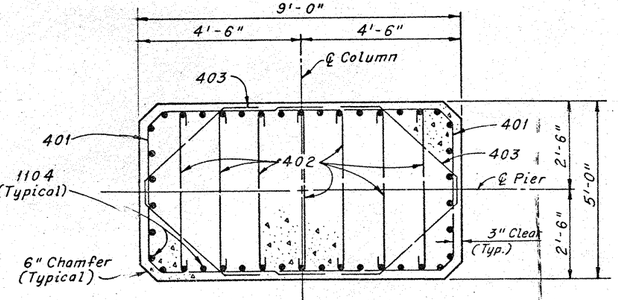
Note: All reinforcing bar marks shall be prefixed PE.



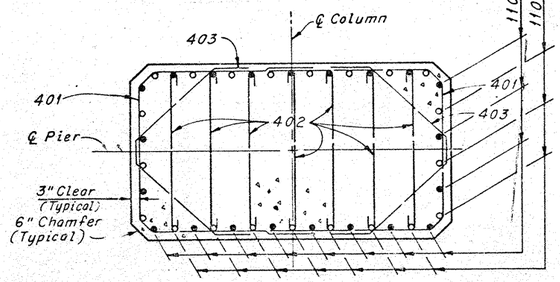

SECTION A-A



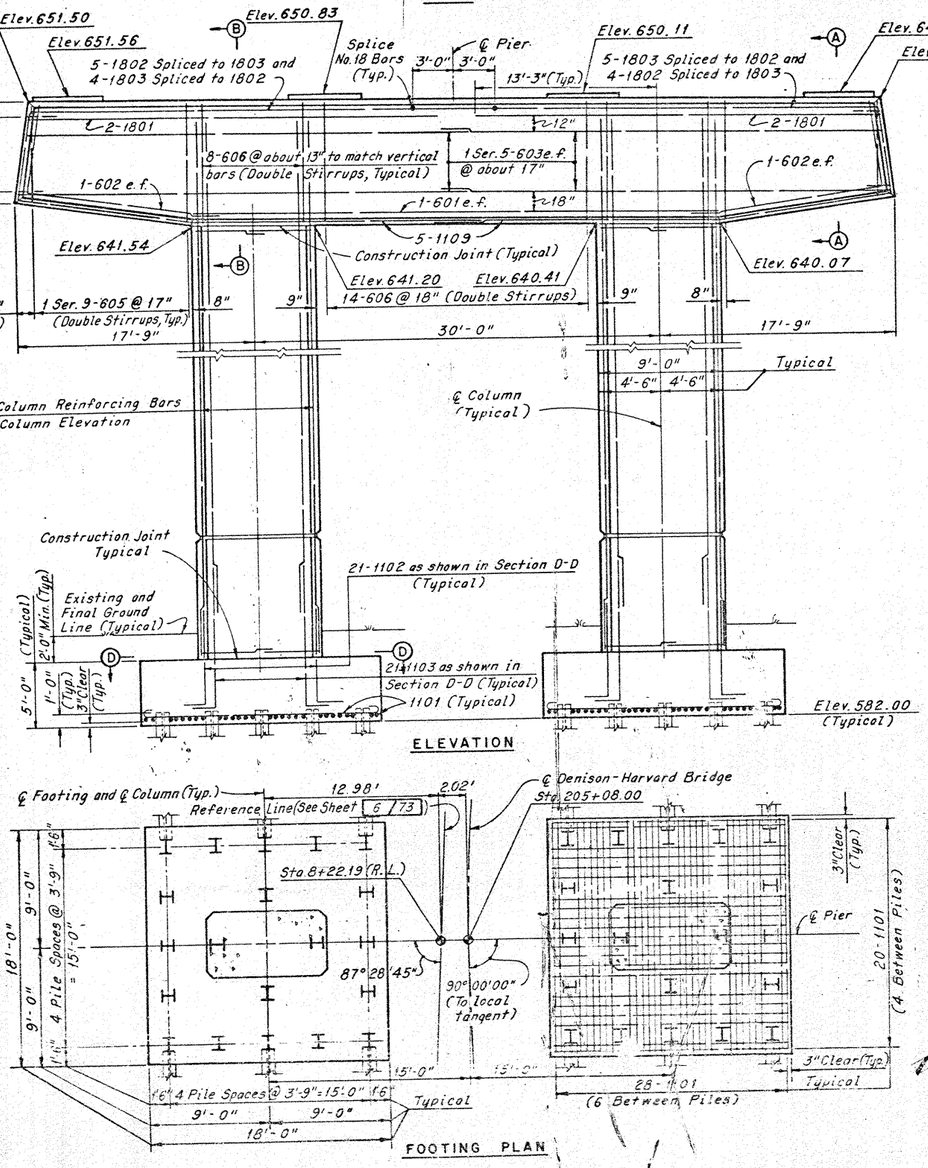

SECTION B-B

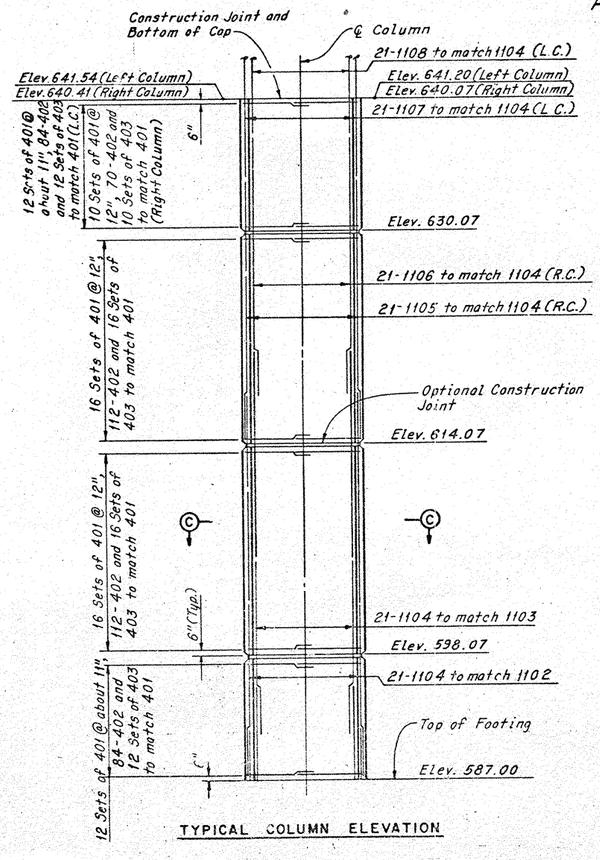



SECTION C-C




SECTION D-D
(For dimensions see Section C-C)




TYPICAL COLUMN ELEVATION




FOOTING PLAN

Note:
For Notes, see Sheet 18 / 73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PIER 5

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY C-10

| DRAWN C.P. | TRACED C.P. | CHECKED A.H.S. | REVIEWED C.A.S. | REVISED |
|---|---|---|---|---|
| DATE 10 26 73 | DATE 10 26 73 | DATE 11 21 73 | DATE 4 8 74 | SHEET 22 / 73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

1½"ø x 2'-1" Swedge anchor bolt with washer. Bolt set 1'-6" into concrete. Thread one end 5" (Typ.)

℄ Girder A and ℄ Base Plate (Typ.) ℄ Girder B ℄ Denison-Harvard Bridge ℄ Girder C (Typ. Girders B and C) ℄ Girder D (Typical)

℄ Pier

Sta. 206+58.00

90°00'00" (Typical)

11-501 @ 6" (Typical)

3 Girder Spaces @ 19'-2" = 57'-6"

65'-6"

6" Chamfer (Typ.)

**PLAN**

**Note: All reinforcing bar marks shall be prefixed PF.**

**Note: Anchor bolts shall be set in formed holes after the steel is erected.**

Elev. 649.14 Elev. 649.24 Elev. 648.97 Elev. 648.73 Elev. 648.54 Elev. 648.37

5-1802 Spliced to 1803 and 4-1803 Spliced to 1802

5-1803 Spliced to 1802 and 4-1802 Spliced to 1803

Splice No. 18 Bars (Typ.)

℄ Pier

13'-3" (Typ.)

7'-6" Typical

7-604 to match horizontal reinforcing bars (Typical)

5-1801 5-1801

1-605 (Double Stirrups, Typ.) 1-602 e.f.

8-607 @ about 13" to match vertical bars (Double Stirrups, Typical)

1 Ser. 5-603 e.f. @ about 17"

1-602 e.f.

1-601 e.f.

12" 18"

5-1107

Construction Joint (Typical)

Elev. 639.49 Elev. 639.38 Elev. 639.13 Elev. 639.02

13½" (Typ.) 1 Ser. 15-606 @ 9" (Double Stirrups, Typ.) 17'-9" 4½" 9" 14-607 @ 18" (Double Stirrups) 9" 4½" 17'-9"

30'-0"

For Column Reinforcing Bars See Column Elevation

℄ Column (Typical)

9'-0" 4'-6" 4'-6" Typical

Construction Joint Typical

21-1102 as shown in Section D-D (Typical)

Existing and Final Ground Line (Typical)

2'-0" Min. (Typ.)

5'-0" (Typical)

1'-0" (Typ.) 3" Clear (Typ.)

21-1103 as shown in Section D-D (Typ.)

1101 (Typical)

Elev. 583.00

**ELEVATION**

Construction Joint and Bottom of Cap ℄ Column

Elev. 639.49 (Left Column) Elev. 639.13 (Right Column)

Elev. 639.38 (Left Column) Elev. 639.02 (Right Column)

10 Sets of 401 @ 12", 70-402 and 10 Sets of 403 to match 401 (Right Column)

11 Sets of 401 @ about 11¼", 77-402 and 11 Sets of 403 to match 401 (L.C.)

6"

21-1106 to match 1104

Elev. 629.02

16 Sets of 401 @ 12", 112-402 and 16 Sets of 403 to match 401

21-1105 to match 1104

Optional Construction Joint

Elev. 613.02

16 Sets of 401 @ 12", 112-402 and 16 Sets of 403 to match 401

6" (Typ.)

21-1104 to match 1103

Elev. 597.02

10 Sets of 401 @ about 11", 70-402 and 10 Sets of 403 to match 401

21-1104 to match 1102

Top of Footing

Elev. 588.00

6"

**TYPICAL COLUMN ELEVATION**

5½" (Typical) 11" 6" ℄ Pier Symmetrical about ℄ Pier ℄ Anchor Bolt (Typ.)

1803 1802 501 1801 606 602 1107

6" (Typ.) 5-603 e.f. 3" Clear (Typ.) 6" Chamfer (Typical)

**SECTION A-A**

1802 1803 6" (Typ.) 1801 607 601 1107 1105 1106

6" Chamfer (Typical) 9'-6" 5-603 e.f. 3" Clear (Typ.) 3½" (Typ.)

Construction Joint, Level

**SECTION B-B**

9'-0" 4'-6" 4'-6" ℄ Column 403 401 1104 (Typical) 402 401 403 ℄ Pier 3" Clear (Typ.) 6" Chamfer (Typical) 2'-6" 5'-0" 2'-6"

**SECTION C-C**

Note: For Notes, see Sheet 18/73.

℄ Footing and ℄ Column (Typical) ℄ Denison-Harvard Bridge Sta. 206+58.00

18'-0" 9'-0" 9'-0" 4 Pile Spaces @ 3'-9" = 15'-0" 1'-6" 1'-6"

3" Clear (Typ.) ℄ Pier 90°00'00" 20'-1101 (4 Between Piles)

15'-0" 15'-0" 28-1101 (6 Between Piles) 3" Clear Typical

4 Pile Spaces @ 3'-9" = 15'-0" 1'-6" Typical 9'-0" 9'-0" 18'-0"

**FOOTING PLAN**

1103 (Typ.) 1102 (Typ.) ℄ Column 403 401 401 403 ℄ Pier 3" Clear (Typical) 6" Chamfer (Typical)

**SECTION D-D**
(For dimensions see Section C-C)

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PIER 6
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | QUANTITIES | REVISED |
|---|---|---|---|---|
| C.P. | C.P. | A.H.S. | | |
| DATE 10/25/73 | DATE 10/25/73 | DATE 10/23/73 | DATE | SHEET 23/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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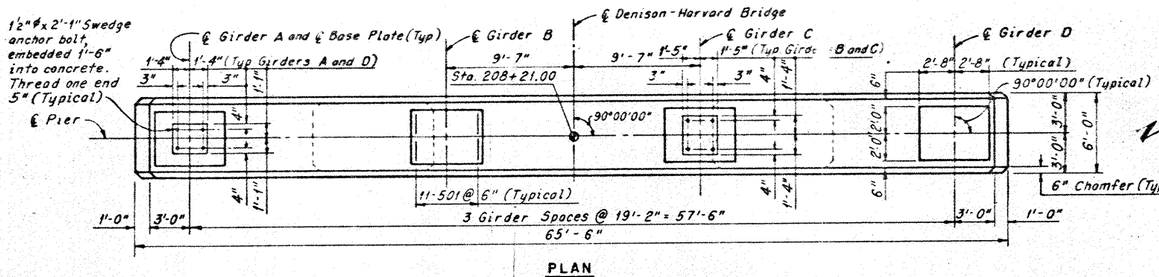
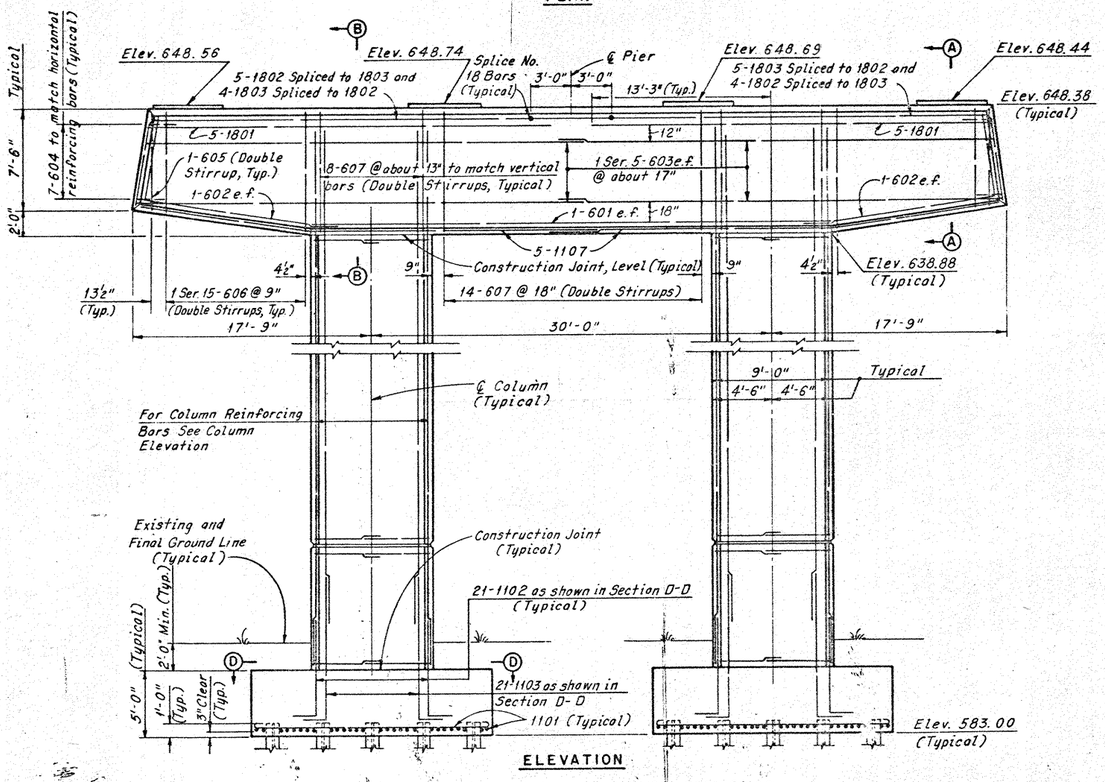
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

Note: All reinforcing bar marks shall be prefixed PG.

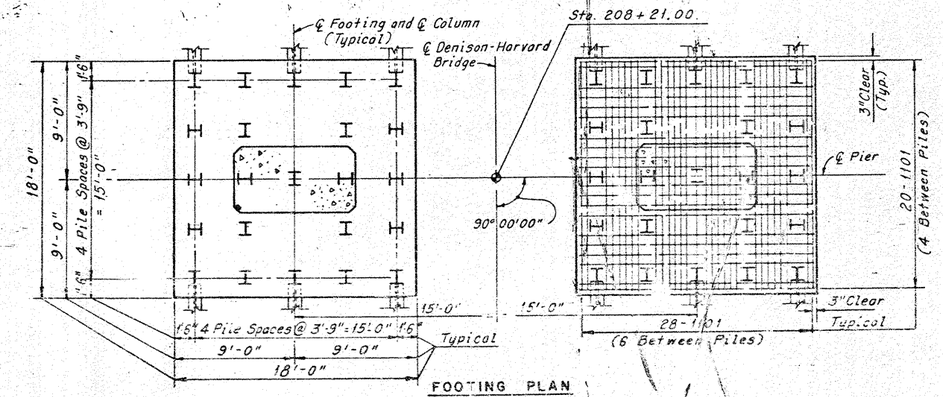
Note: Anchor bolts shall be set in formed holes after the steel is erected.



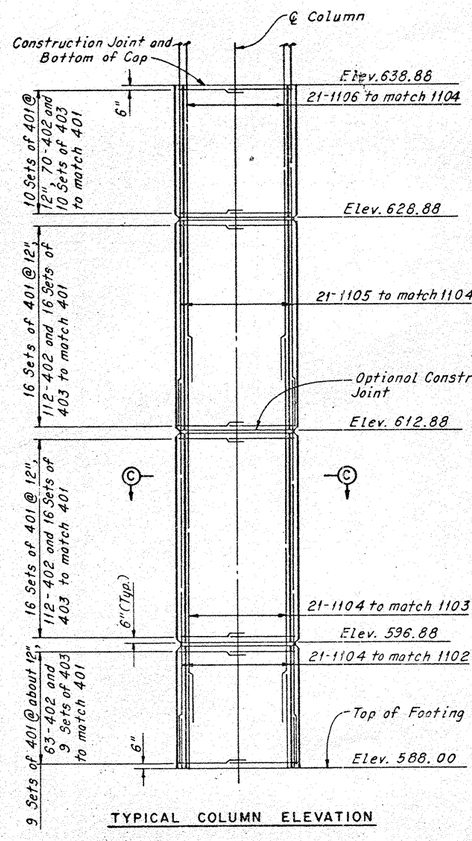

PLAN



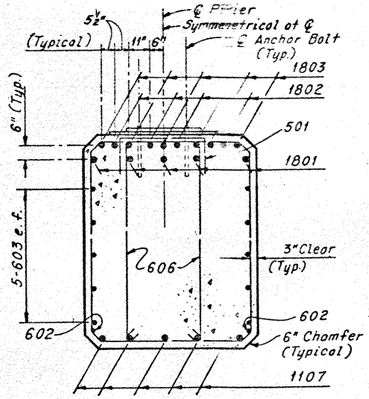

ELEVATION



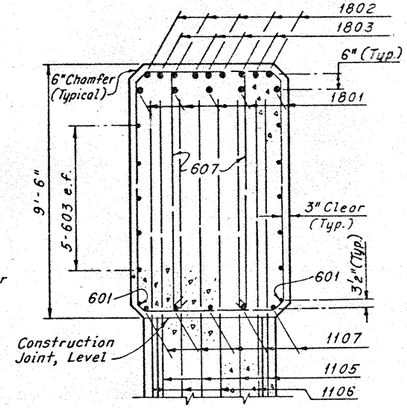

FOOTING PLAN




TYPICAL COLUMN ELEVATION



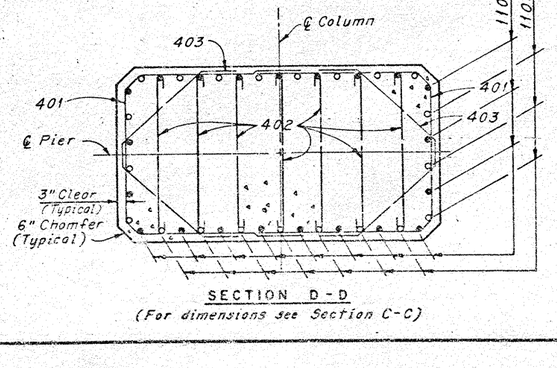

SECTION A-A




SECTION B-B




SECTION C-C




SECTION D-D
(For dimensions see Section C-C)

Note:
For Notes, see Sheet 18/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PIER 7

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN C.P. | TRACED C.P. | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DATE 10 15 73 | DATE 10 17 73 | DATE 10 23 73 | DATE 10 24 73 | |

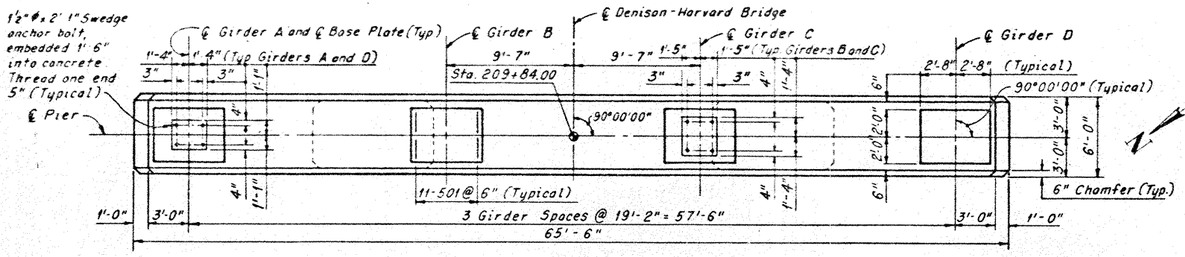
SHEET 24 / 73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

55 / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

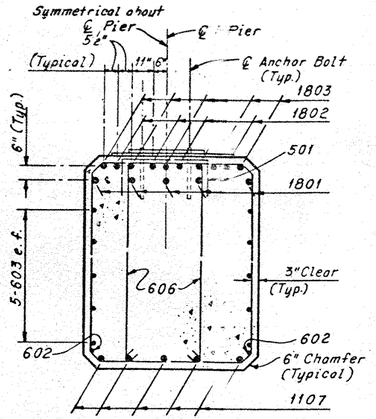
1½"ø x 2' 1" Swedge anchor bolt, embedded 1' 6" into concrete. Thread one end 5" (Typical)



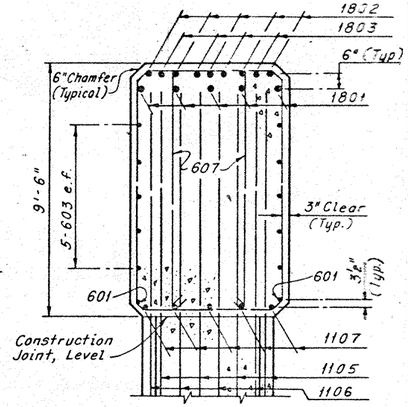

PLAN

Note: All reinforcing bar marks shall be prefixed PH.

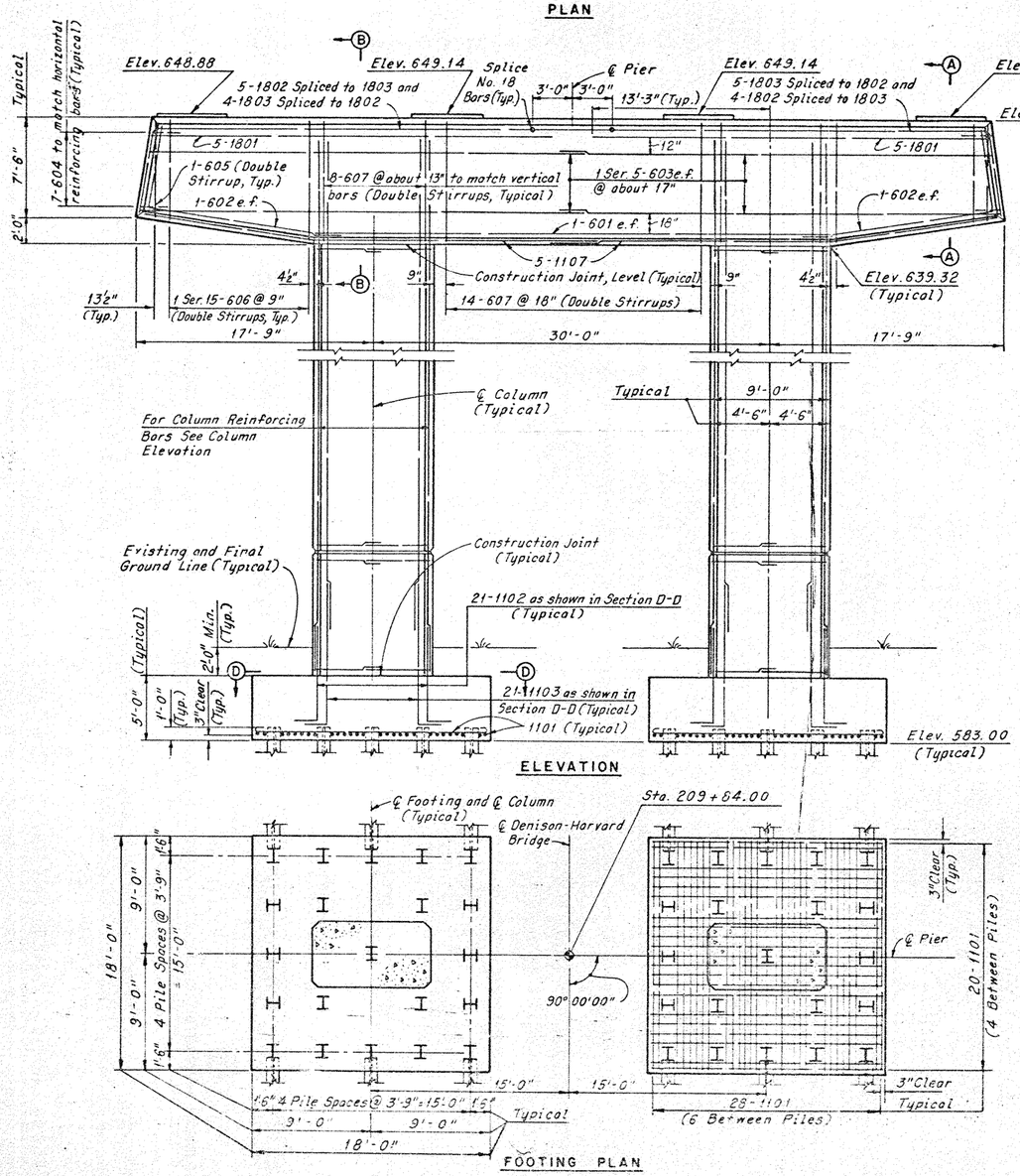
Note:
Anchor bolts shall be set in formed holes after the steel is erected.




SECTION A--A



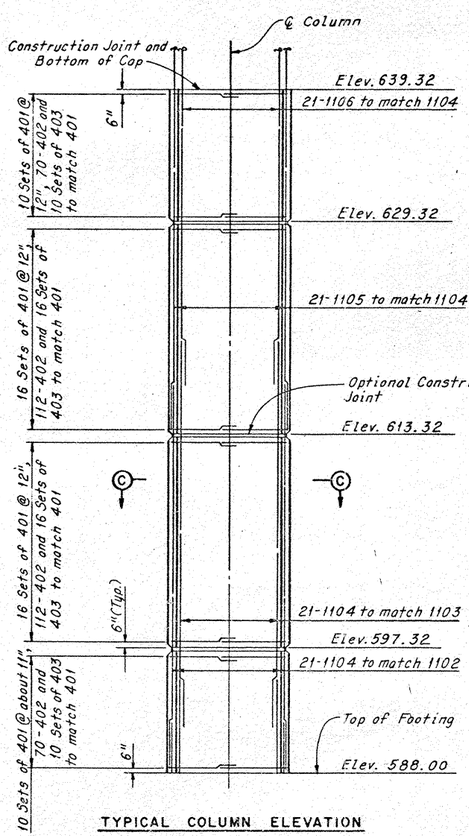

SECTION B-B



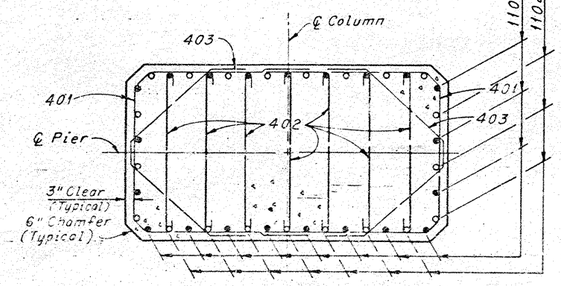

ELEVATION



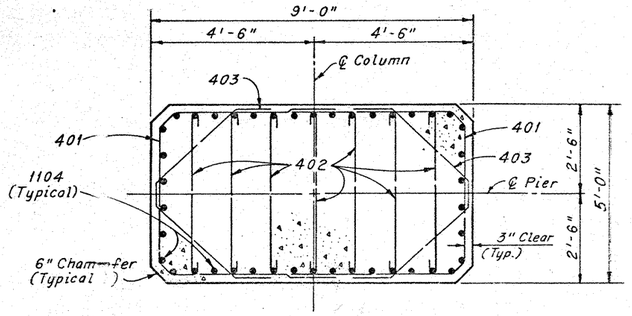

FOOTING PLAN




TYPICAL COLUMN ELEVATION




SECTION D-D
(For dimensions see Section C-C)




SECTION C-C

Note:
For Notes, see Sheet 18/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PIER 8

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN C P | TRACED C P | CHECKED A B | REVISED |
|---|---|---|---|
| DATE 10 21 73 | DATE 10 22 73 | DATE 10 26 73 | DATE 4 5 74 |

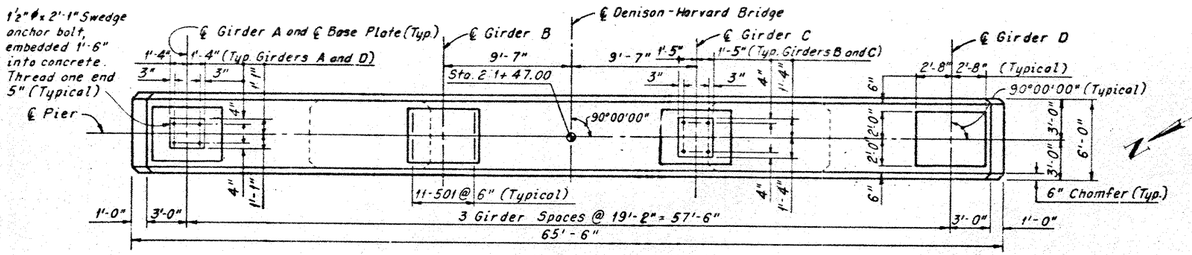
SHEET 25

| FHWA REGION | STATE | PROJECT | | |
|---|---|---|---|---|
| 5 | OHIO | | | |

56
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

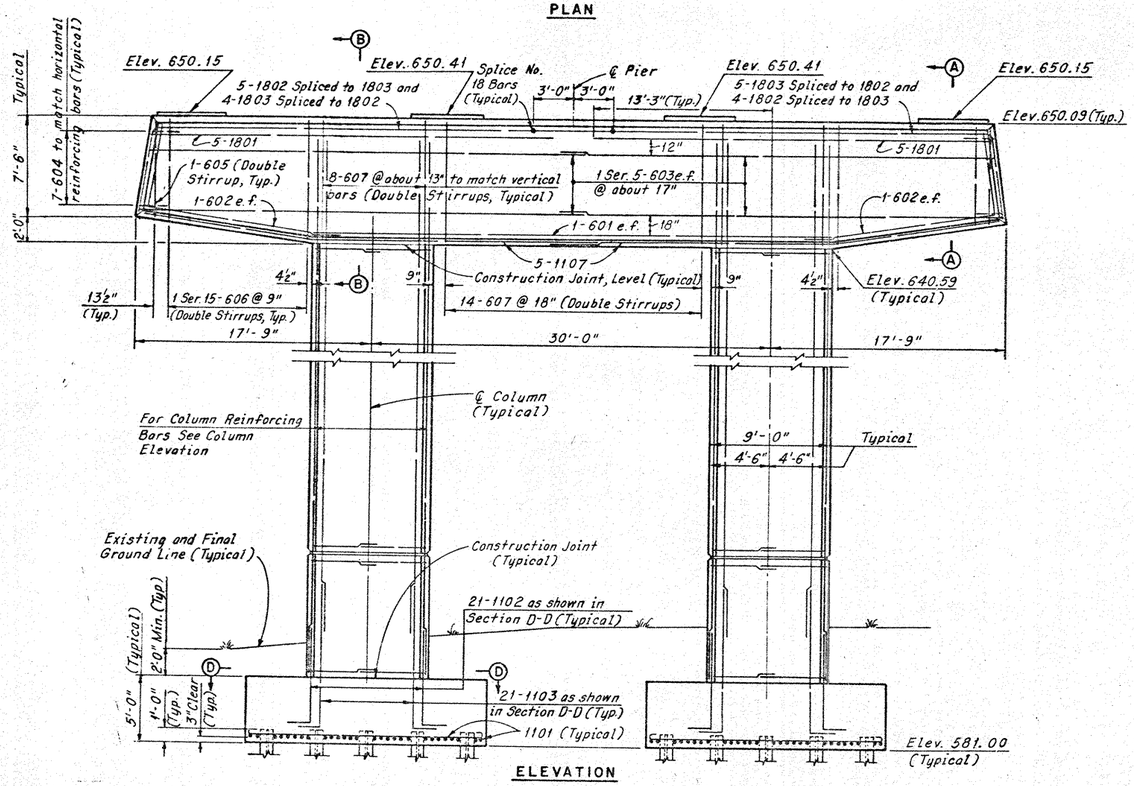
1½"ø x 2'-1" Swedge anchor bolt, embedded 1'-6" into concrete. Thread one end 5" (Typical)



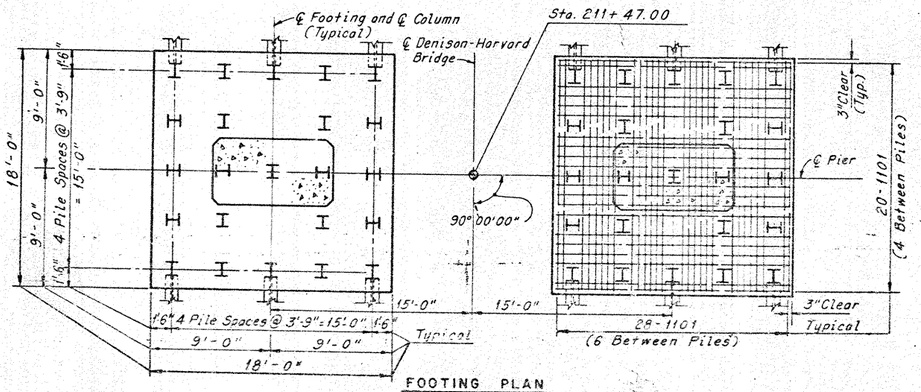

PLAN

Note: All reinforcing bar marks shall be prefixed PJ.

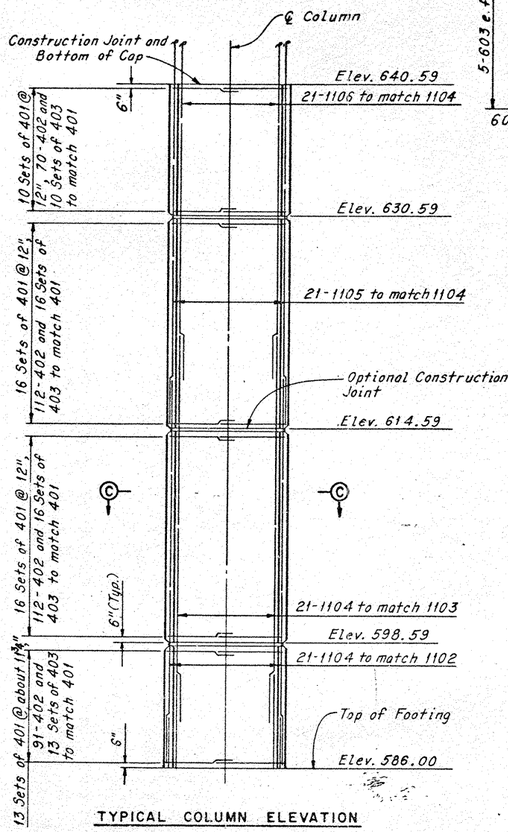
Note: Anchor bolts shall be set in formed holes after the steel is erected.



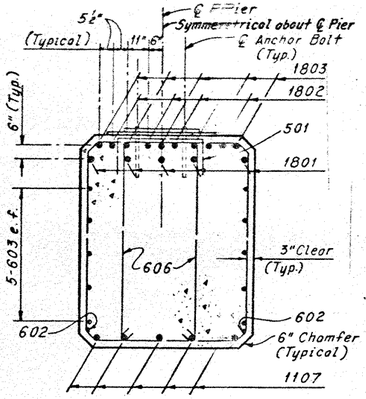

ELEVATION



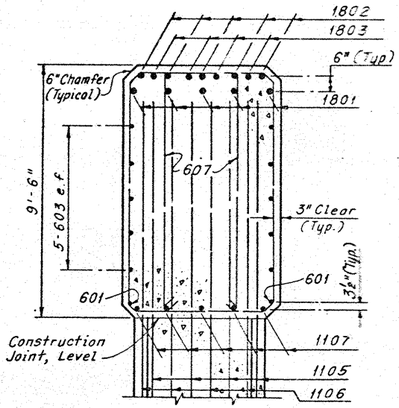

FOOTING PLAN



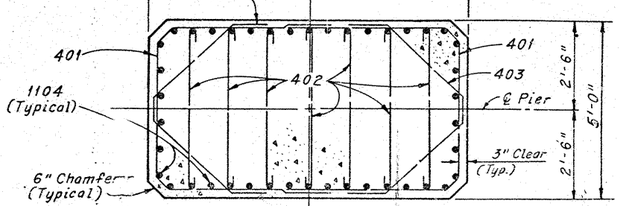

TYPICAL COLUMN ELEVATION



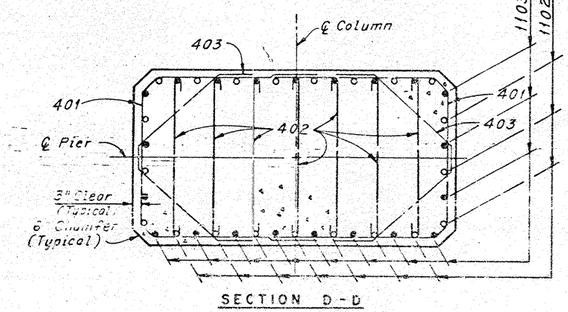

SECTION A-A




SECTION B-B




SECTION C-C




SECTION D-D
(For dimensions see Section C-C)

Note: For Notes, see Sheet 18/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PIER 9
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

DRAWN C.P. TRACED C.P. CHECKED J.V.C. CWED. C.A.S. REVISED
DATE 10 25 73 DATE 10 25 73 DATE 10 29 73 DATE 4 8 74 SHEET 55 OF 73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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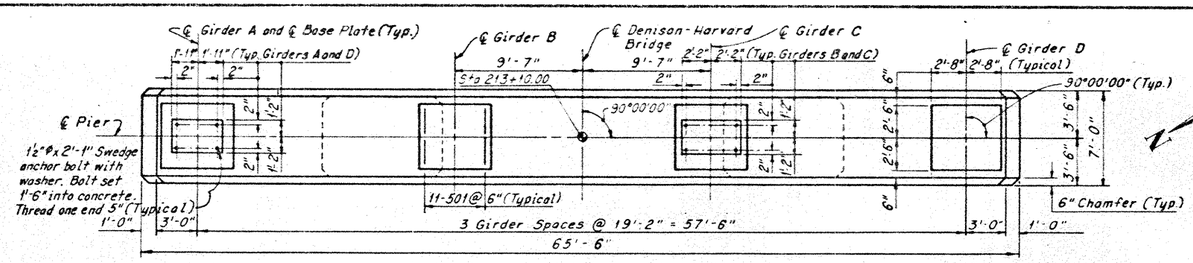
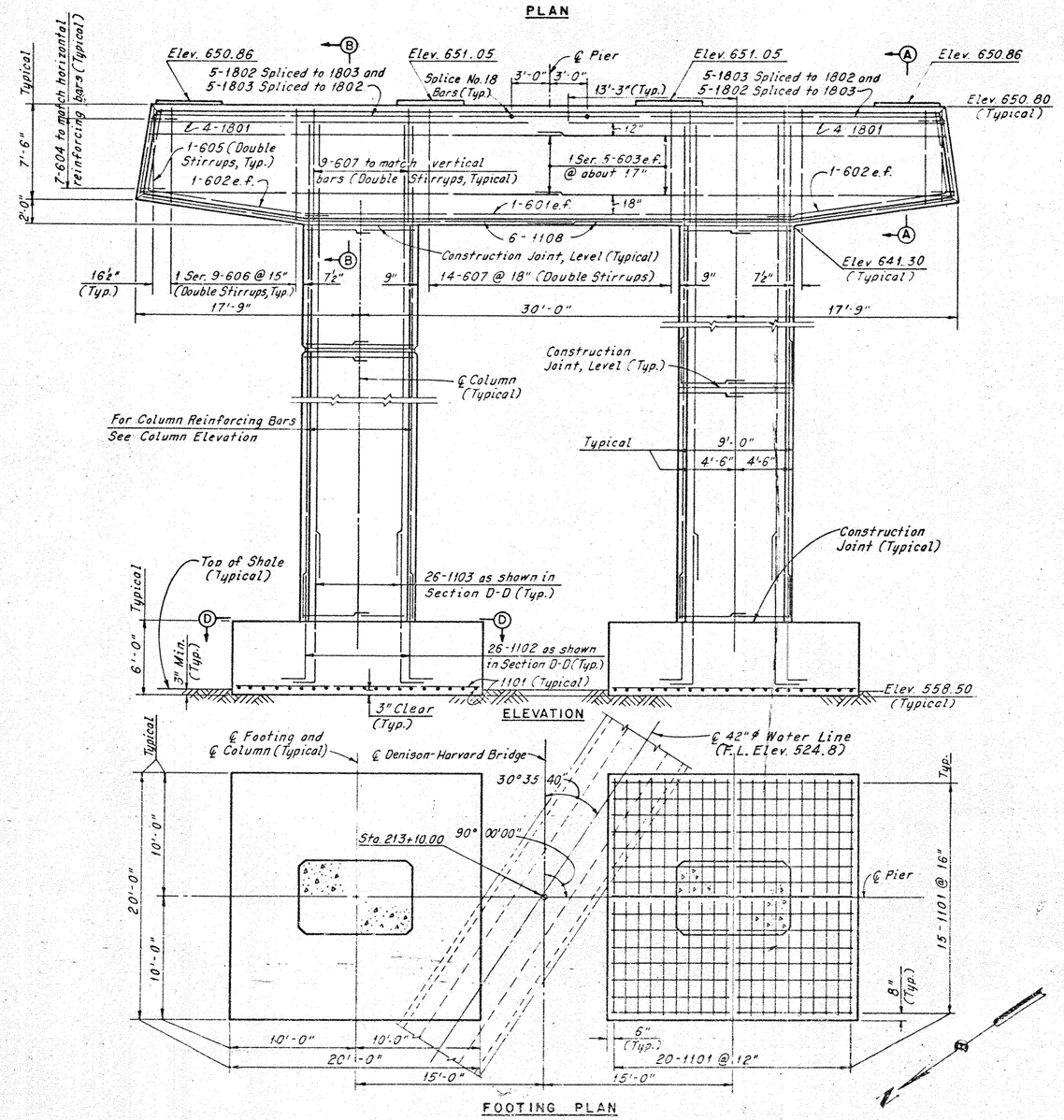
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

Note: All reinforcing bar marks shall be prefixed PK.

Note: Anchor bolts shall be set in formed holes after the steel is erected.



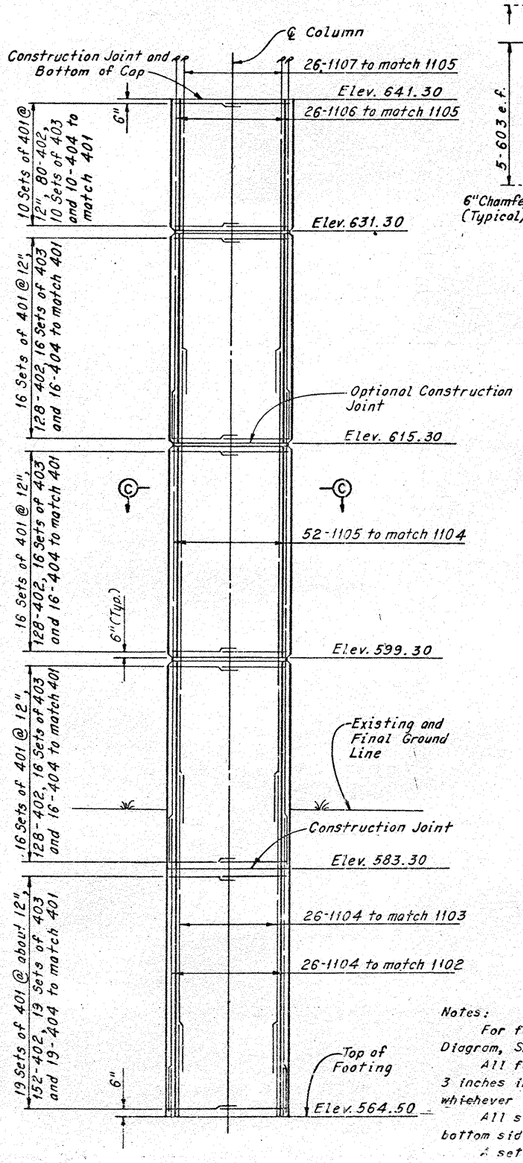

PLAN



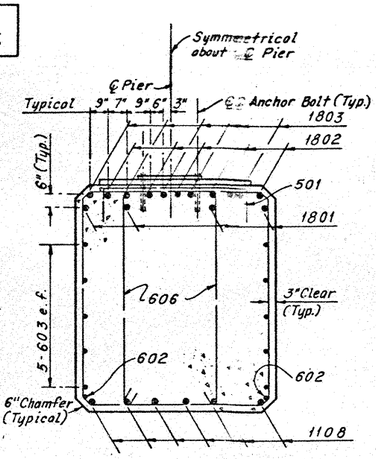

ELEVATION



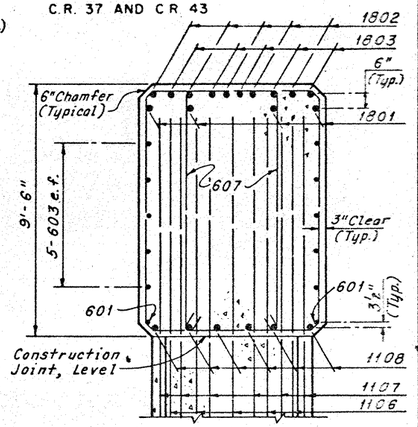

FOOTING PLAN



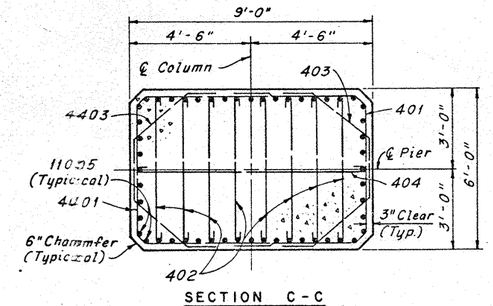

TYPICAL COLUMN ELEVATION



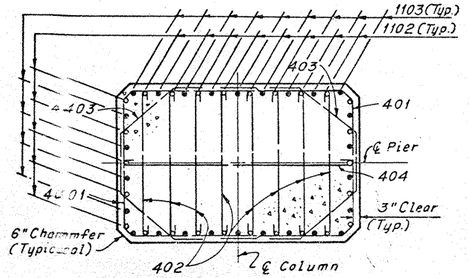

SECTION A-AA




SECTION B-B




SECTION C-C




SECTION D-D

(For dimensions see Section C-C)

Notes:

For footing locations see Bridge Layout Diagram, Sheet 6 / 73.

All footings shall extend to a minimum of 3 inches into shale or to the elevation shown, whichever is lower.

All stirrup hooks shall be placed on the bottom side of pier cap.

A set consists of two bars.

For Rustication Detail, see Sheet 19 / 73.

For Reinforcement Schedules, see Sheet 69 / 73 and 70 / 73.

The following abbreviations are used:

e.f. = each face  Typ. = Typical

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PIER 10

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

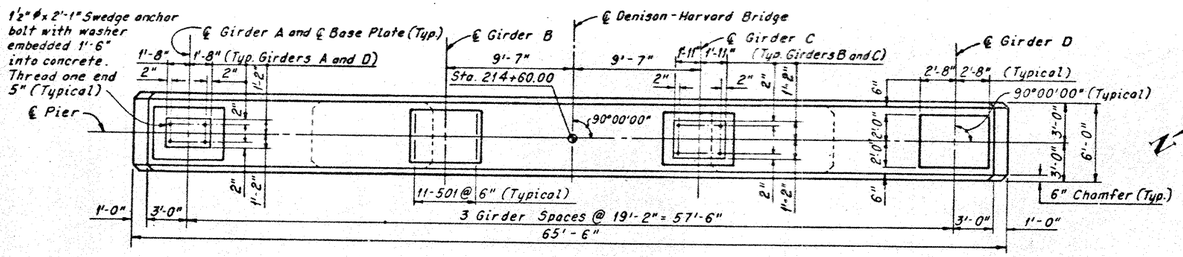
| DRAWN C.P | TRACED C.P | CHECKED H.S | REVIEWED C.A.B | REVISED |
|---|---|---|---|---|
| DATE 10-25-73 | DATE 10-26-73 | DATE 11-20-73 | DATE 12-6-74 | SHEET 2 / 73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

66
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

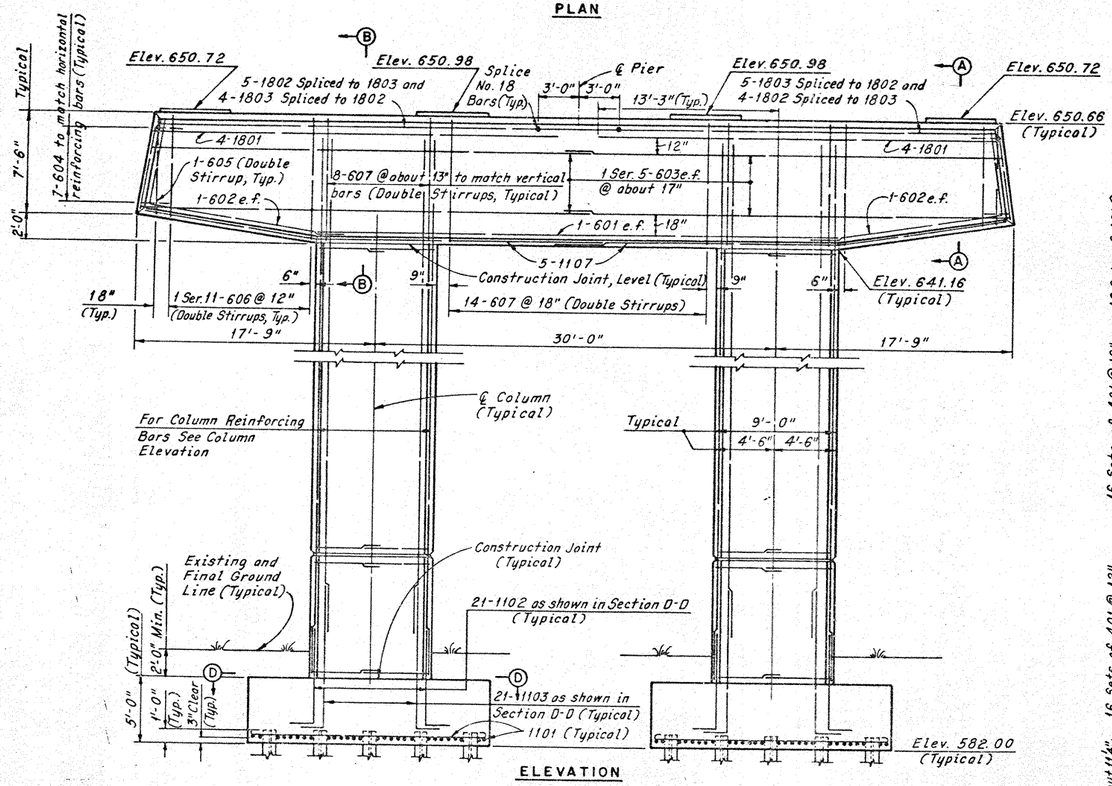
1'½"ø x 2'-1" Swedge anchor bolt with washer embedded 1'-6" into concrete. Thread one end 5" (Typical)



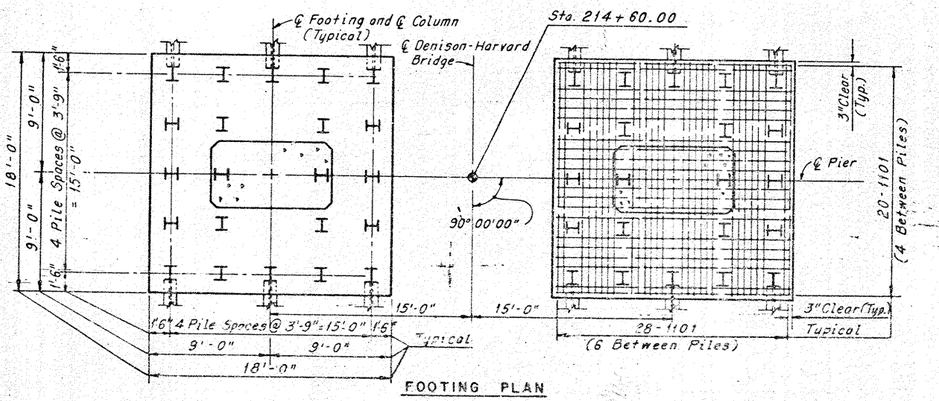

PLAN

Note: Anchor bolts shall be set in formed holes after the steel is erected.

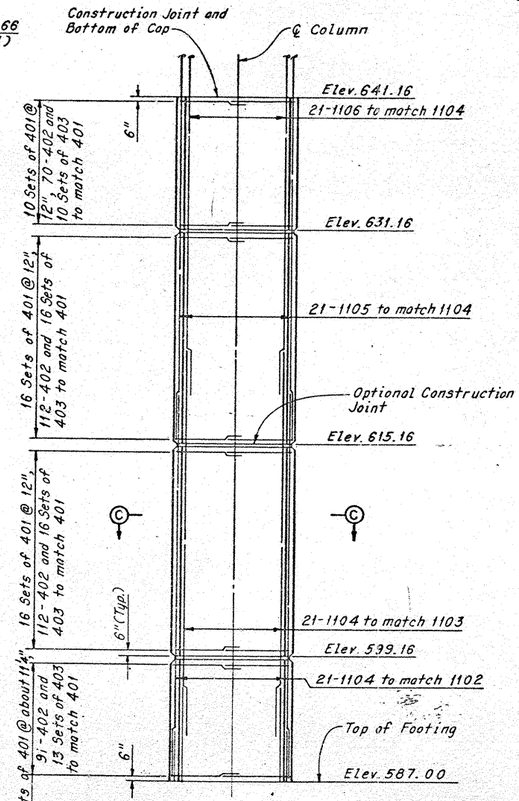
Note: All reinforcing bar marks shall be prefixed PL.



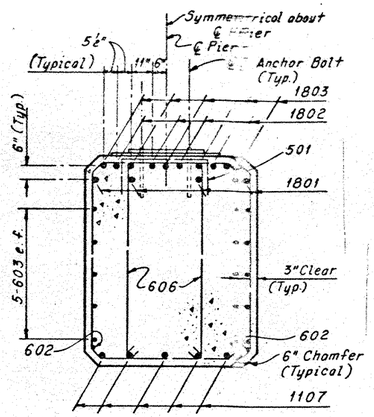

ELEVATION



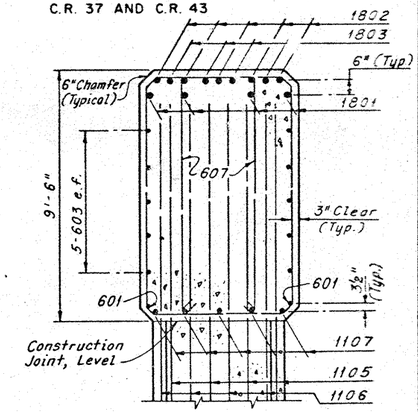

FOOTING PLAN



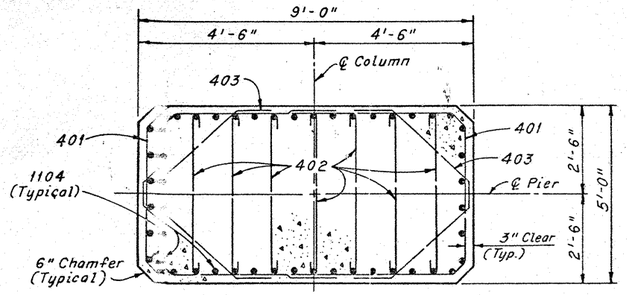

TYPICAL COLUMN ELEVATION



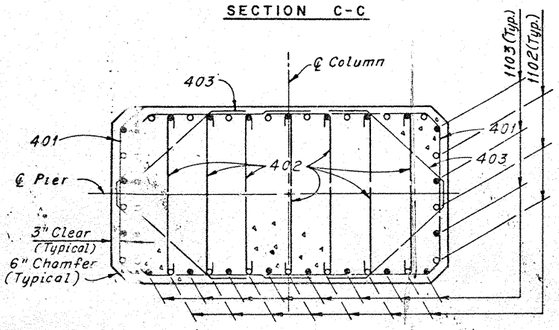

SECTION A-A




SECTION B-B




SECTION C-C




SECTION D-D

(For dimensions see Section C-C)

Note:
For Notes, see Sheet 18/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PIER II

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.P. | C.P. | J.A.S. | C.A.B. | |
| DATE 11/15/73 | DATE 1/6/73 | DATE 11/20/73 | DATE 4/8/74 | SHEET 25/73 |

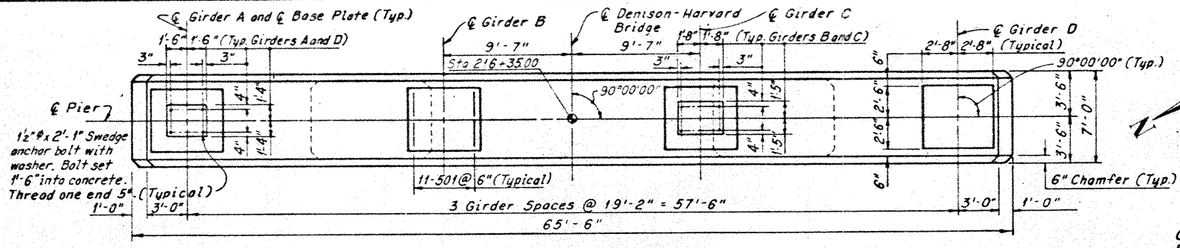
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

83
146

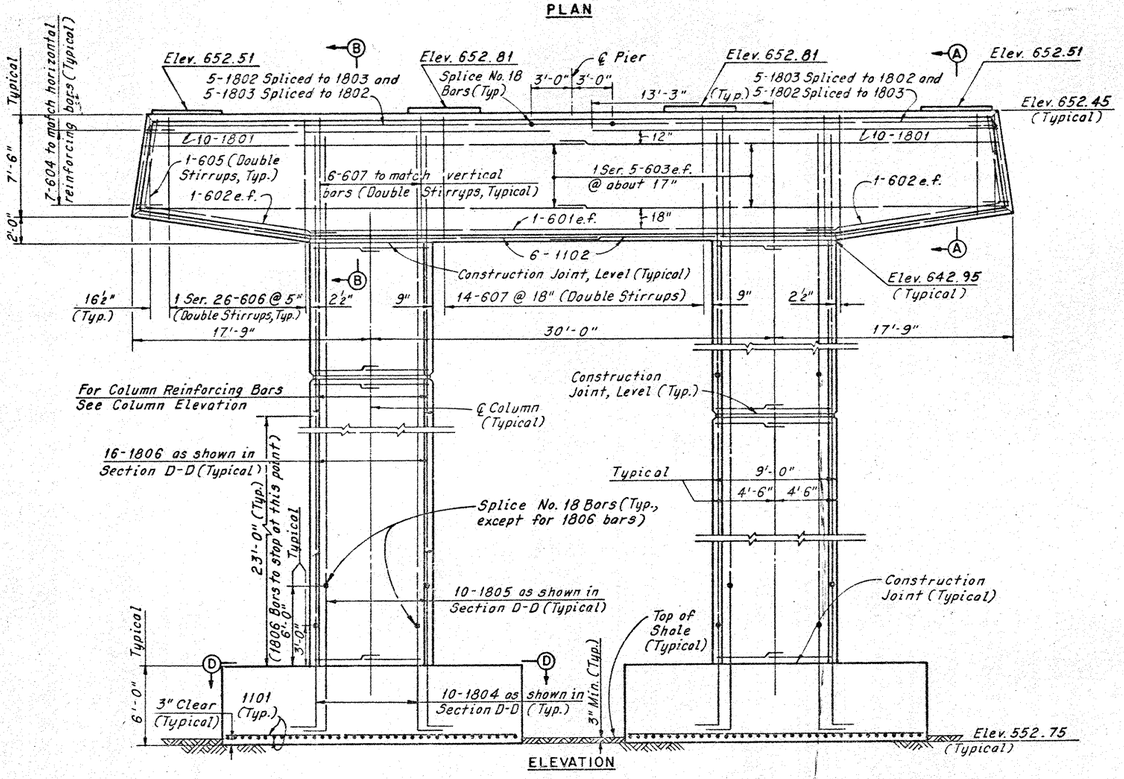
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

Note: All reinforcing bar marks shall be prefixed PM.

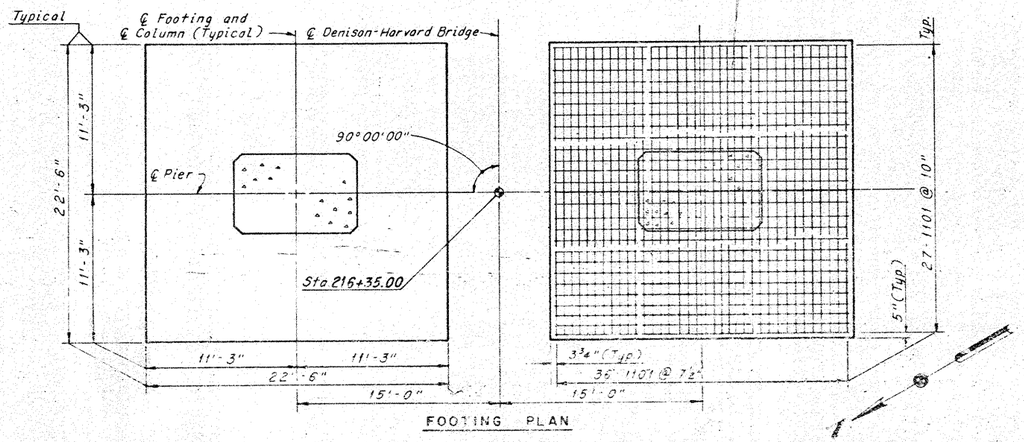
Note: Anchor bolts shall be set in formed holes after the steel is erected.



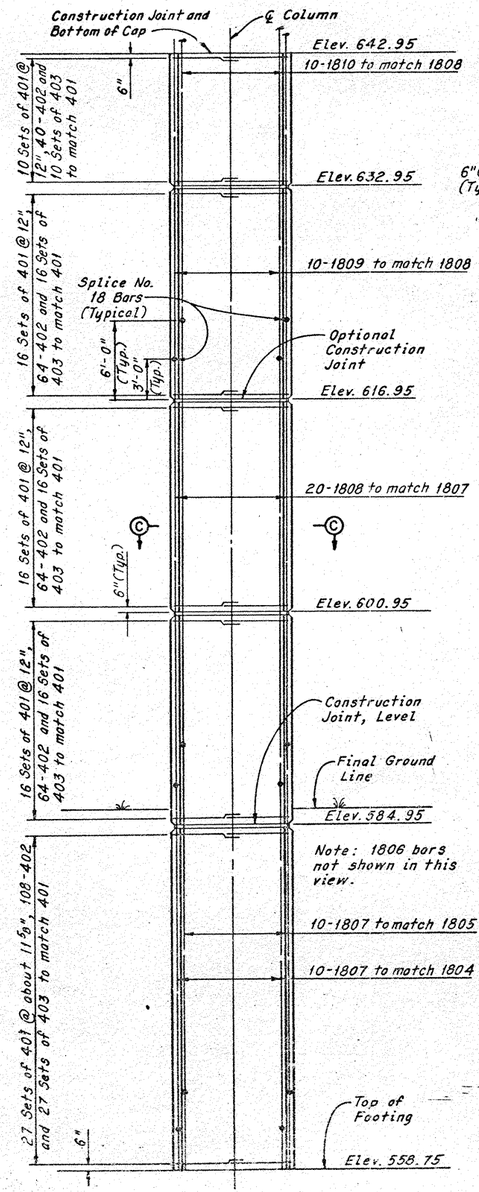

PLAN



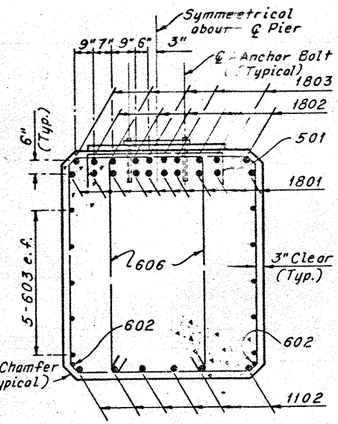

ELEVATION



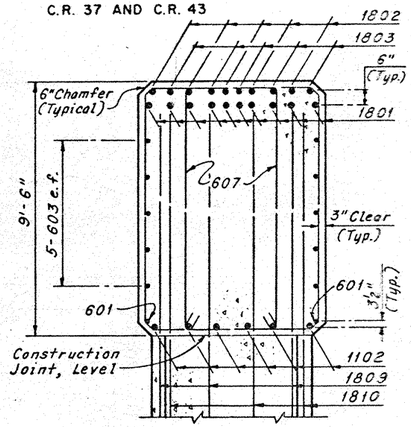

FOOTING PLAN



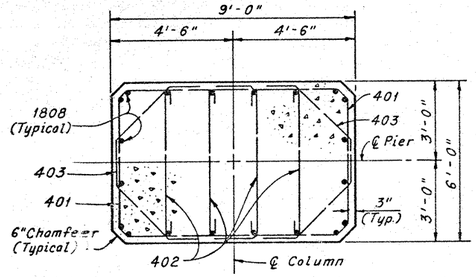

TYPICAL COLUMN ELEVATION



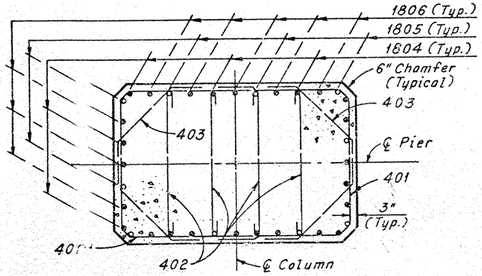

SECTION A-A




SECTION B-B




SECTION C-C




SECTION D-D
(For dimensions see Section C-C)

Note:
For Notes, see Sheet 27/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PIER 12

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

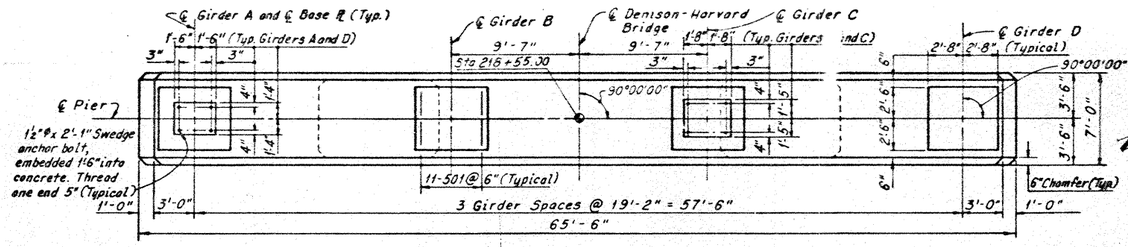
| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.P. | C.P. | | C.A.B. | |
| DATE 11-26-73 | DATE 11-27-73 | DATE 11-29-73 | DATE 4-8-74 | SHEET 25/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

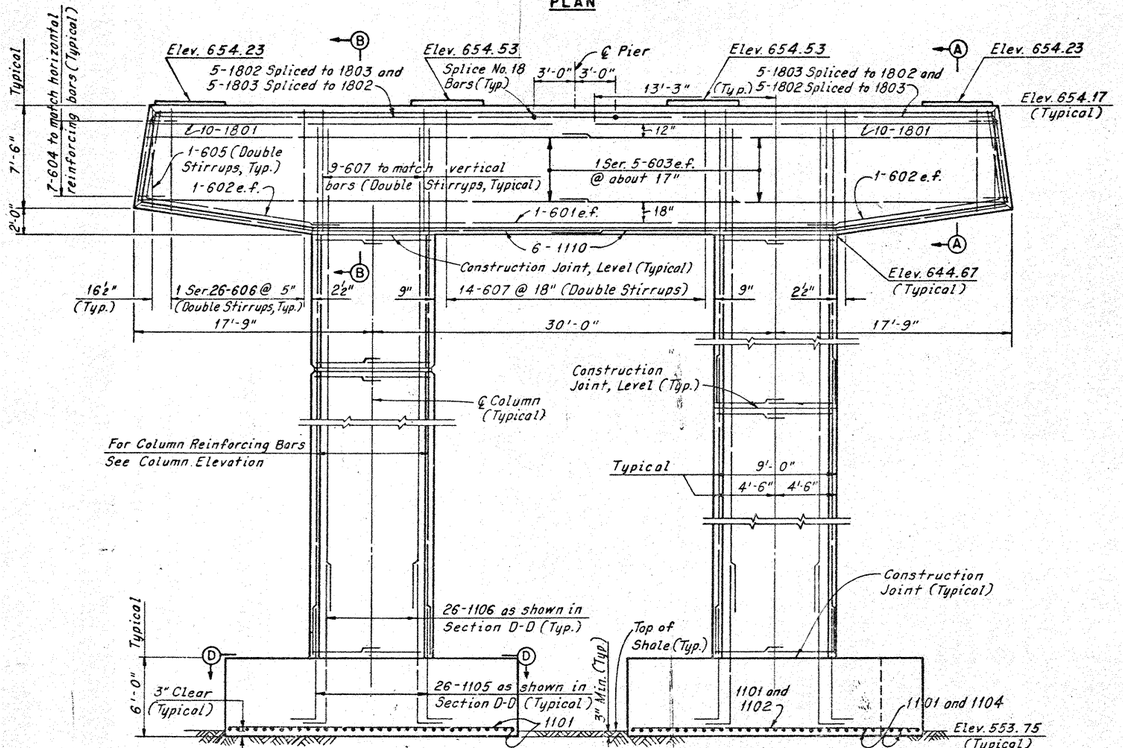
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

Note: All reinforcing bar marks shall be prefixed PN.

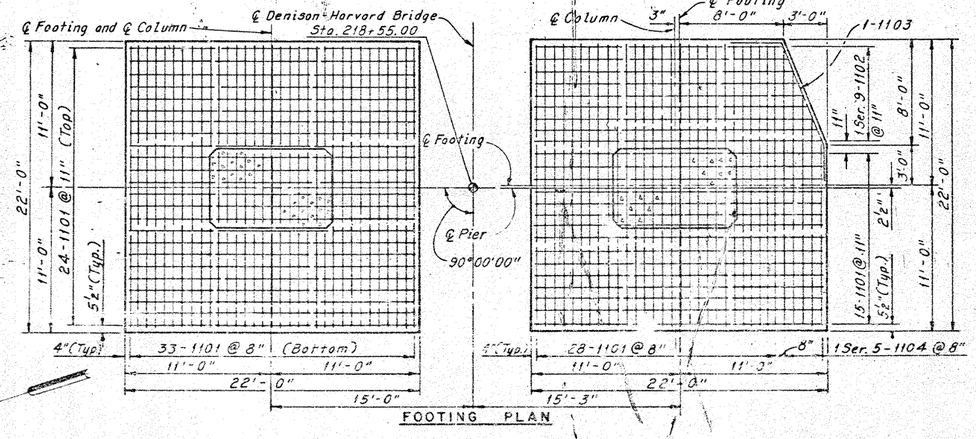
Note: Anchor bolts shall be set in formed holes after the steel is erected.



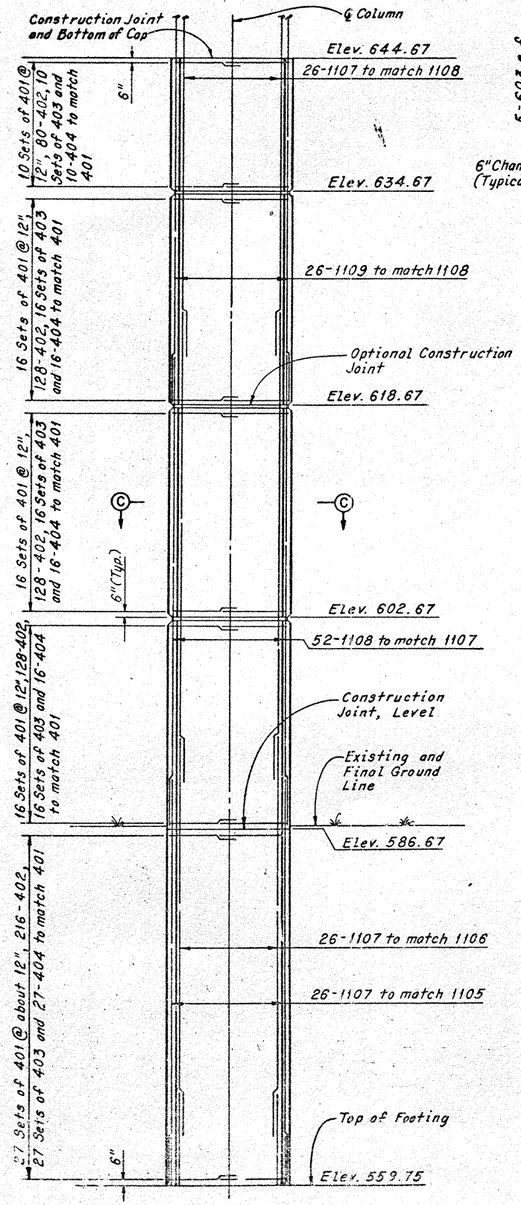

PLAN



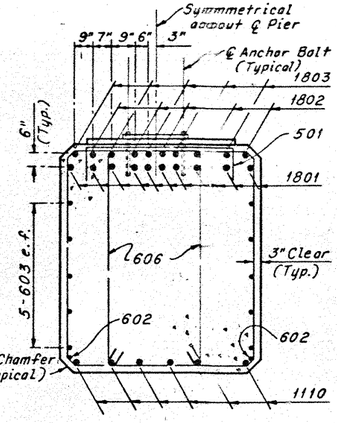

ELEVATION



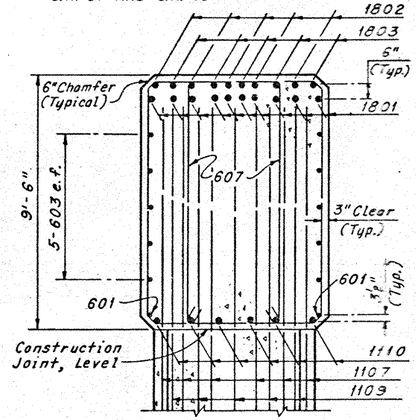

FOOTING PLAN



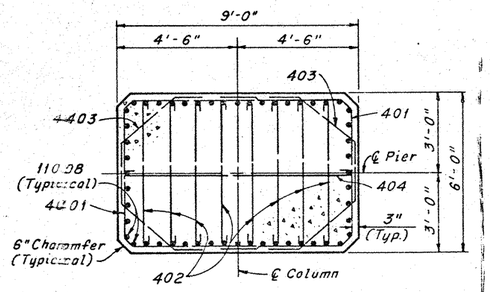

TYPICAL COLUMN ELEVATION



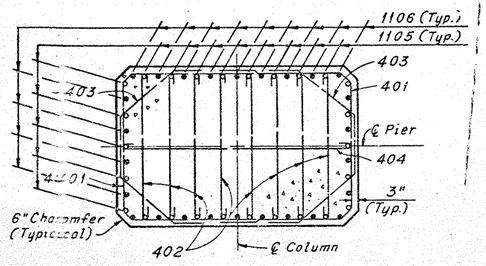

SECTION A — A




SECTION B-B




SECTION C-C




SECTION D-D

(For dimensions see Section C-C)

Note:
For Notes, see Sheet 27 73
For location B&O Railroad Trestle piling ... see Sheet 6 73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PIER 13

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | QUANTITIES REVIEWED | REVISED |
|---|---|---|---|---|
| C.P. | C.P. | H.S. | B.A.B. | |
| DATE 11-26-73 | DATE 11-26-73 | DATE 11-26-73 | DATE 4-8-74 | SHEET 5 OF 173 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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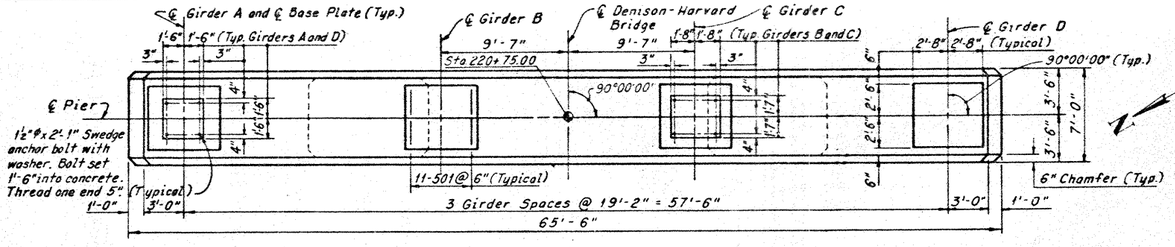
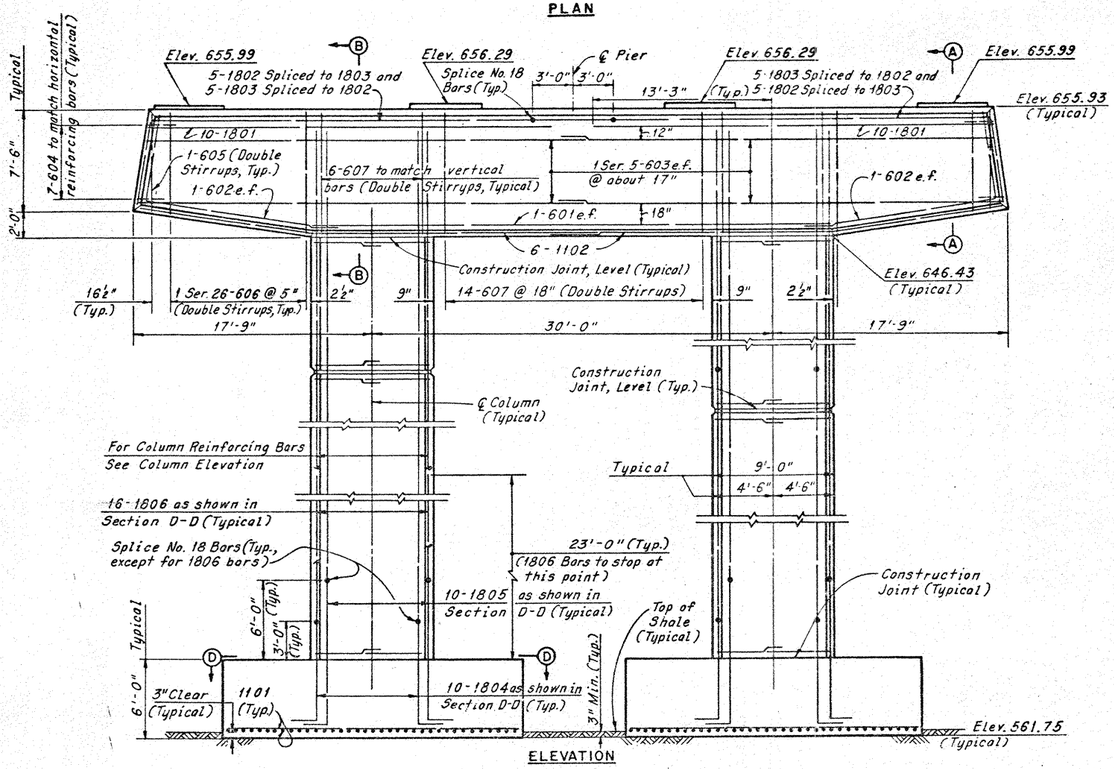
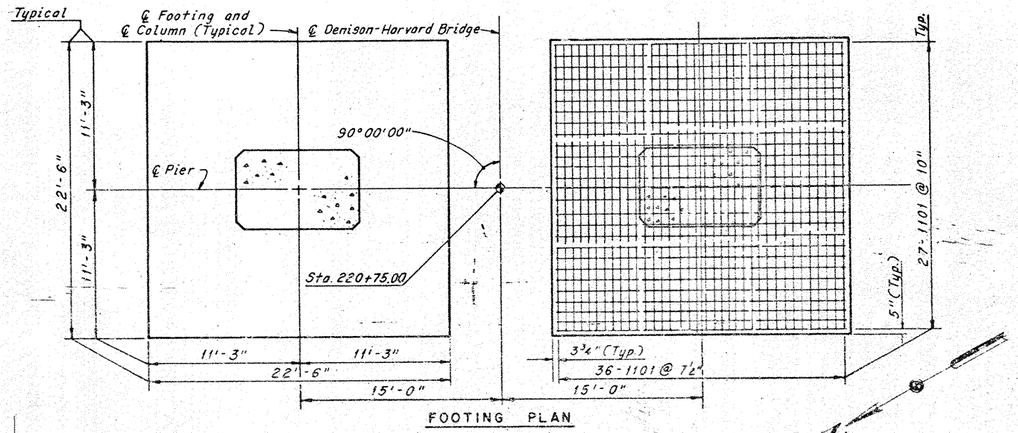
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




PLAN



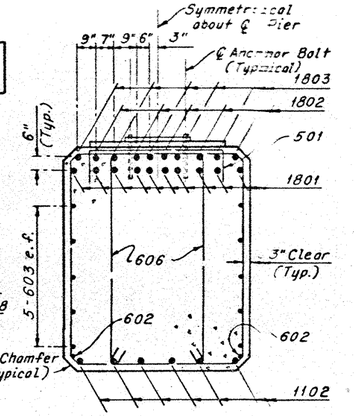

ELEVATION



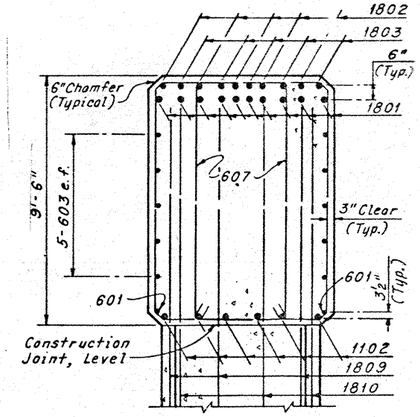

FOOTING PLAN

Note: All reinforcing bar marks shall be prefixed PP.

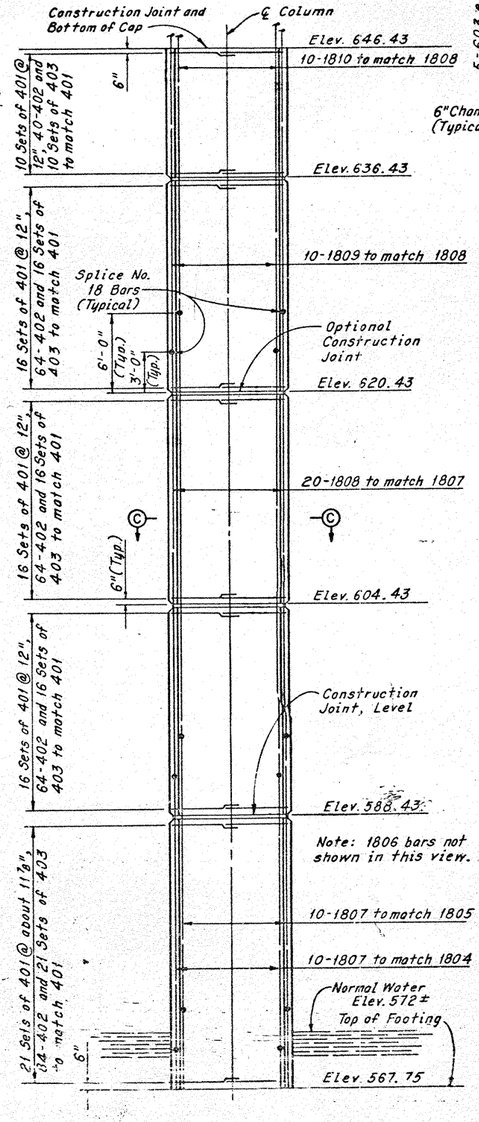
Note: Anchor bolts shall be set in formed holes after the steel is erected.



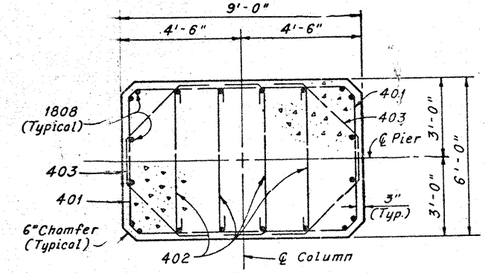

SECTION A - A



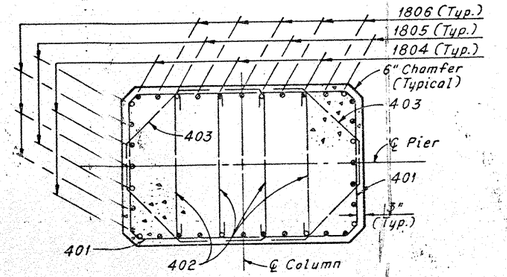

SECTION B-B




TYPICAL COLUMN ELEVATION




SECTION C-C




SECTION D - D

(For dimensions see Section C-C)

Note: For Notes, see Sheet 27/73

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PIER 14

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.P. | C.P. | H.S. | C.E.B. | |
| DATE 11-28-73 | DATE 1-8-74 | DATE 12-3-73 | DATE 4-6-74 | SHEET 31/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

1½"ø x 2'-1" Swedge anchor bolt with washer, embedded 1'-6" into concrete. Thread one end 5" (Typical)

℄ Girder A and ℄ Base Plate (Typ.)

℄ Girder B

℄ Denison-Harvard Bridge

℄ Girder C

℄ Girder D

1'-11" (Typ. Girders A and D)

9'-7"

Sta. 222+72.00

9'-7"

2'-2" 2'-2" (Typ. Girders B and C)

2'-8" 2'-8" (Typical)

90°00'00" (Typical)

℄ Pier

11-501 @ 6" (Typical)

3 Girder Spaces @ 19'-2" = 57'-6"

65'-6"

6" Chamfer (Typ.)

1'-0" 3'-0" 3'-0" 1'-0"

PLAN

Note: Anchor bolts shall be set in formed holes after the steel is erected.

Note: All reinforcing bar marks shall be prefixed PR.

Symmetrical about ℄ Pier

5½" (Typical)

11" 6"

Anchor Bolt (Typ.)

1803 1802 501 1801 3" Clear (Typ.) 606 602 6" Chamfer (Typical) 1107

6" (Typ.)

5-603 e.f.

602

SECTION A-A

1802 1803 6" (Typ.) 1801 6" Chamfer (Typical) 607 3" Clear (Typ.) 601 3½" (Typ.) 1107 1105 1106

9'-6"

5-603 e.f.

Construction Joint, Level

SECTION B-B

Typical 7'-6" 2'-0" 7-604 to match horizontal reinforcing bars (Typical)

Elev. 657.19

Ⓑ Elev. 657.44

Splice No. 18 Bars (Typ.)

3'-0" 3'-0" ℄ Pier 13'-3" (Typ.)

Elev. 657.44 Ⓐ Elev. 657.19

5-1802 Spliced to 1803 and 4-1803 Spliced to 1802

5-1803 Spliced to 1802 and 4-1802 Spliced to 1803

Elev. 657.13 (Typical)

4-1801 1-605 (Double Stirrup, Typ.) 1-602 e.f. 8-607 @ about 13" to match vertical bars (Double Stirrups, Typical) 1 Ser. 5-603 e.f. @ about 17" 12" 4-1801 1-602 e.f. 1-601 e.f. 18" 5-1107 Construction Joint, Level (Typical)

6" 9" 9" 6" Elev. 647.63 (Typical)

18" (Typ.) 1 Ser. 11-606 @ 12" (Double Stirrups, Typ.) 14-607 @ 18" (Double Stirrups)

17'-9" 30'-0" 17'-9"

℄ Column (Typical)

For Column Reinforcing Bars See Column Elevation

Typical 9'-0" 4'-6" 4'-6"

Existing and Final Ground Line (Typical)

Construction Joint (Typical)

21-1102 as shown in Section D-D (Typical)

2'-0" Min. (Typ.) 5'-0" (Typical) 1'-0" (Typ.) 3" Clear (Typ.)

21-1103 as shown in Section D-D (Typical)

1101, 1108 & 1109

1101 (Typ.)

Elev. 587.50 (Typical)

ELEVATION

℄ Footing and ℄ Column (Typ.)

26-1101 (6 Between Piles)

3" Clear (Typ.)

℄ Denison-Harvard Bridge

*Note: Northwest corner of North side footing shall be clipped as shown. For location of Republic Steel Corp. Track, see Sheet 6/73.

1-1109 1-1108

5 sta. 222+72.00

18'-0" 9'-0" 9'-0" 1'-6" 6 Pile Spaces @ 3'-9" = 15'-0" See * Note: 1'-6" 10½"

18'-1101 (4 Between Piles)

90°00'00"

℄ Pier

3" Clear (Typ.)

20-1101 (4 Between Piles)

10'-2" 1-1108 15'-0" 15'-0"

6 Pile Spaces @ 3'-9" = 15'-0" 1'-6"

9'-0" 9'-0" 18'-0"

Typical, except as noted

28-1101 (6 Between Piles)

3" Clear (Typ.)

FOOTING PLAN

Construction Joint and Bottom of Cap

℄ Column

Elev. 647.63

21-1106 to match 1104

6"

10 Sets of 401 @ 12", 70-402 and 10 Sets of 403 to match 401

Elev. 637.63

16 Sets of 401 @ 12", 112-402 and 16 Sets of 403 to match 401

21-1105 to match 1104

Optional Construction Joint

Elev. 621.63

16 Sets of 401 @ 12", 112-402 and 16 Sets of 403 to match 401

6" (Typ.)

21-1104 to match 1103

Elev. 605.63

21-1104 to match 1102

14 Sets of 401 @ about 11½", 98-402 and 14 Sets of 403 to match 401

Top of Footing

6"

Elev. 592.50

TYPICAL COLUMN ELEVATION

9'-0"

4'-6" 4'-6"

℄ Column

403 401 402 1104 (Typical) 401 403 ℄ Pier 3" Clear (Typ.) 6" Chamfer (Typical)

2'-6" 5'-0" 2'-6"

SECTION C-C

1103 (Typ.) 1102 (Typ.)

℄ Column

403 401 402 401 403 ℄ Pier 3" Clear (Typical) 6" Chamfer (Typical)

SECTION D-D

(For dimensions see Section C-C)

Note: For Notes, see Sheet 18/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PIER 15

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | DESIGNED | CHECKED | REVISED |
|---|---|---|---|---|
| C.P. | C.P. | A.S. | CAB | |
| DATE 11-16-73 | DATE 11-17-73 | DATE 11-21-73 | DATE 2-8-74 | SHEET 52/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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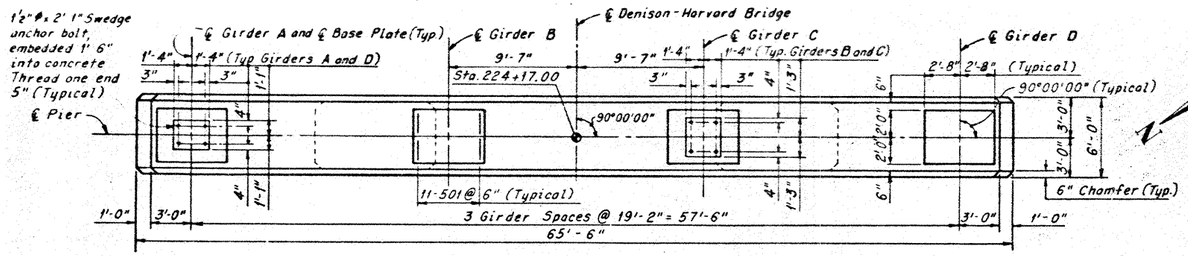
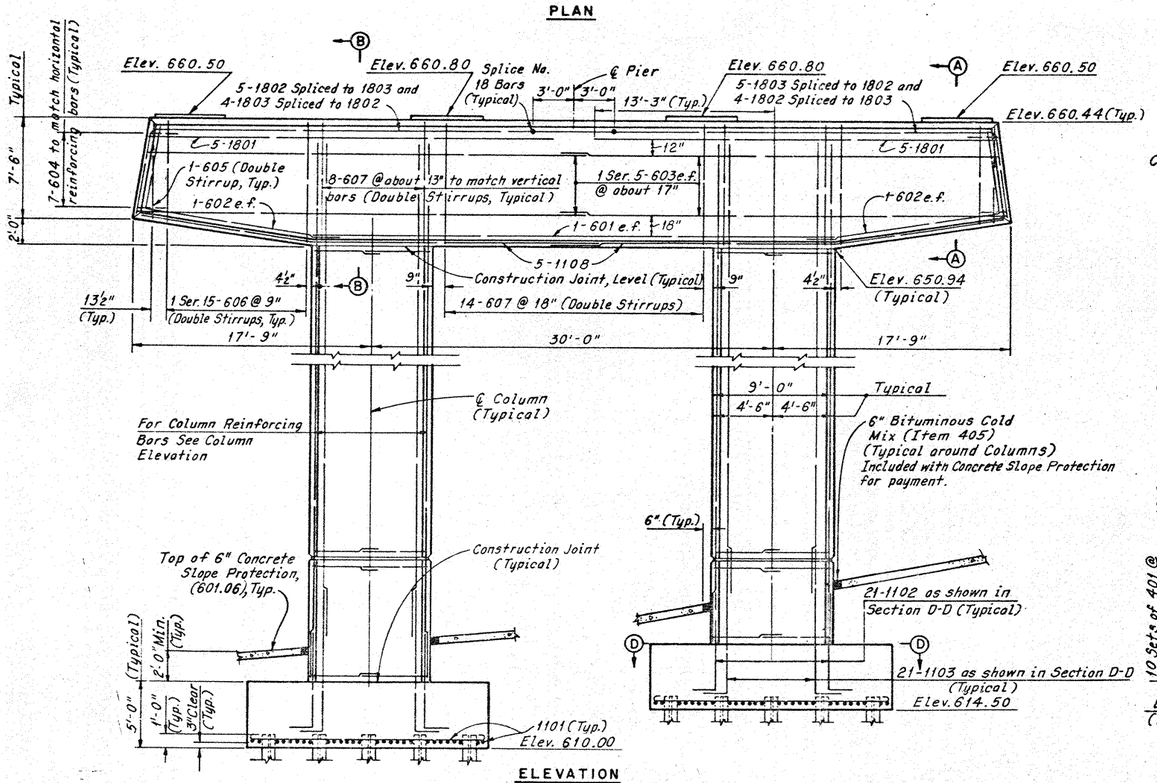
CUYAHOGA COUNTY
C R 37 AND C R 43

Note: All reinforcing bar marks shall be prefixed PS.

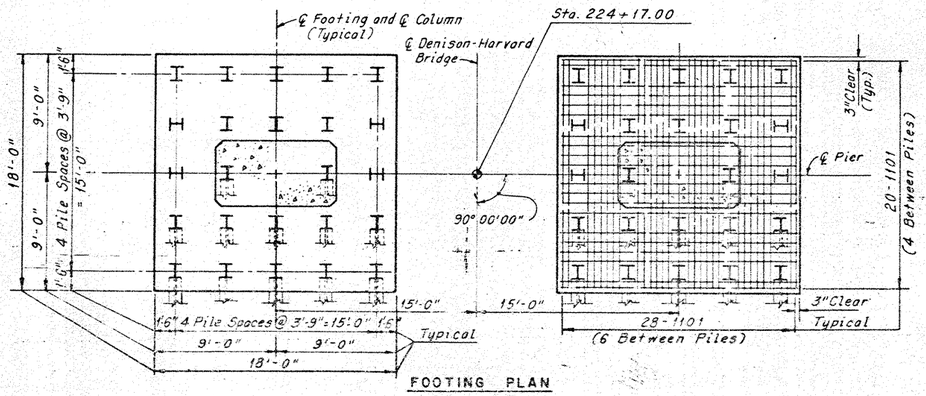
Note:
Anchor bolts shall be set in formed holes after the steel is erected.



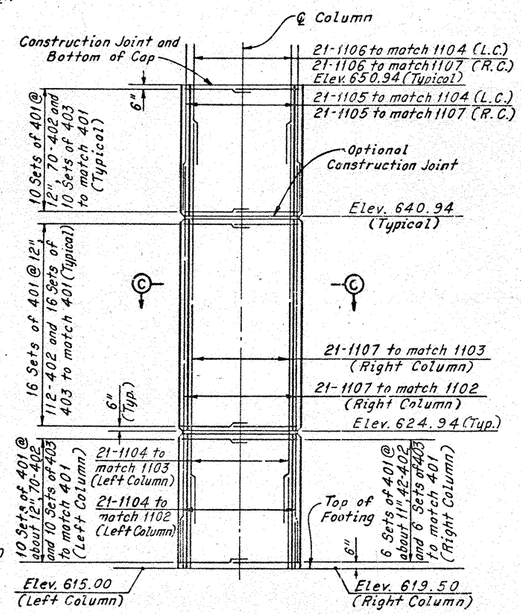

PLAN



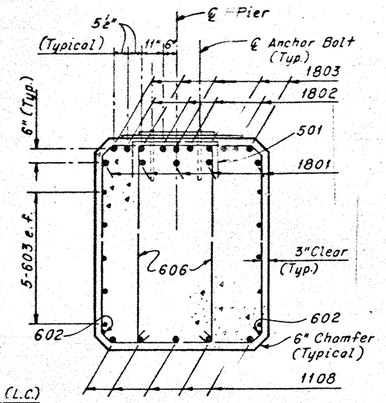

ELEVATION



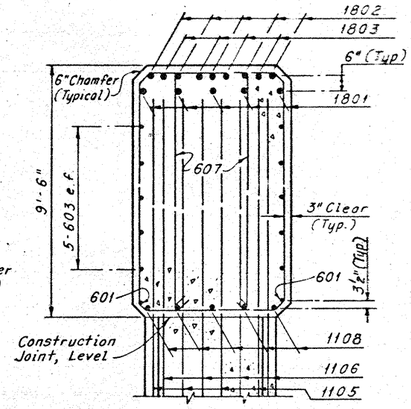

FOOTING PLAN



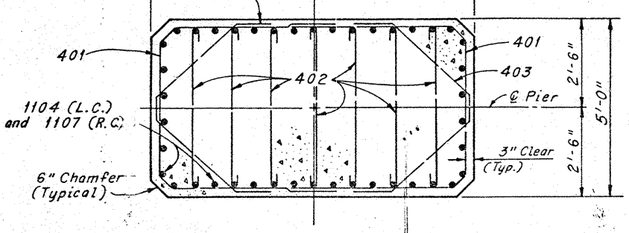

TYPICAL COLUMN ELEVATION



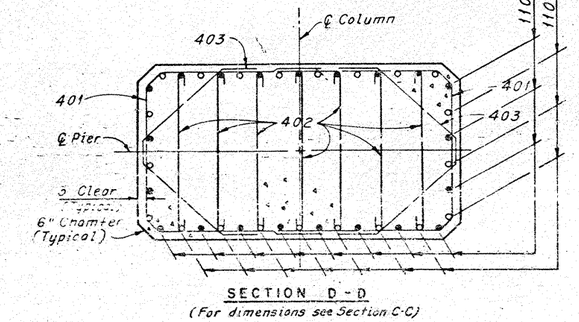

SECTION A--A




SECTION B-B




SECTION C-C




SECTION D-D
(For dimensions see Section C-C)

Note:
For Notes, see Sheet 18/73

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
KANSAS CITY CLEVELAND NEW YORK
CONSULTING ENGINEERS

PIER 16
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY 410
DRAWN C.P. TRACED C.P. CHECKED A.B.S. REVIEWED C.A.B. REVISED
DATE 10-28-75 DATE 1-23-76 DATE 1-28-76 DATE 4-8-76 SHEET 33/73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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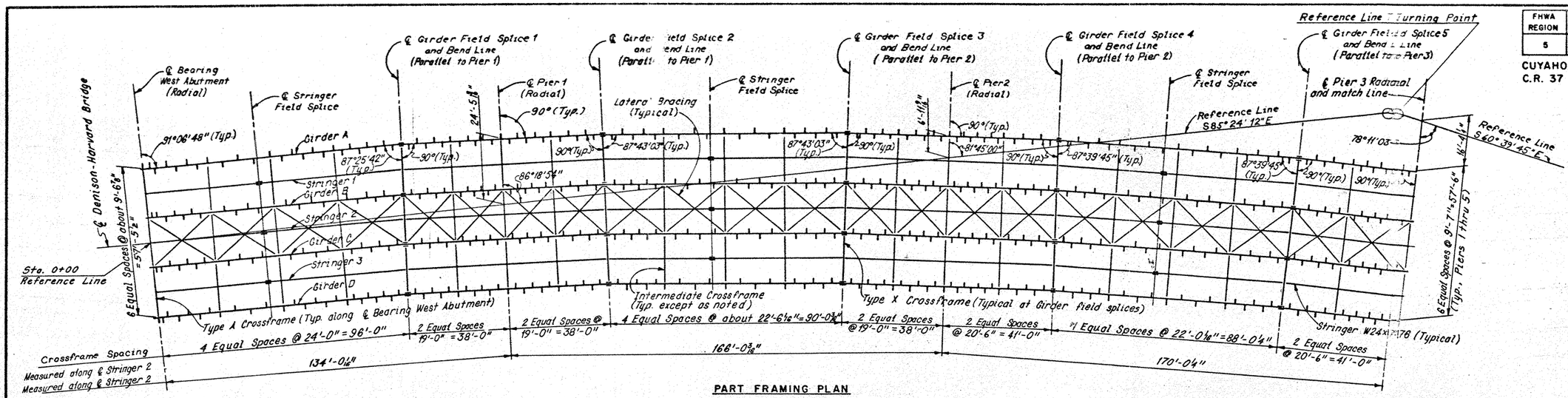
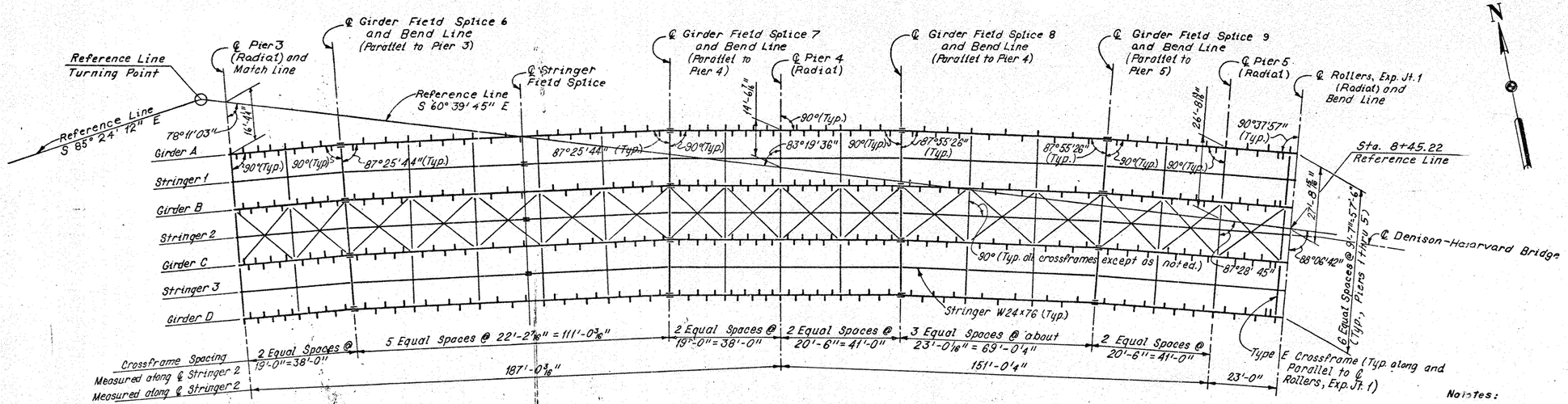
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




PART FRAMING PLAN




PART FRAMING PLAN

## FRAMING PLAN LEGEND

= Indicates stringer or girder splice.

+ Indicates intermediate or bearing stiffener.

HORIZONTAL OFFSETS TO EDGE OF SLAB

| GIRDER | GIRDER A | | | | | | | | | | GIRDER D | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SLAB | NORTH EDGE OF SLAB | | | | | | | | | | SOUTH EDGE OF SLAB | | | | | | | | | |
| FROM | ℄ W. Abut. | F.S.1 | F.S.2 | F.S.3 | F.S.4 | F.S.5 | F.S.6 | F.S.7 | F.S.8 | F.S.9 | ℄ W. Abut. | F.S.1 | F.S.2 | F.S.3 | F.S.4 | F.S.5 | F.S.6 | F.S.7 | F.S.8 | F.S.9 |
| TO | F.S.1 | F.S.2 | F.S.3 | F.S.4 | F.S.5 | F.S.6 | F.S.7 | F.S.8 | F.S.9 | ℄ Roller Exp. Jt. 1 | F.S. | F.S.2 | F.S.3 | F.S.4 | F.S.5 | F.S.6 | F.S.7 | F.S.8 | F.S.9 | ℄ Roller Exp. Jt. 1 |
| 10 EQUAL SPACES .0 | 31'-3¼" | 31'-7¼" | 31'-7¼" | 31'-7¼" | 31'-7½" | 31'-7½" | 31'-7½" | 31'-7½" | 31'-7½" | 31'-7½" | 31'-3¼" | 31'-7¼" | 31'-7¼" | 31'-7¼" | 31'-7½" | 31'-7½" | 31'-7½" | 31'-7½" | 31'-7½" | 31'-7½" |
| .1 | 31'-5¾" | 31'-8⅜" | 31'-1⅝" | 31'-0⅜" | 31'-0⅜" | 21'-11⅞" | 31'-2⅛" | 31'-3⅜" | 21'-11⅝" | 21'-11⅝" | 31'-1⅜" | 31'-5¾" | 31'-5¼" | 31'-5⅜" | 31'-6" | 31'-6¼" | 31'-4⅝" | 31'-5⅝" | 31'-6¾" | 31'-6¾" |
| .2 | 31'-6¾" | 31'-1½" | 31'-2⅜" | 31'-1⅜" | 31'-2" | 31'-1½" | 31'-4⅜" | 31'-1⅝" | 21'-0⅜" | 31'-0¾" | 21'-11⅞" | 31'-4½" | 31'-3⅝" | 31'-4½" | 31'-4½" | 31'-4⅝" | 31'-1⅜" | 31'-4½" | 31'-5⅝" | 31'-5⅝" |
| .3 | 31'-7⅞" | 31'-2⅜" | 31'-4" | 31'-2⅝" | 31'-3⅜" | 31'-2⅛" | 31'-6⅜" | 31'-2⅝" | 31'-1½" | 31'-1½" | 21'-11" | 31'-3⅜" | 31'-2½" | 31'-3⅜" | 31'-3⅜" | 31'-3⅜" | 31'-0" | 31'-3⅜" | 31'-5¼" | 31'-4⅜" |
| .4 | 31'-8⅜" | 31'-2⅞" | 31'-4½" | 31'-2¾" | 31'-2¾" | 31'-2⅜" | 31'-7¾" | 31'-2⅝" | 31'-1⅝" | 31'-2¼" | 21'-10⅝" | 31'-3⅛" | 31'-1⅝" | 31'-3¼" | 31'-2⅝" | 31'-3¼" | 21'-11" | 31'-3¼" | 31'-4½" | 31'-3⅜" |
| .5 | 31'-7½" | 31'-3" | 31'-5" | 31'-3" | 31'-3" | 31'-2⅝" | 31'-8⅛" | 31'-3" | 31'-1⅝" | 31'-2¾" | 21'-10⅜" | 31'-3" | 31'-3" | 31'-3" | 31'-2½" | 31'-3" | 21'-10⅜" | 31'-3" | 31'-4½" | 31'-3¼" |
| .6 | 31'-7¼" | 31'-2⅝" | 31'-4⅜" | 31'-2⅝" | 31'-3⅜" | 31'-2⅝" | 31'-7⅝" | 31'-2⅝" | 31'-1" | 31'-3" | 21'-11⅝" | 31'-3⅛" | 31'-1⅞" | 31'-3¼" | 31'-2⅝" | 31'-3⅛" | 21'-11" | 31'-3¼" | 31'-4⅛" | 31'-3" |
| .7 | 31'-5⅞" | 31'-2⅝" | 31'-4" | 31'-2½" | 31'-3⅛" | 31'-2⅝" | 31'-6⅝" | 31'-2⅝" | 31'-1¼" | 31'-3" | 31'-0⅜" | 31'-3⅝" | 31'-2⅜" | 31'-3⅞" | 31'-3⅝" | 31'-3⅝" | 31'-0" | 31'-3⅞" | 31'-5⅛" | 31'-3" |
| .8 | 31'-4⅛" | 31'-1⅜" | 31'-2¾" | 31'-1⅛" | 31'-2" | 31'-1⅜" | 31'-4⅜" | 31'-1⅛" | 31'-0⅜" | 31'-2⅛" | 31'-2¼" | 31'-4" | 31'-3⅝" | 31'-4⅛" | 31'-4⅛" | 31'-4⅛" | 31'-1⅜" | 31'-4⅛" | 31'-5⅛" | 31'-3⅛" |
| .9 | 31'-1¾" | 31'-0⅝" | 31'-1⅛" | 21'-11⅞" | 31'-0⅝" | 31'-0⅝" | 31'-2⅛" | 21'-11⅞" | 21'-11⅞" | 31'-2¼" | 31'-4" | 31'-5¼" | 31'-5" | 31'-6¼" | 31'-6" | 31'-5⅞" | 31'-4⅛" | 31'-6¼" | 31'-6⅝" | 31'-3⅛" |
| 1.0 | 21'-10⅞" | 21'-10⅞" | 21'-10⅞" | 21'-10⅛" | 21'-10⅛" | 21'-10⅝" | 21'-10⅝" | 21'-10⅛" | 21'-10⅛" | 31'-1⅞" | 31'-4" | 31'-7¼" | 31'-7¼" | 31'-7¼" | 31'-7½" | 31'-7½" | 31'-7½" | 31'-7⅞" | 31'-7⅞" | 31'-4¼" |

Note: Horizontal offsets are measured perpendicular to ℄ of girders.

Notes:

All crossframes shall be perpendicular to ℄ Stringer 2, except Typ. E Crossframes shall be parallel to ℄ Rollers, Exp. Jt. 1 and Typ. A Crossframes shall be along ℄ Bearing West Abutment.

For Girder Notes see Sheet 39 / 73 .

For details of roadway end dam at West Abutment, see Sheets 43 / 73 and 44 / 73 .

For Reference Line Layout Diagram, see Sheet 6 / 73 .

For Crossfrome Details, see Sheet 41 / 73 .

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

FRAMING PLAN — UNIT 1

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

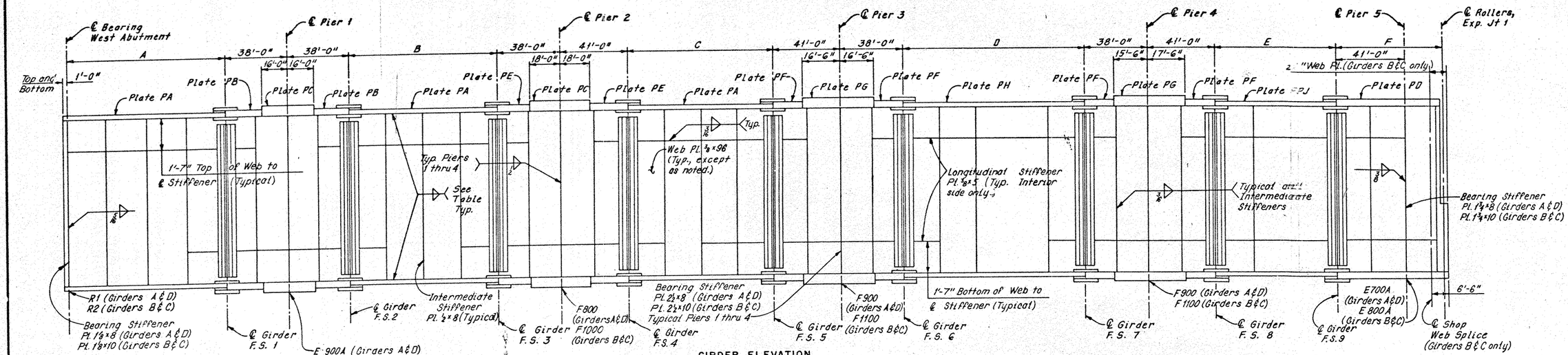
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| SJS | SJS | HC | EAS | |
| DATE 10-11-73 | DATE 10-25-73 | DATE 11-16-73 | DATE 4-8-74 | SHEET 40 / 73 |

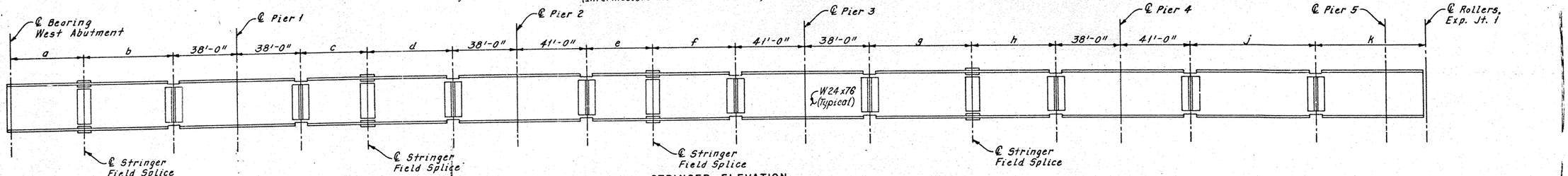
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

95
148




GIRDER ELEVATION
(Intermediate Stiffeners shown only at Crossframes)




STRINGER ELEVATION

| TABLE OF FLANGE PLATE SIZES | | | | |
|---|---|---|---|---|
| Plate | Girder A | Girder B | Girder C | Girder D |
| PA | 1x20 | 1 1/4 x24 | 1 1/4 x24 | 1x20 |
| PB | 2x20 | 2x24 | 2x24 | 2x20 |
| PC | 3 1/2 x20 | 3 1/2 x24 | 3 1/2 x24 | 3 1/2 x20 |
| PD | 1 1/2 x20 | 1 1/2 x24 | 1 1/2 x24 | 1 1/2 x20 |
| PE | 2x20 | 1 3/4 x24 | 1 3/4 x24 | 2x20 |
| PF | 2 1/2 x20 | 2 1/2 x24 | 2 1/2 x24 | 2 1/2 x20 |
| PG | 4x20 | 4x24 | 4x24 | 4x20 |
| PH | 1 3/8 x20 | 1 1/4 x24 | 1 1/4 x24 | 1 1/8 x20 |
| PJ | 1 1/4 x20 | 1 1/2 x24 | 1 1/2 x24 | 1 1/4 x20 |

| TABLE OF DIMENSIONS STRINGERS 1 THRU 3 | | | |
|---|---|---|---|
| Dimension | Stringer 1 | Stringer 2 | Stringer 3 |
| a | 43'-0" | 43'-0" | 43'-0" |
| b | 54'-2 13/16" | 53'-0 1/16" | 51'-9 1/4" |
| c | 40'-0 3/8" | 40'-0 3/8" | 40'-0 3/8" |
| d | 51'-6 3/16" | 50'-0 1/16" | 48'-5 3/4" |
| e | 39'-0 3/8" | 39'-0 1/8" | 39'-0 1/8" |
| f | 50'-6 1/16" | 49'-0 1/8" | 47'-5 5/8" |
| g | 63'-3 15/16" | 61'-7 3/16" | 59'-10 5/16" |
| h | 49'-4 7/16" | 49'-4 7/16" | 49'-4 7/16" |
| j | 70'-4 15/16" | 69'-0 1/4" | 67'-7 7/16" |
| k | 64'-2 13/16" | 64'-0" | 63'-9 1/16" |

| TABLE OF DIMENSIONS- GIRDER A THRU GIRDER D | | | | |
|---|---|---|---|---|
| Dimension | Girder A | GirderB | Girder C | Girder D |
| A | 97'-10 1/4" | 96'-7 5/16" | 95'-4 1/2" | 94'-1 7/16" |
| B | 92'-3 7/16" | 91'-0 9/16" | 89'-3 5/16" | 87'-8 3/16" |
| C | 99'-4 3/16" | 88'-0 3/16" | 87'-2 1/16" | 85'-2 5/16" |
| D | 113'-7 1/16" | 111'-10 1/16" | 110'-1 1/16" | 108'-5 3/16" |
| E | 71'-1 1/4" | 69'-8 3/16" | 68'-3 3/16" | 66'-11 1/4" |
| F | 64'-3 3/16" | 64'-1 3/16" | 63'-10 1/4" | 63'-8 3/16" |

| WELD SIZE- WEB TO FLANGE | |
|---|---|
| Flange Plate Thickness | Fillet Weld Size |
| 1" thru 1 1/2" | 5/16" |
| 1 5/8" thru 2" | 3/8" |
| 2 1/8" thru 4" | 1/2" |

STRINGER NOTES:
All stringers are W24x76.
All stringer field splices shall be made with 1" ϕ high strength steel bolts. The bolts shall have the corrosion resistance and coloring characteristics of ASTM A588 steel and all the mechanical properties of ASTM A325 High Strength Steel Bolts. The bolts shall be placed with their heads on the bottom of all flange splice plates.

Notes:
For Girder Notes see Sheet 39/73.
For Bearing Details see Sheets 50/73 and 51/73.
For Stiffener Angle at Girder Field Splice Detail, see Sheet 40/73.
For Girder Field Splice Details, see Sheet 40/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

GIRDER AND STRINGER ELEVATION
UNIT 1
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

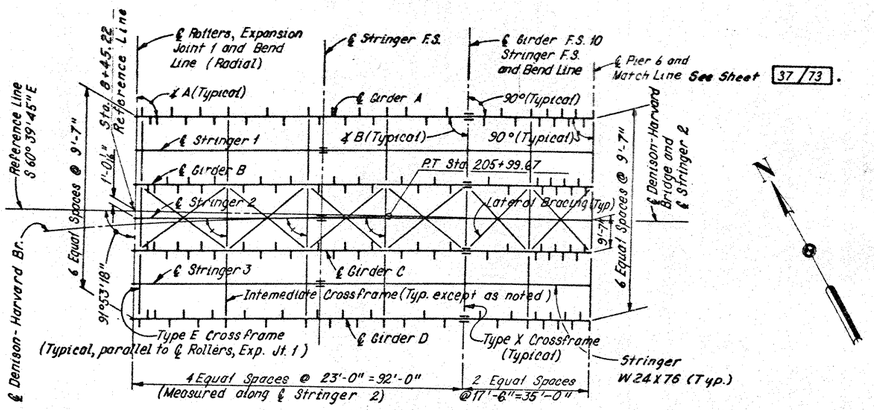
CUYAHOGA COUNTY OHIO

| DRAWN DHS | TRACED SJS | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DATE 8-24-73 | DATE 9-19-73 | DATE 11-16-73 | DATE 4-8-74 | SHEET 55/73 |

| FHWA REGION | STATE | PROJECT | | |
|---|---|---|---|---|
| 5 | OHIO | | | |

96
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




PART FRAMING PLAN

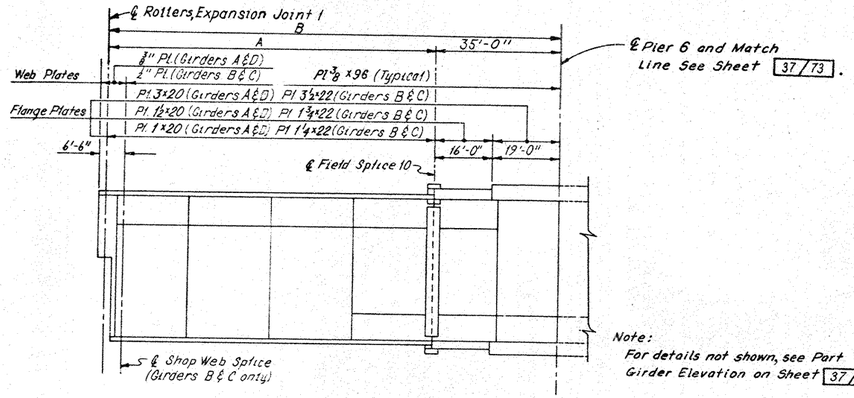
Note: ⌝ denotes 90° angle between ℄ Stringer 2 and ℄ Intermediate Crossframe.

| HORIZ. OFFSETS TO EDGE OF SLAB | | | |
|---|---|---|---|
| GIRDER | | A | D |
| SLAB | | NORTH EDGE OF SLAB | SOUTH EDGE OF SLAB |
| FROM | | ℄ Roller Exp. Jt. 1 | ℄ Roller Exp. Jt. 1 |
| TO | | F.S. 10 | F.S. 10 |
| 10 EQUAL SPACES | .0 | 3'-1½" | 3'-4½" |
| | .1 | 3'-3⅝" | 3'-2⅜" |
| | .2 | 3'-5⅜" | 3'-0⅜" |
| | .3 | 3'-6⅝" | 2'-11½" |
| | .4 | 3'-7⅝" | 2'-10⅜" |
| | .5 | 3'-7⅝" | 2'-10½" |
| | .6 | 3'-7⅜" | 2'-10¾" |
| | .7 | 3'-6⅝" | 2'-11½" |
| | .8 | 3'-5½" | 3'-0⅜" |
| | .9 | 3'-4½" | 3'-1⅜" |
| | 1.0 | 3'-3" | 3'-3" |

Note: Horizontal offsets are measured perpendicular to ℄ of Girders.

| WELD SIZE WEB TO FLANGE | |
|---|---|
| Flange Plate Thickness | Fillet Weld Size |
| 1" thru 1½" | 5/16" |
| 1¾" | ⅜" |
| 3" and 3½" | ½" |

| TABLE OF ANGLES | | | | | | | |
|---|---|---|---|---|---|---|---|
| Angle | Girder A | Stringer 1 | Girder B | Stringer 2 | Girder C | Stringer 3 | Girder D |
| A | 91°15'38" | 91°15'40" | 91°15'43" | 91°15'45" | 91°15'48" | 91°15'51" | 91°15'53" |
| B | 89°22'19" | 89°22'22" | 89°22'24" | 89°22'27" | 89°22'30" | 89°22'32" | 89°22'35" |

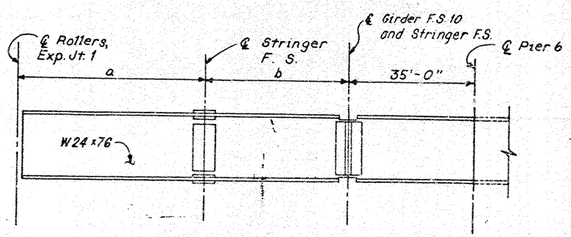



PART GIRDER ELEVATION

(Intermediate Stiffeners Shown only at Crossframes)

| TABLE OF DIMENSIONS - GIRDER A THRU D | | | | |
|---|---|---|---|---|
| Dimension | GirderA | GirderB | GirderC | GirderD |
| A | 92'-11 3/16" | 92'-3 3/16" | 91'-8 3/16" | 91'-0 3/16" |
| B | 127-11 3/16" | 127'-3 3/4" | 126'-8 1/16" | 126'-0 3/16" |

Note:
For details not shown, see Part Girder Elevation on Sheet 37/73.




PART STRINGER ELEVATION

| TABLE OF DIMENSIONS - STRINGER 1 THRU 3 | | | |
|---|---|---|---|
| Dimension | Stringer 1 | Stringer 2 | Stringer 3 |
| a | 51'-7 3/16" | 51'-0" | 50'-4 3/8" |
| b | 41'-0" | 41'-0" | 41'-0" |

Notes:
For Girder Notes see Sheet 39/73.
For Stringer Notes see Sheet 35/73.
For Bearing Details see Sheets 50/73 and 51/73.
For Stiffener Angle at Girder Field Splice Detail, see Sheeet 40/73.
For Reference Line Layout Diagram see Sheet 6/73.
For Framing Plan Legend see Sheet 34/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# FRAMING PLAN AND GIRDER ELEVATION UNIT 2
## DENISON-HARVARD BRIDGE OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

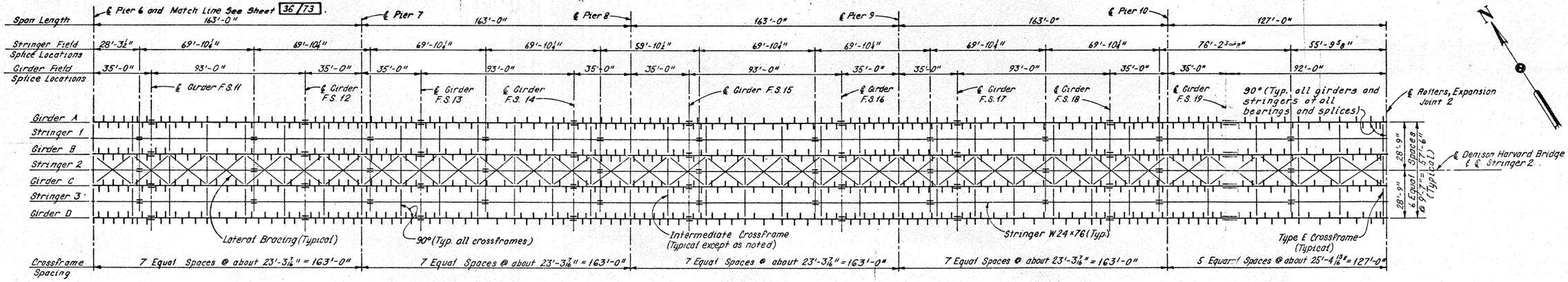
CUYAHOGA COUNTY

| DRAWN SJS | TRACED SJS | CHECKED WHL | REVIEWED EAB | REVISED |
|---|---|---|---|---|
| DATE 10-9-73 | DATE 10-12-73 | DATE 11-2-73 | DATE 11-8-73 | SHEET 36/73 |

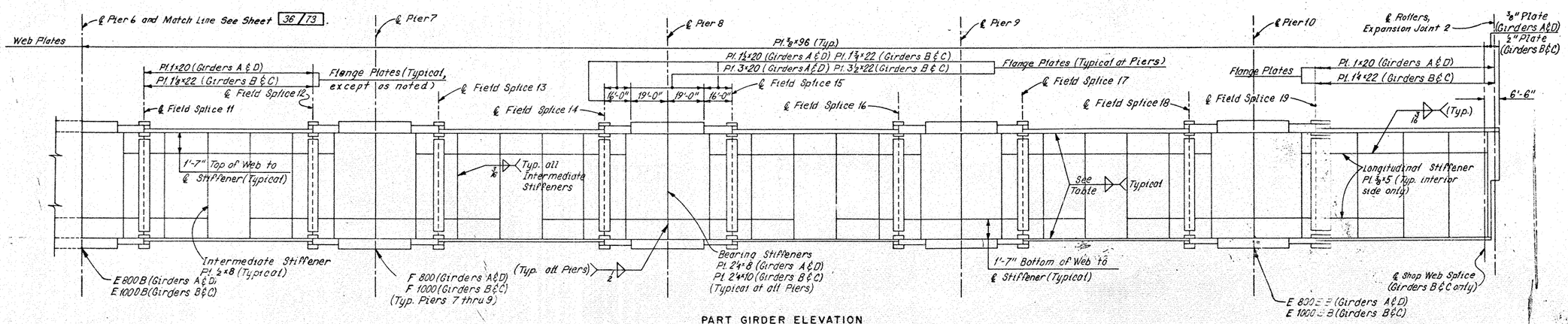
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

97
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




PART FRAMING PLAN




PART GIRDER ELEVATION
(Intermediate Stiffeners shown only at crossframes)

| WELD SIZE WEB TO FLANGE | |
|---|---|
| Flange Plate Thickness | Fillet Weld Size |
| 1" thru 1½" | ⅜" |
| 1⅝" | ½" |
| 3" and 3½" | ⅝" |

Note:
For Notes see Sheet 36/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

FRAMING PLAN AND GIRDER ELEVATION UNIT 2
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

DRAWN SJS | TRACED SJS | CHECKED WHL | REVIEWED SAB | REVISED
DATE 10-16-73 | DATE 10-26-73 | DATE 1-2-73 | DATE 4-8-74
SHEET 37/73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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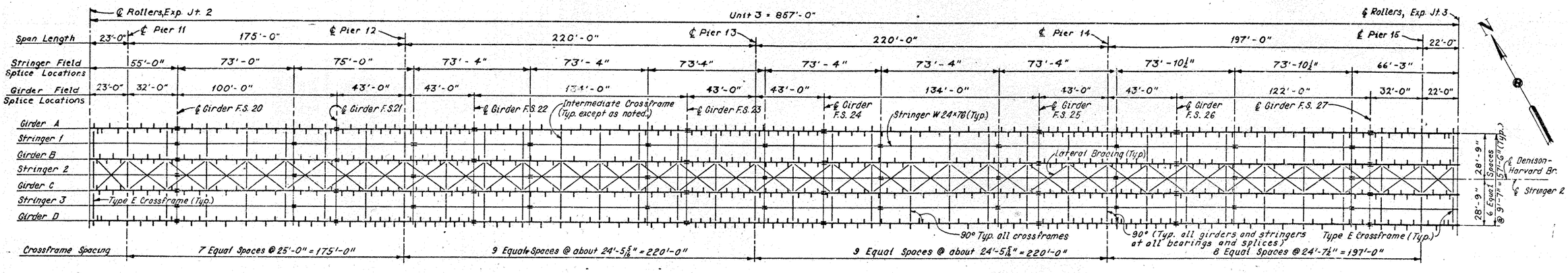
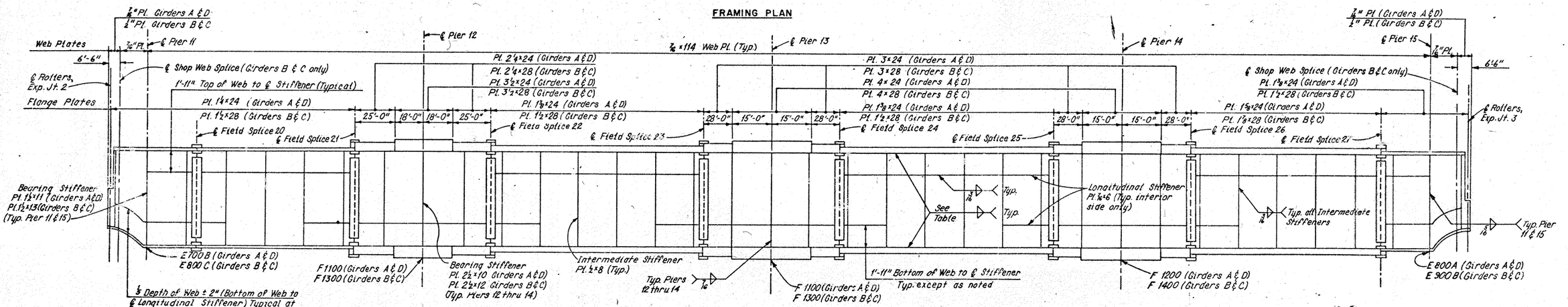
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

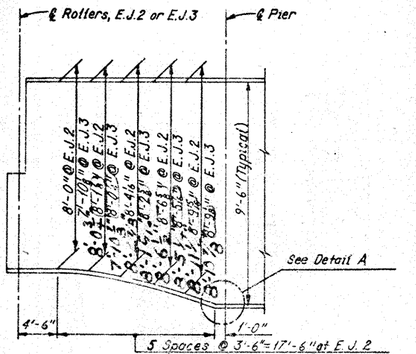



## FRAMING PLAN

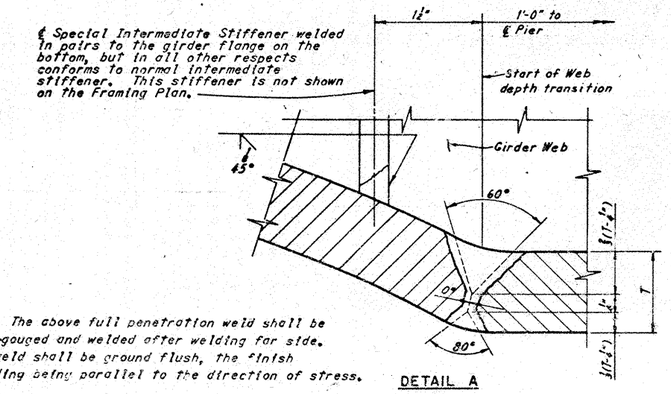



## GIRDER ELEVATION

(Intermediate Stiffeners shown only at Crossframes)




WEB TRANSITION DETAIL




Note: The above full penetration weld shall be back-gouged and welded after welding far side. The weld shall be ground flush, the finish grinding being parallel to the direction of stress.

DETAIL A

| WELD SIZE WEB TO FLANGE | |
|---|---|
| Flange Plate Thickness | Fillet Weld Size |
| 1¼" thru 1⅞" | ⅝ |
| 1⅞" thru 2¼" | ¾ |
| 3" thru 4" | ⅞ |

Notes:
For Girder Notes see Sheet 39/73.
For Stringer Notes see Sheet 35/73.
For Bearing Details see Sheets 50/73 and 51/73.
For Stiffener Angle at Girder Field Splice Detail see Sheet 40/73.
For Framing Plan Legend see Sheet 34/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# FRAMING PLAN AND GIRDER ELEVATIONS UNIT 3
## DENISON-HARVARD BRIDGE, OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

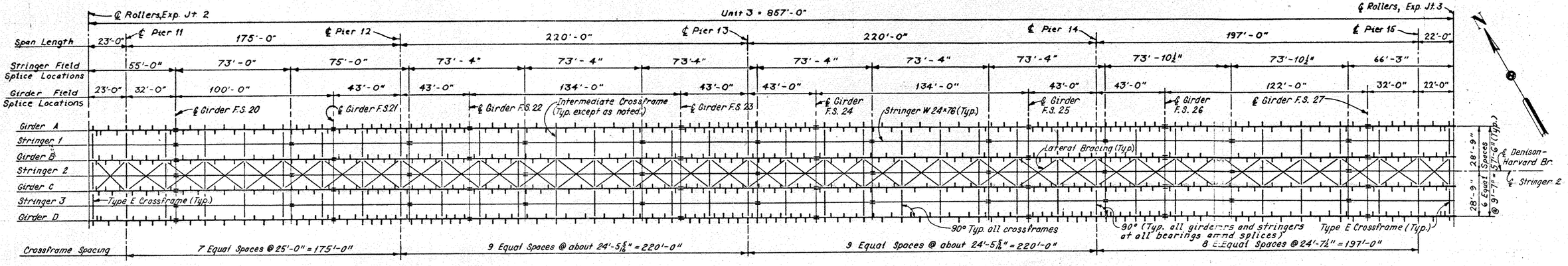
| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DATE 9-12-73 | DATE 10-2-73 | DATE 11-2-73 | DATE 4-9-74 | DATE 6-9-75 |

SHEET 38/73

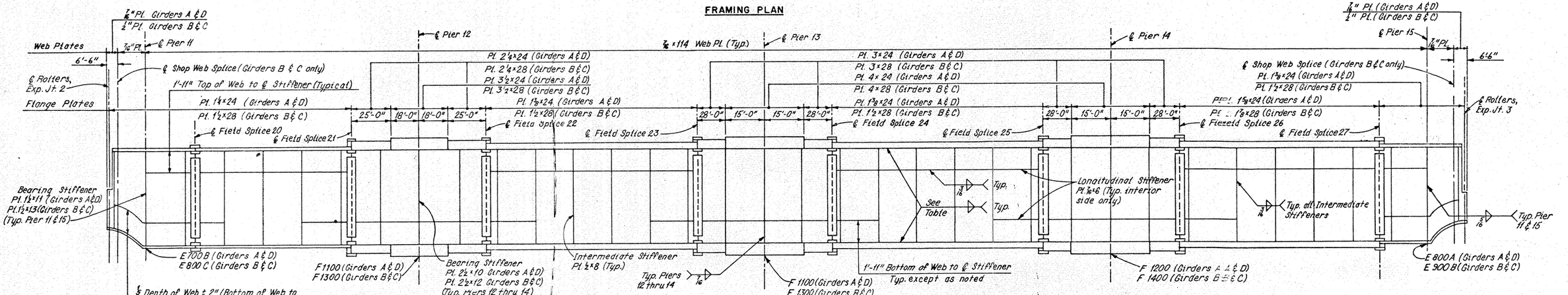
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

SS 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

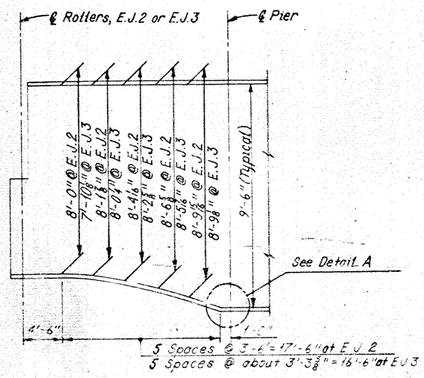



## FRAMING PLAN

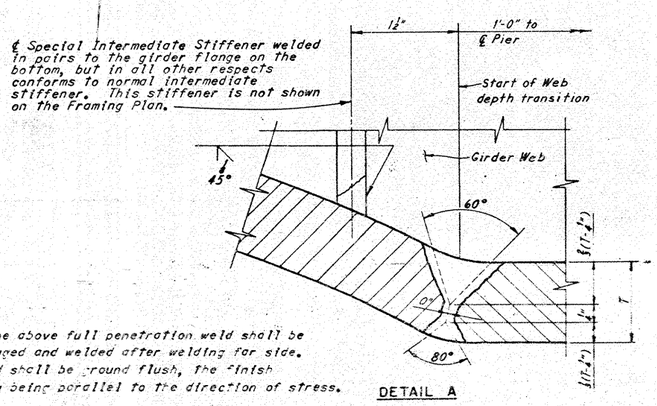



## GIRDER ELEVATION

(Intermediate Stiffeners shown only at Crossframes)




WEB TRANSITION DETAIL




Note: The above full penetration weld shall be back-gouged and welded after welding for side. The weld shall be ground flush, the finish grinding being parallel to the direction of stress.

DETAIL A

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 6-9 1975

| WELD SIZE WEB TO FLANGE | |
|---|---|
| Flange Plate Thickness | Fillet Weld Size |
| 1¼" thru 1½" | ⅝ |
| 1⅝" thru 2¼" | ¾ |
| 3" thru 4" | ⅞ |

Notes:
For Girder Notes see Sheet 39/73.
For Stringer Notes see Sheet 35/73.
For Bearing Details see Sheets 50/73 and 51/73.
For Stiffener Angle at Girder Field Splice Detail see Sheet 40/73.
For Framing Plan Legend see Sheet 34/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# FRAMING PLAN AND GIRDER ELEVATIONS UNIT 3

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

DRAWN CKB | TRACED SJS | CHK. | REVISED
DATE 9-1973 | DATE 10-2-73 | DATE 11-2-73 | DATE 4-9-74 | SHEET 16/73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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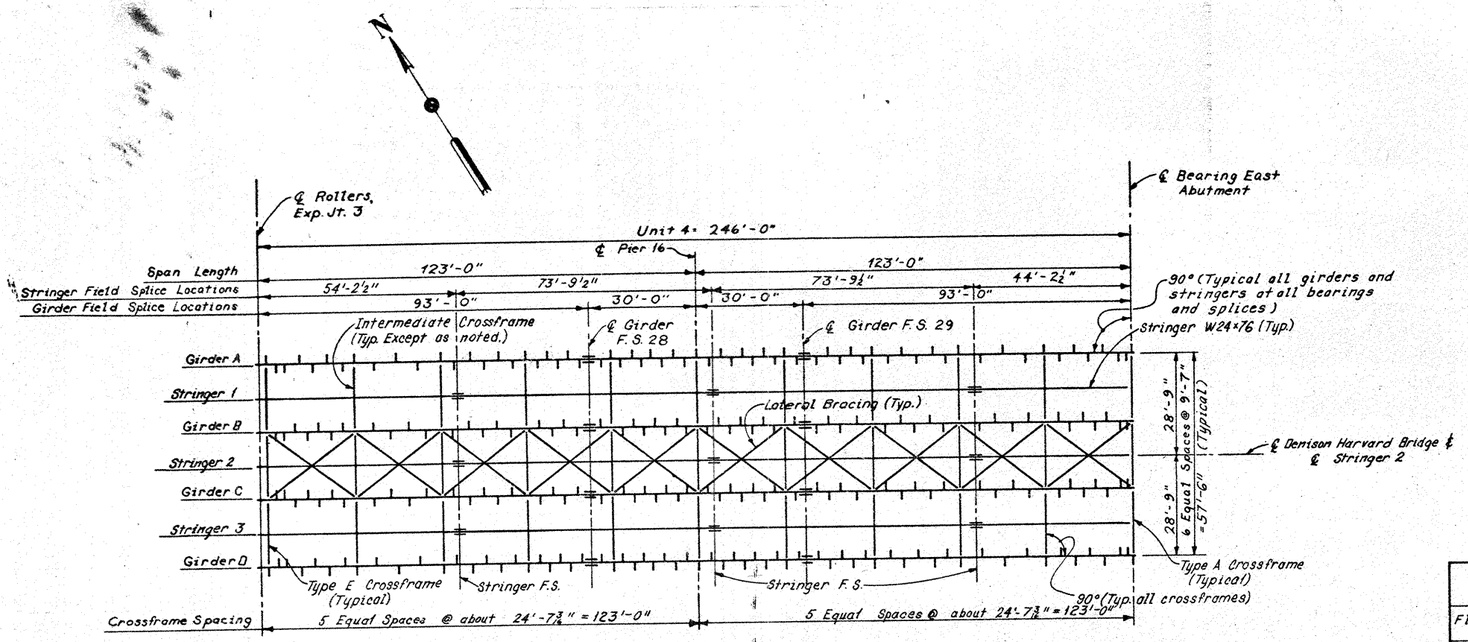
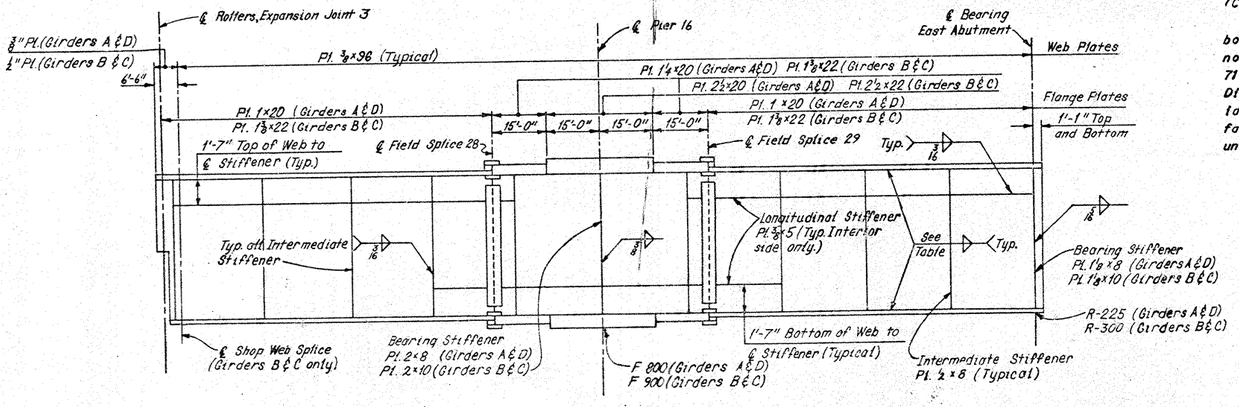
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




FRAMING PLAN




GIRDER ELEVATION
(Intermediate Stiffeners shown only at crossframes)

| WELD SIZE WEB TO FLANGE | |
|---|---|
| Flange Plate Thickness | Fillet Weld Size |
| 1" thru 1⅜" | ⅝" |
| 2½" | ¾" |

SPECIFIED MINIMUM NOTCH TOUGHNESS REQUIREMENTS (CVN) - ALL UNITS

All girder flanges, webs, stringers and bottom struts of crossframes shall meet minimum notch toughness requirements in accordance with 711.01. The Fabricator shall submit to the Director a procedure designed for positive identification of material through all phases of fabrication. No material shall be fabricated until the Director has approved the procedure.

GIRDER NOTES - ALL UNITS

The girders shall be fabricated to compensate for the effects of dead load deflections, vertical curvature and superelevation. The top of the girder webs shall parallel the profile of the roadway surface directly over the center line of the girder.

Top and bottom flange plates are to be the same and shall be spliced at points shown on the girder elevation. The web plates may be shop spliced as required by available plate lengths. The location of the shop web splices and the location and details of any additional shop flange splices shall be submitted to the Director for approval prior to ordering of materials. Butt welds shall be ground flush, the finished grinding being parallel to the direction of stress.

Intermediate stiffeners shall be placed as shown on the framing plan equally spaced between crossframes or between crossframes and girder field splices except the first two stiffeners at the ends of simply supported girders shall be one-half of this spacing.

In addition to the intermediate stiffeners shown on the framing plan a special pair of stiffeners shall be added where the web depth changes adjacent to Piers 11 and 15. These stiffeners shall be welded to the bottom flange but in all other respects conform to the normal intermediate stiffener.

Intermediate stiffeners placed in pairs shall have a tight fit with both flanges in accordance with Section 3.5.1.9 of the American Welding Society Structural Welding Code. Intermediate stiffeners which are not placed in pairs shall be welded to the bottom flange between the ℄ pier and a point midway between the top and bottom longitudinal stiffener overlap, or between the ℄ pier and the intermediate expansion joint, whichever comes first. All other intermediate stiffeners which are not placed in pairs shall be welded to the top flange. These stiffeners shall be welded to the flange on both sides of the stiffener with fillet welds of the same size as the web to flange weld at the same location. The end of the stiffener which is not welded to the flange shall have a tight fit with the flange in accordance with Section 3.5.1.9 of the American Welding Society Structural Welding Code.

Bearing stiffeners at piers and abutments shall be placed in pairs on all girders.

Bearing stiffeners at abutments shall be vertical but all other transverse stiffeners shall be perpendicular to the top flange.

All Intermediate and Bearing Stiffeners shall be clipped at corners as shown on sheet 41/73

Longitudinal stiffener plates shall be placed only on the interior side of the webs. They shall be placed in segments between and 1" clear of, transverse stiffeners and web splice plates.

All girder field splices shall be made with 1" diameter high strength steel bolts. The bolts shall have the corrosion resistance and coloring characteristics of ASTM A588 steel and all the mechanical properties of ASTM A325 High Strength Steel Bolts. The bolts shall be placed with their heads on the outside face of the exterior girders and on the bottom of all flange plates.

The Contractor shall submit to the Director for approval three prints showing his proposed erection procedure.

For details of 2"ø handhold bar see sheet 41/73.

Notes:
For Bearing Details see Sheets 50/73 and 51/73.
For Stringer Notes see Sheet 35/73.
For Stiffener Angle at Girder Field Splice Detail see Sheet 40/73.
For Framing Plan Legend see Sheet 34/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

FRAMING PLAN AND GIRDER ELEVATIONS UNIT 4
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN CKB | TRACED SJS | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DATE 10-8-73 | DATE 10-15-73 | DATE 11-2-73 | DATE 4-3-74 | SHEET 33/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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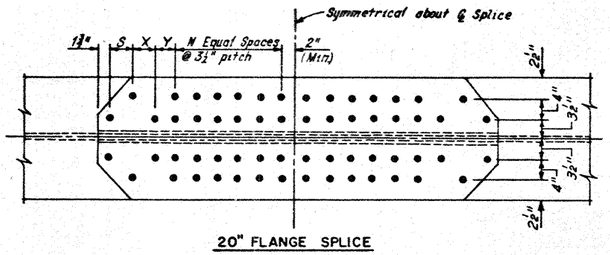
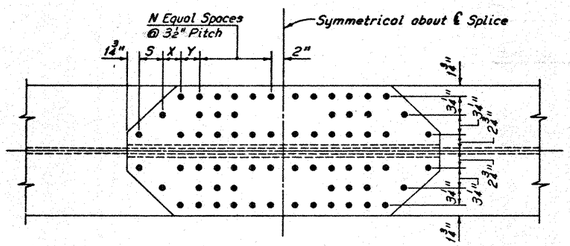
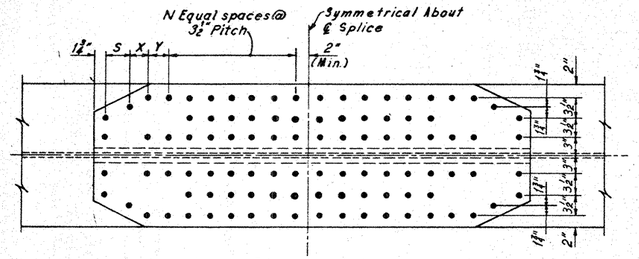
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



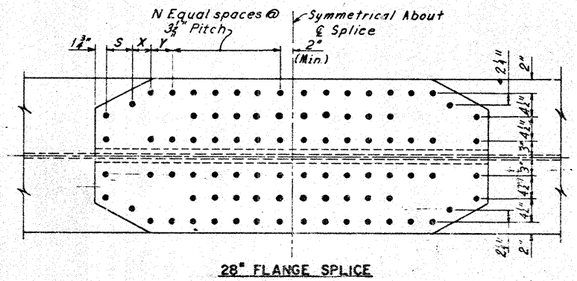

20" FLANGE SPLICE



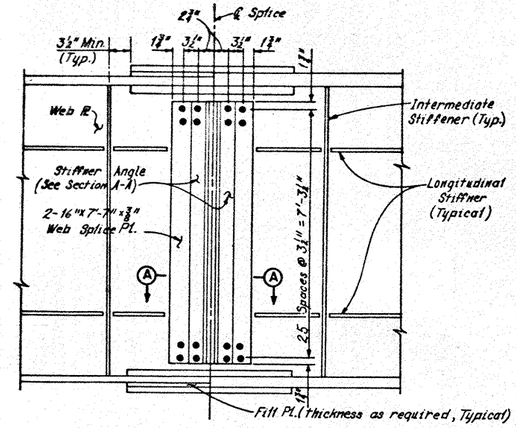

22" FLANGE SPLICE



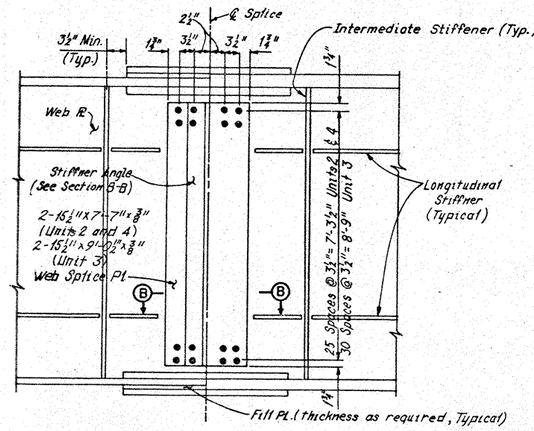

24" FLANGE SPLICE




28" FLANGE SPLICE




TYPICAL GIRDER WEB SPLICE UNIT-1

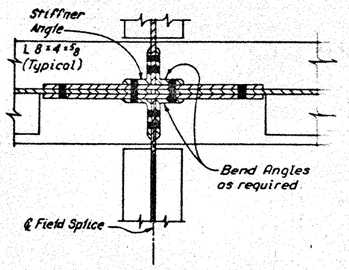



TYPICAL GIRDER WEB SPLICE UNITS-2,3 AND 4

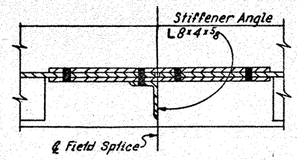
GIRDER FLANGE SPLICES

| Flange Width | *Flange Thick. | FLANGE PLATES Outside, 2 Req. | FLANGE PLATES Inside, 4 Req. | FLANGE BOLT DIMENSIONS No. | N, Spaces | S | X | Y |
|---|---|---|---|---|---|---|---|---|
| 20" | 1" | 20x⅝x4'-9" | 9x⅝x4'-9" | 52 | 4 | 4½" | 2½" | 4½" |
| | 1⅛" | 20x¼x5'-5" | 9x⅝x5'-5" | 80 | 5 | 4½" | 2¾" | 4½" |
| | 1⅜" | 20x⅜x6'-0" | 9x⅝x6'-0" | 68 | 6 | 4½" | 2¾" | 4½" |
| 22" | 1⅛" | 22x⅜x4'-9" | 10x½x4'-9" | 68 | 4 | 4" | 2¾" | 4" |
| | 1¼" | 22x¼x4'-9½" | 10x¼x4'-9½" | 68 | 4 | 4" | 3" | 4" |
| | 1⅜" | 22x⅜x5'-4½" | 10x¼x5'-4½" | 80 | 5 | 4" | 3" | 4" |
| 24" | 1⅛" | 24x¼x4'-9½" | 11x¼x4'-9½" | 76 | 4 | 4" | 3" | 4" |
| | 1⅜" | 24x⅜x4'-9½" | 11x¼x4'-9½" | 76 | 4 | 4" | 3" | 4" |
| | 1¼" | 24x⅜x4'-9½" | 11x½x4'-9½" | 76 | 4 | 4" | 3" | 4" |
| | 1⅜" | 24x1x5'-4½" | 11x⅜x5'-4½" | 88 | 5 | 4" | 3" | 4" |
| 28" | 1⅜" | 28x⅝x6'-0½" | 13x⅝x6'-0½" | 100 | 6 | 4½" | 2½" | 4½" |
| | 1⅜" | 28x1⅛x7'-2½" | 13x1⅛x7'-2½" | 124 | 8 | 4½" | 2½" | 4½" |

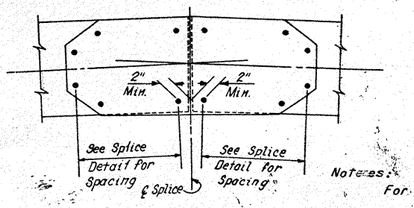
* When the flange size changes at a field splice use the smaller flange to determine the required splice material.



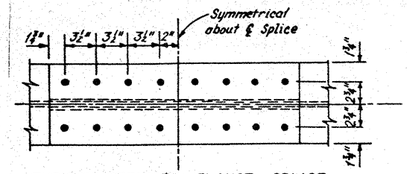

SECTION A-A



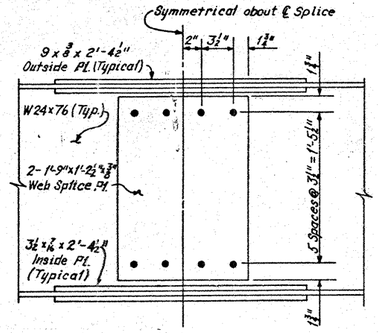

SECTION B-B
(Typical all field splices except Field Splice 10 in Unit 2, see Section A-A.)




COVER PLATE DETAIL AT GIRDER BEND POINT




TYPICAL STRINGER FLANGE SPLICE




TYPICAL STRINGER WEB SPLICE

STRINGER FIELD SPLICE

Notes:
For Girder and Stringer Notes see sheets 35/73 and 39/73.
For Lateral Bracing at Field Splice see "Lateral Bracing at Type X-Crossframes" sheet 42/73.
Holes for girder flange field splices shall be reamed or drilled with all plates in their final positions.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# GIRDER AND STRINGER FIELD SPLICE DETAILS

DENISON-HAYWARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

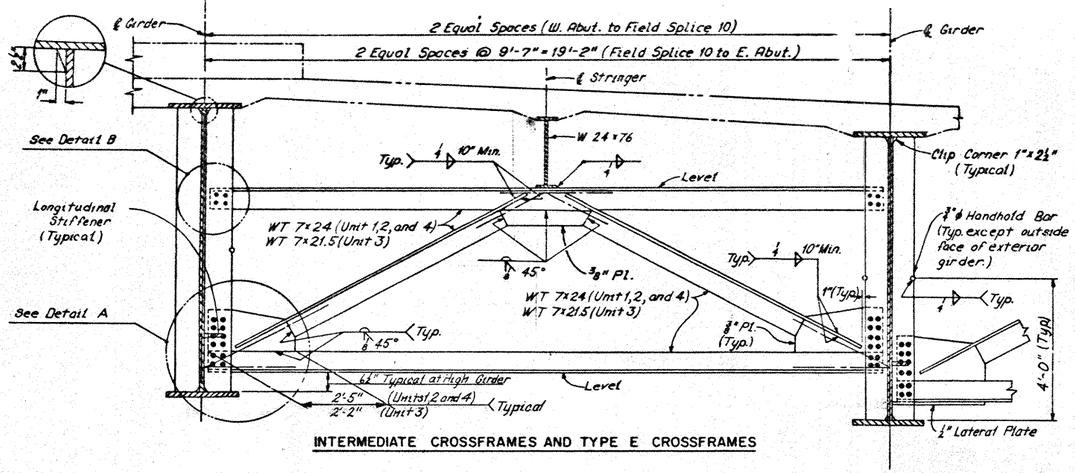
CUYAHOGA COUNTY OHIO

| DRAWN AHS | TRACED SJS | CHECKED | REVISED |
|---|---|---|---|
| DATE 9-12-73 | DATE 9-18-75 | DATE 9-25-75 | SHEET 41/73 |

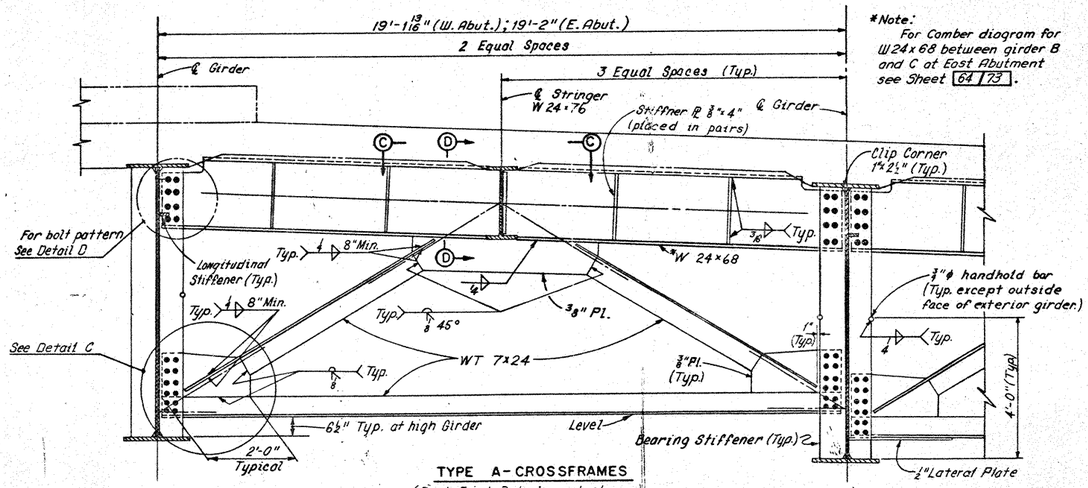
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

101
148

CUYAHOGA COUNTY
C.R 37 AND C.R 43

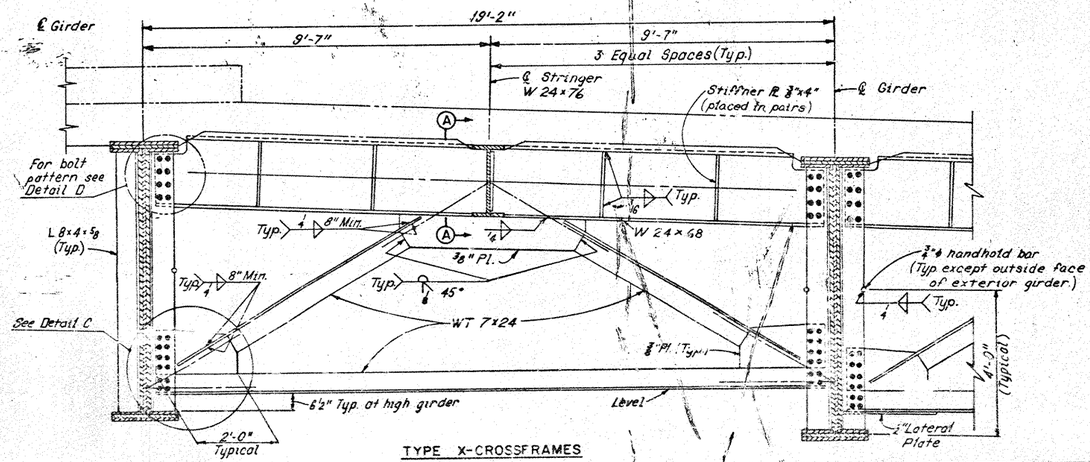



INTERMEDIATE CROSSFRAMES AND TYPE E CROSSFRAMES

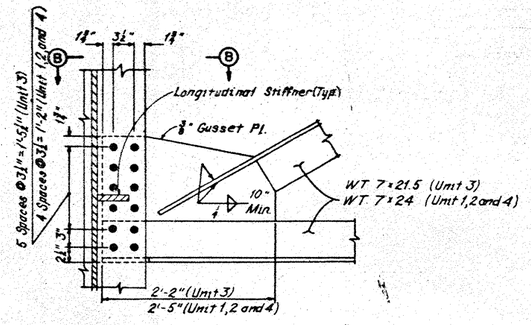



TYPE A- CROSSFRAMES
(Deck Joint Details not shown)

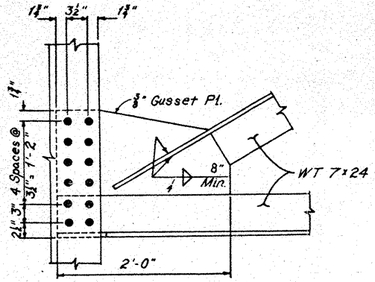
*Note:
For Comber diagram for W24×68 between girder B and C at East Abutment see Sheet 64 / 73.



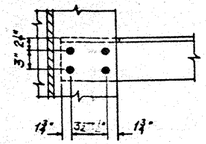

TYPE X-CROSSFRAMES



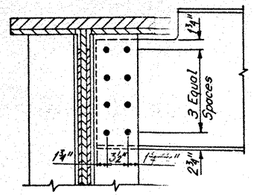

DETAIL A



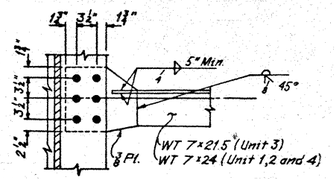

DETAIL C
(Type A-Crossframes Shown. Type X-Crossframes Similar)



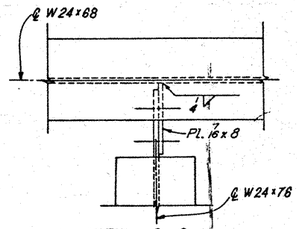

DETAIL B
(Typical except at piers.)



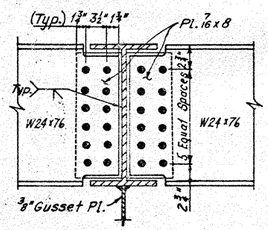

DETAIL D



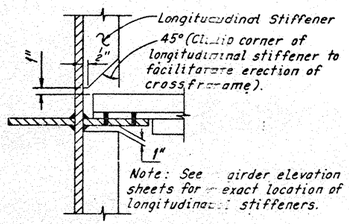

DETAIL B
(At piers)



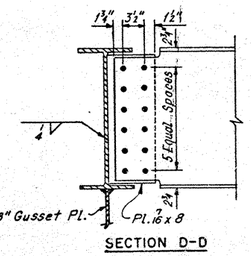

VIEW C-C




SECTION A-A




SECTION B-B
(Crossframe diagonals not shown)




SECTION D-D

Notes: For location of crossframes see Framing Plan sheets.
All bolts are 1" ϕ High Strength Steel bolts. The bolts shall have the corrosion resistance and coloring characteristics of ASTM A588 steel and all the mechanical properties of ASTM A325 High Strength Steel bolts.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# CROSSFRAME DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

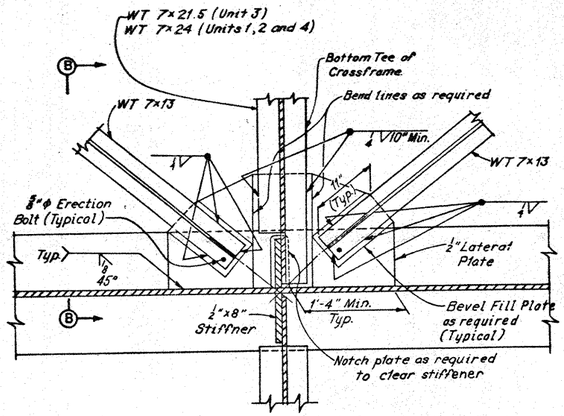
CUYAHOGA COUNTY OHIO

| DRAWN A.H.S | TRACED S.J.S | CHECKED W.L. | REVIEWED C.A.B | REVISED |
|---|---|---|---|---|
| DATE 9-10-73 | DATE 9-19-73 | DATE 9-24-73 | DATE 4-2-74 | SHEET 41/73 |

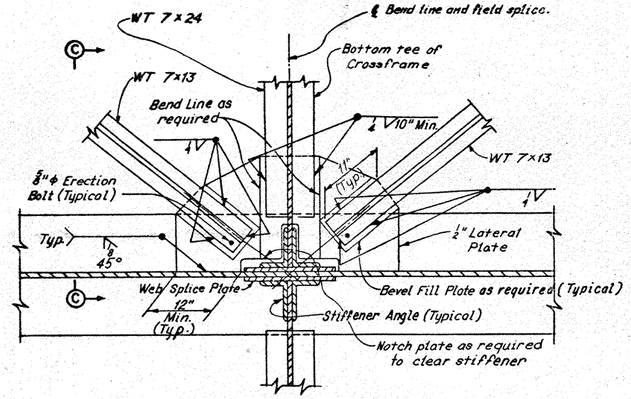
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

132
148

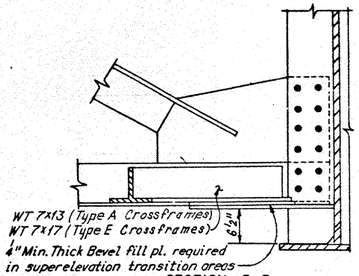
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



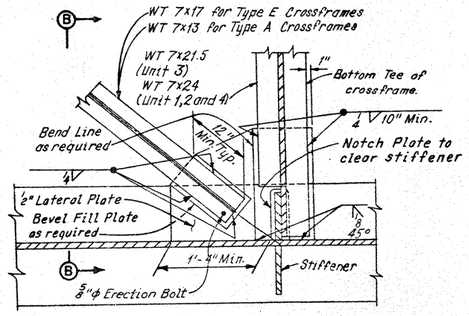

LATERAL BRACING AT INTERMEDIATE CROSSFRAMES



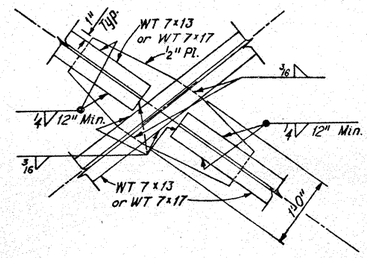

LATERAL BRACING AT TYPE X-CROSSFRAMES



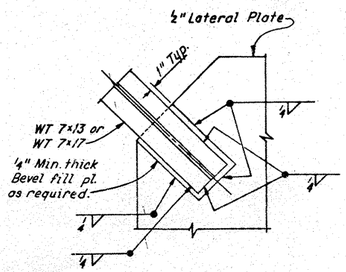

SECTION B-B



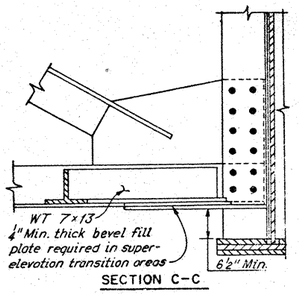

LATERAL BRACING AT TYPE A AND TYPE E CROSSFRAMES




LATERAL BRACING CONNECTION AT MID-PANEL




BEVEL FILL PLATE DETAIL




SECTION C-C

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# LATERAL BRACING DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

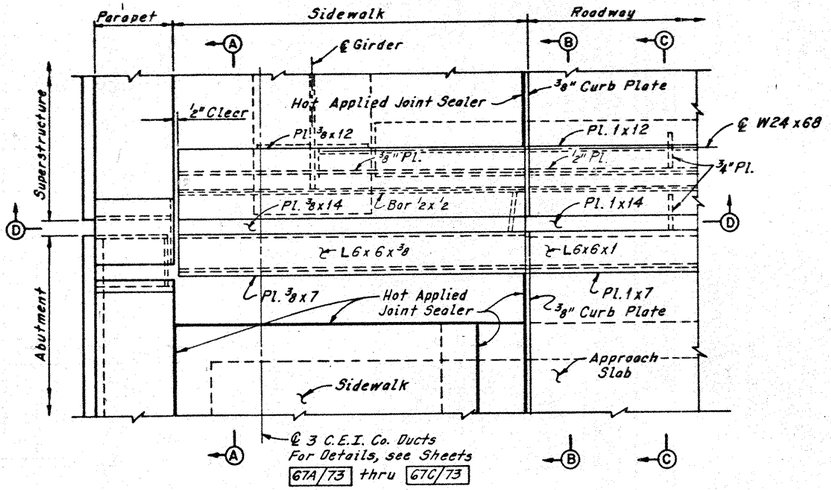
CUYAHOGA COUNTY OHIO

| DRAWN AHJ | TRACED SJS | CHECKED | REVIEWED AB | REVISED |
|---|---|---|---|---|
| DATE 9-10-75 | DATE 9-20-75 | DATE 9-24-75 | DATE 9-9-76 | SHEET 12/13 |

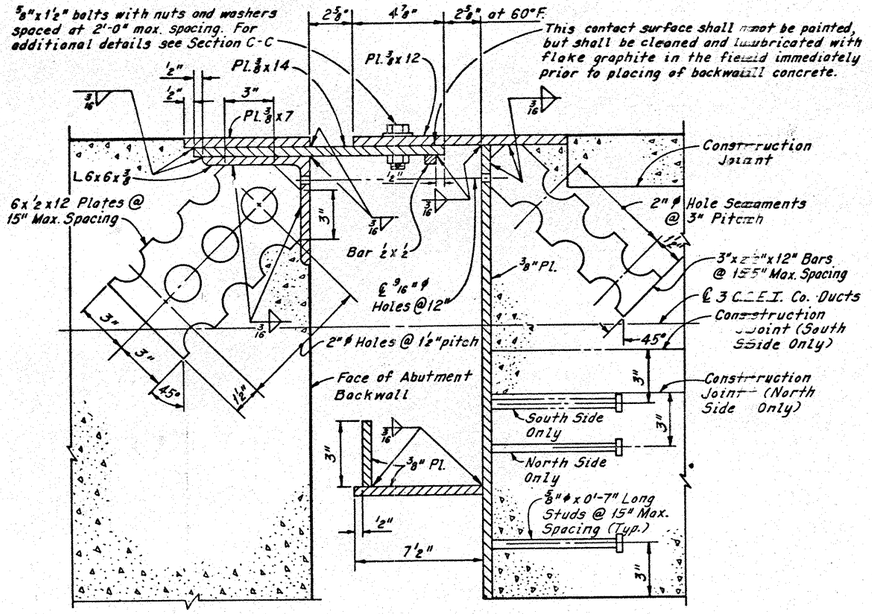
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

103
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




PART PLAN



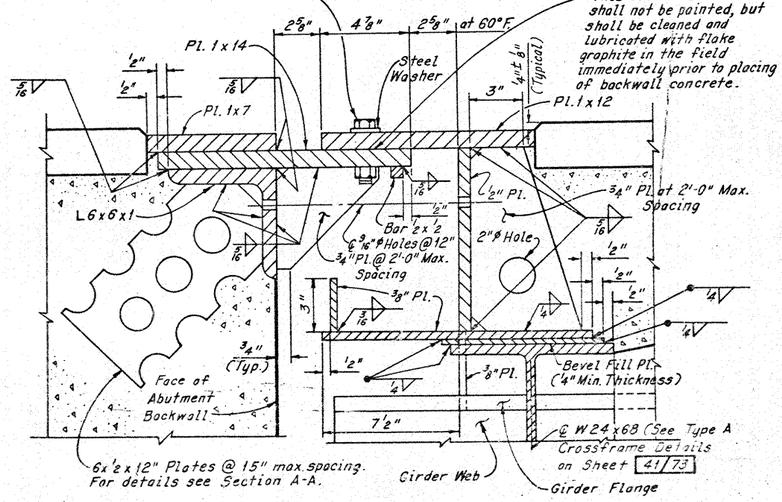

SECTION A-A

*Note:*
*The trough plates shall be galvanized according to 711.02. After galvanizing, the clean and dry interior surfaces (bottom and both sides) shall be bituminous coated (0.05 inches minimum thickness) in conformance with 707.04. Galvanizing and bituminous coating are included with Item 513, Structural Steel, for payment.*

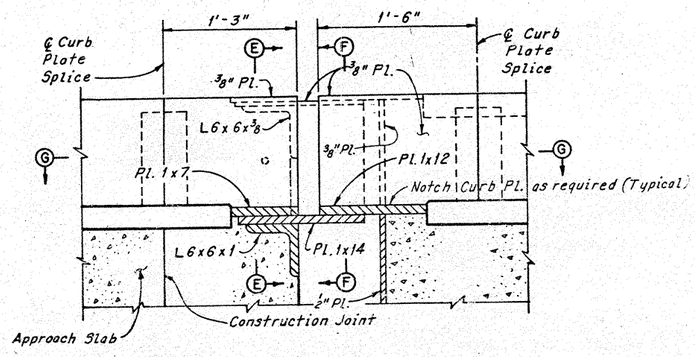
*Note:*
*During the erection of end dams and crossframes care shall be taken to insure that girders, bearing parts and bridge seats remain in bearing contact.*

*Notes:*
*For Sections D-D, E-E and F-F, see Sheet* 44/73
*For Parapet Sliding Plate Detail and Sidewalk Curb Plate Detail, see Sheet* 64/73.

*⅝"x2½" bolts at not more than 2'-0" max. spacing with nuts tack-welded to under side of Pl. 1x14. 1⅛" holes in Pl. 1x12. Center ⅝" bolts in 1⅛" holes. Apply flake graphite between washers and Pl. 1x12. Turn bolts tight and release one-half turn. Remove bolts as soon as concrete has set, preferably within two hours after placing, to avoid damage due to temperature expansion or contraction of superstructure. Fill holes with bituminous material.*




SECTION C-C




SECTION B-B

(For additional details see Section C-C)

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DECK JOINT DETAILS AT WEST ABUTMENT

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

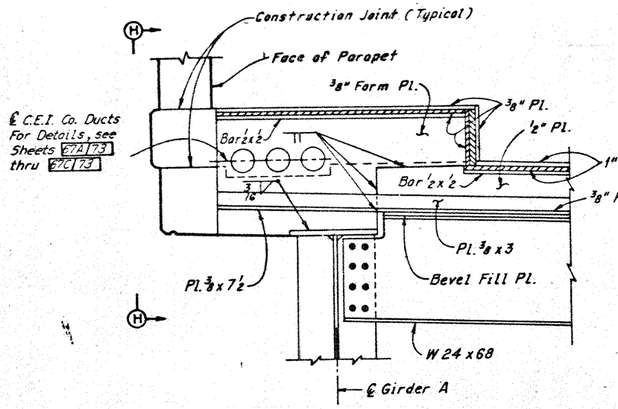
CUYAHOGA COUNTY OHIO

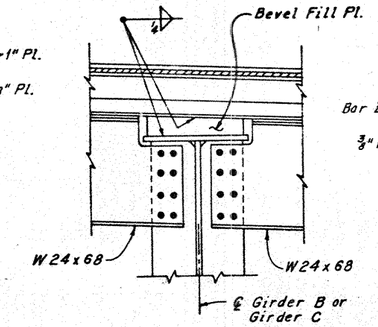
| DESIGN C.K.B | TRACED C.P. | CHECKED S.F. | QUANTITIES | REVISED |
|---|---|---|---|---|
| DATE 3-7-74 | DATE 3-11-74 | DATE 3-15-74 | DATE 4-10-74 | SHEET NO. 103 |

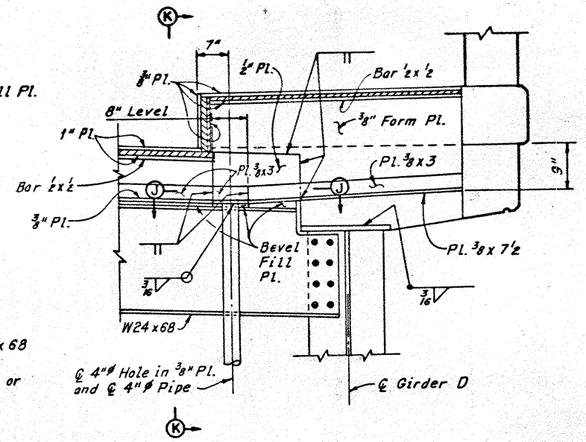
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



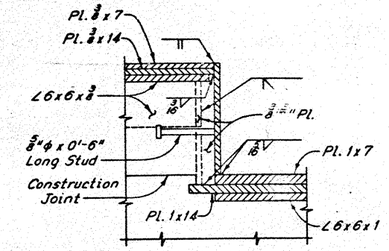


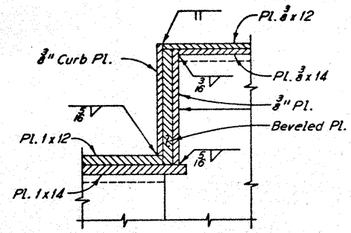

PART SECTION D-D

(Parapet Sliding Plate Not Shown)



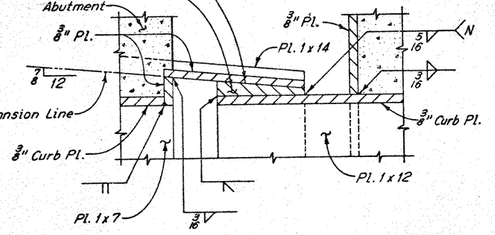

SECTION E-E

(North curb shown, South curb similar)



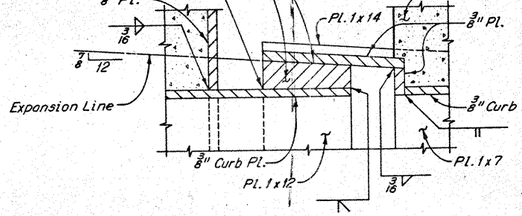

SECTION F-F

(North curb shown, South curb similar)



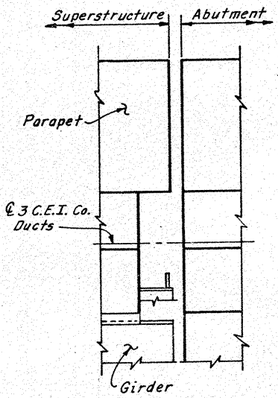

SECTION G-G

(North Curb)



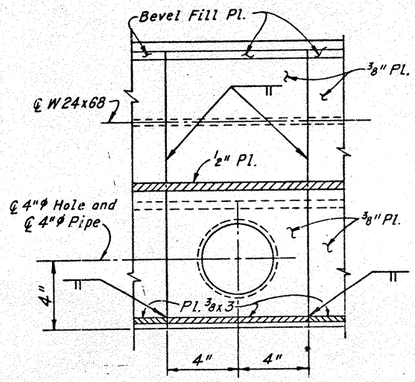

SECTION G-G

(South Curb)

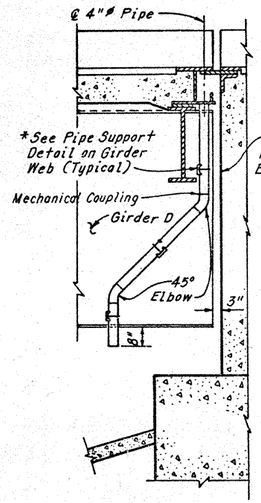



SECTION H-H

(Parapet Sliding Plate Not Shown)

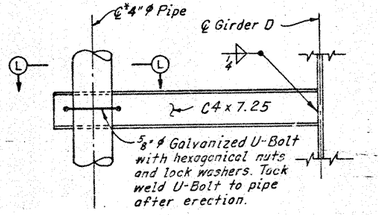



SECTION J-J

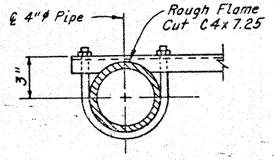



SECTION K-K

*Note:
The 4"ϕ pipe shall be alloy steel pipe, 707.11, or hot-dipped galvanized steel pipe. (Included with Item 603, 8"ϕ pipe, Downspouts Including Supports, for payment).




ELEVATION




SECTION L-L

PIPE SUPPORT DETAIL ON GIRDER D WEB

Notes:
For location of Sections D-D, E-E, F-F and G-G see Sheet 43/73.
For additional notes, see Sheets 43/73 and 60/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DECK JOINT DETAILS AT WEST ABUTMENT

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

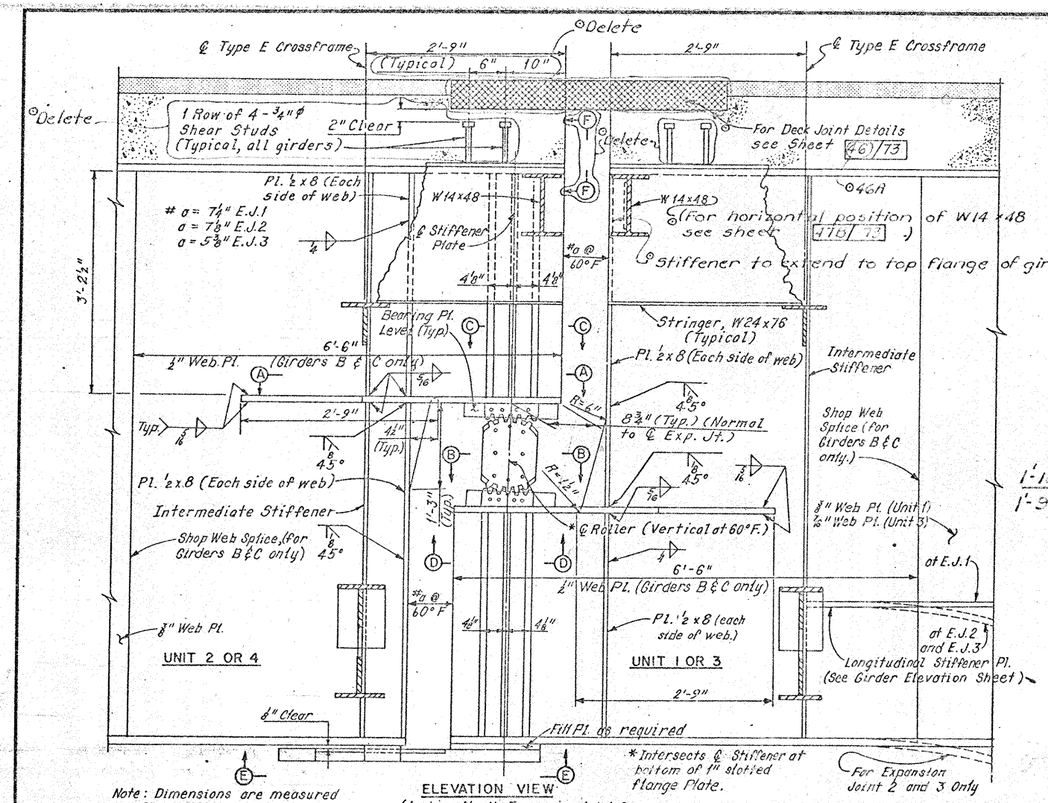
CUYAHOGA COUNTY OHIO

DRAWN C.K.B. TRACED C.P. CHECKED A.D.A. VIEWED S.J.B. APPROVED
DATE 3-8-74 DATE 3-12-74 DATE 3-25-74 DATE 4-10-74 DATE 6-1-73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

105 / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

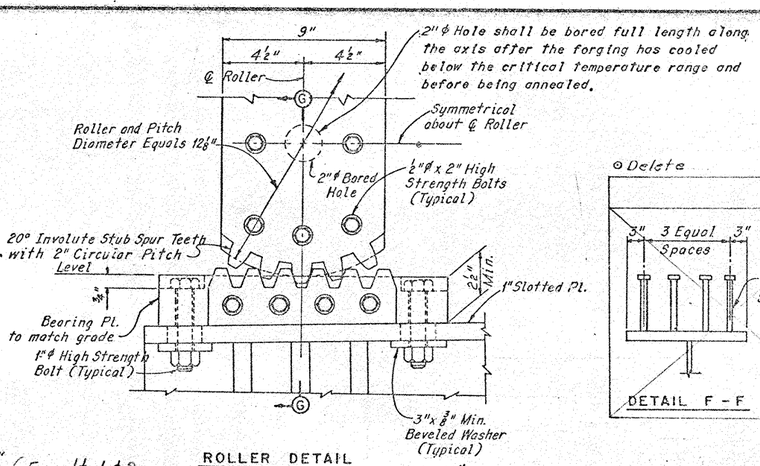



Note: Dimensions are measured parallel and perpendicular to grade.

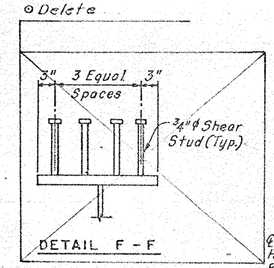
ELEVATION VIEW
(Looking North Expansion Joint 2
Looking South Expansion Joints 1 & 3)

* Intersects ℄ Stiffener at bottom of 1" slotted flange Plate.

For Expansion Joint 2 and 3 Only

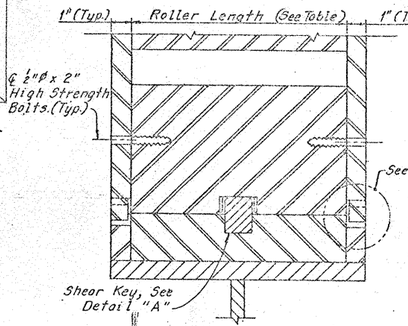



ROLLER DETAIL

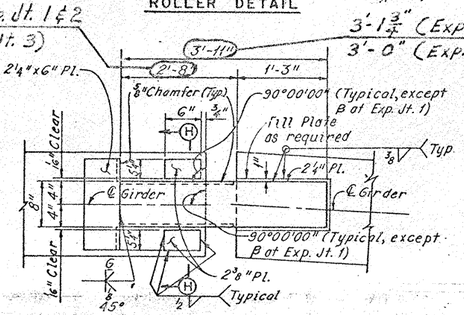



DETAIL F - F

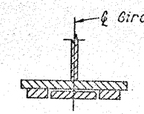
Note:
Rollers, gear plates and bearing plates shall be alloy steel forgings conforming to ASTM A237, Class B with a minimum yield strength of 55 ksi with the corrosion resistance and coloring characteristics of ASTM A588 and shall be paid for at the unit price bid for Item 513 "Structural Steel".




SECTION G-G




VIEW E-E




SECTION H-H

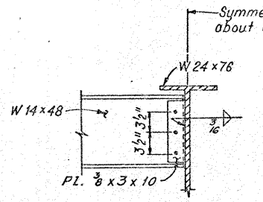
| | β |
|---|---|
| Girder A | 88° 52'58" |
| Girder B | 89° 52'53" |
| Girder C | 88° 52'48" |
| Girder D | 88° 52'42" |

Note:
For location of angles with respect to ℄ Roller and Bearing Plate, ℄ Expansion Rollers and ℄ Girders, at E.J.1, See Section A-A and B-B.

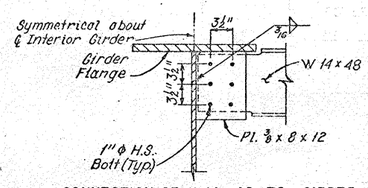
| ROLLER AND SLOTTED FLANGE PLATE DIMENSIONS | | |
|---|---|---|
| Expansion Joint | Dimension A | Dimension B |
| 1 (Girders A and D) | 20" | 18" |
| 1 (Girders B and C) | 22" | 20" |
| 2 (Girders A and D) | 20" | 18" |
| 2 (Girders B and C) | 22" | 20" |
| 3 (Girders A and D) | 20" | 18" |
| 3 (Girders B and C) | 22" | 20" |

| Girder | Expansion Joint 1 Angle ∝ |
|---|---|
| A | 1°07'02" |
| B | 1°07'07" |
| C | 1°07'12" |
| D | 1°07'18" |

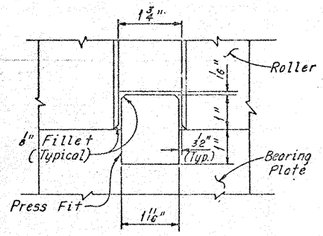
| ROLLERS | |
|---|---|
| Length | Number Required |
| 20" | 6 |
| 18" | 6 |



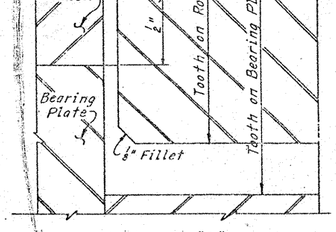

CONNECTION OF W 14 x 48 TO STRINGER W 24 x 76



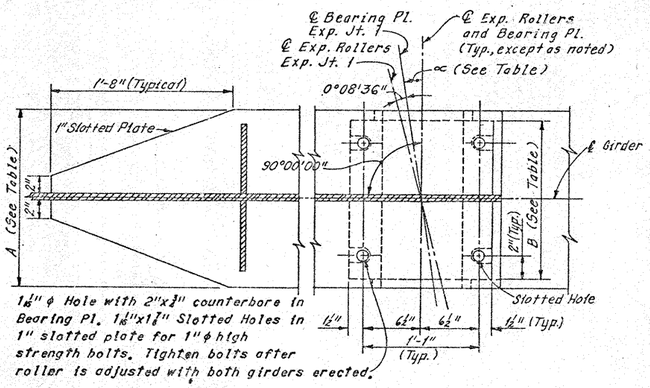

CONNECTION OF W 14 x 48 TO GIRDER
(Exterior Girder shown)



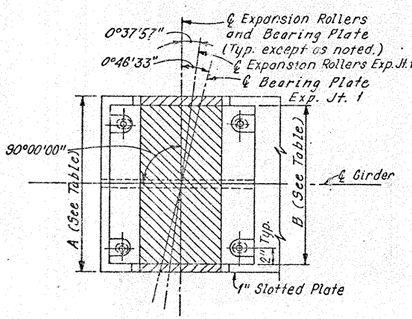

DETAIL "A"
(Shear Key to extend full length of Bearing Plate.)



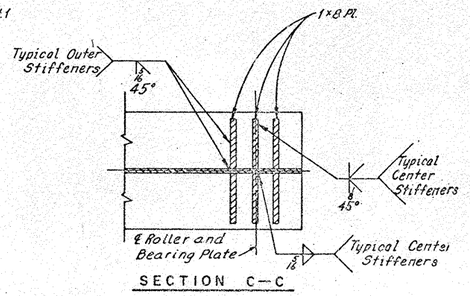

DETAIL "B"



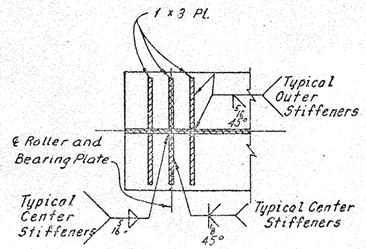

SECTION A-A
(Stiffeners not shown)




SECTION B-B




SECTION C-C




SECTION D-D

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# INTERMEDIATE EXPANSION JOINT DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

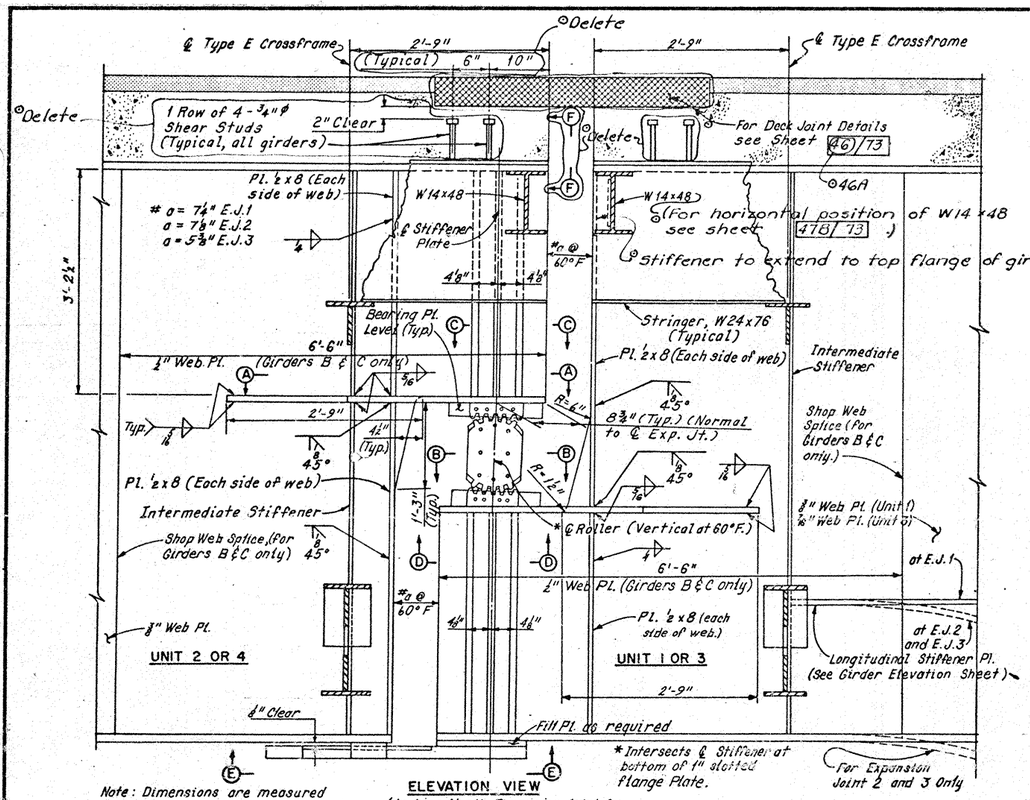
| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| A.H.S. | S.J.S. | J.H.L. | C.A.B. | 3-12-75 |
| DATE 6-6-74 | DATE 8-13-74 | DATE 8-20-74 | DATE 4-10-75 | SHEET 47/73 |

© REV. C.R. 8-22-75

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

105/148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



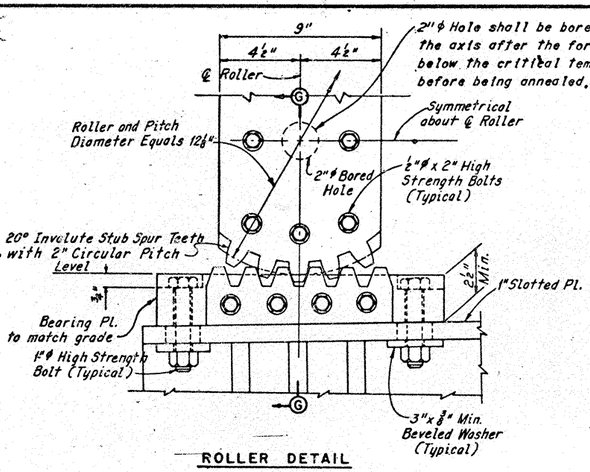

Note: Dimensions are measured parallel and perpendicular to grade.

ELEVATION VIEW
(Looking North Expansion Joint 2
Looking South Expansion Joints 1 ℄ 3)

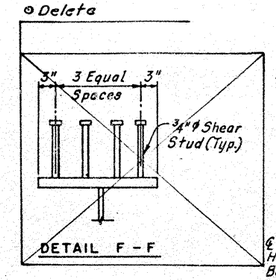
| ROLLER AND SLOTTED FLANGE PLATE DIMENSIONS | | |
|---|---|---|
| Expansion Joint | Dimension A | Dimension B |
| 1 (Girders A and D) | 20" | 18" |
| 1 (Girders B and C) | 22" | 20" |
| 2 (Girders A and D) | 20" | 18" |
| 2 (Girders B and C) | 22" | 20" |
| 3 (Girders A and D) | 20" | 18" |
| 3 (Girders B and C) | 22" | 20" |

| Girder | Expansion Joint 1 Angle ∝ |
|---|---|
| A | 1°07'02" |
| B | 1°07'07" |
| C | 1°07'12" |
| D | 1°07'18" |

| ROLLERS | |
|---|---|
| Length | Number Required |
| 20" | 6 |
| 18" | 6 |

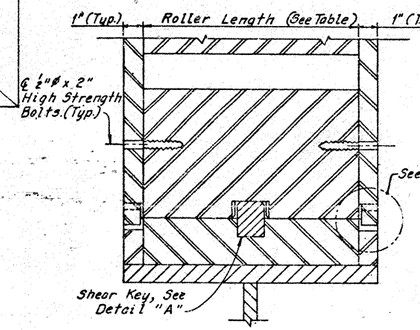



ROLLER DETAIL

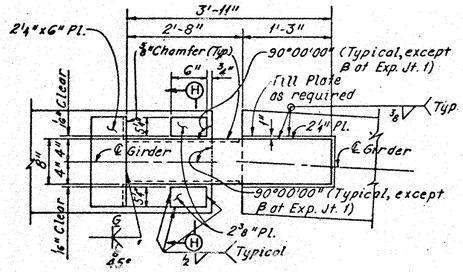



DETAIL F - F

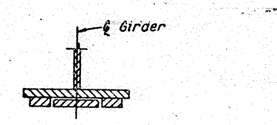
Note:
Rollers, gear plates and bearing plates shall be alloy steel forgings conforming to ASTM A237, Class B with a minimum yield strength of 55 ksi with the corrosion resistance and coloring characteristics of ASTM A588 and shall be paid for at the unit price bid for Item 513 "Structural Steel".




SECTION G-G



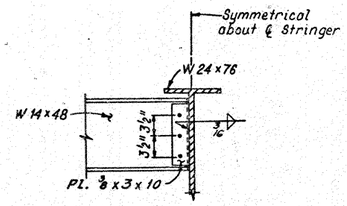

VIEW E-E



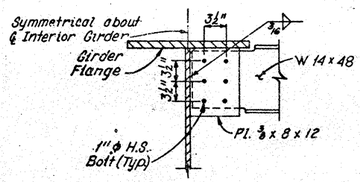

SECTION H-H

| | B |
|---|---|
| Girder A | 88° 52'58" |
| Girder B | 88° 52'53" |
| Girder C | 88° 52'48" |
| Girder D | 88° 52'42" |

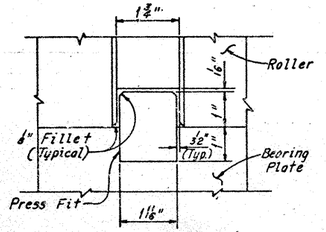
Note:
For location of angles with respect to ℄ Roller and Bearing Plate, ℄ Expansion Rollers and ℄ Girders, at E.J.1, See Section A-A and B-B.



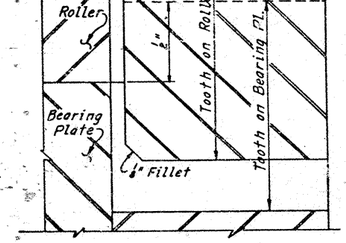

CONNECTION OF W 14x48 TO STRINGER W 24x76



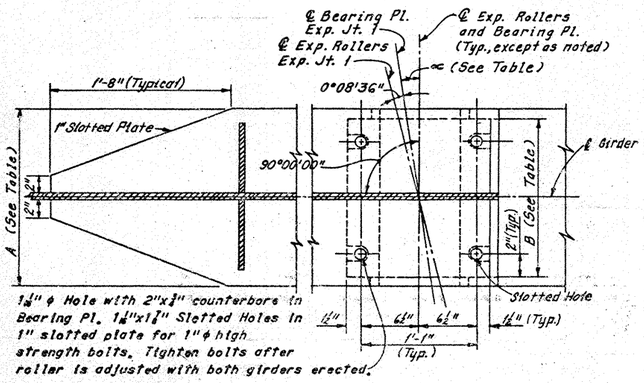

CONNECTION OF W 14x48 TO GIRDER
(Exterior Girder. shown)




DETAIL "A"
(Shear key to extend full length of Bearing Plate.)

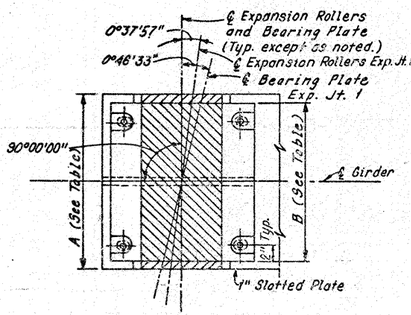



DETAIL "B"

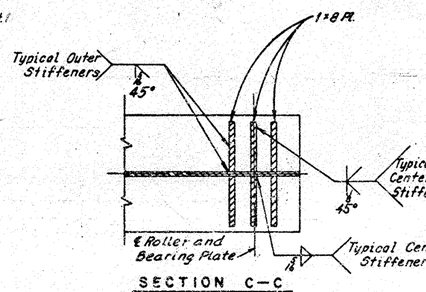



1½" ø Hole with 2"x¾" counterbore in Bearing Pl. 1⅛"x1⅜" Slotted Holes in 1" slotted plate for 1" ø high strength bolts. Tighten bolts after roller is adjusted with both girders erected.

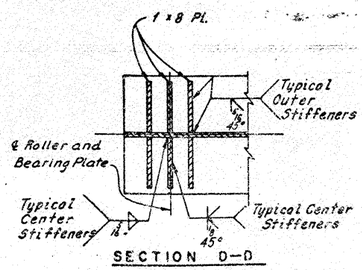
SECTION A-A
(Stiffeners not shown)




SECTION B-B




SECTION C-C




SECTION D-D

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 3-19 1976

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# INTERMEDIATE EXPANSION JOINT DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY 0110

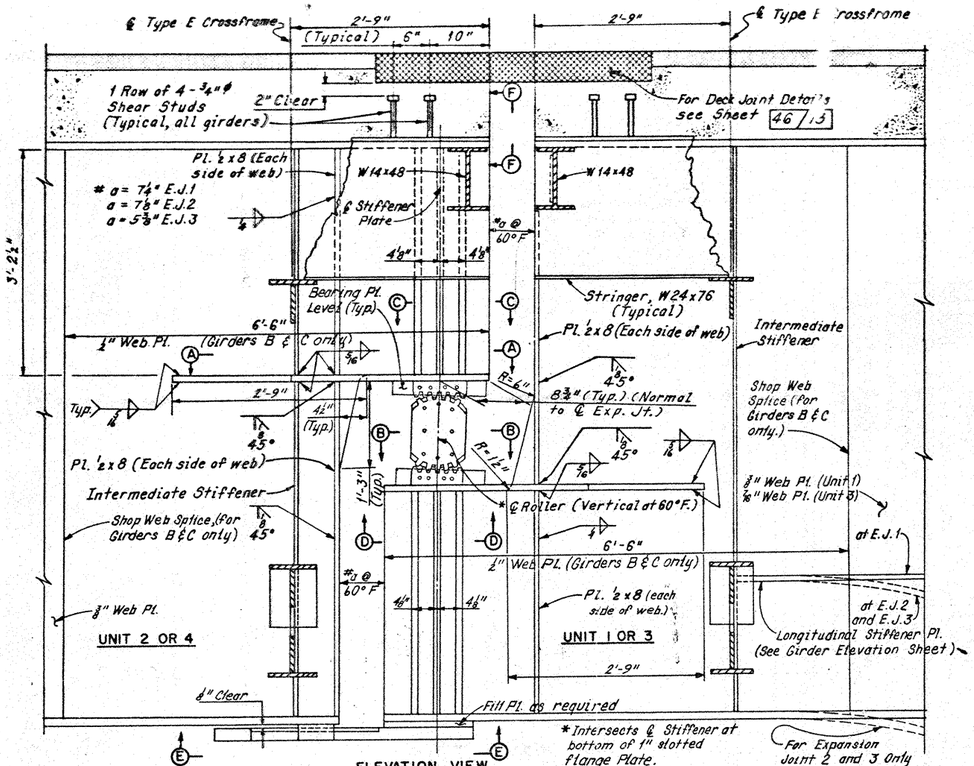
| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| AHS | SJS | WHL | D.A.B. | |
| DATE 8-6-74 | DATE 8-13-74 | DATE 8-20-74 | DATE 4-10-75 | SHEET 45/73 |

© Rev. C.R. 8-22-75

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

105 / 145

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



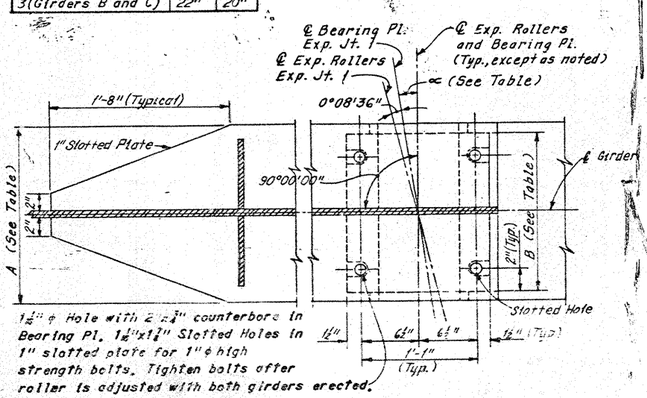

ELEVATION VIEW
(Looking North Expansion Joint 2
Looking South Expansion Joints 1 & 3)

Note: Dimensions are measured parallel and perpendicular to grade.

| ROLLER AND SLOTTED FLANGE PLATE DIMENSIONS | | |
|---|---|---|
| Expansion Joint | Dimension A | Dimension B |
| 1 (Girders A and D) | 20" | 18" |
| 1 (Girders B and C) | 22" | 20" |
| 2 (Girders A and D) | 20" | 18" |
| 2 (Girders B and C) | 22" | 20" |
| 3 (Girders A and D) | 20" | 18" |
| 3 (Girders B and C) | 22" | 20" |

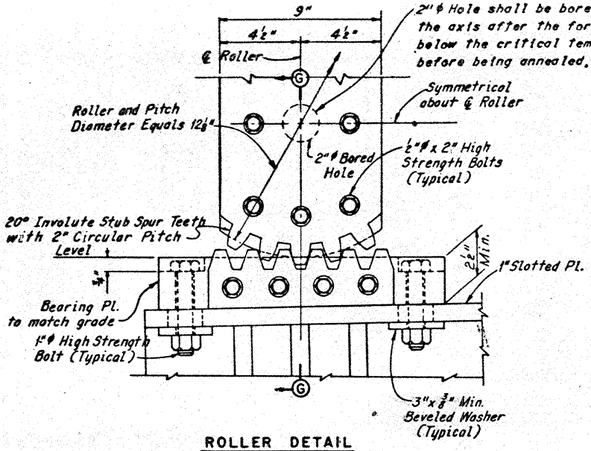
| Girder | Expansion Joint 1 Angle ∝ |
|---|---|
| A | 1°07'02" |
| B | 1°07'07" |
| C | 1°07'12" |
| D | 1°07'18" |

| ROLLERS | |
|---|---|
| Length | Number Required |
| 20" | 6 |
| 18" | 6 |

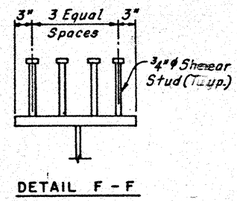



1¼" ϕ Hole with 2 - 2¾" counterbore in Bearing Pl. 1⅜" x 1¾" Slotted Holes in 1" slotted plate for 1" ϕ high strength bolts. Tighten bolts after roller is adjusted with both girders erected.

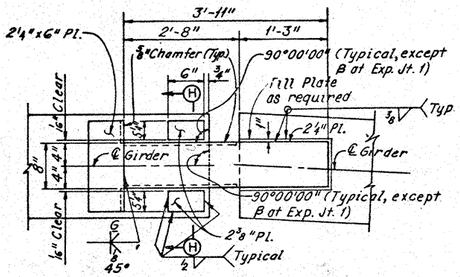
SECTION A-A
(Stiffeners not shown)



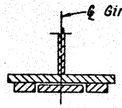

ROLLER DETAIL




DETAIL F - F



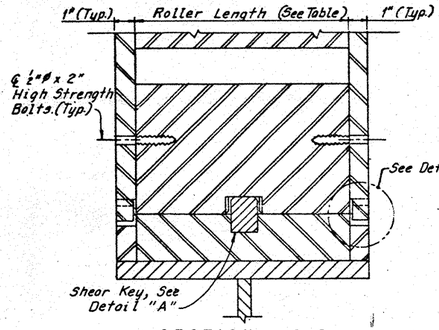

VIEW E-E



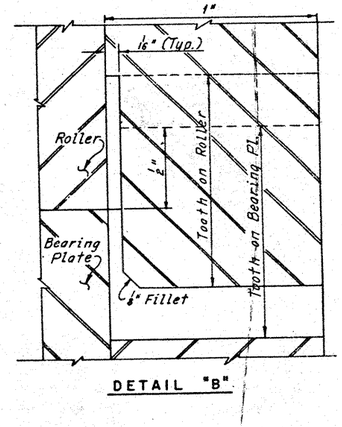

SECTION H-H

| | B |
|---|---|
| Girder A | 88°52'58" |
| Girder B | 88°52'53" |
| Girder C | 88°52'48" |
| Girder D | 88°52'42" |

Note:
Rollers, gear plates and bearing plates shall be alloy steel forgings conforming to ASTM A237, Class B with a minimum yield strength of 55 ksi with the corrosion resistance and coloring characteristics of ASTM A588 and shall be paid for at the unit price bid for Item 513 "Structural Steel".

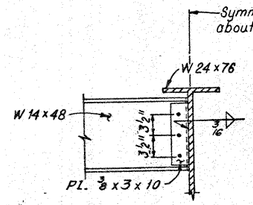



SECTION G-G

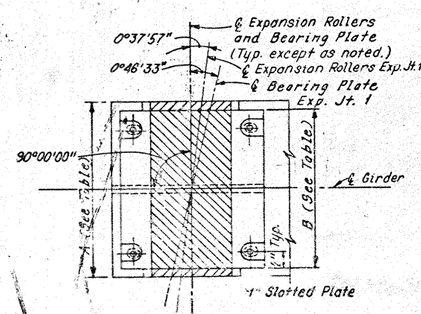



DETAIL "B"

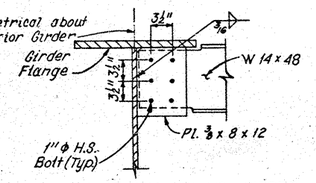
Note: For location of angles with respect to ℄ Roller and Bearing Plate, ℄ Expansion Rollers and ℄ Girders, at E.J.1, See Section A-A and B-B.



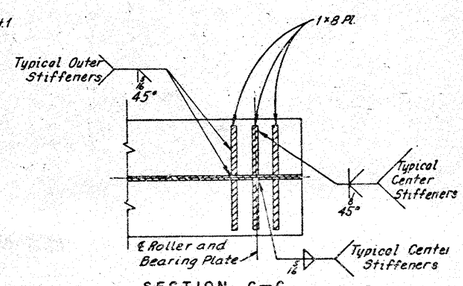

CONNECTION OF W 14x48 TO STRINGER W 24x76



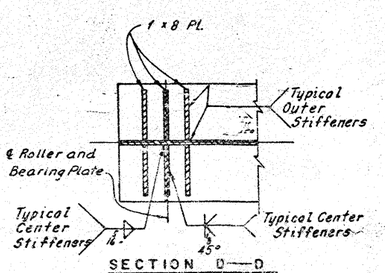

SECTION B-B



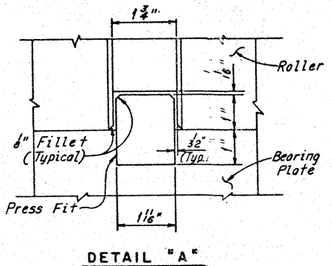

CONNECTION OF W 14x48 TO GIRDER
(Exterior Girder shown)




SECTION C-C




SECTION D-D




DETAIL "A"
(Shear Key to extend full length of Bearing Plate.)

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 8-22-1975

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# INTERMEDIATE EXPANSION JOINT DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

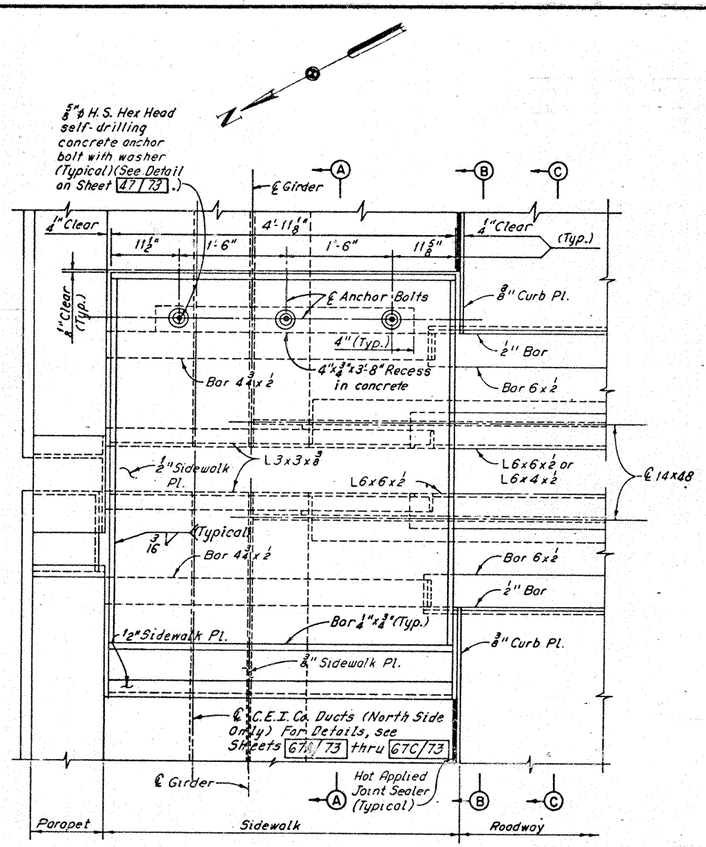
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| AHS | SJS | M.J. | S.A.B. | |
| DATE 8-6-74 | DATE 8-13-74 | DATE 8-20-74 | DATE 8-22-75 | SHEET 45/13 |

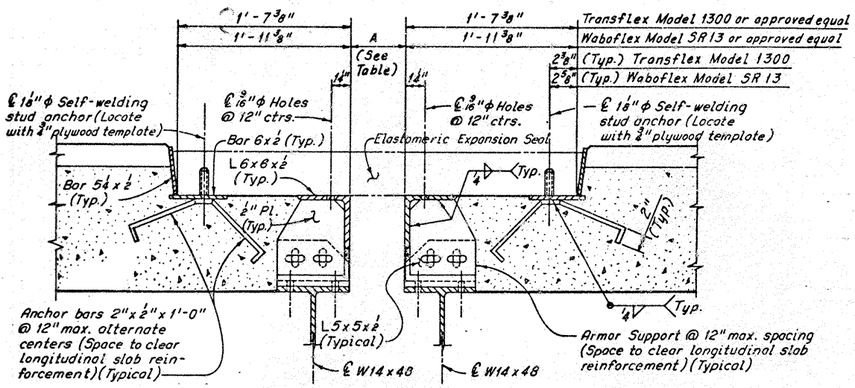
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

106/148

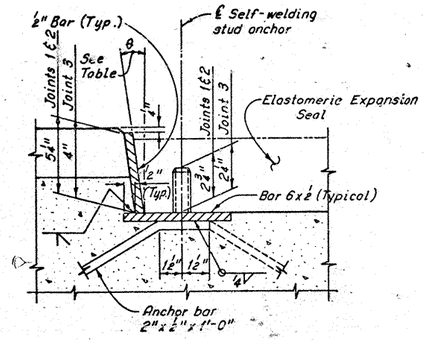
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



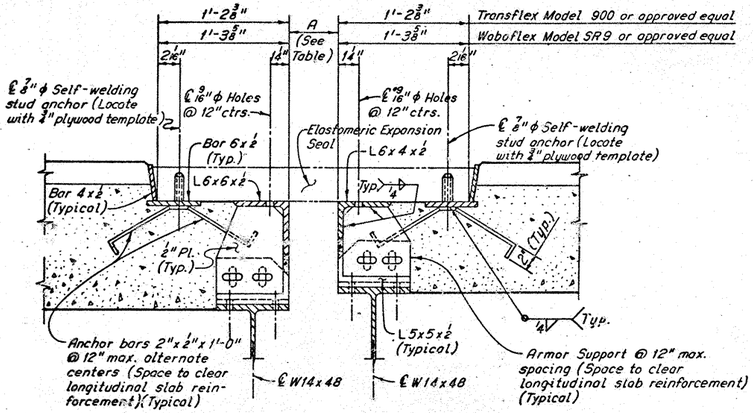

TYPICAL PART PLAN
(Elastomeric Expansion Seal, Armor Support, Anchor Studs and Bars not shown)




SECTION C-C EXPANSION JOINTS 1 AND 2




ARMOR DETAIL AT BACK OF ELASTOMERIC JOINT

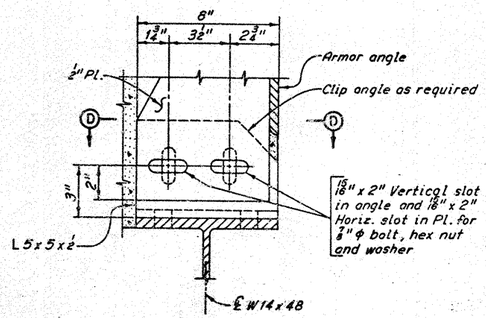



SECTION C-C EXPANSION JOINT 3

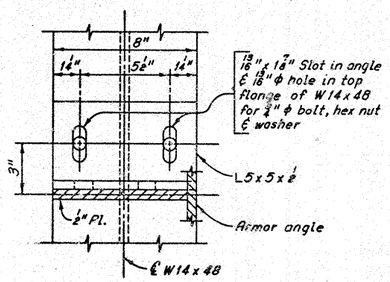
| DIMENSION A | | | |
|---|---|---|---|
| Pouring Temperature | Expansion Joint 1 | Expansion Joint 2 | Expansion Joint 3 |
| -20° | 12 5/8" | 12 9/16" | 8 13/16" |
| -10° | 11 11/16" | 11 3/4" | 8 1/16" |
| 0° | 11 1/16" | 11 5/16" | 8" |
| 10° | 10 3/8" | 10 9/16" | 7 3/16" |
| 20° | 9 3/4" | 9 13/16" | 6 11/16" |
| 30° | 9 1/16" | 9 5/16" | 6 3/16" |
| 40° | 8 7/16" | 8 13/16" | 5 11/16" |
| 50° | 7 13/16" | 7 15/16" | 5 3/16" |
| 60° | 7 1/8" | 7 5/16" | 4 13/16" |
| 70° | 6 7/16" | 6 11/16" | 4 5/16" |
| 80° | 5 13/16" | 5 15/16" | 3 13/16" |
| 90° | 5 3/16" | 5 7/16" | 4 1/16" |
| 100° | 4 9/16" | 4 11/16" | 3 5/16" |

| θ ANGLE TABLE | |
|---|---|
| MODEL | θ |
| Transflex 900 | 4° |
| Transflex 1300 | 3° |
| Waboflex SR9 | 0° |
| Waboflex SR13 | 0° |

Notes:
For Construction and Material Specifications for the Steel Reinforced Elastomeric Expansion Joint Seal, see Sheet GN3.
For Section A-A and Section B-B, Sidewalk Plate Anchorage Detail, Installation Details and Plywood Template Detail, see Sheet 47/73.
For Parapet Sliding Plate Detail and Sidewalk Curb Plate Detail, see Sheet 64/73.

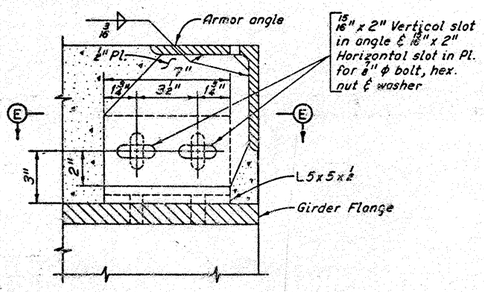



TYPICAL SECTION

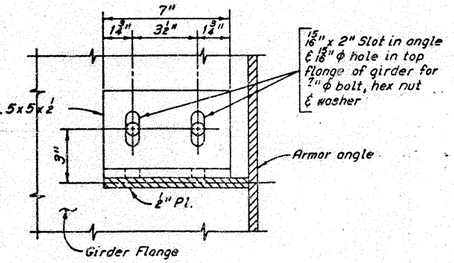



SECTION D-D

ARMOR SUPPORT DETAILS AT W14 X 48




TYPICAL SECTION




SECTION E-E

ARMOR SUPPORT DETAILS AT GIRDERS B AND C

This entire sheet is superseded by sheet 46A/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DECK JOINT DETAILS AT INTERMEDIATE EXPANSION JOINTS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

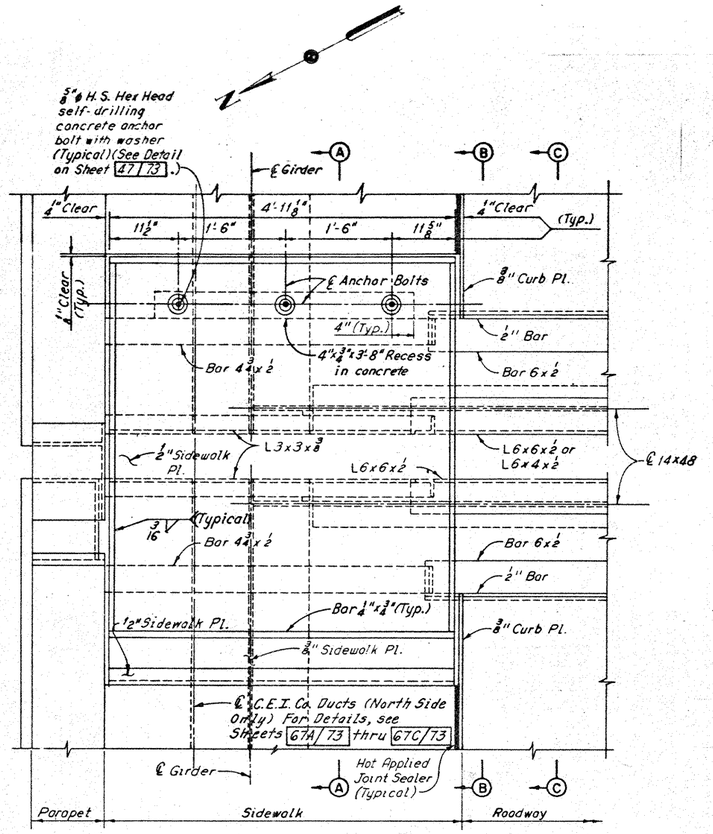
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| CKB | DLA | JHS CAB | | |
| DATE 12-10-73 | DATE 1-16-74 | DATE 1-20-74 DATE 4-10-74 | | SHEET 46/73 |

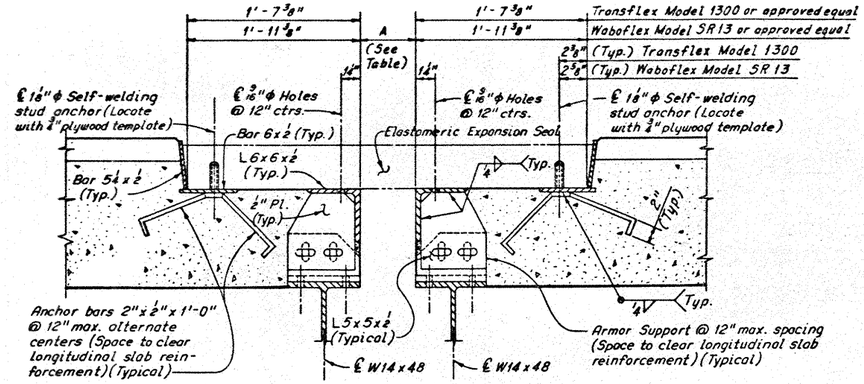
© Rev. C.P. 8-22-75

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

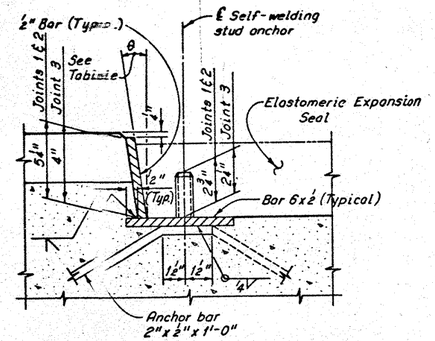
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



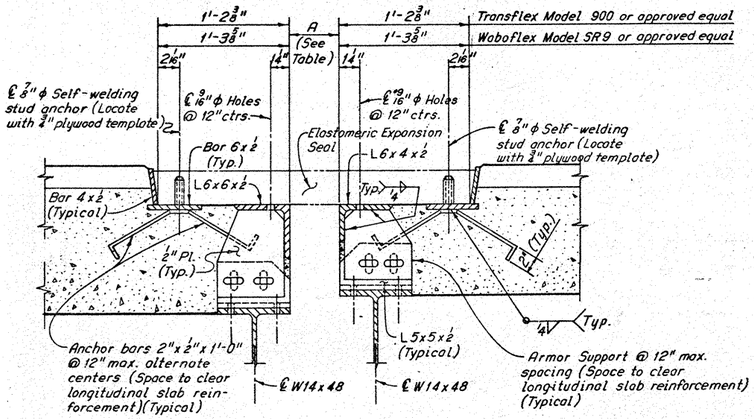

**TYPICAL PART PLAN**
*(Elastomeric Expansion Seal, Armor Support, Anchor Studs and Bars not shown)*




**SECTION C-C EXPANSION JOINTS 1 AND 2**




**ARMOR DETAIL AT BACK OF ELASTOMERIC JOINT**



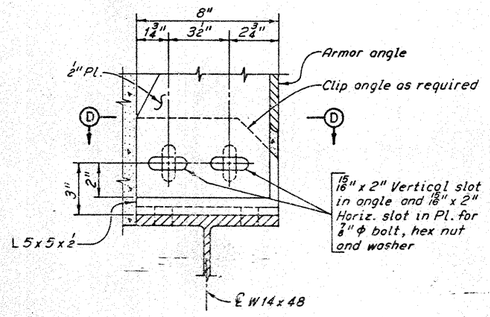

**SECTION C-C EXPANSION JOINT 3**

| DIMENSION A | | | |
|---|---|---|---|
| Pouring Temperature | Expansion Joint 1 | Expansion Joint 2 | Expansion Joint 3 |
| -20° | 12 5/16" | 12 3/16" | 3 13/16" |
| -10° | 11 11/16" | 11 7/8" | 3 9/16" |
| 0° | 11 1/16" | 11 5/16" | 3" |
| 10° | 10 3/8" | 10 5/16" | 2 7/16" |
| 20° | 9 3/4" | 9 3/8" | 1 7/8" |
| 30° | 9 1/8" | 9 5/16" | 1 5/16" |
| 40° | 8 1/2" | 8 1/4" | 3/4" |
| 50° | 7 7/8" | 7 13/16" | 5/16" |
| 60° | 7 1/4" | 7 1/8" | -1/8" |
| 70° | 6 5/8" | 6 1/16" | -4 1/16" |
| 80° | 5 15/16" | 5 13/16" | -4 1/2" |
| 90° | 5 3/16" | 5 1/4" | -4 1/16" |
| 100° | 4 9/16" | 4 5/16" | -3 1/16" |

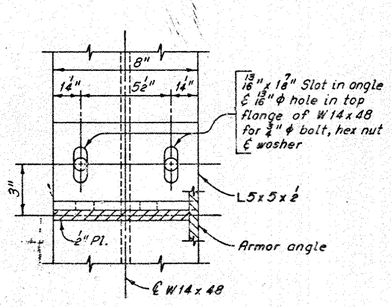
| θ ANGLE TABLE | |
|---|---|
| MODEL | θ |
| Transflex 900 | 4° |
| Transflex 1300 | 3° |
| Waboflex SR9 | 0° |
| Waboflex SR13 | 0° |

*Notes:*
*For Construction and Material Specifications for the Steel Reinforced Elastomeric Expansion Joint Seal, see Sheet* 6N3.
*For Section A-A and Section B-B, Sidewalk Plate Anchorage Detail, Installation Details and Plywood Template Detail, see Sheet* 47/73.
*For Parapet Sliding Plate Detail and Sidewalk Curb Plate Detail, see Sheet* 64/73.

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 8-22 1975

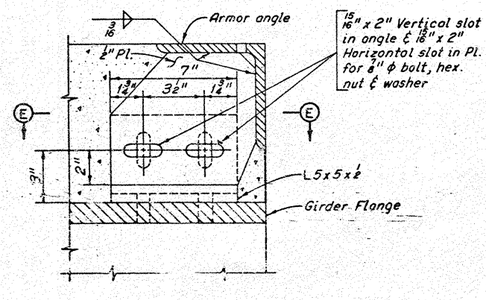



**TYPICAL SECTION**

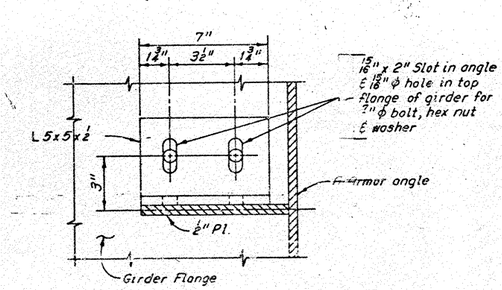



**SECTION D-D**

ARMOR SUPPORT DETAILS AT W14 X 48




**TYPICAL SECTION**




**SECTION E-E**

ARMOR SUPPORT DETAILS AT GIRDERS B AND C

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

**DECK JOINT DETAILS AT INTERMEDIATE EXPANSION JOINTS**
DENISON-RIVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

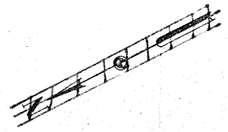
CUYAHOGA COUNTY — OHIO

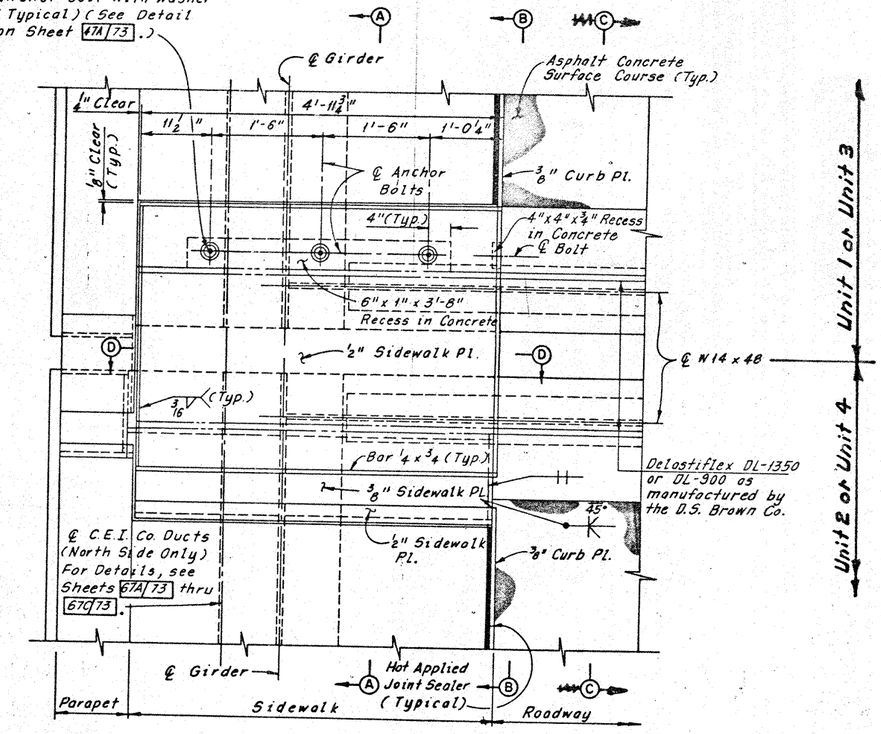
DRAWN C.K.S. | TRACED D.I. | CHECKED J.H.S. | REVIEWED | REVISED C.A.B.
DATE 12-10-73 | DATE 1-16-74 | DATE 1-20- | DATE 4-10-74 | SHEET 66/73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | – | |

10CA 148

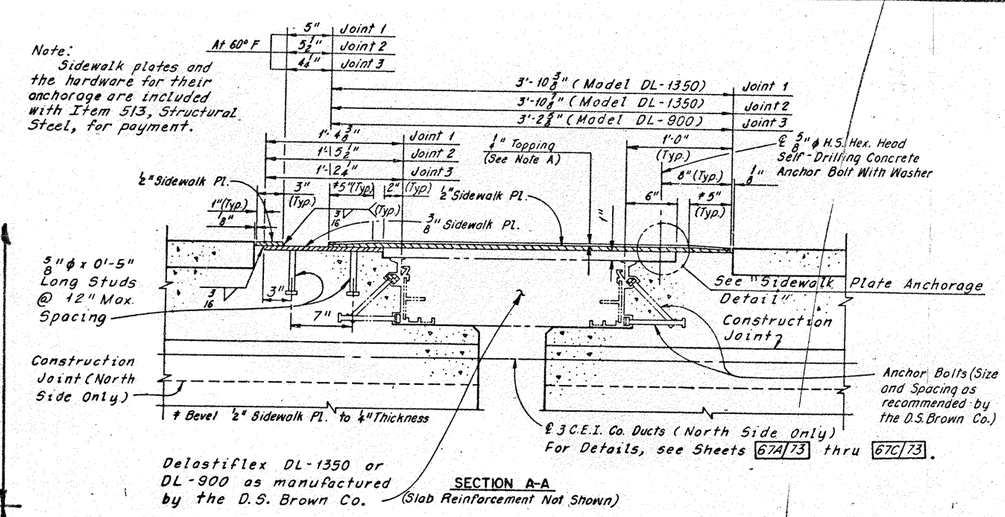
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43






TYPICAL PART PLAN
(Anchor studs not shown)

Note:
Sidewalk plates and the hardware for their anchorage are included with Item 513, Structural Steel, for payment.

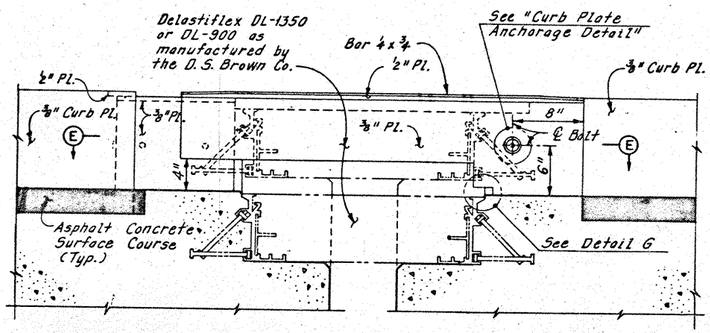



SECTION A-A
(Slab Reinforcement Not Shown)

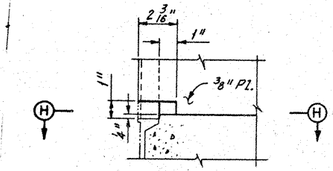
Note A:
The ¼" topping shall be a modified epoxy resembling concrete in appearance as manufactured by the Ceilcote Company, Berea, Ohio 44017, under the trade name "Corocrete A-1" or approved equal. The topping shall be applied in the shop and the surface textured to resemble a typical concrete sidewalk. Preparation of the steel surface shall be the same as for painting described in Section 514.04.

A manufacturer's representative experienced in the application of the topping will instruct the Contractor in the proper procedures for applying the topping.

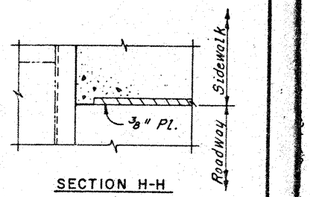
The ¼" topping shall be included with Item 513, Structural Steel, for payment.



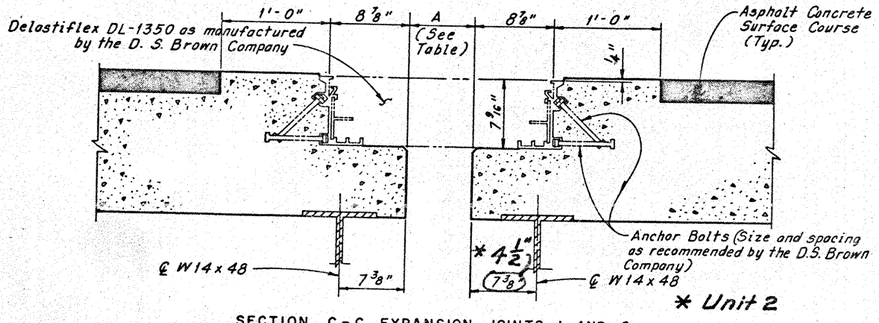

SECTION B-B
(Slab Reinforcement Not Shown)



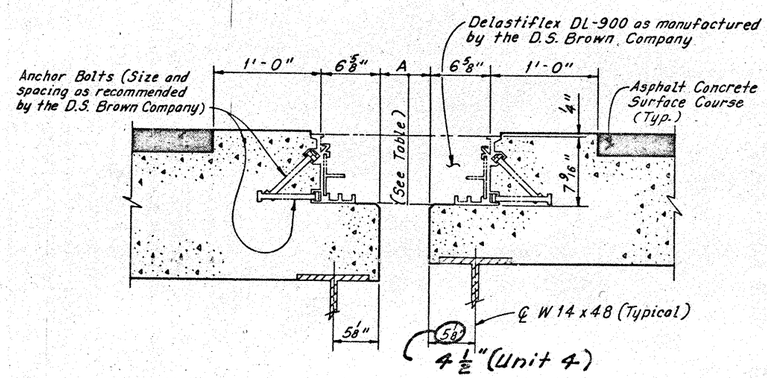

DETAIL G




SECTION H-H




SECTION C-C EXPANSION JOINTS 1 AND 2
(Slab Reinforcement Not Shown)




SECTION C-C EXPANSION JOINT 3
(Slab Reinforcement Not Shown)

| DIMENSION A | | | |
|---|---|---|---|
| Pouring Temperature | Expansion Joint 1 | Expansion Joint 2 | Expansion Joint 3 |
| -20° | 12 13/16" | 12 10/16" | 8 13/16" |
| -10° | 11 16/16" | 11 7/8" | 8 9/16" |
| 0° | 11 6/8" | 11 3/16" | 8" |
| 10° | 10 3/4" | 10 5/16" | 7 7/16" |
| 20° | 9 3/4" | 9 7/16" | 7 1/8" |
| 30° | 9 1/8" | 9 3/16" | 6 11/16" |
| 40° | 8 1/2" | 8 5/16" | 6 4/16" |
| 50° | 7 7/8" | 7 13/16" | 5 13/16" |
| 60° | 7 4/16" | 7 1/8" | 5 3/8" |
| 70° | 6 3/4" | 6 7/16" | 4 13/16" |
| 80° | 5 15/16" | 5 11/16" | 4 5/16" |
| 90° | 5 5/16" | 5 1/16" | 4 1/16" |
| 100° | 4 11/16" | 4 7/16" | 3 5/16" |

Notes:
For Specifications for the D. S. Brown Co. Delastiflex Expansion Joint, see Sheet GN 5A.
For Section D-D and Section E-E, see Sheet 47A 73.
For Sidewalk Plate Anchorage Detail and Curb Plate Anchorage Detail, see Sheet 47A 73.
For Deck and Sidewalk Reinforcement Details At Intermediate Expansion Joints, see Sheet 47B 73.
For Parapet Sliding Plate Detail and Sidewalk Curb Plate Detail, see Sheet 64 73.

This sheet added 8-22-75 and supersedes Sheet 46 73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DECK JOINT DETAILS AT INTERMEDIATE EXPANSION JOINTS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

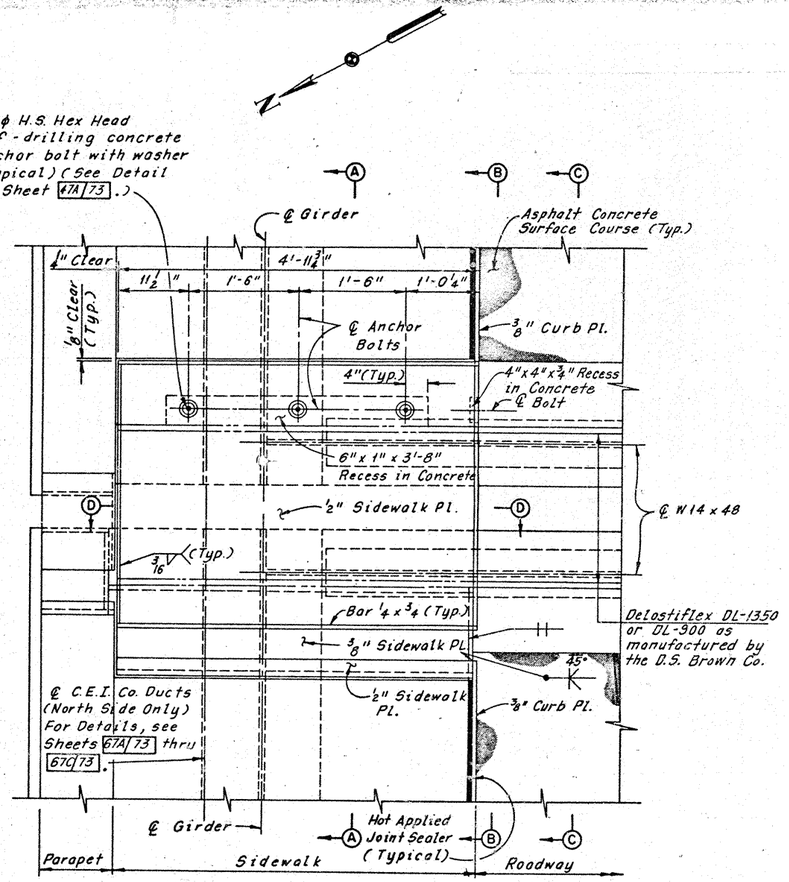
CUYAHOGA COUNTY OHIO

| DRAWN C.P.E. W.E.S. DATE 8-18-75 | TRACED M.E.T. DATE 8-14-75 | CHECKED D.C.A. DATE 2-21-75 | REVIEWED G.H.B. DATE 8-20-75 | REVISED 11-21-75 SHEET 46A 73 |
|---|---|---|---|---|

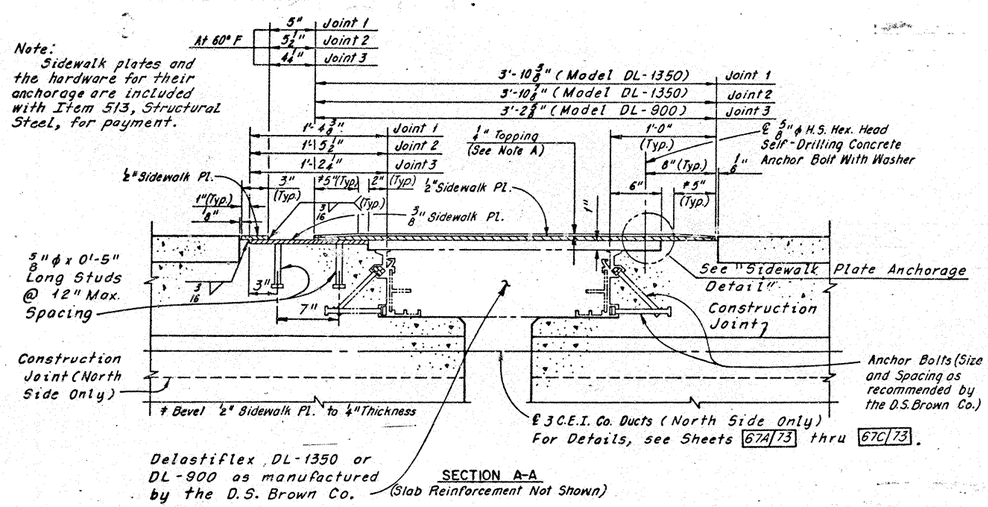
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | – | |

106A / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




TYPICAL PART PLAN
(Anchor studs not shown)

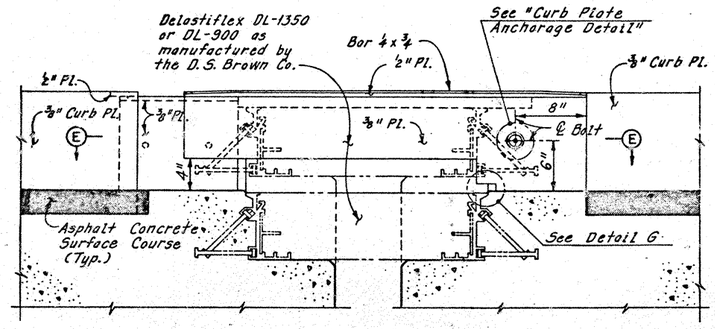



SECTION A-A
(Slab Reinforcement Not Shown)

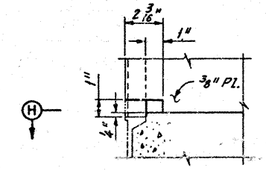
Note A:
The ¼" topping shall be a modified epoxy resembling concrete in appearance as manufactured by the Cailcote Company, Berea, Ohio 44017, under the trade name "Corocrete A-1" or approved equal. The topping shall be applied in the shop and the surface textured to resemble a typical concrete sidewalk. Preparation of the steel surface shall be the same as for painting described in Section 514.04.

A manufacturer's representative experienced in the application of the topping will instruct the Contractor in the proper procedures for applying the topping.

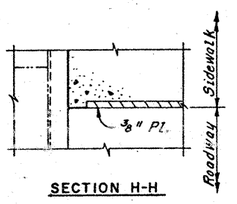
The ¼" topping shall be included with Item 513, Structural Steel, for payment.



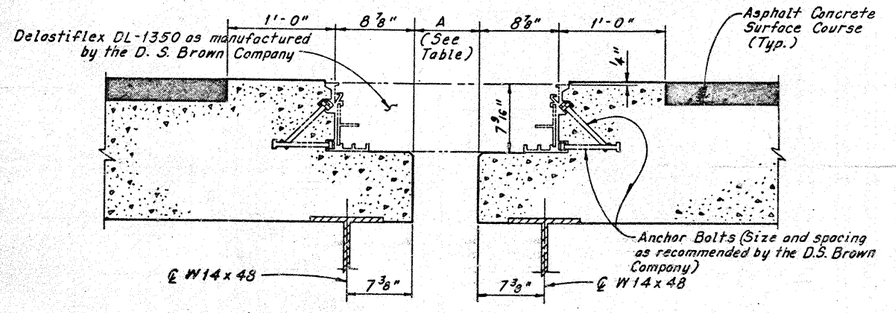

SECTION B-B
(Slab Reinforcement Not Shown)



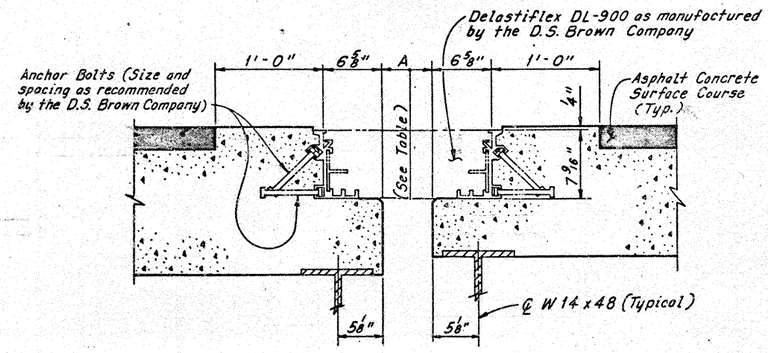

DETAIL G




SECTION H-H




SECTION C-C EXPANSION JOINTS 1 AND 2
(Slab Reinforcement Not Shown)




SECTION C-C EXPANSION JOINT 3
(Slab Reinforcement Not Shown)

| DIMENSION A | | | |
|---|---|---|---|
| Pouring Temperature | Expansion Joint 1 | Expansion Joint 2 | Expansion Joint 3 |
| -20° | 12 9/16" | 12 1/16" | 8 1/16" |
| -10° | 11 11/16" | 11 3/16" | 8 1/16" |
| 0° | 11 1/16" | 11 3/16" | 8" |
| 10° | 10 3/8" | 10 15/16" | 7 15/16" |
| 20° | 9 3/4" | 9 7/16" | 7 7/8" |
| 30° | 9 1/16" | 9 3/16" | 6 11/16" |
| 40° | 8 1/2" | 8 1/16" | 6 1/4" |
| 50° | 7 7/8" | 7 7/16" | 5 13/16" |
| 60° | 7 1/4" | 7" | 5 3/8" |
| 70° | 6 5/8" | 6 9/16" | 4 15/16" |
| 80° | 5 15/16" | 5 13/16" | 4 1/2" |
| 90° | 5 5/16" | 5 1/16" | 4 1/16" |
| 100° | 4 11/16" | 4 5/16" | 3 15/16" |

THIS PLAN SHEET HAS BEEN REVISED SEE REVISION 10-3/19 C

Notes:
For Specifications for the D.S. Brown Co. Delastiflex Expansion Joint, see Sheet GN 5A.
For Section D-D and Section E-E, see Sheet 47A/73.
For Sidewalk Plate Anchorage Detail and Curb Plate Anchorage Detail, see Sheet 47A/73.
For Deck and Sidewalk Reinforcement Details At Intermediate Expansion Joints, see Sheet 47B/73.
For Parapet Sliding Plate Detail and Sidewalk Curb Plate Detail, see Sheet 64/73.

This sheet added 8-22-75 and supersedes Sheet 46/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DECK JOINT DETAILS AT INTERMEDIATE EXPANSION JOINTS
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

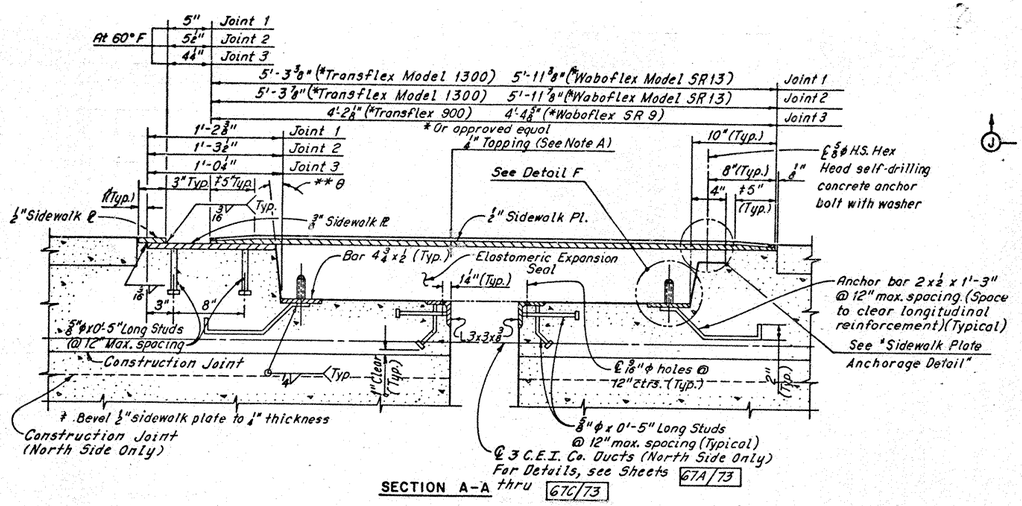
| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.P.G. W.E.B. | M.E.T. | D.C.F. W.E.B. | C.A.B. | |
| DATE 8-12-75 | DATE 8-14-75 | DATE 8-21-75 | DATE 8-22-75 | SHEET 46A/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

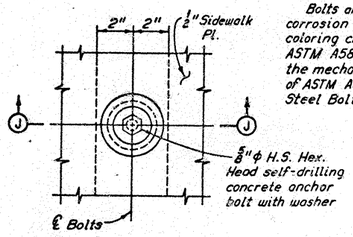
107 / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

# SIDEWALK PLATE ANCHORAGE DETAIL

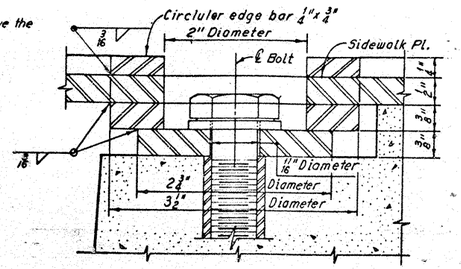



SECTION A-A




PLAN

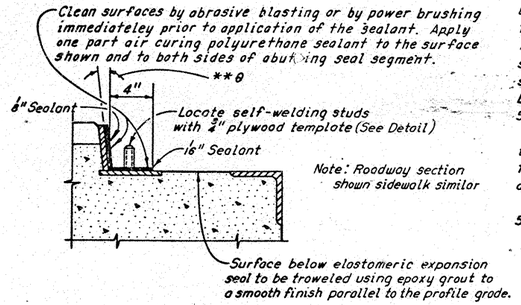
**Note:**
*Bolts and Washers shall have the corrosion resistance and coloring characteristics of ASTM A588 steel and all the mechanical properties of ASTM A325 High Strength Steel Bolts.*




SECTION J-J

**Note:**
*Sidewalk plates and the hardware for their anchorage are included with Item 513, Structural Steel, for payment.*

** For table of θ angle values, see Sheet 46/73.



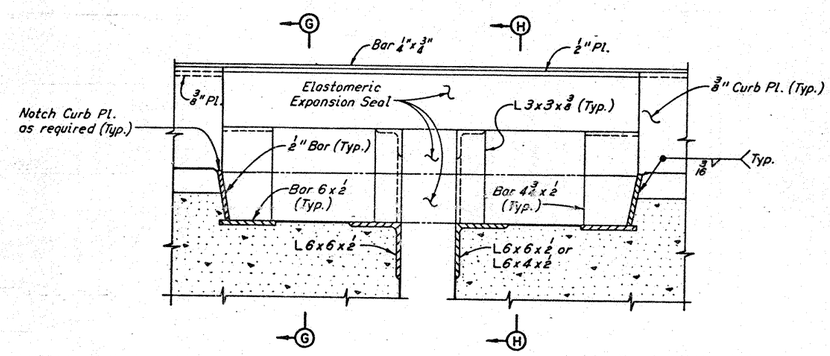

Note: Roadway section shown sidewalk similar

SEALING DETAIL

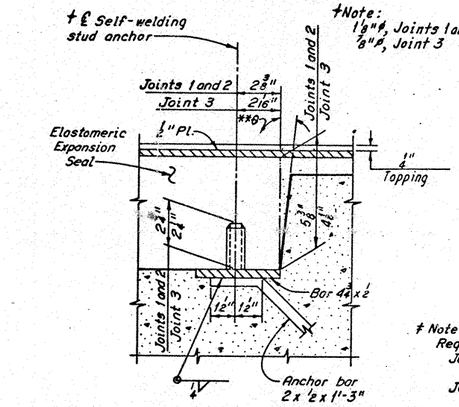
**Note A:**
*The 1/4" topping shall be a modified epoxy resembling concrete in appearance as manufactured by the Ceilcote Company, Berea, Ohio 44017, under the trade name "Corocrete A-1" or approved equal. The topping shall be applied in the shop and the surface textured to resemble a typical concrete sidewalk. Preparation of the steel surface shall be the same as for painting described in Section 514. 04.*

*A manufacturer's representative experienced in the application of the topping will instruct the Contractor in the proper procedures for applying the topping.*

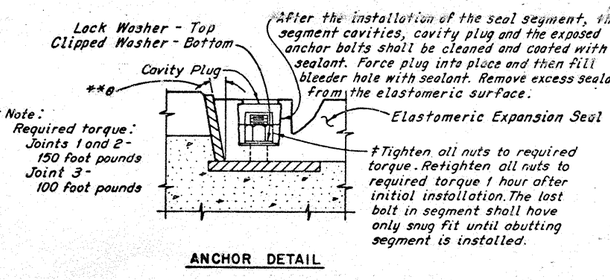
*The 1/4" topping shall be included with Item 513, Structural Steel, for payment.*




SECTION B-B
*(Armor support not shown)*

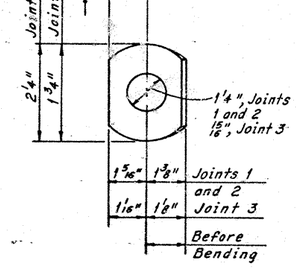



DETAIL F



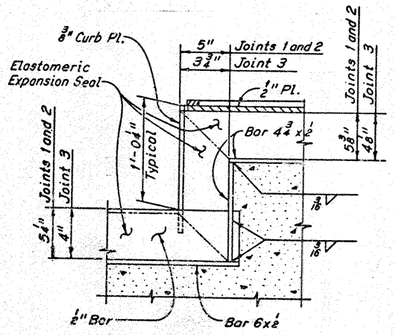

† Note:
Required torque:
Joints 1 and 2 - 150 foot pounds
Joint 3 - 100 foot pounds

ANCHOR DETAIL

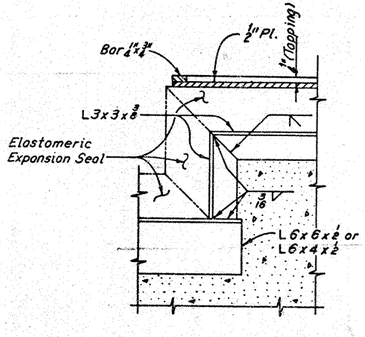



CLIPPED WASHER
*Galvanized Steel*

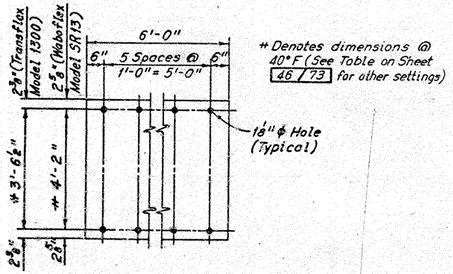
# INSTALLATION DETAILS




SECTION G-G

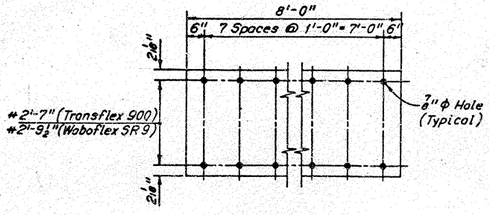



SECTION H-H




* Denotes dimensions @ 40°F (See Table on Sheet 46/73 for other settings)

EXPANSION JOINTS 1 AND 2




EXPANSION JOINT 3

3/4" PLYWOOD TEMPLATE DETAIL

**Notes:**
*For location of Section A-A and Section B-B, see Sheet 46/73.*
*For additional notes see Sheet 46/73*

*This entire sheet is superseded by sheets 46A/73 and 47/1/73.*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

DECK JOINT DETAILS AT INTERMEDIATE EXPANSION JOINTS
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN C.K.B. | TRACED D.L.R. | CHECKED A.H.S. | REVIEWED C.A.B. | REVISED |
|---|---|---|---|---|
| DATE 12-10-73 | DATE 1-16-74 | DATE 1-20-74 | DATE 4-11-74 | SHEET 47/73 |

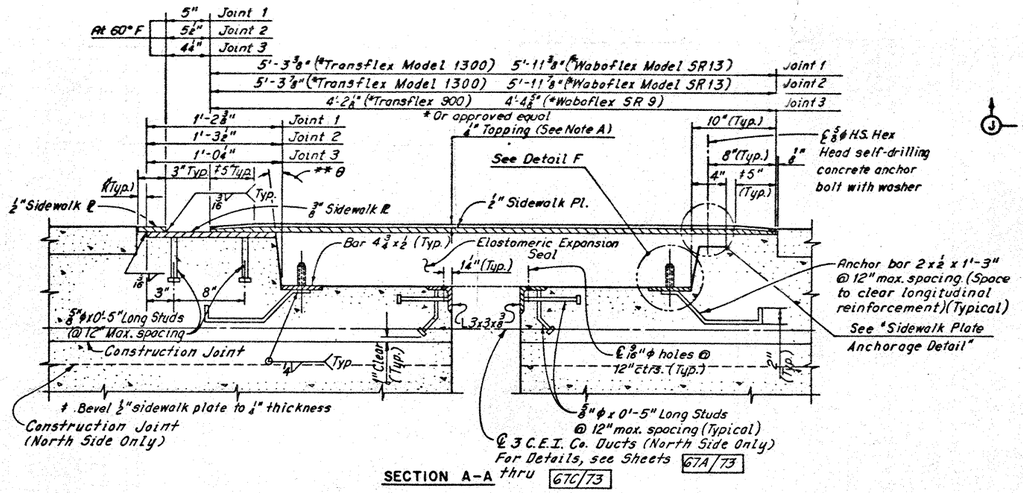
© Rev. W.E.B. 8-22-75

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

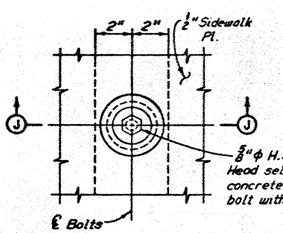
107 / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

# SIDEWALK PLATE ANCHORAGE DETAIL

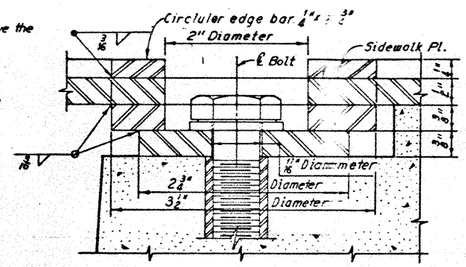



SECTION A-A



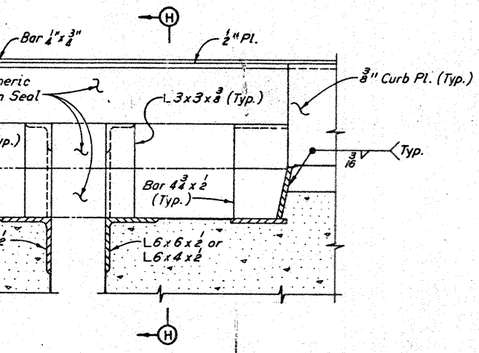

PLAN

Note:
Bolts and Washers shall have the corrosion resistance and coloring characteristics of ASTM A588 steel and all the mechanical properties of ASTM A325 High Strength Steel Bolts.

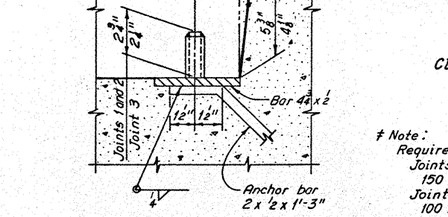



SECTION J-J

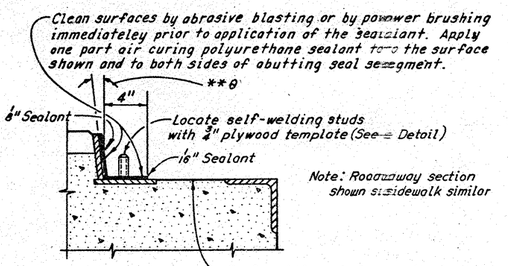
Note:
Sidewalk plates and the hardware for their anchorage are included with Item 513, Structural Steel, for payment.




SECTION B-B
(Armor support not shown)

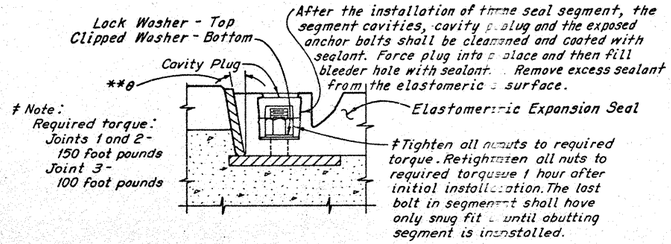



DETAIL F




Note: Roadway section shown similar to sidewalk similar

SEALING DETAIL

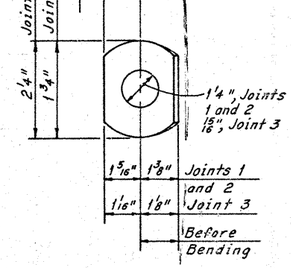



ANCHOR DETAIL

Note A:
The ¼" topping shall be a modified epoxy resembling concrete in appearance as manufactured by the Ceilcote Company, Berea, Ohio 44017, under the trade name "Corocrete A-1" or approved equal. The topping shall be applied in the shop and the surface textured to resemble a typical concrete sidewalk. Preparation of the steel surface shall be the same as for painting described in Section 514.04.

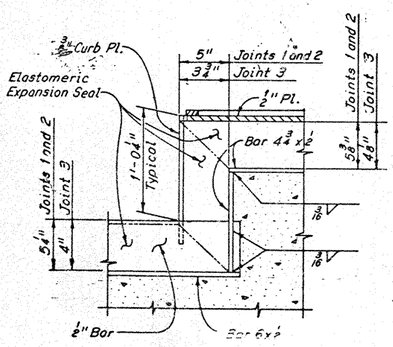
A manufacturer's representative experienced in the application of the topping will instruct the Contractor in the proper procedures for applying the topping.

The ¼" topping shall be included with Item 513, Structural Steel, for payment.

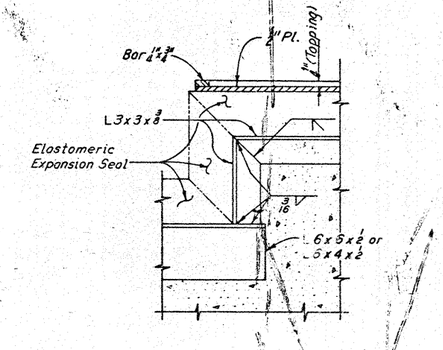



CLIPPED WASHER
Galvanized Steel

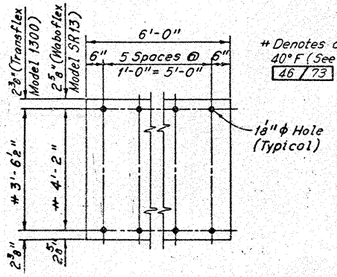
# INSTALLATION DETAILS




SECTION G-G

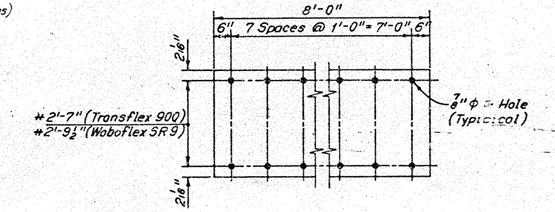



SECTION H-H




# Denotes dimensions @ 40°F (See Table on Sheet 46/73 for other settings)

EXPANSION JOINTS 1 AND 2




EXPANSION JOINT 3

Notes:
For location of Section A-A and Section B-B, see Sheet 46/73.
For additional notes see Sheet 46/73

¾" PLYWOOD TEMPLATE DETAIL

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 8-22-1975

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

DECK JOINT DETAILS AT INTERMEDIATE EXPANSION JOINTS
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

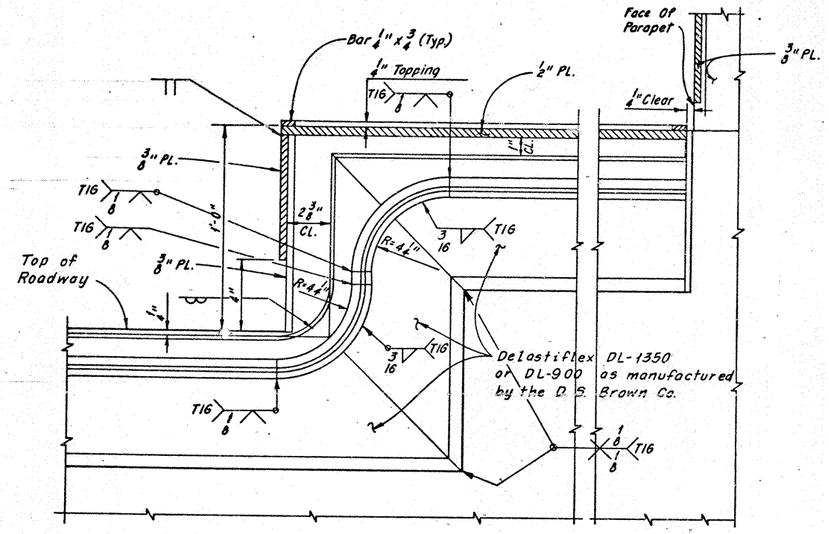
CUYAHOGA COUNTY OHIO

DRAWN C.K.B. TRACED D.L.R. CHECKED A.H.S. REVISED C.K.B. REVISED
DATE 12-10-73 DATE 1-16-74 DATE 1-20-74 DATE 4-11-74 SHEET 47/73

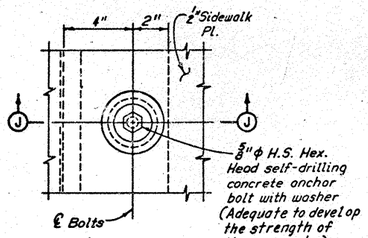
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

107A / 148

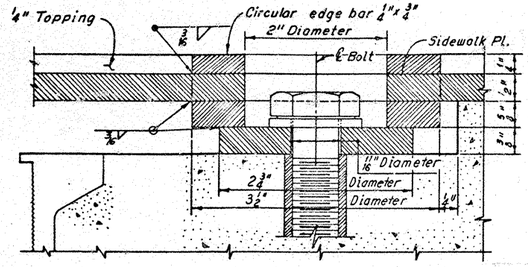
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




SECTION D-D




PLAN



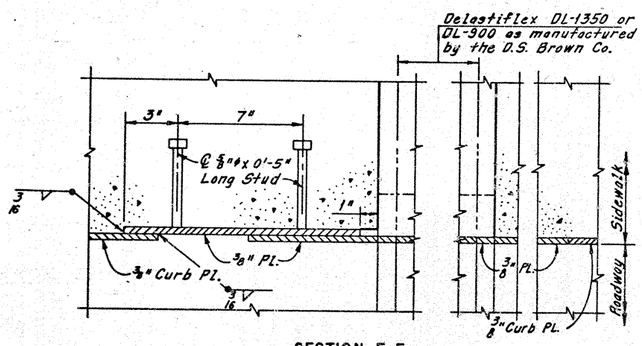

SECTION J-J

Note:
After the sidewalk plate is anchored, a No. 10 solid rubber stopper as distributed by the Philpott Rubber Company of Cleveland, Ohio - or approved equal - shall be installed in the anchor bolt cavity. The No. 10 solid rubber stopper, or approved equal, shall be included with Item 513, Structural Steel, for payment.

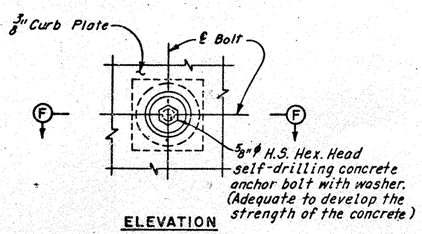
## SIDEWALK PLATE ANCHORAGE DETAIL

Note:
Bolts and Washers shall have the corrosion resistance and coloring characteristics of ASTM A588 steel and all the mechanical properties of ASTM A325 High Strength Steel Bolts.

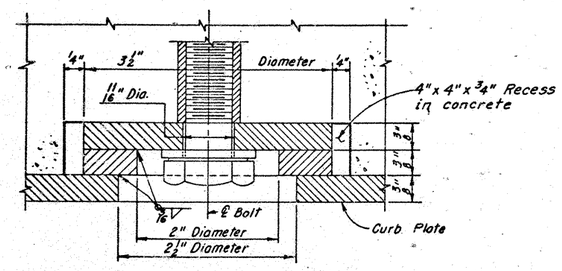
Note:
Sidewalk plates and the hardware for their anchorage are included with Item 513, Structural Steel, for payment.




SECTION E-E
(Anchor Bolt Not Shown)




ELEVATION




SECTION F-F

## CURB PLATE ANCHORAGE DETAIL

This sheet added 8-22-75 and supersedes Sheet 47/73.

Note:
For Location of Section D-D And Section E-E, See Sheet 46A/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DECK JOINT DETAILS AT INTERMEDIATE EXPANSION JOINTS
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

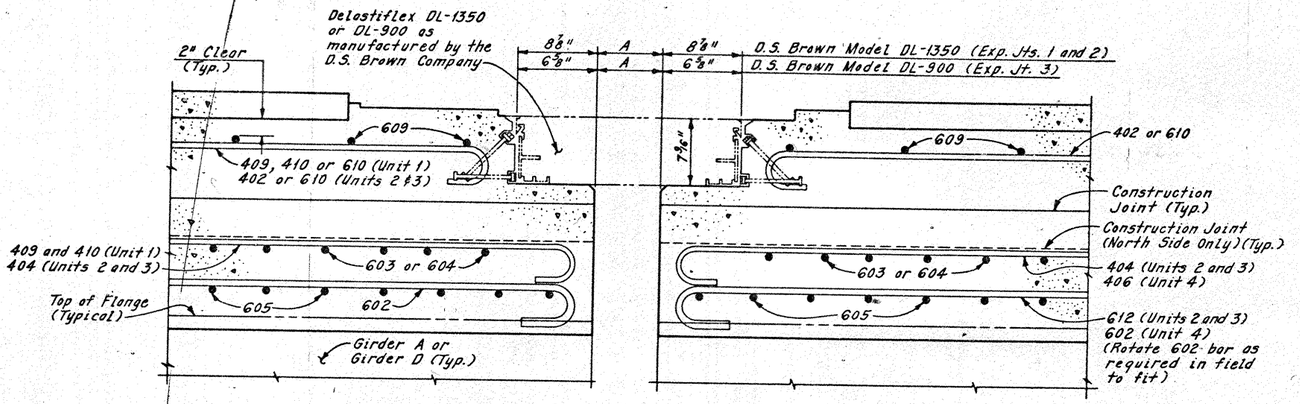
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| W.E.B. | M.E.T. | C.P. | | |
| DATE 8-15-75 | DATE 8-18-75 | DATE 8-22-75 | DATE | SHEET 47A/73 |

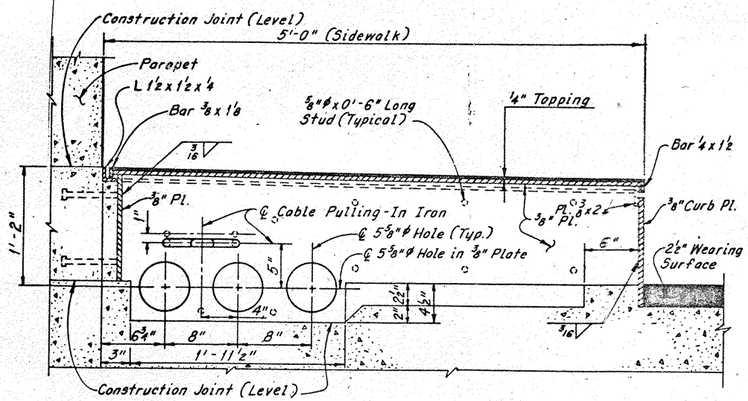
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

107B / 148

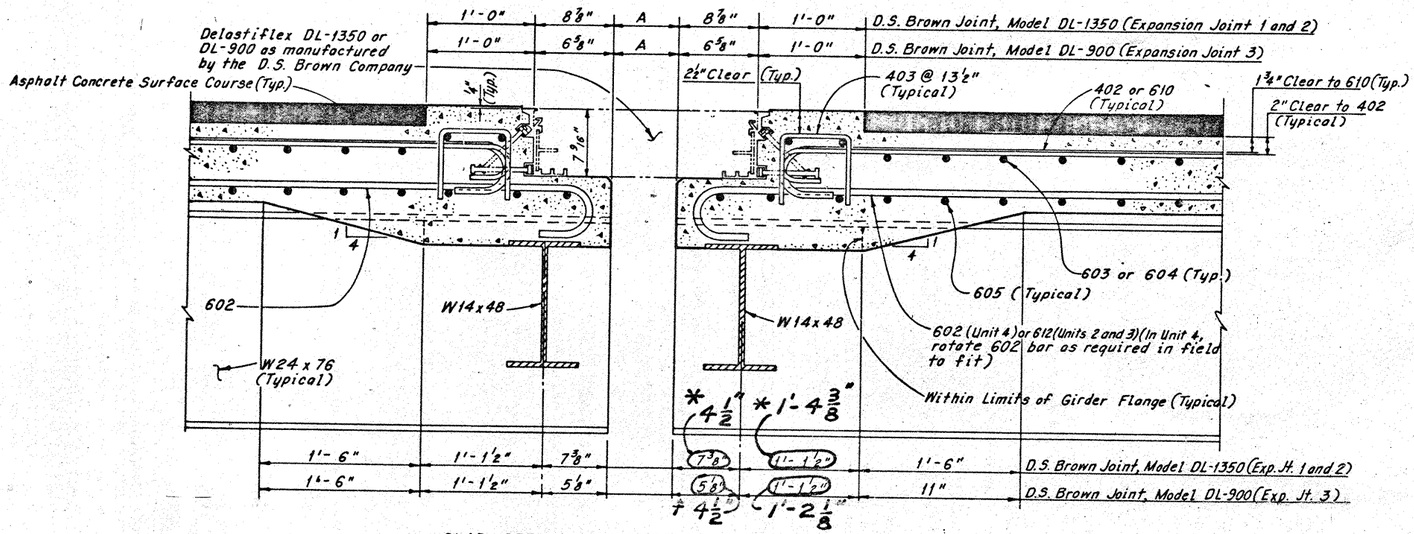
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




SIDEWALK DETAIL AT INTERMEDIATE EXPANSION JOINTS
(Looking North)
(Sidewalk plates and anchorage not shown)




SECTION C - C




SLAB DETAIL AT INTERMEDIATE EXPANSION JOINTS
(Expansion Joint 1 and 2 Shown, Expansion Joint 3, Similar except as noted)
~~(Looking North)~~

* Unit 2
† Unit 4

Notes:
For Location of Section C-C, see Sheet 61A/73.
For Dimension "A", see Sheet 46A/73

This sheet added 8-22-75 and supplements Sheets 64/73 and 67A/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DECK JOINT DETAILS AT INTERMEDIATE EXPANSION JOINTS & SPLICING CHAMBER DETAIL

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

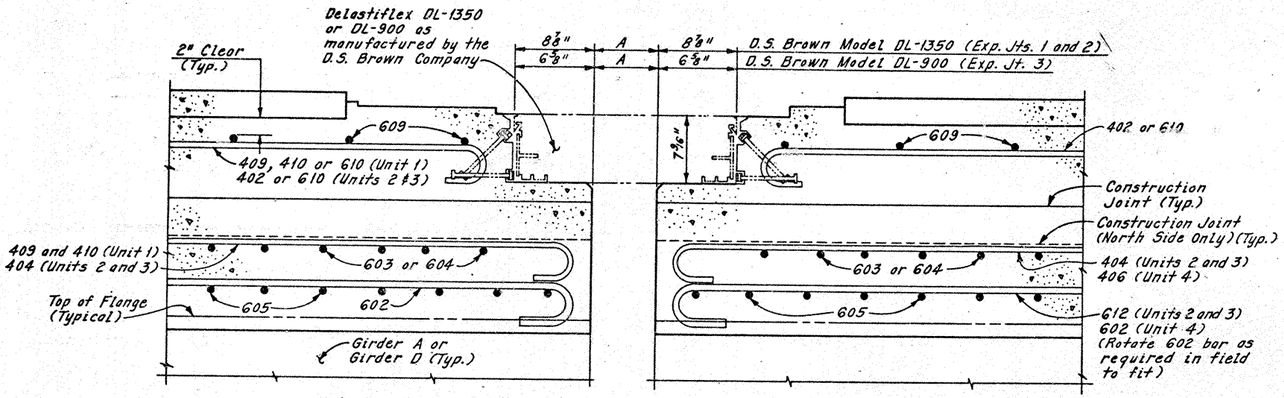
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED 10-31-75 |
|---|---|---|---|---|
| C.P.B. W.E.B. DATE 8-11-75 | C.P.B. W.E.B. DATE 8-14-75 | C.P.B. E.B. DATE 8-22-75 | C.P.B. DATE 8-22-75 | SHEET 47B/73 |

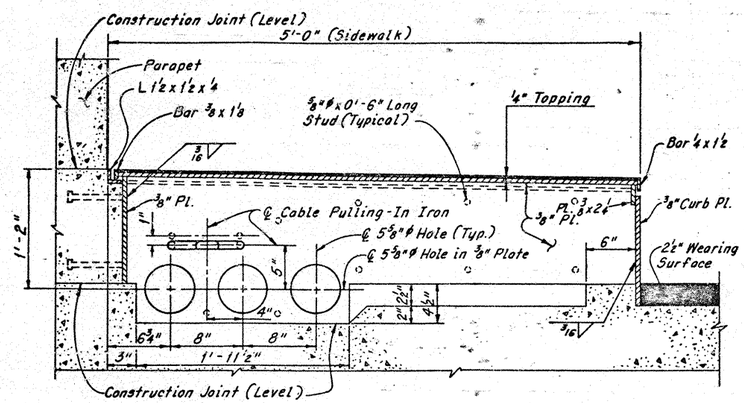
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

107B / 148

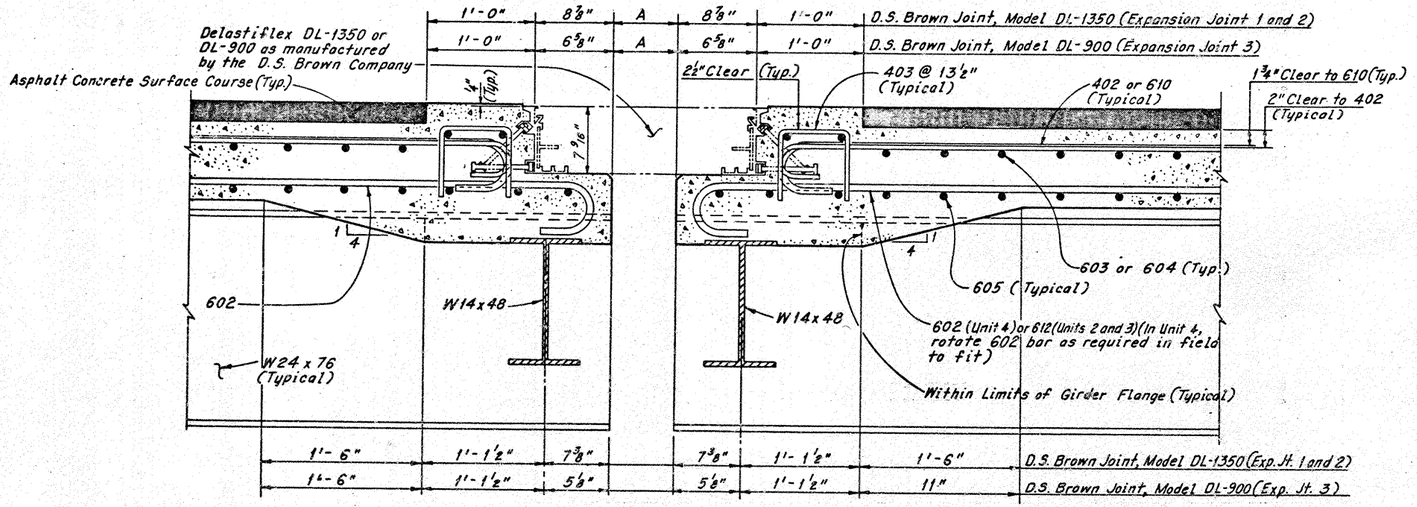
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




SIDEWALK DETAIL AT INTERMEDIATE EXPANSION JOINTS
(Looking North)
(Sidewalk plates and anchorage not shown)




SECTION C - C




SLAB DETAIL AT INTERMEDIATE EXPANSION JOINTS
(Expansion Joint 1 and 2 Shown, Expansion Joint 3, Similar except as noted)
(Looking North)

Notes:
For location of Section C-C, see Sheet 67A/73.
For Dimension "A", see Sheet 46A/73

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 10-31-1975

This sheet added 8-22-75 and supplements Sheets 64/73 and 67A/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

DECK JOINT DETAILS AT INTERMEDIATE EXPANSION JOINTS & SPLICING CHAMBER DETAIL
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.P.E. W.E.B. | C.P.E. W.E.B. | C.P.E. W.E.B. | C.A.B. | |
| DATE 8-11-75 | DATE 8-12-75 | DATE 8-22-75 | DATE 9-22-75 | |

SHEET 47B/73

| FHWA REGION | STATE | PROJECT | | |
|---|---|---|---|---|
| 5 | OHIO | | | |

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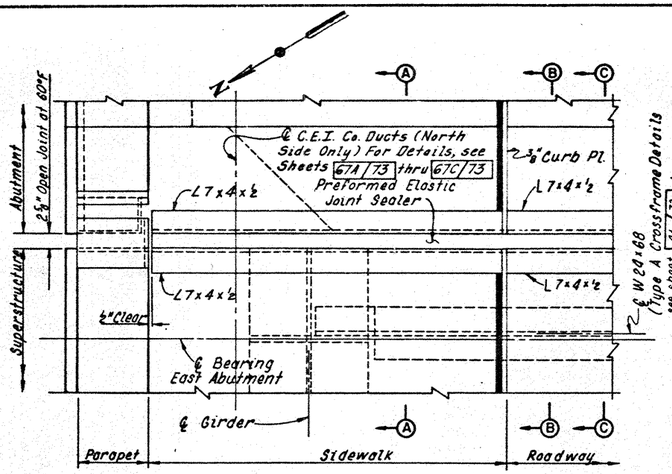
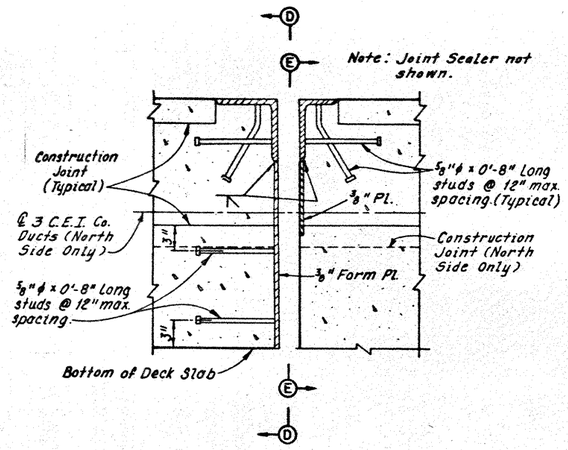
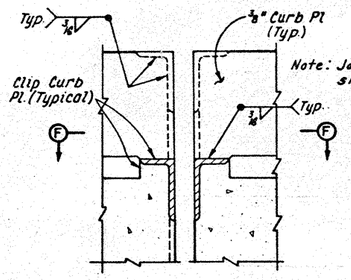
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



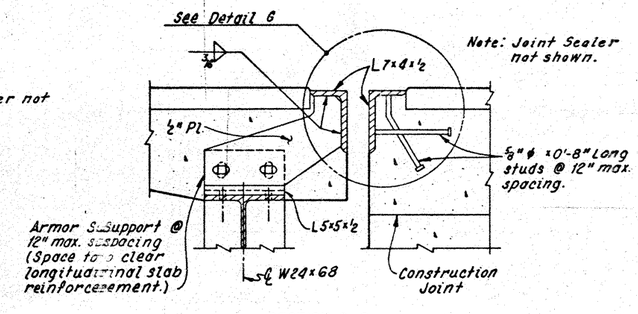

TYPICAL PART PLAN
(Armor Support and Anchor Studs not shown)



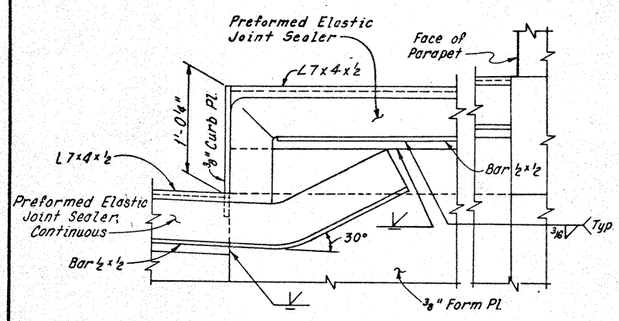

SECTION A-A
(For Details not shown, see Detail G)



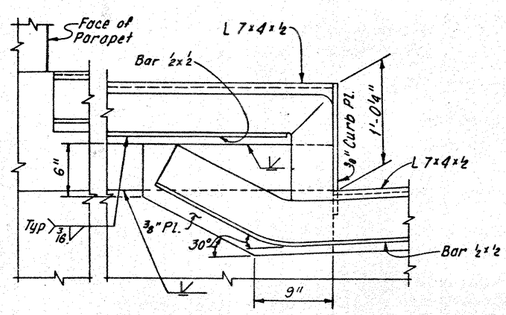

SECTION B-B



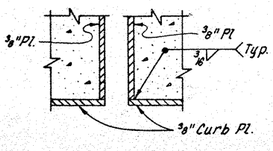

SECTION C-C



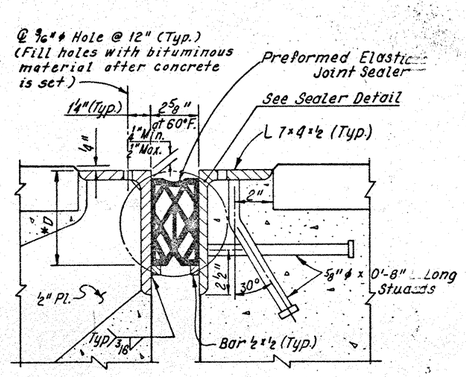

SECTION D-D




SECTION E-E
(For Details not shown, see Section D-D)

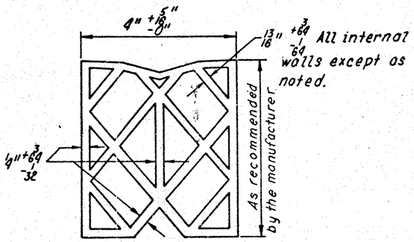



SECTION F-F
(Joint Sealer not shown)



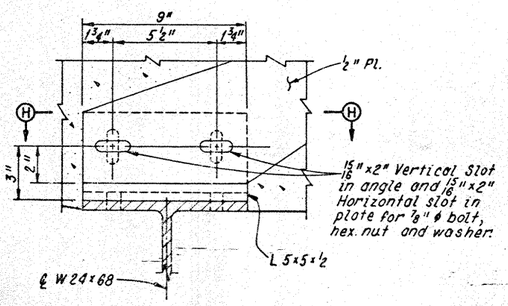

DETAIL G

* D dimension shall be as recommended by the Joint Sealer Manufacturer.

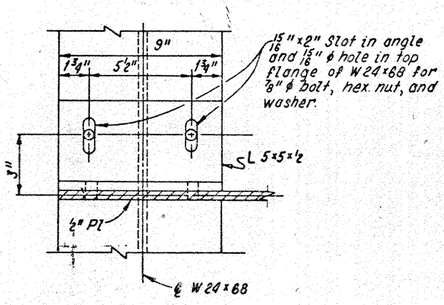



PREFORMED ELASTIC JOINT SEALER

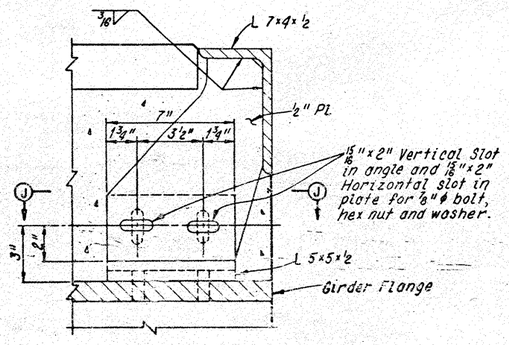
Notes:
For Sidewalk Curb Plate Detail, see Sheet 64/73.



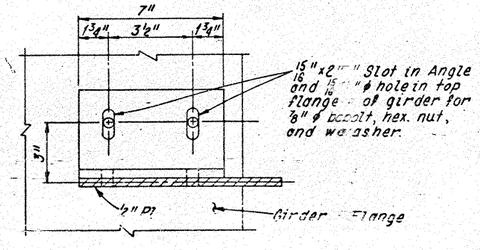

TYPICAL SECTION




SECTION H-H




TYPICAL SECTION




SECTION J-J

ARMOR SUPPORT DETAILS AT W24x68

ARMOR SUPPORT DETAILS AT GIRDERS B AND C

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DECK JOINT DETAILS AT EAST ABUTMENT

DENISON-H YARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN CKB | TRACED SJS | CHECKED JHS | QUANTITIES CKB | REVISED |
|---|---|---|---|---|
| DATE 1-19-74 | DATE 2-5-74 | DATE 3-19-74 | DATE 4-11-74 | SHEET 49/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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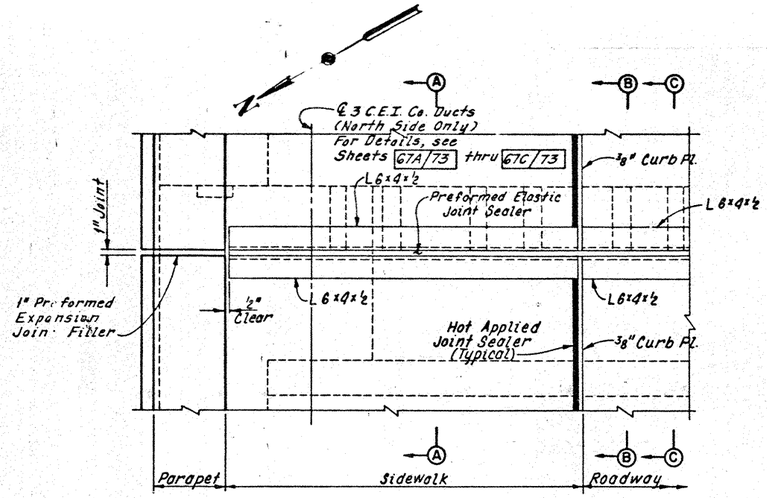
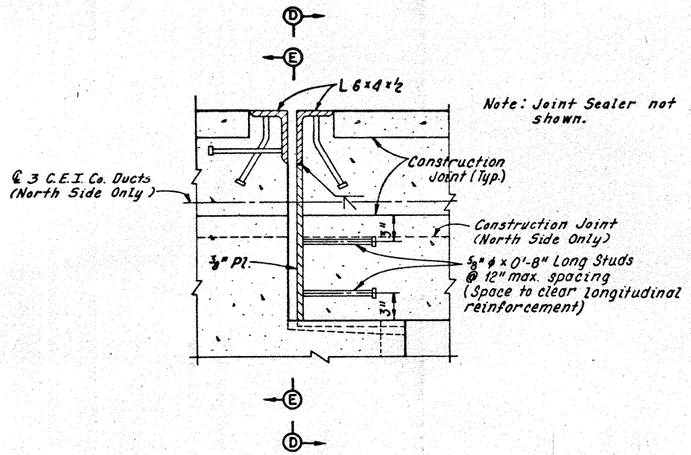
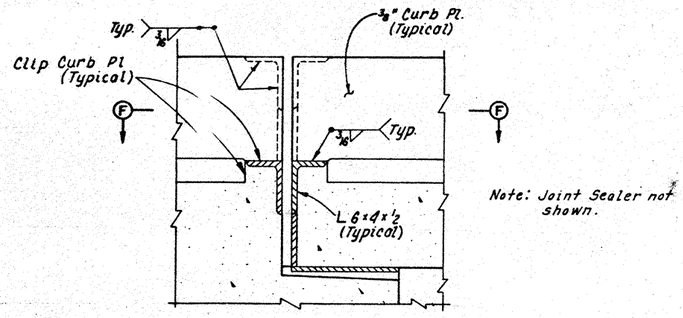
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



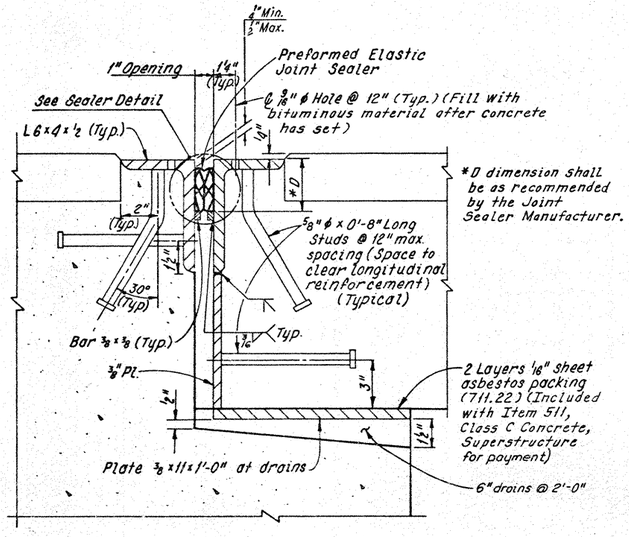

TYPICAL PART PLAN
(Armor Anchor Studs not shown)



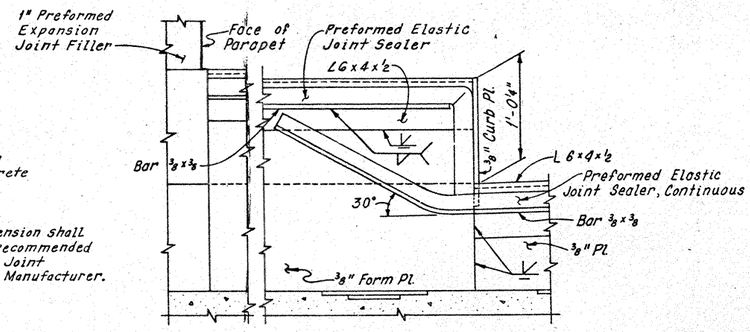

SECTION A-A
(For Details not shown, see Section C-C)



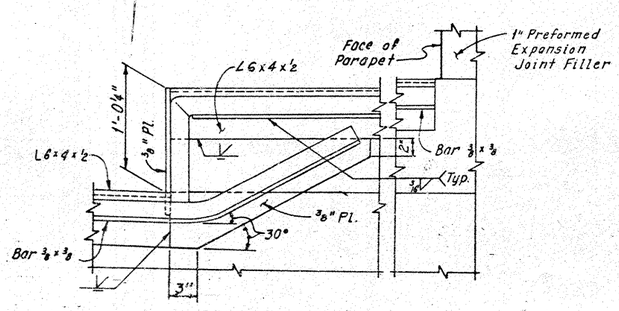

SECTON B-B
(For details not shown, see Section C-C)



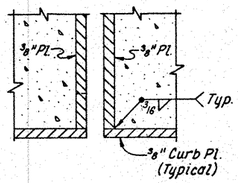

SECTION C-C



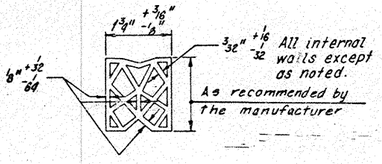

SECTION D-D




SECTION E-E
(For Details not shown, see Section D-D)




SECTION F-F
(Joint Sealer not shown)




PREFORMED ELASTIC
JOINT SEALER

Notes:
For location of Deck Joints see Sheet 12/73.
For Typical Deck Cross Section see Sheet 16/73.
For Sidewalk Curb Plate Detail see Sheet 64/73.
For additional details of Deck Joints see Sheet 17/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# CELLULAR CONSTRUCTION DECK JOINT DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN CKB | TRACED SJS | CHECKED AHS | REVIEWED CAS | REVISED |
|---|---|---|---|---|
| DATE 1-17-74 | DATE 2-4-74 | DATE 2-6-74 | DATE 4-1-74 | SHEET 45/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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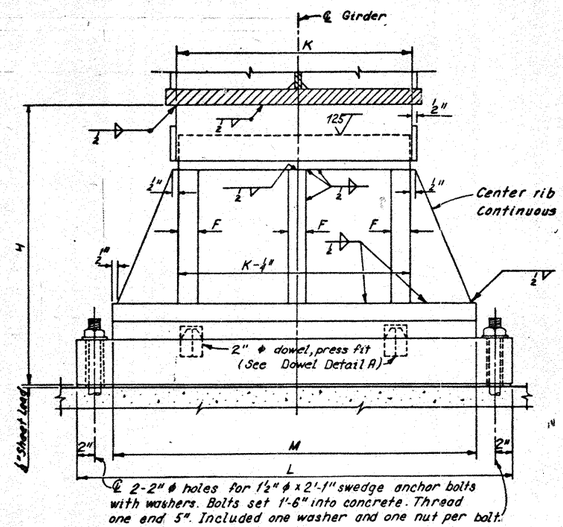
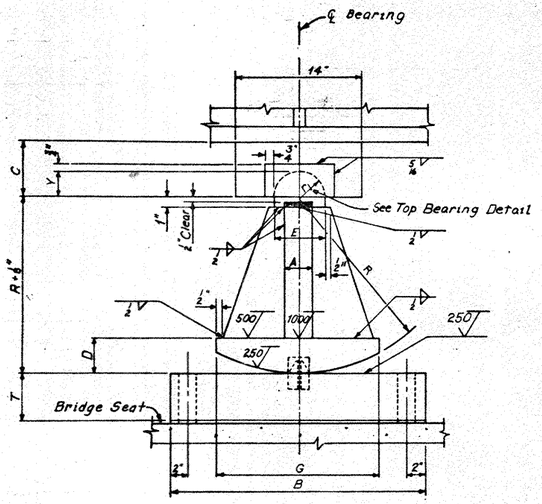
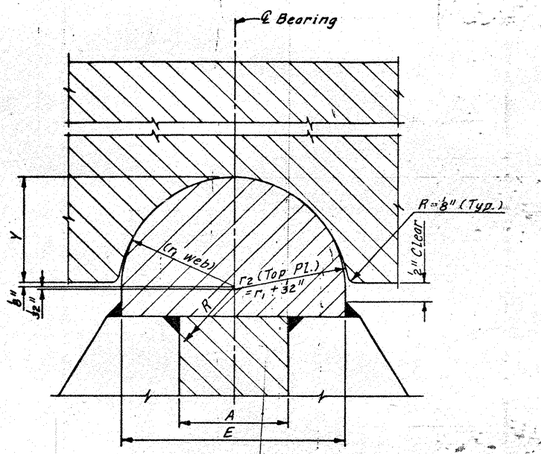
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

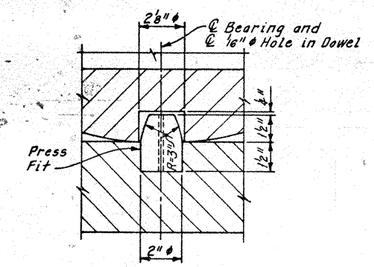



EXPANSION BEARING AT PIERS
(See Table for additional dimensions)




TOP BEARING DETAIL

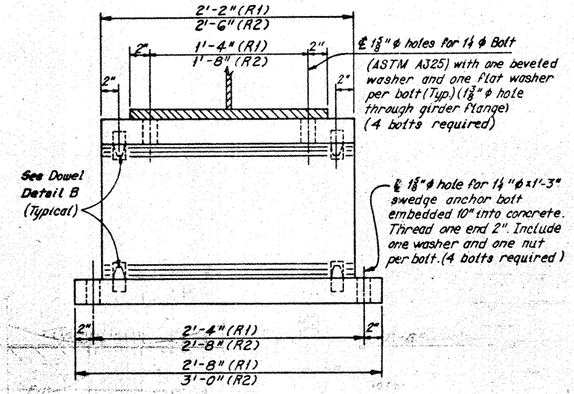



DOWEL DETAIL A

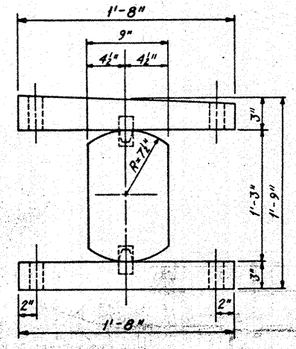
EXPANSION BEARING DIMENSIONS

| Bearing | Location | | Number Required | A | B | C | D | E | F | G | H | K | L | M | R | $r_1$ | T | Y | Weight Each (Lbs.) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E700A | Pier 5 | Girders A ℄ D | 2 | 3½" | 28" | 7¼" | 4" | 6" | 2" | 18" | 32" | 18" | 40" | 32" | 20" | 3" | 4⅜" | 2⅞" | * (3,274) | 3264 |
| E700B | Pier 11 | Girders A ℄ D | 2 | 3½" | 28" | 7¼" | 4" | 6" | 2" | 18" | 32" | 22" | 40" | 32" | 20" | 3" | 4⅜" | 2⅞" | * (3,424) | 3416 |
| E800A | Pier 5 | Girders B ℄ C | 4 | 3½" | 28" | 7⅞" | 4" | 6" | 2" | 18" | 32⅛" | 22" | 46" | 36" | 20" | 3" | 4⅝" | 2⅞" | * 3,754 | |
| | Pier 15 | Girders A ℄ D | | | | | | | | | | | | | | | | | | |
| E800B | Piers 6 ℄ 10 | Girders A ℄ D | 4 | 3½" | 28" | 7⅞" | 4" | 6" | 2" | 18" | 32⅛" | 18" | 46" | 36" | 20" | 3" | 4⅝" | 2⅞" | * (3,608) | 3599 |
| E800C | Pier 11 | Girders B ℄ C | 2 | 3½" | 28" | 7⅞" | 4" | 6" | 2" | 18" | 32⅛" | 26" | 46" | 36" | 20" | 3" | 4⅝" | 2⅞" | * (3,916) | 3907 |
| E900A | Pier 1 | Girders A ℄ D | 2 | 3½" | 28" | 7¾" | 4" | 6" | 2" | 18" | 32⅝" | 18" | 52" | 40" | 20" | 3" | 4⅜" | 2⅞" | * (4,012) | 4003 |
| E900B | Pier 15 | Girders B ℄ C | 2 | 3½" | 28" | 7¾" | 4" | 6" | 2" | 18" | 32⅝" | 26" | 52" | 40" | 20" | 3" | 4⅜" | 2⅞" | * (4,332) | 4323 |
| E1000A | Pier 1 | Girders B ℄ C | 2 | 3½" | 28" | 7¾" | 4" | 6" | 2" | 18" | 32⅜" | 22" | 52" | 44" | 20" | 3" | 5" | 2⅞" | * (4,156) | 4363 |
| E1000B | Piers 6 ℄ 10 | Girders B ℄ C | 4 | 3½" | 28" | 7¾" | 4" | 6" | 2" | 18" | 32⅜" | 20" | 52" | 44" | 20" | 3" | 5" | 2⅞" | * (4,293) | 4283 |

* Note: Weights given are total for all bearings, including high strength bolts, anchor bolts, nuts, washers and ⅛" sheet lead.

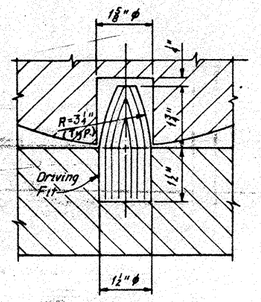



ROLLER DETAIL AT WEST ABUTMENT




EXPANSION BEARINGS AT WEST ABUTMENT

| | Number Required | Weight Each (Lbs.) | |
|---|---|---|---|
| R1 | 2 | * (870) | 1785 |
| R2 | 2 | * (1,082) | 2041 |




DOWEL DETAIL B

EAST ABUTMENT ROCKER DIMENSIONS (INCHES)

| Rocker No. | Number Required | A | B | C | D | F | G | H | K | L | M | R | T | Y | Weight Each (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R-225 | 2 | 3 | 17 | 3½ | 2¾ | ⅜ | 9 | 16⅞ | 13 | 25 | 22 | 11 | 2¼ | 1 7/16 | * 669 |
| R-300 | 2 | 3¾ | 20 | 3½ | 3¼ | ⅜ | 12 | 19⅛ | 14 | 28 | 25 | 12½ | 3 | 1 11/16 | * 1046 |

Note: For dimension locations and details of Rockers, see Ohio Standard Drawing RB-1-55, revised 2-2-59.

Note:
For Notes see Sheet 51/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

EXPANSION BEARINGS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN DHS | TRACED SJS | CHECKED AHS | REVIEWED CAB | REVISED 4-30-75 |
|---|---|---|---|---|
| DATE 12-2-73 | DATE 12-10-73 | DATE 1-23-74 | DATE 4-11-74 | SHEET 50/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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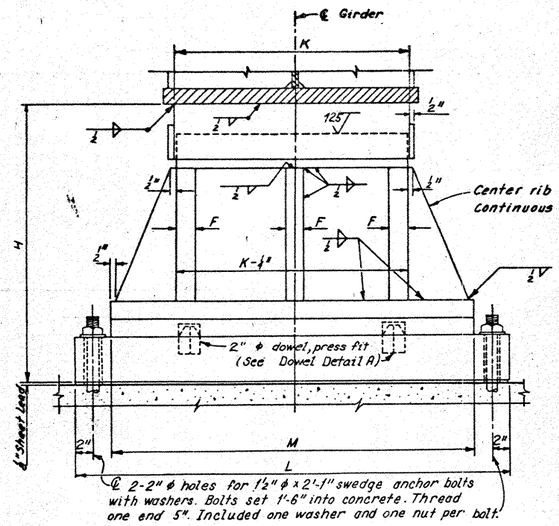
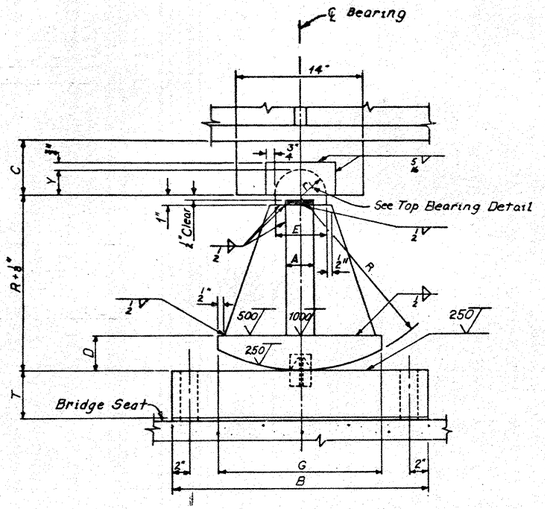
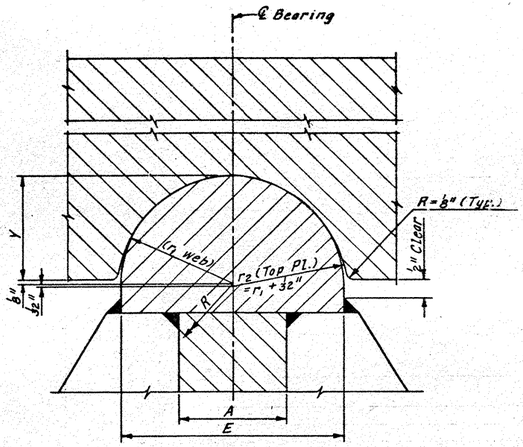
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

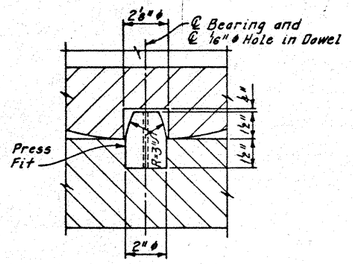



EXPANSION BEARING AT PIERS
(See Table for additional dimensions)



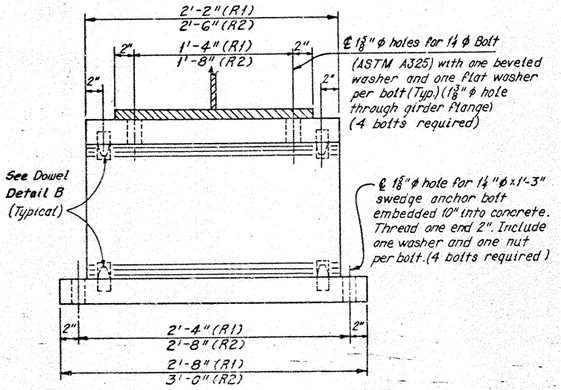

TOP BEARING DETAIL



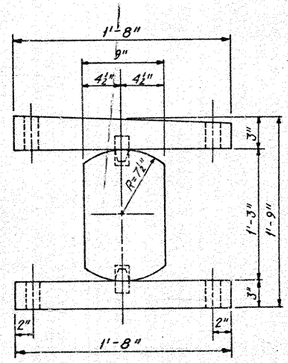

DOWEL DETAIL A

| EXPANSION BEARING DIMENSIONS | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bearing | Location | | Number Required | A | B | C | D | E | F | G | H | K | L | M | R | $r_1$ | T | Y | Weight Each (Lbs.) |
| E700A | Pier 5 | Girders A & D | 2 | 3½" | 28" | 7¼" | 4" | 6" | 2" | 18" | 32" | 18" | 40" | 32" | 20" | 3" | 4⅝" | 2⅞" | * 3,274 |
| E700B | Pier 11 | Girders A & D | 2 | 3½" | 28" | 7¼" | 4" | 6" | 2" | 18" | 32" | 22" | 40" | 32" | 20" | 3" | 4⅝" | 2⅞" | * 3,424 |
| E800A | Pier 5 | Girders B & C | 4 | 3½" | 28" | 7⅜" | 4" | 6" | 2" | 18" | 32⅛" | 22" | 46" | 36" | 20" | 3" | 4⅝" | 2⅞" | * 3,754 |
| | Pier 15 | Girders A & D | | | | | | | | | | | | | | | | | |
| E800B | Piers 6 & 10 | Girders A & D | 4 | 3½" | 28" | 7⅜" | 4" | 6" | 2" | 18" | 32⅛" | 18" | 46" | 36" | 20" | 3" | 4⅝" | 2⅞" | * 3,608 |
| E800C | Pier 11 | Girders B & C | 2 | 3½" | 28" | 7⅜" | 4" | 6" | 2" | 18" | 32⅛" | 26" | 46" | 36" | 20" | 3" | 4⅝" | 2⅞" | * 3,916 |
| E900A | Pier 1 | Girders A & D | 2 | 3½" | 28" | 7¾" | 4" | 6" | 2" | 18" | 32⅝" | 18" | 52" | 40" | 20" | 3" | 4¾" | 2⅞" | * 4,012 |
| E900B | Pier 15 | Girders B & C | 2 | 3½" | 28" | 7¾" | 4" | 6" | 2" | 18" | 32⅝" | 26" | 52" | 40" | 20" | 3" | 4¾" | 2⅞" | * 4,332 |
| E1000A | Pier 1 | Girders B & C | 2 | 3½" | 28" | 7¾" | 4" | 6" | 2" | 18" | 32⅞" | 22" | 52" | 44" | 20" | 3" | 5" | 2⅞" | * 4,154 |
| E1000B | Piers 6&10 | Girders B & C | 4 | 3½" | 28" | 7¾" | 4" | 6" | 2" | 18" | 32⅞" | 20" | 52" | 44" | 20" | 3" | 5" | 2⅞" | * 4,293 |

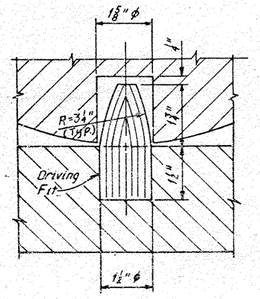
* Note: Weights given are total for all bearings, including high strength bolts, anchor bolts, nuts, washers and ⅛" sheet lead.




ROLLER DETAIL AT WEST ABUTMENT




| EXPANSION BEARINGS AT WEST ABUTMENT | | |
|---|---|---|
| | Number Required | Weight Each (Lbs.) |
| R1 | 2 | * 3,570 |
| R2 | 2 | * 4,082 |




DOWEL DETAIL B

| EAST ABUTMENT ROCKER DIMENSIONS (INCHES) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rocker No. | Number Required | A | B | C | D | F | G | H | K | L | M | R | T | Y | Weight Each (Lbs.) |
| R-225 | 2 | 3 | 17 | 3½ | 2¾ | ⅝ | 9 | 16⅞ | 13 | 25 | 22 | 11 | 2¼ | 1 7/16 | * 669 |
| R-300 | 2 | 3½ | 20 | 3½ | 3¼ | ¾ | 12 | 19⅛ | 14 | 28 | 25 | 12½ | 3 | 1 11/16 | *1046 |

Note: For dimension locations and details of Rockers, see Ohio Standard Drawing RB-1-55, revised 2-2-59.

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 4-30 1975

Note:
For Notes see Sheet 51/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

EXPANSION BEARINGS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN DHS | TRACED SJS | CHECKED AHS | REVIEWED | REVISED |
|---|---|---|---|---|
| DATE 12-2-73 | DATE 12-10-73 | DATE 1-23-74 | DATE 4-11-74 | SHEET 50/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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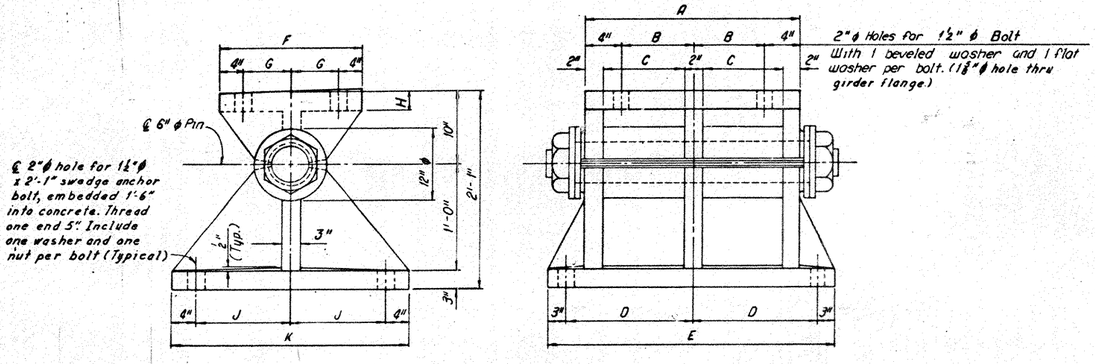
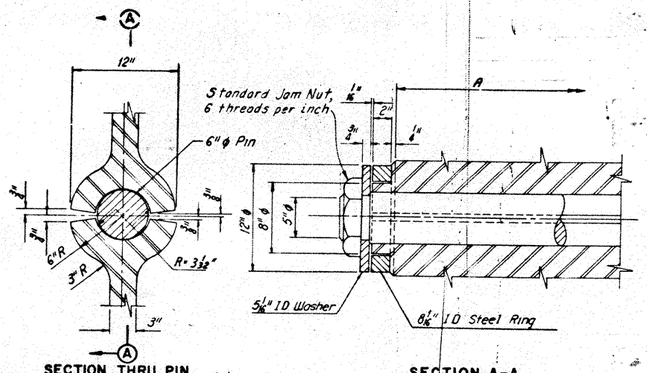
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




2" ϕ Holes for 1½" ϕ Bolt With 1 beveled washer and 1 flat washer per bolt. (1⅜" ϕ hole thru girder flange)

**FIXED BEARING AT PIERS**
*(See table for additional dimensions)*




**6" ϕ PIN DETAILS**

**FIXED BEARING DIMENSIONS**

| Bearing | Location | Number Required | A | B | C | D | E | F | G | H | J | K | Weight Each (Lbs.) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F800 | Piers 2, 7, 8, 9 & 16 Girders A & D | 10 | 1'-8" | 6" | 7" | 1'-1" | 2'-8" | 1'-6" | 5" | 2½" | 9" | 2'-2" | *2,433 | 2267 |
| F900 | Piers 16 Girders B & C / Piers 3 & 4 Girders A & D | 6 | 1'-8" | 6" | 7" | 1'-1" | 2'-8" | 1'-8" | 6" | 3" | 11" | 2'-6" | *2,726 | 2520 |
| F1000 | Piers 2, 7, 8 & 9 Girders B & C | 8 | 1'-10" | 7" | 8" | 1'-2" | 2'-10" | 1'-8" | 6" | 3" | 12" | 2'-8" | *2,970 | 2766 |
| F1100 | Piers 3 & 4 Girders B & C / Piers 12 & 13, Girders A & D | 8 | 2'-0" | 8" | 9" | 1'-3" | 3'-0" | 1'-8" | 6" | 3½" | 12" | 2'-8" | *3,183 | 2981 |
| F1200 | Pier 14, Girders A & D | 2 | 2'-0" | 8" | 9" | 1'-3" | 3'-0" | 1'-8" | 6" | 3½" | 1'-2" | 3'-0" | *3,353 | 3125 |
| F1300 | Piers 12 & 13, Girders B & C | 4 | 2'-4" | 10" | 11" | 1'-5" | 3'-4" | 1'-8" | 6" | 3¾" | 1'-1" | 2'-10" | *3,646 | 3447 |
| F1400 | Pier 14, Girders B & C | 2 | 2'-4" | 10" | 11" | 1'-5" | 3'-4" | 1'-10" | 7" | 3¾" | 1'-3" | 3'-2" | *3,899 | 3702 |

*Note: Weights given are total for all bearings, including high strength bolts, anchor bolts, nuts, washers and ¼" sheet lead.

*Notes:*

*All castings shall be ASTM A296 Class CA-15 Cast Steel, with a 65,000 p.s.i. minimum yield point. All fillets shall be ¾" radius, except as shown.*

*All pins, rollers and base plates under the rollers shall be ASTM A237, Class B Steel Forgings, with 55,000 p.s.i. minimum yield point, with the corrosion resistance and coloring characteristics of ASTM A588 steel.*

*All rockers shall be ASTM A588.*

*All nuts, bolts, washers and rings shall be ASTM A325 with the corrosion resistance and coloring characteristics of ASTM A588 steel.*

*Provide ¼" sheet lead between masonry and bearing and fill space around anchor bolts with molten lead before placing nuts.*

*All base plates and castings shall be scribed with longitudinal and transverse center lines.*

*Bevel top sole plate to match grade.*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# FIXED BEARINGS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN DHS | TRACED SJS | CHECKED AHS | REVIEWED CAB | REVISED 4-30-75 |
|---|---|---|---|---|
| DATE 12-2-74 | DATE 12-9-74 | DATE 1-23-74 | DATE 4/4/74 | SHEET 61 of 73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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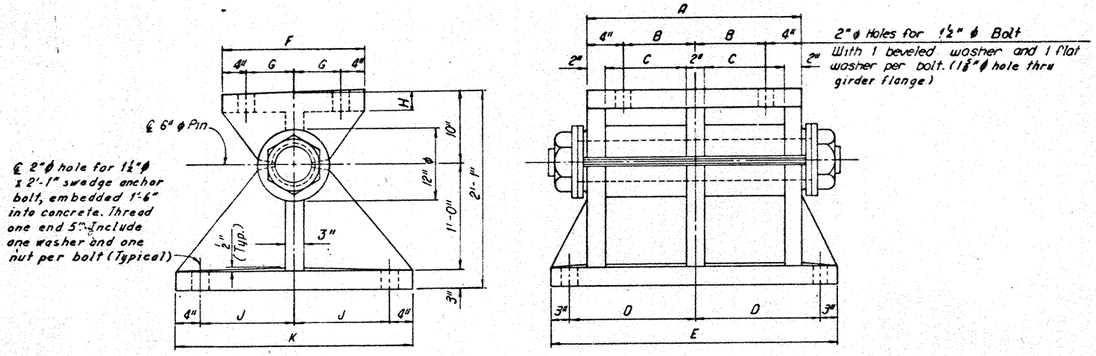
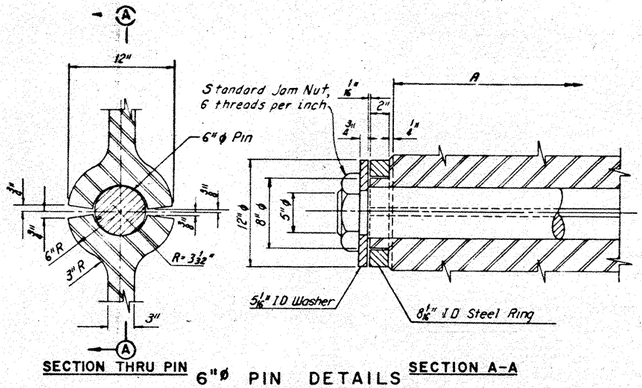
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




FIXED BEARING AT PIERS
*(See table for additional dimensions)*




SECTION THRU PIN — 6" ϕ PIN DETAILS — SECTION A-A

| FIXED BEARING DIMENSIONS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bearing | Location | Number Required | A | B | C | D | E | F | G | H | J | K | Weight Each (Lbs.) |
| F800 | Piers 2, 7, 8, 9 & 16 Girders A & D | 10 | 1'-8" | 6" | 7" | 1'-1" | 2'-8" | 1'-6" | 5" | 2¼" | 9" | 2'-2" | *2,433 |
| F900 | Piers 16 Girders B & C / Piers 3 & 4 Girders A & D | 6 | 1'-8" | 6" | 7" | 1'-1" | 2'-8" | 1'-8" | 6" | 3" | 11" | 2'-6" | *2,726 |
| F1000 | Piers 2, 7, 8, & 9 Girders B & C | 8 | 1'-10" | 7" | 8" | 1'-2" | 2'-10" | 1'-8" | 6" | 3" | 12" | 2'-8" | *2,970 |
| F1100 | Piers 3 & 4, Girders B & C / Piers 12 & 13, Girders A & D | 8 | 2'-0" | 8" | 9" | 1'-3" | 3'-0" | 1'-8" | 6" | 3¼" | 12" | 2'-8" | *3,183 |
| F1200 | Pier 14, Girders A & D | 2 | 2'-0" | 8" | 9" | 1'-3" | 3'-0" | 1'-8" | 6" | 3½" | 1'-2" | 3'-0" | *3,353 |
| F1300 | Piers 12 & 13, Girders B & C | 4 | 2'-4" | 10" | 11" | 1'-5" | 3'-4" | 1'-8" | 6" | 3¾" | 1'-1" | 2'-10" | *3,646 |
| F1400 | Pier 14, Girders B & C | 2 | 2'-4" | 10" | 11" | 1'-5" | 3'-4" | 1'-10" | 7" | 3¾" | 1'-3" | 3'-2" | *3,899 |

*Note: Weights given are total for all bearings, including high strength bolts, anchor bolts, nuts, washers and ⅛" sheet lead.

*Notes:*

*All castings shall be ASTM A296 Class CA-15 Cast Steel, with a 65,000 p.s.i. minimum yield point. All fillets shall be ¾" radius, except as shown.*

*All pins, rollers and base plates under the rollers shall be ASTM A237, Class B Steel Forgings, with 55,000 p.s.i. minimum yield point, with the corrosion resistance and coloring characteristics of ASTM A588 steel.*

*All rockers shall be ASTM A588.*

*All nuts, bolts, washers and rings shall be ASTM A325 with the corrosion resistance and coloring characteristics of ASTM A588 steel.*

*Provide ⅛" sheet lead between masonry and bearing and fill space around anchor bolts with molten lead before placing nuts.*

*All base plates and castings shall be scribed with longitudinal and transverse center lines.*

*Bevel top sole plate to match grade.*

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 4-30 1975

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

FIXED BEARINGS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

DRAWN DHS | TRACED JS | CHECKED | REVIEWED DJB | REVISED
DATE 12-2-74 | DATE 12-9-74 | DATE 1-23-74 | DATE 4-11-74 | SHEET 51 OF 73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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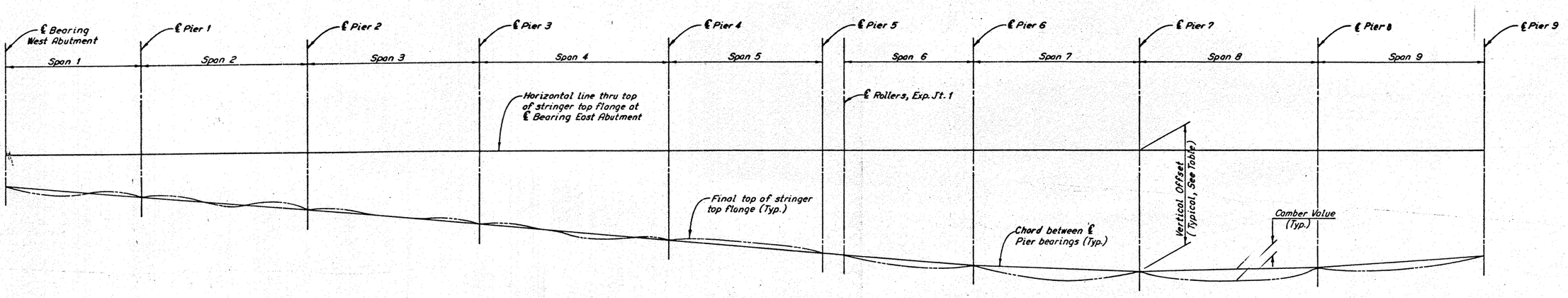
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




**CAMBER DIAGRAM**
*(Stringer 2 Shown)*

**CAMBER TABLE – UNIT 1**

| STRINGER | SPAN 1 | | | | | | | | | | | SPAN 2 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .1 | .2 | .3 | F.S. | .4 | .5 | .6 | .7 | B.P. | .8 | .9 | .1 | .2 | B.P. | .3 | .4 | F.S. | .5 | .6 | .7 | B.P. | .8 | .9 |
| 1 | 3/8 | 5/8 | 5/8 | 9/16 | 1/2 | 7/16 | 7/16 | 1/2 | 1/2 | 5/16 | 1/8 | 1/16 | 1/8 | 1/8 | 1/16 | -1/16 | -1/16 | -1/16 | -1/16 | 1/16 | 3/16 | 1/8 | 1/16 |
| 2 | -1/8 | -3/16 | -3/16 | -3/16 | -3/16 | -1/8 | 0 | 1/8 | 1/16 | 1/16 | 0 | 1/16 | 1/8 | 3/16 | 1/16 | -1/16 | -1/16 | -1/16 | -1/16 | 1/16 | 1/8 | 1/8 | 1/16 |
| 3 | -5/16 | -1/16 | -1 | -1 | -1/8 | -11/16 | -7/16 | -3/16 | -3/16 | -1/8 | -1/8 | 0 | 1/8 | 3/16 | 1/16 | 0 | -1/16 | -1/16 | 0 | 1/16 | 1/16 | 1/8 | 1/16 |

| STRINGER | SPAN 3 | | | | | | | | | | | SPAN 4 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .1 | .2 | .3 | .4 | F.S. | .5 | .6 | .7 | B.P. | .8 | .9 | .1 | .2 | B.P. | .3 | .4 | F.S. | .5 | .6 | .7 | B.P. | .8 | .9 |
| 1 | 1/16 | 1/8 | 3/16 | 1/8 | 0 | 0 | -1/16 | 0 | 1/8 | 3/16 | 1/8 | 1/16 | 1/16 | 3/16 | 1/8 | -1/16 | -1/8 | -3/16 | -1/16 | -1/8 | -1/16 | 3/16 | 1/8 | 1/16 |
| 2 | 1/16 | 1/8 | 3/16 | 1/8 | 0 | 0 | 0 | 0 | 1/8 | 3/16 | 1/8 | 1/16 | 1/16 | 3/16 | 1/8 | 0 | -1/8 | -3/16 | -3/16 | -1/8 | 0 | 3/16 | 1/8 | 1/16 |
| 3 | 1/16 | 1/8 | 3/16 | 1/8 | 0 | 0 | 0 | 0 | 1/8 | 3/16 | 1/8 | 1/16 | 1/16 | 3/16 | 1/16 | 0 | -1/8 | -3/16 | -3/16 | -1/8 | 0 | 3/16 | 1/8 | 1/16 |

**VERTICAL OFFSETS AT PIERS**

| UNIT | 1 | | | | | | | 2 | | | | | | 3 | | | | | | 4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BEARING PT. | W. ABUT. | P.1 | P.2 | P.3 | P.4 | P.5 | ℄ Rollers Exp. Jt. 1 | P.6 | P.7 | P.8 | P.9 | P.10 | ℄ Rollers Exp. Jt. 2 | P.11 | P.12 | P.13 | P.14 | P.15 | ℄ Rollers Exp. Jt. 3 | P.16 |
| STRINGER 1 | -2'-4 13/16" | -3'-6 7/16" | -5'-0 3/4" | -6'-7 5/8" | -8'-4 3/16" | -9'-9 7/16" | -10'-0 5/8" | -11'-6 5/16" | -12'-9 1/16" | | | | | | | | | | | | |
| STRINGER 2 | -3'-4 1/16" | -4'-7 1/4" | -6'-1 1/16" | -7'-8 5/16" | -9'-4 1/16" | -10'-9 5/8" | -11'-0 1/8" | -12'-1 1/16" | -12'-10 5/16" | -12'-4 1/16" | -11'-1 3/8" | -9'-10 1/16" | -8'-9 7/16" | -8'-7 11/16" | -7'-2 7/16" | -5'-5 3/4" | -3'-8 5/16" | -2'-1 1/4" | -1'-11 5/8" | -0'-11 13/16" |
| STRINGER 3 | -3'-8 7/16" | -5'-0 13/16" | -6'-7 3/16" | -8'-1 15/16" | -9'-10 9/16" | -11'-2 1/16" | -11'-4 3/16" | -12'-1 1/16" | -12'-10 5/16" | | | | | | | | | | | | |

**CAMBER TABLE – UNIT 1**

| STRINGER | SPAN 5 | | | | | | | | | | | ℄ Roller Exp. Jt. 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .1 | .2 | B.P. | .3 | .4 | .5 | .6 | B.P. | .7 | .8 | .9 | |
| 1 | 1/16 | 3/16 | | 5/16 | 5/16 | 5/16 | 7/16 | 5/8 | 9/16 | 9/16 | 7/16 | 0 |
| 2 | 0 | 1/8 | | 1/16 | 1/16 | 1/16 | 1/16 | 5/16 | 3/16 | 1/8 | 0 | 0 |
| 3 | 0 | 0 | | 0 | -1/8 | -3/16 | -1/4 | -3/16 | -1/4 | -5/16 | -3/8 | 0 |

**CAMBER TABLE – UNIT 2**

| STRINGER | SPAN 6 | | | | | | | | | | | SPAN 7 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .1 | .2 | .3 | .4 | F.S. | .5 | .6 | .7 | B.P. | .8 | .9 | .1 | F.S. | .2 | .3 | .4 | .5 | .6 | F.S. | .7 | .8 | .9 |
| 1 | -1/8 | -1/16 | -1/8 | -1/8 | -1/4 | -1/8 | -3/16 | -1/8 | -3/16 | -1/8 | -1/8 | -1/8 | -1 1/4 | -1 5/8 | -2 1/8 | -2 1/4 | -2 1/4 | -2 1/16 | -2 1/16 | -1 7/8 | -1 5/16 | -1/16 |
| 2 | -1/8 | -3/16 | -1/4 | -1/4 | -1/4 | -1/4 | -1/4 | -1/4 | -1/4 | -1/4 | -1/8 | -1/8 | -1 | -1 1/4 | -1 1/16 | -1 5/8 | -1 11/16 | -1 7/8 | -1 7/8 | -1 1/16 | -1 1/16 | -1/8 |
| 3 | 1/16 | 1/8 | 1/4 | 3/8 | 3/8 | 1/2 | 1/16 | 1/8 | 1/8 | 1/16 | 1/4 | -1/8 | -1 | -1 1/8 | -1 1/16 | -1 5/8 | -1 11/16 | -1 7/8 | -1 7/8 | -1 1/16 | -1 1/16 | -1/8 |

| STRINGER | SPAN 8 | | | | | | | | | | | SPAN 9 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F.S. | .1 | .2 | .3 | .4 | F.S. | .5 | .6 | .7 | .8 | F.S. | .9 | .1 | .2 | F.S. | .3 | .4 | .5 | .6 | F.S. | .7 | .8 | .9 |
| 1 | -1 5/16 | -1/8 | -1 1/8 | -2 1/16 | -2 1/4 | -2 1/4 | -2 3/16 | -2 1/16 | -1 13/16 | -1 5/16 | -1 1/16 | -1/16 | -1/4 | -5/16 | -5/16 | -5/16 | -1/4 | -1/8 | -3/16 | -1/8 | -1/8 | -1/16 | -1/16 |
| 2 | -1 1/16 | -3/16 | -1 1/8 | -1 7/16 | -1 5/8 | -1 11/16 | -1 7/8 | -1 7/8 | -1 5/8 | -1 1/16 | -1 1/16 | -1/8 | -1/4 | -5/16 | -5/16 | -5/16 | -1/4 | -3/16 | -3/16 | -1/8 | -1/8 | -1/16 | -1/16 |
| 3 | -1 1/16 | -3/16 | -1 1/16 | -1 7/16 | -1 5/8 | -1 11/16 | -1 7/8 | -1 7/8 | -1 5/8 | -1 1/16 | -1 1/16 | -1/8 | -1/4 | -5/16 | -5/16 | -5/16 | -1/4 | -1/8 | -3/16 | -1/8 | -1/8 | -1/16 | -1/16 |

*Notes: Negative values indicate camber below the chord line.*
*Camber required is only for either concavity or convexity.*
*Camber is not required for Spans 10 thru 17.*
*Concavities or Convexities are given to the nearest inch.*
*The following abbreviations are used:*
*B.P. = Bend Point*
*F.S. = Field Splice*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

**STRINGER CAMBER DIAGRAM**

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

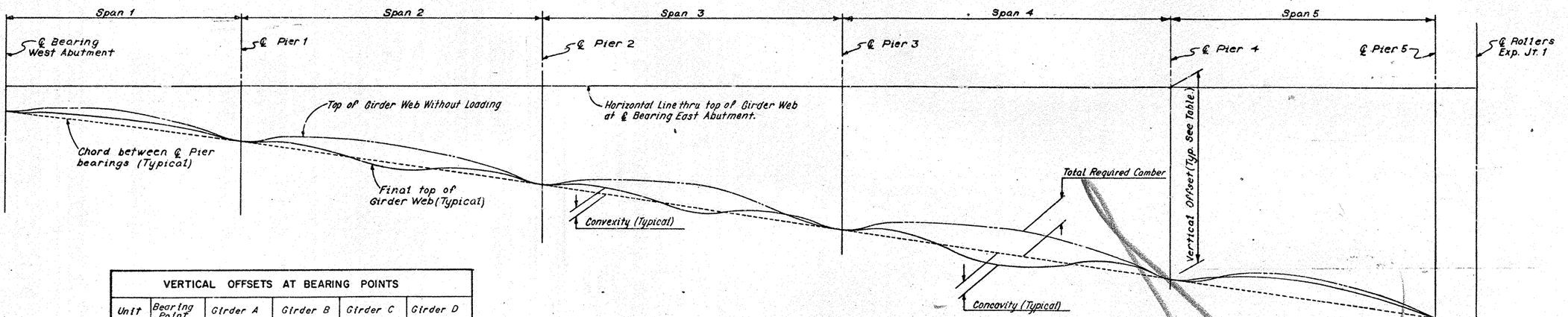
CUYAHOGA COUNTY OHIO

DRAWN DHS | TRACED D. F. | CHK. | AS BUILT REVISED | REVISED
DATE 11-20-73 | DATE 11-21-73 | DATE 12-7-73 | DATE 4-11-74 | SHEET 52 of 73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

113/148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




CAMBER DIAGRAM
(Girder A Shown)

| VERTICAL OFFSETS AT BEARING POINTS | | | | | |
|---|---|---|---|---|---|
| Unit | Bearing Point | Girder A | Girder B | Girder C | Girder D |
| 1 | W. Abut. | -3'-3" | -4'-2 5/8" | -4'-10 1/16" | -5'-3 1/8" |
| | Pier 1 | -4'-4 1/16" | -5'-4 13/32" | -6'-2 1/16" | -6'-7 5/32" |
| | Pier 2 | -5'-10 3/32" | -6'-11 3/32" | -7'-8 3/32" | -8'-2" |
| | Pier 3 | -7'-5 1/16" | -8'-5 11/32" | -9'-3 1/8" | -9'-8 3/32" |
| | Pier 4 | -9'-1 1/32" | -10'-2 3/32" | -10'-11 3/32" | -11'-5 1/8" |
| | Pier 5 | -10'-7 1/32" | -11'-7 1/32" | -12'-4 3/32" | -12'-9 1/32" |
| | ℄ Rollers Exp. Jt. 1 | -10'-11 3/32" | -11'-10 1/32" | -12'-6 1/8" | -12'-10 3/32" |

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 1

| Girder | SPAN 1 .1 | | | .2 | | | F.S. 1 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | .8 | | | .9 | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | |
| A | 5/8 | 13/16 | 5/8 | 2 1/16 | 3/16 | 1/2 | 1 | 2 1/16 | 4 | 1 5/8 | 1 | 3 5/8 | 4 | 2 1/16 | 7/8 | 3 1/16 | 4 | 1 3/8 | 3/4 | 2 5/8 | 3/16 | 1/2 | 11/16 | 2 3/8 | 1/8 | 1/2 | 5/16 | 1 | 0 | 3/16 | 3/8 | A |
| B | 1/8 | 9/16 | 1/8 | 13/16 | 3/16 | 1 | 1/4 | 1 7/16 | 4 | 1 5/16 | 3/16 | 1 3/4 | 4 | 1 7/16 | 3/16 | 1 13/16 | 3/16 | 1/16 | 1/4 | 1 1/2 | 1/8 | 3/4 | 5/16 | 1 3/16 | 1/8 | 5/8 | 1/16 | 7/8 | 0 | 0 | 1/8 | 1/8 |
| C | 1/8 | 1/2 | 1/8 | 7/8 | 3/16 | 1 | -1/8 | 1 1/8 | 4 | 1 1/4 | -1/2 | 1 1/8 | 4 | 1 1/4 | -3/8 | 1 1/8 | 3/16 | 1/16 | -1/4 | 1 | 1/8 | 1/2 | -1/16 | 1 1/2 | 1/8 | 1/2 | -1/16 | 1 1/2 | 0 | 0 | 1/16 | 1/16 |
| D | 1/16 | 1/16 | -1/8 | 1/16 | 3/16 | 1/16 | -1/8 | 1/16 | 4 | 1 1/16 | -1/16 | 1 1/16 | 4 | 1 1/16 | -1/8 | 1 1/16 | 3/16 | 1/16 | -1/8 | 1 1/16 | 1/8 | 1/2 | -1/16 | 1 1/16 | 1/8 | 1/2 | -1/16 | 1 1/16 | 0 | 0 | 1/16 | 1/16 |

| Girder | SPAN 2 .1 | | | .2 | | | F.S. 2 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | F.S. 3 | | | .8 | | | .9 | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | |
| A | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 1/2 | 3/16 | 7/8 | 1/8 | 1 | 1/16 | 1 1/16 | 1/16 | 1/2 | 3/16 | 7/8 | 1/8 | 1 | 1/16 | 1 1/16 | 3/16 | 1 1/16 | 3/16 | 1 7/16 | 1/8 | 1 1/8 | 1/16 | 1 5/16 | 1/8 | 1 1/8 | 1/16 | 1 5/16 | 3/16 | 1 1/16 | 1/16 | 1 5/16 | A |
| B | 1/8 | 1/2 | 1/16 | 11/16 | 1/16 | 1 | 1/4 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | 1/16 | 1 | 1/4 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | B |
| C | 1/8 | 1/2 | 1/16 | 11/16 | 1/16 | 1 | 1/4 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | 1/16 | 1 | 1/4 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | 1/8 | 1 1/16 | 1/16 | 1 5/16 | C |
| D | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 1/2 | 3/16 | 7/8 | 1/8 | 1 | 1/16 | 1 1/16 | 1/16 | 1/2 | 3/16 | 7/8 | 1/8 | 1 | 1/16 | 1 1/16 | 3/16 | 1 1/16 | 3/16 | 1 7/16 | 1/8 | 1 1/8 | 1/16 | 1 5/16 | 1/8 | 1 1/8 | 1/16 | 1 5/16 | 3/16 | 1 1/16 | 1/16 | 1 5/16 | D |

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 1

| Girder | SPAN 3 .1 | | | .2 | | | F.S. 4 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | F.S. 5 | | | .8 | | | .9 | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | |
| A | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 2 | 1/8 | 2 1/16 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 | 1/8 | 2 1/16 | 3/16 | 1 5/8 | 0 | 1 13/16 | 1/8 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 | 1/8 | 2 1/16 | 3/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | A |
| B | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 2 | 1/8 | 2 1/16 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 | 1/8 | 2 1/16 | 3/16 | 1 5/8 | 0 | 1 13/16 | 1/8 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 | 1/8 | 2 1/16 | 3/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | B |
| C | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 2 | 1/8 | 2 1/16 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 | 1/8 | 2 1/16 | 3/16 | 1 5/8 | 0 | 1 13/16 | 1/8 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 | 1/8 | 2 1/16 | 3/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | C |
| D | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 2 | 1/8 | 2 1/16 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 | 1/8 | 2 1/16 | 3/16 | 1 5/8 | 0 | 1 13/16 | 1/8 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 | 1/8 | 2 1/16 | 3/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | D |

| Girder | SPAN 4 .1 | | | .2 | | | F.S. 6 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | F.S. 7 | | | .8 | | | .9 | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | |
| A | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 3/16 | 1 5/8 | 0 | 1 13/16 | 1/8 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 3/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | A |
| B | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 3/16 | 1 5/8 | 0 | 1 13/16 | 1/8 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 3/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | B |
| C | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 3/16 | 1 5/8 | 0 | 1 13/16 | 1/8 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 3/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | C |
| D | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 3/16 | 1 5/8 | 0 | 1 13/16 | 1/8 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 2 1/8 | 1/8 | 2 5/16 | 3/16 | 1 5/8 | 1/16 | 1 3/4 | 1/16 | 1 5/8 | 1/16 | 1 3/4 | D |

Note: For Notes see sheet 54/73.

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 1

| Girder | SPAN 5 .1 | | | .2 | | | F.S. 8 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | F.S. 9 | | | .8 | | | .9 | | | ℄ ROLLER EXP JT. 1 | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | |
| A | 0 | -1/8 | 1/8 | 0 | 0 | 0 | 1/4 | 1/4 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 5/16 | 1/8 | 1/16 | 1/8 | 5/16 | 1/8 | 1/16 | 1/8 | 5/16 | 1/8 | 1/16 | 1/8 | 5/16 | 1/8 | 1/16 | 1/8 | 5/16 | 1/8 | 1/16 | 1/8 | 5/16 | 1/8 | 1/16 | A |
| B | 0 | -1/16 | 1/16 | 0 | 0 | 1/16 | 3/16 | 1/4 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 0 | 0 | 0 | 0 | B |
| C | 0 | -1/16 | 0 | -1/16 | 0 | 1/16 | 1/16 | 1/8 | 1/16 | 3/16 | 1/16 | 1/8 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 1/16 | 0 | 0 | 0 | 0 | C |
| D | 0 | -1/16 | -1/8 | -3/16 | 0 | 1/16 | -1/16 | 0 | 0 | 1/4 | 0 | 1/4 | 1/16 | 1/4 | -1/16 | 1/4 | 1/16 | 5/16 | -1/16 | 1/4 | 1/16 | 5/16 | -1/16 | 1/4 | 1/16 | 5/16 | -1/16 | 1/4 | 1/16 | 5/16 | -1/16 | 1/4 | 0 | 0 | 0 | 0 | D |

This sheet is superseded by sheet No. 113A. 6-9-75

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

CAMBER DIAGRAM UNIT 1

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

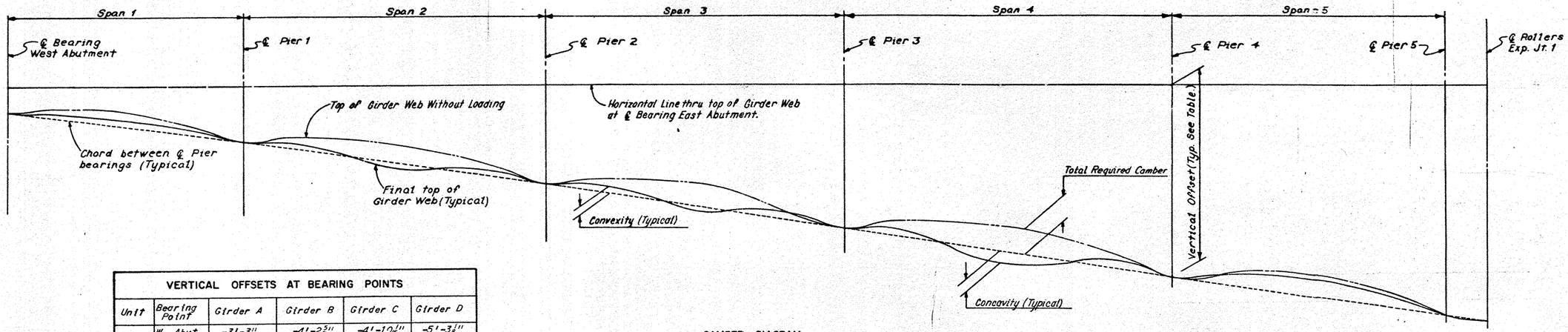
CUYAHOGA COUNTY OHIO

DRAWN JJS | TRACED SJS | CHECKED AHS | REVIEWED CAE | REVISED
DATE 10-3-75 | DATE 10-8-75 | DATE 10-24-75 | DATE 2-11-76 | SHEET 53/73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

113
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




CAMBER DIAGRAM
(Girder A Shown)

| VERTICAL OFFSETS AT BEARING POINTS | | | | | |
|---|---|---|---|---|---|
| Unit | Bearing Point | Girder A | Girder B | Girder C | Girder D |
| 1 | W. Abut. | -3'-3" | -4'-2 3/8" | -4'-10 1/16" | -5'-3 1/4" |
| | Pier 1 | -4'-4 15/16" | -5'-4 13/16" | -6'-2 11/16" | -6'-7 5/8" |
| | Pier 2 | -5'-10 3/8" | -6'-11 3/8" | -7'-8 5/16" | -8'-2" |
| | Pier 3 | -7'-5 1/16" | -8'-5 7/16" | -9'-3 1/16" | -9'-8 3/4" |
| | Pier 4 | -9'-1 3/4" | -10'-2 9/16" | -10'-11 3/4" | -11'-5 7/8" |
| | Pier 5 | -10'-7 1/4" | -11'-7 1/2" | -12'-4 9/16" | -12'-9 1/4" |
| | ℄ Rollers Exp. Jt. 1 | -10'-11 5/8" | -11'-10 1/2" | -12'-6 1/8" | -12'-10 3/8" |

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 1

| Girder | SPAN 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPAN 2 | | | | | | | | | | | | | | | | | | | | | | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .1 | | | | .2 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 1 | | | | .8 | | | | .9 | | | | .1 | | | | .2 | | | | F.S. 2 | | | | .3 | | | | .4 | | | | | |
| | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | | |
| A | 1/8 | 1/16 | 5/8 | 1 5/16 | 3/16 | 1 1/2 | 1 | 2 11/16 | 4 | 1 1/8 | 1 | 3 1/8 | 4 | 2 1/16 | 1 | 3 3/16 | 4 | 1 7/8 | 3/4 | 2 5/8 | 3/16 | 1 2 | 11/16 | 2 5/8 | 0 | 1 | 5/8 | 1 3/4 | 1/8 | 7/8 | 1 1/16 | 1 15/16 | 0 | 3/16 | 3/8 | 0 | 0 | 1/8 | 3/16 | 0 | 1/16 | 3/16 | 3/8 | 0 | 1/8 | 3/16 | 3/8 | 0 | 1/16 | 3/16 | 3/8 | 0 | 1/8 | 3/16 | 3/8 | 0 | 1/8 | 3/16 | 3/8 | A |
| B | 1/8 | 3/16 | 1/8 | 1/2 | 3/16 | 1 | 1/4 | 1 7/16 | 4 | 1 5/16 | 1 1/2 | 3 1/16 | 4 | 1 7/16 | 3/16 | 2 1/16 | 4 | 1 7/8 | 3/16 | 2 1/16 | 4 | 1 1/2 | 1/16 | 2 1/16 | 0 | 1/8 | 1/4 | 3/8 | 1/8 | 3/8 | 1/16 | 1/2 | 0 | 1/16 | 3/16 | 1/16 | 0 | 1/16 | 3/16 | 1/16 | 0 | 1/16 | 3/16 | 1/16 | 0 | 1/16 | 3/16 | 1/16 | 0 | 1/16 | 3/16 | 1/16 | 0 | 1/16 | 3/16 | 1/16 | B |
| C | 1/8 | 1/2 | -7/16 | 1/8 | 3/16 | 1 | -7/16 | 5/8 | 4 | 1 1/4 | -1/2 | 1 1/8 | 4 | 1 1/4 | -3/8 | 1 1/8 | 3/16 | 1 1/16 | -1/16 | 1 | 4 | 1 1/16 | -1/16 | 1 | 1/8 | 1/16 | 0 | 3/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | 0 | 1/16 | C |
| D | 1/16 | 11/16 | -1 3/8 | -9/16 | 3/16 | 1 3/8 | -1 5/8 | -7/16 | 4 | 1 1/16 | -1 3/8 | -3/4 | 4 | 1 1/8 | -1 5/8 | -9/16 | 4 | 1 1/4 | -1 5/8 | -9/16 | 4 | 1 1/4 | -1 5/8 | -9/16 | 1/8 | 1/16 | -1/8 | 3/16 | 0 | 1/16 | -1/8 | 3/16 | 0 | 1/16 | -1/8 | 3/16 | 0 | 1/16 | -1/8 | 3/16 | 0 | 1/16 | -1/8 | 3/16 | 0 | 1/16 | -1/8 | 3/16 | 0 | 1/16 | -1/8 | 3/16 | 0 | 1/16 | -1/8 | 3/16 | D |

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 1

| Girder | SPAN 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPAN 4 | | | | | | | | | | | | | | | | | | | | | | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .1 | | | | .2 | | | | F.S. 4 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 5 | | | | .8 | | | | .9 | | | | .1 | | | | .2 | | | | F.S. 6 | | | | .3 | | | | .4 | | | |
| | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | | |
| A | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 1/2 | 1/8 | 11/16 | 1/16 | 1/16 | 3/16 | 15/16 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 0 | 1/16 | 1/8 | 1/16 | 0 | 1/16 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | A |
| B | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 7/16 | 1/8 | 5/8 | 1/8 | 3/16 | 1/16 | 1/16 | 0 | 1/4 | 7/16 | 11/16 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 0 | 1/16 | 1/8 | 1/16 | 0 | 1/16 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | B |
| C | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 3/8 | 1/8 | 9/16 | 1/8 | 1/2 | 3/16 | 13/16 | 1/8 | 1/16 | 0 | 1/4 | 1/8 | 1/16 | 0 | 1/4 | 1/8 | 1/16 | 0 | 1/4 | 1/8 | 1/16 | 0 | 1/16 | 1/8 | 1/16 | 0 | 1/16 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | C |
| D | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 7/16 | 1/8 | 5/8 | 1/16 | 5/8 | 3/16 | 7/8 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 0 | 1/16 | 1/8 | 1/16 | 0 | 1/16 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | 1/8 | 1/16 | 1/16 | 1/4 | D |

Note: For Notes see sheet 54/73.

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 1

| Girder | SPAN 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | ℄ ROLLER EXP. JT. 1 | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .1 | | | | .2 | | | | F.S. 8 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 9 | | | | .8 | | | | .9 | | | | | | | | |
| | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | Stl. | Rem DL | Con. | Tot. | | |
| A | 0 | 1/8 | 1/8 | 0 | 0 | 0 | 1/4 | 1/4 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 5/16 | 3/16 | 7/16 | 1/8 | 3/8 | 3/16 | 7/16 | 1/16 | 1/2 | 1/16 | 1/16 | 1/8 | 1/16 | 1/16 | 1/16 | 1/8 | 1/16 | 1/16 | 1/16 | 1/8 | 1/16 | 1/16 | 1/16 | 1/8 | 1/16 | 1/16 | 1/16 | 1/8 | 1/16 | 1/16 | 1/16 | 0 | 0 | 0 | 0 | A |
| B | 0 | 1/16 | 1/16 | 0 | 0 | 1/16 | 3/16 | 1/4 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 0 | 1/16 | 0 | 1/16 | B |
| C | 0 | 1/16 | 1/16 | 0 | 0 | 1/16 | 1/8 | 3/16 | 1/8 | 1/8 | 1/16 | 3/8 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 3/16 | 1/16 | 1/16 | 1/16 | 0 | 1/16 | 0 | 1/16 | C |
| D | 0 | 1/16 | 1/16 | 0 | 0 | 1/16 | 1/8 | 3/16 | 0 | 1/4 | 0 | 1/4 | 1/16 | 1/4 | 1/16 | 3/8 | 1/16 | 1/4 | 1/16 | 3/8 | 1/16 | 1/4 | 1/16 | 3/8 | 1/16 | 1/4 | 1/16 | 3/8 | 1/16 | 1/4 | 1/16 | 3/8 | 1/16 | 1/4 | 1/16 | 3/8 | 1/16 | 1/4 | 1/16 | 3/8 | 1/16 | 1/4 | 1/16 | 0 | 1/16 | 0 | 1/16 | D |

THIS PLAN SHEET HAS BEEN REVISED SEE REVISION 8-9 19 75

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

CAMBER DIAGRAM UNIT 1
DENISON-N YARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

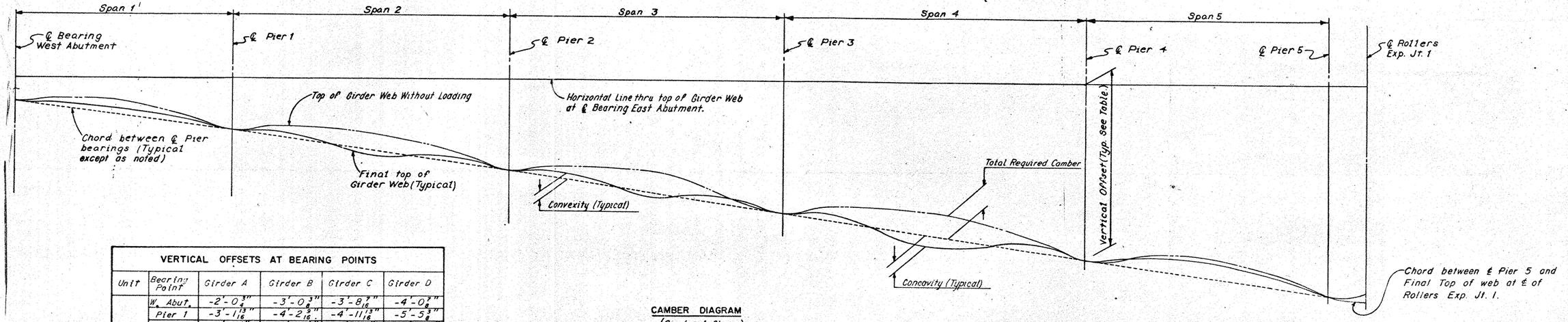
CUYAHOGA COUNTY OHIO

DRAWN SJS | TRACED SJS | CHECKED A.J.F. | VIEWED | REVISED
DATE 10-3-75 | DATE 10-8-75 | DATE 10-24 | DATE 11-24 | SHEET 55/173

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

1134
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




CAMBER DIAGRAM
(Girder A Shown)

**VERTICAL OFFSETS AT BEARING POINTS**

| Unit | Bearing Point | Girder A | Girder B | Girder C | Girder D |
|---|---|---|---|---|---|
| 1 | W. Abut. | -2'-0 3/4" | -3'-0 3/16" | -3'-8 7/16" | -4'-0 7/8" |
| | Pier 1 | -3'-1 13/16" | -4'-2 9/16" | -4'-11 13/16" | -5'-5 3/8" |
| | Pier 2 | -4'-8 1/8" | -5'-8 15/16" | -6'-6 1/8" | -6'-11 3/4" |
| | Pier 3 | -6'-2 7/8" | -7'-3 11/16" | -8'-0 7/8" | -8'-6 1/2" |
| | Pier 4 | -7'-11 3/16" | -9'-0 3/16" | -9'-9 1/2" | -10'-3 1/8" |
| | Pier 5 | -9'-5" | -10'-5 1/4" | -11'-1 15/16" | -11'-7" |
| | ℄Rollers Exp. Jt. 1 | -9'-9 1/16" | -10'-8 1/4" | -11'-3 7/8" | -11'-7 13/16" |

**DEAD LOAD DEFLECTIONS AND CAMBER UNIT 1**

SPAN 1

| Girder | .1 | | | .2 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | F.S. 1 | | | .8 | | | .9 | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | |
| A | 1/8 | 1/16 | 5/8 | 1/16 | 3/16 | 1/16 | 1 | 2 1/8 | 4 | 1/16 | 1 | 2 1/16 | 4 | 1/16 | 2 11/16 | 3/16 | 1/8 | 2 11/16 | 3/16 | 1/8 | 2 1/4 | 0 | 3/16 | 3/8 | 0 | 1/8 | 1/16 | 3/16 | 1/8 | 1/16 | 1/16 | 5/16 | A |
| B | 1/8 | 9/16 | 1/8 | 1/16 | 3/16 | 1 | 1/4 | 1 7/16 | 4 | 1/16 | 3/16 | 1 5/8 | 4 | 1/4 | 3/16 | 1 11/16 | 4 | 1/16 | 3/16 | 1 5/8 | 3/16 | 1/8 | 4 1/8 | 0 | 1/8 | 5/16 | 1/16 | 1/8 | 1/8 | 1/16 | 1/16 | 1/4 | B |
| C | 1/8 | 1/2 | 5/16 | 5/8 | 3/16 | 7/8 | 3/16 | 1 1/16 | 4 | 1/4 | 2 | 1 1/4 | 4 | 1/16 | 3/16 | 1 3/8 | 4 | 1/16 | 3/16 | 1 5/8 | 1/8 | 5/8 | 5/16 | 1/16 | 1/8 | 5/8 | 5/16 | 1/16 | 1/8 | 5/8 | 5/16 | 1/16 | C |
| D | 1/16 | 1/16 | 7/16 | 7/16 | 3/16 | 1/16 | 1/16 | 1/4 | 4 | 1/4 | 1/16 | 1/8 | 4 | 1/16 | 1/16 | 1/8 | 4 | 1/16 | 1/16 | 1/8 | 1/8 | 1/16 | 1/16 | 1/8 | 1/8 | 1/16 | 1/16 | 1/8 | 1/8 | 1/16 | 1/16 | 1/8 | D |

SPAN 2

| Girder | .1 | | | .2 | | | F.S. 2 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | F.S. 3 | | | .8 | | | .9 | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | |
| A | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 2 | 1/8 | 2 1/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | A |
| B | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 3/8 | 1/8 | 2 1/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | B |
| C | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 3/8 | 1/8 | 2 1/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | C |
| D | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 7/16 | 1/8 | 2 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | D |

**DEAD LOAD DEFLECTIONS AND CAMBER UNIT 1**

SPAN 3

| Girder | .1 | | | .2 | | | F.S. 4 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | F.S. 5 | | | .8 | | | .9 | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | |
| A | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 2 | 1/8 | 2 1/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | A |
| B | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 5/8 | 1/8 | 2 1/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | B |
| C | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 3/8 | 1/8 | 2 1/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | C |
| D | 0 | 1/8 | 1/16 | 3/16 | 1/16 | 7/16 | 1/8 | 2 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | 1/16 | 1/8 | 1/8 | 1 5/16 | D |

SPAN 4

| Girder | .1 | | | .2 | | | F.S. 6 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | F.S. 7 | | | .8 | | | .9 | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | |
| A | 1/16 | 7/16 | 5/16 | 3/16 | 1/16 | 3/8 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | A |
| B | 1/16 | 7/16 | 5/16 | 3/16 | 1/16 | 3/8 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | B |
| C | 1/16 | 7/16 | 5/16 | 3/16 | 1/16 | 3/8 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | C |
| D | 1/16 | 7/16 | 5/16 | 3/16 | 1/16 | 3/8 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | 1/16 | 3/16 | 1/8 | 2 1/16 | D |

2 1/16

1 3/16

Note: For Notes see sheet 54/73.

**DEAD LOAD DEFLECTIONS AND CAMBER UNIT 1**

SPAN 5

| Girder | .1 | | | .2 | | | F.S. 8 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | F.S. 9 | | | .8 | | | .9 | | | ℄ ROLLER EXP. JT. 1 | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | Stl. | Rem DL | Con | Tot | |
| A | 0 | -9/16 | 1/8 | 0 | 0 | 0 | 1/4 | 1/4 | 1/8 | 3/16 | 7/16 | 11/16 | 1/16 | 5/16 | 3/16 | -1/4 | 1/8 | 5/8 | 3/8 | 1 1/8 | 1/8 | 1/16 | 7/16 | 1 1/2 | 1/8 | 3/4 | 1/2 | 1 3/8 | 1/8 | 3/4 | 1/2 | 1 3/8 | 1/8 | 5/8 | 1/3 | 1 1/8 | 0 | 0 | 0 | 0 | A |
| B | 0 | -1/16 | 1/16 | 0 | 0 | 1/16 | 3/16 | 1/4 | 1/16 | 3/16 | 1/4 | 1/2 | 1/16 | 5/16 | 1/4 | -3/16 | 1/8 | 1/2 | 3/16 | 1 1/16 | 1/8 | 1/16 | 5/16 | 1 1/16 | 1/8 | 3/4 | 5/16 | 1 1/16 | 1/8 | 5/8 | 3/8 | 1 1/8 | 1/16 | 7/16 | 1/4 | 1 | 0 | 1/16 | 0 | 1/16 | B |
| C | 0 | -1/16 | 0 | -1/16 | 0 | 1/16 | 1/16 | 1/8 | 1/16 | 3/16 | 1/8 | 3/8 | 1/16 | 1/4 | 1/8 | -1/8 | 1/8 | 1/2 | 0 | 1/8 | 1/8 | 1/16 | 1/4 | 1 1/16 | 1/8 | 5/8 | 3/8 | 1 1/8 | 1/16 | 7/16 | 1/4 | 1 1/16 | 1/16 | 3/8 | 1/4 | 1 1/16 | 0 | 1/16 | 0 | 1/16 | C |
| D | 0 | -1/16 | -1/16 | 0 | 0 | 1/16 | -1/16 | 0 | 0 | 1/4 | 0 | 1/4 | 1/16 | 1/4 | -1/16 | 1/4 | 1/8 | 3/8 | -1/4 | 1/8 | 1/8 | 1/16 | 3/16 | 1 1/16 | 1/8 | 5/8 | 1/4 | 1 1/16 | 1/16 | 7/16 | 1/4 | 1 1/16 | 1/16 | 3/8 | 1/4 | 1 1/16 | 0 | 1/16 | 0 | 1/16 | D |

2 7/16

3/8

This sheet supersedes sheet No. 113. 6-9-75

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

CAMBER DIAGRAM UNIT 1

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

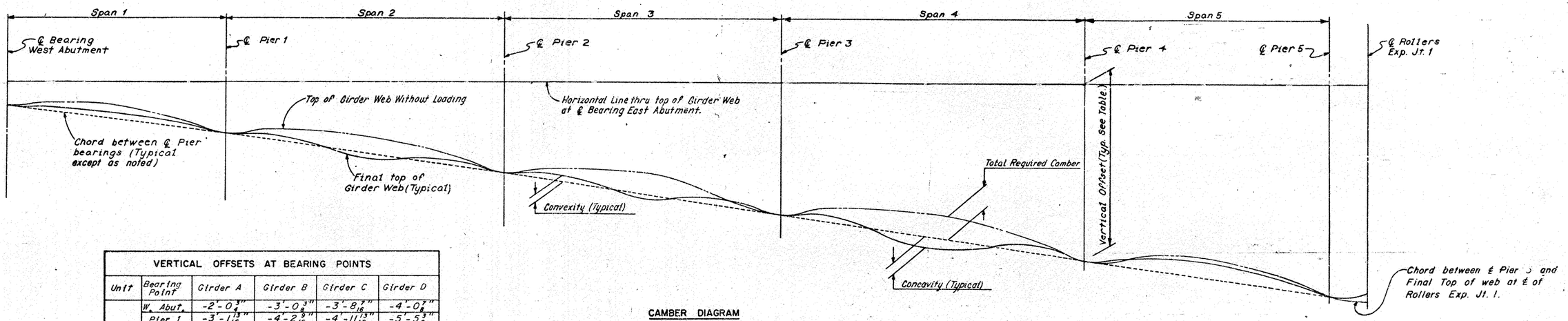
CUYAHOGA COUNTY OHIO

| DRAWN SJS | TRACED SJS | CHECKED AHS | REVIEWED CAB | REVISED 9-26-75 |
|---|---|---|---|---|
| DATE 10-3-75 | DATE 10-8-75 | DATE 10-24-75 | DATE 4-11-74 | SHEET 53/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

1134 / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




CAMBER DIAGRAM
(Girder A Shown)

| VERTICAL OFFSETS AT BEARING POINTS | | | | | |
|---|---|---|---|---|---|
| Unit | Bearing Point | Girder A | Girder B | Girder C | Girder D |
| 1 | W. Abut. | -2'-0 3/8" | -3'-0 3/8" | -3'-8 7/16" | -4'-0 7/8" |
| | Pier 1 | -3'-1 13/16" | -4'-2 9/16" | -4'-11 13/16" | -5'-5 3/8" |
| | Pier 2 | -4'-8 1/8" | -5'-8 15/16" | -6'-6 1/16" | -6'-11 3/4" |
| | Pier 3 | -6'-2 7/8" | -7'-3 11/16" | -8'-0 7/16" | -8'-6 1/2" |
| | Pier 4 | -7'-11 9/16" | -9'-0 5/16" | -9'-9 1/2" | -10'-3 1/8" |
| | Pier 5 | -9'-5" | -10'-5 1/4" | -11'-1 13/16" | -11'-7" |
| | ℄ Rollers Exp. Jt. 1 | -9'-9 1/16" | -10'-8 1/4" | -11'-3 7/8" | -11'-7 13/16" |

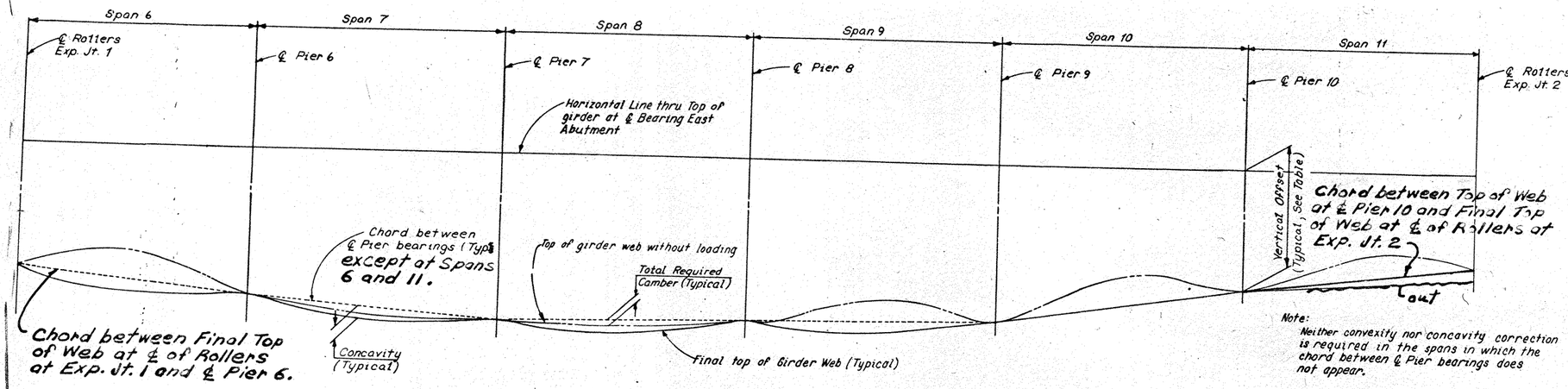
DEAD LOAD DEFLECTIONS AND CAMBER UNIT 1

| Girder | SPAN 1 | | | | |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

114
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




CAMBER DIAGRAM
(Girder A shown)

Note:
Neither convexity nor concavity correction is required in the spans in which the chord between ℄ Pier bearings does not appear.

**VERTICAL OFFSETS AT BEARING POINTS**

| Unit | Bearing Point | Girder A | Girder B | Girder C | Girder D |
|---|---|---|---|---|---|
| 2 | ℄Rollers Exp. Jt. 1 | -11'-11½" | -11'-10⅞" | -11'-10⅜" | -11'-10⅜" |
| | Pier 6 | -12'-9 9/16" | -12'-10 3/4" | -12'-11 3/16" | -12'-11 7/16" |
| | Pier 7 | -13'-9½" | -13'-10⅜" | -13'-10⅞" | -13'-11⅛" |
| | Pier 8 | -14'-8⅞" | -14'-9⅜" | -14'-9⅞" | -14'-10⅜" |
| | Pier 9 | -12'-8 11/16" | -12'-9 5/16" | -12'-9 15/16" | -12'-10 5/16" |
| | Pier 10 | -11'-8" | -11'-8 9/16" | -11'-9 1/16" | -11'-9 5/16" |
| | ℄Rollers Exp. Jt. 2 | -10'-7½" | -10'-8 1/16" | -10'-8 5/16" | -10'-8 5/8" |
| Pier 6 | | -11'-7¼" | -12'-0⅜" | -12'-3 11/16" | -12'-3 11/16" |
| Pier 7 | | -12'-10 9/16" | -12'-11 3/16" | -13'-0 1/16" | -13'-0" |

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 2

SPAN 6

| Girder | .1 | | | | .2 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 10 | | | | .8 | | | | .9 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. |
| A | 1/16 | 3/16 | -0 | 1/2 | 0 | 1 1/16 | -3/16 | 1 | 3/16 | 1 1/16 | -3/16 | 1 | 5/16 | 1 1/16 | -3/16 | 1 | 5/16 | 1 1/16 | -3/16 | 1 | 0 | 1 1/16 | -3/16 | 1 | 0 | 1 1/16 | -3/16 | 1 | 5/16 | 1 1/16 | -3/16 | 1 | 0 | 1 1/16 | -3/16 | 1 | 0 | 1 1/16 | -3/16 | 1 |
| B | 1/16 | 3/16 | -0 | 1/2 | 0 | 1 1/16 | -3/16 | 1 | 3/16 | 1 1/16 | -4 | 1 | 5/16 | 1 1/16 | -4 | 1 | 5/16 | 1 1/16 | -4 | 1 | 0 | 1 1/16 | -3/16 | 1 | 0 | 1 1/16 | -3/16 | 1 | 5/16 | 1 1/16 | -4 | 1 | 0 | 1 1/16 | -3/16 | 1 | 0 | 1 1/16 | -3/16 | 1 |
| C | 1/16 | 1/16 | -1/16 | 1/16 | 0 | 1 1/16 | -3/16 | 1 | 3/16 | 1 1/16 | 0 | 1 1/16 | 5/16 | 1 1/16 | 0 | 1 1/16 | 5/16 | 1 1/16 | 0 | 1 1/16 | 0 | 1 1/16 | 0 | 1 1/16 | 0 | 1 1/16 | 0 | 1 1/16 | 5/16 | 1 1/16 | 0 | 1 1/16 | 0 | 1 1/16 | 0 | 1 1/16 | 0 | 1 1/16 | 0 | 1 1/16 |
| D | 1/16 | 3/16 | 0 | 3/4 | 0 | 1 1/16 | 4 | 7/16 | 3/16 | 1 1/16 | 4 | 7/16 | 3/16 | 1 1/16 | 4 | 7/16 | 3/16 | 1 1/16 | 4 | 7/16 | 0 | 1 1/16 | 4 | 7/16 | 0 | 1 1/16 | 4 | 7/16 | 3/16 | 1 1/16 | 4 | 7/16 | 0 | 1 1/16 | 4 | 7/16 | 0 | 1 1/16 | 4 | 7/16 |

SPAN 7

| Girder | .1 | | | | .2 | | | | F.S. 11 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 12 | | | | .8 | | | | .9 | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | |
| A | 0 | 1/8 | -1 | -7/8 | 1/16 | 7/16 | -1 3/8 | -1 3/16 | 1/16 | 1/2 | -2 | -1 7/16 | 1/8 | 5/8 | -2 7/16 | -1 5/16 | 3/16 | 1 1/4 | -2 5/8 | -1 3/16 | 1/16 | 1 1/8 | -2 1/16 | -7/8 | 0 | 1 | -3/16 | 3/4 | -5/16 | 0 | 1/8 | -1/16 | -1/4 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1 1/4 | -1 1/16 | -3/16 | A |
| B | 0 | 1/8 | -3/4 | -5/8 | 1/16 | 7/16 | -1 3/8 | -9/16 | 1/16 | 1/2 | -1 1/4 | -5/8 | 1/8 | 5/8 | -1 5/8 | -7/8 | 1/16 | 1 1/16 | -1 15/16 | -13/16 | 1/16 | 1 1/16 | -1 1/2 | -7/16 | 1/16 | 1 1/16 | -1 7/16 | -5/16 | 1/16 | 1 1/16 | -1 7/16 | -5/16 | 1/16 | 1/2 | -1 5/16 | -13/16 | 1/16 | 1 1/16 | -1 7/16 | -5/16 | B |
| C | 0 | 1/8 | -5/8 | -1/2 | 1/16 | 7/16 | -1 1/16 | -3/16 | 1/16 | 1/2 | -1 3/16 | -5/8 | 1/8 | 5/8 | -1 7/16 | -11/16 | 1/16 | 1 1/16 | -1 7/8 | -5/16 | 1/16 | 1 1/16 | -1 13/16 | -3/4 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | 1/16 | 1/2 | -1 7/16 | -3/4 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | C |
| D | 0 | 1/8 | -5/8 | -1/2 | 1/16 | 7/16 | -1 1/16 | -9/16 | 1/16 | 1/2 | -1 3/16 | -5/8 | 1/8 | 5/8 | -1 7/16 | -11/16 | 1/16 | 1 1/16 | -1 7/8 | -5/16 | 1/16 | 1 1/16 | -1 13/16 | -3/4 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | 1/16 | 1/2 | -1 7/16 | -3/4 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | D |

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 2

SPAN 8

| Girder | .1 | | | | .2 | | | | F.S. 13 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 14 | | | | .8 | | | | .9 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. |
| A | 0 | 1/8 | -1 | -7/8 | 1/16 | 7/16 | -1 3/8 | -1 3/16 | 1/16 | 1/2 | -2 | -1 7/16 | 1/8 | 5/8 | -2 7/16 | -1 5/16 | 3/16 | 1 1/4 | -2 5/8 | -1 3/16 | 1/16 | 1 1/8 | -2 1/16 | -7/8 | 0 | 1 | -3/16 | 3/4 | -5/16 | 0 | 1/8 | -1/16 | -1/4 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1 1/4 | -1 1/16 | -3/16 |
| B | 0 | 1/8 | -3/4 | -5/8 | 1/16 | 7/16 | -1 3/8 | -9/16 | 1/16 | 1/2 | -1 1/4 | -5/8 | 1/8 | 5/8 | -1 5/8 | -7/8 | 1/16 | 1 1/16 | -1 15/16 | -13/16 | 1/16 | 1 1/16 | -1 1/2 | -7/16 | 1/16 | 1 1/16 | -1 7/16 | -5/16 | 1/16 | 1 1/16 | -1 7/16 | -5/16 | 1/16 | 1/2 | -1 5/16 | -13/16 | 1/16 | 1 1/16 | -1 7/16 | -5/16 | B |
| C | 0 | 1/8 | -5/8 | -1/2 | 1/16 | 7/16 | -1 1/16 | -3/16 | 1/16 | 1/2 | -1 3/16 | -5/8 | 1/8 | 5/8 | -1 7/16 | -11/16 | 1/16 | 1 1/16 | -1 7/8 | -5/16 | 1/16 | 1 1/16 | -1 13/16 | -3/4 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | 1/16 | 1/2 | -1 7/16 | -3/4 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | C |
| D | 0 | 1/8 | -5/8 | -1/2 | 1/16 | 7/16 | -1 1/16 | -9/16 | 1/16 | 1/2 | -1 3/16 | -5/8 | 1/8 | 5/8 | -1 7/16 | -11/16 | 1/16 | 1 1/16 | -1 7/8 | -5/16 | 1/16 | 1 1/16 | -1 13/16 | -3/4 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | 1/16 | 1/2 | -1 7/16 | -3/4 | 1/16 | 1 1/16 | -1 11/16 | -9/16 | D |

SPAN 9

| Girder | .1 | | | | .2 | | | | F.S. 15 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 16 | | | | .8 | | | | .9 | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | |
| A | 0 | 1/8 | -1/2 | -3/8 | 0 | 1/8 | -1/2 | -3/8 | 0 | 1/8 | -1/2 | -3/8 | 1/16 | 1/8 | -1/2 | -5/16 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1/2 | -1/2 | 1/16 | 1/16 | 1 1/4 | -1/2 | 3/4 | 0 | 1/8 | -1/2 | -3/8 | A |
| B | 0 | 1/8 | -3/4 | -5/8 | 0 | 1/8 | -1/2 | -3/8 | 0 | 1/8 | -1/2 | -3/8 | 1/16 | 1/8 | -1/2 | -5/16 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1/2 | -1/2 | 1/16 | 1/16 | 1 1/4 | -1/2 | 3/4 | 0 | 1/8 | -1/2 | 1/16 | B |
| C | 0 | 1/8 | -5/8 | -1/2 | 0 | 1/8 | -1/2 | -3/8 | 0 | 1/8 | -1/2 | -3/8 | 1/16 | 1/8 | -1/2 | -5/16 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1/2 | -1/2 | 1/16 | 1/16 | 1 1/4 | -1/2 | 3/4 | 0 | 1/8 | -1/2 | 1/16 | C |
| D | 0 | 1/8 | -5/8 | -1/2 | 0 | 1/8 | -1/2 | -3/8 | 0 | 1/8 | -1/2 | -3/8 | 1/16 | 1/8 | -1/2 | -5/16 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1 1/4 | -1/2 | 3/4 | 1/16 | 1/2 | -1/2 | 1/16 | 1/16 | 1 1/4 | -1/2 | 3/4 | 0 | 1/8 | -1/2 | 1/16 | D |

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 2

SPAN 10

| Girder | .1 | | | | .2 | | | | F.S. 17 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 18 | | | | .8 | | | | .9 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. |
| A | 0 | 1/8 | 0 | 1/8 | 1/16 | 1/16 | 0 | 1/8 | 1/16 | 1/2 | 0 | 9/16 | 1/8 | 3/8 | 0 | 1/2 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 1/8 | 3/8 | 0 | 1/2 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 1/8 | 3/8 | 0 | 1/2 |
| B | 0 | 1/8 | 0 | 1/8 | 1/16 | 1/16 | 0 | 1/8 | 1/16 | 1/2 | 0 | 9/16 | 1/8 | 3/16 | 0 | 5/16 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 1/8 | 3/8 | 0 | 1/2 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 1/8 | 3/8 | 0 | 1/2 |
| C | 0 | 1/8 | 0 | 1/8 | 1/16 | 1/16 | 0 | 1/8 | 1/16 | 1/2 | 0 | 9/16 | 1/8 | 1/8 | 0 | 3/8 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 1/8 | 3/8 | 0 | 1/2 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 1/8 | 3/8 | 0 | 1/2 |
| D | 0 | 1/8 | 0 | 1/8 | 1/16 | 1/16 | 0 | 1/8 | 1/16 | 1/2 | 0 | 9/16 | 1/8 | 3/8 | 0 | 1/2 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 1/8 | 3/8 | 0 | 1/2 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 1/8 | 3/8 | 0 | 1/2 |

SPAN 11

| Girder | .1 | | | | .2 | | | | F.S. 19 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | .8 | | | | .9 | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | |
| A | 0 | 1/8 | 0 | 1/8 | 1/16 | 7/16 | 0 | 5/8 | 1/16 | 1/2 | 0 | 9/16 | 1/8 | 3/8 | 0 | 1/2 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 1/8 | 1 | 0 | 1 1/8 | 3/16 | 1 1/16 | 0 | 1 5/16 | 3/16 | 1 1/16 | 0 | 1 5/16 | 1/8 | 1 | 0 | 1 1/8 | A |
| B | 0 | 1/8 | 0 | 1/8 | 1/16 | 7/16 | 0 | 5/8 | 1/16 | 1/2 | 0 | 9/16 | 1/8 | 1/2 | 0 | 5/8 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 3/16 | 1 1/16 | 0 | 1 5/16 | 1/8 | 1 | 0 | 1 1/8 | 3/16 | 1 1/16 | 0 | 1 5/16 | 3/16 | 1 1/16 | 0 | 1 5/16 | 1/8 | 1 | 0 | 1 1/8 | B |
| C | 0 | 1/8 | 0 | 1/8 | 1/16 | 7/16 | 0 | 5/8 | 1/16 | 1/2 | 0 | 9/16 | 1/8 | 1/2 | 0 | 5/8 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 3/16 | 1 1/16 | 0 | 1 5/16 | 1/8 | 1 | 0 | 1 1/8 | 3/16 | 1 1/16 | 0 | 1 5/16 | 3/16 | 1 1/16 | 0 | 1 5/16 | 1/8 | 1 | 0 | 1 1/8 | C |
| D | 0 | 1/8 | 0 | 1/8 | 1/16 | 7/16 | 0 | 5/8 | 1/16 | 1/2 | 0 | 9/16 | 1/8 | 1/2 | 0 | 5/8 | 3/16 | 1 1/4 | 0 | 1 7/16 | 3/16 | 1 1/8 | 0 | 1 5/16 | 3/16 | 1 1/16 | 0 | 1 5/16 | 1/8 | 1 | 0 | 1 1/8 | 3/16 | 1 1/16 | 0 | 1 5/16 | 3/16 | 1 1/16 | 0 | 1 5/16 | 1/8 | 1 | 0 | 1 1/8 | D |

*Notes:*

*Negative values for deflections indicate deflections above chord line. Negative values of convexity or concavity and total required camber indicate values below the chord line. Deflections and convexities or concavities are given to the nearest 1/16 inch.*

*The following abbreviations are used:*

*Stl. = Dead load deflection due to the weight of steel*

*Rem D.L. = Remaining dead load deflection*

*Con. = Convexity or concavity*

*Tot. = Total required camber*

Revised 9-26-75

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

CAMBER DIAGRAM UNIT 2

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

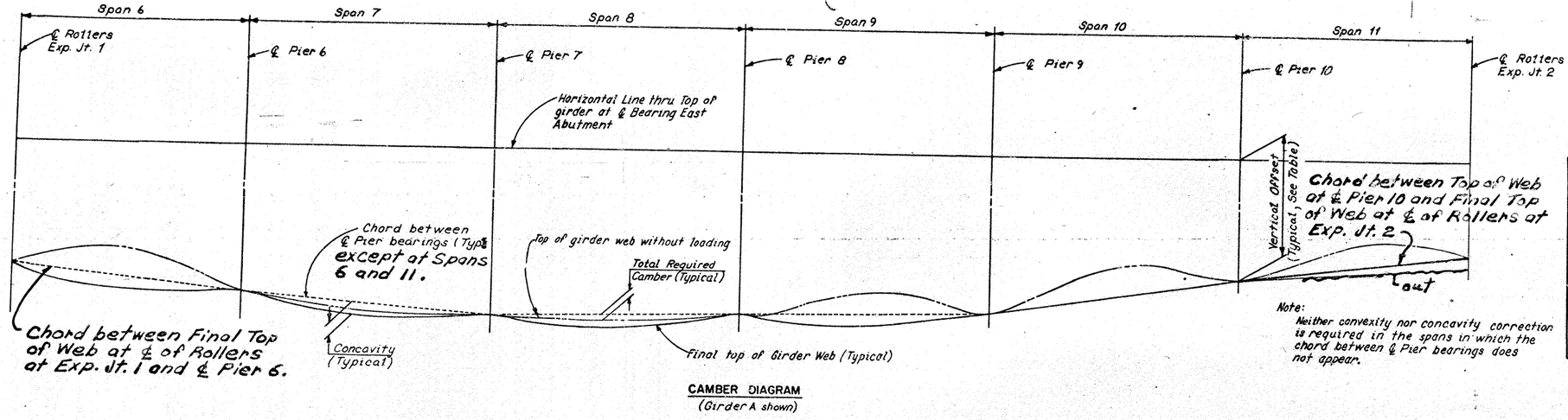
CUYAHOGA COUNTY OHIO

| DRAWN SJS | TRACED SJS | CHECKED AHS | REVIEWED CAB | REVISED 6-9-75 |
|---|---|---|---|---|
| DATE 10-27-73 | DATE 10-11-73 | DATE 10-24-73 | DATE 4-11-74 | SHEET 54/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

114 / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




CAMBER DIAGRAM
(Girder A shown)

Note:
Neither convexity nor concavity correction is required in the spans in which the chord between ℄ Pier bearings does not appear.

VERTICAL OFFSETS AT BEARING POINTS

| Unit | Bearing Point | Girder A | Girder B | Girder C | Girder D |
|---|---|---|---|---|---|
| 2 | ℄Rollers Exp. Jt. 1 | -10'-11 3/16" | -11'-1 1/16" | -12'-6 3/16" | -12'-10 7/16" |
| | Pier 6 | -12'-0 1/16" | -13'-3 1/16" | -13'-5 3/16" | -13'-5 7/16" |
| | Pier 7 | -14'-0 1/16" | -14'-1 3/16" | -14'-2 3/16" | -14'-2 7/16" |
| | Pier 8 | | -13'-2 3/16" | | -12'-6 11/16" |
| | Pier 9 | | -12'-5 3/16" | | -11'-3 7/16" |
| | Pier 10 | | -11'-2 3/16" | | -9'-11 13/16" |
| | ℄Rollers Exp. Jt. 2 | | -10'-1 7/16" | | -8'-11 5/8" |
| Pier 6 | | -11'-7 1/4" | -12'-0 3/8" | -12'-3 11/16" | -12'-3 11/16" |
| Pier 7 | | -12'-10 3/16" | -12'-11 3/16" | -13'-0 1/16" | -13'-0" |

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 2

SPAN 6 / SPAN 7

| Girder | .1 | .2 | .3 | .4 | .5 | .6 | .7 | F.S. 10 | .8 | .9 | .1 | .2 | F.S. 11 | .3 | .4 | .5 | .6 | .7 | F.S. 12 | .8 | .9 | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. / Rem. D.L. / Con. / Tot. | | | | | | | | | | | | | | | | | | | | | |
| A | 1/16 / 3/16 / -0 / 1/2 | 0 / 1/16 / -3/16 / 1 | 3/16 / 1/16 / -5/16 / 5/16 | 3/16 / 1/16 / -5/16 / 5/16 | 3/16 / 1/16 / -5/16 / 5/16 | 3/16 / 1/16 / -5/16 / 5/16 | 0 / 1/16 / -3/16 / 5/16 | 1/16 / 5/16 / -3/16 / 1/2 | 1/16 / 5/16 / -3/16 / 3/8 | 0 / 1/16 / -0 / 1/16 | 0 / 0 / -1 / -1 | 0 / 0 / -1/8 / -1/8 | 1/16 / 0 / -2 / -1 15/16 | 0 / 0 / -2 1/16 / -2 1/16 | 0 / 0 / -2 1/16 / -2 1/16 | 1/16 / 0 / -2 1/16 / -2 1/16 | 1/16 / 0 / -2 1/16 / -2 1/16 | 1/16 / 0 / -2 1/16 / -2 1/16 | 1/16 / 0 / -2 1/16 / -2 1/16 | 1/16 / 0 / -2 1/16 / -2 1/16 | 0 / 0 / -2 1/16 / -2 1/16 | A |
| B | 1/16 / 1/16 / -0 / 3/16 | 0 / 1/16 / -3/16 / 3/16 | 3/16 / 1/16 / -4 / 5/16 | 3/16 / 1/8 / -4 / 5/16 | 3/16 / 1/16 / -4 / 5/16 | 3/16 / 1/16 / -4 / 5/16 | 1/16 / 1/16 / -4 / 5/16 | 1/16 / 1/8 / -4 / 5/16 | 1/16 / 1/8 / -4 / 5/16 | 0 / 1/16 / -0 / 1/16 | 0 / 0 / -1/8 / -1/8 | 0 / 0 / -1/8 / -1/8 | 1/16 / 0 / -2 1/16 / -2 1/16 | 0 / 0 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 0 / 1/16 / -2 1/16 / -2 1/16 | B |
| C | 1/16 / 1/16 / -1/16 / 1/16 | 0 / 1/16 / -3/16 / 1/8 | 3/16 / 1/16 / 0 / 1/4 | 3/16 / 1/16 / 1/16 / 5/16 | 3/16 / 1/16 / 1/16 / 5/16 | 3/16 / 1/16 / 1/16 / 5/16 | 1/16 / 1/16 / 1/16 / 3/8 | 1/16 / 1/8 / 1/16 / 1/2 | 1/16 / 1/8 / 1/16 / 1/2 | 0 / 1/16 / 1/16 / 1/8 | 0 / 0 / -1/8 / -1/8 | 0 / 0 / -1/8 / -1/8 | 1/16 / 0 / -2 1/16 / -2 | 0 / 0 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 0 / 1/16 / -2 1/16 / -2 1/16 | C |
| D | 1/16 / 3/16 / -0 / 1/4 | 0 / 1/16 / -3/16 / 1/8 | 3/16 / 1/16 / -3/16 / 1/16 | 3/16 / 1/16 / -3/16 / 1/16 | 3/16 / 1/16 / -3/16 / 1/16 | 3/16 / 1/16 / -3/16 / 1/16 | 1/16 / 1/16 / -3/16 / 1/16 | 1/16 / 1/8 / -3/16 / 1/16 | 1/16 / 1/8 / -3/16 / 1/16 | 0 / 1/16 / -0 / 1/16 | 0 / 0 / -1/8 / -1/8 | 0 / 0 / -1/8 / -1/8 | 1/16 / 0 / -2 1/16 / -2 | 0 / 0 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 1/16 / 1/16 / -2 1/16 / -2 1/16 | 0 / 1/16 / -2 1/16 / -2 1/16 | D |

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 2

SPAN 8 / SPAN 9

| Girder | .1 | .2 | F.S. 13 | .3 | .4 | .5 | .6 | .7 | F.S. 14 | .8 | .9 | .1 | .2 | F.S. 15 | .3 | .4 | .5 | .6 | .7 | F.S. 16 | .8 | .9 | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. / Rem. D.L. / Con. / Tot. | | | | | | | | | | | | | | | | | | | | | |
| A | 0 / 1/8 / -1 / -7/8 | 1/16 / 7/16 / -1 3/8 / -1 3/16 | 1/16 / 2 / -2 / -1/16 | 1/8 / 9/16 / -2 1/16 / -1 7/16 | 3/16 / 1 1/4 / -2 1/16 / -5/8 | 3/16 / 1 3/8 / -2 1/16 / -1/2 | 3/16 / 1 1/4 / -2 1/16 / -1/2 | 1/8 / 1 1/4 / -2 1/16 / -11/16 | 1/16 / 2 / -1 1/2 / 1/2 | 1/16 / 1 1/16 / -1 1/2 / 1/16 | 0 / 1/8 / -3/4 / -5/8 | 0 / 1/8 / -1/2 / -3/8 | 1/16 / 2 / -1 1/2 / 1/2 | 1/16 / 1 1/16 / -1 1/2 / 1/16 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 0 / 1/8 / -1 1/2 / -1 3/8 | 0 / 1/8 / -5/8 / -1/2 | A |
| B | 0 / 1/8 / -3/4 / -5/8 | 1/16 / 7/16 / -1 3/8 / -3/4 | 1/16 / 2 / -1 3/4 / 1/4 | 1/8 / 9/16 / -1 3/4 / -1/16 | 3/16 / 1 1/8 / -1 3/4 / 1/16 | 3/16 / 1 1/8 / -1 3/4 / 1/16 | 3/16 / 1 1/8 / -1 3/4 / 1/16 | 1/8 / 1 1/8 / -1 3/4 / 1/16 | 1/16 / 2 / -1 3/4 / 1/4 | 1/16 / 1 1/16 / -1 3/4 / 1/8 | 0 / 1/8 / -3/4 / -5/8 | 0 / 1/8 / -1/2 / -3/8 | 1/16 / 2 / -1 3/4 / 1/4 | 1/16 / 1 1/16 / -1 3/4 / 1/8 | 1/16 / 1 1/4 / -1 3/4 / 1/8 | 1/16 / 1 1/4 / -1 3/4 / 1/8 | 1/16 / 1 1/4 / -1 3/4 / 1/8 | 1/16 / 1 1/4 / -1 3/4 / 1/8 | 1/16 / 1 1/4 / -1 3/4 / 1/8 | 1/16 / 1 1/4 / -1 3/4 / 1/8 | 0 / 1/8 / -1 3/4 / -1 5/8 | 0 / 1/8 / -5/8 / -1/2 | B |
| C | 0 / 1/8 / -5/8 / -1/2 | 1/16 / 7/16 / -1 1/4 / -3/8 | 1/16 / 2 / -1 1/2 / 1/2 | 1/8 / 9/16 / -1 1/2 / 1/16 | 3/16 / 1 1/8 / -1 1/2 / 1/8 | 3/16 / 1 1/8 / -1 1/2 / 1/8 | 3/16 / 1 1/8 / -1 1/2 / 1/8 | 1/8 / 1 1/8 / -1 1/2 / 1/8 | 1/16 / 2 / -1 1/2 / 1/2 | 1/16 / 1 1/16 / -1 1/2 / 1/4 | 0 / 1/8 / -3/4 / -5/8 | 0 / 1/8 / -1/2 / -3/8 | 1/16 / 2 / -1 1/2 / 1/2 | 1/16 / 1 1/16 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 0 / 1/8 / -1 1/2 / -1 3/8 | 0 / 1/8 / -5/8 / -1/2 | C |
| D | 0 / 1/8 / -5/8 / -1/2 | 1/16 / 7/16 / -1 1/4 / -3/8 | 1/16 / 2 / -1 1/2 / 1/2 | 1/8 / 9/16 / -1 1/2 / 1/16 | 3/16 / 1 1/8 / -1 1/2 / 1/8 | 3/16 / 1 1/8 / -1 1/2 / 1/8 | 3/16 / 1 1/8 / -1 1/2 / 1/8 | 1/8 / 1 1/8 / -1 1/2 / 1/8 | 1/16 / 2 / -1 1/2 / 1/2 | 1/16 / 1 1/16 / -1 1/2 / 1/4 | 0 / 1/8 / -3/4 / -5/8 | 0 / 1/8 / -1/2 / -3/8 | 1/16 / 2 / -1 1/2 / 1/2 | 1/16 / 1 1/16 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 1/16 / 1 1/4 / -1 1/2 / 1/4 | 0 / 1/8 / -1 1/2 / -1 3/8 | 0 / 1/8 / -5/8 / -1/2 | D |

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 2

SPAN 10 / SPAN 11

| Girder | .1 | .2 | F.S. 17 | .3 | .4 | .5 | .6 | .7 | F.S. 18 | .8 | .9 | .1 | 2 | F.S. 19 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. / Rem. D.L. / Con. / Tot. | | | | | | | | | | | | | | | | | | | | | |
| A | 0 / 0 / 1/2 / 1/2 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 2 / 0 / 2 1/16 | 1/8 / 9/16 / 0 / 1 3/16 | 3/16 / 1 1/4 / 0 / 1 7/16 | 3/16 / 1 3/8 / 0 / 1 9/16 | 3/16 / 1 1/4 / 0 / 1 7/16 | 1/8 / 1 1/4 / 0 / 1 3/8 | 1/16 / 2 / 0 / 2 1/16 | 1/16 / 1 1/16 / 0 / 1 1/8 | 0 / 1/8 / 0 / 1/8 | 0 / 1/8 / 0 / 1/8 | 1/16 / 0 / 1/2 / 9/16 | 0 / 1/8 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 0 / 1/8 / 0 / 1/8 | A |
| B | 0 / 1/8 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 2 / 0 / 2 1/16 | 1/8 / 9/16 / 0 / 1 3/16 | 3/16 / 1 1/8 / 0 / 1 5/16 | 3/16 / 1 1/8 / 0 / 1 5/16 | 3/16 / 1 1/8 / 0 / 1 5/16 | 1/8 / 1 1/8 / 0 / 1 5/16 | 1/16 / 2 / 0 / 2 1/16 | 1/16 / 1 1/16 / 0 / 1 1/8 | 0 / 1/8 / 0 / 1/8 | 0 / 1/8 / 0 / 1/8 | 1/16 / 0 / 1/2 / 9/16 | 0 / 1/8 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 0 / 1/8 / 0 / 1/8 | B |
| C | 0 / 1/8 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 2 / 0 / 2 1/16 | 1/8 / 9/16 / 0 / 1 3/16 | 3/16 / 1 1/8 / 0 / 1 5/16 | 3/16 / 1 1/8 / 0 / 1 5/16 | 3/16 / 1 1/8 / 0 / 1 5/16 | 1/8 / 1 1/8 / 0 / 1 5/16 | 1/16 / 2 / 0 / 2 1/16 | 1/16 / 1 1/16 / 0 / 1 1/8 | 0 / 1/8 / 0 / 1/8 | 0 / 1/8 / 0 / 1/8 | 1/16 / 0 / 1/2 / 9/16 | 0 / 1/8 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 0 / 1/8 / 0 / 1/8 | C |
| D | 0 / 1/8 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 2 / 0 / 2 1/16 | 1/8 / 9/16 / 0 / 1 3/16 | 3/16 / 1 1/8 / 0 / 1 5/16 | 3/16 / 1 1/8 / 0 / 1 5/16 | 3/16 / 1 1/8 / 0 / 1 5/16 | 1/8 / 1 1/8 / 0 / 1 5/16 | 1/16 / 2 / 0 / 2 1/16 | 1/16 / 1 1/16 / 0 / 1 1/8 | 0 / 1/8 / 0 / 1/8 | 0 / 1/8 / 0 / 1/8 | 1/16 / 0 / 1/2 / 9/16 | 0 / 1/8 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 1/16 / 1/16 / 0 / 1/8 | 0 / 1/8 / 0 / 1/8 | D |

Notes:

Negative values for deflections indicate deflections above chord line. Negative values of convexity or concavity and total required camber indicate values below the chord line. Deflections and convexities or concavities are given to the nearest 1/16 inch.

The following abbreviations are used:

Stl. = Dead load deflection due to the weight of steel
Rem D.L. = Remaining dead load deflection
Con. = Convexity or concavity
Tot. = Total required camber

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 9-26-1975

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

CAMBER DIAGRAM UNIT 2

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

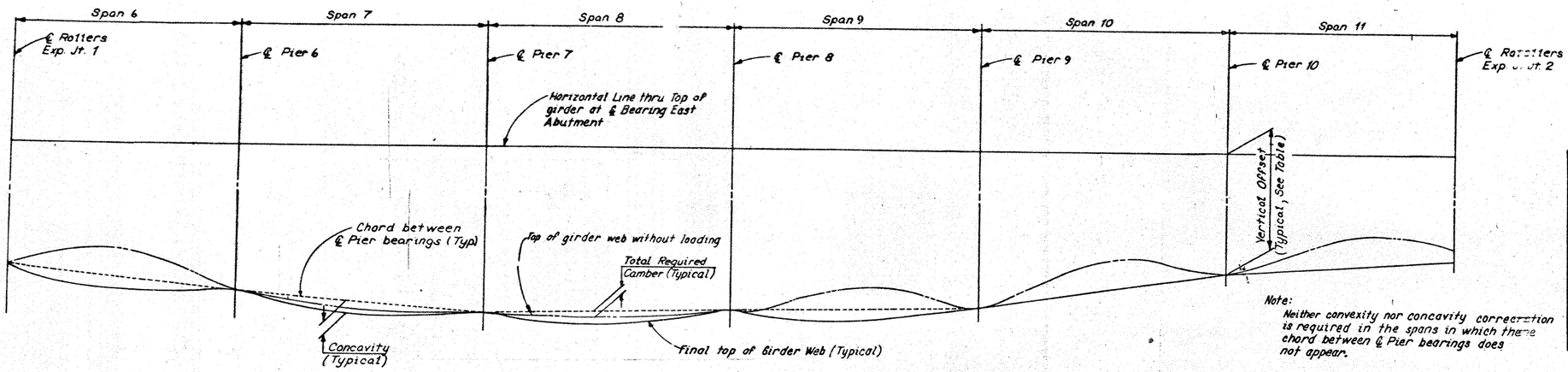
| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DATE 10-2-73 | DATE 10-11-73 | DATE 10-24-73 | DATE 4-11-74 | 6-9-75 |

SHEET 54 / 113

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

114
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




**CAMBER DIAGRAM**
*(Girder A shown)*

Note:
Neither convexity nor concavity correction is required in the spans in which the chord between ℄ Pier bearings does not appear.

**VERTICAL OFFSETS AT BEARING POINTS**

| Unit | Bearing Point | Girder A | Girder B | Girder C | Girder D |
|---|---|---|---|---|---|
| 2 | ℄Rollers Exp. Jt. 1 | -10'-11 3/16" | -11'-10 1/2" | -12'-6 1/2" | -12'-1 7/8" |
| | Pier 6 | -12'-9 1/2" | -13'-3 1/8" | -13'-5 5/16" | -13'-5 3/16" |
| | Pier 7 | -14'-0 13/16" | -14'-1 3/16" | -14'-2 1/8" | -14'-2 3/16" |
| | Pier 8 | -13'-8 5/16" | | | |
| | Pier 9 | -12'-5 3/16" | | | |
| | Pier 10 | -11'-2 1/8" | | | |
| | ℄Rollers Exp. Jt. 2 | -10'-1 3/16" | | | |

**DEAD LOAD DEFLECTIONS AND CAMBER UNIT 2**

SPAN 6

| Girder | .1 | | | | .2 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 10 | | | | .8 | | | | .9 | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | |
| A | 1/16 | 3/16 | -1/8 | 2 | 1/8 | 1 1/16 | -3/16 | 1 | 3/16 | 1 15/16 | -3/16 | 1 5/16 | 1/16 | 1 15/16 | -1/8 | 1 3/16 | 3/16 | 1 15/16 | -1/8 | 1 3/16 | 1/8 | 1 15/16 | -3/16 | 1 7/8 | 1/8 | 1 15/16 | -3/16 | 1 7/8 | 5/16 | 1 15/16 | -3/16 | 1 7/8 | 1/16 | 1 15/16 | -1/8 | 1 7/8 | 0 | 1/8 | -1/8 | 0 | A |
| B | 1/16 | 1/8 | -1/8 | 3/16 | 1/8 | 1 3/16 | -5/16 | 3/4 | 3/16 | 1 1/16 | -4 | 1 | 1/8 | 1 1/16 | -4 | 1 | 3/16 | 1 1/16 | -4 | 1 | 1/8 | 1 1/16 | -4 | 1 | 1/8 | 1 1/16 | -3/16 | 1 | 1/8 | 1 1/16 | -3/16 | 1 | 1/8 | 1 1/16 | -3/16 | 1 | 0 | 1/8 | -1/8 | 0 | B |
| C | 1/16 | 1/8 | -1/16 | 3/16 | 1/8 | 1 3/16 | -1/16 | 1/4 | 3/16 | 1 1/16 | 0 | 1 1/4 | 1/8 | 1 1/16 | 0 | 1 1/4 | 3/16 | 1 1/16 | 0 | 1 1/4 | 1/8 | 1 1/16 | 0 | 1 1/4 | 1/8 | 1 1/16 | 0 | 1 1/4 | 1/8 | 1 1/16 | 0 | 1 1/4 | 1/8 | 1 1/16 | 0 | 1 1/4 | 0 | 1/8 | 0 | 1/8 | C |
| D | 1/16 | 3/16 | 1/8 | 3/4 | 1/8 | 1 1/16 | 4 | 1 7/16 | 3/16 | 1 7/16 | 16 | 1 15/16 | 1/16 | 1 7/16 | 16 | 1 15/16 | 3/16 | 1 7/16 | 16 | 1 15/16 | 1/16 | 1 7/16 | 16 | 1 15/16 | 1/16 | 1 7/16 | 16 | 1 15/16 | 1/16 | 1 7/16 | 16 | 1 15/16 | 1/16 | 1 7/16 | 16 | 1 15/16 | 0 | 1/8 | 0 | 1/8 | D |

SPAN 7

| Girder | .1 | | | | .2 | | | | F.S. 11 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 12 | | | | .8 | | | | .9 | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | |
| A | 0 | 1/8 | -1 | -7/8 | 1/16 | 7/16 | -1 7/8 | -1 3/8 | 1/16 | 7/16 | -2 | -1 7/16 | 1/8 | 7/16 | -2 1/16 | -1 7/16 | 3/16 | 1 1/4 | -2 9/16 | -1 1/8 | 3/16 | 1 1/4 | -2 5/16 | -1 1/16 | 3/16 | 1 1/4 | -2 1/16 | -1 | 3/16 | 1 1/8 | -2 | -1 | 3/16 | 1 1/8 | -1 15/16 | -3/4 | 3/16 | 1 1/8 | -1 7/8 | -5/8 | 1/16 | 1/2 | -1 1/2 | -1 | A |
| B | 0 | 1/8 | -1 | -7/8 | 1/16 | 7/16 | -1 7/8 | -1 3/8 | 1/16 | 7/16 | -2 | -1 7/16 | 1/8 | 7/16 | -2 1/16 | -1 7/16 | 3/16 | 1 1/4 | -2 9/16 | -1 1/8 | 3/16 | 1 1/4 | -2 5/16 | -1 1/16 | 3/16 | 1 1/4 | -2 1/16 | -1 | 3/16 | 1 1/8 | -2 | -1 | 3/16 | 1 1/8 | -1 15/16 | -3/4 | 3/16 | 1 1/8 | -1 7/8 | -5/8 | 1/16 | 1/2 | -1 1/2 | -1 | B |
| C | 0 | 1/8 | -1 | -7/8 | 1/16 | 7/16 | -1 7/8 | -1 3/8 | 1/16 | 7/16 | -2 | -1 7/16 | 1/8 | 7/16 | -2 1/16 | -1 7/16 | 3/16 | 1 1/4 | -2 9/16 | -1 1/8 | 3/16 | 1 1/4 | -2 5/16 | -1 1/16 | 3/16 | 1 1/4 | -2 1/16 | -1 | 3/16 | 1 1/8 | -2 | -1 | 3/16 | 1 1/8 | -1 15/16 | -3/4 | 3/16 | 1 1/8 | -1 7/8 | -5/8 | 1/16 | 1/2 | -1 1/2 | -1 | C |
| D | 0 | 1/8 | -1 | -7/8 | 1/16 | 7/16 | -1 7/8 | -1 3/8 | 1/16 | 7/16 | -2 | -1 7/16 | 1/8 | 7/16 | -2 1/16 | -1 7/16 | 3/16 | 1 1/4 | -2 9/16 | -1 1/8 | 3/16 | 1 1/4 | -2 5/16 | -1 1/16 | 3/16 | 1 1/4 | -2 1/16 | -1 | 3/16 | 1 1/8 | -2 | -1 | 3/16 | 1 1/8 | -1 15/16 | -3/4 | 3/16 | 1 1/8 | -1 7/8 | -5/8 | 1/16 | 1/2 | -1 1/2 | -1 | D |

**DEAD LOAD DEFLECTIONS AND CAMBER UNIT 2**

SPAN 8

| Girder | .1 | | | | .2 | | | | F.S. 13 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 14 | | | | .8 | | | | .9 | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | |
| A | 0 | 1/8 | -1 | -7/8 | 1/16 | 7/16 | -1 3/8 | -1 3/16 | 1/16 | 1/2 | -2 | -1 7/16 | 1/8 | 7/8 | -2 5/8 | -1 7/16 | 3/16 | 1 3/8 | -2 5/8 | -1 3/16 | 3/16 | 1 3/8 | -2 1/16 | -1 3/16 | 3/16 | 1 3/8 | -1 7/8 | -3/8 | 1/16 | 1/2 | -1 1/2 | -15/16 | 1/16 | 1/2 | -1 1/2 | -15/16 | 1/16 | 1/2 | -1 1/2 | -15/16 | 0 | 1/8 | -3/4 | -5/8 | A |
| B | 0 | 1/8 | -3/4 | -5/8 | 1/16 | 7/16 | -1 3/8 | -5/8 | 1/16 | 1/2 | -1 1/4 | -5/8 | 1/16 | 13/16 | -1 5/8 | -13/16 | 3/16 | 1 1/8 | -1 11/16 | -5/8 | 1/16 | 1/2 | -1 1/4 | -5/8 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 0 | 1/8 | -1 | -7/8 | B |
| C | 0 | 1/8 | -5/8 | -1/2 | 1/16 | 7/16 | -1 1/16 | -5/8 | 1/16 | 1/2 | -1 1/16 | -5/8 | 1/16 | 13/16 | -1 5/16 | -7/16 | 3/16 | 1 1/8 | -1 5/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 0 | 1/8 | -1 | -7/8 | C |
| D | 0 | 1/8 | -5/8 | -1/2 | 1/16 | 7/16 | -1 1/16 | -5/8 | 1/16 | 1/2 | -1 1/16 | -5/8 | 1/16 | 7/8 | -1 5/16 | -7/16 | 3/16 | 1 1/4 | -1 5/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 1/16 | 1/2 | -1 1/16 | -7/16 | 0 | 1/8 | -1 | -7/8 | D |

SPAN 9

| Girder | .1 | | | | .2 | | | | F.S. 15 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 16 | | | | .8 | | | | .9 | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | |
| A | 0 | 1/8 | -1/4 | -1/8 | 1/16 | 7/16 | -5/16 | 1/16 | 1/16 | 1/2 | -5/16 | 1/16 | 1/8 | 7/8 | -5/8 | 1/16 | 3/16 | 1 1/4 | -4 | 1 1/16 | 3/16 | 1 3/16 | -3/16 | 1 | 1/8 | 1 1/4 | -1/8 | 1 1/8 | 1/8 | 1 1/4 | -1/8 | 1 1/8 | 1/16 | 1 1/4 | -1/8 | 1 1/16 | 0 | 1/8 | -1/16 | 1/16 | 1/16 | 1/2 | -1/8 | 1/16 | A |
| B | 0 | 1/8 | -1/4 | -1/8 | 1/16 | 7/16 | -5/16 | 1/16 | 1/16 | 1/2 | -5/16 | 1/16 | 1/8 | 7/8 | -5/8 | 1/16 | 3/16 | 1 1/4 | -4 | 1 1/16 | 3/16 | 1 3/16 | -3/16 | 1 | 1/8 | 1 1/4 | -1/8 | 1 1/8 | 1/8 | 1 1/4 | -1/8 | 1 1/8 | 1/16 | 1 1/4 | -1/8 | 1 1/16 | 0 | 1/8 | -1/16 | 1/16 | 1/16 | 1/2 | -1/8 | 1/16 | B |
| C | 0 | 1/8 | -1/4 | -1/8 | 1/16 | 7/16 | -5/16 | 1/16 | 1/16 | 1/2 | -5/16 | 1/16 | 1/8 | 7/8 | -5/8 | 1/16 | 3/16 | 1 1/4 | -4 | 1 1/16 | 3/16 | 1 3/16 | -3/16 | 1 | 1/8 | 1 1/4 | -1/8 | 1 1/8 | 1/8 | 1 1/4 | -1/8 | 1 1/8 | 1/16 | 1 1/4 | -1/8 | 1 1/16 | 0 | 1/8 | -1/16 | 1/16 | 1/16 | 1/2 | -1/8 | 1/16 | C |
| D | 0 | 1/8 | -1/4 | -1/8 | 1/16 | 7/16 | -5/16 | 1/16 | 1/16 | 1/2 | -5/16 | 1/16 | 1/8 | 7/8 | -5/8 | 1/16 | 3/16 | 1 1/4 | -4 | 1 1/16 | 3/16 | 1 3/16 | -3/16 | 1 | 1/8 | 1 1/4 | -1/8 | 1 1/8 | 1/8 | 1 1/4 | -1/8 | 1 1/8 | 1/16 | 1 1/4 | -1/8 | 1 1/16 | 0 | 1/8 | -1/16 | 1/16 | 1/16 | 1/2 | -1/8 | 1/16 | D |

**DEAD LOAD DEFLECTIONS AND CAMBER UNIT 2**

SPAN 10

| Girder | .1 | | | | .2 | | | | F.S. 17 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | F.S. 18 | | | | .8 | | | | .9 | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | |
| A | 0 | 1/8 | 0 | 1/8 | 1/16 | 7/16 | 0 | 1/2 | 1/16 | 1/2 | 0 | 3/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | 1/8 | 1 3/8 | 0 | 1 1/2 | 3/16 | 1 5/16 | 0 | 1 7/16 | 3/16 | 1 7/16 | 0 | 1 7/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | 1/16 | 1 7/16 | 0 | 1 7/16 | 3/16 | 1 7/16 | 0 | 1 7/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | A |
| B | 0 | 1/8 | 0 | 1/8 | 1/16 | 7/16 | 0 | 1/2 | 1/16 | 1/2 | 0 | 3/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | 1/8 | 1 3/8 | 0 | 1 1/2 | 3/16 | 1 5/16 | 0 | 1 7/16 | 3/16 | 1 7/16 | 0 | 1 7/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | 1/16 | 1 7/16 | 0 | 1 7/16 | 3/16 | 1 7/16 | 0 | 1 7/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | B |
| C | 0 | 1/8 | 0 | 1/8 | 1/16 | 7/16 | 0 | 1/2 | 1/16 | 1/2 | 0 | 3/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | 1/8 | 1 3/8 | 0 | 1 1/2 | 3/16 | 1 5/16 | 0 | 1 7/16 | 3/16 | 1 7/16 | 0 | 1 7/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | 1/16 | 1 7/16 | 0 | 1 7/16 | 3/16 | 1 7/16 | 0 | 1 7/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | C |
| D | 0 | 1/8 | 0 | 1/8 | 1/16 | 7/16 | 0 | 1/2 | 1/16 | 1/2 | 0 | 3/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | 1/8 | 1 3/8 | 0 | 1 1/2 | 3/16 | 1 5/16 | 0 | 1 7/16 | 3/16 | 1 7/16 | 0 | 1 7/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | 1/16 | 1 7/16 | 0 | 1 7/16 | 3/16 | 1 7/16 | 0 | 1 7/16 | 1/8 | 1 3/8 | 0 | 1 1/2 | D |

SPAN 11

| Girder | .1 | | | | .2 | | | | F.S. 19 | | | | .3 | | | | .4 | | | | .5 | | | | .6 | | | | .7 | | | | .8 | | | | .9 | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | Stl. | Rem D.L. | Con. | Tot. | |
| A | 0 | 1/8 | 0 | 1/8 | 1/16 | 3/16 | 0 | 1/4 | 1/16 | 1/2 | 0 | 3/16 | 1/8 | 1 1/16 | 0 | 1 1/4 | 1/8 | 1 1/16 | 0 | 1 1/4 | 3/16 | 1 1/16 | 0 | 1 1/2 | 3/16 | 1 1/16 | 0 | 1 1/2 | 1/8 | 1 | 0 | 1 1/8 | 1/16 | 1 | 0 | 1 1/16 | 3/16 | 1 1/16 | 0 | 1 1/2 | 1/8 | 1 | 0 | 1 1/8 | A |
| B | 0 | 1/8 | 0 | 1/8 | 1/16 | 3/16 | 0 | 1/4 | 1/16 | 1/2 | 0 | 3/16 | 1/8 | 1 1/16 | 0 | 1 1/4 | 1/8 | 1 1/16 | 0 | 1 1/4 | 3/16 | 1 1/16 | 0 | 1 1/2 | 3/16 | 1 1/16 | 0 | 1 1/2 | 1/8 | 1 | 0 | 1 1/8 | 1/16 | 1 | 0 | 1 1/16 | 3/16 | 1 1/16 | 0 | 1 1/2 | 1/8 | 1 | 0 | 1 1/8 | B |
| C | 0 | 1/8 | 0 | 1/8 | 1/16 | 3/16 | 0 | 1/4 | 1/16 | 1/2 | 0 | 3/16 | 1/8 | 1 1/16 | 0 | 1 1/4 | 1/8 | 1 1/16 | 0 | 1 1/4 | 3/16 | 1 1/16 | 0 | 1 1/2 | 3/16 | 1 1/16 | 0 | 1 1/2 | 1/8 | 1 | 0 | 1 1/8 | 1/16 | 1 | 0 | 1 1/16 | 3/16 | 1 1/16 | 0 | 1 1/2 | 1/8 | 1 | 0 | 1 1/8 | C |
| D | 0 | 1/8 | 0 | 1/8 | 1/16 | 3/16 | 0 | 1/4 | 1/16 | 1/2 | 0 | 3/16 | 1/8 | 1 1/16 | 0 | 1 1/4 | 1/8 | 1 1/16 | 0 | 1 1/4 | 3/16 | 1 1/16 | 0 | 1 1/2 | 3/16 | 1 1/16 | 0 | 1 1/2 | 1/8 | 1 | 0 | 1 1/8 | 1/16 | 1 | 0 | 1 1/16 | 3/16 | 1 1/16 | 0 | 1 1/2 | 1/8 | 1 | 0 | 1 1/8 | D |

*Notes:*

*Negative values for deflections indicate deflections above chord line. Negative values of convexity or concavity and total required camber indicate values below the chord line. Deflections and convexities or concavities are given to the nearest 1/16 inch.*

*The following abbreviations are used:*

*Stl. = Dead load deflection due to the weight of steel*

*Rem D.L. = Remaining dead load deflection*

*Con. = Convexity or concavity*

*Tot. = Total required camber*

THIS PLAN SHEET HAS BEEN REVISED SEE REVISION 6-9 19 76

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

CAMBER DIAGRAM UNIT 2

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

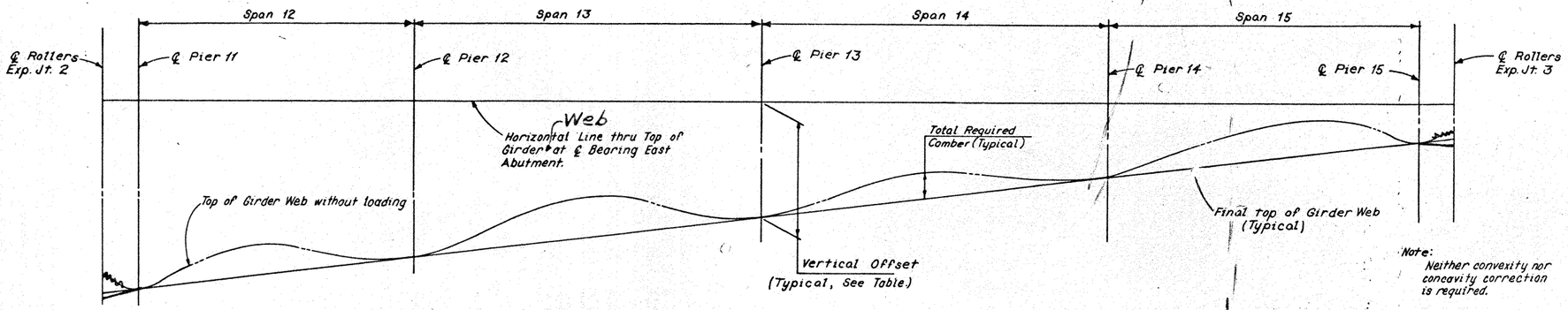
| DRAWN | TRACED | CHECKED | REVISED | REVISED |
|---|---|---|---|---|
| SJS | SJS | AHS | CAB | |
| DATE 10-2-73 | DATE 10-11-73 | DATE 10-24-73 | DATE 4-11-74 | |

SHEET 50 of 73

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

115 / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




CAMBER DIAGRAM
(Girder A shown)

Note:
Neither convexity nor concavity correction is required.

| VERTICAL OFFSETS AT BEARING POINTS | | |
|---|---|---|
| Unit | Bearing Point | Girders A, B, C and D |
| 3 | ℄ Rollers Exp. Jt. 2 | -31'-1⅞" - 8'-11 5/8" |
| | Pier 11 | -31'-11⅝" - 8'-9 11/16" |
| | Pier 12 | -31'-6⅞" - 7'-4 5/8" |
| | Pier 13 | -31'-0⅞" - 5'-7 1/4" |
| | Pier 14 | -31'-0⅜" - 3'-10 3/8" |
| | Pier 15 | -31'-5⅜" - 2'-3 1/2" |
| | ℄ Rollers Exp. Jt. 3 | -31'-1⅞" - 2'-1 3/8" |

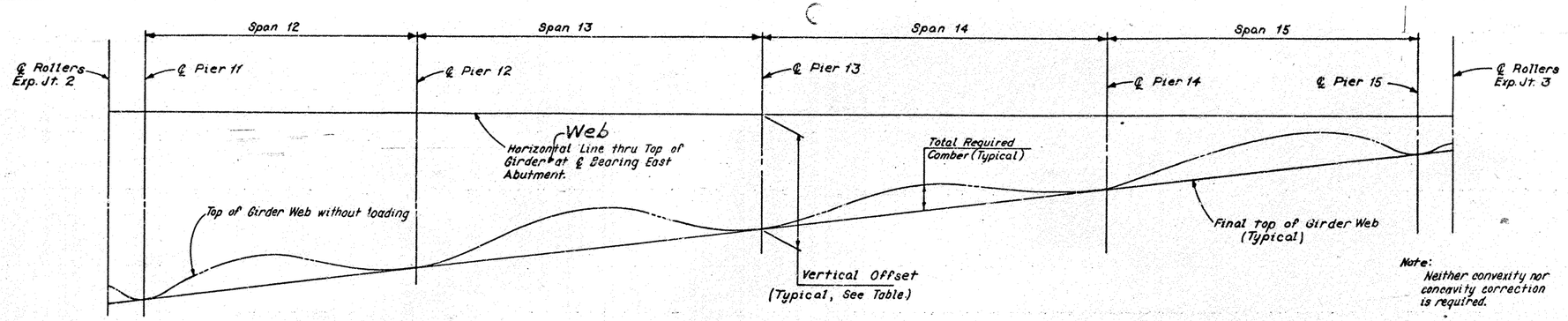
DEAD LOAD DEFLECTIONS AND CAMBER UNIT 3

| Girder | ℄ ROLLER EXP JT. 2 | SPAN 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPAN 13 | | | | | | | | | | | | | | | | | | |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

115
148




CAMBER DIAGRAM
(Girder A shown)

Note:
Neither convexity nor concavity correction is required.

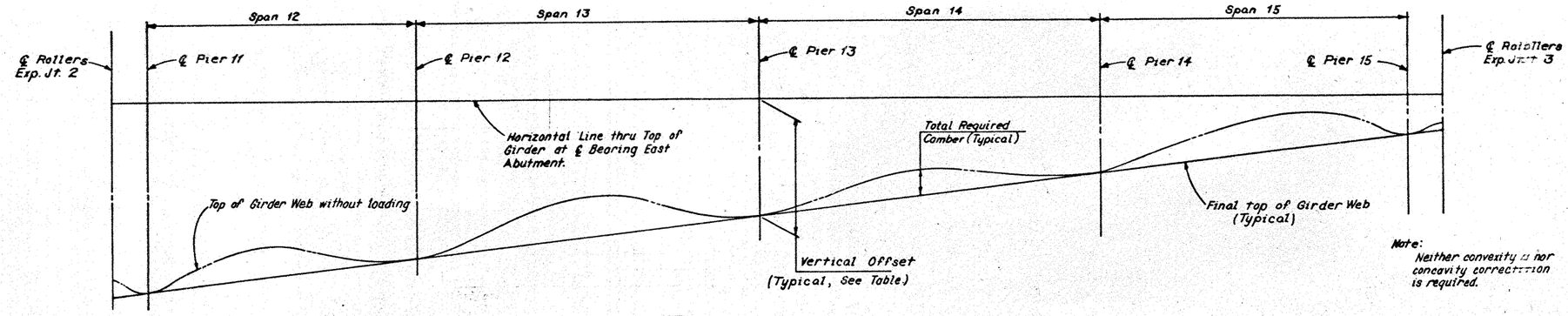
| VERTICAL OFFSETS AT BEARING POINTS | | |
|---|---|---|
| Unit | Bearing Point | Girders A, B, C and D |
| 3 | ℄ Rollers Exp. Jt. 2 | (10'-1⅞") - 8'-11 5/8" |
| | Pier 11 | (9'-11⅞") - 8'-9 1/16" |
| | Pier 12 | (8'-6⅞") - 7'-4 5/8" |
| | Pier 13 | (6'-3⅞") - 5'-7 1/4" |
| | Pier 14 | (5'-0⅞") - 4'-10 3/8" |
| | Pier 15 | (3'-5⅞") - 2'-3 1/2" |
| | ℄ Rollers Exp. Jt. 3 | (3'-1⅞") - 2'-1 3/8" |

DEAD LOAD DEFLECTIONS AND CAMBER UNIT 3

| Girder | ℄ ROLLER EXP. JT. 2 | SPAN 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPAN 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Girder |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | .1 | | | | F.S. 20 | | | .2 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | F.S. 21 | | | .8 | | | .9 | | | .1 | | | F.S. 22 | | | .2 | | | .3 | | | .4 | | | .5 | | | .6 | | | .7 | | | .8 | | | F.S. 23 | | | .9 | | | |
| | | Stl. | Rem. D.L. | Con. | Tot. | Stl. | Rem. D.L. | Con. | Tot. | Stl. | Rem. D.L. | Con. | Tot.

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




CAMBER DIAGRAM
(Girder A shown)

| VERTICAL OFFSETS AT BEARING POINTS | | |
|---|---|---|
| Unit | Bearing Point | Girders A, B, C and D |
| 3 | ℄ Rollers Exp. Jt. 2 | -10'-1 7/8" |
| | Pier 11 | -9'-11 11/16" |
| | Pier 12 | -8'-6 3/8" |
| | Pier 13 | -6'-9 3/4" |
| | Pier 14 | -5'-0 5/8" |
| | Pier 15 | -3'-5 1/4" |
| | ℄ Rollers Exp. Jt. 3 | -3'-1 1/8" |

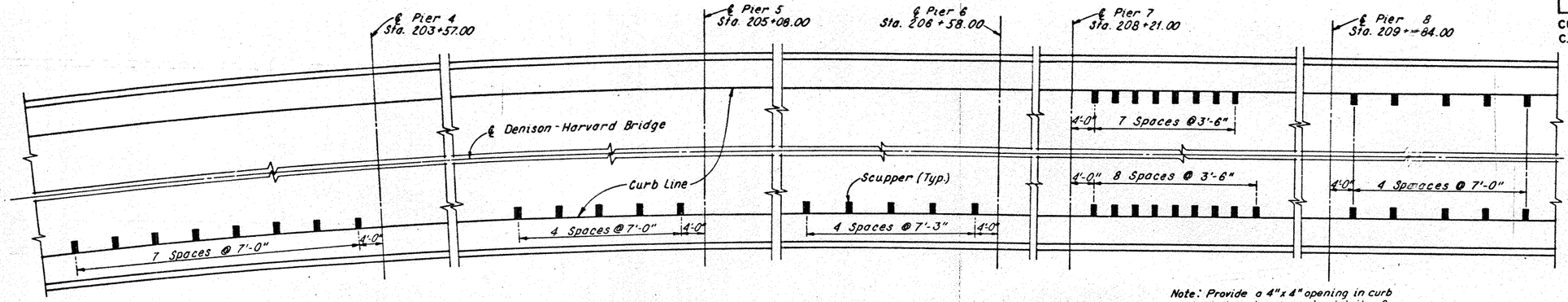
DEAD LOAD DEFLECTIONS AND CAMBER UNIT 3

| Girder | ℄ ROLLER EXP JT. 2 | SPAN 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SPAN 13 | | | | | | | | | | | | | | | | | | |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

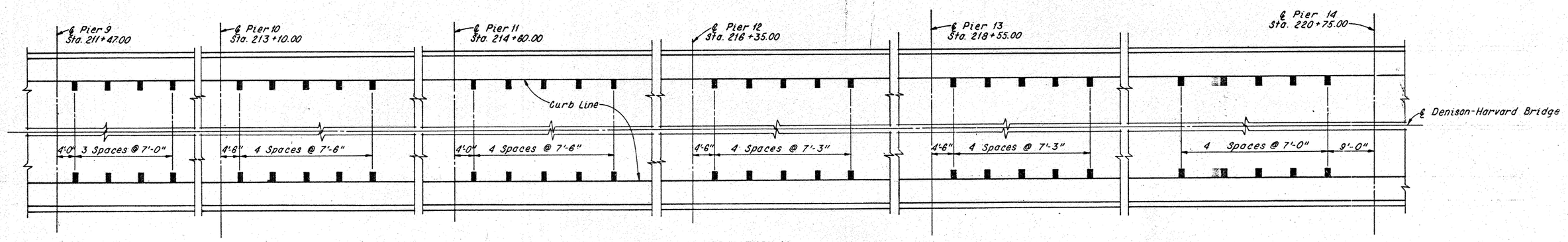
115
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

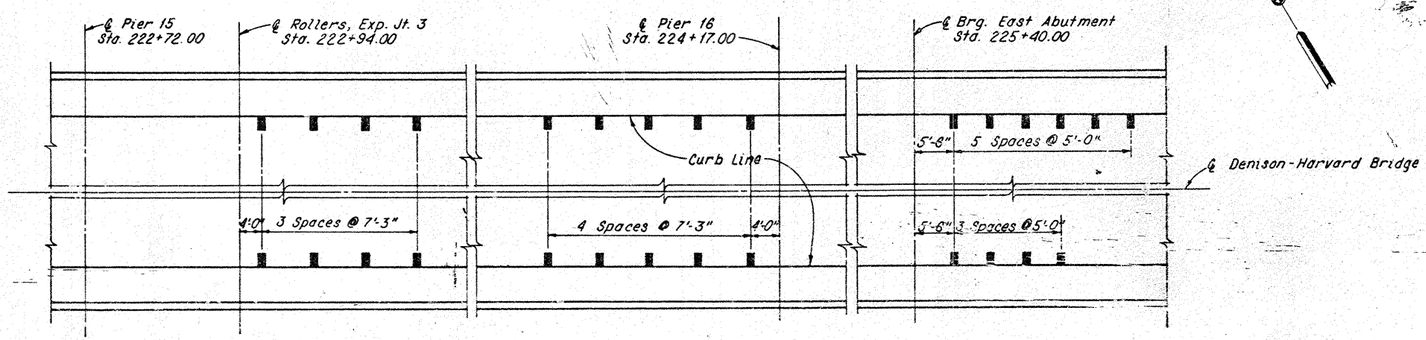



SCUPPER LOCATIONS AT PIER 4 THRU 8
(No Scale)

Note: Provide a 4"x 4" opening in curb behind each scupper in vicinity of Pier 7. For Details see sheet 58/73




SCUPPER LOCATIONS AT PIER 9 THRU 14
(No Scale)




SCUPPER LOCATIONS AT EXP. JT. 3, PIER 16 AND EAST ABUTMENT
(No Scale)

Notes: For Scupper and Drainage Details see sheets 57/73 thru 60/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# SCUPPER LOCATIONS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

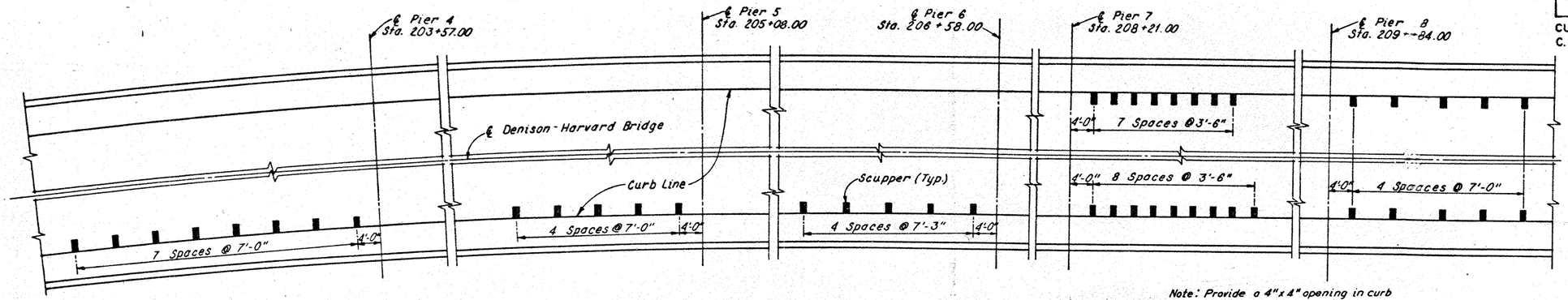
CUYAHOGA COUNTY OHIO

| DRAWN DHS | TRACED SJS | CHECKED AHS | REVIEWED EAB | REVISED |
|---|---|---|---|---|
| DATE 12-14-73 | DATE 1-4-74 | DATE 1-26-74 | DATE 4-11-74 | SHEET 58/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

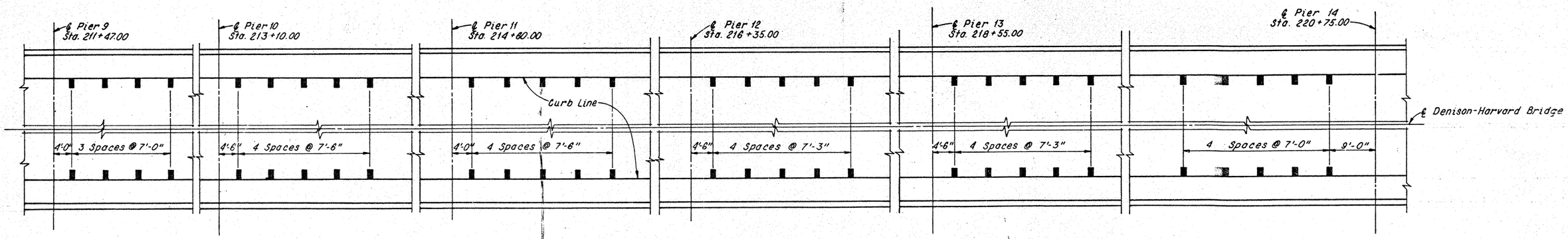
115/143

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

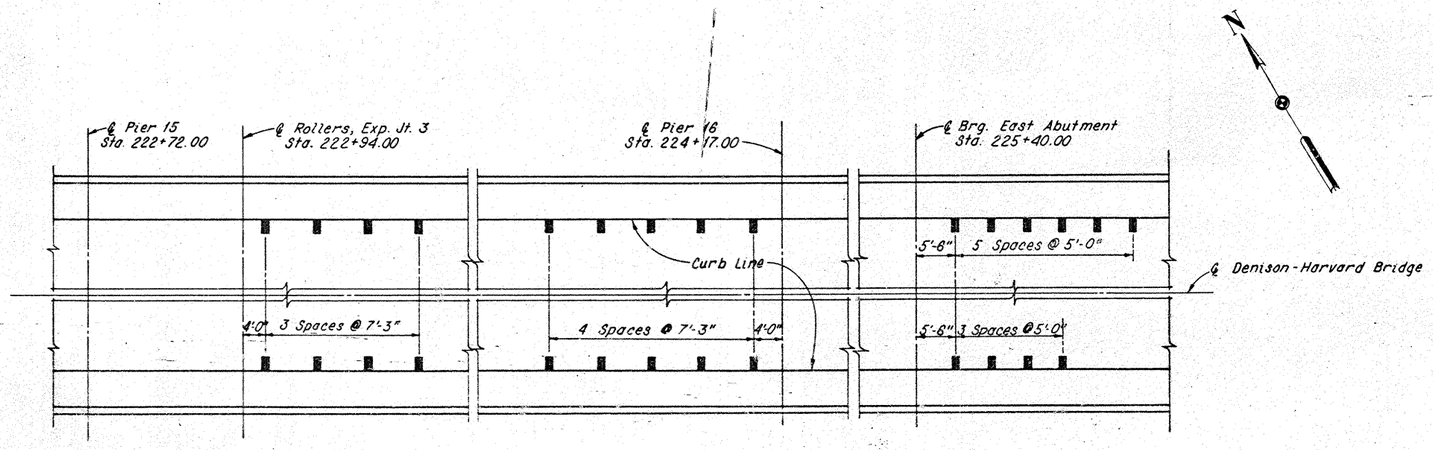



SCUPPER LOCATIONS AT PIER 4 THRU 8
(No Scale)

Note: Provide a 4"x 4" opening in curb behind each scupper in vicinity of Pier 7. For Details see sheet 58/73




SCUPPER LOCATIONS AT PIER 9 THRU 14
(No Scale)




SCUPPER LOCATIONS AT EXP. JT. 3, PIER 16 AND EAST ABUTMENT
(No Scale)

Notes: For Scupper and Drainage Details see sheets 57/73 thru 60/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# SCUPPER LOCATIONS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

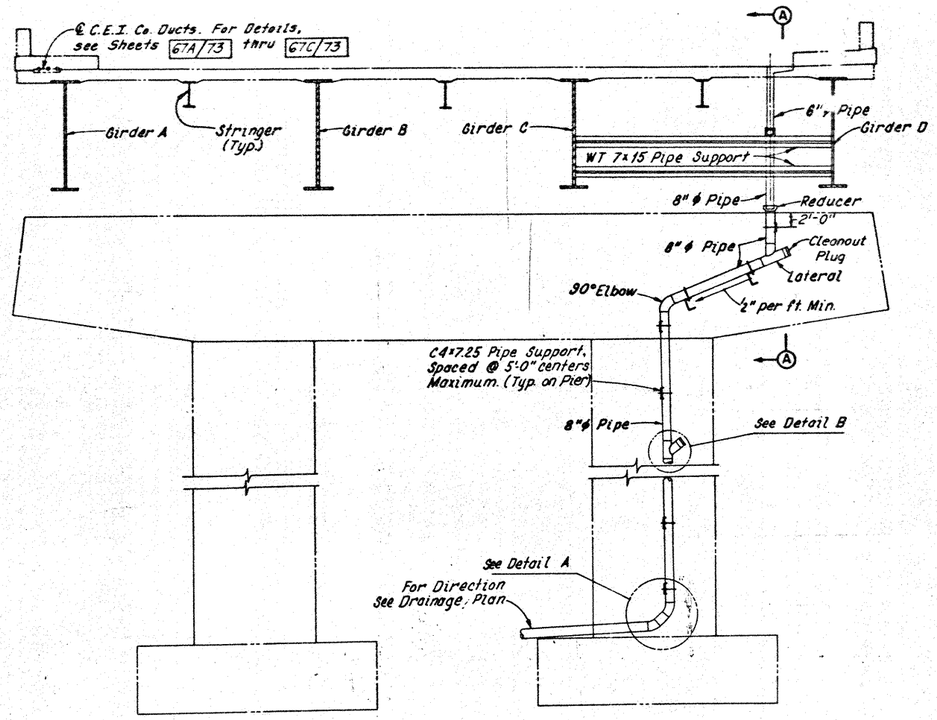
CUYAHOGA COUNTY OHIO

| DRAWN DHS | TRACED SJS | CHECKED AHS | REVIEWED CAB | REVISED |
|---|---|---|---|---|
| DATE 12-14-73 | DATE 1-4-74 | DATE 2-8-74 | DATE 4-11-74 | SHEET 55/73 |

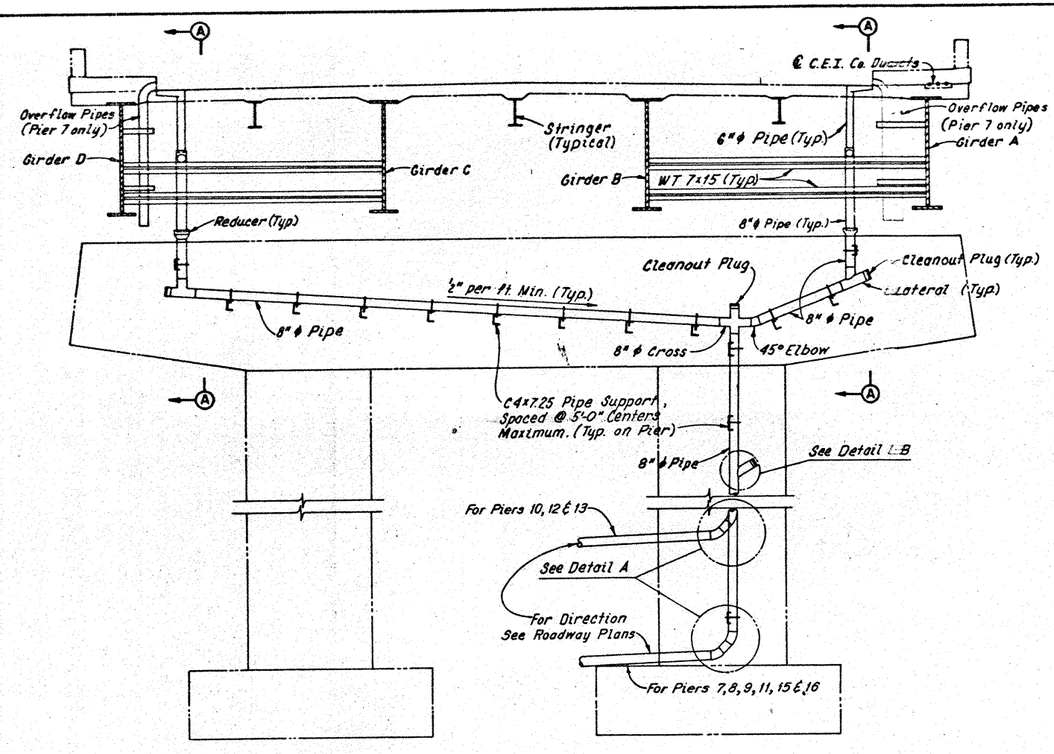
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

117
148

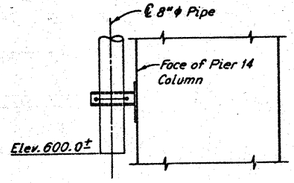
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



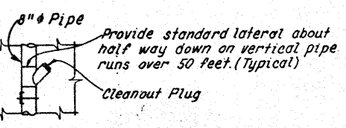

PIERS 4, 5 & 6
(Looking East)
(For Pier 4 pipes are on far side of Pier)



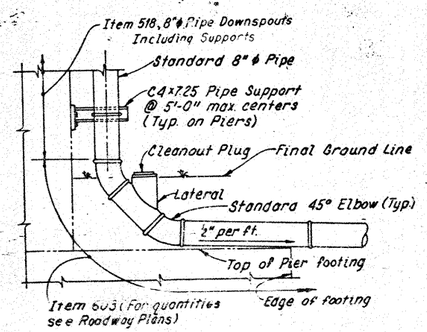

PIERS 7, 8, 9, 10, 11, 12, 13, 15 AND 16 (LOOKING WEST)
PIER 14 (LOOKING EAST)
(Vertical 8" ϕ Pipe along Pier Column at Pier 14 shall be stopped at Elev. 600.0±, See Detail C)



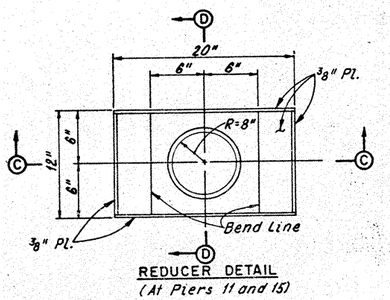

DETAIL C



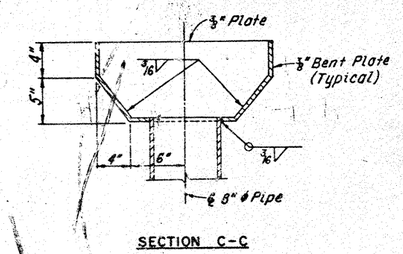

DETAIL B



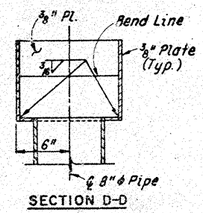

DETAIL A
(Turn pipe, Lateral and 45° Elbow as required for connection to storm sewer)



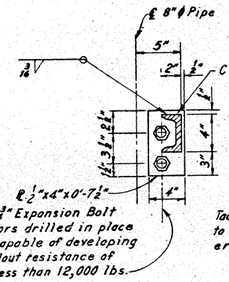

REDUCER DETAIL
(At Piers 11 and 15)



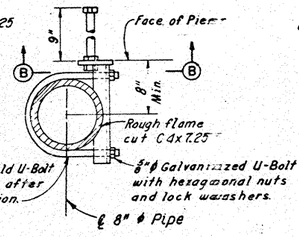

SECTION C-C



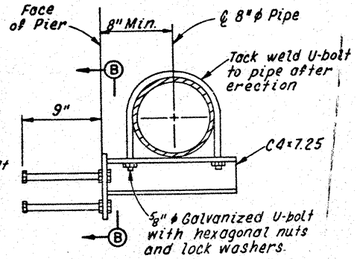

SECTION D-D




SECTION B-B




PLAN




PLAN

PIPE SUPPORT DETAIL
ON PIERS

Notes:
For Scupper Detail see sheet 56/73.
For Section A-A see sheet 58/73.
Reducer at piers is 16"x8" standard concentric reducer except at Piers 11 and 15, see Reducer Detail for Piers 11 and 15 on this sheet.
For additional notes see sheet 60/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DRAINAGE DETAILS (ON PIERS)

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

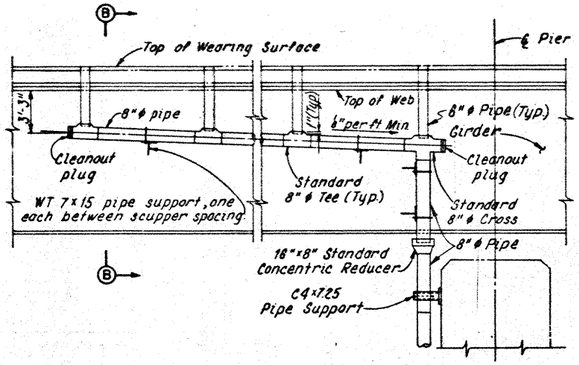
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | SHEET NO. | REVISED |
|---|---|---|---|---|
| DHS | SJS | CAG | | |
| DATE 11-1-73 | DATE 1-24-74 | DATE 1-30-74 | DATE 6-11-74 | SHEET 57/73 |

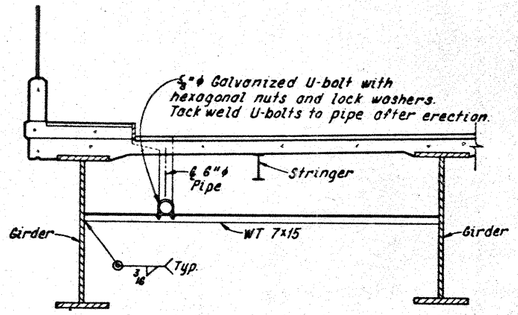
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

118
148

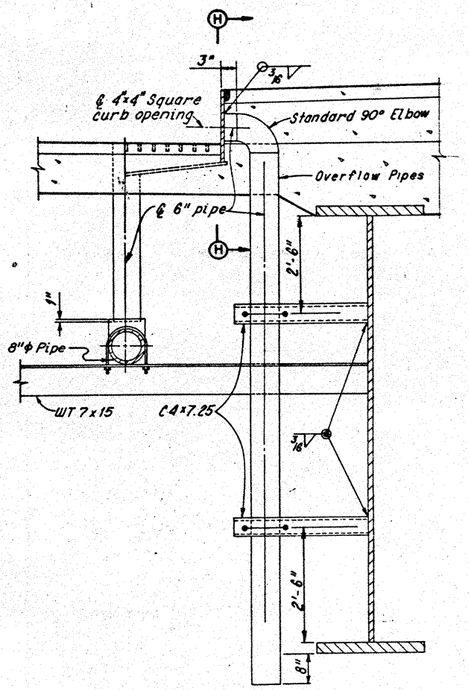
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



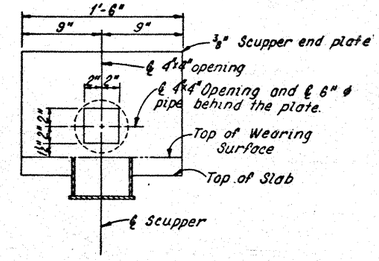

SECTION A-A
(Typical at piers except at Piers 7,15 and 16)



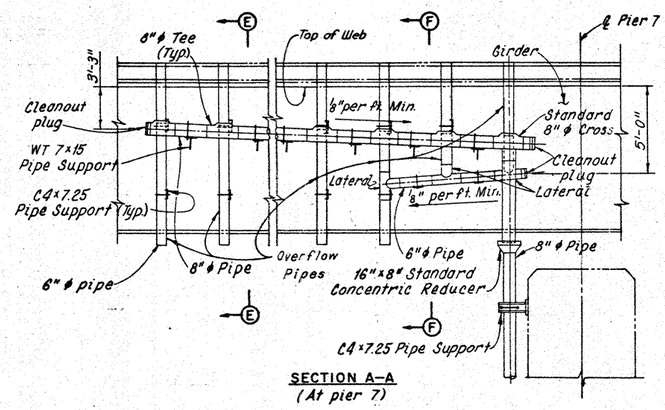

SECTION B-B



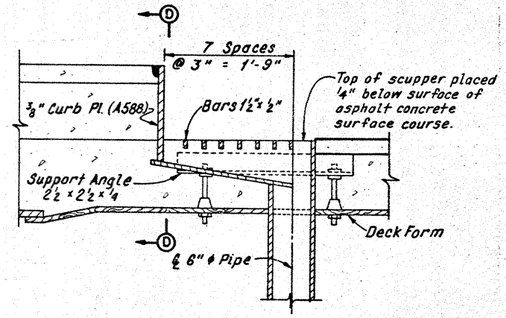

SECTION E-E



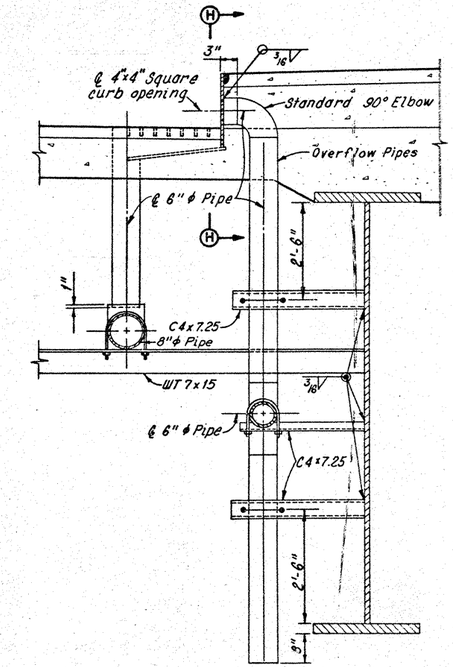

SECTION H-H
(For details not shown see Section D-D)



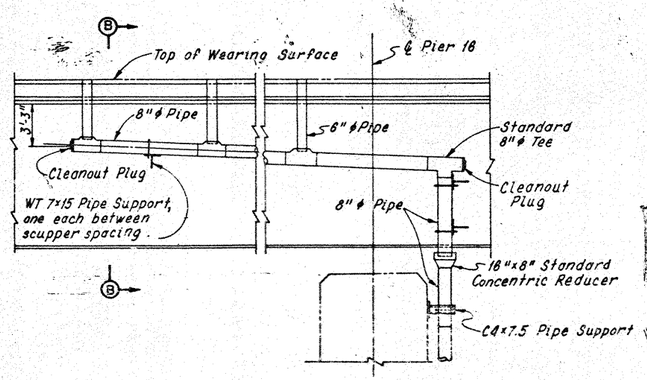

SECTION A-A
(At pier 7)



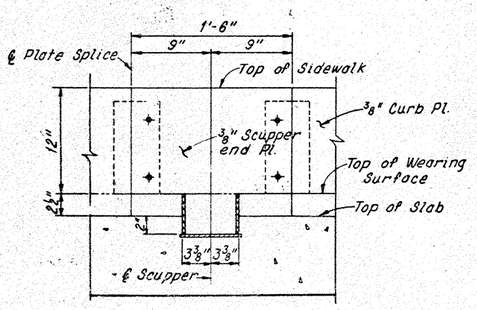

SCUPPER DETAIL
(For Details not shown see Ohio Standard Drawing SD-1-69 Sheet No. 3 of 4.)




SECTION F-F




SECTION A-A
(At Pier 16)




SECTION D-D (TYPICAL EXCEPT NEAR PIER 7)
(For Plate Splice detail see Curb Plate Splice Sheet 64/73.)
(For Details @ Pier 7 See Section H-H.)

Notes:
For location of Section A-A see sheet 57/73.
For additional notes see sheet 60/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DRAINAGE DETAILS (ON SUPERSTRUCTURE)

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

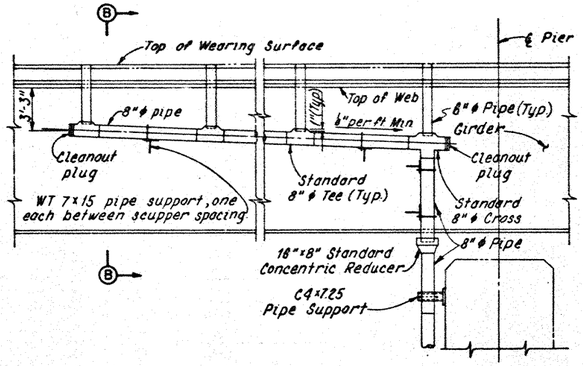
CUYAHOGA COUNTY

| DRAWN DHS | TRACED SJS | CHECKED AHS | REVIEWED EAB | REVISED |
|---|---|---|---|---|
| DATE 11-1-73 | DATE 1-8-74 | DATE 1-30-74 | DATE 4-17-74 | SHEET 53/73 |

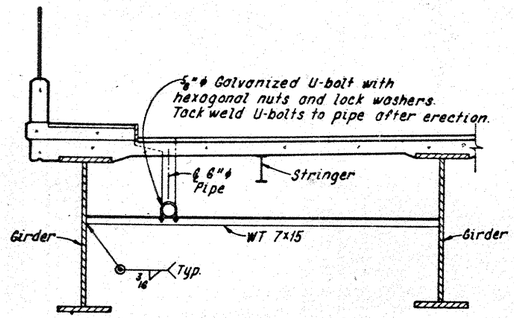
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

115
148

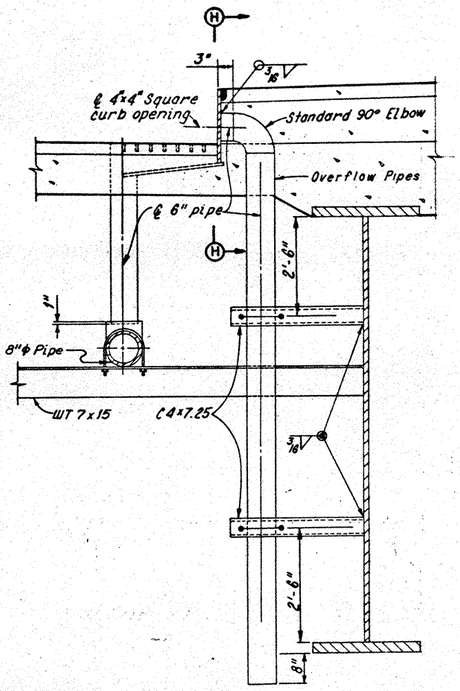
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



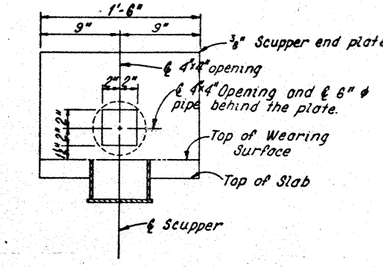

SECTION A-A
(Typical at piers except at Piers 7,15 and 16)



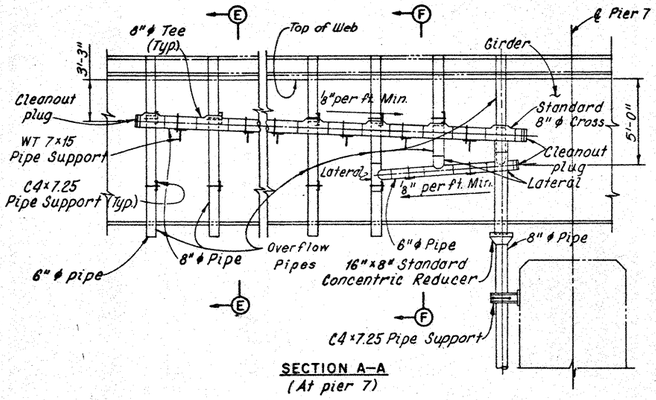

SECTION B-B



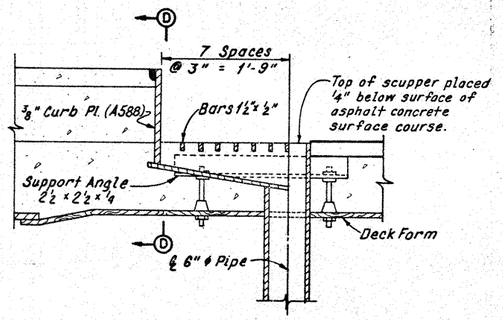

SECTION E-E



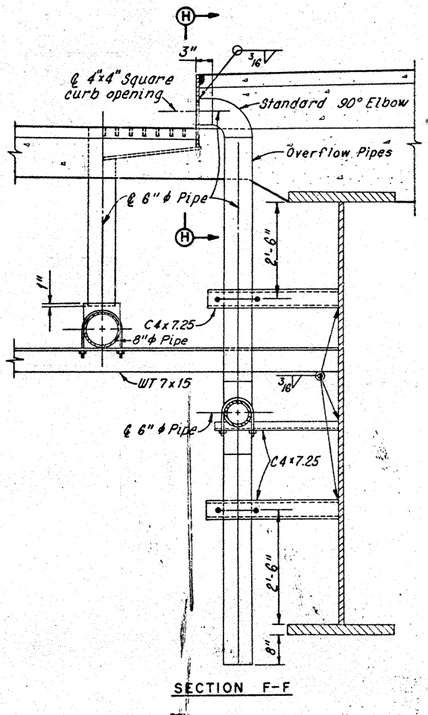

SECTION H-H
(For details not shown see Section D-D)



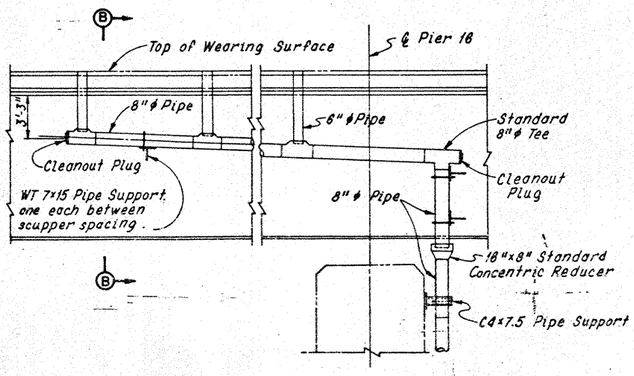

SECTION A-A
(At pier 7)



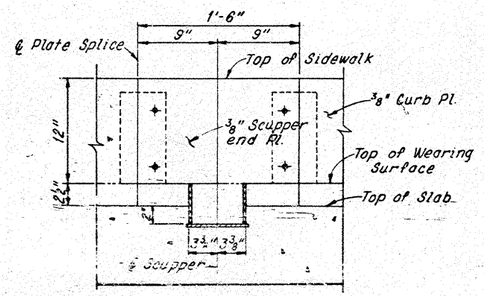

SCUPPER DETAIL
(For Details not shown see Ohio Standard Drawing SD1-69 Sheet No. 3 of 4.)




SECTION F-F




SECTION A-A
(At Pier 16)




SECTION D-D (TYPICAL EXCEPT NEAR PIER 7)
(For Plate Splice detail see Curb Plate Splice Sheet 64/73.)
(For Details @ Pier 7 See Section H-H.)

Notes:
For location of Section A-A see sheet 57/73.
For additional notes see sheet 60/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DRAINAGE DETAILS (ON SUPERSTRUCTURE)

DENISON-N. YARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN DHS | TRACED SJS | CHECKED JHS | REVIEWED EJH | REVISED |
|---|---|---|---|---|
| DATE 11-1-73 | DATE 11-8-73 | DATE 1-30-74 | DATE 2-11-74 | SHEET 58/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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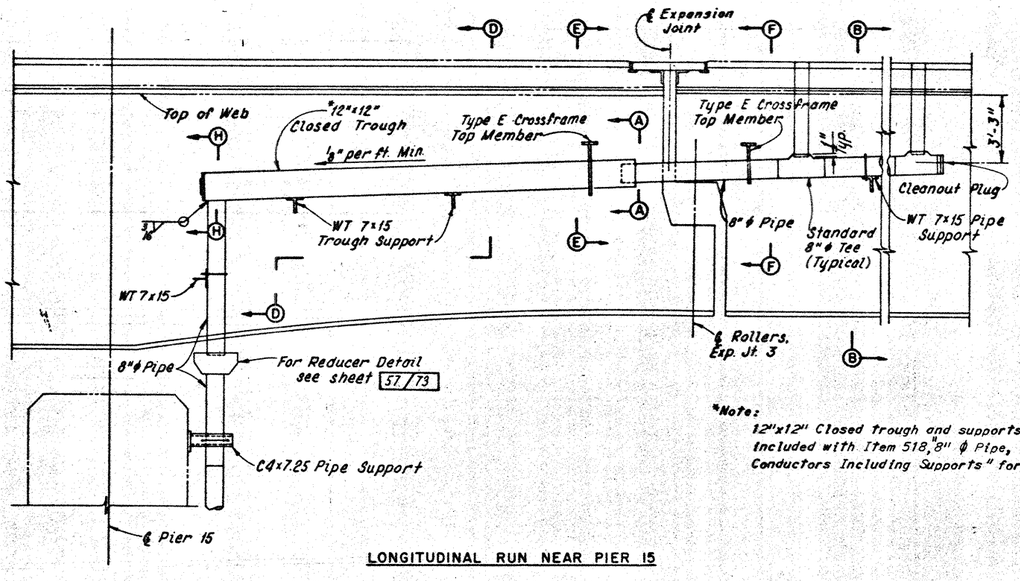
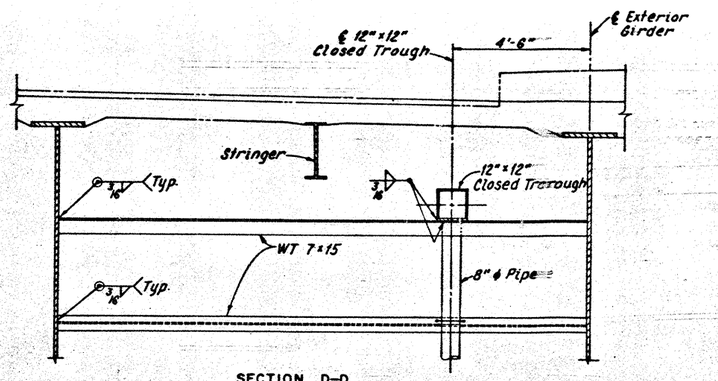
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

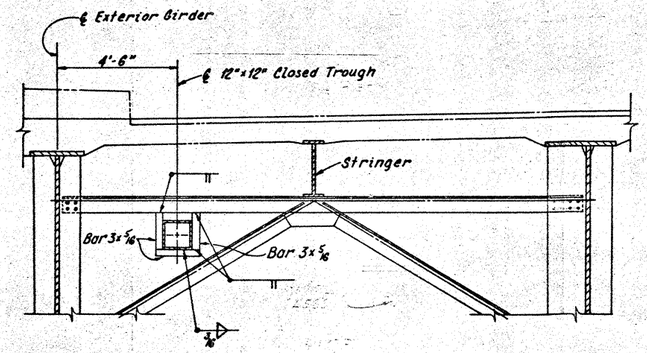



LONGITUDINAL RUN NEAR PIER 15

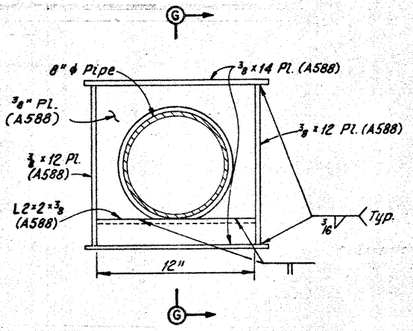
*Note:
12"x12" Closed trough and supports shall be included with Item 518,"8" ϕ Pipe, Horizontal Conductors Including Supports" for payment.



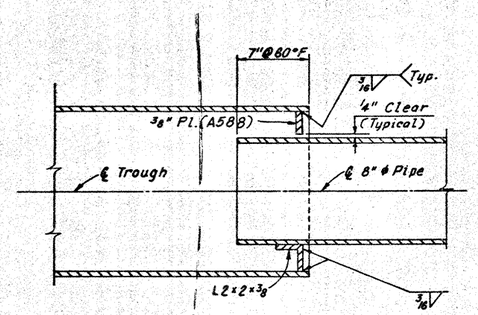

SECTION D-D



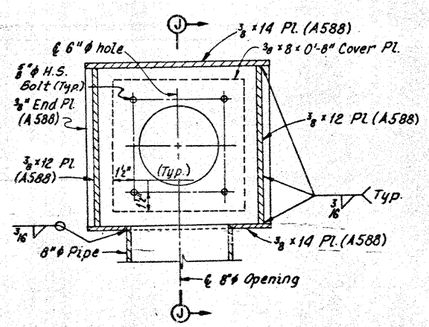

SECTION E-E



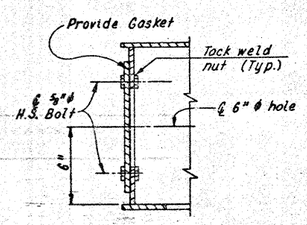

SECTION A-A



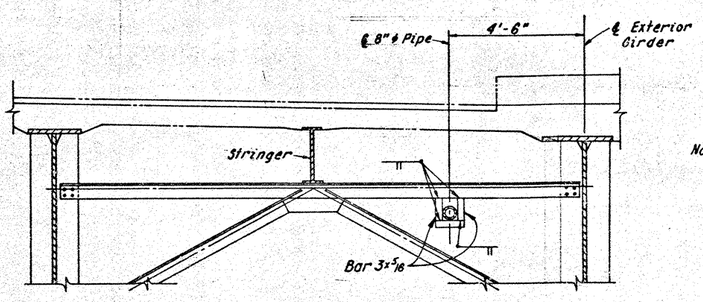

SECTION G-G




SECTION H-H




SECTION J-J




SECTION F-F

Note:
For Section B-B see sheet 58/73.
For additional notes see sheet 60/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DRAINAGE DETAILS (ON SUPERSTRUCTURE)

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

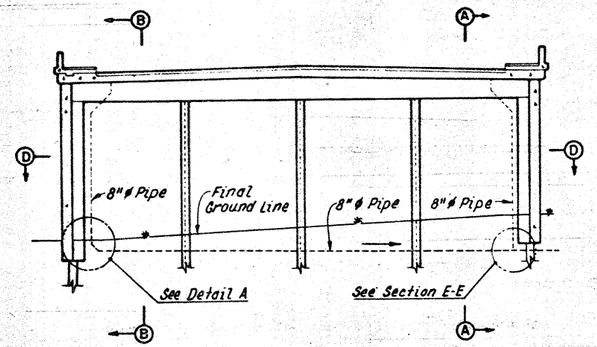
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DHS | SJS | AHS | EJS | |
| DATE 11-1-73 | DATE 1-9-74 | DATE 1-30-74 | DATE 2-11-74 | SHEET 59/73 |

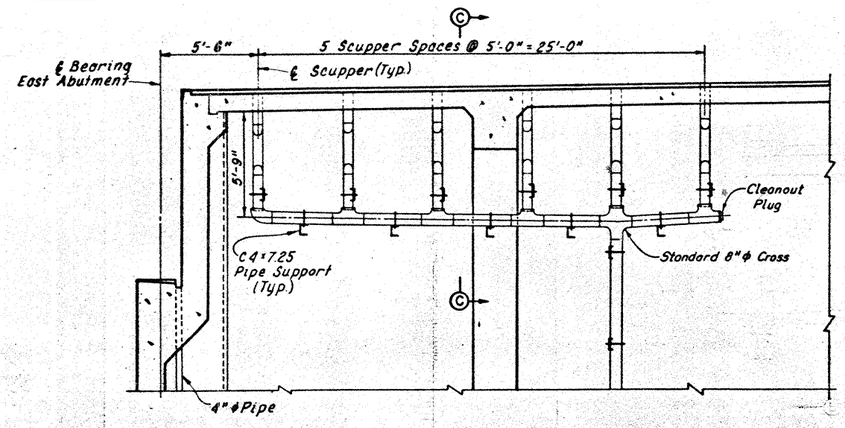
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

127
148

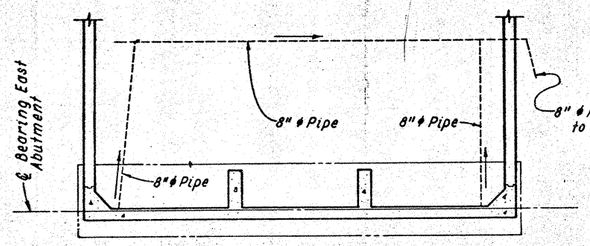
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



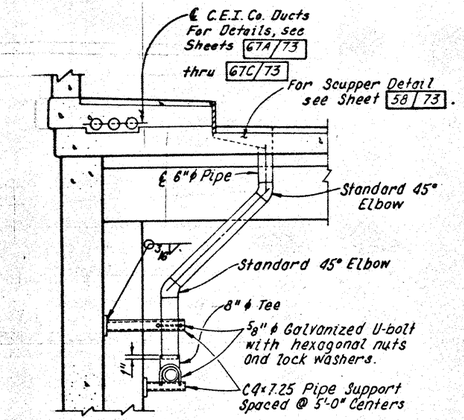

EAST ABUTMENT CELLULAR CROSS SECTION
(Looking East)



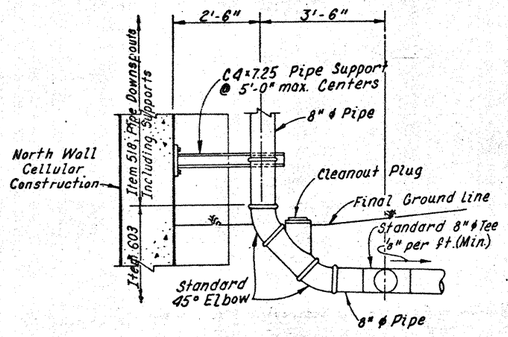

SECTION B-B
(For details not shown See Section A-A)



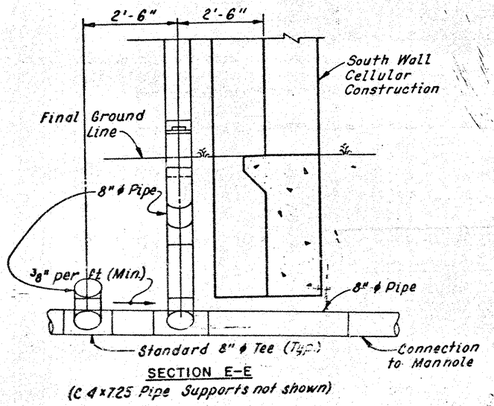

SECTION D-D



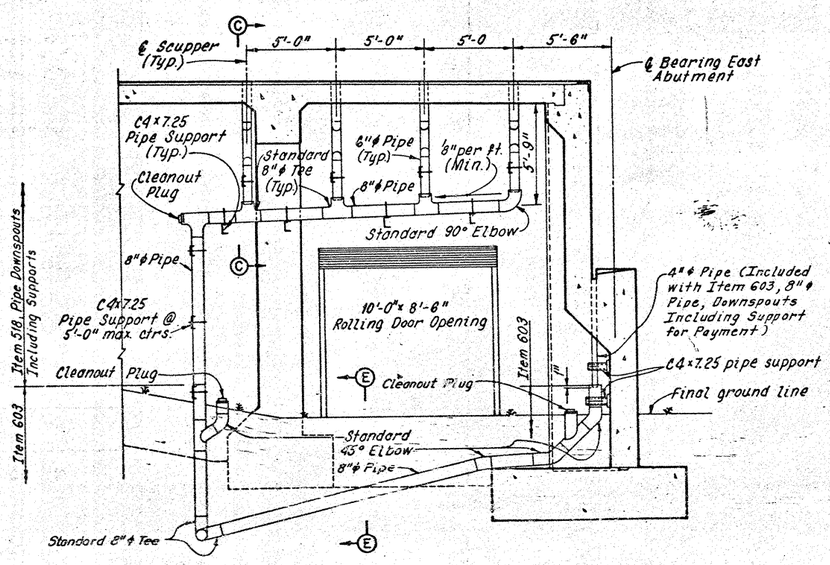

SECTION C-C




DETAIL A
Scale 1/2"=1'-0"




SECTION E-E
(C 4x725 Pipe Supports not shown)




SECTION A-A

**Notes:**

The scuppers, scupper supports, curb openings and troughs shall be hot-dipped galvanized ASTM A588 steel. The 4"ϕ, 6"ϕ and 8"ϕ pipes shall be alloy steel pipe, 707.11, or hot-dipped galvanized steel pipe. Joints shall be made by welding or by use of clamp-type coupling with a rinng gasket. All welding shall be done before galvanizing. Support material for attaching pipes shall be ASTM A588. The bolts shall be galvanized as specified in ASTM A153.

Standard 4"ϕ, 6"ϕ or 8"ϕ elbows, tees, crosses and laterals shall be used in all cases.

The support angles and attached 6"ϕ pipe are included with Item 518, Scuppers Including Supports, for payment.

The 6"ϕ pipe attached to superstructure including fittings, supports and accessories shall be paid for at the unit price bid for Item 518, 6"ϕ Pipe, Horizontal Conductors Including Supports.

The 8"ϕ pipe attached to superstructure including fittings, supports and accessories shall be paid for at the unit price bid for Item 518, 8"ϕ Pipe, Horizontal Conductors Including Supports.

The 8"ϕ pipe attached to the substructure including fittings, supports and accessories shall be paid for at the unit price bid for Item 518, 8"ϕ Pipe, Downspouts, Including Supports.

For pipe support details on wall, see "Pipe Support Details on Piers" on Sheet 57/73, except "pier" shall read "wall".

For Item 603 Quantities, see Roadway Plans.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# DRAINAGE DETAILS (AT CELLULAR CONSTRUCTION AND EAST ABUTMENT)

DENISON-HAYWARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

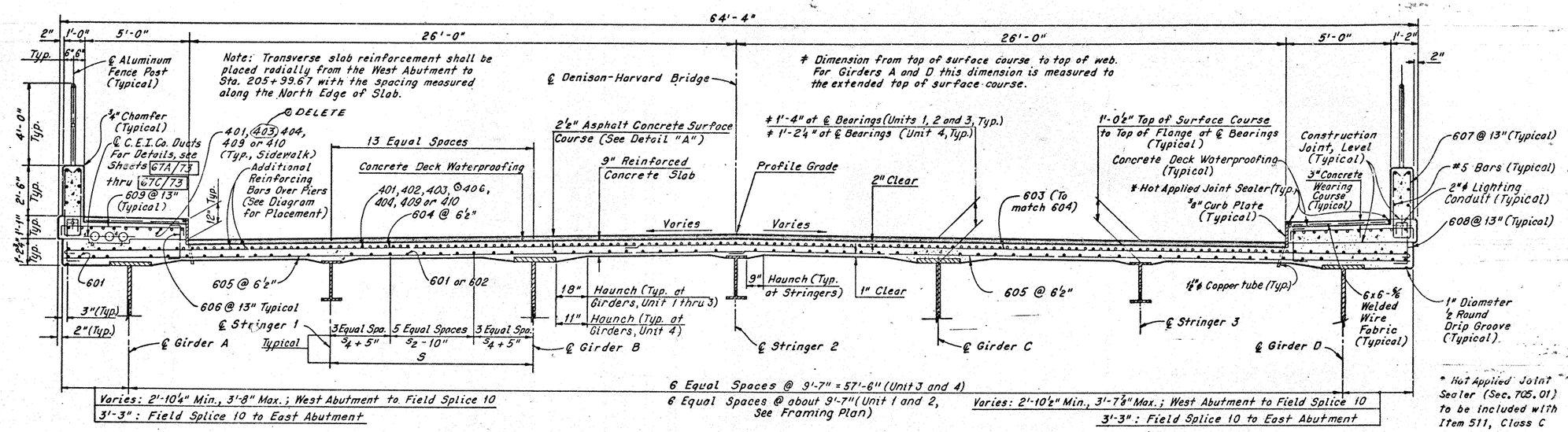
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DHS | SJS | AHS | SAB | |
| DATE 11-1-73 | DATE 1-28-74 | DATE 1-30-74 | DATE 4-11-74 | SHEET 60/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

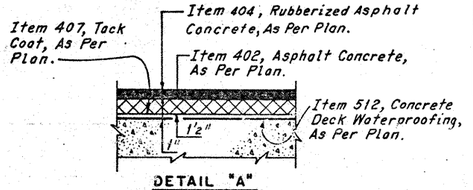
121 / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




TYPICAL CROSS SECTION

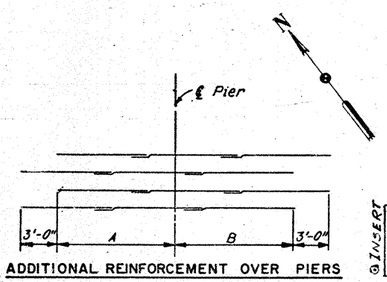
* Hot Applied Joint Sealer (Sec. 705.01) to be included with Item 511, Class C Concrete, Superstructure, for payment.




DETAIL "A"

Note:
All reinforcing bar marks shall be prefixed as follows:
SA - Unit 1
SB - Unit 2
SC - Unit 3
SD - Unit 4

Note: The deck slab haunch adjacent to the top of the steel girders which is shown as 18" wide for Units 1 thru 3 and 11" for Unit 4 may vary from this dimension with a minimum of 14" and a maximum of 24" for Units 1 thru 3 and with a minimum of 10" and maximum of 14" for Unit 4. (The slope shall not be more than 1:4)




ADDITIONAL REINFORCEMENT OVER PIERS

| ADDITIONAL REINFORCING OVER PIERS | | | | |
|---|---|---|---|---|
| Unit | Pier | A | B | No. of Bars |
| 1 | 1 | 43'-0" | 43'-0" | 82 Lines of 3-405 |
| | 2 | 43'-0" | 46'-0" | 82 Lines of 3-406 |
| | 3 | 47'-0" | 43'-0" | 82 Lines of 3-407 |
| | 4 | 43'-0" | 47'-0" | 82 Lines of 3-407 |
| | 5 | 46'-0" | 44'-0" | 82 Lines of 3-408 |
| 2 | 6, 7, 8, 9, & 10 | 40'-0" | 40'-0" | 82 Lines of 3-405 |
| 3 | 11 | 12'-0" | 20'-0" | 82 Lines of 3-405 |
| | 12 & 13 | 52'-0" | 52'-0" | 82 Lines of 3-406 |
| | 14 | 54'-0" | 48'-0" | 82 Lines of 3-407 |
| | 15 | 20'-0" | 11'-0" | 82 Lines of 3-405 |
| 4 | 16 | 30'-0" | 30'-0" | 82 Lines of 3-405 |

SLAB REINFORCEMENT

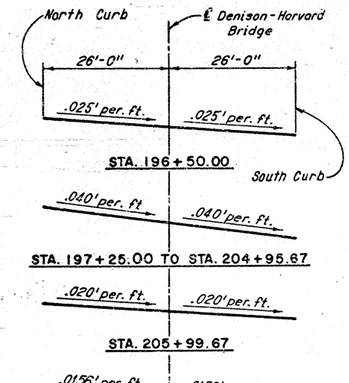
| | UNIT 1 | UNIT 2 | UNIT 3 | UNIT 4 |
|---|---|---|---|---|
| 87 Lines of | 27-401 | 30-401 | 29-401 | 7-401 |
| 87 Lines of | 1-404 to match 401 near W. Abutment | ——— | ——— | 1-404 to match 401 near E. Abutment |
| Longitudinal Reinforcement 71 Lines of | ℄ Series 402 to match 401 at E.J.1 | 1-402 to match 401 at E.J.1<br>1-402 to match 401 at E.J.2 | 1-402 to match 401 at E.J.2<br>1-402 to match 401 at E.J.3 | 1-402 to match 401 at E.J.3 |
| 71 Lines of | 1-403 to match 402 | 2-403 to match 402 | 2-403 to match 402 | 1-403 to match 402 |
| 8 Lines of | 1-409 to match 401 under North Sidewalk E.J.1 | 2-404 to match 401 under each Sidewalk | 2-404 to match 401 under each Sidewalk | 1-404 to match 401 under each Sidewalk<br>1-406 to match 401 under each Sidewalk |
| 8 Lines of | 1-410 to match 401 under South Sidewalk E.J.1 | ——— | ——— | ——— |
| 72 Lines of | 1-612 to alternate 404 | ——— | ——— | 1-612 to alternate 404 |
| 72 Lines of | 1-610 to alternate 402 | 2-610 to alternate 402 | 2-610 to alternate 402 | 1-610 to alternate 402 |
| 72 Lines of | 1-611 to match 610 | 2-611 to match 610 | 2-611 to match 610 | 1-611 to match 610 |
| 68 Lines of | 29-601 @ 31 | 32-601 @ 29 | 30-601 | 8-601 |
| 68 Lines of | 1-Series 602 to match 601 | 1-602 to match 601 | 1-602 to match 601 | 1-602 to match 601 |
| Transverse Reinforcement | 1558-603 and 604 | 1667-603 and 604 @ about 13" | 1578-603 and 604 | 458-603 and 604 |
| | 3116-605 | 3354-605 @ about 6½" | 3156-605 | 916-605 |
| 48 Lines of | 1-403 to match 402 or 610 at Exp. Jt. 1 | 1-403 to match 402 or 610 at Exp. Jt. 1<br>1-403 to match 402 or 610 at Exp. Jt. 2 | 1-403 to match 402 or 610 at Exp. Jt. 2<br>1-403 to match 402 or 610 at Exp. Jt. 3 | 1-403 to match 402 or 610 at Exp. Jt. 3 |
| 48 Lines of | ——— | 1-612 to match 601 | 1-612 to match 601 | ——— |

INSERT

SIDEWALK REINFORCEMENT

| | UNIT 1 | UNIT 2 | UNIT 3 | UNIT 4 |
|---|---|---|---|---|
| 6 Lines of | 27-401 Each Sidewalk | 30-401 Each Sidewalk | 29-401 Each Sidewalk | 7-401 Each Sidewalk |
| 6 Lines of | 1-404 to match 401 Each Sidewalk near W. Abutment | 1-402 to match 401 Each Sidewalk E.J.1<br>1-402 to match 401 Each Sidewalk E.J.2 | 1-402 to match 401 Each Sidewalk E.J.2<br>1-402 to match 401 Each Sidewalk E.J.3 | 1-404 to match 401 Each Sidewalk near E. Abutment |
| 6 Lines of | 1-409 to match 401 North Sidewalk near E.J.1 | ——— | ——— | 1-402 to match 401 Each Sidewalk near E.J.3 |
| 6 Lines of | 1-410 to match 401 South Sidewalk near E.J.1 | ——— | ——— | ——— |
| 6 Lines of | 1-403 to match 409 | 2-403 to match 402 Each Sidewalk | 2-403 to match 402 Each Sidewalk | 1-403 to match 402 Each Sidewalk |
| 6 Lines of | 1-403 to match 410 | ——— | ——— | ——— |
| 5 Lines of | 1-612 to alternate 404 | ——— | ——— | 1-612 to alternate 404 |
| 5 Lines of | 1-610 to alternate 409 Each Sidewalk or 410 | 2-610 to alternate 402 Each Sidewalk | 2-610 to alternate 402 Each Sidewalk | 1-610 to alternate 402 Each Sidewalk |
| 5 Lines of | 1-611 to match 610 | 2-611 to match 610 | 2-611 to match 610 | 1-611 to match 610 |

DELETE
DELETE
DELETE
DELETE




SUPERELEVATION TRANSITION DIAGRAMS

Notes:
For Slab Details at Exp. Jts. and at Abutments and Curb Plate Details see sheet 64 / 73.
For Aluminum Fence Details see sheet 63 / 73.
For Parapet Details see sheets 63 / 73 and 64 / 73.
The following abbreviations are used:
E = East
W = West
E.J. = Expansion Joint
Typ. = Typical

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# TYPICAL CROSS SECTION AND SLAB REINFORCEMENT DENISON-HARVARD BRIDGE OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

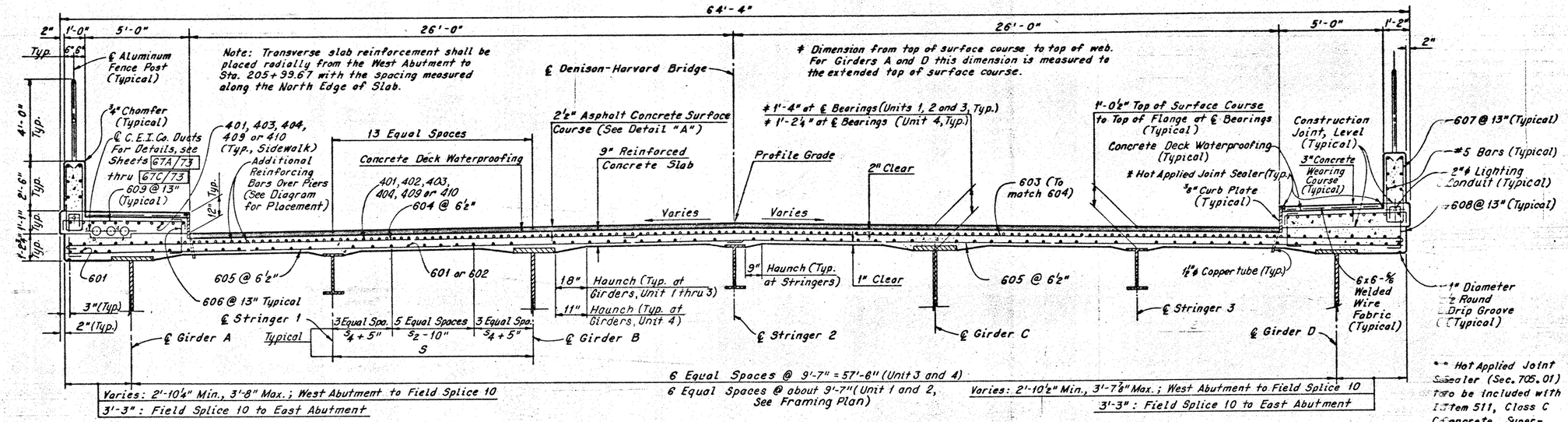
| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| W.H.L. | S.J.S. | A.H.S. | G.A.B. | |
| DATE 9-6-73 | DATE 9-27-73 | DATE 11-16-73 | DATE 4-11-74 | SHEET 61 / 73 |

© REV. C.P. & W.E.B. 6-22-75

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

121 / 145

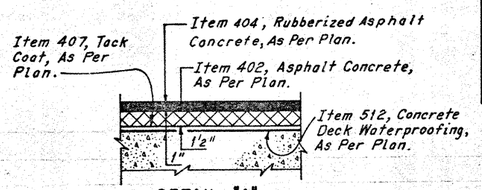
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



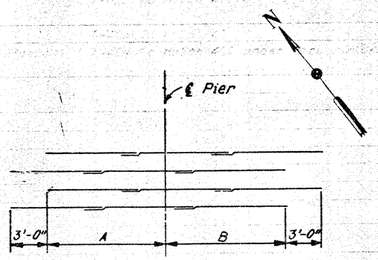

TYPICAL CROSS SECTION

** Hot Applied Joint Sealer (Sec. 705.01) to be included with Item 511, Class C Concrete, Superstructure, for payment.

**Note:** The deck slab haunch adjacent to the top of the steel girders which is shown as 18" wide for Units 1 thru 3 and 11" for Unit 4 may vary from this dimension with a minimum of 14" and a maximum of 24" for Units 1 thru 3 and with a minimum of 10" and maximum of 14" for Unit 4. (The slope shall not be more than 1:4)




DETAIL "A"




ADDITIONAL REINFORCEMENT OVER PIERS

| ADDITIONAL REINFORCING OVER PIERS | | | | |
|---|---|---|---|---|
| Unit | Pier | A | B | No. of Bars |
| 1 | 1 | 43'-0" | 43'-0" | 82 Lines of 3-405 |
| | 2 | 43'-0" | 46'-0" | 82 Lines of 3-406 |
| | 3 | 47'-0" | 43'-0" | 82 Lines of 3-407 |
| | 4 | 43'-0" | 47'-0" | 82 Lines of 3-407 |
| | 5 | 46'-0" | 11'-0" | 82 Lines of 3-408 |
| 2 | 6, 7, 8, 9, & 10 | 41'-0" | 41'-0" | 82 Lines of 3-405 |
| 3 | 11 | 12'-0" | 20'-0" | 82 Lines of 3-405 |
| | 12 & 13 | 52'-0" | 52'-0" | 82 Lines of 3-406 |
| | 14 | 54'-0" | 48'-0" | 82 Lines of 3-407 |
| | 15 | 20'-0" | 11'-0" | 82 Lines of 3-405 |
| 4 | 16 | 30'-0" | 30'-0" | 82 Lines of 3-405 |

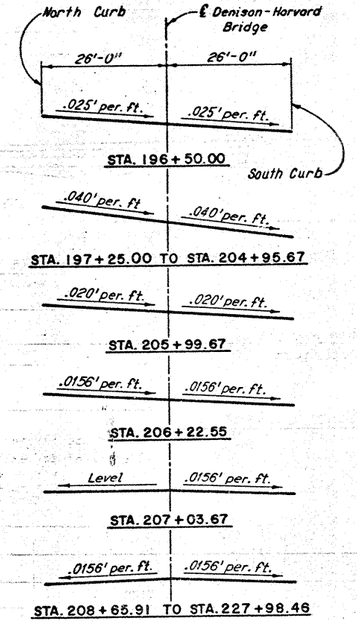
**Note:**
All reinforcing bar marks shall be prefixed as follows:
SA - Unit 1
SB - Unit 2
SC - Unit 3
SD - Unit 4

SLAB REINFORCEMENT

| | UNIT 1 | UNIT 2 | UNIT 3 | UNIT 4 |
|---|---|---|---|---|
| Longitudinal Reinforcement | 87 Lines of 27-401 | 30-401 | 29-401 | 7-401 |
| | 87 Lines of 1-404 to match 401 near W. Abutment | ——— | ——— | 1-404 to match 401 near E. Abutment |
| | 71 Lines of ℄ Series 402 to match 401 at E.J.1 | 1-402 to match 401 at E.J.1<br>1-402 to match 401 at E.J.2 | 1-402 to match 401 at E.J.2<br>1-402 to match 401 at E.J.3 | 1-402 to match 401 at E.J.3 |
| | 71 Lines of 1-403 to match 402 | 2-403 to match 402 | 2-403 to match 402 | 1-403 to match 402 |
| | 8 Lines of 1-409 to match 401 under North Sidewalk E.J.1 | 2-404 to match 401 under each Sidewalk | 2-404 to match 401 under each Sidewalk | 1-404 to match 401 under each Sidewalk |
| | 8 Lines of 1-410 to match 401 under South Sidewalk E.J.1 | ——— | ——— | ——— |
| | 72 Lines of 1-612 to alternate 404 | ——— | ——— | 1-612 to alternate 404 |
| | 72 Lines of 1-610 to alternate 402 | 2-610 to alternate 402 | 2-610 to alternate 402 | 1-610 to alternate 402 |
| | 72 Lines of 1-611 to match 610 | 2-611 to match 610 | 2-611 to match 610 | 1-611 to match 610 |
| | 68 Lines of 29-601 | 32-601 | 30-601 | 8-601 |
| | 68 Lines of 1-Series 602 to match 601 | 1-602 to match 601 | 1-602 to match 601 | 1-602 to match 601 |
| Transverse Reinforcement | 1558-603 and 604 | 1667-603 and 604 @ about 13" | 1578-603 and 604 | 458-603 and 604 |
| | 3116-605 | 3354-605 @ about 6½" | 3156-605 | 916-605 |

SIDEWALK REINFORCEMENT

| | UNIT 1 | UNIT 2 | UNIT 3 | UNIT 4 |
|---|---|---|---|---|
| 6 Lines of | 27-401 Each Sidewalk | 30-401 Each Sidewalk | 29-401 Each Sidewalk | 7-401 Each Sidewalk |
| 6 Lines of | 1-404 to match 401 Each Sidewalk near W. Abutment | 1-402 to match 401 Each Sidewalk E.J.1<br>1-402 to match 401 Each Sidewalk E.J.2 | 1-402 to match 401 Each Sidewalk E.J.2<br>1-402 to match 401 Each Sidewalk E.J.3 | 1-404 to match 401 Each Sidewalk near E. Abutment |
| 6 Lines of | 1-409 to match 401 North Sidewalk near E.J.1 | ——— | ——— | 1-402 to match 401 Each Sidewalk near E.J.3 |
| 6 Lines of | 1-410 to match 401 South Sidewalk near E.J.1 | ——— | ——— | ——— |
| 6 Lines of | 1-403 to match 409 | 2-403 to match 402 Each Sidewalk | 2-403 to match 402 Each Sidewalk | 1-403 to match 402 Each Sidewalk |
| 6 Lines of | 1-403 to match 410 | ——— | ——— | ——— |
| 5 Lines of | 1-612 to alternate 404 | ——— | ——— | 1-612 to alternate 404 |
| 5 Lines of | 1-610 to alternate 409 Each Sidewalk | 2-610 to alternate 402 Each Sidewalk | 2-610 to alternate 402 Each Sidewalk | 1-610 to alternate 402 Each Sidewalk |
| 5 Lines of | 1-611 to match 610 | 2-611 to match 610 | 2-611 to match 610 | 1-611 to match 610 |




SUPERELEVATION TRANSITION DIAGRAMS

Notes:
For Slab Details at Exp. Jts. and at Abutments and Curb Plate Details see sheet 64/73.
For Aluminum Fence Details see sheet 63/73.
For Parapet Details see sheets 63/73 and 64/73.
The following abbreviations are used:
E = East
W = West
E.J. = Expansion Joint
Typ. = Typical

THIS PLAN SHEET HAS BEEN REVISED SEE REVISION 8-22-1975.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

TYPICAL CROSS SECTION AND SLAB REINFORCEMENT
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN W.H.L. | TRACED S.J.S. | CHECKED A.H.A. | REVIEWED C.J.S. | REVISED |
|---|---|---|---|---|
| DATE 9-6-73 | DATE 9-7-73 | DATE 11-16-73 | DATE 11-14-73 | SHEET 64/73 |

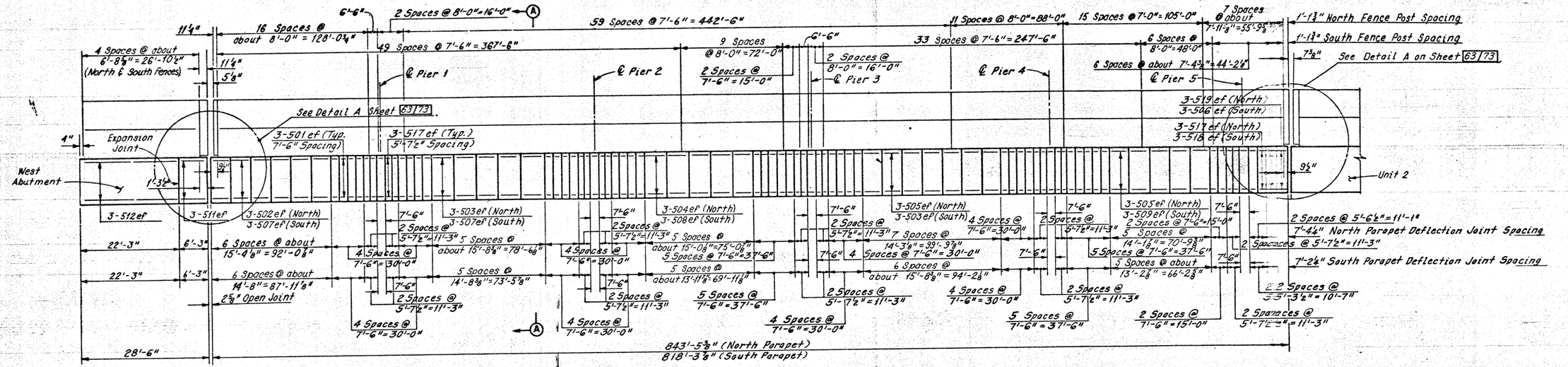
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

122
148

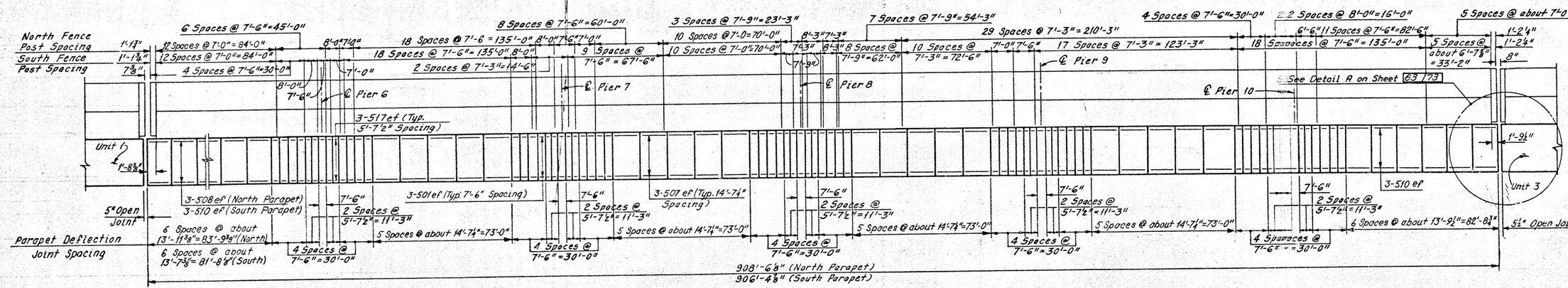
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

**Note:**
For guard rail connection at the South and North Parapet of the West Abutment, see "Guard Rail Connection Bracket on Ohio Standard Drawing BR-2-67.

Preformed Expansion Joint Filler in the fencing parapet deflection joints may be either ½" gray sponge rubber or ½" gray cellular polyvinyl chloride (PVC) sponge. Either material shall meet the requirements of AASHO M-153, Type 1, except the density of the PVC sponge shall be not less than 20 lb. per cu. ft.




## NORTH AND SOUTH PARAPET AND FENCE DETAILS
## UNIT 1




## NORTH AND SOUTH PARAPET AND FENCE DETAILS
## UNIT 2

**Note:** All reinforcing bar marks shall be prefixed R.

**Note:**
For notes and Section A-A see Sheet 63/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PARAPET AND FENCE DETAILS UNITS 1 AND 2

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

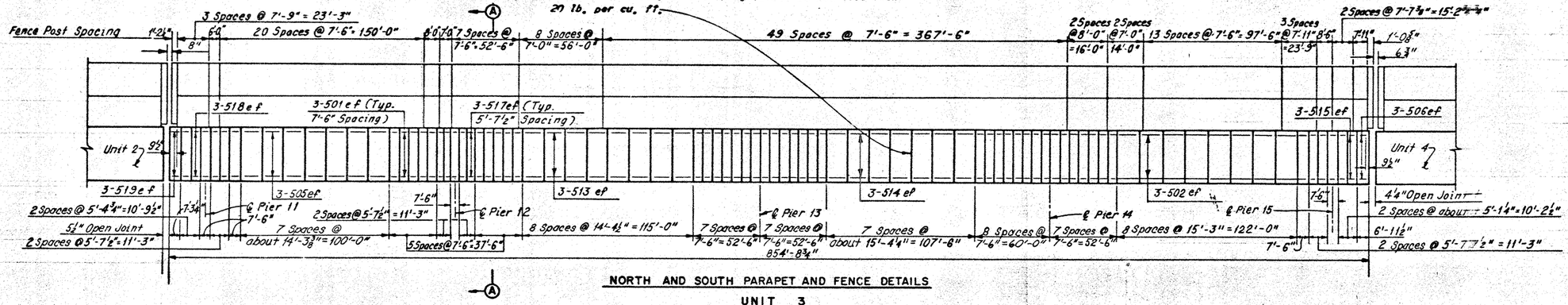
| DRAWN W/HL | TRACED JJS | CHECKED JHS | REVIEWED Ehd | REVISED |
|---|---|---|---|---|
| DATE 9-6-73 | DATE 10-30-73 | DATE 2-1-74 | DATE 4-1-74 | SHEET 62/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

125
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

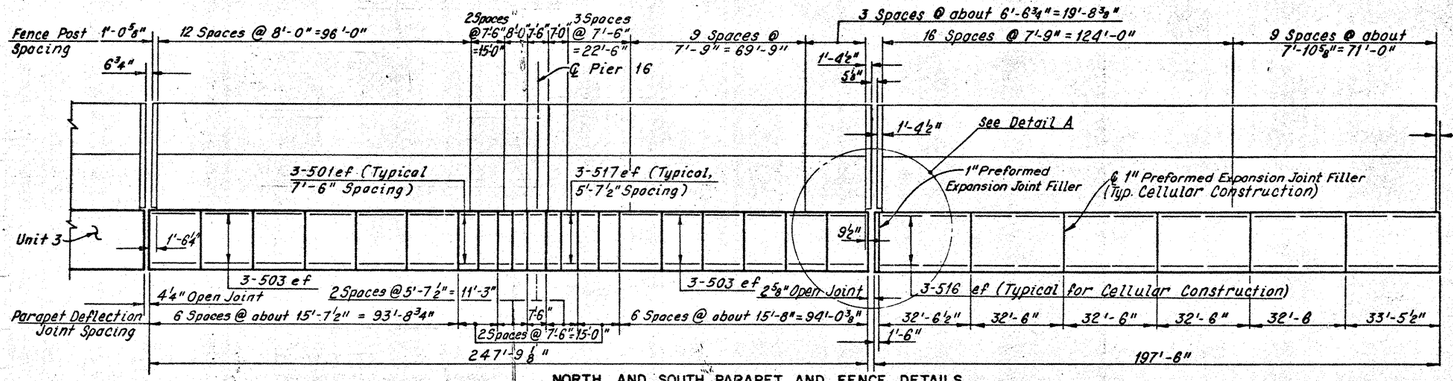
Preformed Expansion Joint Filler in the fencing parapet deflection joints may be either ½" gray sponge rubber or ½" gray cellular polyvinyl chloride (PVC) sponge. Either material shall meet the requirements of AASHO M-153, Type 1 except the density of PVC sponge shall be not less than 20 lb. per cu. ft.




NORTH AND SOUTH PARAPET AND FENCE DETAILS

UNIT 3

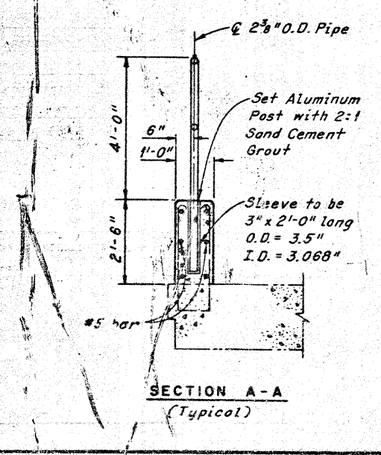
**Note:** All reinforcing bar marks shall be prefixed R.




NORTH AND SOUTH PARAPET AND FENCE DETAILS

UNIT 4

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| R501 | 1,620 | 71'-3" | Str. | | 12,250 |
| R502 | 132 | 141'-5" | Str. | | 2,031 |
| R503 | 210 | 151'-3" | Str. | | 3,340 |
| R504 | 30 | 141'-6" | Str. | | 454 |
| R505 | 156 | 131'-5" | Str. | | 2,237 |
| R506 | 18 | 61'-5" | Str. | | 127 |
| R507 | 306 | 141'-3" | Str. | | 4,548 |
| R508 | 66 | 131'-6" | Str. | | 929 |
| R509 | 30 | 121'-9" | Str. | | 399 |
| R510 | 108 | 131'-3" | Str. | | 1,493 |
| R511 | 12 | 51'-9" | Str. | | 72 |
| R512 | 12 | 21'-6" | Str. | | 272 |
| R513 | 96 | 141'-0" | Str. | | 1,402 |
| R514 | 84 | 151'-0" | Str. | | 1,314 |
| R515 | 24 | 41'-9" | Str. | | 110 |
| R516 | 72 | 321'-0" | Str. | | 2,403 |
| R517 | 612 | 51'-3" | Str. | | 3,351 |
| R518 | 36 | 51'-0" | Str. | | 186 |
| R519 | 18 | 71'-0" | Str. | | 131 |
| | | | | | |
| | | Total | Weight = | | 37,060 |




SECTION A-A
(Typical)

CELLULAR CONSTRUCTION

**Notes:**

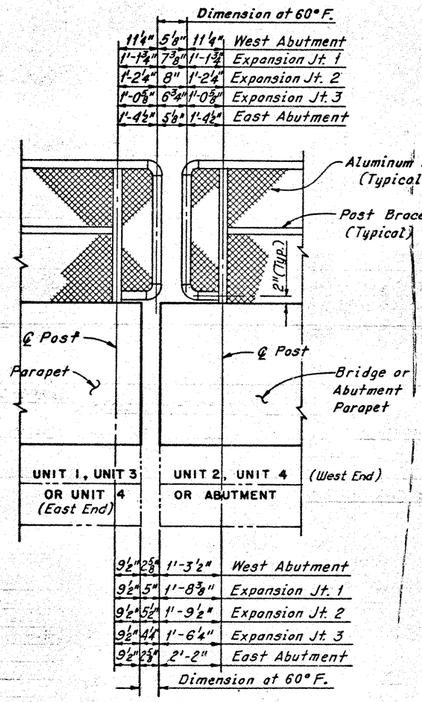
Payment for parapet and fence shall be made at the contract unit price for "Item 517", Railing (Concrete Parapet with Chain Link Fence Aluminum Alloy fabric Sec. 710.03. Payment length shall be the overall length of the parapets. Sleeves, parapet expansion joint material and longitudinal reinforcing steel in the parapets shall be included with "Item 517" for payment. All other reinforcing steel in the parapets is included with "Item 509".

Concrete parapets shall be placed in alternate sections by the use of bulkheads. Closing sections shall be placed after removal of bulkheads and after placement of sponge filler. Filler shall be flush with surface of concrete and exposed edges shall be free of mortar.

The following abbreviation is used:
ef = each face

For parapet sliding plate details see Sheet 64 of 73.

**Note:**
For guard rail connection at the North and South Parapet of the Cellular Construction, see "Guard Rail Connection Bracket" on Ohio Standard Drawing BR-2-67. Shim 5x1x1'-0" bar, as required, to align the bracket with the guard rail.




DETAIL A
(Sliding plates not shown)

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PARAPET AND FENCE DETAILS
UNITS 3, 4 AND
CELLULAR CONSTRUCTION
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

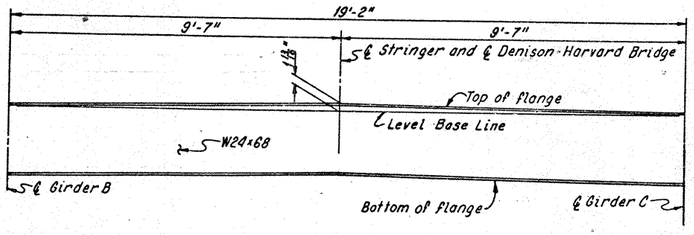
CUYAHOGA COUNTY OHIO

| DRAWN WHL | TRACED 5/5 | CHECKED AHS | REVIEWED CAB | REVISED |
|---|---|---|---|---|
| DATE 9-6-73 | DATE 10-30-73 | DATE 2-1-74 | DATE 4-11-74 | SHEET 63 73 |

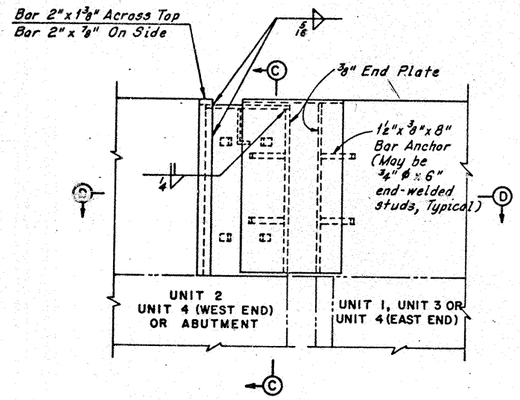
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

124
148

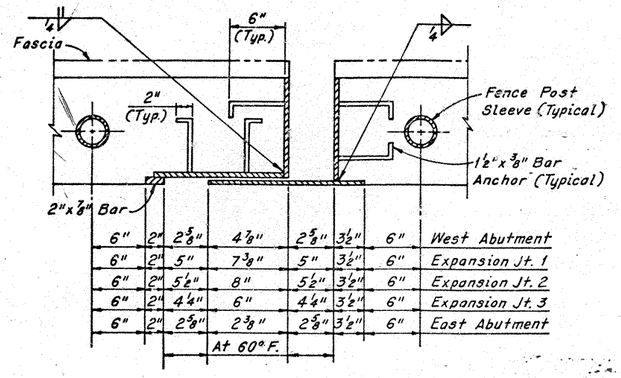
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



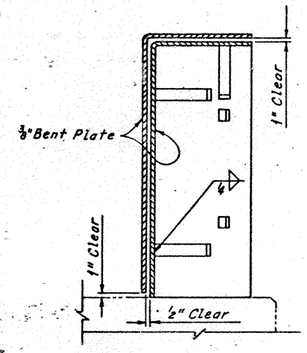

CAMBER FOR W24 x 68 BEAM AT
TYPE A CROSSFRAME – EAST ABUTMENT




ELEVATION



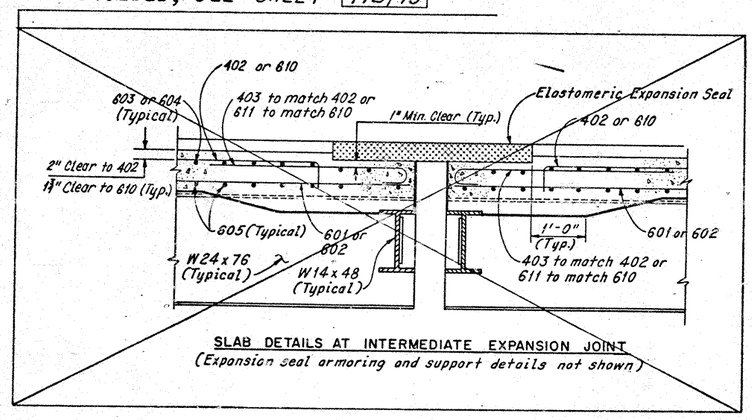

SECTION D-D



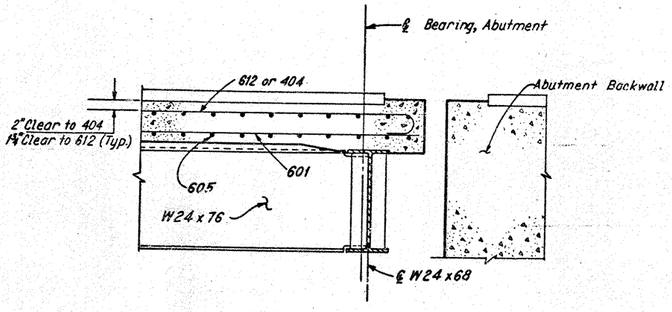

SECTION C-C

PARAPET SLIDING PLATE DETAILS

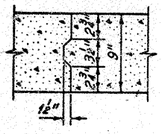
⊙SUPERSEDED, SEE SHEET 478/73



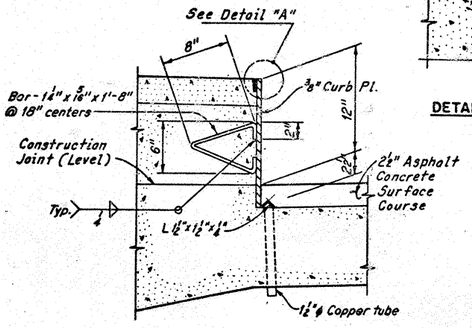

SLAB DETAILS AT INTERMEDIATE EXPANSION JOINT
(Expansion seal armoring and support details not shown)



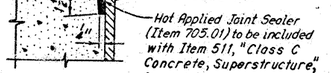

SLAB DETAIL AT ABUTMENT
(Sliding Plate and/or Preformed Elastic Joint Sealer Details not shown)



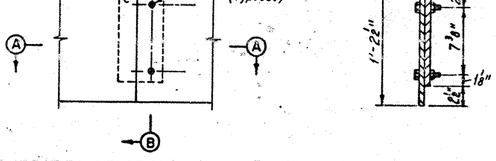

OPTIONAL TRANSVERSE DECK JOINT




SIDEWALK CURB PLATE DETAIL

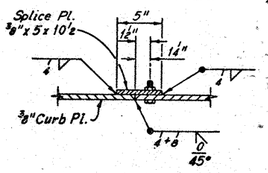



DETAIL "A"




ELEVATION

SECTION B-B




SECTION A-A

Note:
Remove bolts after field welds have been completed Plug weld holes flush with curb plate.

TYPICAL CURB PLATE SPLICE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# MISCELLANEOUS DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

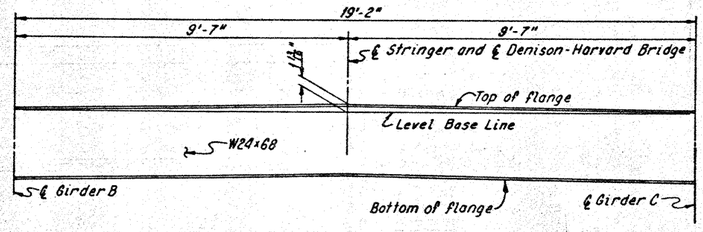
| DRAWN C.K.B. | TRACED S.J.S | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DATE 2-17-76 | DATE 3-15-76 | DATE 4-21-76 | DATE 5-11-76 | SHEET 64/73 |

©REV. C.R. 8-22-75

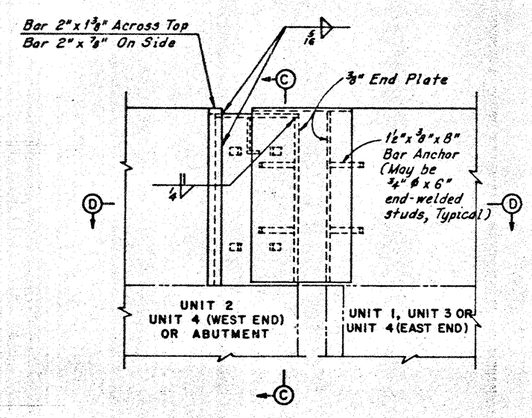
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

124
149

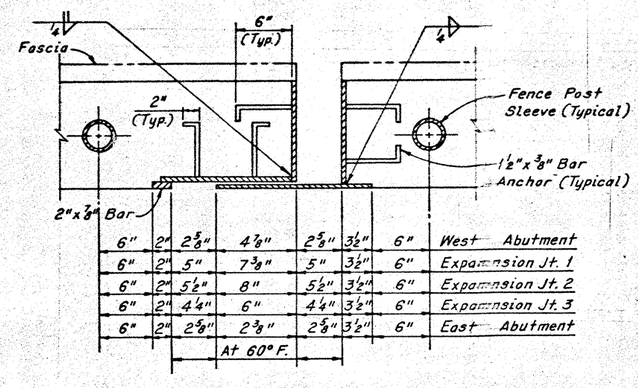
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




CAMBER FOR W24x68 BEAM AT
TYPE A CROSSFRAME – EAST ABUTMENT



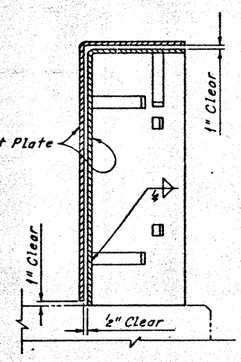

ELEVATION




| | | | | | | |
|---|---|---|---|---|---|---|
| 6" | 2" | 2 3/8" | 4 7/8" | 2 3/8" | 3 1/2" | 6" | West Abutment |
| 6" | 2" | 5" | 7 3/8" | 5" | 3 1/2" | 6" | Expansion Jt. 1 |
| 6" | 2" | 5 1/2" | 8" | 5 1/2" | 3 1/2" | 6" | Expansion Jt. 2 |
| 6" | 2" | 4 1/4" | 6" | 4 1/4" | 3 1/2" | 6" | Expansion Jt. 3 |
| 6" | 2" | 2 3/8" | 2 3/8" | 2 3/8" | 3 1/2" | 6" | East Abutment |

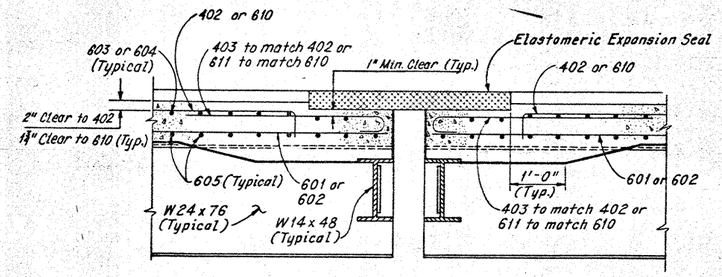
At 60° F.

SECTION D-D

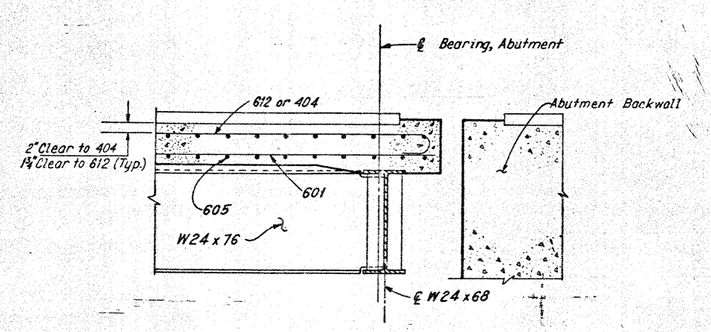



SECTION C-C

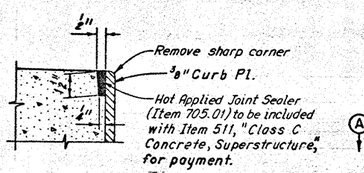
PARAPET SLIDING PLATE DETAILS



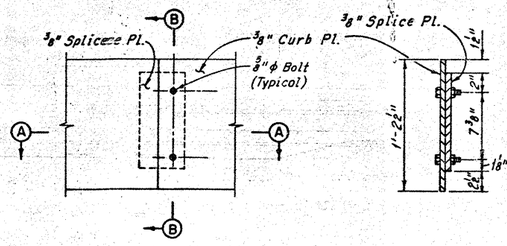

SLAB DETAILS AT INTERMEDIATE EXPANSION JOINT
(Expansion seal armoring and support details not shown)




SLAB DETAIL AT ABUTMENT
(Sliding Plate and/or Preformed Elastic Joint Sealer Details not shown)

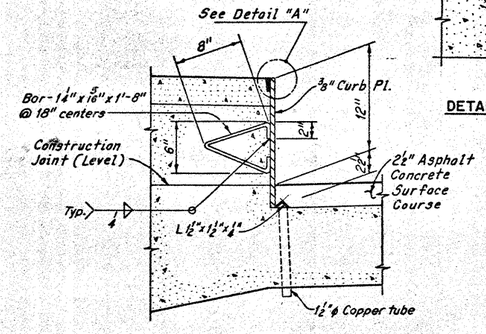



DETAIL "A"

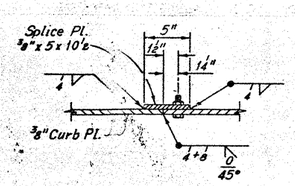



ELEVATION

SECTION B-B



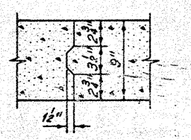

SIDEWALK CURB PLATE DETAIL




SECTION A-A

TYPICAL CURB PLATE SPLICE

Note:
Remove bolts after field welds have been completed Plug weld holes flush with curb plate.




OPTIONAL TRANSVERSE DECK JOINT

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 8-22 19 75

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

MISCELLANEOUS DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY C-110

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.K.B. | S.J.S. | H.H.S. | E.A.B. | |
| DATE 2-17-74 | DATE 3-13-74 | DATE 5-2-74 | DATE 4-11-74 | SHEET 6-1/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

125
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 1

| | SPAN 1 | | | | | | | | | | | SPAN 2 | | | | | | | | | | | SPAN 3 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Brg. West Abut. | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 2 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 3 |
| Girder A | 671.06 | 671.00 | 670.92 | 670.81 | 670.69 | 670.57 | 670.46 | 670.35 | 670.22 | 670.09 | 669.97 | 669.82 | 669.67 | 669.51 | 669.35 | 669.20 | 669.05 | 668.90 | 668.76 | 668.60 | 668.44 | 668.29 | 668.14 | 667.98 | 667.81 | 667.66 | 667.50 | 667.35 | 667.20 | 667.04 | 666.88 |
| Girder B | 670.39 | 670.28 | 670.17 | 670.05 | 669.93 | 669.81 | 669.69 | 669.58 | 669.45 | 669.33 | 669.20 | 669.05 | 668.91 | 668.75 | 668.59 | 668.43 | 668.28 | 668.14 | 667.99 | 667.83 | 667.67 | 667.52 | 667.37 | 667.21 | 667.05 | 666.89 | 666.74 | 666.59 | 666.43 | 666.27 | 666.11 |
| Girder C | 669.72 | 669.56 | 669.41 | 669.28 | 669.16 | 669.04 | 668.93 | 668.82 | 668.69 | 668.56 | 668.43 | 668.28 | 668.14 | 667.98 | 667.82 | 667.67 | 667.52 | 667.37 | 667.22 | 667.06 | 666.91 | 666.75 | 666.61 | 666.45 | 666.28 | 666.12 | 665.97 | 665.82 | 665.67 | 665.50 | 665.34 |
| Girder D | 669.05 | 668.94 | 668.66 | 668.52 | 668.39 | 668.28 | 668.16 | 668.05 | 667.92 | 667.79 | 667.67 | 667.52 | 667.37 | 667.22 | 667.05 | 666.90 | 666.75 | 666.60 | 666.46 | 666.30 | 666.14 | 665.99 | 665.84 | 665.68 | 665.52 | 665.36 | 665.20 | 665.06 | 664.90 | 664.74 | 664.58 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 1

| | SPAN 1 | | | | | | | | | | | SPAN 2 | | | | | | | | | | | SPAN 3 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Brg. West Abut. | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 2 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 3 |
| North Gutter | 670.75 | 670.76 | 670.74 | 670.67 | 670.56 | 670.42 | 670.27 | 670.10 | 669.94 | 669.79 | 669.65 | 669.50 | 669.38 | 669.28 | 669.16 | 669.02 | 668.86 | 668.67 | 668.48 | 668.29 | 668.12 | 667.98 | 667.85 | 667.73 | 667.60 | 667.46 | 667.28 | 667.08 | 666.89 | 666.71 | 666.56 |
| South Gutter | 668.93 | 668.80 | 668.67 | 668.50 | 668.45 | 668.32 | 668.17 | 668.01 | 667.85 | 667.70 | 667.57 | 667.42 | 667.30 | 667.18 | 667.06 | 666.92 | 666.76 | 666.60 | 666.39 | 666.21 | 666.04 | 665.90 | 665.77 | 665.64 | 665.51 | 665.36 | 665.19 | 665.00 | 664.81 | 664.63 | 664.48 |

.72 .65 .54 .40 .26 .09 .54 .43 .30 .16 .27 .15 .00 .84 .66 .91 .75 .57 .59 .45 .26 .07

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 1

| | SPAN 4 | | | | | | | | | | | SPAN 5 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 3 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 4 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 5 | ℄ Roller Exp. Jt. 1 |
| Girder A | 666.88 | 666.71 | 666.55 | 666.36 | 666.17 | 666.00 | 665.83 | 665.67 | 665.51 | 665.33 | 665.16 | 665.02 | 664.89 | 664.75 | 664.61 | 664.47 | 664.33 | 664.20 | 664.05 | 663.89 | 663.70 | 663.36 |
| Girder B | 668.11 | 665.94 | 665.78 | 665.59 | 665.41 | 665.23 | 665.06 | 664.90 | 664.75 | 664.56 | 664.39 | 664.25 | 664.12 | 663.99 | 663.84 | 663.70 | 663.56 | 663.43 | 663.29 | 663.14 | 662.98 | 662.73 |
| Girder C | 665.34 | 665.17 | 665.01 | 664.83 | 664.64 | 664.47 | 664.30 | 664.14 | 663.98 | 663.80 | 663.62 | 663.49 | 663.35 | 663.22 | 663.07 | 662.93 | 662.80 | 662.66 | 662.52 | 662.38 | 662.26 | 662.09 |
| Girder D | 664.58 | 664.41 | 664.25 | 664.06 | 663.88 | 663.70 | 663.53 | 663.37 | 663.21 | 663.03 | 662.86 | 662.72 | 662.59 | 662.45 | 662.31 | 662.17 | 662.03 | 661.90 | 661.75 | 661.62 | 661.54 | 661.45 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 1

| | SPAN 4 | | | | | | | | | | | SPAN 5 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 3 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 4 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 5 | ℄ Roller Exp. Jt. 1 |
| North Gutter | 666.56 | 666.42 | 666.31 | 666.21 | 666.10 | 665.95 | 665.73 | 665.53 | 665.28 | 665.05 | 664.84 | 664.69 | 664.56 | 664.45 | 664.34 | 664.22 | 664.08 | 663.94 | 663.77 | 663.59 | 663.39 | 663.06 |
| South Gutter | 664.48 | 664.33 | 664.21 | 664.10 | 664.07 | 663.92 | 663.63 | 663.41 | 663.18 | 662.96 | 662.76 | 662.61 | 662.48 | 662.37 | 662.25 | 662.13 | 662.00 | 661.85 | 661.69 | 661.54 | 661.43 | 661.34 |

.30 .19 .07 .92 .70 .51 .27 .20 .08 .95 .80 .61 .39

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 2

| | SPAN 6 | | | | | | | | | | | SPAN 7 | | | | | | | | | | | SPAN 8 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Roller Exp. Jt. 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 6 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 7 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 8 |
| Girder A | 663.36 | 663.17 | 662.98 | 662.79 | 662.61 | 662.42 | 662.24 | 662.05 | 661.87 | 661.69 | 661.51 | 661.30 | 661.10 | 660.93 | 660.79 | 660.67 | 660.56 | 660.46 | 660.38 | 660.30 | 660.24 | 660.19 | 660.15 | 660.13 | 660.16 | 660.19 | 660.24 | 660.31 | 660.38 | 660.45 | 660.56 |
| Girder B | 662.73 | 662.58 | 662.44 | 662.29 | 662.15 | 662.02 | 661.88 | 661.74 | 661.60 | 661.47 | 661.34 | 661.19 | 661.05 | 660.93 | 660.83 | 660.74 | 660.66 | 660.59 | 660.53 | 660.49 | 660.46 | 660.43 | 660.42 | 660.43 | 660.45 | 660.49 | 660.54 | 660.61 | 660.68 | 660.76 | 660.86 |
| Girder C | 662.09 | 661.99 | 661.89 | 661.80 | 661.70 | 661.61 | 661.52 | 661.43 | 661.32 | 661.21 | 661.11 | 660.99 | 660.88 | 660.78 | 660.69 | 660.62 | 660.55 | 660.50 | 660.46 | 660.43 | 660.41 | 660.41 | 660.41 | 660.43 | 660.45 | 660.49 | 660.54 | 660.61 | 660.68 | 660.76 | 660.86 |
| Girder D | 661.45 | 661.40 | 661.35 | 661.30 | 661.25 | 661.21 | 661.17 | 661.12 | 661.02 | 660.91 | 660.81 | 660.69 | 660.58 | 660.48 | 660.40 | 660.32 | 660.26 | 660.20 | 660.16 | 660.13 | 660.12 | 660.11 | 660.11 | 660.13 | 660.16 | 660.20 | 660.25 | 660.31 | 660.38 | 660.46 | 660.56 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 2

| | SPAN 6 | | | | | | | | | | | SPAN 7 | | | | | | | | | | | SPAN 8 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Roller Exp. Jt. 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 6 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 7 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 8 |
| North Gutter | 663.06 | 662.93 | 662.79 | 662.63 | 662.46 | 662.27 | 662.07 | 661.86 | 661.65 | 661.46 | 661.28 | 661.09 | 660.92 | 660.79 | 660.69 | 660.58 | 660.47 | 660.35 | 660.23 | 660.13 | 660.06 | 660.02 | 660.01 | 660.04 | 660.09 | 660.14 | 660.18 | 660.21 | 660.25 | 660.31 | 660.40 |
| South Gutter | 661.34 | 661.33 | 661.31 | 661.28 | 661.24 | 661.18 | 661.10 | 661.02 | 660.89 | 660.76 | 660.65 | 660.53 | 660.45 | 660.39 | 660.33 | 660.27 | 660.19 | 660.11 | 660.03 | 659.98 | 659.95 | 659.95 | 659.98 | 660.04 | 660.09 | 660.14 | 660.18 | 660.21 | 660.25 | 660.31 | 660.40 |

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 2

| | SPAN 9 | | | | | | | | | | | SPAN 10 | | | | | | | | | | | SPAN 11 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 8 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 9 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 10 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | ℄ Roller Exp. Jt. 2 |
| Girder A | 660.56 | 660.67 | 660.79 | 660.92 | 661.05 | 661.18 | 661.31 | 661.44 | 661.57 | 661.70 | 661.83 | 661.96 | 662.09 | 662.22 | 662.35 | 662.48 | 662.61 | 662.74 | 662.87 | 663.00 | 663.13 | 663.23 | 663.34 | 663.44 | 663.54 | 663.64 | 663.74 | 663.84 | 663.94 | 664.05 | 664.15 |
| Girder B | 660.86 | 660.97 | 661.09 | 661.21 | 661.34 | 661.47 | 661.61 | 661.74 | 661.87 | 662.00 | 662.13 | 662.26 | 662.39 | 662.52 | 662.65 | 662.78 | 662.91 | 663.04 | 663.17 | 663.30 | 663.43 | 663.53 | 663.63 | 663.74 | 663.84 | 663.94 | 664.04 | 664.14 | 664.24 | 664.35 | 664.45 |
| Girder C | 660.86 | 660.97 | 661.09 | 661.21 | 661.34 | 661.47 | 661.61 | 661.74 | 661.87 | 662.00 | 662.13 | 662.26 | 662.39 | 662.52 | 662.65 | 662.78 | 662.91 | 663.04 | 663.17 | 663.30 | 663.43 | 663.53 | 663.63 | 663.74 | 663.84 | 663.94 | 664.04 | 664.14 | 664.24 | 664.35 | 664.45 |
| Girder D | 660.56 | 660.67 | 660.79 | 660.92 | 661.05 | 661.18 | 661.31 | 661.44 | 661.57 | 661.70 | 661.83 | 661.96 | 662.09 | 662.22 | 662.35 | 662.48 | 662.61 | 662.74 | 662.87 | 663.00 | 663.13 | 663.23 | 663.34 | 663.44 | 663.54 | 663.64 | 663.74 | 663.84 | 663.94 | 664.05 | 664.15 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 2

| | SPAN 9 | | | | | | | | | | | SPAN 10 | | | | | | | | | | | SPAN 11 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 8 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 9 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 10 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | ℄ Roller Exp. Jt. 2 |
| North Gutter | 660.40 | 660.51 | 660.66 | 660.82 | 660.98 | 661.12 | 661.24 | 661.34 | 661.44 | 661.54 | 661.66 | 661.80 | 661.96 | 662.13 | 662.29 | 662.43 | 662.55 | 662.65 | 662.74 | 662.80 | 662.97 | 663.07 | 663.19 | 663.32 | 663.45 | 663.57 | 663.67 | 663.76 | 663.84 | 663.90 | 663.95 |
| South Gutter | 660.40 | 660.51 | 660.66 | 660.82 | 660.98 | 661.12 | 661.24 | 661.34 | 661.44 | 661.54 | 661.66 | 661.80 | 661.96 | 662.12 | 662.29 | 662.43 | 662.55 | 662.65 | 662.74 | 662.80 | 662.97 | 663.07 | 663.19 | 663.32 | 663.45 | 663.57 | 663.67 | 663.76 | 663.84 | 663.90 | 663.95 |

**Notes:**

*Elevations shown for Girders A and D are to extended top of wearing surface.*

*The elevations shown at the gutter lines are those which are required before concrete is placed. Proper allowance has been made for the dead load deflections caused by the weight of the concrete and wearing course.*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PAVEMENT ELEVATIONS UNITS 1 AND 2

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DESIGNED CEP | TRACED CEP | CHECKED CPB | REVIEWED CPB | REVISED 6-9-75 |
|---|---|---|---|---|
| DATE 10-2-73 | DATE 10-5-73 | DATE 2-19-74 | DATE 4-1-74 | SHEET 65 1/3 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

125
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 1

| | SPAN 1 | | | | | | | | | | | SPAN 2 | | | | | | | | | | | SPAN 3 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Brg. West Abut. | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 2 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 3 |
| Girder A | 671.06 | 671.00 | 670.92 | 670.81 | 670.69 | 670.57 | 670.46 | 670.35 | 670.22 | 670.09 | 669.97 | 669.82 | 669.67 | 669.51 | 669.35 | 669.20 | 669.05 | 668.90 | 668.76 | 668.60 | 668.44 | 668.29 | 668.14 | 667.98 | 667.81 | 667.66 | 667.50 | 667.35 | 667.20 | 667.04 | 666.88 |
| Girder B | 670.39 | 670.28 | 670.17 | 670.05 | 669.93 | 669.81 | 669.69 | 669.58 | 669.45 | 669.33 | 669.20 | 669.05 | 668.91 | 668.75 | 668.59 | 668.43 | 668.28 | 668.14 | 667.99 | 667.83 | 667.67 | 667.52 | 667.37 | 667.21 | 667.05 | 666.89 | 666.74 | 666.59 | 666.43 | 666.27 | 666.11 |
| Girder C | 669.72 | 669.56 | 669.41 | 669.28 | 669.16 | 669.04 | 668.93 | 668.82 | 668.69 | 668.56 | 668.43 | 668.28 | 668.14 | 667.98 | 667.82 | 667.67 | 667.52 | 667.37 | 667.22 | 667.06 | 666.91 | 666.75 | 666.61 | 666.45 | 666.28 | 666.12 | 665.97 | 665.82 | 665.67 | 665.50 | 665.34 |
| Girder D | 669.05 | 668.84 | 668.66 | 668.52 | 668.39 | 668.28 | 668.16 | 668.05 | 667.92 | 667.79 | 667.67 | 667.52 | 667.37 | 667.22 | 667.05 | 666.90 | 666.75 | 666.60 | 666.46 | 666.30 | 666.14 | 665.99 | 665.84 | 665.68 | 665.52 | 665.36 | 665.20 | 665.06 | 664.90 | 664.74 | 664.58 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 1

| | SPAN 1 | | | | | | | | | | | SPAN 2 | | | | | | | | | | | SPAN 3 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Brg. West Abut. | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 2 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 3 |
| North Gutter | 670.75 | 670.76 | 670.74 | 670.67 | 670.56 | 670.42 | 670.27 | 670.10 | 669.94 | 669.79 | 669.65 | 669.50 | 669.38 | 669.28 | 669.16 | 669.02 | 668.86 | 668.67 | 668.48 | 668.29 | 668.12 | 667.98 | 667.85 | 667.73 | 667.60 | 667.46 | 667.28 | 667.08 | 666.89 | 666.71 | 666.56 |
| South Gutter | 668.93 | 668.80 | 668.67 | 668.56 | 668.45 | 668.32 | 668.17 | 668.01 | 667.85 | 667.70 | 667.57 | 667.42 | 667.30 | 667.18 | 667.06 | 666.92 | 666.76 | 666.58 | 666.39 | 666.21 | 666.04 | 665.90 | 665.77 | 665.64 | 665.51 | 665.36 | 665.19 | 665.00 | 664.81 | 664.63 | 664.48 |

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 1

| | SPAN 4 | | | | | | | | | | | SPAN 5 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 3 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 4 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 5 | ℄ Roller Exp. Jt. 1 |
| Girder A | 666.88 | 666.71 | 666.55 | 666.36 | 666.17 | 666.00 | 665.83 | 665.67 | 665.51 | 665.33 | 665.16 | 665.02 | 664.89 | 664.75 | 664.61 | 664.47 | 664.33 | 664.20 | 664.05 | 663.89 | 663.70 | 663.36 |
| Girder B | 666.11 | 665.94 | 665.78 | 665.59 | 665.41 | 665.23 | 665.06 | 664.90 | 664.75 | 664.56 | 664.39 | 664.25 | 664.12 | 663.99 | 663.84 | 663.70 | 663.56 | 663.43 | 663.29 | 663.14 | 662.98 | 662.73 |
| Girder C | 665.34 | 665.17 | 665.01 | 664.83 | 664.64 | 664.47 | 664.30 | 664.14 | 663.98 | 663.80 | 663.62 | 663.49 | 663.35 | 663.22 | 663.07 | 662.93 | 662.80 | 662.66 | 662.52 | 662.38 | 662.26 | 662.09 |
| Girder D | 664.58 | 664.41 | 664.25 | 664.06 | 663.88 | 663.70 | 663.53 | 663.37 | 663.21 | 663.03 | 662.86 | 662.72 | 662.59 | 662.45 | 662.31 | 662.17 | 662.03 | 661.90 | 661.75 | 661.62 | 661.54 | 661.45 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 1

| | SPAN 4 | | | | | | | | | | | SPAN 5 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 3 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 4 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 5 | ℄ Roller Exp. Jt. 1 |
| North Gutter | 666.56 | 666.42 | 666.31 | 666.21 | 666.10 | 665.95 | 665.73 | 665.53 | 665.28 | 665.05 | 664.84 | 664.69 | 664.56 | 664.45 | 664.34 | 664.22 | 664.08 | 663.94 | 663.77 | 663.59 | 663.39 | 663.06 |
| South Gutter | 664.48 | 664.33 | 664.21 | 664.10 | 664.97 | 663.82 | 663.63 | 663.41 | 663.18 | 662.96 | 662.76 | 662.61 | 662.48 | 662.37 | 662.25 | 662.13 | 662.00 | 661.85 | 661.69 | 661.54 | 661.43 | 661.34 |

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 2

| | SPAN 6 | | | | | | | | | | | SPAN 7 | | | | | | | | | | | SPAN 8 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Roller Exp. Jt. 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 6 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 7 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 8 |
| Girder A | 663.36 | 663.17 | 662.98 | 662.79 | 662.61 | 662.42 | 662.24 | 662.05 | 661.87 | 661.69 | 661.51 | 661.30 | 661.10 | 660.93 | 660.79 | 660.67 | 660.56 | 660.46 | 660.38 | 660.30 | 660.24 | 660.19 | 660.15 | 660.13 | 660.16 | 660.19 | 660.24 | 660.31 | 660.38 | 660.46 | 660.56 |
| Girder B | 662.73 | 662.58 | 662.44 | 662.29 | 662.15 | 662.02 | 661.88 | 661.74 | 661.60 | 661.47 | 661.34 | 661.19 | 661.05 | 660.93 | 660.83 | 660.74 | 660.66 | 660.59 | 660.53 | 660.49 | 660.46 | 660.43 | 660.42 | 660.43 | 660.45 | 660.49 | 660.54 | 660.61 | 660.68 | 660.76 | 660.86 |
| Girder C | 662.09 | 661.99 | 661.89 | 661.80 | 661.70 | 661.61 | 661.52 | 661.43 | 661.32 | 661.21 | 661.11 | 660.99 | 660.88 | 660.78 | 660.69 | 660.62 | 660.55 | 660.50 | 660.46 | 660.43 | 660.41 | 660.41 | 660.41 | 660.43 | 660.45 | 660.49 | 660.54 | 660.61 | 660.68 | 660.76 | 660.86 |
| Girder D | 661.45 | 661.40 | 661.35 | 661.30 | 661.25 | 661.21 | 661.17 | 661.12 | 661.02 | 660.91 | 660.81 | 660.69 | 660.58 | 660.48 | 660.40 | 660.32 | 660.26 | 660.20 | 660.16 | 660.13 | 660.12 | 660.11 | 660.11 | 660.13 | 660.16 | 660.20 | 660.25 | 660.31 | 660.38 | 660.46 | 660.56 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 2

| | SPAN 6 | | | | | | | | | | | SPAN 7 | | | | | | | | | | | SPAN 8 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Roller Exp. Jt. 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 6 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 7 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 8 |
| North Gutter | 663.06 | 662.93 | 662.79 | 662.63 | 662.46 | 662.27 | 662.07 | 661.86 | 661.65 | 661.46 | 661.28 | 661.09 | 660.92 | 660.79 | 660.69 | 660.58 | 660.47 | 660.35 | 660.23 | 660.13 | 660.06 | 660.02 | 660.01 | 660.04 | 660.09 | 660.14 | 660.18 | 660.21 | 660.25 | 660.31 | 660.40 |
| South Gutter | 661.34 | 661.33 | 661.31 | 661.28 | 661.24 | 661.18 | 661.10 | 661.02 | 660.89 | 660.76 | 660.65 | 660.53 | 660.45 | 660.39 | 660.33 | 660.27 | 660.19 | 660.11 | 660.03 | 659.98 | 659.95 | 659.95 | 659.98 | 660.04 | 660.09 | 660.14 | 660.18 | 660.21 | 660.25 | 660.31 | 660.40 |

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 2

| | SPAN 9 | | | | | | | | | | | SPAN 10 | | | | | | | | | | | SPAN 11 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 8 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 9 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier10 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | ℄ Roller Exp. Jt. 2 |
| Girder A | 660.56 | 660.67 | 660.79 | 660.92 | 661.05 | 661.18 | 661.31 | 661.44 | 661.57 | 661.70 | 661.83 | 661.96 | 662.09 | 662.22 | 662.35 | 662.48 | 662.61 | 662.74 | 662.87 | 663.00 | 663.13 | 663.23 | 663.34 | 663.44 | 663.54 | 663.64 | 663.74 | 663.84 | 663.94 | 664.05 | 664.15 |
| Girder B | 660.86 | 660.97 | 661.09 | 661.21 | 661.34 | 661.47 | 661.61 | 661.74 | 661.87 | 662.00 | 662.13 | 662.26 | 662.39 | 662.52 | 662.65 | 662.78 | 662.91 | 663.04 | 663.17 | 663.30 | 663.43 | 663.53 | 663.63 | 663.74 | 663.84 | 663.94 | 664.04 | 664.14 | 664.24 | 664.35 | 664.45 |
| Girder C | 660.86 | 660.97 | 661.09 | 661.21 | 661.34 | 661.47 | 661.61 | 661.74 | 661.87 | 662.00 | 662.13 | 662.26 | 662.39 | 662.52 | 662.65 | 662.78 | 662.91 | 663.04 | 663.17 | 663.30 | 663.43 | 663.53 | 663.63 | 663.74 | 663.84 | 663.94 | 664.04 | 664.14 | 664.24 | 664.35 | 664.45 |
| Girder D | 660.55 | 660.67 | 660.79 | 660.92 | 661.05 | 661.18 | 661.31 | 661.44 | 661.57 | 661.70 | 661.83 | 661.96 | 662.09 | 662.22 | 662.35 | 662.48 | 662.61 | 662.74 | 662.87 | 663.00 | 663.13 | 663.23 | 663.34 | 663.44 | 663.54 | 663.64 | 663.74 | 663.84 | 663.94 | 664.05 | 664.15 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 2

| | SPAN 9 | | | | | | | | | | | SPAN 10 | | | | | | | | | | | SPAN 11 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 8 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 9 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier10 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | ℄ Roller Exp. Jt. 2 |
| North Gutter | 660.40 | 660.51 | 660.66 | 660.82 | 660.98 | 661.12 | 661.24 | 661.34 | 661.44 | 661.54 | 661.66 | 661.80 | 661.96 | 662.13 | 662.29 | 662.43 | 662.55 | 662.65 | 662.74 | 662.80 | 662.87 | 663.07 | 663.19 | 663.32 | 663.45 | 663.57 | 663.67 | 663.76 | 663.84 | 663.90 | 663.95 |
| South Gutter | 660.40 | 660.51 | 660.66 | 660.82 | 660.98 | 661.12 | 661.24 | 661.34 | 661.44 | 661.54 | 661.66 | 661.80 | 661.96 | 662.12 | 662.29 | 662.43 | 662.55 | 662.65 | 662.74 | 662.80 | 662.87 | 663.07 | 663.19 | 663.32 | 663.45 | 663.57 | 663.67 | 663.76 | 663.84 | 663.90 | 663.95 |

THIS PLAN SHEET HAS BEEN REVISED SEE REVISION 6-9 1975

**Notes:**

*Elevations shown for Girders A and D are to extended top of wearing surface.*

*The elevations shown at the gutter lines are those which are required before concrete is placed. Proper allowance has been made for the dead load deflections caused by the weight of the concrete and wearing course.*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PAVEMENT ELEVATIONS UNITS 1 AND 2

DENISON-HIGHLAND BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN CEP | TRACED CEP | CHECKED CKB | REVIEWED CKB | REVISED |
|---|---|---|---|---|
| DATE 10-2-73 | DATE 10-5-73 | DATE 2-19-74 | DATE 4/1/74 | SHEET 65/75 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

125
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 1

| | SPAN 1 | | | | | | | | | | | SPAN 2 | | | | | | | | | | SPAN 3 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Brg. West Abut. | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 2 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 3 |
| Girder A | 671.06 | 671.00 | 670.92 | 670.81 | 670.69 | 670.57 | 670.46 | 670.35 | 670.22 | 670.09 | 669.97 | 669.82 | 669.67 | 669.51 | 669.35 | 669.20 | 669.05 | 668.90 | 668.76 | 668.60 | 668.44 | 668.29 | 668.14 | 667.98 | 667.81 | 667.66 | 667.50 | 667.35 | 667.20 | 667.04 | 666.88 |
| Girder B | 670.39 | 670.28 | 670.17 | 670.05 | 669.93 | 669.81 | 669.69 | 669.58 | 669.45 | 669.33 | 669.20 | 669.05 | 668.91 | 668.75 | 668.59 | 668.43 | 668.28 | 668.14 | 667.99 | 667.83 | 667.67 | 667.52 | 667.37 | 667.21 | 667.05 | 666.89 | 666.74 | 666.59 | 666.43 | 666.27 | 666.11 |
| Girder C | 669.72 | 669.56 | 669.41 | 669.28 | 669.16 | 669.04 | 668.93 | 668.82 | 668.69 | 668.56 | 668.43 | 668.28 | 668.14 | 667.98 | 667.82 | 667.67 | 667.52 | 667.37 | 667.22 | 667.06 | 666.91 | 666.75 | 666.61 | 666.45 | 666.28 | 666.12 | 665.97 | 665.82 | 665.67 | 665.50 | 665.34 |
| Girder D | 669.05 | 668.84 | 668.65 | 668.52 | 668.39 | 668.28 | 668.16 | 668.05 | 667.92 | 667.79 | 667.67 | 667.52 | 667.37 | 667.22 | 667.05 | 666.90 | 666.75 | 666.60 | 666.46 | 666.30 | 666.14 | 665.99 | 665.84 | 665.68 | 665.52 | 665.36 | 665.20 | 665.06 | 664.90 | 664.74 | 664.58 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 1

| | SPAN 1 | | | | | | | | | | | SPAN 2 | | | | | | | | | | SPAN 3 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Brg. West Abut. | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 2 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 3 |
| North Gutter | 670.75 | 670.76 | 670.74 | 670.67 | 670.56 | 670.42 | 670.27 | 670.10 | 669.94 | 669.79 | 669.65 | 669.50 | 669.38 | 669.28 | 669.16 | 669.02 | 668.86 | 668.67 | 668.48 | 668.29 | 668.12 | 667.98 | 667.85 | 667.73 | 667.60 | 667.46 | 667.28 | 667.08 | 666.89 | 666.71 | 666.56 |
| South Gutter | 668.93 | 668.80 | 668.67 | 668.56 | 668.45 | 668.32 | 668.17 | 668.01 | 667.85 | 667.70 | 667.57 | 667.42 | 667.30 | 667.18 | 667.06 | 666.92 | 666.76 | 666.58 | 666.39 | 666.21 | 666.04 | 665.90 | 665.77 | 665.64 | 665.51 | 665.36 | 665.19 | 665.00 | 664.81 | 664.63 | 664.48 |

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 1

| | SPAN 4 | | | | | | | | | | SPAN 5 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 3 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 4 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 5 | ℄ Roller Exp. Jt. 1 |
| Girder A | 666.88 | 666.71 | 666.55 | 666.36 | 666.17 | 666.00 | 665.83 | 665.67 | 665.51 | 665.33 | 665.16 | 665.02 | 664.89 | 664.75 | 664.61 | 664.47 | 664.33 | 664.20 | 664.05 | 663.89 | 663.70 | 663.36 |
| Girder B | 666.11 | 665.94 | 665.78 | 665.59 | 665.41 | 665.23 | 665.06 | 664.90 | 664.75 | 664.56 | 664.39 | 664.25 | 664.12 | 663.99 | 663.84 | 663.70 | 663.56 | 663.43 | 663.29 | 663.14 | 662.98 | 662.73 |
| Girder C | 665.34 | 665.17 | 665.01 | 664.83 | 664.64 | 664.47 | 664.30 | 664.14 | 663.98 | 663.80 | 663.62 | 663.49 | 663.35 | 663.22 | 663.07 | 662.93 | 662.80 | 662.66 | 662.52 | 662.38 | 662.26 | 662.09 |
| Girder D | 664.58 | 664.41 | 664.25 | 664.06 | 663.88 | 663.70 | 663.53 | 663.37 | 663.21 | 663.03 | 662.86 | 662.72 | 662.59 | 662.45 | 662.31 | 662.17 | 662.03 | 661.90 | 661.75 | 661.62 | 661.54 | 661.45 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 1

| | SPAN 4 | | | | | | | | | | SPAN 5 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 3 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 4 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 5 | ℄ Roller Exp. Jt. 1 |
| North Gutter | 666.56 | 666.42 | 666.31 | 666.21 | 666.10 | 665.95 | 665.73 | 665.53 | 665.28 | 665.05 | 664.84 | 664.69 | 664.56 | 664.45 | 664.34 | 664.22 | 664.08 | 663.94 | 663.77 | 663.59 | 663.39 | 663.06 |
| South Gutter | 664.48 | 664.33 | 664.21 | 664.10 | 664.97 | 663.82 | 663.63 | 663.41 | 663.18 | 662.96 | 662.76 | 662.61 | 662.48 | 662.37 | 662.25 | 662.13 | 662.00 | 661.85 | 661.69 | 661.54 | 661.43 | 661.34 |

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 2

| | SPAN 6 | | | | | | | | | | SPAN 7 | | | | | | | | | | SPAN 8 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Roller Exp. Jt. 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 6 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 7 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 8 |
| Girder A | 663.36 | 663.17 | 662.98 | 662.79 | 662.61 | 662.42 | 662.24 | 662.05 | 661.87 | 661.69 | 661.51 | 661.30 | 661.10 | 660.93 | 660.79 | 660.67 | 660.56 | 660.46 | 660.38 | 660.30 | 660.24 | 660.19 | 660.15 | 660.13 | 660.16 | 660.19 | 660.24 | 660.31 | 660.38 | 660.46 | 660.56 |
| Girder B | 662.73 | 662.58 | 662.44 | 662.29 | 662.15 | 662.02 | 661.88 | 661.74 | 661.60 | 661.47 | 661.34 | 661.19 | 661.05 | 660.93 | 660.83 | 660.74 | 660.66 | 660.59 | 660.53 | 660.49 | 660.46 | 660.43 | 660.42 | 660.43 | 660.45 | 660.49 | 660.54 | 660.61 | 660.68 | 660.76 | 660.86 |
| Girder C | 662.09 | 661.99 | 661.89 | 661.80 | 661.70 | 661.61 | 661.52 | 661.43 | 661.32 | 661.21 | 661.11 | 660.99 | 660.88 | 660.78 | 660.69 | 660.62 | 660.55 | 660.50 | 660.46 | 660.43 | 660.41 | 660.41 | 660.41 | 660.43 | 660.45 | 660.49 | 660.54 | 660.61 | 660.68 | 660.76 | 660.86 |
| Girder D | 661.45 | 661.40 | 661.35 | 661.30 | 661.25 | 661.21 | 661.17 | 661.12 | 661.02 | 660.91 | 660.81 | 660.69 | 660.58 | 660.48 | 660.40 | 660.32 | 660.26 | 660.20 | 660.16 | 660.13 | 660.12 | 660.11 | 660.11 | 660.13 | 660.16 | 660.20 | 660.25 | 660.31 | 660.38 | 660.46 | 660.56 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 2

| | SPAN 6 | | | | | | | | | | SPAN 7 | | | | | | | | | | SPAN 8 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Roller Exp. Jt. 1 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 6 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 7 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 8 |
| North Gutter | 663.06 | 662.93 | 662.79 | 662.63 | 662.46 | 662.27 | 662.07 | 661.86 | 661.65 | 661.46 | 661.28 | 661.09 | 660.92 | 660.79 | 660.69 | 660.58 | 660.47 | 660.35 | 660.23 | 660.13 | 660.06 | 660.02 | 660.01 | 660.04 | 660.09 | 660.14 | 660.18 | 660.21 | 660.25 | 660.31 | 660.40 |
| South Gutter | 661.34 | 661.33 | 661.31 | 661.28 | 661.24 | 661.18 | 661.10 | 661.02 | 660.89 | 660.76 | 660.65 | 660.53 | 660.45 | 660.39 | 660.33 | 660.27 | 660.19 | 660.11 | 660.03 | 659.96 | 659.95 | 659.95 | 659.98 | 660.04 | 660.09 | 660.14 | 660.18 | 660.21 | 660.25 | 660.31 | 660.40 |

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 2

| | SPAN 9 | | | | | | | | | | SPAN 10 | | | | | | | | | | SPAN 11 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 8 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 9 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 10 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | ℄ Roller Exp. Jt. 2 |
| Girder A | 660.56 | 660.67 | 660.79 | 660.92 | 661.05 | 661.18 | 661.31 | 661.44 | 661.57 | 661.70 | 661.83 | 661.96 | 662.09 | 662.22 | 662.35 | 662.48 | 662.61 | 662.74 | 662.87 | 663.00 | 663.13 | 663.23 | 663.34 | 663.44 | 663.54 | 663.64 | 663.74 | 663.84 | 663.94 | 664.05 | 664.15 |
| Girder B | 660.86 | 660.97 | 661.09 | 661.21 | 661.34 | 661.47 | 661.61 | 661.74 | 661.87 | 662.00 | 662.13 | 662.26 | 662.39 | 662.52 | 662.65 | 662.78 | 662.91 | 663.04 | 663.17 | 663.30 | 663.43 | 663.53 | 663.63 | 663.74 | 663.84 | 663.94 | 664.04 | 664.14 | 664.24 | 664.35 | 664.45 |
| Girder C | 660.86 | 660.97 | 661.09 | 661.21 | 661.34 | 661.47 | 661.61 | 661.74 | 661.87 | 662.00 | 662.13 | 662.26 | 662.39 | 662.52 | 662.65 | 662.78 | 662.91 | 663.04 | 663.17 | 663.30 | 663.43 | 663.53 | 663.63 | 663.74 | 663.84 | 663.94 | 664.04 | 664.14 | 664.24 | 664.35 | 664.45 |
| Girder D | 660.55 | 660.67 | 660.79 | 660.92 | 661.05 | 661.18 | 661.31 | 661.44 | 661.57 | 661.70 | 661.83 | 661.96 | 662.09 | 662.22 | 662.35 | 662.48 | 662.61 | 662.74 | 662.87 | 663.00 | 663.13 | 663.23 | 663.34 | 663.44 | 663.54 | 663.64 | 663.74 | 663.84 | 663.94 | 664.05 | 664.15 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 2

| | SPAN 9 | | | | | | | | | | SPAN 10 | | | | | | | | | | SPAN 11 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 8 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 9 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 10 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | ℄ Roller Exp. Jt. 2 |
| North Gutter | 660.40 | 660.51 | 660.66 | 660.82 | 660.98 | 661.12 | 661.24 | 661.34 | 661.44 | 661.54 | 661.66 | 661.80 | 661.96 | 662.13 | 662.29 | 662.43 | 662.55 | 662.65 | 662.74 | 662.80 | 662.87 | 663.07 | 663.19 | 663.32 | 663.45 | 663.57 | 663.67 | 663.76 | 663.84 | 663.90 | 663.95 |
| South Gutter | 660.40 | 660.51 | 660.66 | 660.82 | 660.98 | 661.12 | 661.24 | 661.34 | 661.44 | 661.54 | 661.66 | 661.80 | 661.96 | 662.12 | 662.29 | 662.43 | 662.55 | 662.65 | 662.74 | 662.80 | 662.87 | 663.07 | 663.19 | 663.32 | 663.45 | 663.57 | 663.67 | 663.76 | 663.84 | 663.90 | 663.95 |

**Notes:**

*Elevations shown for Girders A and D are to extended top of wearing surface.*

*The elevations shown at the gutter lines are those which are required before concrete is placed. Proper allowance has been made for the dead load deflections caused by the weight of the concrete and wearing course.*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PAVEMENT ELEVATIONS
## UNITS 1 AND 2
## DENISON-HARVARD BRIDGE
## OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY — OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| CEP | CEP | CRB | GAB | |
| DATE 10-2-73 | DATE 10-5-73 | DATE 2-19-74 | DATE 4-11-74 | SHEET 65/175 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

125/148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 3

| | SPAN 12 | | | | | | | | | | | | SPAN 13 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄Roller Exp. Jt. 2 | Pier 11 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 12 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 13 |
| Girder A | 664.15 | 664.33 | 664.47 | 664.61 | 664.75 | 664.89 | 665.03 | 665.17 | 665.31 | 665.45 | 665.59 | 665.73 | 665.91 | 666.08 | 666.26 | 666.44 | 666.61 | 666.79 | 666.96 | 667.14 | 667.32 | 667.49 |
| Girder B | 664.45 | 664.63 | 664.77 | 664.91 | 665.05 | 665.19 | 665.33 | 665.47 | 665.61 | 665.75 | 665.89 | 666.03 | 666.21 | 666.38 | 666.56 | 666.73 | 666.91 | 667.09 | 667.26 | 667.44 | 667.61 | 667.79 |
| Girder C | 664.45 | 664.63 | 664.77 | 664.91 | 665.05 | 665.19 | 665.33 | 665.47 | 665.61 | 665.75 | 665.89 | 666.03 | 666.21 | 666.38 | 666.56 | 666.73 | 666.91 | 667.09 | 667.26 | 667.44 | 667.61 | 667.79 |
| Girder D | 664.15 | 664.33 | 664.47 | 664.61 | 664.75 | 664.89 | 665.03 | 665.17 | 665.31 | 665.45 | 665.59 | 665.73 | 665.91 | 666.08 | 666.26 | 666.44 | 666.61 | 666.79 | 666.96 | 667.14 | 667.32 | 667.49 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 3

| | SPAN 12 | | | | | | | | | | | | SPAN 13 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Roller Exp. Jt. 2 | Pier 11 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 12 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 13 |
| North Gutter | 663.95 | 664.17 | 664.35 | 664.53 | 664.70 | 664.85 | 664.99 | 665.10 | 665.21 | 665.31 | 665.43 | 665.57 | 665.78 | 666.01 | 666.26 | 666.48 | 666.68 | 666.83 | 666.95 | 667.06 | 667.18 | 667.33 |
| South Gutter | 663.95 | 664.17 | 664.35 | 664.53 | 664.70 | 664.85 | 664.99 | 665.10 | 665.21 | 665.31 | 665.43 | 665.57 | 665.78 | 666.01 | 666.26 | 666.48 | 666.68 | 666.83 | 666.95 | 667.06 | 667.18 | 667.33 |

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 3

| | SPAN 14 | | | | | | | | | | | SPAN 15 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 13 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 14 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 15 | ℄Roller Exp. Jt. 3 |
| Girder A | 667.49 | 667.67 | 667.84 | 668.02 | 668.20 | 668.37 | 668.55 | 668.72 | 668.90 | 669.08 | 669.25 | 669.41 | 669.57 | 669.72 | 669.88 | 670.04 | 670.20 | 670.36 | 670.51 | 670.67 | 670.83 | 671.00 |
| Girder B | 667.79 | 667.97 | 668.14 | 668.32 | 668.49 | 668.67 | 668.85 | 669.02 | 669.20 | 669.37 | 669.55 | 669.71 | 669.87 | 670.02 | 670.18 | 670.34 | 670.50 | 670.65 | 670.81 | 670.97 | 671.13 | 671.30 |
| Girder C | 667.79 | 667.97 | 668.14 | 668.32 | 668.49 | 668.67 | 668.85 | 669.02 | 669.20 | 669.37 | 669.55 | 669.71 | 669.87 | 670.02 | 670.18 | 670.34 | 670.50 | 670.65 | 670.81 | 670.97 | 671.13 | 671.30 |
| Girder D | 667.49 | 667.67 | 667.84 | 668.02 | 668.20 | 668.37 | 668.55 | 668.72 | 668.90 | 669.08 | 669.25 | 669.41 | 669.57 | 669.72 | 669.88 | 670.04 | 670.20 | 670.36 | 670.51 | 670.67 | 670.83 | 671.00 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 3

| | SPAN 14 | | | | | | | | | | | SPAN 15 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pier 13 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 14 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 15 | ℄ Roller Exp. Jt. 3 |
| North Gutter | 667.33 | 667.51 | 667.72 | 667.94 | 668.16 | 668.34 | 668.50 | 668.64 | 668.77 | 668.91 | 669.09 | 669.27 | 669.48 | 669.70 | 669.92 | 670.11 | 670.27 | 670.40 | 670.50 | 670.59 | 670.66 | 670.77 |
| South Gutter | 667.33 | 667.51 | 667.72 | 667.94 | 668.16 | 668.34 | 668.50 | 668.64 | 668.77 | 668.91 | 669.09 | 669.27 | 669.48 | 669.70 | 669.92 | 670.11 | 670.27 | 670.40 | 670.50 | 670.59 | 670.66 | 670.77 |

## TOP OF WEARING SURFACE ELEVATIONS - UNIT 4

| | SPAN 16 | | | | | | | | | | | SPAN 17 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄Roller Exp. Jt. 3 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 16 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | ℄ Brg. East Abut. |
| Girder A | 671.00 | 671.10 | 671.20 | 671.30 | 671.40 | 671.50 | 671.59 | 671.69 | 671.79 | 671.89 | 671.99 | 672.09 | 672.18 | 672.28 | 672.38 | 672.48 | 672.58 | 672.68 | 672.78 | 672.87 | 672.97 |
| Girder B | 671.30 | 671.40 | 671.50 | 671.60 | 671.70 | 671.79 | 671.89 | 671.99 | 672.09 | 672.19 | 672.29 | 672.39 | 672.48 | 672.58 | 672.68 | 672.78 | 672.88 | 672.98 | 673.07 | 673.17 | 673.27 |
| Girder C | 671.30 | 671.40 | 671.50 | 671.60 | 671.70 | 671.79 | 671.89 | 671.99 | 672.09 | 672.19 | 672.29 | 672.39 | 672.48 | 672.58 | 672.68 | 672.78 | 672.88 | 672.98 | 673.07 | 673.17 | 673.27 |
| Girder D | 671.00 | 671.10 | 671.20 | 671.30 | 671.40 | 671.50 | 671.59 | 671.69 | 671.79 | 671.89 | 671.99 | 672.09 | 672.18 | 672.28 | 672.38 | 672.48 | 672.58 | 672.68 | 672.78 | 672.87 | 672.97 |

## TOP OF PORTLAND CEMENT CONCRETE - UNIT 4

| | SPAN 16 | | | | | | | | | | | SPAN 17 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℄ Roller Exp. Jt. 3 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | Pier 16 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | ℄ Brg. East Abut. |
| North Gutter | 670.77 | 670.92 | 671.06 | 671.19 | 671.30 | 671.40 | 671.49 | 671.56 | 671.64 | 671.73 | 671.82 | 671.93 | 672.05 | 672.18 | 672.30 | 672.42 | 672.53 | 672.62 | 672.69 | 672.75 | 672.81 |
| South Gutter | 670.77 | 670.92 | 671.06 | 671.19 | 671.30 | 671.40 | 671.49 | 671.56 | 671.64 | 671.73 | 671.82 | 671.93 | 672.05 | 672.18 | 672.30 | 672.42 | 672.53 | 672.62 | 672.69 | 672.75 | 672.81 |

*Notes:*

*Elevations shown for Girders A and D are to extended top of wearing surface.*

*The elevations shown at the gutter lines are those which are required before concrete is placed. Proper allowance has been made for the dead load deflections caused by the weight of the concrete and wearing course.*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# PAVEMENT ELEVATIONS
## UNITS 3 AND 4
## DENISON-HARVARD BRIDGE
## OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

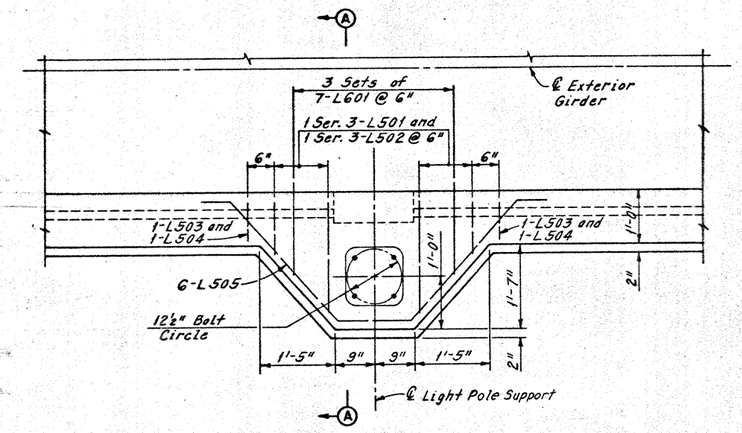
CUYAHOGA COUNTY OHIO

| DRAWN CEP | TRACED CEP | CHECKED CKB | SUPERVISED | REVISED |
|---|---|---|---|---|
| DATE 10-4-73 | DATE 10-6-73 | DATE 2-19-74 | DATE 4-11-74 | SHEET 6 of 13 |

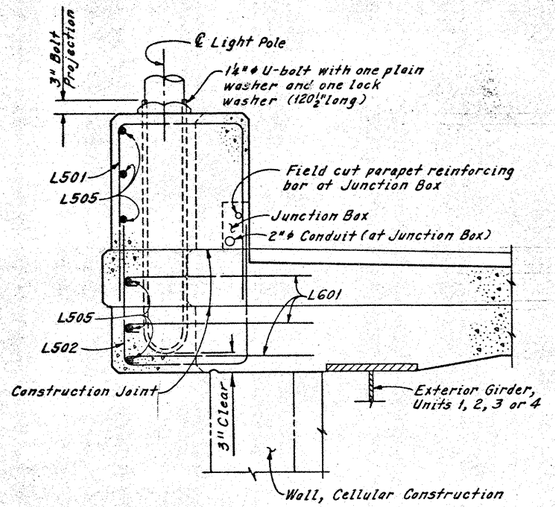
| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

127
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




PLAN

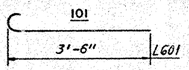


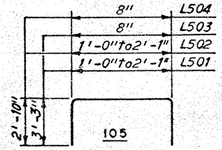

SECTION A-A

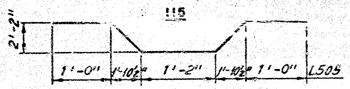
Note:
Normal sidewalk, parapet and slab reinforcement not shown; normal longitudinal reinforcement is continuous through light support unless indicated otherwise.

| REINFORCEMENT SCHEDULE LIGHT POLE SUPPORT | | | | | |
|---|---|---|---|---|---|
| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
| L501 | 2 Ser. 3 | ~~7'-3" 8'-4"~~ | 105 | 6½" | 49 |
| L502 | 2 Ser. 3 | ~~6'-5" 7'-6"~~ | 105 | 6½" | 44 |
| L503 | 2 | 6'-11" | 105 | | 14 |
| L504 | 2 | 6'-1" | 105 | | 13 |
| L505 | 6 | 8'-7" | 115 | | 54 |
| | | | | | |
| | | | | | |
| L601 | 21 | 4'-2" | 101 | | 131 |
| | | | | | |
| | | | | | |
| For One Light Pole Support | | | | | |
| | | Total Weight | = | | 305 |
| | | | | | |
| | | | | | |

BENDING DIAGRAMS




Notes:
For location of conduit in the structure, additional lighting details and lighting quantities see Lighting Plans.
For Light Pole Locations see Sheets 1 73 thru 4 73 .
Light Pole Support reinforcement is included for payment with slab reinforcement; see Reinforcement Schedule for weight summary.
Concrete for Light Pole Supports above the parapet joint is included for payment with "Item 517, Bridge Railing (Concrete Parapet with Aluminum Chain Link Fence, Sec. 710.04)".

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# LIGHT POLE SUPPORT DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

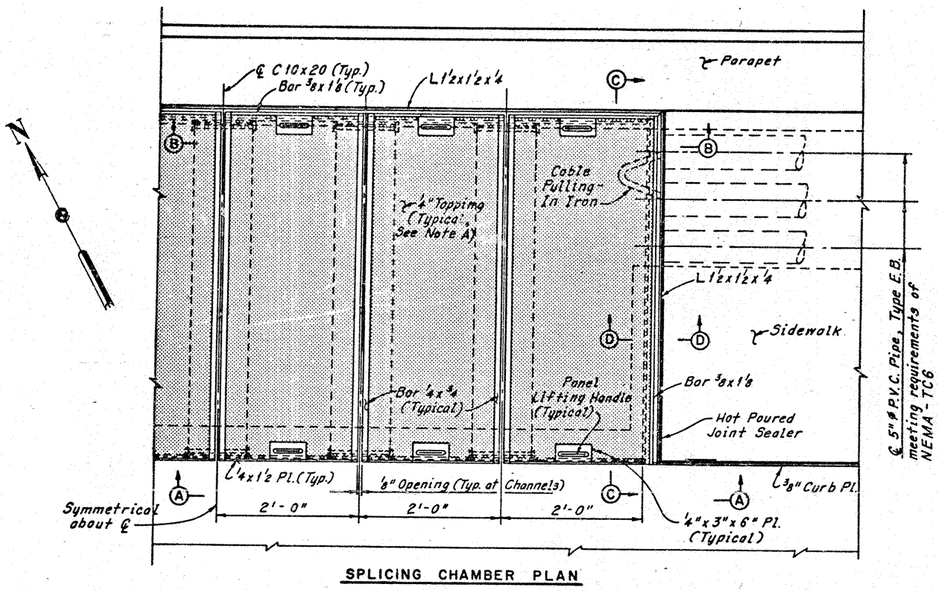
CUYAHOGA COUNTY

| DRAWN WEB | TRACED WEB | CHECKED CEP | REVIEWED [illegible] | REVISED |
|---|---|---|---|---|
| DATE 7-16-74 | DATE 7-17-74 | DATE 7-17-74 | DATE 7-17-74 | SHEET 67 73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

128/148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



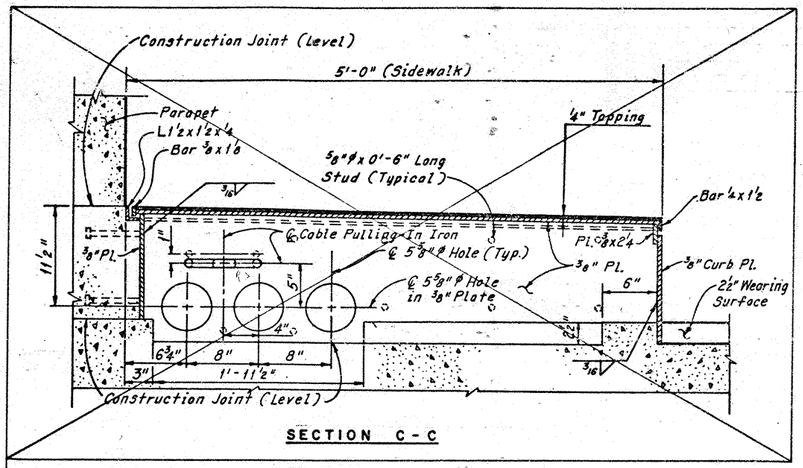

SPLICING CHAMBER PLAN

(Studs Not Shown)

Note A:

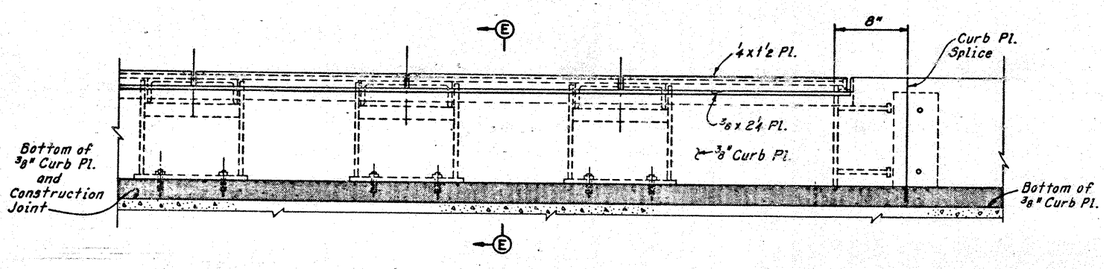
The 1" topping shall be a modified epoxy resembling concrete in appearance as manufactured by the Ceilcote Company, Berea, Ohio 44017, under the trade name "Corocrete A-1" or approved equal. The topping shall be applied in the shop and the surface textured to resemble a typical concrete sidewalk. Preparation of the steel surface shall be the same as for painting described in Section 514.04.

A manufacturer's representative experienced in the application of the topping will instruct the Contractor in the proper procedures for applying the topping.

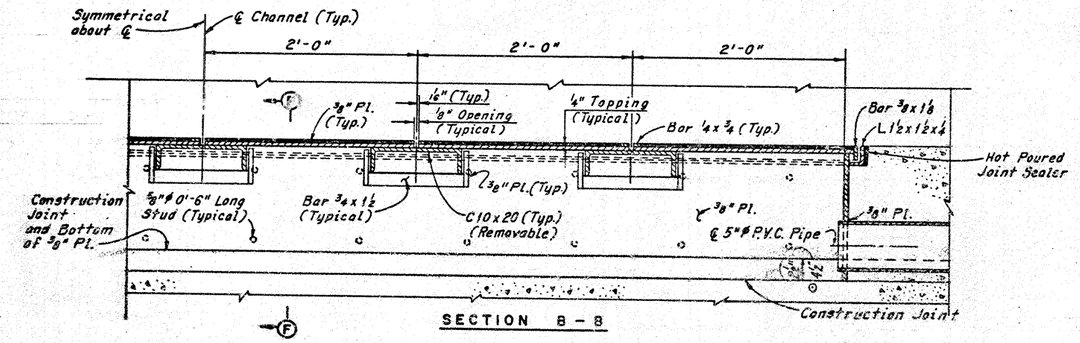



SECTION C-C

© Superseded, see sheet 478/73 .

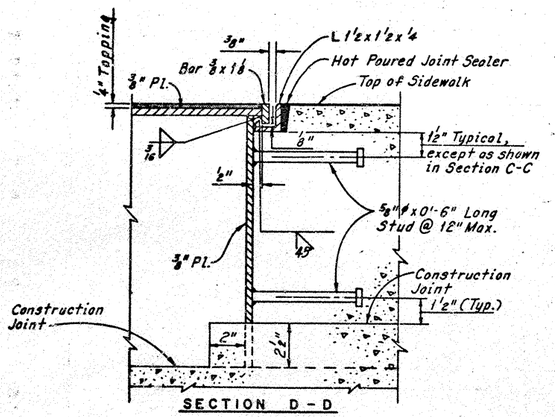



ELEVATION A-A




SECTION B-B

(Panel Lifting Handles Not Shown)




SECTION D-D

Note:
For Sections E-E and F-F, see Sheet 678/73 .

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

C.E.I. Co. 3-5"ϕ DUCTS
SPLICING CHAMBER DETAILS
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN C.K.D. | TRACED C.P. | CHECKED C.P. | REVIEWED C.A.D. | REVISED |
|---|---|---|---|---|
| DATE 4-1-74 | DATE 4-9-74 | DATE 5-20-74 | DATE 6-11-74 | SHEET 674/73 |

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| FHWA REGION | STATE | PROJECT | | |
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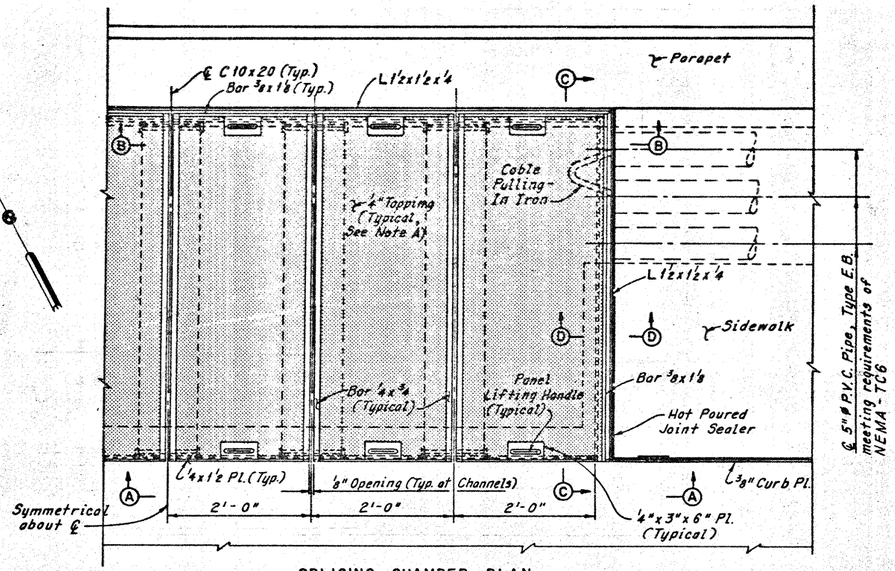
| 5 | OHIO | | | |

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

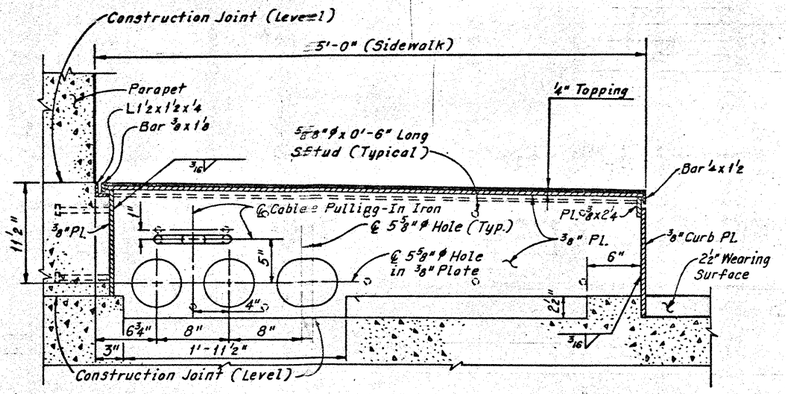



SPLICING CHAMBER PLAN

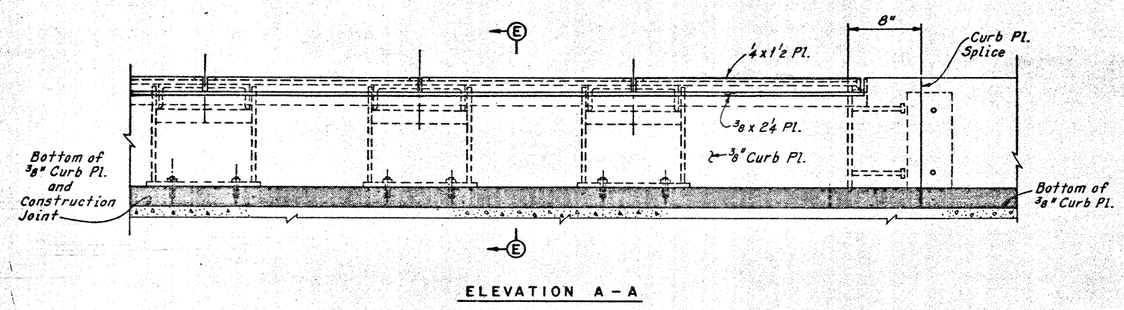
(Studs Not Shown)

Note A:
The 1/4" topping shall be a modified epoxy resembling concrete in appearance as manufactured by the Ceilcote Company, Berea, Ohio 44017, under the trade name "Corocrete A-1" or approved equal. The topping shall be applied in the shop and the surface textured to resemble a typical concrete sidewalk. Preparation of the steel surface shall be the same as for painting described in Section 514.04.

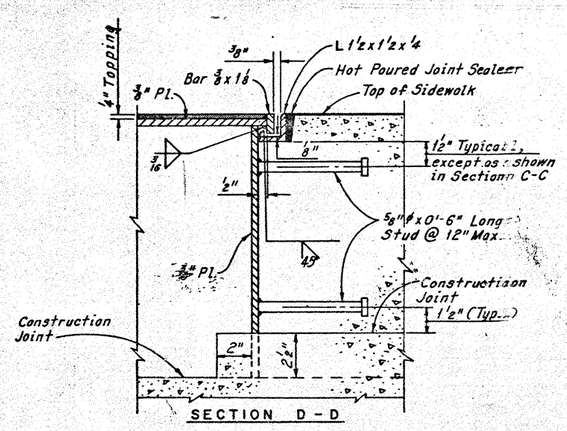
A manufacturer's representative experienced in the application of the topping will instruct the Contractor in the proper procedures for applying the topping.



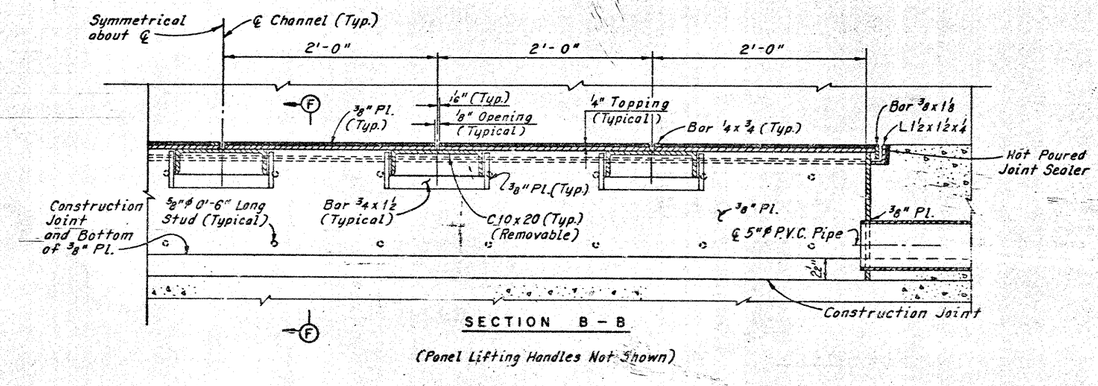

SECTION C-C




ELEVATION A-A




SECTION D-D




SECTION B-B

(Panel Lifting Handles Not Shown)

Note:
For Sections E-E and F-F, see Sheet 678/73.

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 8-22 1975

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

C.E.I. Co. 3-5" ϕ DUCTS
SPLICING CHAMBER DETAILS
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| CKB | CP | | DAB | |
| DATE 4-1-74 | DATE 4-9-74 | DATE 8-20-75 | DATE 4-11-74 | SHEET 677/73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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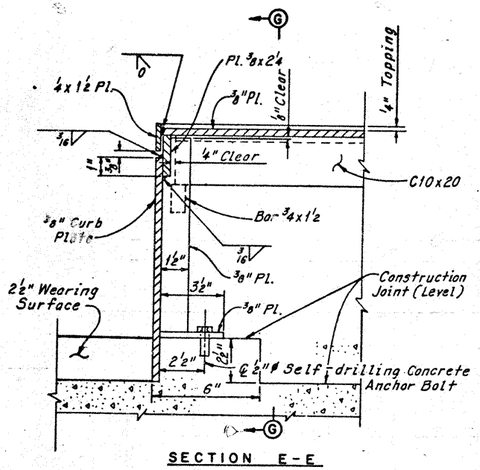
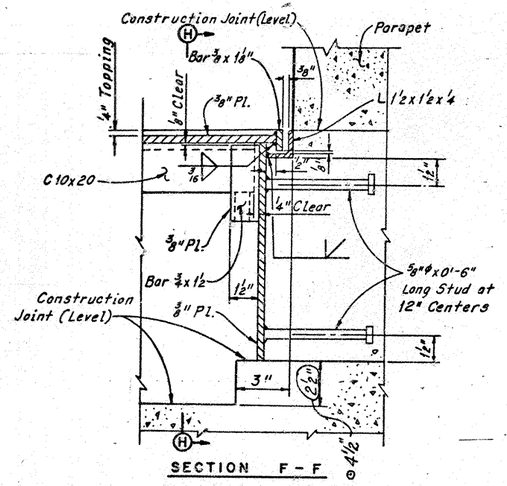
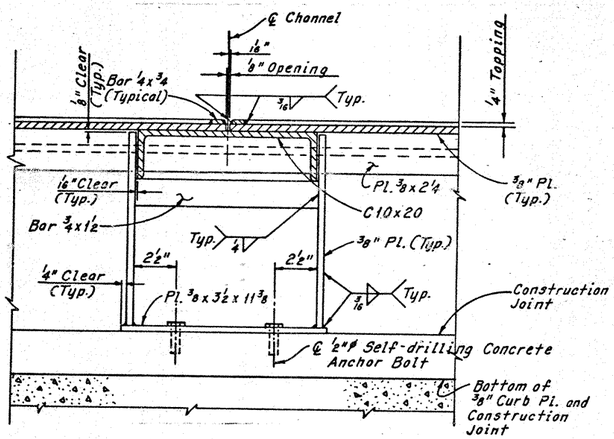
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



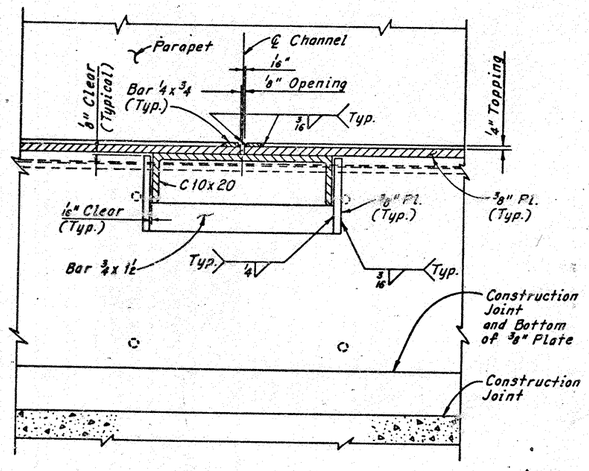

SECTION E-E



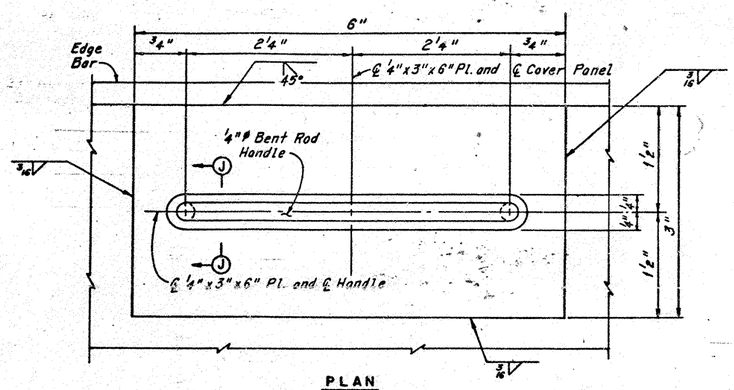

SECTION F-F



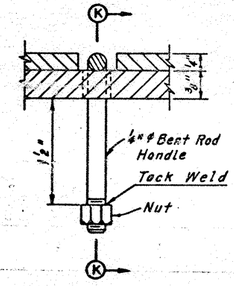

SECTION G-G



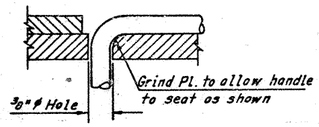

SECTION H-H




PLAN




SECTION J-J

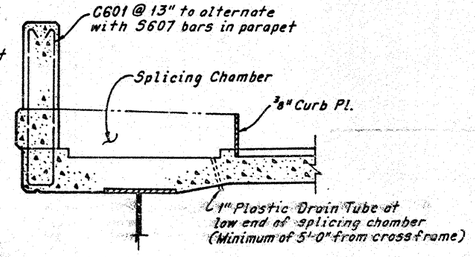



SECTION K-K

PANEL LIFTING HANDLE DETAILS

Note:
For location of Sections E-E and F-F, see Sheet 67A/73.

Note:
Sidewalk reinforcement shall be field cut as required for installation of splicing chamber.

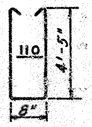


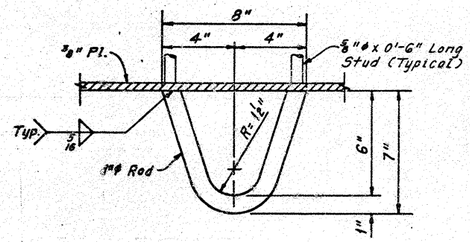

PARAPET REINFORCEMENT AND CHAMBER DRAINAGE DETAIL
(Normal Reinforcement Not Shown)

REINFORCEMENT SCHEDULE
SPLICING CHAMBER

| MARK | NO. | LENGTH | TYPE | WEIGHT (LBS) |
|---|---|---|---|---|
| For | One | Splicing | Chamber | |
| C601 | 13 | 10'-5" | 110 | 203 |
| | | | | |
| | | | | |

BENDING DIAGRAM




CABLE PULLING-IN IRON DETAIL

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

C.E.I. Co. 3-5"ø DUCTS
SPLICING CHAMBER DETAILS
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN C.K.B. | TRACED C.P. | CHECKED W.E.B. | REVIEWED C.A.B. | REVISED |
|---|---|---|---|---|
| DATE 3-1-74 | DATE 4-9-74 | DATE 8-20-74 | DATE 8-11-74 | SHEET 67B/73 |

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| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

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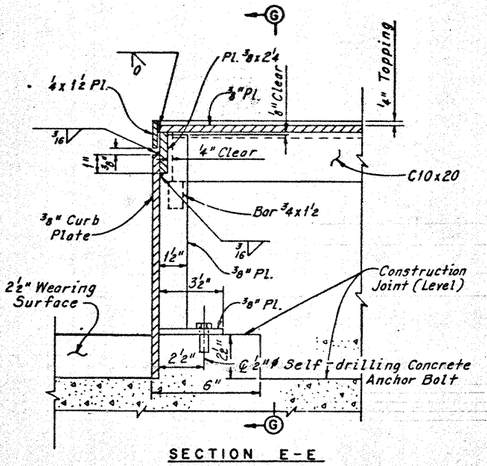
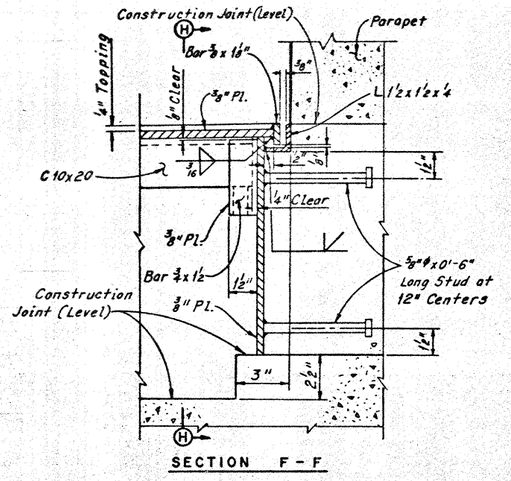
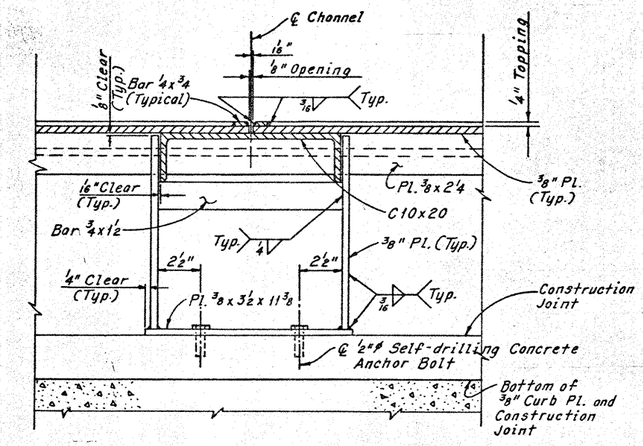
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



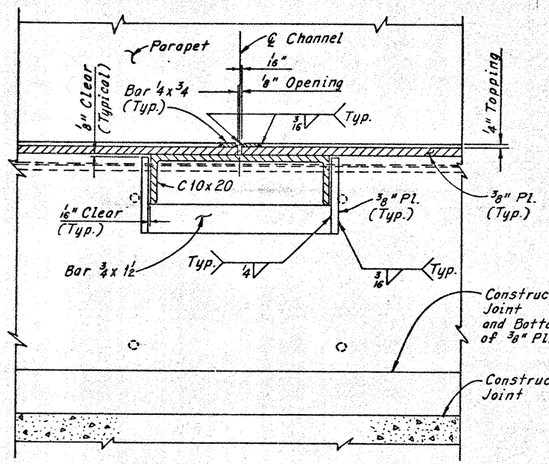

SECTION E-E



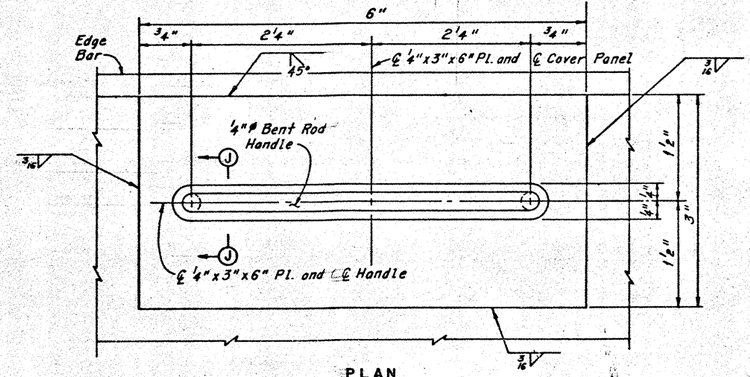

SECTION F-F



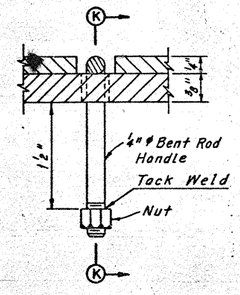

SECTION G-G



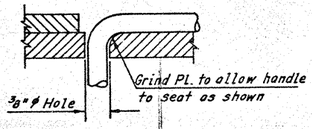

SECTION H-H




PLAN




SECTION J-J

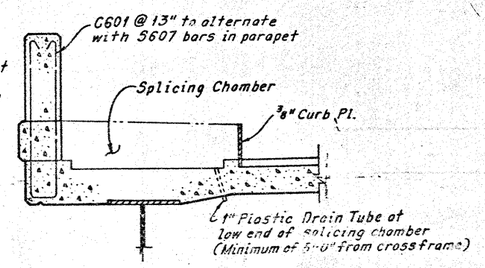



SECTION K-K

PANEL LIFTING HANDLE DETAILS

Note:
For location of Sections E-E and F-F, see Sheet 67A 73.

Note:
Sidewalk reinforcement shall be field cut as required for installation of splicing chamber.

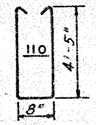


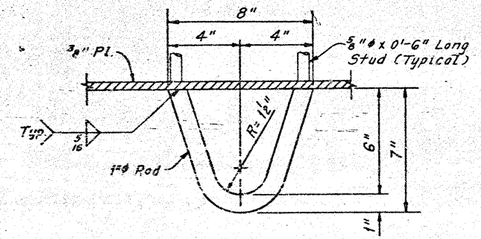

PARAPET REINFORCEMENT AND CHAMBER DRAINAGE DETAIL
(Normal Reinforcement Not Shown)

REINFORCEMENT SCHEDULE
SPLICING CHAMBER

| MARK | NO. | LENGTH | TYPE | WEIGHT(LBS) |
|---|---|---|---|---|
| For | One | Splicing | Chamber | |
| C601 | 13 | 10'-5" | 110 | 203 |
| | | | | |
| | | | | |

BENDING DIAGRAM




CABLE PULLING-IN IRON DETAIL

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 8-22 1975

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

C.E.I. Co. 3-5"ø DUCTS
SPLICING CHAMBER DETAILS
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN C.A.B | TRACED C.P. | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DATE 4-1-74 | DATE 4-9-74 | DATE 8-20-74 | DATE 4-1-74 | SHEET 5 73 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 6 | OHIO | | |

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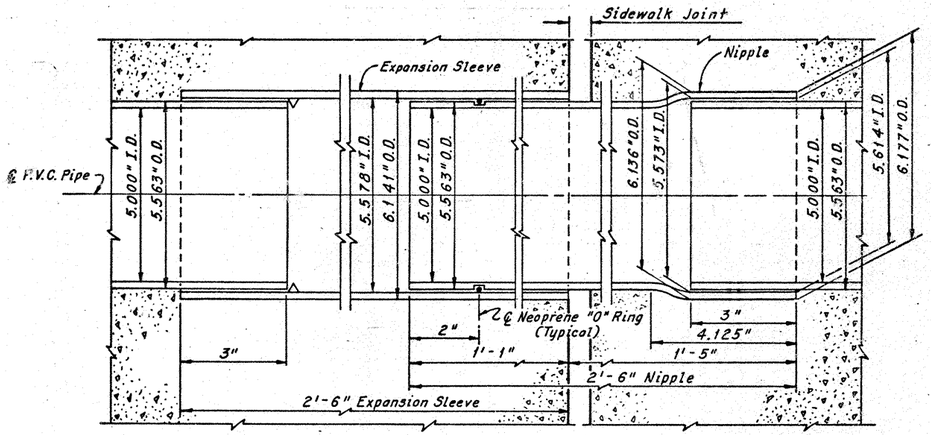
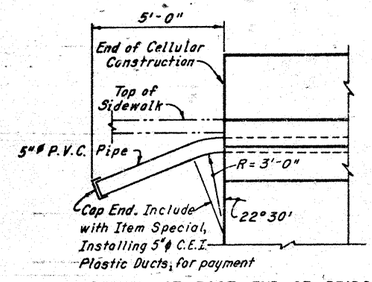
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



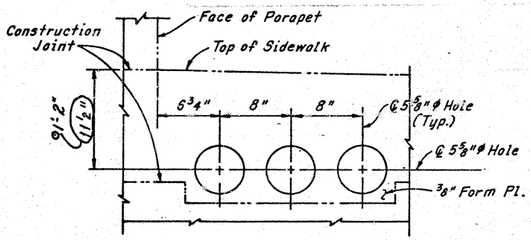

DUCT EXPANSION JOINT

(⅜" Form Plates Not Shown)

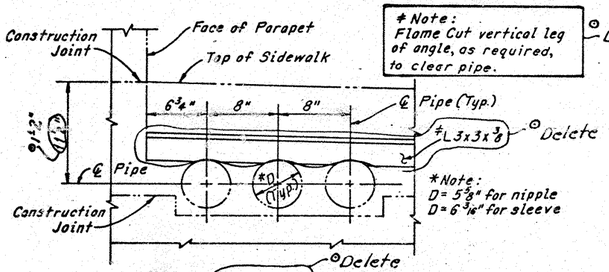
| LOCATION OF DUCT EXPANSION JOINT SLEEVES | |
|---|---|
| JOINT LOCATION | SLEEVE LOCATION |
| West Abutment | West Side |
| Intermediate Expansion Joints | West Side |
| Cellular Joints | West Side |
| East Abutment | East Side |




DETAIL AT EAST END OF BRIDGE

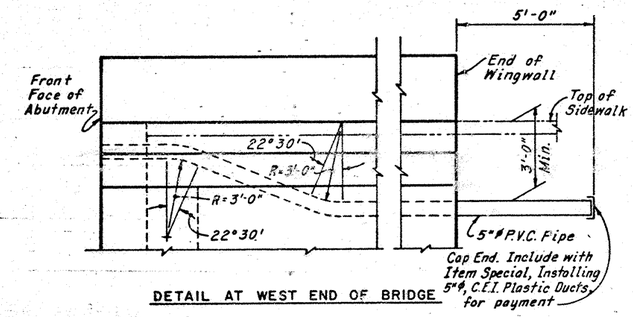



MODIFICATION OF ⅜" FORM PLATES AT WEST ABUTMENT, EAST ABUTMENT AND CELLULAR JOINTS




*Note: Flame Cut vertical leg of angle, as required, to clear pipe. Delete

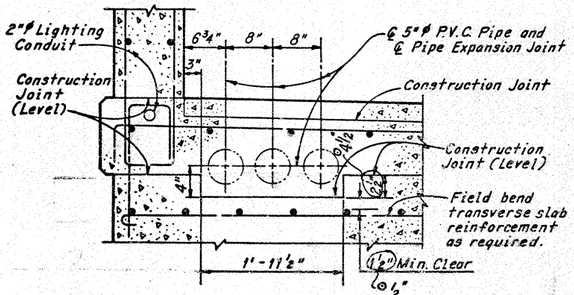
MODIFICATION OF L 3x3x⅜ AT INTERMEDIATE EXPANSION JOINTS 1 AND 2




DETAIL AT WEST END OF BRIDGE

TERMINAL DETAILS

(Looking South)




SLAB AND SIDEWALK DETAIL AT C.E.I. DUCTS

(Bar Marks Not Shown)

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# C.E.I. Co. 3-5"ϕ DUCTS MISCELLANEOUS DETAILS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.K.B. | C.P. | HED | E.H.S. | |
| DATE 4-4-74 | DATE 4-11-74 | DATE 8-20-74 | DATE 4-11-74 | SHEET 6 OF 73 |

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|---|---|---|---|
| 5 | OHIO | | |

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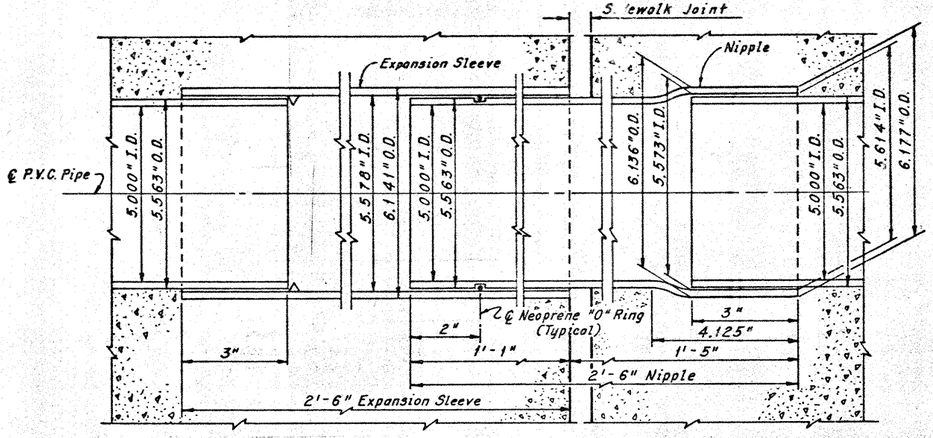
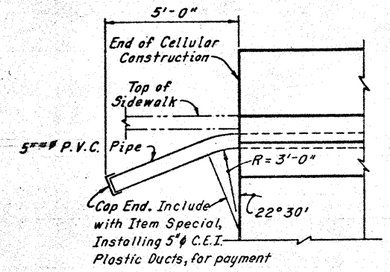
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43



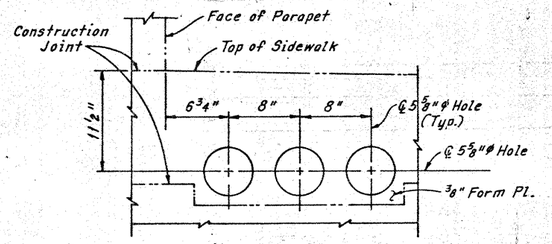

DUCT EXPANSION JOINT

("8" Form Plates Not Shown)

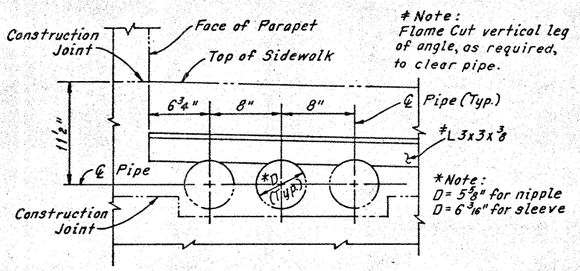
| LOCATION OF DUCT EXPANSION JOINT SLEEVES | |
|---|---|
| JOINT LOCATION | SLEEVE LOCATION |
| West Abutment | West Side |
| Intermediate Expansion Joints | West Side |
| Cellular Joints | West Side |
| East Abutment | East Side |




DETAIL AT EAST END OF BRIDGE



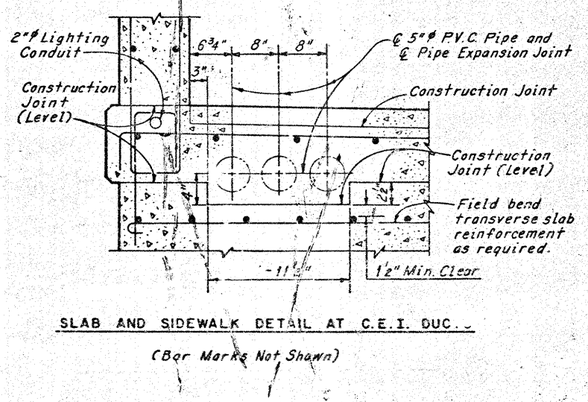

MODIFICATION OF ⅜" FORM PLATES AT WEST ABUTMENT, EAST ABUTMENT AND CELLULAR JOINTS




*Note:
Flame Cut vertical leg of angle, as required, to clear pipe.

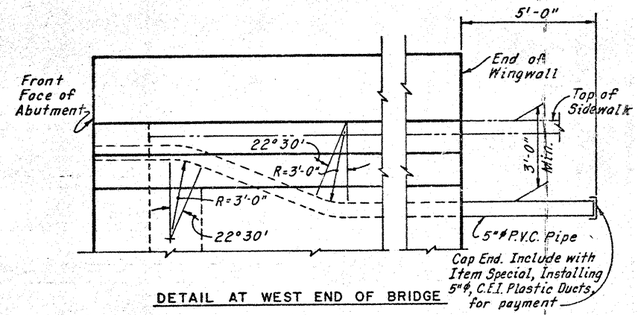
*Note:
D=5⅝" for nipple
D=6³/₁₆" for sleeve

MODIFICATION OF L3x3x⅜ AT INTERMEDIATE EXPANSION JOINTS 1 AND 2




SLAB AND SIDEWALK DETAIL AT C.E.I. DUC.

(Bar Marks Not Shown)




DETAIL AT WEST END OF BRIDGE

TERMINAL DETAILS

(Looking South)

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 8-22 1975

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

C.E.I. Co. 3-5"ø DUCTS
MISCELLANEOUS DETAILS
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | QUANTITIES | REVISED |
|---|---|---|---|---|
| C.K.B. | C.P. | H.S. | E.B. | |
| DATE 4-4-74 | DATE 4-11-74 | DATE 8-20-74 | DATE 4-11-74 | SHEET 5 OF 173 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

131
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

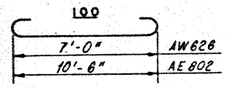
## WEST ABUTMENT

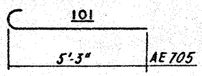
| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| AW401 | 40 | 4'-1" | 105 | | 109 |
| AW501 | 50 | 101'-5" | 105 | | 657 |
| AW502 | 54 | 61'-10" | 105 | | 385 |
| AW503 | 14 | 111'-8" | 105 | | 177 |
| AW504 | 19 | 71'-1" | 104 | | 140 |
| AW505 | 15 | 71'-8" | 104 | | 120 |
| AW506 | 2 | 151'-5" | 104 | | 32 |
| AW507 | 15 | 81'-3" | 104 | | 129 |
| AW508 | 30 | 321'-5" | Str. | | 1,017 |
| AW509 | 4 | 261'-9" | Str. | | 112 |
| AW510 | 18 | 51'-9" | Str. | | 108 |
| AW511 | 14 | 211'-9" | Str. | | 318 |
| AW512 | 2 Ser. 4 | 6'-9" / 8'-6" | 155 | 4½" | 62 |
| AW513 | 2 | 81'-10" | 105 | | 18 |
| AW514 | 5 | 81'-10" | 104 | | 46 |
| AW515 | 4 | 91'-0" | 104 | | 38 |
| AW516 | 24 | 31'-0" | Str. | | 776 |
| AW517 | 2 | 71'-10" | 105 | | 16 |
| | | | | | |
| AW601 | 6 | 41'-3" | Str. | | 38 |
| AW602 | 32 | 51'-0" | Str. | | 240 |
| AW603 | 216 | 141'-9" | 105 | | 4,785 |
| AW604 | 4 | 91'-1" | 105 | | 55 |
| AW605 | 53 | 51'-9" | 105 | | 537 |
| AW606 | 4 | 91'-3" | Str. | | 56 |
| AW607 | 8 | 191'-1" | 105 | | 229 |
| AW608 | 20 | 21'-6" | Str. | | 75 |
| AW609 | 4 | 81'-10" | 104 | | 53 |
| AW610 | 7 | 101'-11" | 104 | | 115 |
| AW611 | 35 | 41'-7" | 104 | | 241 |
| AW612 | 35 | 101'-7" | 127 | | 556 |
| AW613 | 2 | 91'-9" | Str. | | 29 |
| AW614 | 2 Ser. 10 | 2'-9" / 11'-3" | Str. | 11⅜" | 210 |
| AW615 | 12 | 15'-3" | Str. | | 275 |
| AW616 | 7 | 81'-11" | 104 | | 94 |
| AW617 | 2 | 161'-6" | Str. | | 50 |
| AW618 | 8 | 211'-9" | Str. | | 261 |
| AW619 | 4 | 71'-2" | 104 | | 43 |
| AW620 | 14 | 31'-0" | Str. | | 63 |
| AW621 | 35 | 91'-1" | 135 | | 477 |
| AW622 | 2 | 171'-6" | Str. | | 53 |
| AW623 | 4 Ser. 7 | 6'-6" / 11'-0" | Str. | 9" | 368 |
| AW624 | 24 | 111'-0" | Str. | | 397 |
| AW625 | 2 | 91'-5" | Str. | | 28 |
| AW626 | 8 | 81'-4" | 100 | | 100 |
| AW627 | 2 | 161'-0" | Str. | | 48 |
| AW628 | 4 | 61'-11" | 104 | | 42 |
| AW629 | 8 | 91'-5" | 104 | | 113 |
| AW630 | 10 | 201'-0" | 127 | | 300 |
| AW631 | 58 | 6'-4" | 163 | | 552 |
| AW632 | 58 | 91'-7" | 110 | | 835 |
| AW633 | 8 | 91'-10" | 104 | | 118 |
| AW634 | 2 | 31'-6" | Str. | | 11 |
| AW635 | 2 | 41'-0" | Str. | | 12 |
| AW636 | 2 | 31'-9" | Str. | | 11 |
| | | | | | |
| AW801 | 20 | 341'-0" | Str. | | 1,816 |
| AW802 | 17 | 151'-6" | 126 | | 749 |
| AW803 | 15 | 171'-2" | 125 | | 688 |
| AW804 | 37 | 41'-9" | 147 | | 469 |
| AW805 | 15 | 171'-9" | 126 | | 711 |
| AW806 | 10 | 51'-9" | Str. | | 180 |
| AW807 | 4 | 161'-4" | 104 | | 174 |
| AW808 | 3 | 231'-4" | 108 | | 187 |
| AW809 | 2 | 101'-3 | 107 | | 55 |
| AW810 | 2 | 101'-9" | 107 | | 57 |
| AW811 | 5 | 181'-3" | 126 | | 244 |
| AW812 | 2 | 181'-9" | 126 | | 100 |
| AW813 | 3 | 241'-4" | 110 | | 135 |
| AW814 | 8 | 111'-1" | 104 | | 237 |
| | | | | | |
| AW1001 | 5 | 131'-0" | 104 | | 280 |
| AW1002 | 7 | 91'-2" | 104 | | 291 |
| AW1003 | 10 | 101'-5" | 104 | | 448 |
| AW1004 | 10 | 51'-6" | Str. | | 237 |
| AW1005 | 5 | 111'-0" | 104 | | 237 |
| AW1006 | 7 | 71'-9" | 104 | | 231 |
| | | Total Weight = | | | 23,309 |

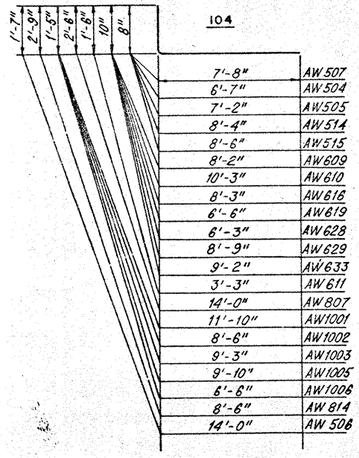
## EAST ABUTMENT

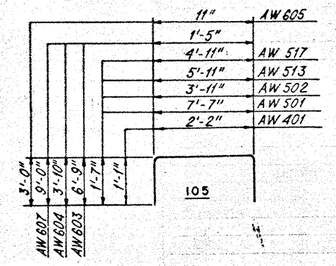
| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| AE401 | 40 | 4'-1" | 105 | | 109 |
| AE501 | 51 | 321'-9" | Str. | | 1,742 |
| AE502 | 1 | 351'-5" | Str. | | 37 |
| AE503 | 24 | 291'-6" | Str. | | 738 |
| AE504 | 16 | 81'-0" | 109 | | 134 |
| AE505 | 19 | 91'-3" | 127 | | 192 |
| AE506 | 21 | 51'-9" | Str. | | 126 |
| AE507 | Ser. 7 | 10'-5" / 16'-1" | 155 | 11⅜" | 97 |
| AE508 | 4 | 4'-6" | Str. | | 19 |
| AE509 | 4 | 111'-9" | Str. | | 49 |
| AE510 | 2 | 221'-9" | Str. | | 48 |
| AE511 | 4 | 3'-8" | 105 | | 15 |
| | | | | | |
| AE601 | 112 | 51'-8" | 104 | | 953 |
| AE602 | 8 | 71'-2" | 104 | | 86 |
| AE603 | 29 | 101'-9" | Str. | | 468 |
| AE604 | 33 | 121'-3" | Str. | | 607 |
| AE605 | 17 | 81'-0" | Str. | | 204 |
| AE606 | 21 | 91'-6" | Str. | | 300 |
| AE607 | 46 | 51'-5" | 104 | | 374 |
| AE608 | 53 | 21'-9" | 105 | | 1,731 |
| AE609 | 4 | 16'-3" | 105 | | 98 |
| AE610 | 8 | 23'-7" | 105 | | 283 |
| AE611 | 8 | 11'-3" | Str. | | 135 |
| AE612 | 69 | 41'-0" | Str. | | 415 |
| AE613 | 61 | 81'-6" | 108 | | 779 |
| AE614 | 65 | 51'-1" | 124 | | 496 |
| AE615 | 4 | 101'-1" | 111 | | 61 |
| AE616 | 2 | 71'-5" | Str. | | 23 |
| AE617 | 2 | 91'-0" | Str. | | 27 |
| AE618 | 2 | 31'-0" | Str. | | 9 |
| AE619 | 2 | 41'-6" | Str. | | 14 |
| | | | | | |
| AE701 | 6 | 61'-0" | 104 | | 74 |
| AE702 | 3 | 131'-3" | Str. | | 81 |
| AE703 | 3 | 141'-9" | Str. | | 90 |
| AE704 | 6 | 91'-3" | Str. | | 113 |
| AE705 | 6 | 61'-1" | 101 | | 75 |
| AE706 | 3 | 111'-0" | Str. | | 67 |
| AE707 | 3 | 121'-6" | Str. | | 77 |
| | | | | | |
| AE801 | 46 | 101'-6" | Str. | | 1,290 |
| AE802 | 84 | 121'-3" | 100 | | 2,840 |
| AE803 | 15 | 291'-0" | Str. | | 1,161 |
| AE804 | 15 | 381'-3" | Str. | | 1,534 |
| AE805 | 16 | 251'-6" | Str. | | 1,089 |
| AE806 | 15 | 51'-10" | 104 | | 234 |
| AE807 | 16 | 401'-0" | Str. | | 1,779 |
| AE808 | 16 | 61'-0" | 108 | | 256 |
| AE809 | 90 | 81'-7" | 104 | | 2,062 |
| | | | | | |
| | | Total Weight = | | | 23,121 |

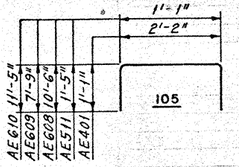
## BENDING DIAGRAMS

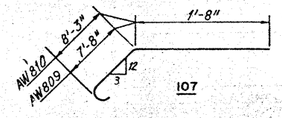


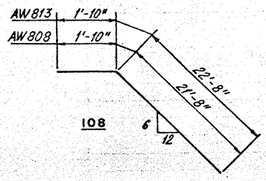



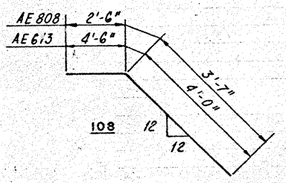



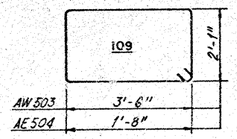



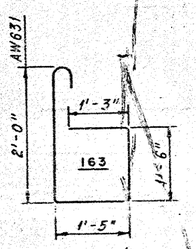



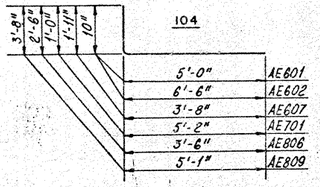



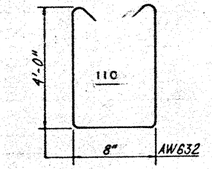



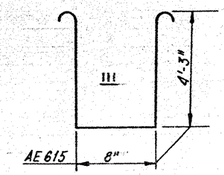



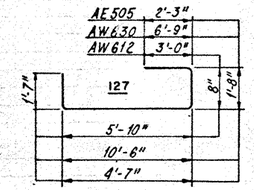



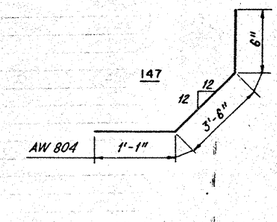



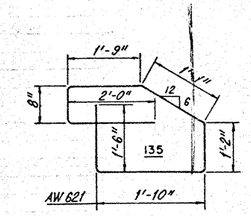



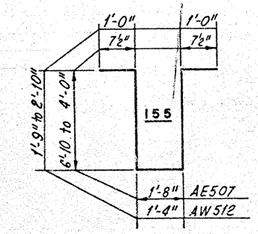


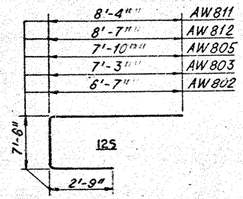





Note: For Replacement Bar Schedule see sheet 73/73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# REINFORCEMENT SCHEDULE ABUTMENTS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN AJS | TRACED SJS | CHECKED DH | REVIEWED GAB | REVISED |
|---|---|---|---|---|
| DATE 2-15-74 | DATE 2-27-74 | DATE 3-7-74 | DATE 4-11-74 | SHEET 63/73 |

| FHWA REGION | STATE | PROJECT | | |
|---|---|---|---|---|
| 5 | OHIO | | | |

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CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| **PIER 1** | | | | | |
| PA401 | 98 | 13'-9" | 140 | | 900 |
| PA402 | 343 | 5'-6" | 100 | | 1,260 |
| PA403 | 98 | 8'-6" | 163 | | 556 |
| PA501 | 44 | 5'-11" | 105 | | 271 |
| PA601 | 2 | 39'-0" | Str. | | 117 |
| PA602 | 4 | 22'-0" | 164 | | 132 |
| PA603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PA604 | 14 | 9'-0" | 105 | | 189 |
| PA605 | 4 | 23'-3" | 165 | | 140 |
| PA606 | 4 Ser. 18 | 23'-7" / 26'-11" | 165 | 1 3/16" | 2,731 |
| PA607 | 60 | 26'-11" | 165 | | 2,426 |
| PA1101 | 94 | 20'-8" | 100 | | 10,321 |
| PA1102 | 42 | 9'-5" | 104 | | 2,101 |
| PA1103 | 42 | 12'-8" | 104 | | 2,827 |
| PA1104 | 21 | 35'-0" | Str. | | 3,905 |
| PA1105 | 21 | 31'-9" | Str. | | 3,542 |
| PA1106 | 21 | 31'-3" | Str. | | 3,487 |
| PA1107 | 21 | 28'-0" | Str. | | 3,124 |
| PA1108 | 10 | 34'-3" | 108 | | 1,820 |
| PA1801 | 14 | 30'-0" | Str. | | 5,712 |
| PA1802 | 9 | 35'-3" | 108 | | 4,315 |
| PA1803 | 9 | 41'-3" | 108 | | 5,049 |
| | | | Total Weight = | | 55,920 |
| **PIER 2** | | | | | |
| PB401 | 204 | 13'-9" | 140 | | 1,874 |
| PB402 | 612 | 5'-6" | 100 | | 2,248 |
| PB403 | 204 | 9'-1" | 163 | | 1,238 |
| PB501 | 44 | 5'-11" | 105 | | 271 |
| PB601 | 2 | 39'-0" | Str. | | 117 |
| PB602 | 4 | 22'-0" | 164 | | 132 |
| PB603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PB604 | 14 | 9'-0" | 105 | | 189 |
| PB605 | 4 | 23'-3" | 165 | | 140 |
| PB606 | 4 Ser. 18 | 23'-7" / 26'-11" | 165 | 1 3/16" | 2,731 |
| PB607 | 60 | 26'-11" | 165 | | 2,426 |
| PB801 | 44 | 18'-8" | 100 | | 2,193 |
| PB1101 | 34 | 23'-8" | 100 | | 4,275 |
| PB1102 | 10 | 34'-3" | 108 | | 1,820 |
| PB1103 | 34 | 23'-5" | 100 | | 4,230 |
| PB1801 | 14 | 30'-0" | Str. | | 5,712 |
| PB1802 | 9 | 35'-3" | 108 | | 4,315 |
| PB1803 | 9 | 41'-3" | 108 | | 5,049 |
| PB1804 | 24 | 11'-3" | 104 | | 3,672 |
| PB1805 | 24 | 14'-3" | 104 | | 4,651 |
| PB1806 | 32 | 30'-3" | 104 | | 13,165 |
| PB1807 | 48 | 23'-3" | Str. | | 15,178 |
| PB1808 | 12 | 31'-0" | Str. | | 5,059 |
| PB1809 | 12 | 28'-0" | Str. | | 4,570 |
| PB1810 | 12 | 32'-3" | Str. | | 5,263 |
| PB1811 | 12 | 29'-3" | Str. | | 4,774 |
| | | | Total Weight = | | 96,287 |

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| **PIER 3** | | | | | |
| PC401 | 224 | 13'-9" | 140 | | 2,057 |
| PC402 | 784 | 5'-6" | 100 | | 2,880 |
| PC403 | 224 | 8'-6" | 163 | | 1,272 |
| PC501 | 44 | 5'-11" | 105 | | 272 |
| PC601 | 2 | 39'-0" | Str. | | 117 |
| PC602 | 4 | 22'-0" | 164 | | 132 |
| PC603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PC604 | 14 | 9'-0" | 105 | | 189 |
| PC605 | 4 | 23'-3" | 165 | | 140 |
| PC606 | 4 Ser. 13 | 23'-7" / 26'-11" | 165 | 1 3/16" | 2,731 |
| PC607 | 60 | 26'-11" | 165 | | 2,426 |
| PC1101 | 96 | 20'-8" | 100 | | 10,541 |
| PC1102 | 42 | 9'-5" | 104 | | 2,101 |
| PC1103 | 42 | 12'-8" | 104 | | 2,827 |
| PC1104 | 84 | 32'-3" | Str. | | 14,393 |
| PC1105 | 21 | 33'-9" | Str. | | 3,765 |
| PC1106 | 21 | 30'-6" | Str. | | 3,403 |
| PC1107 | 21 | 35'-0" | Str. | | 3,905 |
| PC1108 | 21 | 31'-9" | Str. | | 3,542 |
| PC1109 | 10 | 34'-3" | 108 | | 1,820 |
| PC1801 | 14 | 30'-0" | Str. | | 5,712 |
| PC1802 | 9 | 35'-3" | 108 | | 4,315 |
| PC1803 | 9 | 41'-3" | 108 | | 5,049 |
| | | | Total Weight = | | 74,585 |
| **PIER 4** | | | | | |
| PD401 | 224 | 13'-9" | 140 | | 2,057 |
| PD402 | 672 | 5'-6" | 100 | | 2,469 |
| PD403 | 224 | 9'-1" | 163 | | 1,359 |
| PD501 | 44 | 5'-11" | 105 | | 272 |
| PD601 | 2 | 39'-0" | Str. | | 117 |
| PD602 | 4 | 22'-0" | 164 | | 132 |
| PD603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PD604 | 14 | 9'-0" | 105 | | 189 |
| PD605 | 4 | 23'-3" | 165 | | 140 |
| PD606 | 4 Ser. 18 | 23'-7" / 28'-11" | 165 | 1 3/16" | 2,731 |
| PD607 | 60 | 26'-11" | 165 | | 2,426 |
| PD801 | 44 | 18'-8" | 100 | | 2,193 |
| PD1101 | 68 | 23'-8" | 100 | | 8,550 |
| PD1102 | 10 | 34'-3" | 108 | | 1,820 |
| PD1801 | 14 | 30'-0" | Str. | | 5,712 |
| PD1802 | 9 | 35'-3" | 108 | | 4,315 |
| PD1803 | 9 | 41'-3" | 108 | | 5,049 |
| PD1804 | 24 | 11'-3" | 104 | | 3,672 |
| PD1805 | 24 | 14'-3" | 104 | | 4,651 |
| PD1806 | 32 | 25'-3" | 104 | | 10,989 |
| PD1807 | 48 | 29'-0" | Str. | | 13,931 |
| PD1808 | 12 | 31'-0" | Str. | | 5,059 |
| PD1809 | 12 | 28'-0" | Str. | | 4,570 |
| PD1810 | 12 | 32'-3" | Str. | | 5,263 |
| PD1811 | 12 | 29'-3" | Str. | | 4,774 |
| | | | Total Weight = | | 98,435 |

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| **PIER 5** | | | | | |
| PE401 | 220 | 13'-9" | 140 | | 2,021 |
| PE402 | 770 | 5'-6" | 100 | | 2,830 |
| PE403 | 220 | 8'-6" | 163 | | 1,249 |
| PE501 | 44 | 5'-11" | 105 | | 271 |
| PE601 | 2 | 39'-0" | Str. | | 117 |
| PE602 | 4 | 22'-0" | 164 | | 132 |
| PE603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PE604 | 14 | 9'-0" | 105 | | 189 |
| PE605 | 4 | 23'-3" | 165 | | 140 |
| PE606 | 4 Ser. 9 | 23'-3" / 26'-9" | 165 | 2 3/8" | 1,352 |
| PE607 | 60 | 26'-11" | 165 | | 2,426 |
| PE1101 | 96 | 20'-8" | 100 | | 10,541 |
| PE1102 | 42 | 9'-5" | 104 | | 2,101 |
| PE1103 | 42 | 12'-8" | 104 | | 2,827 |
| PE1104 | 84 | 30'-9" | Str. | | 13,723 |
| PE1105 | 21 | 33'-9" | Str. | | 3,765 |
| PE1106 | 21 | 30'-6" | Str. | | 3,403 |
| PE1107 | 21 | 35'-0" | Str. | | 3,905 |
| PE1108 | 21 | 31'-9" | Str. | | 3,542 |
| PE1109 | 10 | 34'-3" | 108 | | 1,820 |
| PE1801 | 4 | 30'-0" | Str. | | 1,632 |
| PE1802 | 9 | 35'-3" | 108 | | 4,315 |
| PE1803 | 9 | 41'-3" | 108 | | 5,049 |
| | | | Total Weight = | | 68,206 |
| **PIER 6** | | | | | |
| PF401 | 210 | 13'-9" | 140 | | 1,930 |
| PF402 | 735 | 5'-6" | 100 | | 2,700 |
| PF403 | 210 | 8'-6" | 163 | | 1,192 |
| PF501 | 44 | 5'-11" | 105 | | 272 |
| PF601 | 2 | 39'-0" | Str. | | 117 |
| PF602 | 4 | 22'-0" | 164 | | 132 |
| PF603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PF604 | 14 | 9'-0" | 105 | | 189 |
| PF605 | 4 | 23'-3" | 165 | | 140 |
| PF606 | 4 Ser. 15 | 23'-7" / 26'-9" | 165 | 1 7/8" | 2,268 |
| PF607 | 60 | 26'-11" | 165 | | 2,426 |
| PF1101 | 96 | 20'-8" | 100 | | 10,541 |
| PF1102 | 42 | 9'-5" | 104 | | 2,120 |
| PF1103 | 42 | 12'-9" | 104 | | 2,845 |
| PF1104 | 84 | 28'-9" | Str. | | 12,831 |
| PF1105 | 42 | 33'-9" | Str. | | 7,531 |
| PF1106 | 42 | 30'-6" | Str. | | 6,806 |
| PF1107 | 10 | 34'-3" | 108 | | 1,820 |
| PF1801 | 10 | 30'-0" | Str. | | 4,080 |
| PF1802 | 9 | 35'-3" | 108 | | 4,315 |
| PF1803 | 9 | 41'-3" | 108 | | 5,049 |
| | | | Total Weight = | | 70,299 |
| **PIER 7** | | | | | |
| PG401 | 204 | 13'-9" | 140 | | 1,874 |
| PG402 | 714 | 5'-6" | 100 | | 2,623 |
| PG403 | 204 | 8'-6" | 163 | | 1,158 |
| PG501 | 44 | 5'-11" | 105 | | 271 |
| PG601 | 2 | 39'-0" | Str. | | 117 |
| PG602 | 4 | 22'-0" | 164 | | 132 |
| PG603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PG604 | 14 | 9'-0" | 105 | | 189 |
| PG605 | 4 | 23'-3" | 165 | | 140 |
| PG606 | 4 Ser. 15 | 23'-7" / 26'-9" | 165 | 1 7/8" | 2,268 |
| PG607 | 60 | 26'-11" | 165 | | 2,426 |
| PG1101 | 96 | 20'-8" | 100 | | 10,540 |
| PG1102 | 42 | 9'-5" | 104 | | 2,120 |
| PG1103 | 42 | 12'-9" | 104 | | 2,845 |
| PG1104 | 84 | 28'-6" | Str. | | 12,719 |
| PG1105 | 42 | 33'-9" | Str. | | 7,531 |
| PG1106 | 42 | 30'-6" | Str. | | 6,806 |

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| PG1107 | 10 | 34'-3" | 108 | | 1,820 |
| PG1801 | 10 | 30'-0" | Str. | | 4,080 |
| PG1802 | 9 | 35'-3" | 108 | | 4,315 |
| PG1803 | 9 | 41'-3" | 108 | | 5,049 |
| | | | Total Weight = | | 70,018 |
| **PIER 8** | | | | | |
| PH401 | 208 | 13'-9" | 140 | | 1,910 |
| PH402 | 728 | 5'-6" | 100 | | 2,675 |
| PH403 | 208 | 8'-6" | 163 | | 1,181 |
| PH501 | 44 | 5'-11" | 105 | | 271 |
| PH601 | 2 | 39'-0" | Str. | | 117 |
| PH602 | 4 | 22'-0" | 164 | | 132 |
| PH603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PH604 | 14 | 9'-0" | 105 | | 189 |
| PH605 | 4 | 23'-3" | 165 | | 140 |
| PH606 | 4 Ser. 15 | 23'-7" / 26'-9" | 165 | 1 7/8" | 2,268 |
| PH607 | 60 | 26'-11" | 165 | | 2,426 |
| PH1101 | 96 | 20'-8" | 100 | | 10,541 |
| PH1102 | 42 | 9'-5" | 104 | | 2,101 |
| PH1103 | 42 | 12'-8" | 104 | | 2,827 |
| PH1104 | 84 | 29'-0" | Str. | | 12,942 |
| PH1105 | 42 | 33'-9" | Str. | | 7,531 |
| PH1106 | 42 | 30'-6" | Str. | | 6,806 |
| PH1107 | 10 | 34'-3" | 108 | | 1,820 |
| PH1801 | 10 | 30'-0" | Str. | | 4,080 |
| PH1802 | 9 | 35'-3" | 108 | | 4,315 |
| PH1803 | 9 | 41'-3" | 108 | | 5,049 |
| | | | Total Weight = | | 70,316 |
| **PIER 9** | | | | | |
| PJ401 | 220 | 13'-9" | 140 | | 2,021 |
| PJ402 | 770 | 5'-6" | 100 | | 2,830 |
| PJ403 | 220 | 8'-6" | 163 | | 1,249 |
| PJ501 | 44 | 5'-11" | 105 | | 271 |
| PJ601 | 2 | 39'-0" | Str. | | 117 |
| PJ602 | 4 | 22'-0" | 164 | | 132 |
| PJ603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PJ604 | 14 | 9'-0" | 105 | | 189 |
| PJ605 | 4 | 23'-3" | 165 | | 140 |
| PJ606 | 4 Ser. 15 | 23'-7" / 26'-9" | 165 | 1 7/8" | 2,268 |
| PJ607 | 60 | 26'-11" | 165 | | 2,426 |
| PJ1101 | 96 | 20'-8" | 100 | | 10,541 |
| PJ1102 | 42 | 9'-6" | 104 | | 2,120 |
| PJ1103 | 42 | 12'-9" | 104 | | 2,845 |
| PJ1104 | 84 | 32'-3" | Str. | | 14,393 |
| PJ1105 | 42 | 33'-9" | Str. | | 7,531 |
| PJ1106 | 42 | 30'-6" | Str. | | 6,806 |
| PJ1107 | 10 | 34'-3" | 108 | | 1,820 |
| PJ1801 | 10 | 30'-0" | Str. | | 4,080 |
| PJ1802 | 9 | 35'-3" | 108 | | 4,315 |
| PJ1803 | 9 | 41'-3" | 108 | | 5,049 |
| | | | Total Weight = | | 72,138 |

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| **PIER 10** | | | | | |
| PK401 | 308 | 14'-9" | 140 | | 3,035 |
| PK402 | 1,232 | 5'-5" | 100 | | 5,349 |
| PK403 | 308 | 9'-5" | 163 | | 1,937 |
| PK404 | 77 | 9'-6" | 100 | | 489 |
| PK501 | 44 | 6'-11" | 105 | | 317 |
| PK601 | 2 | 39'-0" | Str. | | 117 |
| PK602 | 4 | 22'-0" | 164 | | 132 |
| PK603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PK604 | 14 | 9'-0" | 105 | | 189 |
| PK605 | 4 | 24'-5" | 165 | | 147 |
| PK606 | 4 Ser. 9 | 24'-11" / 27'-11" | 165 | 2 3/4" | 1,428 |
| PK607 | 64 | 28'-1" | 165 | | 2,700 |
| PK1101 | 70 | 19'-6" | Str. | | 7,252 |
| PK1102 | 52 | 10'-5" | 104 | | 2,878 |
| PK1103 | 52 | 13'-8" | 104 | | 3,776 |
| PK1104 | 104 | 22'-6" | Str. | | 12,432 |
| PK1105 | 104 | 35'-6" | Str. | | 19,616 |
| PK1106 | 52 | 33'-9" | Str. | | 9,324 |
| PK1107 | 52 | 30'-6" | Str. | | 8,426 |
| PK1108 | 12 | 34'-3" | 108 | | 2,184 |
| PK1801 | 8 | 30'-0" | Str. | | 3,264 |
| PK1802 | 10 | 35'-3" | 108 | | 4,794 |
| PK1803 | 10 | 41'-3" | 108 | | 5,610 |
| | | | Total Weight = | | 96,391 |
| **PIER 11** | | | | | |
| PL401 | 220 | 13'-9" | 140 | | 2,021 |
| PL402 | 770 | 5'-6" | 100 | | 2,829 |
| PL403 | 220 | 8'-6" | 163 | | 1,249 |
| PL501 | 44 | 5'-11" | 105 | | 271 |
| PL601 | 2 | 39'-0" | Str. | | 117 |
| PL602 | 4 | 22'-0" | 164 | | 139 |
| PL603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PL604 | 14 | 9'-0" | 105 | | 189 |
| PL605 | 4 | 23'-3" | 165 | | 140 |
| PL606 | 4 Ser. 11 | 23'-9" / 26'-9" | 165 | 1 3/8" | 1,669 |
| PL607 | 60 | 26'-11" | 165 | | 2,426 |
| PL1101 | 96 | 20'-8" | 100 | | 10,541 |
| PL1102 | 42 | 9'-5" | 104 | | 2,101 |
| PL1103 | 42 | 12'-8" | 104 | | 2,827 |
| PL1104 | 84 | 31'-9" | Str. | | 14,170 |
| PL1105 | 42 | 33'-9" | Str. | | 7,531 |
| PL1106 | 42 | 30'-6" | Str. | | 6,806 |
| PL1107 | 10 | 34'-3" | 108 | | 1,820 |
| PL1801 | 8 | 30'-0" | Str. | | 3,264 |
| PL1802 | 9 | 35'-3" | 108 | | 4,315 |
| PL1803 | 9 | 41'-3" | 108 | | 5,049 |
| | | | Total Weight = | | 70,469 |

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| **PIER 12** | | | | | |
| PM401 | 340 | 14'-9" | 140 | | 3,350 |
| PM402 | 680 | 6'-6" | 100 | | 2,953 |
| PM403 | 340 | 9'-4" | 163 | | 2,120 |
| PM501 | 44 | 6'-11" | 105 | | 317 |
| PM601 | 2 | 39'-0" | Str. | | 117 |
| PM602 | 4 | 22'-0" | 164 | | 132 |
| PM603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PM604 | 14 | 9'-0" | 105 | | 189 |
| PM605 | 4 | 24'-5" | 165 | | 145 |
| PM606 | 4 Ser. 26 | 24'-11" / 28'-11" | 165 | ¾" | 4,140 |
| PM607 | 52 | 28'-1" | 165 | | 2,193 |
| PM1101 | 126 | 22'-0" | Str. | | 14,728 |
| PM1102 | 12 | 34'-3" | 108 | | 2,184 |
| PM1801 | 20 | 30'-0" | Str. | | 8,160 |
| PM1802 | 10 | 35'-3" | 108 | | 4,794 |
| PM1803 | 10 | 41'-3" | 108 | | 5,510 |
| PM1804 | 20 | 11'-3" | 104 | | 3,060 |
| PM1805 | 20 | 14'-3" | 104 | | 3,876 |
| PM1806 | 32 | 31'-3" | 104 | | 13,600 |
| PM1807 | 40 | 26'-3" | Str. | | 14,280 |
| PM1808 | 40 | 32'-0" | Str. | | 17,408 |
| PM1809 | 20 | 31'-0" | Str. | | 8,432 |
| PM1810 | 20 | 28'-0" | Str. | | 7,616 |
| | | | Total Weight = | | 120,300 |

Notes: For Replacement Bar Schedule see sheet 73 / 73.
For Bending Diagrams see sheet 70 / 73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# REINFORCEMENT SCHEDULE
## PIERS 1 THRU 12
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

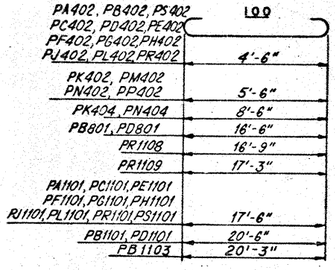
| DRAWN C.P. | TRACED SJS | CHECKED DBS | REVISED |
|---|---|---|---|
| DATE 12-13-74 | DATE 2-11-74 | DATE 3-7-75 | DATE 4-11-75 |

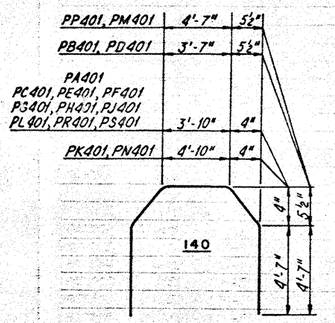
SHEET 69 / 73

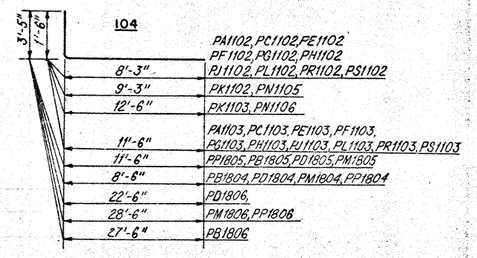
| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| PIER 13 | | | | | |
| PN401 | 340 | 141'-9" | 140 | | 3,350 |
| PN402 | 1,360 | 51'-6" | 100 | | 5,905 |
| PN403 | 340 | 91'-5" | 163 | | 2,139 |
| PN404 | 170 | 91'-6" | 100 | | 1,079 |
| | | | | | |
| PN501 | 44 | 61'-11" | 105 | | 317 |
| | | | | | |
| PN601 | 2 | 391'-0" | Str. | | 117 |
| PN602 | 4 | 221'-0" | 164 | | 139 |
| PN603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PN604 | 14 | 91'-0" | 105 | | 189 |
| PN605 | 4 | 241'-5" | 165 | | 147 |
| PN606 | 4 Ser. 26 | 24'-11" / 28'-1" | 165 | ⅜" | 4,140 |
| PN607 | 64 | 28'-1" | 165 | | 2,700 |
| | | | | | |
| PN1101 | 100 | 21'-6" | Str. | | 11,423 |
| PN1102 | 1 Ser. 9 | 21'-5" / 18'-8" | Str. | 4⅛" | 957 |
| PN1103 | 1 | 141'-11" | 147 | | 79 |
| PN1104 | 1 Ser. 5 | 21'-3" / 13'-6" | Str. | 1'-11¼" | 462 |
| PN1105 | 52 | 101'-5" | 104 | | 2,878 |
| PN1106 | 52 | 131'-8" | 104 | | 3,776 |
| PN1107 | 156 | 301'-6" | Str. | | 25,279 |
| PN1108 | 104 | 351'-6" | Str. | | 19,615 |
| PN1109 | 52 | 331'-9" | Str. | | 9,324 |
| PN1110 | 12 | 341'-3" | 108 | | 2,184 |
| | | | | | |
| PN1801 | 20 | 301'-0" | Str. | | 8,160 |
| PN1802 | 10 | 351'-3" | 108 | | 4,794 |
| PN1803 | 10 | 411'-3" | 108 | | 5,610 |
| | | | | | |
| Total Weight = 115,758 | | | | | |
| PIER 14 | | | | | |
| PP401 | 316 | 141'-9" | 140 | | 3,114 |
| PP402 | 632 | 61'-6" | 100 | | 2,744 |
| PP403 | 316 | 91'-4" | 163 | | 1,970 |
| | | | | | |
| PP501 | 44 | 61'-11" | 105 | | 317 |
| | | | | | |
| PP601 | 2 | 391'-0" | Str. | | 117 |
| PP602 | 4 | 221'-0" | 164 | | 132 |
| PP603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PP604 | 14 | 91'-0" | 105 | | 189 |
| PP605 | 4 | 241'-5" | 165 | | 146 |
| PP606 | 4 Ser. 26 | 24'-11" / 28'-1" | 165 | ⅜" | 4,140 |
| PP607 | 52 | 281'-1" | 165 | | 2,193 |
| | | | | | |
| PP1101 | 126 | 221'-0" | Str. | | 14,728 |
| PP1102 | 12 | 341'-3" | 108 | | 2,184 |
| | | | | | |
| PP1801 | 20 | 301'-0" | Str. | | 8,160 |
| PP1802 | 10 | 351'-3" | 108 | | 4,794 |
| PP1803 | 10 | 411'-3" | 108 | | 5,610 |
| PP1804 | 20 | 111'-3" | 104 | | 3,060 |
| PP1805 | 20 | 141'-3" | 104 | | 3,876 |
| PP1806 | 32 | 311'-3" | 104 | | 13,600 |
| PP1807 | 40 | 201'-9" | Str. | | 11,288 |
| PP1808 | 40 | 321'-9" | Str. | | 17,816 |
| PP1809 | 20 | 311'-0" | Str. | | 8,432 |
| PP1810 | 20 | 281'-0" | Str. | | 7,616 |
| | | | | | |
| Total Weight = 117,221 | | | | | |

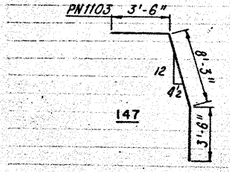
| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| PIER 15 | | | | | |
| PR401 | 224 | 131'-9" | 140 | | 2,057 |
| PR402 | 784 | 51'-5" | 100 | | 2,880 |
| PR403 | 224 | 81'-5" | 163 | | 1,272 |
| | | | | | |
| PR501 | 44 | 51'-11" | 105 | | 271 |
| | | | | | |
| PR601 | 2 | 391'-0" | Str. | | 117 |
| PR602 | 4 | 221'-0" | 164 | | 132 |
| PR603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str. | 2¼" | 995 |
| PR604 | 14 | 91'-0" | 105 | | 189 |
| PR605 | 4 | 231'-3" | 165 | | 140 |
| PR606 | 4 Ser. 11 | 23'-9" / 26'-9" | 165 | 1⅛" | 1,669 |
| PR607 | 60 | 261'-11" | 165 | | 2,426 |
| | | | | | |
| PR1101 | 92 | 201'-8" | 100 | | 10,102 |
| PR1102 | 42 | 91'-5" | 104 | | 2,101 |
| PR1103 | 42 | 121'-8" | 104 | | 2,827 |
| PR1104 | 84 | 321'-9" | Str. | | 14,616 |
| PR1105 | 42 | 331'-9" | Str. | | 7,531 |
| PR1106 | 42 | 301'-6" | Str. | | 6,806 |
| PR1107 | 10 | 341'-3" | 108 | | 1,820 |
| PR1108 | 2 | 191'-11" | 100 | | 212 |
| PR1109 | 2 | 201'-5" | 100 | | 217 |
| | | | | | |
| PR1801 | 8 | 301'-0" | Str. | | 3,264 |
| PR1802 | 9 | 351'-3" | 108 | | 4,315 |
| PR1803 | 9 | 411'-3" | 108 | | 5,049 |
| | | | | | |
| Total Weight = 71,008 | | | | | |
| PIER 16 | | | | | |
| PS401 | 136 | 131'-9" | 140 | | 1,249 |
| PS402 | 476 | 51'-6" | 100 | | 1,749 |
| PS403 | 136 | 81'-6" | 163 | | 772 |
| | | | | | |
| PS501 | 44 | 51'-11" | 105 | | 271 |
| | | | | | |
| PS601 | 2 | 391'-0" | Str | | 117 |
| PS602 | 4 | 221'-0" | 164 | | 132 |
| PS603 | 4 Ser. 5 | 32'-9" / 33'-6" | Str | 2¼" | 995 |
| PS604 | 14 | 91'-0" | 105 | | 189 |
| PS605 | 4 | 231'-3" | 165 | | 140 |
| PS606 | 4 Ser. 15 | 23'-7" / 26'-9" | 165 | 1⅛" | 2,268 |
| PS607 | 60 | 261'-11" | 165 | | 2,426 |
| | | | | | |
| PS1101 | 96 | 201'-8" | 100 | | 10,541 |
| PS1102 | 42 | 91'-5" | 104 | | 2,101 |
| PS1103 | 42 | 121'-8" | 104 | | 2,827 |
| PS1104 | 42 | 291'-6" | Str | | 6,583 |
| PS1105 | 42 | 181'-0" | Str | | 4,017 |
| PS1106 | 42 | 141'-9" | Str | | 3,291 |
| PS1107 | 42 | 251'-0" | Str | | 5,579 |
| PS1108 | 10 | 341'-3" | 108 | | 1,820 |
| | | | | | |
| PS1801 | 10 | 301'-0" | Str | | 4,080 |
| PS1802 | 9 | 351'-3" | 108 | | 4,315 |
| PS1803 | 9 | 411'-3" | 108 | | 5,049 |
| | | Total Weight = 60,511 | | | |

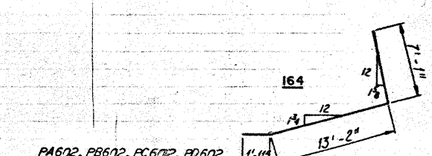
# BENDING DIAGRAMS

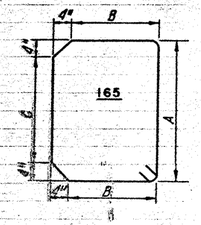


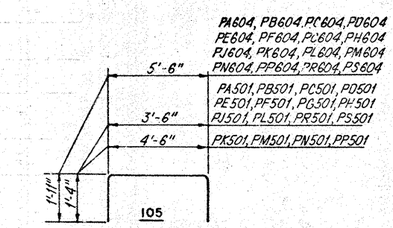



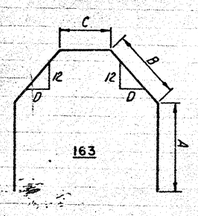



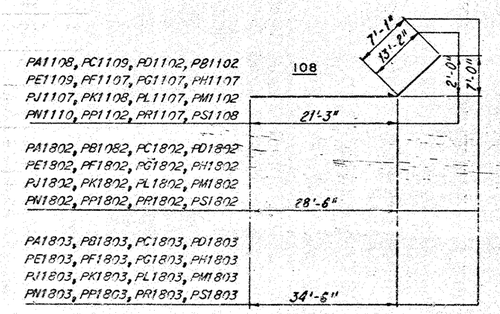




| TYPE 165 BAR | | | |
|---|---|---|---|
| BAR MARK | A | B | C |
| PA605, PB605, PC605, PD605, PF605, PG605, PH605, PJ605, PL605, PR605, PS605 | 7'-2" | 4'-0" | 6'-6" |
| PE605 | 7'-2" to 8'-11" | 4'-0" | 6'-6" to 8'-3" |
| PK605, PM605, PN605, PP605 | 7'-2" | 4'-7" | 6'-6" |
| PA606 | 7'-4" to 9'-0" | 4'-0" | 6'-8" to 8'-3" |
| PF606, PG606, PH606, PJ606, PS606 | 7'-4" to 8'-11" | 4'-0" | 6'-8" to 8'-3" |
| PB606, PC606, PD606 | 7'-4" to 9'-0" | 4'-0" | 6'-8" to 8'-4" |
| PE606, PA607, PC607, PD607, PF607, PG607, PH607, PJ607, PL607, PR607, PB607, PS607 | 9'-0" | 4'-0" | 8'-4" |
| PM607, PN607, PP607, PK607 | 9'-0" | 4'-7" | 8'-4" |
| PK606 | 7'-5" to 8'-11" | 4'-7" | 6'-9" to 8'-3" |
| PM606, PN606, PP606 | 7'-5" to 9'-0" | 4'-7" | 6'-9" to 8'-4" |
| PL606, PR606 | 7'-5" to 8'-11" | 4'-0" | 6'-9" to 8'-3" |




| TYPE 163 BAR | | | | |
|---|---|---|---|---|
| BAR MARK | A | B | C | D |
| PA403 | 11'-3" | 21'-8" | 11" | 10⅞" |
| PB403 | 11'-3" | 21'-8" | 1'-6" | 8" |
| PC403 | 11'-3" | 21'-8" | 11" | 10⅞" |
| PD403 | 11'-3" | 21'-8" | 1'-6" | 8" |
| PE403 | 11'-3" | 21'-8" | 11" | 10⅞" |
| PF403 | 11'-3" | 21'-8" | 11" | 10⅞" |
| PG403 | 11'-3" | 21'-8" | 11" | 10⅞" |
| PH403 | 11'-3" | 21'-8" | 11" | 10⅞" |
| PJ403 | 11'-3" | 21'-8" | 11" | 10⅞" |
| PK403 | 11'-3" | 21'-4" | 21'-6" | 10" |
| PL403 | 11'-3" | 21'-8" | 11" | 10⅞" |
| PM403 | 11'-3" | 21'-8" | 11'-9" | 12" |
| PN403 | 11'-3" | 21'-4" | 21'-6" | 10" |
| PP403 | 11'-3" | 21'-8" | 11'-9" | 12" |
| PR403 | 11'-3" | 21'-8" | 11" | 10⅞" |
| PS403 | 11'-3" | 21'-8" | 11" | 10⅞" |




Note: For Replacement Bar Schedule see sheet 73/73.

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

133/148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# REINFORCEMENT SCHEDULE
## PIERS 13 THRU 16
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DESIGNED C.P. | TRACED SJS | CHECKED DHS | QUANTITIES CAS | REVISED |
|---|---|---|---|---|
| DATE 1-28-74 | DATE 1-8-74 | DATE 3-7-74 | DATE 4-17-74 | SHEET 72/73 |

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| SOUTH WALL | | | | | |
| | | | | | |
| WS401 | 8 | 6'-10" | 109 | | 37 |
| WS402 | 48 | 10'-0" | 109 | | 321 |
| WS403 | 33 | 9'-10" | 109 | | 217 |
| WS404 | 2 | 4'-11" | 105 | | 7 |
| WS405 | 8 | 3'-5" | 105 | | 18 |
| | | | | | |
| WS501 | 8 | 3'-11" | 163 | | 33 |
| | | | | | |
| WS601 | 1 | 14'-3" | Str. | | 21 |
| WS602 | 1 | 10'-2" | 101 | | 15 |
| WS603 | 3 | 17'-6" | Str. | | 79 |
| WS604 | 1 | 13'-5" | 101 | | 20 |
| WS605 | 1 | 11'-0" | Str. | | 17 |
| WS606 | 3 | 16'-0" | Str. | | 72 |
| WS607 | 2 | 4'-3" | 104 | | 13 |
| WS608 | 4 | 6'-6" | 104 | | 39 |
| WS609 | 14 | 3'-6" | Str. | | 74 |
| WS610 | 8 | 5'-6" | Str. | | 66 |
| WS611 | 8 | 2'-6" | Str. | | 30 |
| WS612 | 4 | 7'-6" | 124 | | 45 |
| WS613 | 8 | 7'-0" | 126 | | 84 |
| WS614 | 8 | 4'-0" | Str. | | 48 |
| WS615 | 2 | 12'-0" | Str. | | 36 |
| WS616 | 1 | 16'-8" | 101 | | 25 |
| WS617 | 3 | 21'-0" | Str. | | 95 |
| WS618 | 8 | 19'-3" | Str. | | 231 |
| WS619 | 70 | 32'-0" | Str. | | 3,364 |
| WS620 | 6 | 20'-3" | Str. | | 182 |
| WS621 | 16 | 9'-0" | Str. | | 216 |
| WS622 | 8 | 21'-6" | Str. | | 258 |
| WS623 | 2 Ser. 8 | 20'-0" / 18'-0" | Str. | 3/16" | 457 |
| WS624 | 3 | 7'-6" | Str. | | 34 |
| WS625 | 6 | 18'-0" | Str. | | 162 |
| WS626 | 2 Ser. 9 | 16'-9" / 14'-3" | Str. | 3/4" | 419 |
| WS627 | 10 | 3'-7" | 104 | | 54 |
| WS628 | 10 | 5'-0" | 104 | | 75 |
| WS629 | 2 | 10'-3" | Str. | | 31 |
| WS630 | 1 | 15'-9" | Str. | | 24 |
| WS631 | 3 | 14'-11" | 101 | | 67 |
| WS632 | 2 | 24'-6" | Str. | | 74 |
| WS633 | 6 | 33'-0" | Str. | | 297 |
| WS634 | 3 | 30'-11" | 101 | | 139 |
| WS635 | 4 | 14'-3" | Str. | | 86 |
| WS636 | 2 Ser. 10 | 13'-9" / 11'-6" | Str. | 3" | 379 |
| WS637 | 4 | 11'-3" | Str. | | 68 |
| WS638 | 8 | 5'-4" | 104 | | 64 |
| WS639 | 2 | 4'-9" | Str. | | 14 |
| WS640 | 2 | 9'-9" | Str. | | 29 |
| WS641 | 10 | 5'-0" | Str. | | 75 |
| WS642 | 5 | 16'-4" | 100 | | 123 |
| WS643 | 2 Ser. 9 | 11'-0" / 8'-0" | Str. | 4 1/2" | 257 |
| WS644 | 46 | 8'-0" | Str. | | 553 |
| WS645 | 2 Ser. 10 | 8'-0" / 7'-6" | Str. | 3/8" | 233 |
| WS646 | 6 | 4'-3" | Str. | | 38 |
| WS647 | 22 | 7'-6" | Str. | | 248 |
| WS648 | 2 | 5'-3" | Str. | | 16 |
| WS649 | 5 | 13'-11" | 101 | | 105 |
| WS650 | 2 Ser. 9 | 8'-3" / 6'-9" | Str. | 2 1/2" | 203 |
| WS651 | 2 | 7'-0" | Str. | | 21 |
| WS652 | 1 | 22'-0" | Str. | | 33 |
| WS653 | 4 | 6'-9" | Str. | | 41 |
| WS654 | 2 Ser. 10 | 6'-9" / 6'-3" | Str. | 2 5/8" | 176 |
| WS655 | 2 | 15'-0" | Str. | | 45 |
| WS656 | 1 | 7'-2" | 101 | | 11 |
| WS657 | 28 | 7'-9" | Str. | | 326 |
| WS658 | 4 | 8'-3" | Str. | | 50 |
| WS659 | 2 | 5'-9" | Str. | | 17 |
| | | | | | |
| WS801 | 1 | 15'-9" | 109 | | 45 |
| WS802 | 1 | 15'-9" | 107 | | 45 |
| WS803 | 5 | 21'-6" | Str. | | 288 |
| WS804 | 60 | 5'-7" | 104 | | 894 |
| WS805 | 5 | 18'-0" | Str. | | 240 |
| WS806 | 1 | 13'-11" | 103 | | 37 |
| WS807 | 1 | 13'-3" | 107 | | 35 |
| WS808 | 1 | 6'-9" | Str. | | 18 |
| WS809 | 5 | 14'-1" | Str. | | 190 |
| WS810 | 1 | 18'-5" | 108 | | 49 |
| WS811 | 1 | 16'-10" | 106 | | 45 |

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| | | | | | |
| WS812 | 6 | 4'-6" | Str. | | 72 |
| WS813 | 5 | 11'-3" | Str. | | 150 |
| WS814 | 1 | 14'-11" | 108 | | 40 |
| WS815 | 1 | 14'-3" | 107 | | 38 |
| WS816 | 1 | 18'-2" | 108 | | 49 |
| WS817 | 1 | 16'-10" | 106 | | 45 |
| WS818 | 10 | 8'-0" | Str. | | 214 |
| WS819 | 7 | 7'-6" | Str. | | 140 |
| WS820 | 1 | 14'-8" | 108 | | 39 |
| WS821 | 1 | 14'-0" | 107 | | 37 |
| WS822 | 5 | 6'-9" | Str. | | 90 |
| WS823 | 1 | 17'-8" | 108 | | 47 |
| WS824 | 1 | 16'-7" | 106 | | 44 |
| WS825 | 5 | 5'-0" | Str. | | 67 |
| WS826 | 10 | 7'-9" | Str. | | 207 |
| WS827 | 5 | 8'-3" | Str. | | 110 |
| WS828 | 4 | 5'-3" | Str. | | 56 |
| WS829 | 1 | 14'-3" | Str. | | 38 |
| | | Total Weight = 14,076 | | | |
| NORTH WALL | | | | | |
| | | | | | |
| WN401 | 78 | 10'-0" | 109 | | 521 |
| WN402 | 61 | 9'-10" | 109 | | 401 |
| WN403 | 2 | 3'-5" | 105 | | 5 |
| WN404 | 8 | 4'-11" | 105 | | 26 |
| | | | | | |
| WN601 | 2 | 4'-9" | Str. | | 14 |
| WN602 | 1 | 14'-9" | Str. | | 22 |
| WN603 | 1 | 13'-11" | 101 | | 21 |
| WN604 | 1 | 20'-3" | Str. | | 30 |
| WN605 | 2 | 14'-11" | 101 | | 45 |
| WN606 | 1 | 5'-11" | 101 | | 9 |
| WN607 | 140 | 32'-0" | Str. | | 6,729 |
| WN608 | 3 | 31'-2" | 101 | | 140 |
| WN609 | 1 | 3'-6" | Str. | | 5 |
| WN610 | 5 | 5'-0" | Str. | | 38 |
| WN611 | 2 Ser. 10 | 5'-0" / 6'-3" | Str. | 1 3/8" | 170 |
| WN612 | 4 | 6'-9" | Str. | | 41 |
| WN613 | 2 Ser. 9 | 6'-9" / 8'-3" | Str. | 2 1/4" | 203 |
| WN614 | 4 | 4'-4" | 104 | | 26 |
| WN615 | 2 | 4'-3" | 104 | | 13 |
| WN616 | 2 | 6'-0" | Str. | | 18 |
| WN617 | 4 | 8'-6" | Str. | | 51 |
| WN618 | 2 Ser. 10 | 8'-6" / 12'-0" | Str. | 4 1/8" | 308 |
| WN619 | 4 | 13'-0" | Str. | | 78 |
| WN620 | 2 Ser. 9 | 13'-0" / 18'-0" | Str. | 4 1/2" | 392 |
| WN621 | 2 | 15'-0" | Str. | | 45 |
| WN622 | 2 | 3'-1" | 104 | | 9 |
| WN623 | 10 | 5'-0" | 104 | | 75 |
| WN624 | 5 | 8'-0" | Str. | | 60 |
| WN625 | 2 | 15'-9" | Str. | | 47 |
| WN626 | 2 | 18'-9" | Str. | | 56 |
| WN627 | 2 | 24'-0" | Str. | | 72 |
| WN628 | 5 | 17'-9" | Str. | | 133 |
| WN629 | 2 Ser. 8 | 17'-9" / 20'-6" | Str. | 4 1/8" | 460 |
| WN630 | 8 | 22'-3" | Str. | | 267 |
| WN631 | 2 Ser. 8 | 22'-0" / 23'-0" | Str. | 2 5/8" | 541 |
| WN632 | 2 | 21'-0" | Str. | | 63 |
| WN633 | 3 | 11'-8" | 101 | | 53 |
| WN634 | 1 | 17'-6" | Str. | | 26 |
| WN635 | 1 | 13'-5" | 101 | | 20 |
| WN636 | 2 | 22'-9" | Str. | | 68 |
| WN637 | 5 | 33'-9" | Str. | | 253 |
| WN638 | 1 | 29'-8" | 101 | | 45 |
| WN639 | 4 | 6'-6" | 104 | | 39 |
| WN640 | 24 | 7'-6" | 124 | | 270 |
| WN641 | 24 | 5'-6" | Str. | | 198 |
| WN642 | 32 | 21'-6" | Str. | | 120 |
| WN643 | 16 | 7'-0" | 126 | | 168 |
| WN644 | 46 | 24'-0" | Str. | | 1,658 |
| WN645 | 3 | 13'-7" | 100 | | 61 |
| WN646 | 2 | 20'-9" | Str. | | 62 |
| WN647 | 46 | 23'-9" | Str. | | 1,641 |
| WN648 | 2 | 20'-6" | Str. | | 61 |
| WN649 | 1 | 30'-2" | Str. | | 45 |
| WN650 | 1 | 10'-2" | 101 | | 15 |
| WN651 | 44 | 23'-6" | Str. | | 1,553 |
| WN652 | 6 | 21'-9" | Str. | | 196 |
| WN653 | 3 | 33'-0" | Str. | | 149 |
| WN654 | 2 | 5'-4" | 104 | | 18 |

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| | | | | | |
| WN655 | 4 | 7'-6" | Str. | | 45 |
| | | | | | |
| WN801 | 1 | 14'-8" | 108 | | 39 |
| WN802 | 1 | 14'-3" | 107 | | 38 |
| WN803 | 6 | 4'-6" | Str. | | 72 |
| WN804 | 1 | 18'-0" | 108 | | 48 |
| WN805 | 1 | 17'-1" | 106 | | 45 |
| WN806 | 5 | 5'-0" | Str. | | 67 |
| WN807 | 60 | 5'-7" | 104 | | 894 |
| WN808 | 5 | 6'-9" | Str. | | 90 |
| WN809 | 5 | 8'-6" | Str. | | 113 |
| WN810 | 1 | 18'-4" | 108 | | 49 |
| WN811 | 1 | 17'-7" | 106 | | 46 |
| WN812 | 5 | 13'-0" | Str. | | 174 |
| WN813 | 1 | 14'-2" | 108 | | 38 |
| WN814 | 1 | 13'-9" | 107 | | 37 |
| WN815 | 5 | 17'-9" | Str. | | 237 |
| WN816 | 5 | 22'-0" | Str. | | 294 |
| WN817 | 1 | 12'-2" | 108 | | 32 |
| WN818 | 1 | 11'-9" | 107 | | 31 |
| WN819 | 4 | 7'-6" | Str. | | 80 |
| WN820 | 1 | 14'-9" | 108 | | 39 |
| WN821 | 1 | 14'-7" | 107 | | 39 |
| WN822 | 10 | 24'-0" | Str. | | 641 |
| WN823 | 10 | 23'-9" | Str. | | 634 |
| WN824 | 10 | 23'-6" | Str. | | 627 |
| WN825 | 2 | 5'-3" | Str. | | 28 |
| | | Total Weight = 22,330 | | | |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

134 / 145

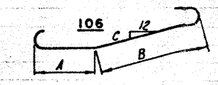
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## BENDING DIAGRAMS

100

| | |
|---|---|
| 15'-0" | WS642 |
| 12'-3" | WN645 |

106

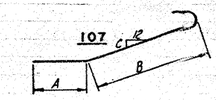



| TYPE 106 BAR | | | |
|---|---|---|---|
| | A | B | C |
| WS811 | 1'-6" | 13'-3" | 2 3/8 |
| WS817 | 9" | 14'-0" | 7/16 |
| WS820 | 9" | 13'-9" | 1 3/4 |
| WN805 | 1'-6" | 13'-6" | 1 7/16 |
| WN811 | 1'-6" | 14'-0" | 3 3/8 |

101

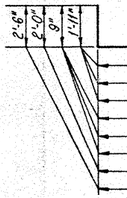
| | |
|---|---|
| 5'-3" | WN606 |
| 6'-6" | WS656 |
| 9'-6" | WS602, WN650 |
| 11'-0" | WN633 |
| 12'-9" | WS604, WN635 |
| 13'-3" | WS649, WN603 |
| 14'-3" | WS631, WN605 |
| 16'-0" | WS616 |
| 29'-0" | WN638 |
| 30'-3" | WS634 |
| 30'-6" | WN608 |

107



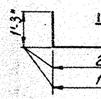

| TYPE 107 BAR | | | |
|---|---|---|---|
| | A | B | C |
| WS802 | 5'-3" | 10'-6" | 2 3/4 |
| WS807 | 9" | 11'-6" | 2 3/4 |
| WS815 | 9" | 12'-6" | 3 1/2 |
| WS821 | 9" | 12'-3" | 1 1/2 |
| WN802 | 9" | 12'-6" | 1 3/8 |
| WN814 | 9" | 12'-0" | 3 5/16 |
| WN818 | 9" | 10'-0" | 2 |
| WN821 | 3'-1" | 10'-6" | 3 1/2 |

104



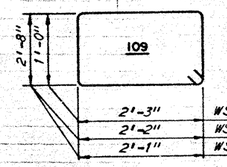

| | |
|---|---|
| 2'-6" | WS607, WN615 |
| 4'-9" | WS608, WN639 |
| 3'-3" | WS628, WN623 |
| 3'-0" | WS627 |
| 3'-9" | WN614 |
| 2'-6" | WN622 |
| 3'-6" | WS638, WN654 |
| 3'-3" | WS804, WN807 |

105



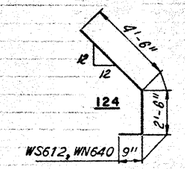

| | |
|---|---|
| 2'-8" | WS404, WN404 |
| 1'-2" | WS105, WN403 |

109



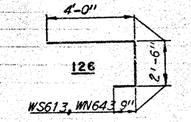

| | |
|---|---|
| 2'-3" | WS401 |
| 2'-2" | WS402, WN401 |
| 2'-1" | WS403, WN402 |

124



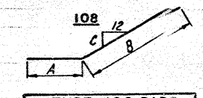

WS612, WN640 9"

126



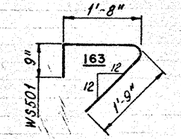

WS613, WN643 9"

108




| TYPE 108 BAR | | | |
|---|---|---|---|
| | A | B | C |
| WS801 | 5'-3" | 11'-7" | 2 5/8 |
| WS806 | 9" | 13'-3" | 2 3/4 |
| WS810 | 3'-3" | 15'-3" | 2 3/8 |
| WS814 | 9" | 14'-3" | 3 1/2 |
| WS816 | 2'-3" | 16'-0" | 1 1/2 |
| WS820 | 9" | 14'-0" | 1 1/2 |
| WS823 | 2'-3" | 15'-6" | 1 1/2 |
| WN801 | 9" | 14'-0" | 1 1/2 |
| WN809 | 3'-1" | 15'-0" | 1 3/16 |
| WN810 | 3'-1" | 15'-4" | 3 5/8 |
| WN813 | 9" | 13'-6" | 3 5/8 |
| WN817 | 3" | 11'-6" | 1 |
| WN820 | 3'-1" | 11'-9" | 1 1/4 |

163




WS501

Note: For Replacement Bar Schedule see sheet 73 / 73.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# REINFORCEMENT SCHEDULE CELLULAR CONSTRUCTION-WALLS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| SJS | SJS | DNS | CAB | |
| DATE 3-14-74 | DATE 3-14-74 | DATE 3-20-74 | DATE 4-11-74 | SHEET 74 / 173 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

1342
145

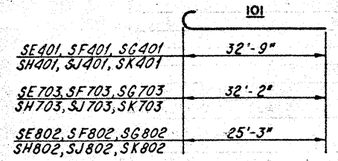
CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

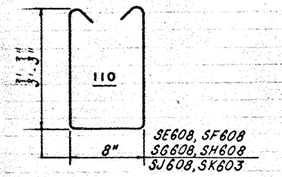
| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| SLAB PANEL 1 | | | | | |
| SE401 | 62 | 33'-3" | 101 | | 1,377 |
| SE402 | 12 | 32'-0" | Str. | | 257 |
| SE403 | 10 | 9'-0" | Str. | | 60 |
| SE404 | 2 Ser. 7 | 9'-9" 10'-1" | 109 | 1" 16 | 93 |
| SE405 | 2 Ser. 8 | 10'-1" 10'-5" | 109 | 3" 16 | 110 |
| SE406 | 2 Ser. 4 | 10'-5" 10'-7" | 109 | 1" 16 | 56 |
| SE407 | 16 | 5'-5" | 109 | | 58 |
| SE408 | 2 Ser. 7 | 11'-6" 11'-10" | 112 | 1" 16 | 109 |
| SE409 | 2 Ser. 8 | 11'-10" 12'-2" | 112 | 3" 16 | 128 |
| SE410 | 2 Ser. 4 | 12'-2" 12'-4" | 112 | 1" 16 | 65 |
| SE601 | 56 | 101'-3" | Str. | | 862 |
| SE602 | 56 | 131'-2" | 104 | | 1,108 |
| SE603 | 55 | 61'-2" | 104 | | 509 |
| SE604 | 48 | 331'-0" | Str. | | 2,379 |
| SE605 | 50 | 61'-6" | 105 | | 488 |
| SE606 | 50 | 21'-8" | 105 | | 200 |
| SE607 | 50 | 31'-8" | 127 | | 275 |
| SE608 | 50 | 81'-1" | 110 | | 607 |
| SE609 | 10 | 311'-3" | Str. | | 469 |
| SE701 | 55 | 151'-0" | Str. | | 1,717 |
| SE702 | 55 | 111'-0" | Str. | | 1,237 |
| SE703 | 130 | 331'-0" | 101 | | 8,769 |
| SE704 | 8 | 5'-0" | Str. | | 82 |
| SE801 | 16 | 331'-3" | Str. | | 1,420 |
| SE802 | 16 | 261'-6" | 101 | | 1,132 |
| SE803 | 8 | 141'-9" | Str. | | 315 |
| SE804 | 4 | 311'-6" | Str | | 336 |
| 2 Light Pole Supports = 610 | | | | | |
| Total Weight= 24,828 | | | | | |
| SLAB PANEL 2 | | | | | |
| SF401 | 62 | 33'-3" | 101 | | 1,377 |
| SF402 | 12 | 32'-0" | Str. | | 257 |
| SF403 | 10 | 9'-0" | Str. | | 60 |
| SF404 | 2 Ser. 7 | 9'-9" 10'-1" | 109 | 1" 16 | 93 |
| SF405 | 2 Ser. 8 | 10'-1" 10'-5" | 109 | 3" 16 | 110 |
| SF406 | 2 Ser. 4 | 10'-5" 10'-7" | 109 | 1" 16 | 56 |
| SF407 | 16 | 5'-5" | 109 | | 58 |
| SF408 | 2 Ser. 7 | 11'-6" 11'-10" | 112 | 1" 16 | 109 |
| SF409 | 2 Ser. 8 | 11'-10" 12'-2" | 112 | 3" 16 | 128 |
| SF410 | 2 Ser. 4 | 12'-2" 12'-4" | 112 | 1" 16 | 65 |
| SF601 | 56 | 101'-3" | Str. | | 862 |
| SF602 | 56 | 131'-2" | 104 | | 1,108 |
| SF603 | 55 | 61'-2" | 104 | | 509 |
| SF604 | 50 | 331'-0" | Str. | | 2,478 |
| SF605 | 50 | 61'-6" | 105 | | 488 |
| SF606 | 50 | 21'-8" | 105 | | 200 |
| SF607 | 50 | 31'-8" | 127 | | 275 |
| SF608 | 50 | 81'-1" | 110 | | 607 |
| SF609 | 10 | 311'-3" | Str. | | 469 |
| SF701 | 56 | 151'-0" | Str. | | 1,717 |
| SF702 | 55 | 111'-0" | Str. | | 1,237 |
| SF703 | 130 | 331'-0" | 101 | | 8,769 |
| SF801 | 16 | 331'-3" | Str. | | 1,420 |
| SF802 | 16 | 261'-6" | 101 | | 1,132 |
| SF803 | 8 | 141'-9" | Str. | | 315 |
| SF804 | 4 | 311'-6" | Str. | | 336 |
| Total Weight = 24,235 | | | | | |

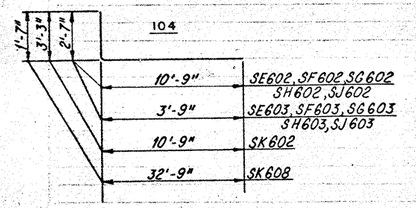
| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| SLAB PANEL 3 | | | | | |
| SG401 | 62 | 331'-3" | 101 | | 1,377 |
| SG402 | 12 | 321'-0" | Str. | | 257 |
| SG403 | 10 | 9'-0" | Str. | | 60 |
| SG404 | 2 Ser. 7 | 9'-9" 10'-1" | 109 | 1" 16 | 93 |
| SG405 | 2 Ser. 8 | 10'-1" 10'-5" | 109 | 3" 16 | 110 |
| SG406 | 2 Ser. 4 | 10'-5" 10'-7" | 109 | 1" 16 | 56 |
| SG407 | 16 | 5'-5" | 109 | | 58 |
| SG408 | 2 Ser. 7 | 11'-6" 11'-10" | 112 | 1" 16 | 109 |
| SG409 | 2 Ser. 8 | 11'-10" 12'-2" | 112 | 3" 16 | 128 |
| SG410 | 2 Ser. 4 | 12'-2" 12'-4" | 112 | 1" 16 | 65 |
| SG601 | 56 | 101'-3" | Str | | 862 |
| SG602 | 56 | 131'-2" | 104 | | 1,108 |
| SG603 | 55 | 61'-2" | 104 | | 509 |
| SG604 | 50 | 331'-0" | Str | | 2,478 |
| SG605 | 50 | 61'-6" | 105 | | 488 |
| SG606 | 50 | 21'-8" | 105 | | 200 |
| SG607 | 50 | 31'-8" | 127 | | 275 |
| SG608 | 50 | 81'-1" | 110 | | 607 |
| SG609 | 10 | 311'-3" | Str | | 469 |
| SG701 | 56 | 151'-0" | Str | | 1,717 |
| SG702 | 55 | 111'-0" | Str | | 1,237 |
| SG703 | 130 | 331'-0" | 101 | | 8,769 |
| SG801 | 16 | 331'-3" | Str. | | 1,420 |
| SG802 | 16 | 261'-6" | 101 | | 1,132 |
| SG803 | 8 | 141'-9" | Str. | | 315 |
| SG804 | 4 | 311'-6" | Str. | | 336 |
| Total Weight = 24,235 | | | | | |
| SLAB PANEL 4 | | | | | |
| SH401 | 62 | 33'-3" | 101 | | 1,137 |
| SH402 | 12 | 32'-0" | Str. | | 257 |
| SH403 | 10 | 9'-0" | Str. | | 60 |
| SH404 | 2 Ser. 7 | 9'-9" 10'-1" | 109 | 1" 16 | 93 |
| SH405 | 2 Ser. 8 | 10'-1" 10'-5" | 109 | 3" 16 | 110 |
| SH406 | 2 Ser. 4 | 10'-5" 10'-7" | 109 | 1" 16 | 56 |
| SH407 | 16 | 5'-5" | 109 | | 58 |
| SH408 | 2 Ser. 7 | 11'-6" 11'-10" | 112 | 1" 16 | 109 |
| SH409 | 2 Ser. 8 | 11'-10" 12'-2" | 112 | 3" 16 | 128 |
| SH410 | 2 Ser. 4 | 12'-2" 12'-4" | 112 | 1" 16 | 65 |
| SH601 | 56 | 101'-3" | Str. | | 862 |
| SH602 | 56 | 131'-2" | 104 | | 1,108 |
| SH603 | 55 | 61'-2" | 104 | | 509 |
| SH604 | 50 | 331'-0" | Str. | | 2,478 |
| SH605 | 50 | 61'-6" | 105 | | 488 |
| SH606 | 50 | 21'-8" | 105 | | 200 |
| SH607 | 50 | 31'-8" | 127 | | 275 |
| SH608 | 50 | 81'-1" | 110 | | 607 |
| SH609 | 10 | 311'-3" | Str. | | 469 |
| SH701 | 56 | 151'-0" | Str. | | 1,717 |
| SH702 | 55 | 111'-0" | Str. | | 1,237 |
| SH703 | 130 | 331'-0" | 101 | | 8,769 |
| SH801 | 16 | 331'-3" | Str. | | 1,420 |
| SH802 | 16 | 261'-6" | 101 | | 1,132 |
| SH803 | 8 | 141'-9" | Str. | | 315 |
| SH804 | 4 | 311'-6" | Str. | | 336 |
| Total Weight = 24,235 | | | | | |

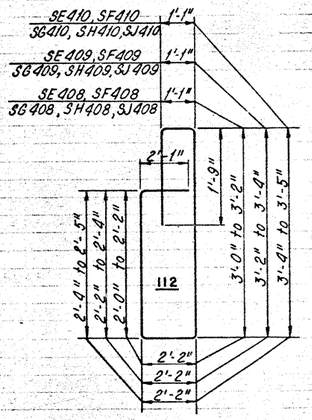
| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| SLAB PANEL 5 | | | | | |
| SJ401 | 62 | 331'-3" | 101 | | 1,377 |
| SJ402 | 12 | 321'-0" | Str. | | 257 |
| SJ403 | 10 | 9'-0" | Str. | | 60 |
| SJ404 | 2 Ser. 7 | 9'-9" 10'-1" | 109 | 1" 16 | 93 |
| SJ405 | 2 Ser. 8 | 10'-1" 10'-5" | 109 | 3" 16 | 110 |
| SJ406 | 2 Ser. 4 | 10'-5" 10'-7" | 109 | 1" 16 | 56 |
| SJ407 | 16 | 5'-5" | 109 | | 58 |
| SJ408 | 2 Ser. 7 | 11'-6" 11'-10" | 112 | 1" 16 | 109 |
| SJ409 | 2 Ser. 8 | 11'-10" 12'-2" | 112 | 3" 16 | 128 |
| SJ410 | 2 Ser. 4 | 12'-2" 12'-4" | 112 | 1" 16 | 65 |
| SJ601 | 56 | 101'-3" | Str. | | 862 |
| SJ602 | 56 | 131'-2" | 104 | | 1,108 |
| SJ603 | 55 | 61'-2" | 104 | | 509 |
| SJ604 | 50 | 331'-0" | Str. | | 2,478 |
| SJ605 | 50 | 61'-6" | 105 | | 488 |
| SJ606 | 50 | 21'-8" | 105 | | 200 |
| SJ607 | 50 | 31'-8" | 127 | | 275 |
| SJ608 | 50 | 81'-1" | 110 | | 607 |
| SJ609 | 10 | 311'-3" | Str. | | 469 |
| SJ701 | 56 | 151'-0" | Str. | | 1,717 |
| SJ702 | 55 | 111'-0" | Str. | | 1,237 |
| SJ703 | 130 | 331'-0" | 101 | | 8,769 |
| SJ801 | 16 | 331'-3" | Str. | | 1,420 |
| SJ802 | 16 | 261'-6" | 101 | | 1,132 |
| SJ803 | 8 | 141'-9" | Str. | | 315 |
| SJ804 | 4 | 311'-6" | Str. | | 336 |
| Total Weight = 24,235 | | | | | |
| SLAB PANEL 6 | | | | | |
| SK401 | 64 | 331'-3" | 101 | | 1,422 |
| SK402 | 12 | 321'-0" | Str. | | 257 |
| SK403 | 10 | 9'-0" | Str. | | 60 |
| SK404 | 2 Ser. 7 | 9'-9" 10'-1" | 109 | 1" 16 | 93 |
| SK405 | 2 Ser. 8 | 10'-1" 10'-5" | 109 | 3" 16 | 110 |
| SK406 | 2 Ser. 4 | 10'-5" 10'-7" | 109 | 1" 16 | 56 |
| SK407 | 16 | 5'-5" | 109 | | 58 |
| SK408 | 2 Ser. 8 | 13'-7" 13'-11" | 109 | 3" 16 | 147 |
| SK409 | 2 Ser. 8 | 13'-11" 14'-3" | 109 | 3" 16 | 151 |
| SK410 | 2 Ser. 4 | 14'-3" 14'-5" | 109 | 1" 16 | 77 |
| SK411 | 2 | 141'-3" | 109 | | 19 |
| SK601 | 56 | 101'-3" | Str. | | 862 |
| SK602 | 56 | 131'-10" | 104 | | 1,164 |
| SK603 | 50 | 81'-1" | 110 | | 607 |
| SK604 | 52 | 331'-0" | Str. | | 2,577 |
| SK605 | 50 | 61'-6" | 105 | | 488 |
| SK606 | 50 | 21'-8" | 105 | | 200 |
| SK607 | 50 | 31'-8" | 127 | | 275 |
| SK608 | 10 | 341'-2" | 104 | | 513 |
| SK609 | 4 | 311'-3" | Str. | | 188 |
| SK610 | 20 | 321'-0" | Str. | | 984 |
| SK701 | 56 | 151'-0" | Str. | | 1,717 |
| SK702 | 55 | 111'-0" | Str. | | 1,237 |
| SK703 | 130 | 331'-0" | 101 | | 8,769 |
| SK801 | 10 | 331'-3" | Str. | | 888 |
| SK802 | 8 | 261'-6" | 101 | | 565 |
| SK803 | 4 | 141'-9" | Str. | | 158 |
| SK804 | 36 | 51'-7" | 147 | | 537 |
| 2 Light Pole Supports = 610 | | | | | |
| Total Weight = 24,790 | | | | | |

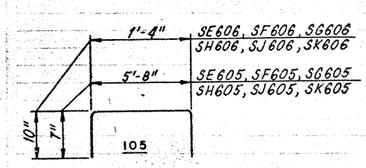
## BENDING DIAGRAMS

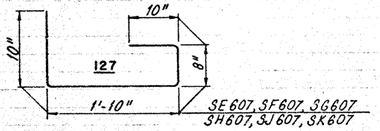


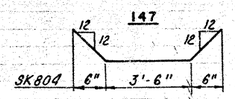



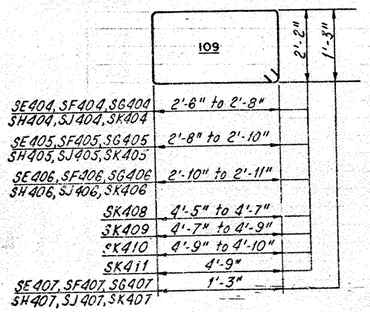




Notes:
For Replacement Bar Schedule see Sheet 73 / 73 .
For Light Pole Support Reinforcement Schedule and Bending Diagrams see Sheet 67 / 73 .

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

# REINFORCEMENT SCHEDULE CELLULAR CONSTRUCTION SLAB PANELS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| SJS | SJS | DAS | EAR | |
| DATE 2-21-74 | DATE 2-27-74 | DATE 3-7-74 | DATE 3-11-74 | |

SHEET 72 / 73

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| **SLAB — UNIT 1** | | | | | |
| SA401 | 2673 | 30'-0" | Str. | | 53,567 |
| SA402 | 1 Ser. 71 | 11'-9" to 37'-9" | 104 | 4" | 1,339 |
| SA403 | 83 | 3'-3" | 101 | | 202 |
| SA404 | 99 | 30'-6" | 101 | | 2,017 |
| SA405 | 246 | 30'-6" | Str. | | 5,012 |
| SA406 | 246 | 31'-6" | Str. | | 5,176 |
| SA407 | 492 | 31'-9" | Str. | | 10,435 |
| SA408 | 246 | 21'-0" | Str. | | 3,451 |
| SA409 | 14 @ 39', 9 @ 38'-9" | 39'-3" | 101 | | 372,460 |
| SA410 | 14 @ 14', 3 @ 13'-3" | 13'-9" | 101 | | 133,420 |
| SA403 | 48 | 1'-9" | 105 | | 56 |
| | | | | | |
| | 2'-8" | 27'-2" | 101 | | 1,524 |
| SA601 | 1,972 | 30'-0" | Str. | | 88,858 |
| SA602 | 1 Ser. 68 | 2'-0" to 46'-0" | Str. | 4" | 1,459 |
| SA603 | 1,558 | 37'-4" | 101 | | 87,364 |
| SA604 | 1,558 | 29'-7" | 101 | | 69,228 |
| SA605 | 3,116 | 32'-9" | Str. | | 153,278 |
| SA606 | 1,537 | 2'-8" | 105 | | 6,167 |
| SA607 | 1,537 | 8'-1" | 110 | | 18,660 |
| SA608 | 1,537 | 3'-8" | 127 | | 9,466 |
| SA609 | 1,537 | 6'-6" | 105 | | 15,006 |
| SA610 | 13'-8" 82 | 12'-5" | 104 | 101 | 1,507 |
| SA611 | 82 | 4'-8" | 101 | | 575 |
| SA612 | 82 | 15'-2" | 101 | | 1,868 |
| 10 Light Pole Supports | | | | = | 3,050 |
| | | | | | |
| | | Total Weight = | | | 637,029 |
| **SLAB — UNIT 2** | | | | | |
| SB401 | 2,970 | 30'-0" | Str. | | 59,519 |
| SB402 | 166 | 22'-11" | 104 | 101 | 2,540 |
| SB403 | 166 | 3'-9" | 101 | | 419 |
| SB404 | 24 @ 0" 32 | 23'-11" | 104 | 101 | 511 |
| SB405 | 1,230 | 28'-6" | Str. | | 23,417 |
| SB403 | 96 | 1'-9" | 105 | | 112 |
| | 2,108 | | | | |
| SB601 | C.I.P. | 30'-0" | Str. | | 98,057 |
| SB602 | 10'-9" 68 | 10'-0" | STD. | 101 | 1,027 |
| SB603 | 1,677 | 37'-4" | 101 | | 94,036 |
| SB604 | 1,677 | 29'-7" | 101 | | 74,515 |
| SB605 | 3,354 | 32'-9" | Str. | | 164,985 |
| SB606 | 1,680 | 2'-8" | 105 | | 6,730 |
| SB607 | 1,680 | 8'-1" | 110 | | 20,396 |
| SB608 | 1,680 | 3'-8" | 127 | | 9,253 |
| SB609 | 1,680 | 6'-6" | 105 | | 16,402 |
| SB610 | 14 @ 5' 164 | 13'-5" | 104 | 101 | 5,305 |
| SB611 | 164 | 4'-8" | 101 | | 1,150 |
| SB612 | 68 | 30'-8" | 101 | | 3,132 |
| 10 Light Pole Supports | | | | = | 3,050 |
| | | Total Weight = | | | 629,238 |
| **SLAB — UNIT 3** | | | | | |
| SC401 | 2,871 | 30'-0" | Str. | | 57,535 |
| SC402 | 10'-3" 166 | 8'-2" | 104 | 101 | 1,010 |
| SC403 | 166 | 3'-9" | 101 | | 419 |
| SC404 | 11'-3" 32 | 11'-2" | 104 | 101 | 239 |
| SC405 | 492 | 12'-6" | Str. | | 4,108 |
| SC406 | 492 | 36'-6" | Str. | | 11,996 |
| SC407 | 246 | 36'-0" | Str. | | 5,916 |
| SC403 | 96 | 1'-9" | 105 | | 112 |
| SC612 | 68 | 30'-8" | 101 | | 3,132 |
| SC601 | C.I.P. | 30'-0" | Str. | | 91,972 |
| SC602 | 12'-2" 68 | 11'-5" | STD. | 101 | 1,175 |
| SC603 | 1,578 | 37'-4" | 101 | | 88,485 |
| SC604 | 1,578 | 29'-7" | 101 | | 70,116 |
| SC605 | 3,156 | 32'-9" | Str. | | 155,245 |
| SC606 | 1,580 | 2'-8" | 105 | | 6,329 |
| SC607 | 1,580 | 8'-1" | 110 | | 19,182 |
| SC608 | 1,580 | 3'-8" | 127 | | 8,702 |
| SC609 | 1,580 | 6'-6" | 105 | | 15,426 |
| SC610 | 11'-8" 164 | 10'-5" | 104 | 101 | 1,729 |
| SC611 | 164 | 4'-8" | 101 | | 1,150 |
| 12 Light Pole Supports | | | | = | 3,660 |
| | | Total Weight | | | 545,228 |

| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| **SLAB — UNIT 4** | | | | | |
| SD401 | 693 | 30'-0" | Str. | | 103,888 |
| SD402 | 83 | 22'-5" | 104 | | 1,243 |
| SD403 | 83 | 3'-9" | 101 | | 202 |
| SD404 | 152 @ 32 | 24'-5" | 101 | | 1,870 |
| SD405 | 246 | 22'-0" | Str. | | 3,615 |
| SD403 | 48 | 1'-9" | 105 | | 56 |
| SD406 | 16 | 25'-6" | 101 | | 273 |
| SD601 | 544 | 30'-0" | Str. | | 24,513 |
| SD602 | 24 @ 2' 68 | 23'-5" | STD. | 101 | 2,401 |
| SD603 | 458 | 37'-4" | 101 | | 25,682 |
| SD604 | 458 | 29'-7" | 101 | | 20,351 |
| SD605 | 916 | 32'-9" | Str. | | 45,058 |
| SD606 | 460 | 2'-8" | 105 | | 1,843 |
| SD607 | 460 | 8'-1" | 110 | | 5,585 |
| SD608 | 460 | 3'-8" | 127 | | 2,534 |
| SD609 | 460 | 6'-6" | 105 | | 4,491 |
| SD610 | 82 @ 14-5" | 13'-5" | 104 | 101 | 1,652 |
| SD611 | 82 | 4'-8" | 101 | | 575 |
| SD612 | 82 | 15'-5" | 101 | | 1,899 |
| | | | | | |
| 2 Light Pole Supports | | | | = | 610 |
| | | | | | |
| | | Total Weight | | = | 58,023 |

DELETE

1,615

DELETE

2,468

1,776

DELETE

157,560

DELETE

1,683

DELETE

513

DELETE

3,551

DELETE

1,137

DELETE

240

1,972

DELETE

88858

1,243

DELETE

2,874

536,557

544,296

579,236

# BENDING DIAGRAMS

101

| | | |
|---|---|---|
| DELETE | SA403, SB403 SC403, SD403 | 3'-3" |
| SB612, SC612, | SA 404 | 30'-0" |
| | SD 404 | 24'-0" |
| | SA 409 | 38'-3" @ 39'-3" |
| | SA 410 | 12'-9" @ 13'-9" |
| | SA603, SB603 SC603, SD603 | 36'-8" |
| | SA604, SB604 SC604, SD604 | 28'-11" |
| DELETE | SA611, SB611 SC611, SD611 | 4'-0" |
| | SA 612 | 14'-6" |
| | SD612 | 14'-9" |
| | SA402 | 11'-9" to 37'-3" |
| | SB402 | 22'-6" |
| | SC402 | 9'-9" |
| | SD402 | 23'-0" |
| | SB404 | 23'-6" |
| | SC404 | 10'-9" |
| | SD406 | 25'-0" |
| | SA602 | 2'-0" to 26'-6" |
| | SB602 | 10'-0" |
| | SC602 | 11'-6" |
| | SD602 | 23'-6" |
| | SA610 | 13'-0" |
| SB610, | SD610 | 13'-9" |
| | SC610 | 11'-0" |

104

| | |
|---|---|
| 10'-9" to 36'-3" | SA402 |
| 21'-6" | SB402 |
| 23'-6" | SB404 |
| 8'-9" | SC402 |
| 10'-9" | SC404 |
| 22'-0" | SD402 |
| 12'-0" | SA610 |
| 12'-9" | SB610, SD610 |
| 10'-0" | SC610 |

DELETE

105

| | |
|---|---|
| 8" | SA403 SB403, SC403, SD403 |
| 5'-8" | SA609, SB609 SC609, SD609 |
| 1'-4" | SA606, SB606 SC606, SD606 |

110

8" SA 607, SB607 SC 607, SD607

127

10" SA 608, SB608 SC608, SD608

| REPLACEMENT BAR SCHEDULE | | | |
|---|---|---|---|
| Size | No. | Length | Type |
| 4 | 20 | 61'-3" | Str. |
| 5 | 1 | 61'-9" | Str. |
| 6 | 87 | 71'-0" | Str. |
| 7 | 4 | 71'-3" | Str. |
| 8 | 3 | 71'-6" | Str. |
| 10 | 1 | 81'-3" | Str. |
| 11 | 32 | 81'-6" | Str. |
| 18 | 25 | 21'-6" | Str. |

Note:
For Light Pole Support Reinforcement Schedule and Bending Diagrams see Sheet 67 | 73 .

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

134B / 148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

## REINFORCEMENT SCHEDULE SLABS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DHS | SJS | AHS | EAB | |
| DATE 2-1-74 | DATE 2-22-74 | DATE 2-1-74 | DATE 4/1/74 | SHEET 73/73 |

REV. C.P. & W.E.B. 8-22-75

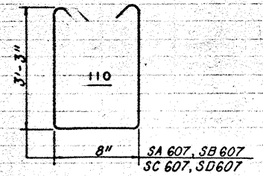
| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| **SLAB — UNIT 1** | | | | | |
| SA401 | 2673 | 30'-0" | Str. | | 53,567 |
| SA402 | 1 Ser. 71 | 11'-3" to 36'-9" | 104 | 4½" | 1,132 |
| SA403 | 83 | 3'-9" | 101 | | 208 |
| SA404 | 99 | 30'-6" | 101 | | 2,017 |
| SA405 | 246 | 30'-6" | Str. | | 5,012 |
| SA406 | 246 | 31'-6" | Str. | | 5,176 |
| SA407 | 492 | 31'-9" | Str. | | 10,435 |
| SA408 | 246 | 21'-0" | Str. | | 3,451 |
| SA409 | 14 | 38'-9" | 101 | | 362 |
| SA410 | 14 | 13'-3" | 101 | | 124 |
| SA601 | 1,972 | 30'-0" | Str. | | 88,352 |
| SA602 | 1 Ser. 68 | 2'-0" to 26'-9" | Str. | 4½" | 1,455 |
| SA603 | 1,558 | 37'-4" | 101 | | 87,354 |
| SA604 | 1,558 | 29'-7" | 101 | | 59,228 |
| SA605 | 3,116 | 32'-9" | Str. | | 153,278 |
| SA606 | 1,537 | 2'-8" | 105 | | 6,157 |
| SA607 | 1,537 | 8'-1" | 110 | | 18,660 |
| SA608 | 1,537 | 3'-8" | 127 | | 8,466 |
| SA609 | 1,537 | 6'-6" | 105 | | 15,006 |
| SA610 | 82 | 12'-3" | 104 | | 1,500 |
| SA611 | 82 | 4'-8" | 101 | | 575 |
| SA612 | 82 | 15'-2" | 101 | | 1,868 |
| 10 Light Pole Supports | | | | = | 3050 |
| | | Total Weight = | | | 537,025 |
| **SLAB — UNIT 2** | | | | | |
| SB401 | 2,970 | 30'-0" | Str. | | 59,519 |
| SB402 | 166 | 22'-11" | 104 | | 2,541 |
| SB403 | 166 | 3'-9" | 101 | | 416 |
| SB404 | 32 | 23'-11" | 104 | | 511 |
| SB405 | 1,230 | 28'-6" | Str. | | 23,417 |
| SB601 | 2,176 | 30'-0" | Str. | | 98,051 |
| SB602 | 68 | 10'-0" | Str. | | 1,021 |
| SB603 | 1,677 | 37'-4" | 101 | | 94,035 |
| SB604 | 1,677 | 29'-7" | 101 | | 74,515 |
| SB605 | 3,354 | 32'-9" | Str. | | 164,985 |
| SB606 | 1,680 | 2'-8" | 105 | | 6,730 |
| SB607 | 1,680 | 8'-1" | 110 | | 20,396 |
| SB608 | 1,680 | 3'-8" | 127 | | 9,253 |
| SB609 | 1,680 | 6'-6" | 105 | | 16,402 |
| SB610 | 164 | 13'-5" | 104 | | 3,305 |
| SB611 | 164 | 4'-8" | 101 | | 1,150 |
| 10 Light Pole Supports | | | | = | 3,050 |
| | | Total Weight = | | | 579,298 |
| **SLAB — UNIT 3** | | | | | |
| SC401 | 2,871 | 30'-0" | Str. | | 57,535 |
| SC402 | 166 | 9'-2" | 104 | | 1,016 |
| SC403 | 166 | 3'-9" | 101 | | 416 |
| SC404 | 32 | 11'-2" | 104 | | 239 |
| SC405 | 492 | 12'-6" | Str. | | 4,103 |
| SC406 | 492 | 36'-6" | Str. | | 11,995 |
| SC407 | 246 | 36'-0" | Str. | | 5,916 |
| SC601 | 2,040 | 30'-0" | Str. | | 91,922 |
| SC602 | 68 | 11'-6" | Str. | | 1,175 |
| SC603 | 1,578 | 37'-4" | 101 | | 88,485 |
| SC604 | 1,578 | 29'-7" | 101 | | 70,115 |
| SC605 | 3,156 | 32'-9" | Str. | | 155,245 |
| SC606 | 1,580 | 2'-8" | 105 | | 6,329 |
| SC607 | 1,580 | 8'-1" | 110 | | 19,122 |
| SC608 | 1,580 | 3'-8" | 127 | | 8,722 |
| SC609 | 1,580 | 6'-6" | 105 | | 15,426 |
| SC610 | 164 | 10'-8" | 104 | | 2,528 |
| SC611 | 164 | 4'-8" | 101 | | 1,150 |
| 12 Light Pole Supports | | | | = | 3,660 |
| | | Total Weight | | | 545,246 |

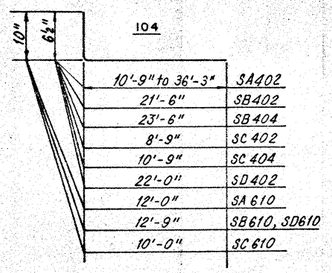
| MARK | NO. | LENGTH | TYPE | SER. INCR. | WEIGHT (LBS.) |
|---|---|---|---|---|---|
| **SLAB — UNIT 4** | | | | | |
| SD401 | 693 | 30'-0" | Str. | | 13,888 |
| SD402 | 83 | 22'-5" | 104 | | 1,243 |
| SD403 | 83 | 3'-9" | 101 | | 208 |
| SD404 | 115 | 24'-5" | 101 | | 1,876 |
| SD405 | 246 | 22'-0" | Str. | | 3,615 |
| SD601 | 544 | 30'-0" | Str. | | 24,513 |
| SD602 | 68 | 23'-6" | Str. | | 2,400 |
| SD603 | 458 | 37'-4" | 101 | | 25,632 |
| SD604 | 458 | 29'-7" | 101 | | 22,351 |
| SD605 | 916 | 32'-9" | Str. | | 45,058 |
| SD606 | 460 | 2'-8" | 105 | | 1,843 |
| SD607 | 460 | 8'-1" | 110 | | 5,585 |
| SD608 | 460 | 3'-8" | 127 | | 2,534 |
| SD609 | 460 | 6'-6" | 105 | | 4,491 |
| SD610 | 82 | 13'-5" | 104 | | 1,652 |
| SD611 | 82 | 4'-8" | 101 | | 575 |
| SD612 | 82 | 15'-5" | 101 | | 1,899 |
| 2 Light Pole Supports | | | | = | 610 |
| | | Total Weight | | = | 158,023 |

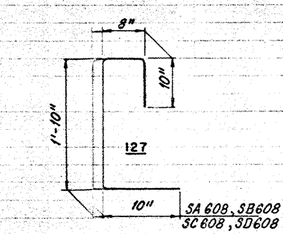
## BENDING DIAGRAMS

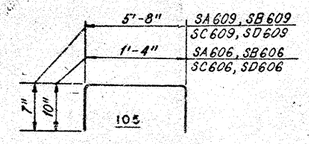
101

| | |
|---|---|
| SA403, SB403 SC403, SD403 | 3'-3" |
| SA404 | 30'-0" |
| SD404 | 24'-0" |
| SA409 | 38'-3" |
| SA410 | 12'-9" |
| SA603, SB603 SC603, SD603 | 36'-8" |
| SA604, SB604 SC604, SD604 | 28'-11" |
| SA611, SB611 SC611, SD611 | 4'-0" |
| SA612 | 14'-6" |
| SD612 | 14'-9" |




Note:
For Light Pole Support Reinforcement Schedule and Bending Diagrams see Sheet 67 | 73 .

| REPLACEMENT BAR SCHEDULE | | | |
|---|---|---|---|
| Size | No. | Length | Type |
| 4 | 20 | 61'-3" | Str. |
| 5 | 1 | 61'-3" | Str. |
| 6 | 87 | 71'-3" | Str. |
| 7 | 4 | 71'-3" | Str. |
| 8 | 3 | 71'-3" | Str. |
| 10 | 1 | 81'-3" | Str. |
| 11 | 32 | 81'-3" | Str. |
| 18 | 25 | 21'-3" | Str. |

THIS PLAN SHEET HAS BEEN REVISED
SEE REVISION 8-22-1975

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

134B
148

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

REINFORCEMENT SCHEDULE
SLABS

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY

STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DHS | SJS | AJS | CAB | |
| DATE 2-1-74 | DATE 2-22-74 | DATE 2-1-74 | DATE 2-11-74 | SHEET 72/73 |

# CENTERLINE SURVEY PLAT

## DENISON-HARVARD BRIDGE

## COUNTY ROAD 37 COUNTY ROAD 43

ONE HUNDRED ACRE LOT NUMBER 274, TOWN 7, RANGE 12

BROOKLYN TOWNSHIP, TOWN 7, RANGE 12, ORIGINAL LOTS NUMBERS 74 AND 80

CITY OF CLEVELAND

VILLAGE OF CUYAHOGA HEIGHTS

CUYAHOGA COUNTY, OHIO

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642(1) | |

136/148

1/13

CUYAHOGA COUNTY

COUNTY ROAD 37

COUNTY ROAD 43

**CURVE DATA 1**

P.I. = Sta. 198+83.35
Δ = 41°16'51" Rt.
D = 2°45'00"
R = 2083.48'
L = 1501.12'
T = 784.81'
E = 142.91'

**CURVE DATA 2**

P.I. = Sta. 231+98.49
Δ = 31°12'27" Lt.
D = 4°00'00"
R = 1432.39'
T = 780.19'
L = 400.03'
E = 54.81'

I hearby certify that this plat is a true delineation of a survey made for the Ohio Department of Transportation.

By_____

Registered Surveyor No. _____

Date_____

Cuyahoga County Engineers

Signed_____

Date_____ District Deputy Director
Ohio Department of Transportation

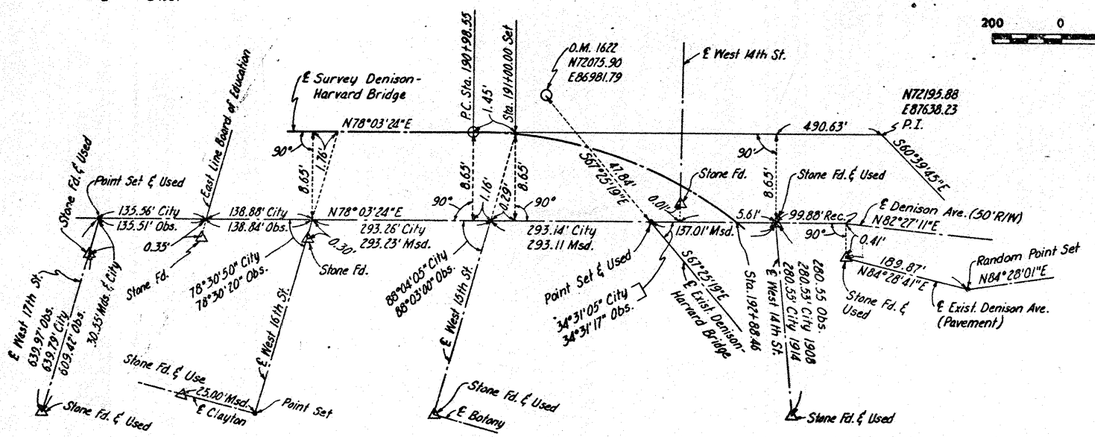
**LEGEND**

- ● Proposed Centerline Reference Monument at the following Stations:
  201+00.00
  205+39.67
  214+00.00
  221+50.00

  See Standard Construction Drawing MC-1 for Details of the above Monument.
- ■ Item 604 Monument Assembly (Proposed) Type 36-B as per plan. See Sheet 14 for Detail. Sta. 227+98.46
- □ Existing Monument Box
- △ Existing Stone

200 0 200 400 600 800

SCALE IN FEET




DETAIL "A"
No Scale

① Sta. 200+37.60 ℄ Den.-Har. Br. = Sta. 66+60.73 ℄ Jennings Rd.

② Sta. 202+16.87 ℄ Den.-Har. Br. = Sta. 1350+30.90 ℄ B.℄O. R.R. 98°01'50" to Local Tangents

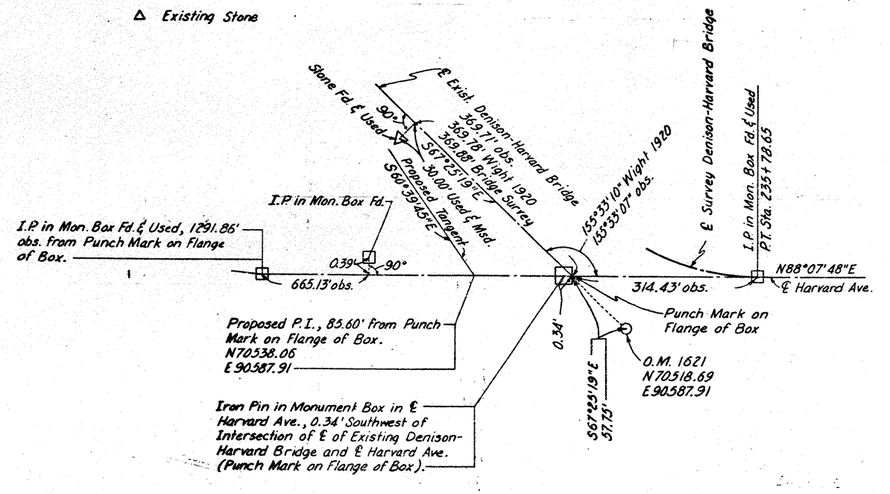
③ Sta. 203+31.18 ℄ Den.-Har. Br. Sta. 1371+91.86 ℄ N.℄ W. Rly. 76°14'49" to Local Tangent

④ Sta. 219+66.25 ℄ Den.-Har. Br. Sta. 18+51.82 ℄ B.℄O. R.R. 151°16'21" to Local Tangent

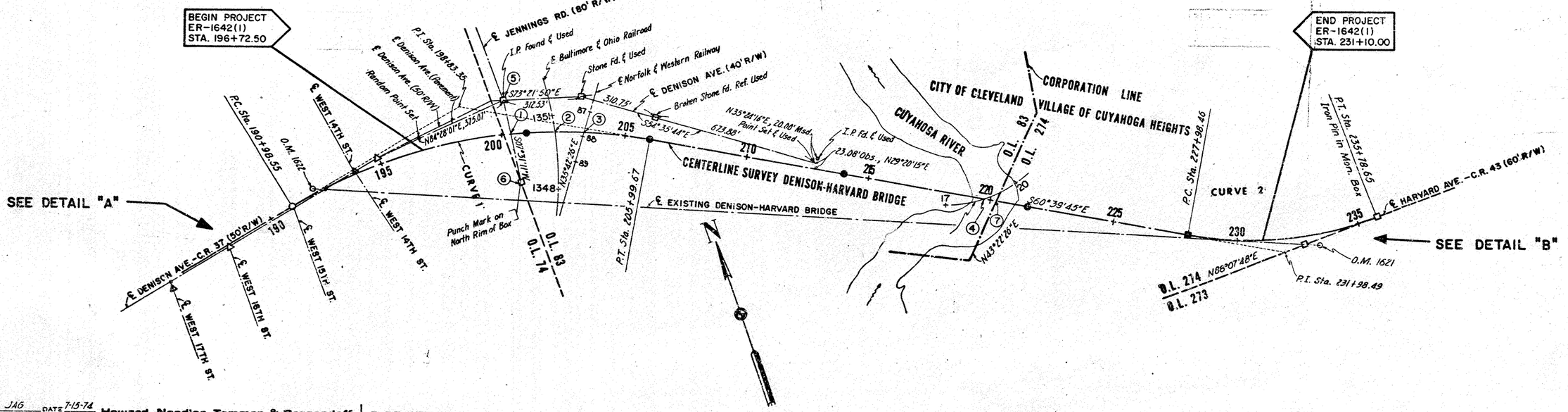
⑤ Sta. 65+16.61 ℄ Jennings Rd. = ℄ Denison Ave. R/W ℄ Pavement

⑥ Sta. 68+54.00 ℄ Jennings Rd.

⑦ Sta. 220+18.03 ℄ Den.-Har. Br.




DETAIL "B"
No Scale




MADE JAG DATE 7-15-74
TRACED ____ DATE ____
CHECKED JNS DATE 7-18-74
SCALE 1"= 200'

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

Rev. 2-20-75

CENTERLINE PLAT 1 OF 1

CENTERLINE SURVEY PLAT

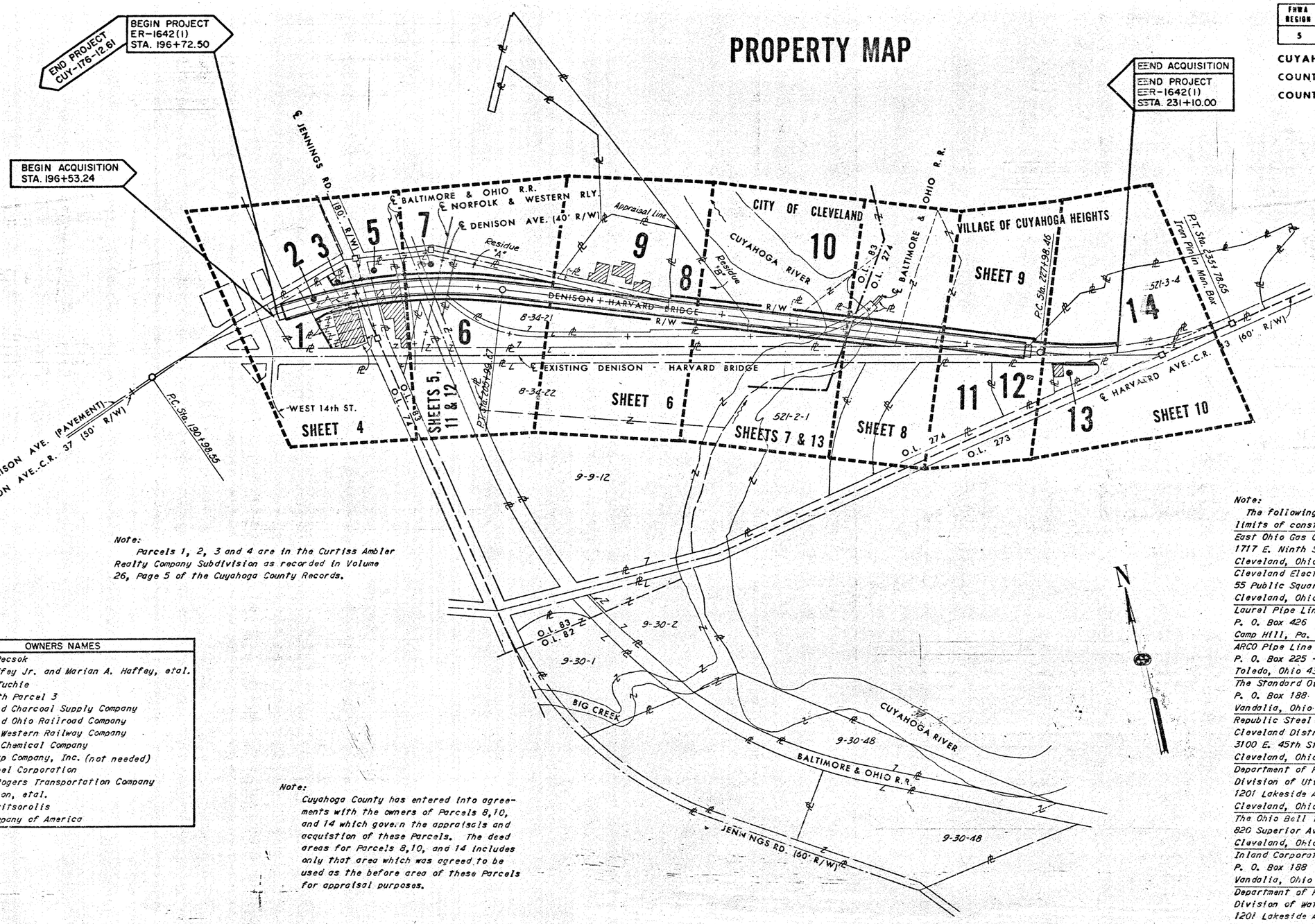
# PROPERTY MAP

| FHWA REGION | STATE | PROJECT | | |
|---|---|---|---|---|
| 5 | OHIO | ER-1642(1) | | |

137 / 148

2 / 13

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




*Note:*
*Parcels 1, 2, 3 and 4 are in the Curtiss Ambler Realty Company Subdivision as recorded in Volume 26, Page 5 of the Cuyahoga County Records.*

| PARCELS | OWNERS NAMES |
|---|---|
| 1 | *William B. Pecsok* |
| 2 | *James R. Haffey Jr. and Marian A. Haffey, etal.* |
| 3 | *Laura F. LaTuchie* |
| 4 | *Combined with Parcel 3* |
| 5 | *The Cleveland Charcoal Supply Company* |
| 6 | *Baltimore and Ohio Railroad Company* |
| 7 | *Norfolk and Western Railway Company* |
| 8 | *The Harshaw Chemical Company* |
| 9 | *Cuyahoga Soap Company, Inc. (not needed)* |
| 10 | *Republic Steel Corporation* |
| 11 | *Charles J. Rogers Transportation Company* |
| 12 | *Helen Dechison, etal.* |
| 13 | *Dimitrios Tritsorolis* |
| 14 | *Aluminum Company of America* |

*Note:*
*Cuyahoga County has entered into agreements with the owners of Parcels 8,10, and 14 which govern the appraisals and acquistion of these Parcels. The dead areas for Parcels 8,10, and 14 includes only that area which was agreed to be used as the before area of these Parcels for appraisal purposes.*

*Note:*
*The following is a list of utilities within the limits of construction:*

*East Ohio Gas Company*
*1717 E. Ninth St.* 23257
*Cleveland, Ohio 44114*

*Cleveland Electric Illuminating Company*
*55 Public Square*
*Cleveland, Ohio 44113*

*Laurel Pipe Line Company*
*P. O. Box 426*
*Camp Hill, Pa. 17011*

*ARCO Pipe Line Company*
*P. O. Box 225 - Station A*
*Toledo, Ohio 43605*

*The Standard Oil Company of Ohio*
*P. O. Box 188*
*Vandalia, Ohio 45377*

*Republic Steel Corporation*
*Cleveland District*
*3100 E. 45th St.*
*Cleveland, Ohio 44127*

*Department of Public Utilities*
*Division of Utilities Engineering*
*1201 Lakeside Ave.*
*Cleveland, Ohio 44114*

*The Ohio Bell Telephone Company*
*820 Superior Ave. N.W.*
*Cleveland, Ohio 44113*

*Inland Corporation*
*P. O. Box 188*
*Vandalia, Ohio 45377*

*Department of Public Utilities*
*Division of Water and Heat*
*1201 Lakeside Ave.*
*Cleveland, Ohio 44114*

200 0 200 400
SCALE IN FEET

MADE JAS DATE 3-21-74
TRACED DATE
CHECKED MEC DATE 3-27-74
SCALE 1" = 200'

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

BROOKLYN TOWNSHIP, TOWN 7, RANGE 12, ORIGINAL LOTS NUMBERS 74 AND 83
ONE HUNDRED ACRE LOT NUMBER 274, TOWN 7 RANGE 12

| NAME | REVISION | DATE |
|---|---|---|
| | | |
| | | |
| | | |

Total Owners = 12
Total Takes = 2
Total Structures = 1
Total Takes with Structures = 0

# SUMMARY OF ADDITIONAL RIGHT OF WAY REQUIRED

| FED. RD DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642(1) | |

138
148

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

3
13

| PARCEL NO. | OWNER | AUD. NO. | TYPE FUNDS | DEED RECORD BOOK | DEED RECORD PAGE | DEED AREA | TOTAL P.R.O. | TOTAL TAKE | P.R.O. INTAKE | NET TAKE LAND | NET TAKE BLDG. | LEFT RESIDUE NET | LEFT RESIDUE P.R.O. | RIGHT RESIDUE NET | RIGHT RESIDUE P.R.O. | SHEET NO. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 WD | William B. Pecsok | 8-28-106 | | 5224 | 37 | 35101 | 3550 | 35101 | 3550 | 31551 | No | - | - | - | - | 4 | Total Taking |
| 2 WD | James R. Haffey Jr., et al. | 8-28-107 | | 10946 | 3 | 15698 | - | 15698 | - | 15698 | No | - | - | - | - | 4 | Total Taking |
| | | 8-28-108 | | 13337 | 75 | | | | | | | | | | | | |
| 3 WR | Laura F. LaTuchie | 8-28-109 | | 10642 | 245 | 39228 | - | 3281 | - | 3281 | No | 5154 | - | 26218 | - | 4 | Total Take Area = 7856 |
| | | 8-28-35 | | | | | - | 3742 | - | 3742 | - | - | - | - | - | 4 | |
| | | 8-28-36 | | | | | - | 833 | - | 833 | - | - | - | - | - | 4 | |
| 3S | | 8-28-37 | | | | | - | 265 | - | 265 | - | - | - | - | - | 4 | 12" Circular, Reinforced Concrete Storm Sewer. |
| 3SL | | 8-28-38 | | | | | - | 2226 | - | 2226 | - | - | - | - | - | 4 | Slope Grading |
| | | 8-28-39 | | | | | | | | | | | | | | | |
| | | 8-28-40 | | | | | | | | | | | | | | | |
| 4 | | | | - | - | - | - | - | - | - | - | - | - | - | - | - | Combined with Parcel 3 |
| 5 WR | The Cleveland Charcoal Supply Company | 8-34-5 | | 9473 | 644 | 37897 | - | 10014 | - | 10014 | Yes | 4988 | - | 22895 | - | 4 | |
| 5 T | | | | | | | | 17232 | - | 17232 | - | - | - | - | - | 4 | Structure Removal (Item 202) |
| 6 Aerial-1 | Baltimore and Ohio Railroad Company | 8-34-4 | | - | - | - | - | 12006 | - | 12006 | No | - | - | - | - | 11 | |
| 6 Aerial-2 | | 8-34-20 | | | | | | 107 | - | 107 | - | - | - | - | - | 11 | |
| 6 Aerial-3 | | | | | | | | 16010 | - | 16010 | - | - | - | - | - | 13 | Includes Overlap Area Parcel 6 |
| 6 | | | | | | | | 388 | | 388 | - | - | - | - | - | 13 | Footings (Highway Easement) |
| 7 Aerial | Norfolk and Western Railway Company | 8-34-15 | | - | - | - | - | 6919 | - | 6919 | No | - | - | - | - | 12 | Includes Overlap Area Parcel 7 |
| 7 | | | | | | | | 1127 | - | 1127 | - | - | - | - | - | 12 | Footings (Highway Easement) |
| 8 WR | The Harshaw Chemical Company | 8-34-21 | | 7679 | 63 to 65 | 252233 | 17724 | 104669 | - | 104669 | No | 12156(A) 40551(B) | 17724 | 77133 | - | 5,6 & 7 | Deed Area is a part of Auditor No. 8-34-21, as per agreement. * . |
| 9 | Cuyahoga Soap Company Inc. | 8-34-12 | | - | - | - | - | - | - | - | - | - | - | - | - | - | Not Needed |
| 10 WR-1 | Republic Steel Corporation | 8-35-1 | | | | 106701 | - | 17426 | - | 17426 | No | - | - | - | - | 7 | Deed Area Equals Sum of Take Areas, as per agreement. * . Total Take Area = 25935 |
| | | 8-35-2 | | | | | | 8509 | - | 8509 | - | - | - | - | - | 7 | |
| 10 WR-2 | | 521-1-1 | | | | | | 7122 | - | 7122 | - | - | - | - | - | 8 | Total Take Area = 52517 |
| | | 521-1-2 | | | | | | 11709 | - | 11709 | - | - | - | - | - | 8 | |
| | | 521-2-6 | | | | | | 13388 | - | 13388 | - | - | - | - | - | 8 | |
| | | 521-3-1 | | | | | | 20298 | - | 20298 | - | - | - | - | - | 8 & 9 | |
| 10 SL | | | | | | | | 28249 | - | 28249 | - | - | - | - | - | 8 & 9 | Slope Grading |
| 11 | C.J. Rogers Transportation Company | 521-2-5 | | 13610 | 549 | 143127 | - | 3624 | - | 3624 | No | - | - | 143127 | - | 9 | Access and Maintenance Easement |
| 11 SL-1 | | | | | | | | 2691 | - | 2691 | - | - | - | - | - | 9 | Slope Grading |
| 11 SL-2 | | | | | | | | 2411 | - | 2411 | - | - | - | - | - | 9 | Slope Grading |
| 12 SL | Helen Dechison, et al. | 521-2-3 | | 11892 | 693 | 42324 | - | 3125 | - | 3125 | No | - | - | 42324 | - | 9 | Slope Grading |
| | | | | 11892 | 694 | | | | | | | | | | | | |
| | | | | 11892 | 695 | | | | | | | | | | | | |
| 13 WD | Dimitrios Tritsorolis | 521-2-4 | | 12147 | 713 | 14560 | - | 1095 | - | 1095 | No | - | - | 13465 | - | 10 | |
| | | | | | 715 | | | | | | | | | | | | |
| 14 WD | Aluminum Company of America | 521-3-4 | | 7809 | 580 & 581 | 250590 | 12547 | 4568 | - | 4668 | No | 233375 | 10144 | - | 2403 | 9 & 10 | Deed Area as per agreement. * . |
| | | | | 13111 | 51, 52 & 53 | | | | | | | | | | | | |

Note:
All areas are in square feet.

*Note:
Cuyahoga County has entered into agreements with the owners of Parcels 8, 10, and 14 which govern the appraisals and acquisition of these Parcels. The deed areas for Parcels 8, 10, and 14 includes only that area which was agreed to be used as the before area of these Parcels for appraisal purposes.

| NAME | REVISION | DATE |
|---|---|---|
| | | |

SCALE
MADE JAS DATE 8-15-73
CHK'D DATE
CKD MEE DATE 9-30-74

HOWARD NEEDLES TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642(1) | |

139
148

4
13

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

N

WEST 13th STREET
40.00' Existing R/W
25.00' R/W
142.18'
130.00'
Sublot 11 8-28-107
Sublot 12 James R. Haffey Jr. et al. 8-28-108
Sublot 13 8-28-109
Site Grading Limits
℄ DENISON AVE.
12" PELP
4" SCLP
24"
8"
N 82° 27' 11" E
Sta. 199+04.20, 94.34' Lt.
Sta. 199+18.12 47.50' Lt.
Sta. 199+59.20 47.50' Lt.
Sta. 199+73.12 47.50' Lt.
Sta. 199+90.85 73.63' Lt.
Sta. 199+73.23 41.50' Lt.
Iron Pin in Monument Box Sta. 65+16.61 ℄ Jennings Rd.
Sta. 199+40.43 106.88' Lt.
No. 6 "C" Comb.
No. 6 "C" Branch
S 07° 31' 11" W
S 16° 40' 49" E
S 14° 09' 25" E
Subtot 14 CB=N77°36'58"W C=20.34' A=20.34'
3S 26.5 Sq. Ft.
3SL 2226 Sq. Ft.
49.00' R/W
N 06° 40' 46" W
A=42.02' C=42.02' CB=N78°50'24"W
CB=S78°22'26"E A=76.71' C=76.71' R=2130.98'
R/W
23.94'
12" Type "C" Conduit
20" PEHP M.E.L.P. & O.B.T.
Existing R/W
14" Laurel Pipe Line
AERIAL
Sta 200+71.80 47.50' Lt.
A=107.41' C=107.40' R=2130.98' CB=S73°44'05"E
R/W
5WR 10014 Sq. Ft.
BALTIMORE & OHIO R.R. TRACKS
AERIAL & R/W
A=99.79'
CB=S10°35'47"W C=95.77'
Sta 200+37.60 ℄ D-H Bridge = Sta. 66+60.73 ℄ Jennings Rd.
201
95.81'
83° 38' 21" To Local Tangent
196.89'
C.E.I. & O.B.T.
3WR 7856 Sq. Ft. Parking Area
Pier 3 Area = 495 Sq. Ft.
℄ Pier 3 Footings
Sublot 15 8-28-35 Parking Area
Pier 2 Area = 124 Sq. Ft.
151.46'
51.00'
100.00'
2WD 15698 Sq. Ft.
199
℄ Pier 1 Footings
40.00'
N 82° 27' 11" E
℄ SURVEY DENISON-HARVARD BRIDGE
197
N 06° 36' 49" W
130.00' (Local)
20.94' (Local)
R=2035.98' A=112.57' C=112.55' CB=N 78° 41' 10" W
2.48'
17.58'
Sta 198+86.67 47.50' Rt.
Sta 200+01.86 47.50' Rt.
℄ Pier 2 Footings
Existing 12" Type "C" Conduit
(C.E.I. & O.B.T.
JENNINGS ROAD
OL-83 OL-74
Sta 200+84.26 47.50' Rt.
5T 17232 Sq. Ft. 2 Story Frame
CLEVELAND CHARCOAL SUPPLY COMPANY 8-34-5
R=2035.98' CB=S73°23'48"E C=102.29' A=102.30'
R/W
S 82° 28' 49" E 40.00'
M.E.L.P. & O.B.T.
18" PE H.P. Aban.
4" Arco Pipeline
N 07° 31' 11" E
6'-6" Circ. Br.
16"
68'
40.00' R/W
40.00' Exist.
12" PELP Aban.
137.66'
N 00° 41' 19" W 59.84'
Duluth Mark on Monument Box 681.540
N 67° 05' 19" W
Northerly Existing Denison-Harvard Bridge R/W
A=199.80'
CB=S16°38'47"W C=199.63'
MATCH LINE STA. 202+00 SEE SHEET 5
END PROJECT CUY-176-12.61
BEGIN PROJECT ER-1642(1) STA. 196+72.50
1WD 35101 Sq. Ft.
Sta 198+15.17 67.82' Rt.
Site Grading Limits
Exist. Gabion Wall
209.82' Easterly 14th Street Existing R/W
WEST 14th STREET
BEGIN ACQUISITION STA. 196+53.24
℄ SURVEY
DENISON-HARVARD BRIDGE CURVE DATA
P.I. = Sta. 198+83.35
Δ = 41° 16' 51"
D = 2° 45' 00"
R = 2083.48'
L = 1501.12'
T = 784.81'
E = 142.91'
CURTISS AMBLER REALTY COMPANY SUBDIVISION
VOLUME 26 PAGE 5
William B. Pecsok 8-28-106, Block "B"
159.40'
Northerly Existing Denison-Harvard Bridge R/W
Sta 150+52.39 198.07' Rt.
Sublot 16 8-28-36
Sublot 17 8-28-37
MODERN BUILDERS SUPPLY COMPANY
OBT line to be temporarily relocated by OBT
Sublot 18 8-28-38
Laura F. Latuchie
1 Story Brick
Sublot 19 8-28-39
Sublot 20 8-28-40
Asphalt
120' PEHP
2"SCLP
6'-6" Circ. Br.
68'
40.00' R/W
40.00' Exist.
Existing 2 Story Frame
Existing Gabion Wall
20 0 20 40
SCALE IN FEET

CITY OF CLEVELAND
BROOKLYN TOWNSHIP
ORIGINIAL LOTS NUMBERS 74 & 83
TOWN 7, RANGE 12

SCALE 1"=20'
MADE JMC DATE 6-1974
TRCD DATE
CED JAG DATE 6-1974

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| NAME | REVISION | DATE |
|---|---|---|
| | | |

P/W PLAN STA. 196+53.24 TO STA. 202+00

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642(1) | |

140
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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

NOTE:
FOR DETAILS ON PARCELS 6 AERIAL-1, 6 AERIAL-2, 7 AERIAL AND 7(HIGHWAY EASEMENT), SEE SHEETS 11 AND 12.

℄ NORFOLK & WESTERN RAILWAY

Stone in Monument Box

S73°21'50"E 312.53'

No. 2 Brick Storm

102.02'

50.00'

4" PE.L.P.

3" PE.L.P.

S54°38'44"E

No. 2 Brick Storm

24"

No. 2 Brick Storm

8" Vit. Storm

985.85'

No. 2 Brick Storm

8"

24"

℄ DENISON AVE.

15" Vit. Storm

8" Vit. Storm

8" Vit. Sanitary

20.00'

20.00'

4" Drainage Pipe

℄ BALTIMORE & OHIO RAILROAD

8-34-15

50.00'

25.87'

87

LEFT RESIDUE "A"

The Harshaw Chemical Company

Sta. 205+92.66
47.50' Lt.

℄ Pier 4 Footings

R=2130.98' CB=S63°30'32"E C=211.64' A=211.72'

Sta. 205+99.67
47.50' Lt.

S60°39'45"E

R/W

256.16'

1351

AERIAL

7 AERIAL

7

8

AERIAL & R/W

Pier 5 Area = 495 sq. ft.

8WR 104669 Sq. Ft.

10.00

18' Easement as recorded, for 15" Sewer, in Volume 9058, Page 577 of the Cuyahoga County Records.

℄ SURVEY DENISON-HARVARD BRIDGE 205

P.T. Sta. 205+99.67

47.50' R/W Proposed

Pier 6 Area = 495 Sq. Ft.

26' Easement as recorded in Volume 4704, Page 560 of the Cuyahoga County Records.

207

S60°39'45"E

24' Right of Way as recorded in Volume 4364, Page 456 of the Cuyahoga County Records.

26.00'

MATCH LINE STA. 202+00 SEE SHEET 4

8-34-4

6 AERIAL-1

84.18'

R=553.69', CB=N24°33'20"W, C=19.02' & A=19.02'

℄ Pier 5 Footings

C=205.61' A=205.70'

℄ Pier 6 Footings

N60°39'45"W

1350

AERIAL

R/W

R=2035.98' CB=N63°33'25"W

Sta. 205+99.67
47.50' Rt.

1005.50'

MATCH LINE STA. 208+00 SEE SHEET 6

N33°42'28"E

6 AERIAL-2

℄ SURVEY
DENISON-HARVARD BRIDGE CURVE DATA
P.I. = Sta. 198+83.35
Δ = 41°16'51"
D = 2°45'00"
R = 2083.48'
L = 1501.12'
T = 784.81'
E = 142.91'

Concrete

15" Vit. Sanitary

Existing Access Road

Parking Area

℄ BALTIMORE & OHIO RAILROAD

8-34-3

SIDING OF CUYAHOGA SOAP COMPANY

The Harshaw Chemical Company
8-34-21

20.00'

1349

6" Laurel Pipe Line

30.00'

30.00'

CITY OF CLEVELAND
BROOKLYN TOWNSHIP
ORIGINAL LOT NUMBER 83
TOWN 7 RANGE 12

20 0 20 40
SCALE IN FEET

SCALE 1" = 20'
MADE JAG DATE 6-10-74
TRCD DATE
CRD MEE DATE 6-11-74

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| NAME | REVISION | DATE |
|---|---|---|
| | Rev. 2-20-75 | |

R/W PLAN STA. 202+00 TO STA. 208+00

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642(1) | |

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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

6
13

SIDING OF CUYAHOGA SOAP COMPANY

CUYAHOGA SOAP COMPANY

1 Story Concrete Block

The Harshaw Chemical Company 8-34-21

LEFT RESIDUE "A"

LEFT RESIDUE "B"

MATCH LINE STA. 208+00 SEE SHEET 5

MATCH LINE STA. 214+00 SEE SHEET 7

985.85'

S54°35'44"E

20.00' R/W

20.00' Existing

3" P.E.L.P.

15" Vit. Storm

8" Vit. Sanitary

℄ DENISON AVE.

24"

8"

R/W

256.16' S60°39'45"E

Sta. 208+55.82
47.50' Lt.

4.00'

N20°13'E

Sta. 212+76.78
47.50' Lt.

4.65'

S60°39'45"E 267.20'

N22°24'16"E

334.22'

S 49°49'40"E
Reference Line

47.50' R/W

47.50' Proposed

℄ SURVEY DENISON-HARVARD BRIDGE

210

212

63.30'

425.07'

32.50'

S60°39'45"E

(Pier 7 Area = 495 Sq. Ft.)

Pier 8 Area = 495 Sq. Ft.

Pier 9 Area = 430 Sq. Ft.

Pier 10 Area = 540 Sq. Ft.

8WR

Easement as recorded, for 42" Water line, in Volume 3207, Page 403 of the Cuyahoga County Records.

42"

N60°39'45"W 1005.50'

℄ Pier 7 Footings

℄ Pier 8 Footings

℄ Pier 9 Footings

℄ Pier 10 Footings

Parking Area

The Harshaw Chemical Company
8-34-21

BALTIMORE & OHIO RAILROAD TRACKS

CITY OF CLEVELAND
BROOKLYN TOWNSHIP
ORIGINAL LOT NUMBER 83
TOWN 7 RANGE 12

20 0 20 40
SCALE IN FEET

SCALE 1" = 20'
MADE JAG DATE 6-3-74
TSCD ____ DATE ____
CKD MEE DATE 6-4-74

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| NAME | REVISION | DATE |
|---|---|---|
| | | |

R/W PLAN STA 208+00 TO STA. 214+00

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642(1) | |

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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

NOTE:
FOR DETAILS ON PARCELS 6 AERIAL-3
AND 6 (HIGHWAY EASEMENT) SEE SHEET 13.

MATCH LINE STA. 214+00 SEE SHEET 6

MATCH LINE STA. 220+05 SEE SHEET 8

LEFT RESIDUE "B"

Harshaw Chemical Company
8-34-21

Republic Steel Corporation
8-35-1

8-35-2

CUYAHOGA RIVER

N14°29'39"W

℄ Pier 11 Footings

S60°39'45"E

R/W

267.20'

℄ Pier 12 Footings

S60°39'45"E

459.98'

R/W

℄ Pier 13 Footings

Sta. 220+03.96
47.50' Lt.

Pier 11 Area = 495 Sq. Ft.

Pier 12 Area = 540 Sq. Ft.

Pier 13 Area = 403 Sq. Ft.

10 WR-1
25935 Sq. Ft.

℄ SURVEY DENISON-HARVARD BRIDGE

47.50' Proposed R/W

83.97'

215

S 60°39'45"E

220

8 WR
104669 Sq. Ft.

Reference Line

S 49°49'40"E

N22°46'40"E

Sta. 216+04.29
39.88' Rt.

28.87'

N 67°12'41"W, 0.92'

334.22'

S22°47'19"W, 7.68'

℄ Aerial & R/W

N67°12'41"W

305.89'

6

AERIAL & R/W

℄ Wood Bridge

R=439.28' CB=N 89°34'13" E C=108.36' A=108.64'

AERIAL & R/W

151°16'21" To Local Tangent

Sta. 219+66.25 ℄ D & H.B.=
Sta. 18+51.82 ℄ B. & O. R.R.

18

6 Aerial-3

R/W

N60°39'45"W 1005.50'

R/W

AERIAL

AERIAL

16

℄ BALTIMORE & OHIO RAILROAD

N 67°55'18"E

PC Sta. 16+74.39

CUYAHOGA RIVER

O.L. 83

O.L. 274

CITY OF CLEVELAND
VILLAGE OF CUYAHOGA HEIGHTS

42°

32.50' Ex. R/W

32.50' R/W

℄ EXISTING DENISON-HARVARD BRIDGE

S67°25'19"E

20 0 20 40
SCALE IN FEET

BROOKLYN TOWNSHIP ORIGINAL LOT NUMBER 83 TOWN 7 RANGE 12

SCALE 1"=20'
MADE MEE DATE 5-29-74
TRCD ___ DATE ___
CED JAG DATE 5-30-74

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| NAME | REVISION | DATE |
|---|---|---|
| | | |

R/W PLAN STA. 214+00 TO STA. 220+05

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642(1) | |

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**CUYAHOGA COUNTY**
COUNTY ROAD 37
COUNTY ROAD 43

MATCH LINE STA. 224+00 SEE SHEET 9

S30°39'45"E 225.00'

10 SL
2824.9 Sq. Ft.
Site Grading Limits

Sta. 223+75.00
100.00' Lt.

N72°56'25"E 243.21'

SL 72.50'
Sta. 223+23.00
47.50' Lt.

N60°39'45"W

R/W

521-3-1

521-2-6

O.B.T.

C.J. Rogers
Transportation Company
521-2-5

℄ EXISTING DENISON-HARVARD BRIDGE

Site Grading Limits

℄ SURVEY DENISON-HARVARD BRIDGE

10 WR-2

Area = 495 Sq. Ft.

S60°39'45"E

S60°22'19"E

8" Standard Oil Pipe Lines (Abandoned)

12" Standard Oil Pipe Lines

8" Inland Corporation Pipe Line

REPUBLIC STEEL CORPORATION TRACKS
(RIVER TERMINAL RAILWAY)
Reservations as recorded in
Volume 7282 Page 552 of the
Cuyahoga County Records.

Republic Steel Corporation
521-1-2

℄ Pier 15 Footings

N61°22'19"W 63.03'

Sta. 221+20.59
47.50' Rt.

222

214.43'

E.O.G. 12" P.E.I.P.

Abandoned E.O.G. 8" H.P.

3" C.E.I. Duct

12" P.E.H.P.

E.O.G.

8"
12"
16"

47.50' Proposed

47.50' R/W

521-1-1

℄ BALTIMORE & OHIO RAILROAD

20

Pier 14 Area = 540 Sq. Ft.

32.50' Existing

32.50' R/W

724.87'

R=478.26'
CB N39°45'43"E
C=59.79'
59.83'

AERIAL R/W

10 WR-2
5251.75 Sq. Ft.

℄ Pier 14 Footings

N60°39'45"W

CUYAHOGA RIVER

VILLAGE OF CUYAHOGA HEIGHTS
CITY OF CLEVELAND

O.L. 274
O.L. 83

N43°22'26"E

B-35-2

768.25'

Sta. 220+16.03 ℄

59.51

6 AERIAL-3

NOTE:
FOR DETAILS ON PARCEL 6 AERIAL-3
SEE SHEET 13.

BROOKLYN TOWNSHIP ORIGINAL LOT NUMBER 83
TOWN 7 RANGE 12
ONE HUNDRED ACRE LOT NUMBER 274
TOWN 7 RANGE 12

20 0 20 40
SCALE IN FEET

MATCH LINE STA. 220+05 SEE SHEET 7

SCALE 1" = 20'
MADE JAG DATE 5-10-74
TRCD DATE
CKD NEE DATE 5-17-74

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| NAME | REVISION | DATE |
|---|---|---|
| | | |

R/W PLAN STA. 220+05 TO STA. 224+00

MATCH LINE STA. 228+10 SEE SHEET 10

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642(1) | |

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**CUYAHOGA COUNTY**
COUNTY ROAD 37
COUNTY ROAD 43

① R=1392.39'
CB=S66°53'36"E
C=302.24'
A=302.84'

② 40.00' Proposed R/W

Aluminum Co. of America 521-3-4

Sta. 228+09.35
95.86' Lt.

S66°17'41"W 60.36'

23.36'

SL

S13°42'19"E

Sta. 227+50.00
140.00' Lt.

50.00'

SL

S60°39'45"E

Sta. 227+00.00
140.00' Lt.

S85°27'50"E

SL

107.70'

Sta. 226+00.00
100.00' Lt.

Republic Steel Corporation
521-3-1

Sta. 227+72.21
47.50' Lt.

Sta. 227+66.57
40.00' Lt.

Sidewalk

S60°39'45"E 31.89'

R/W

15.18'

15.88'

14WD

P.C. Sta. 227+98.45

553.78'

N22°34'41"E
32.50'

5' Sidewalk

Abandoned 10" Water

Abandoned C.E.I. Ducts

18" Storm

Abandoned C.E.I. Vault

℄ 227

12" Storm

10WR-2

Site Grading Limits

R/W

447.21'

768.25'

N60°39'45"W

704.87'

℄ 225 SURVEY DENISON-HARVARD BRIDGE

550.65'

N67°22'19"W

47.50'
Proposed R/W

Pier 16 Area = 495 Sq. Ft.

S60°39'45"E

℄ Pier 16 Footings

10SL
28249 Sq. Ft.

8" Standard Oil Pipe Lines (Abandoned)

12" Standard Oil Pipe Lines

REPUBLIC STEEL CORPORATION TRACKS
(RIVER TERMINAL RAILWAY)

521-2-6

Slag Parking

Heleri Dechision, et al
521-2-3

Story Frame Shed

Sta. 227+15.97
54.24' Rt.

S88°06'25"W

SL 98.60'

Site Grading Limits

103.00'

12SL
3125 Sq. Ft.

Sta. 226+37.47
113.90' Rt.

Sta. 226+17.60
116.25' Rt.

Sta. 226+19.67
133.63' Rt.

N67°22'19"W 20.00'

SL

50.00'
N22°33'23"E

67.50'

51.06'

11SL-2
2411 Sq. Ft.

74.15'

℄ EXISTING DENISON-HARVARD BRIDGE

Sta. 224+61.00
72.61' Rt.

Sta. 225+44.64
74.55' Rt.

16.48'

54.92'

11SL-1
2691 Sq. Ft.

72.47'

Site Grading Limits

78.12'

N27°37'30"W

SL

Sta. 224+72.67
83.38' Rt.

32.50'
Existing R/W

32.50'
R/W

S62°25'19"E

S60°39'45"E

S88°07'48"W

30.00'
Existing R/W

℄ HARVARD AVE. - COUNTY ROAD 43
663.47' to Intersection of ℄ Harvard Ave. (60' R/W) and ℄ Denison-Harvard Bridge (160' R/W).

O.L. 273
O.L. 274

N01°52'12"W
30.00'

115.00'

Sta. 226+84.63
276.35' Rt.

114.74'

11
3624 Sq. Ft.

Sta. 226+71.60
284.12' Rt.

15' ACCESS AND MAINTENANCE EASEMENT

N01°52'12"W
238.21'

63.40'

44.90'

N01°52'12"W
245.03'

N01°52'12"W
190.11'

Sta. 225+99.42
136.03' Rt.

Sta. 225+73.10
121.52' Rt.

N67°22'19"W 55.18'

SL

Sta. 225+38.16
125.67' Rt.

C. J. Rogers
Transportation Company
521-2-5

VILLAGE OF CUYAHOGA HEIGHTS
ONE HUNDRED ACRE LOT NUMBER 274
TOWN 7 RANGE 12

20 0 20 40
SCALE IN FEET

SCALE 1" = 20'
MADE JAG DATE 5-13-74
TRCD DATE
CKD MEC DATE 5-14-74

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| NAME | REVISION | DATE |
|---|---|---|
| | | |

MATCH LINE STA. 224+00 SEE SHEET 8

R/W PLAN STA. 224+00 TO STA. 228+10

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642(1) | |

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CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

℄ SURVEY
DENISON-HARVARD BRIDGE CURVE DATA
P.I. = Sta. 231+98.49
Δ = 31°12'27"
D = 4°00'00"
R = 1432.39'
L = 780.19'
T = 400.03'
E = 54.81'

END ACQUISITION
END PROJECT
ER-1642(1)
STA. 231+10.00

Reservation for 10" Water Line (now abandoned) as recorded in Vol. 7809, Page 680 of the Cuyahoga County Records.

Iron Pin in Monument Box
P.T. Sta. 233+78.65

Asphalt Parking

Aluminum Company of America
521-3-4

Sta. 231+10.00
40.50' Lt.

S16°52'33"W
10.97'

Drainage System

Parking Spaces (Typical)

14 WD
4668 Sq. Ft.

R=1392.39' CB=S66°53'36"E C=302.24' A=302.84'

C.E.I.

5' Sidewalk

R/W

N67°25'19"W 153.84'

55.15'

CB=N79°23'53"W C=141.84' A=141.92'

R=1423.40'

N22°34'41"E, 2.50'

C.E.I. Anchor Pole

29.02'

9 C.E.I. Ducts

12" Storm

232

231

12" Storm

S88°07'48"W 314.43'

523.78'

425.12'

32.50' R/W

30.00' R/W

40.00' R/W

℄ SURVEY DENISON-HARVARD BRIDGE

S67°25'19"E

℄ EXISTING DENISON-HARVARD BRIDGE

℄ Drive Sta. 230+00

Sta. 230+26.26
40.00' Rt.

32.50' Existing

32.50'

N22°34'41"E
2.50'

30.00' Existing

40.00' Proposed

5' Sidewalk

S67°25'19"E
55.35'

106.21'

S67°25'19"E

1095 Sq. Ft.

4.00'

R=1472.39' C B=N66°17'29"W C=178.91' A=179.02'

R/W

O.B.T.

C.E.I.

16" P.E.L.P.

E.O.G.

24" Water

12" Water

Tangent

O.L. 274

O.L. 273

65.60'

668.47'

Proposed P.I. Sta. 231+98.49

12" Storm

N67°25'19"W
57.75'

Cleveland Regional Geodetic Survey Monument 1621.

MATCH LINE STA. 228+10 SEE SHEET 9

Sta. 228+51.93
36.98' Rt.

Sta. 229+52.10
40.00' Rt.

G. & D.
Restaurant
1 Story Brick

13 WD

R=25.00'
C.B. =S45°20'54"E
C = 18.79'
A = 19.26'

℄ Drive Sta. 229+37

Asphalt Parking

Stag Parking

Helen Dechison, et al
521-2-3

Dimitrios Tritsarolis
521-2-4

N17°03'38"E

1 Story Concrete Brick Garage

℄ HARVARD AVE. - COUNTY ROAD 43

15" Vit.

34.00' Existing

30.00' R/W

30.00' Existing

30.00' R/W

24" Water

Iron Pin in Monument Box in ℄ Harvard Ave., 0.34' Southwest of Intersection of ℄ of Existing Denison-Harvard Bridge and ℄ Harvard Ave. (Punch Mark on Flange of Box)

N

VILLAGE OF CUYAHOGA HEIGHTS
ONE HUNDRED ACRE LOT NUMBER 274
TOWN 7 RANGE 12

20 0 20 40
SCALE IN FEET

SCALE 1" = 20'
MADE JAG DATE 6-6-74
TRCD DATE
CKD MEE DATE 6-7-74

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| NAME | REVISION | DATE |
|---|---|---|
| | | |

R/W PLAN STA. 228+10 TO STA. 231+10

# BALTIMORE AND OHIO RAILROAD PLAT

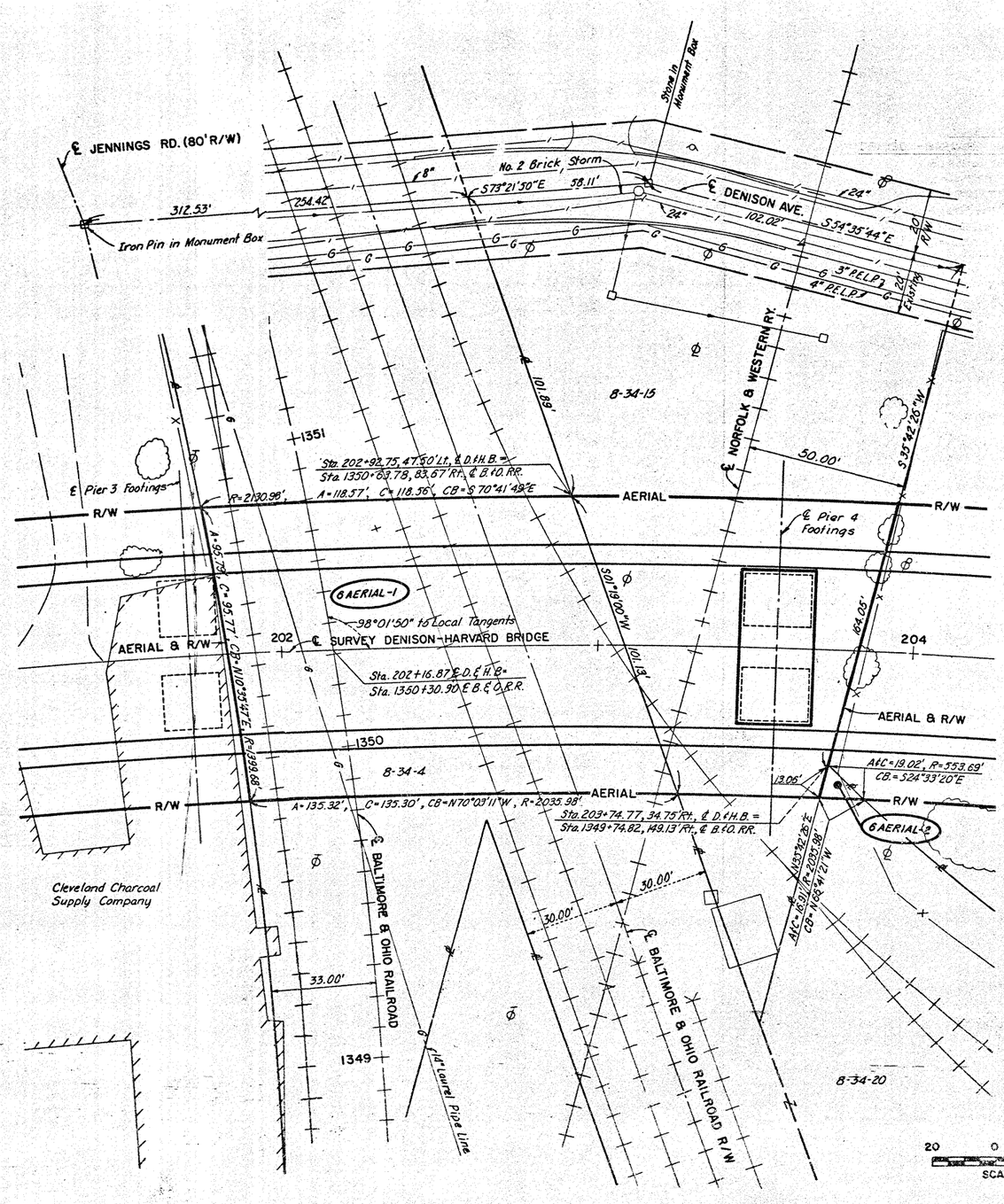
| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642(1) | |

146/148

11/13

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43

℄ SURVEY
DENISON-HARVARD BRIDGE CURVE DATA
P.I. = Sta. 198+83.35
Δ = 41°16'51"
D = 2°45'00"
R = 2083.48'
L = 1501.12'
T = 784.81'
E = 142.91'




CITY OF CLEVELAND
BROOKLYN TOWNSHIP
ORIGINAL LOT NUMBER 83
TOWN 7 RANGE 12

BALTIMORE & OHIO
RAILROAD SUMMARY

| PARCEL NUMBER | TOTAL AREA |
|---|---|
| 6 AERIAL-1 | 12006 Sq. Ft. |
| 6 AERIAL-2 | 107 Sq. Ft. |

20 0 20 40
SCALE IN FEET

SCALE 1" = 20'
MADE GFM DATE 6-12-74
TRCD DATE
CED JAG DATE 5-17-74

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| NAME | REVISION | DATE |
|---|---|---|
| | | |

BALTIMORE & OHIO RAILROAD PLAT

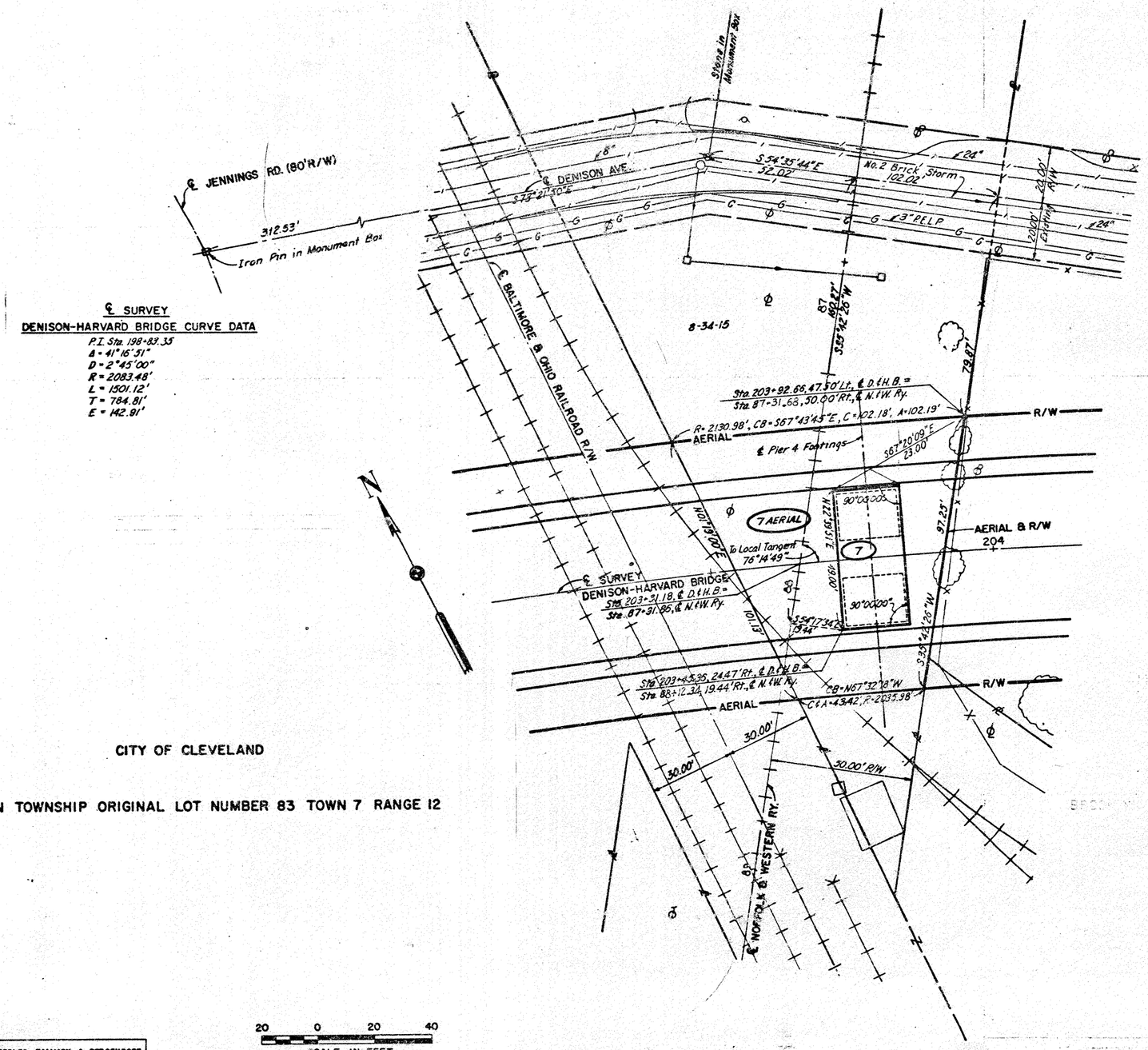
# NORFOLK AND WESTERN RAILWAY PLAT

| FED. RD. DIVISION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | ER-1642(1) | |

147 / 148

12 / 13

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




℄ SURVEY
DENISON-HARVARD BRIDGE CURVE DATA
P.I. Sta. 198+83.35
Δ = 41°16'51"
D = 2°45'00"
R = 2083.48'
L = 1501.12'
T = 784.81'
E = 142.91'

CITY OF CLEVELAND

BROOKLYN TOWNSHIP ORIGINAL LOT NUMBER 83 TOWN 7 RANGE 12

NORFOLK & WESTERN
RAILWAY SUMMARY

| PARCEL NUMBER | TOTAL AREA | HIGHWAY EASEMENT OVERLAP |
|---|---|---|
| 7 AERIAL | 6919 Sq.Ft. | 1127 Sq.Ft. |
| 7 | 1127 Sq.Ft. | |

20 0 20 40
SCALE IN FEET

SCALE 1" = 20'
MADE GFM DATE 5-3-74
TRCD — DATE
CKD JAG DATE 6-18-74

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

Rev. 2-20-75

| NAME | REVISION | DATE |
|---|---|---|
| | | |

NORFOLK & WESTERN RAILWAY PLAT

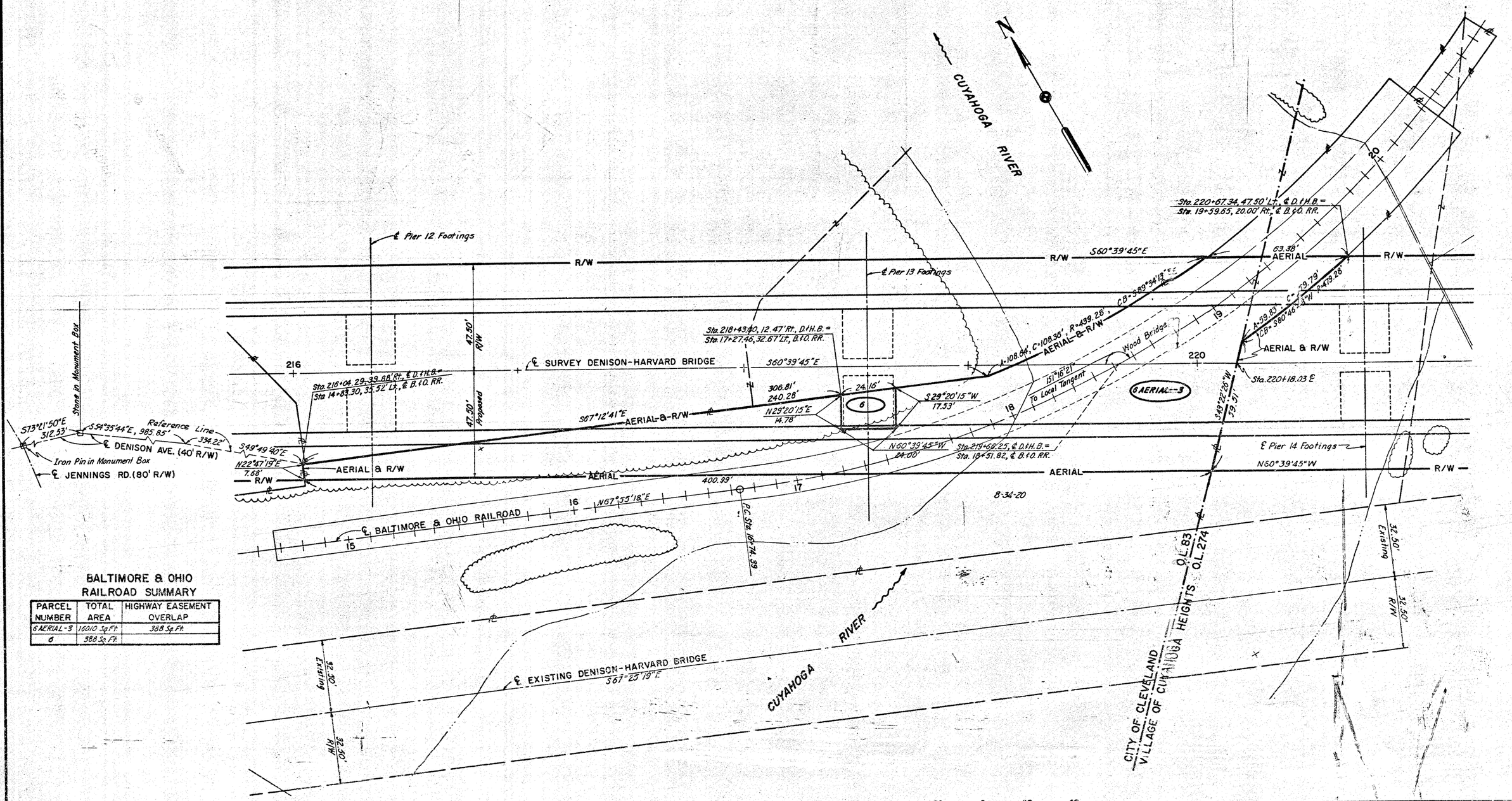
# BALTIMORE AND OHIO RAILROAD PLAT

| FED. RD. DIVISION | STATE | PROJECT | | |
|---|---|---|---|---|
| 5 | OHIO | ER-1642(1) | | |

148
148

13
13

CUYAHOGA COUNTY
COUNTY ROAD 37
COUNTY ROAD 43




## BALTIMORE & OHIO RAILROAD SUMMARY

| PARCEL NUMBER | TOTAL AREA | HIGHWAY EASEMENT OVERLAP |
|---|---|---|
| 6 AERIAL-3 | 16010 Sq. Ft. | 388 Sq. Ft. |
| 6 | 388 Sq. Ft. | |

BROOKLYN TOWNSHIP ORIGINAL LOT NUMBER 83 TOWN 7 RANGE 12
ONE HUNDRED ACRE LOT NUMBER 274 TOWN 7 RANGE 12

20 0 20 40
SCALE IN FEET

SCALE 1"=20'
MADE GFM DATE 6-7-24
TRCD. DATE
CED JAG DATE 6-8-24

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

| NAME | REVISION | DATE |
|---|---|---|
| | | |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## GENERAL INFORMATION

### INTRODUCTION

The proposed new Denison–Harvard Bridge will cross Jennings Road, the tracks of the Baltimore and Ohio Railroad, Norfolk and Western Railway, the Cuyahoga River, River Terminal Railway, and Republic Steel Corporation tracks. The project begins in the vicinity of West 13th Street at Denison Avenue in the west bluffs, and terminates in the east bluffs at Harvard Avenue, just north of the Aluminum Company of America plant.

### GEOLOGY OF THE SITE

The structure site is located between the Cuyahoga River Valley walls, in the flood plain, and over the Cuyahoga River. Man-made fill, relatively shallow valley fill (flood plain area), and deep glacially-derived soils (valley wall areas), overlie shale bedrock of Devonian Age.

### EXPLORATION

The explorations consisted of fourteen Drive-Press Sample-Core borings, and one Drive-Press Sample boring made between November 9 and 26, 1971. Two additional Drive-Press Sample borings were made June 9, 1973. Drilling and Sampling utilized conventional rotary-drive procedures consisting of 8-inch O.D. by 3.25-inch I.D. hollow stem flight augers, 2-inch O.D. by 1.375-inch I.D. split barrel sampler, 3-inch O.D. thin wall (Shelby Tube) sampler, and 2.125-inch I.D. diamond bit rock core barrel.

### INVESTIGATIONAL FINDINGS

In the west bluff area (boring DH-1 & DH-2) the soils above elevation 620± are predominantly ML – CL, silt-silty clays. Between elevations 620± and 593± the materials are predominantly CL, silty to lean clays. Hard shale bedrock was encountered at elevation 593.6± in boring DH-1, located at station 196+80, 5' Right ℄. An outcrop of shale was noted at the base of the valley wall at elevation 602.2±, 600'± Right of station 198+50.

In the westerly portion of the flood plain area (borings DH-2A through DH-8 a thin surficial layer of miscellaneous fill is underlain by soft to medium stiff CL, silty clay, and shale bedrock varying from elevations 569.0± to 561.5± at the 8 borings.

Bordering the west and east sides of the existing Cuyahoga River channel (borings DH-9 through DH-13) the surficial miscellaneous fill is underlain by loose to medium SW–SM and ML, sand, silty sand, and silt, with medium to stiff CL silty clay predominant in the borings (DH-12 & 13) adjacent to east valley wall. Shale bedrock varied in elevation from 553.3± to 564.9±.

In the east bluff area (borings DH-14 and DH-15) the surficial miscellaneous fill varies from 17 to 26± feet in thickness and is underlain by soft to very stiff CL, clay and silty clay to shale bedrock, at elevation 557.0± in boring DH-14. Boring DH-15 was terminated at elevation 592± before reaching bedrock.

Water level determinations were as follows:

| Area | Boring No. | At Drilling | Completion of Drilling | Elev./ Hrs. After Drilling |
|---|---|---|---|---|
| West Bluffs | DH-1 | Dry | Dry | 626.6±/18 |
| West Plains | DH-2A | 594.0± | 584.0± | — |
| West Plains | DH-2B | 592.1± | 585.6± | 591.6±/1.5 |
| West Plains | DH-3 | 570± | — | — |
| West Plains | DH-4 | 578.5± | — | — |
| West Plains | DH-5 | 580.2± | — | — |
| West Plains | DH-6 | 578.6± | — | — |
| West Plains | DH-7 | 577.5± | — | — |
| West Plains | DH-8 | 577.0± | — | — |
| Central Plains | DH-9 | 571.0± | — | — |
| Central Plains | DH-10 | 573.0± | 573.2± | 573.2±/24 |
| Central Plains | DH-11 | 576.7± | — | — |
| Central Plains | DH-12 | (Surface seepage – elev. 593.6±) | | |
| Central Plains | DH-13 | 586.0± | — | — |
| East Bluffs | DH-14 | 650.6± | — | — |
| East Bluffs | DH-15 | (Seepage in hole at elev. 622±) | | |

## LEGEND

### GENERAL

- Press and/or Drive Sample and/or Core Boring Location – Plan View.
- Tick to the left of Boring Log Indicates the Depth the Sample Was Taken.
- X/Y — Figures Beside the Boring Log in Profile Indicate the Number of Blows for Standard Penetration Test. X = Number of Blows for Second 6 inches. Y = Number of Blows for Third 6 inches.
- PS — Undisturbed Press Sample
- Capped Pile
- Footing
- Footing on Pile
- TR — Top of Rock
- W— Indicates Water Elevation. (Shown elsewhere this sheet)
- ▼— Indicates Static Water Elevation.

### ROCK TYPES

- Coal
- Weathered Indurated Clay
- Indurated Clay
- Weathered Shale
- Shale
- Boulders
- Weathered Sandstone
- Sandstone
- Leached Dolomite
- Dolomite
- Leached Limestone
- Limestone

## GENERAL INFORMATION

### DRIVE SAMPLE, PRESS SAMPLE AND CORE SAMPLE BORINGS

All borings were made by means of conventional rotary-drive procedures utilizing 8-inch O.D., 3.25-inch I.D. hollow stem flight augers in 5-foot sections. Samples were taken at 5 and 10-foot intervals.

Drive sample – employing a 2-inch O.D., 1.375 I.D. split barrel sampler, driven by means of a 140-pound drop-hammer with a free fall of 30-inches. The number of blows required to drive the sampler two 6-inch increments after having been seated for 6-inches, is the Standard Penetration Test. Penetration less than the required 12-inches is recorded as blows over penetration (100/6").

Press Sample – employing a 3-inch O.D., 2.875-inch I.D. thin wall (Shelby Tube type) press sampler. The sampler was advanced by continuous uniform pressures, applied by the drill rig.

Core Sample – employing a 2.875-inch O.D., 2.125-inch I.D. Double Tube Core Barrel (NX series). The Core Barrel was advanced with simultaneous water flow and continuous uniform pressure, applied by the drill rig.

Soil Classification System — ASTM D2488-66T (Visual-Manual Procedure)

R D Q (Rock Quality Designation) as indicated in logs is a modified core recovery procedure used as an Index of Rock Quality.

| RQD (%) (Rock Quality Designation) | Description of Rock Quality |
|---|---|
| 0 – 25 | Very Poor |
| 25 – 50 | Poor |
| 50 – 75 | Fair |
| 75 – 90 | Good |
| 90 – 100 | Excellent |

### PARTICLE SIZE DEFINITIONS

| Cobbles | Coarse Gravel | Fine Gravel (4.76mm, No. 4 sieve) | Coarse Sand (2.0mm, No. 10 sieve) | Medium Sand (0.42mm, No. 40 sieve) | Fine Sand (0.074mm, No. 200 sieve) | Fines |
|---|---|---|---|---|---|---|

NOTE: Subsurface information shown on this drawing was obtained solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed and it is not to be construed as part of the plans governing construction of the project.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

STRUCTURE FOUNDATION INVESTIGATION

DENISON - HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

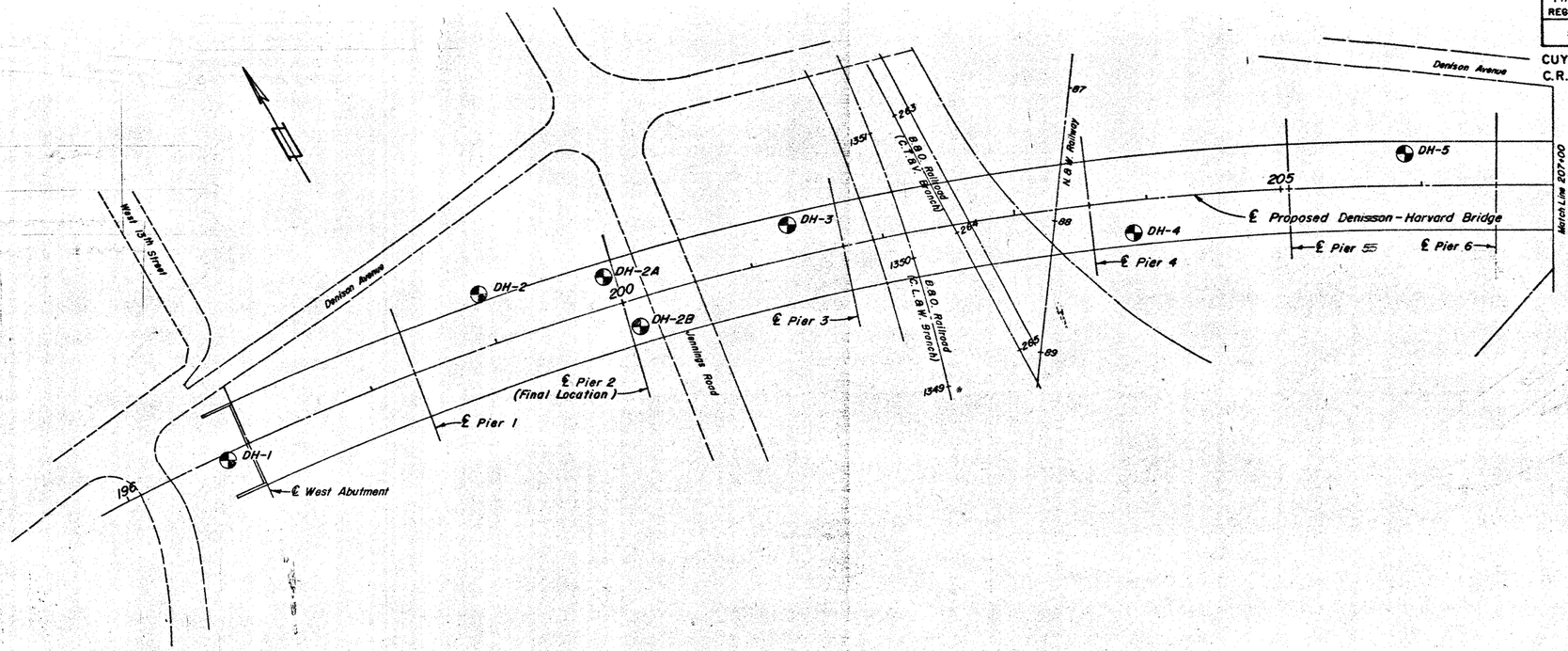
| NO. | DATE | REVISION | BY |
|---|---|---|---|
| 1 | 4-2-74 | Boring DH-2A & DH-2B added | DLP |

DRAWN C.G.L. TRACED DESIGN C.W.C. CHECKED REVISED
DATE 1-13-72 DATE 1-15-72 DATE SHEET 2 OF 3

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

2/9

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

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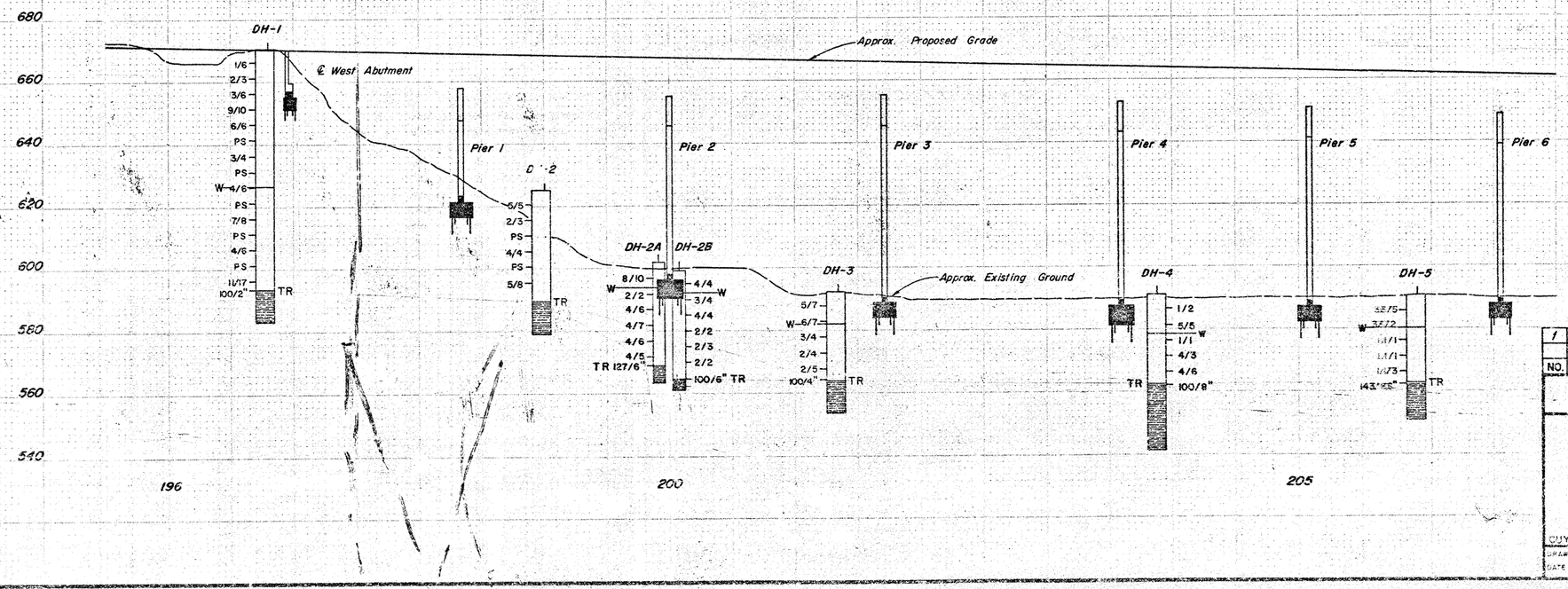
1"=20' vert.




Note: Subsurface information shown on this drawing was obtained solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed and it is not to be construed as part of the plans governing construction of the project.

| NO. | DATE | REVISION | BY |
|---|---|---|---|
| 1 | 4-2-74 | Add Borings DH-2A & DH-2B and show final substructure locations | D.L.R. |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

STRUCTURE FOUNDATION INVESTIGATION

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

DRAWN C.G.& TRACED R.D.B. DATE 1-3-72 | CHECKED C.G.J. DATE 1-13-72 | REVISED DATE | SHEET 2 / 9

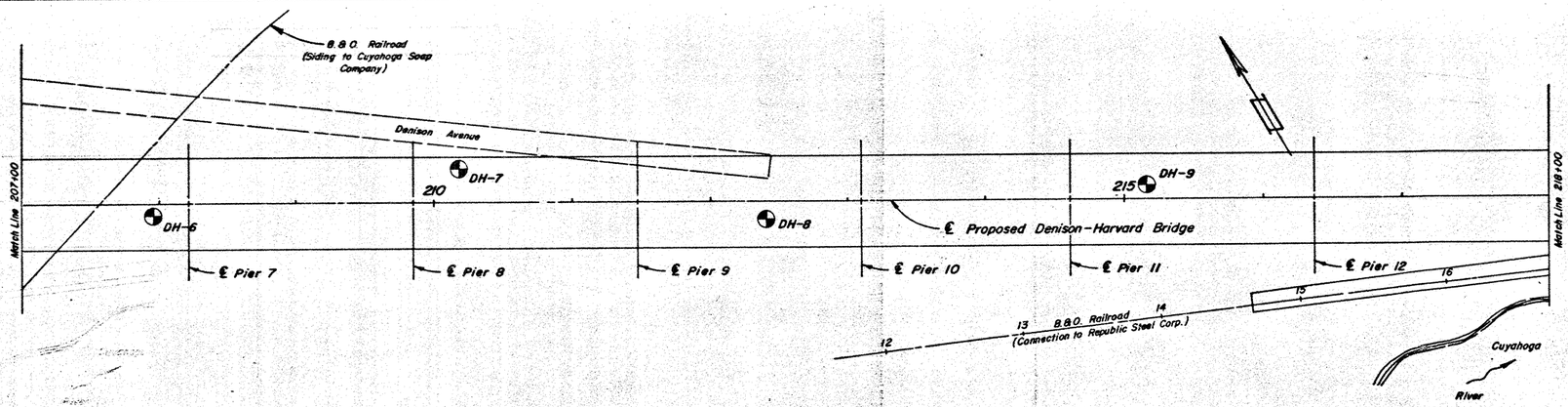
SOILS & FOUNDATION ENGINEERING SECTION
Howard, Needles, Tammen & Bergendoff
H N T B

PREPARED DATE 1-6-72 | DRAWN C.G.J. DATE 1-6-72 | CHECKED C.T.G.J. DATE 1-9-72
JOB 9686-1200

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

3/9

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

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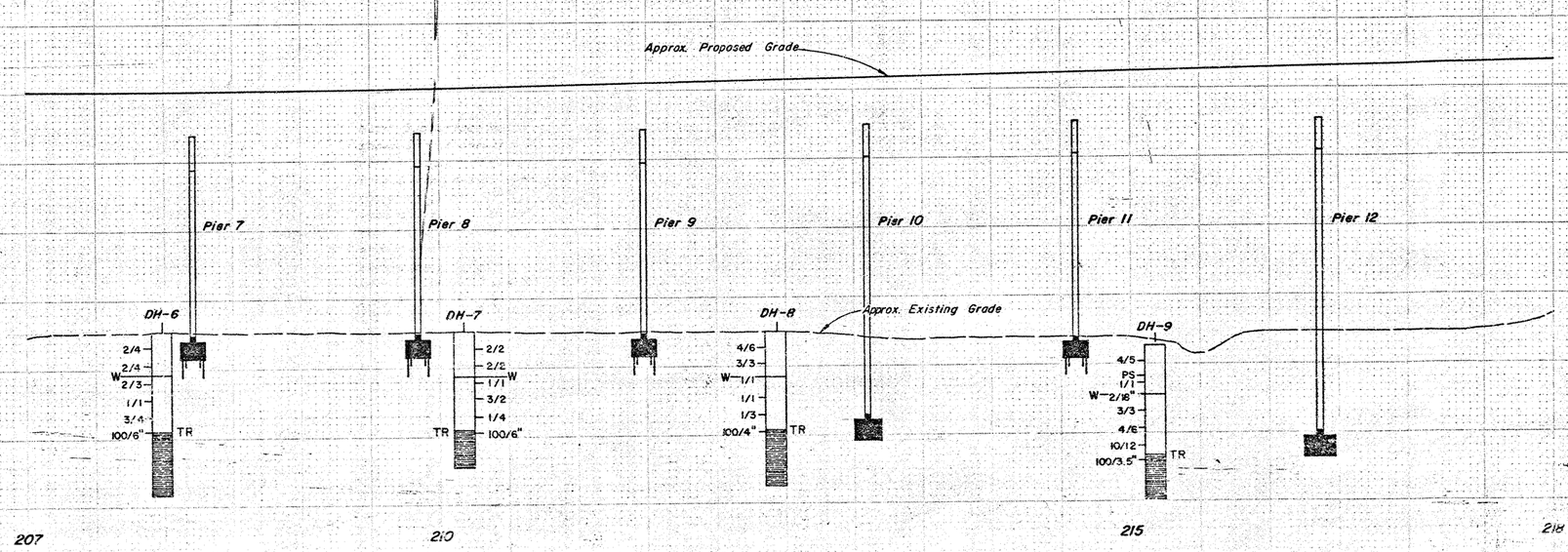
1"=20' vert.




Note: Subsurface information shown on this drawing was obtained solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed and it is not to be construed as part of the plans governing construction of the project.

| NO. | DATE | REVISION | BY |
|---|---|---|---|
| 1 | 4-2-74 | Show Final substructure locations | D.L.R |
| | | | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

STRUCTURE FOUNDATION INVESTIGATION

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

DRAWN C.G.L. / TRACED R.E.S. DATE 1-2-72
CHECKED G.G.J. / REVIEWED DATE 1-13-72
REVISED DATE
SHEET 3/9

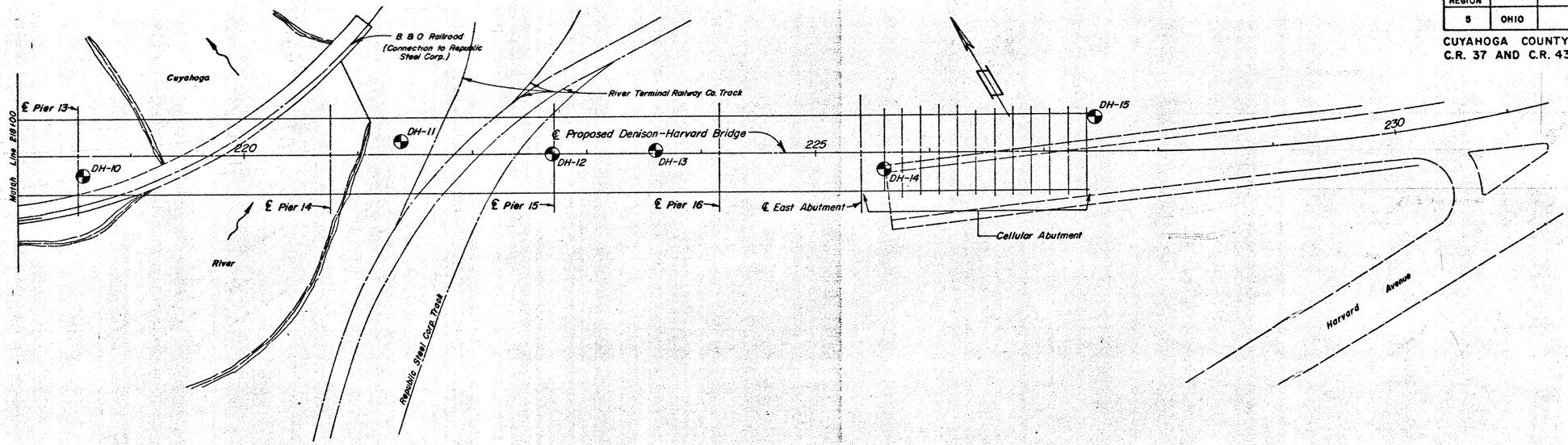
SOILS & FOUNDATION ENGINEERING SECTION
HOWARD NEEDLES TAMMEN & BERGENDOFF
INTB

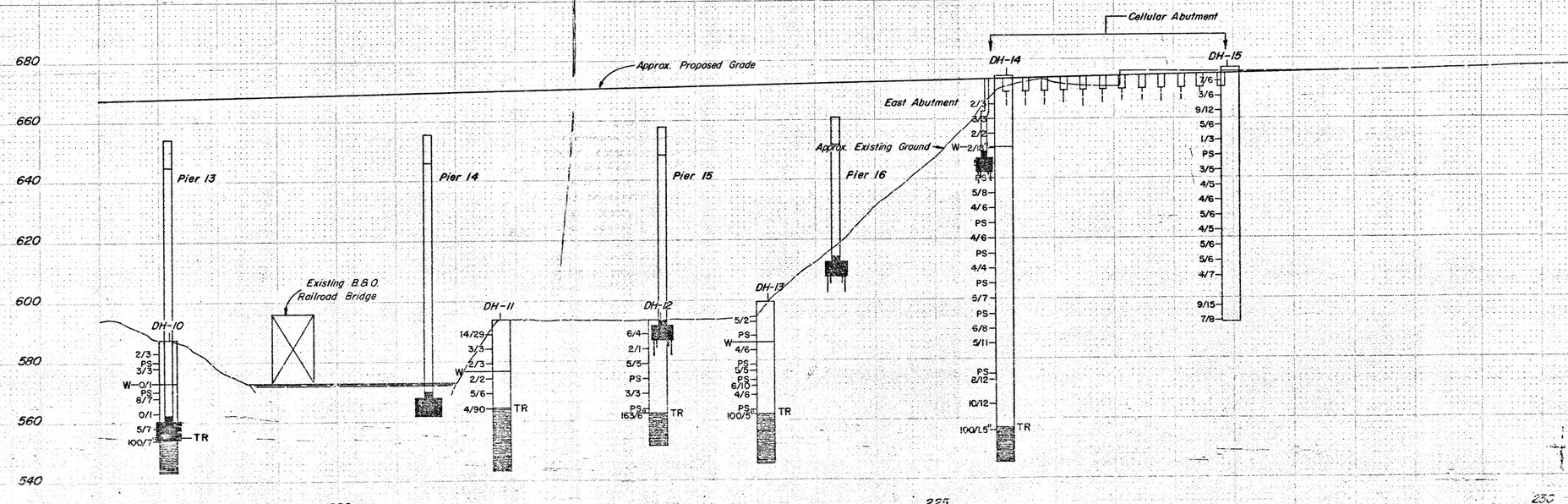
PREPARED 12/68 DATE 1-7-72 | SHEET 03
DRAWN 12/68 DATE 1-18-72 | FA 2685-1(20)
CHECKED 01/69 DATE | STA 196+97.50 TO STA 227+37.75

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

4
9

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43




Note: Subsurface information shown on this drawing was obtained solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed and it is not to be construed as part of the plans governing construction of the project.

| NO | DATE | REVISION | BY |
|---|---|---|---|
| 1 | 4-2-74 | Show final substructure locations | DLR |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

STRUCTURE FOUNDATION INVESTIGATION

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA 227+37.75

CUYAHOGA COUNTY OHIO

DRAWN RDB TRACED DATE 1-11-72 DATE | DESIGNED CJO REVIEWED DATE 1-10-72 DATE | REVISED SHEET 4/9

DRAWN RDB DATE 1-5-72
CHECKED CJO DATE 1-10-72
TRACED CFC/GDJ DATE 1-15-72

SOILS & FOUNDATION ENGINEERING SECTION
Howard Needles Tammen & Bergendoff
SHEET OF SHEETS
JOB 2605-12.00
H N T B

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

5/9

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Edward Szewcyk
ENGINEERS REP.: H. Berg
PROJECT: Denison-Harvard Bridge, Cleveland, Ohio
BORING NO.: BH-1 SHEET ___ OF ___
STATION: 196+80
OFFSET: 5' R
DATE STARTED: 11-9-71 COMPLETED: 11-10-71

GROUND WATER: Encountered During Drilling at Dry Feet; Depth at Completion of Drilling Dry Feet; Depth After 18 Hours 44.0 Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: [ ] Hand Auger; [X] Hollow Stem Auger; [ ] Continuous Flight Auger; [ ] Driving Casing; [ ] Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample 3"OD x 2.875"ID(Shelby); [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core NX 2.125"ID; [ ] Other ___; [ ] Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE INTERVAL & TYPE | SAMPLE NUMBER | SAMPLE RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS (Blows per 6 inches) 0-6" / 6-12" / 12-18" | "N" BPF | POCKET PENETROMETER (P) TONS/SQ. FT. | TORVANE (T) TONS/SQ. FT. | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | Elevation Datum MSL / ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Soil Classification System ASTM D-2488, Unified | 670.62 |
| | A | | | | | | | | Loose, Light and Dark Brown SILT, SAND, CINDERS, CEMENT, WOOD and GLASS fragments. Minor Clay. Fill. Damp. | |
| 5 | S | J-1 | 18 | 1 / 1 / 6 | 7 | | | | 6.5' | 664.12 |
| | A | | | | | | | | | |
| 10 | S | J-2 | 18 | 4 / 2 / 3 | 5 | | | (ML-CL) | Medium, Brown SILT-CLAY. Trace Sand. Moist. 12.0' | 658.12 |
| | A | | | | | | | | | |
| 15 | S | J-3 | 18 | 3 / 3 / 6 | 9 | | | (SP) | Loose, Brown Fine to Coarse SAND. Trace Gravel. Damp. 17.0' | 653.62 |
| | A | | | | | | | | | |
| 20 | S | J-4 | 6 | 5 / 9 / 10 | 19 | | | (ML) | Medium, Brown Clayey SILT. Minor Sand. Trace Sandstone fragment. Damp. 21.0' | 649.62 |
| | A | | | | | | | | | |
| 25 | S | J-5 | 18 | 4 / 6 / 6 | 12 | | | (ML) | Stiff, Gray Clayey SILT. Trace Sand. Moist. | |
| | A | | | | | | | | | |
| 30 | U | Q-6 J-7 | 24 | | | | | | 30.5' | 640.12 |
| | A | | | | | | | | | |
| 35 | S | J-8 | 14 | 3 / 3 / 4 | 7 | | | (ML-CL) | Medium to stiff, Gray SILT-CLAY with laminae of Silt, Clay and Fine Sand ranging in thickness from 1/16 inch to 2 inches irregularly spaced throughout formation. Moist. | |
| | A | | | | | | | | | |
| 40 | U | Q-9 J-10 | 24 | | | 2.0(P) 1.5(P) 1.75(T) | | | | |
| | A | | | | | | | | | |
| 45 | S | J-11 | 18 | 4 / 4 / 6 | 10 | | | | | |
| | A | | | | | | | | | |
| 50 | U | Q-12 J-13 | 24 | | | | | (ML-CL) | | |
| | A | | | | | | | | | |
| 55 | S | J-14 | 18 | 5 / 7 / 8 | 15 | | | | | |
| | A | | | | | | | | | |
| 60 | U | Q-15 J-16 | 24 | | | | | | | |
| | A | | | | | | | | | |
| 65 | S | J-17 | 16 | 4 / 4 / 6 | 10 | | | | 65.0' | 605.62 |
| | A | | | | | | | | | |
| 70 | U | Q-18 J-19 | 24 | | | 2.0(P) .95(T) | | (CL) | Stiff Gray Silty CLAY. Minor Sand. Trace Gravel. Moist. 70.5' | 600.12 |
| | A | | | | | | | | | |
| 75 | S | J-20 | 15 | 10 / 11 / 17 | 28 | 4.0(P) | | (CL) | Very stiff, Gray Silty CLAY. Trace Sand. Pocket of fine Sand 1.0 inch thick in sample. hoist. 77.0' | 593.62 |
| | S | J-21 | 2 | | | 100/2" | | | | |
| 80 | A | | | | | | | | | |
| 85 | C | C-1 | 82" | | | | | | Hard, Gray Shale. Seams of Gray Clayey Silt ½ to ¾ inch thick at depths of 80.0' and 80.5'. Moderately-weathered sections at 78.7', 82.0', and 84.0'. Recovery = 68% R.D.Q. = 40% 87.5' | 583.12 |
| | | | | | | | | | Bottom of boring. *Auger refusal at 77.5' | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Edward Szewcyk
ENGINEERS REP.: H. Berg
PROJECT: Denison-Harvard Bridge, Cleveland, Ohio
BORING NO.: BH-2 SHEET ___ OF ___
STATION: 199+00
OFFSET: 39' L
DATE STARTED: 11-12-71 COMPLETED: 11-12-71

GROUND WATER: Encountered During Drilling at Dry Feet; Depth at Completion of Drilling Dry Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: [ ] Hand Auger; [X] Hollow Stem Auger; [ ] Continuous Flight Auger; [ ] Driving Casing; [ ] Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample 3"OD x 2.875"ID(Shelby); [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core NX 2.125"ID; [ ] Other ___; [ ] Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE INTERVAL & TYPE | SAMPLE NUMBER | SAMPLE RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS (Blows per 6 inches) 0-6" / 6-12" / 12-18" | "N" BPF | POCKET PENETROMETER (P) TONS/SQ. FT. | TORVANE (T) TONS/SQ. FT. | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | Elevation Datum MSL / ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Soil Classification System ASTM D-2488, Unified | 625.00 |
| | | | | | | | | | Clay, Sand and Brick. Fill. 3.0' | 622.00 |
| 5 | S | J-1 | 18 | 5 / 5 / 5 | 10 | | | | | |
| | A | | | | | | | | | |
| 10 | S | J-2 | 18 | 1 / 2 / 3 | 5 | | | (CL) | Medium to Stiff, Brown Silty CLAY. Minor to Trace Sand. Trace Gravel. Moist. | |
| | A | | | | | | | | | |
| 15 | U | Q-3 J-4 | 18 | | | 2.25(P) 0.75(T) | | | 17.0' | 608.00 |
| | A | | | | | | | | | |
| 20 | S | J-5 | 18 | 2 / 4 / 4 | 8 | | | (CL) | Medium Gray Silty CLAY with laminae of Silt, Clay and fine Sand ranging in thickness from 1/16 inch to 2 inches irregularly spaced throughout formation. Moist. 20.0' | 605.00 |
| | A | | | | | | | | | |
| 25 | U | Q-6 J-7 | 24 | | | 2.50(P) 0.75(T) | | (CL) | | |
| | A | | | | | | | | | |
| 30 | S | J-8 | 18 | 5 / 5 / 8 | 13 | 1.75(P) | | | Stiff, Gray Silty CLAY. Minor Sand. Trace Gravel. Moist. | |
| | A | | | | | | | | | |
| 35 | U | J-9 | NR* | | | | | | 35.5' | 589.50 |
| | C | | | | | | | | Gray SHALE. Slightly-weathered section at 40.5'. Recovery = 83.3% R.D.Q. = 57.5% | |
| 40 | C | | | | | | | | | |
| 45 | | | | | | | | | 45.5' | 579.50 |
| | | | | | | | | | Bottom of boring. *No Shelby tube recovery. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Edward Szewcyk
ENGINEERS REP.: H. Berg
PROJECT: Denison-Harvard Bridge, Cleveland, Ohio
BORING NO.: DH-3 SHEET ___ OF ___
STATION: 201+34
OFFSET: 25' L
DATE STARTED: 11-11-71 COMPLETED: 11-11-71

GROUND WATER: Encountered During Drilling at 22.0 Feet; Depth at Completion of Drilling 10.2 Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: [ ] Hand Auger; [X] Hollow Stem Auger; [ ] Continuous Flight Auger; [ ] Driving Casing; [ ] Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample 3"OD x 2.875"ID(Shelby); [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core NX 2.125"ID; [ ] Other ___; [ ] Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE INTERVAL & TYPE | SAMPLE NUMBER | SAMPLE RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS (Blows per 6 inches) 0-6" / 6-12" / 12-18" | "N" BPF | POCKET PENETROMETER (P) TONS/SQ. FT. | TORVANE (T) TONS/SQ. FT. | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | Elevation Datum MSL / ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Soil Classification System ASTM D-2488, Unified | 592.18 |
| | A | | | | | | | | Black Miscellaneous Fill and Brick fragments. 3.0' | 589.18 |
| 5 | S | J-1 | 18 | 3 / 5 / 7 | 12 | 3.5(P) | | | | |
| | A | | | | | | | | | |
| 10 | S | J-2 | 16 | 4 / 6 / 7 | 13 | 3.25(P) | | (CL) | Stiff to Very Stiff, Brown and Gray Mottled to Gray Silty CLAY. Trace Sand. Moist. | |
| | A | | | | | | | | | |
| 15 | S | J-3 | 18 | 3 / 3 / 4 | 7 | 1.5(P) | | | 15.0' | 577.18 |
| | A | | | | | | | | | |
| 20 | S | J-4 | 18 | 1 / 2 / 2 | 4 | 0.75(P) | | (CL) | Soft, Gray Silty CLAY. Trace Sand with decomposed vegetation. Moist. 22.0' | 570.18 |
| | A | | | | | | | | | |
| 25 | S | J-5 | 15 | 2 / 2 / 5 | 7 | | | (SM) | Loose, Silty SAND. Trace Gravel and Clay. Fragment of Wood 3.0" long by 1-3/8" in diameter at approximate depth of 24.0'. Saturated. 27.0' | 565.18 |
| | S | J-6 | 8 | 65 / 100/4" | | | | | Hard, Gray SHALE, Minor Clay. Moist. 28.5' | 563.68 |
| 30 | C | C-1 | 21 | | | | | | | |
| 35 | C | C-2 | 33 | | | | | | Gray SHALE. Seams of Gray Clayey Silt ½" thick at depths of 32.0' and 32.3'. Moderately-weathered section at 32.5' and 38.0'. Recovery = 42.5% R.D.Q. = 5.8% 38.5' | 553.69 |
| 40 | | | | | | | | | Bottom of boring. *Auger refusal at 28.5'. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Lynn Lease
ENGINEERS REP.: H. Berg
PROJECT: Denison-Harvard Bridge, Cleveland, Ohio
BORING NO.: DH-4 SHEET ___ OF ___
STATION: 203+88
OFFSET: 25' R
DATE STARTED: 11-23-71 COMPLETED: 11-23-71

GROUND WATER: Encountered During Drilling at 12.5 Feet; Depth at Completion of Drilling ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: [ ] Hand Auger; [X] Hollow Stem Auger; [ ] Continuous Flight Auger; [ ] Driving Casing; [ ] Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample ___; [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core NX 2.125"ID; [ ] Other ___; [ ] Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE INTERVAL & TYPE | SAMPLE NUMBER | SAMPLE RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS (Blows per 6 inches) 0-6" / 6-12" / 12-18" | "N" BPF | POCKET PENETROMETER (P) TONS/SQ. FT. | TORVANE (T) TONS/SQ. FT. | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | Elevation Datum MSL / ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Soil Classification System ASTM D-2488, Unified | 591.0 |
| | A | | | | | | | | Loose Black CINDERS, SLAG, SAND and WOOD. Fill. Wet. 4.0' | 587.0 |
| 5 | S | J-1 | 18 | 2 / 1 / 2 | 3 | 1.5(P) | | | | |
| | A | | | | | | | | | |
| 10 | S | J-2 | 18 | 4 / 5 / 5 | 10 | 2.25(P) | | (CL) | Soft to Stiff, Gray to Brown and Gray Silty CLAY. Trace Sand. Thin layer of Cinders and Wood fragments at approximate depth of 14.0'. Fill. Moist. | |
| 15 | S | J-3 | 18 | 2 / 1 / 1 | 2 | 1.0(P) | | | | |
| | A | | | | | | | | 19.0' | 572.0 |
| 20 | S | J-4 | 18 | 4 / 4 / 3 | 7 | | | | | |
| | A | | | | | | | | | |
| 25 | S | J-5 | 18 | 2 / 4 / 6 | 10 | | | (CL) | Medium to Stiff, Brown to Gray Sandy CLAY, Silty, Gravelly. Shale fragments. Wet. 28.5' | 562.5 |
| 30 | S | J-6 | 8 | 100/8" | 100/8" | | | | | |
| | C | C-1 | 22 | | | | | | Gray SHALE. Laminae of Siltstone 1/16 to 1½ inches thick from 29.4 to 34.4'. Weathered sections from 48.0 to 49.4'. Recovery 37% R.D.Q. 0% Recovery 92% R.D.Q. 60% Recovery 87% R.D.Q. 40% Recovery 70% R.D.Q. 0% | |
| 35 | C | C-2 | 55 | | | | | | | |
| 40 | C | C-3 | 52 | | | | | | | |
| 45 | C | C-4 | 42 | | | | | | 49.4' | 541.6 |
| 50 | | | | | | | | | Bottom of boring. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

*Note: Subsurface information shown on this drawing was obtained solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed and it is not to be construed as part of the plans governing construction of the project.*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

STRUCTURE FOUNDATION INVESTIGATION

DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DATE 1-10-72 | DATE | DATE 1-10-72 | DATE | SHEET 5/9 |

| FHWA REGION | STATE | PROJECT | | |
|---|---|---|---|---|
| 5 | OHIO | | | |

6/9

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

EXPLORATION CONTRACTOR: HERRON TESTING LABORATORIES, INC.
LOGGED BY: L. Lease
ENGINEERS REP.:

# BORING LOG

PROJECT: DENISON-HARVARD BRIDGE
CLEVELAND, OHIO

BORING NO.: DH-2A SHEET 1 OF 1
STATION 199+93
OFFSET 22' L
DATE STARTED 6-9-73 COMPLETED 6-9-73

**GROUND WATER**
Encountered During Drilling at 8.0 Feet
Depth at Completion of Drilling 18.0 Feet
Depth After ___ Hours ___ Feet
Depth After ___ Hours ___ Feet
Depth After ___ Hours ___ Feet
Depth After ___ Hours ___ Feet

**BORING METHOD**
☐ Hand Auger
☒ Hollow Stem Auger
☐ Continuous Flight Auger
☐ Driving Casing
☐ Rotary (Mud) Drilling
___ Depth Mud Started

**SAMPLER TYPE & SIZE**
[S] Split Barrel 2" od x 1-3/8" id
[U] Undisturbed Sample ___
[A] Auger Hollow Stem 7" od x 2-3/4" id
[C] Rock Core ___
☐ Other ___
☐ Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE INTERVAL & TYPE | SAMPLE NUMBER | SAMPLE RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS (Blows per 6 inches) 0-6" / 6"-12" / 12"-18" | "N" | BPF | POCKET PENETROMETER (P) TORVANE (T) (tsf) | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | Elevation Datum USGS / ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Soil Classification System ASTM D-2488, Unified | ELEVATION 602.0' |
| | | | | | | | | | 0 - 0.2' Asphalt 0.2 - 0.8' Stone Base | |
| | A | | | | | | | | | |
| | S | J-1 | | 6 8 10 | 18 | | | — | Medium, Brown Silty Clay with Cinders, Asphalt and Slag. Fill. Moist. 5.0' | 597.0' |
| 5 | A | | | | | | | | | |
| | S | J-2 | | 5 5 6 | 11 | | | — | Medium, Brown Sand with Slag and Asphalt. Fill. Moist. 8.0' | 594.0' |
| | A | | | | | | | (SM) | | |
| 10 | S | J-3 | | 2 2 2 | 4 | | | *(ML) | Soft Layers of Brown Silty Sand, Brown Silt and Brown Silty Clay. Wet. 11.0' | 591.0' |
| | A | | | | | | | | | |
| | S | J-4 | | 2 4 5 | 9 | | | (CL) | Stiff, Brown and Gray Silty Clay. Trace Sand. Moist. | |
| 15 | A | | D | | | | | | | |
| | S | J-5 | E | 3 4 6 | 10 | | | | 18.0' | 584.0' |
| | A | | | | | | | | | |
| 20 | S | J-6 | R | 3 4 7 | 11 | | | (CL) | Stiff, Brown and Gray Laminated Silty Clay and Silt. Moist. | |
| | A | | O | | | | | | | |
| 25 | S | J-7 | C | 2 4 6 | 10 | | | | 28.0' | 574.0' |
| | A | | O | | | | | | | |
| 30 | S | J-8 | R | 2 4 5 | 9 | | | (CL) | Stiff, Gray Silty Clay. Minor Sand. Trace Shale Fragments. Moist. 33.0' | 569.0' |
| | A | | D | | | | | | | |
| 35 | S | J-9 | | 127/ 6" | 127/ 6" | | | — | Gray Shale. Moist. Auger refusal at 38.0' 38.0' | 564.0' |
| 40 | | | | | | | | *and (CL) | BOTTOM OF BORING | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

EXPLORATION CONTRACTOR: HERRON TESTING LABORATORIES, INC.
LOGGED BY: L. Lease
ENGINEERS REP.:

# BORING LOG

PROJECT: DENISON-HARVARD BRIDGE
CLEVELAND, OHIO

BORING NO.: DH-2B SHEET 1 OF 1
STATION 200+08
OFFSET 20' R
DATE STARTED 6-9-73 COMPLETED 6-9-73

**GROUND WATER**
Encountered During Drilling at 7.5 Feet
Depth at Completion of Drilling 14.0 Feet
Depth After 1.5 Hours 8.0 Feet
Depth After ___ Hours ___ Feet
Depth After ___ Hours ___ Feet
Depth After ___ Hours ___ Feet

**BORING METHOD**
☐ Hand Auger
☒ Hollow Stem Auger
☐ Continuous Flight Auger
☐ Driving Casing
☐ Rotary (Mud) Drilling
___ Depth Mud Started

**SAMPLER TYPE & SIZE**
[S] Split Barrel 2" od x 1-3/8" id
[U] Undisturbed Sample ___
[A] Auger Hollow stem 7" od x 2-3/4" id
[C] Rock Core ___
☐ Other ___
☐ Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE INTERVAL & TYPE | SAMPLE NUMBER | SAMPLE RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS (Blows per 6 inches) 0-6" / 6"-12" / 12"-18" | "N" | BPF | POCKET PENETROMETER (P) TORVANE (T) (tsf) | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | Elevation Datum USGS / ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Soil Classification System AASHTO M-145, Unified | ELEVATION 599.6' |
| | | | | | | | | | 0 - 0.2' Asphalt 0.2 - 0.9' Stone Base | |
| | A | | | | | | | | | |
| | S | J-1 | | 2 4 4 | 8 | | | (CL) | Medium, Brown and Gray Silty Clay. Trace Sand and Gravel. Fill. Moist. 5.0' | 594.6' |
| 5 | A | | | | | | | | | |
| | S | J-2 | | 1 9 13 | 22 | | | (CL) | Very Stiff Light and Dark Brown Silty Clay. Minor Sand. Trace Gravel. Fill. Moist. 7.5' | 592.1' |
| | A | | | | | | | (CL) | | |
| 10 | S | J-3 | | 1 3 4 | 7 | | | (ML) | Medium Layers of Brown Silt and Gray Silty Clay. Minor Sand. Trace Gravel. Fill. Moist. 11.0' | 588.6' |
| | A | | | | | | | | | |
| | S | J-4 | | 2 4 7 | 11 | | | (CL) | | |
| 15 | A | | D | | | | | | Stiff to Soft, Brown and Grawy Silty Clay. | |
| | S | J-5 | E | 3 4 4 | 8 | | | | Moist to Wet. | |
| | A | | | | | | | | | |
| 20 | S | J-6 | R | 1 2 2 | 4 | | | | 23.0' | 576.6' |
| | A | | O | | | | | | | |
| 25 | S | J-7 | C | 2 2 3 | 5 | | | (CL) | Medium, Gray Silty Clay. Trace Fine Sand. Moist. 28.0' | 571.6' |
| | A | | O | | | | | | | |
| 30 | S | J-8 | R | 1 2 2 | 4 | | | (CL) | Soft, Gray Silty Clay. Traces Fine Sand. Partially Decomposed Wood and Vegetation throughout Formation. Wet. 35.0' | 564.6' |
| | A | | D | | | | | | | |
| 35 | S | J-9 | | 2 2 2 | 4 | | | | | |
| | S | J-10 | | 25 100 | | | | | Gray Shale. Moist. Auger Refusal at 38.0' 38.0' | 561.6' |
| 40 | A | | | | | | | | BOTTOM OF BORING | |

*Note: Subsurface information shown on this drawing was obtained solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed and it is not to be construed as part of the plans governing construction of the project.*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

STRUCTURE FOUNDATION INVESTIGATION
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO STA. 227+37.75
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| DATE 1-10-74 | DATE | DATE | DATE | SHEET 6/9 |

| FHWA REGION | STATE | PROJECT | |
|---|---|---|---|
| 5 | OHIO | | |

7/9

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Lynn Lease
ENGINEERS REP.: R. Berg

PROJECT: Denison-Harvard Bridge, Cleveland, Ohio

BORING NO: DH-5 SHEET ___ OF ___
STATION 205+88
OFFSET 25' L
DATE STARTED 11-24-71 COMPLETED 11-24-71

GROUND WATER: Encountered During Drilling at 10.0 Feet; Depth at Completion of Drilling ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: [ ] Hand Auger; [X] Hollow Stem Auger; [ ] Continous Flight Auger; [ ] Driving Casing; [ ] Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample ___; [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core NX 2.125"ID; [ ] Other ___; [ ] Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE: INTERVAL & TYPE | SAMPLE: NUMBER | SAMPLE: RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS: (Blows per 6 inches) 0-6" / 6"-12" / 12"-18" | "N" | BPF | POCKET PENETROMETER (P) OR TORVANE (T) (tsf) | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | Elevation Datum MSL / ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Soil Classification System ASTM D-2488, Unified | 590.2 |
| | A | | | | | | | | Loose, Black and Gray Miscellaneous Fill. 3.0' | 587.2 |
| 5 | S | J-1 | 18 | 3 / 3 / 5 | 8 | | 3.75(P) | | | |
| | A | | | | | | | | | |
| 10 | S | J-2 | 18 | 3 / 3 / 2 | 5 | | 1.5(P) | (CL) | Medium, Brown and Gray Silty CLAY. Trace Sand. Moist. 14.5' | 575.7 |
| 15 | A | | | | | | | | | |
| | S | J-3 | 18 | 2 / 1 / 1 | 2 | | 2.25(P) | | | |
| 20 | A | | | | | | | | | |
| | S | J-4 | 18 | 1 / 1 / 1 | 2 | | 0.5(P) | | | |
| 25 | A | | | | | | | (CL) | Soft, Brown to Gray Silty CLAY, Sandy, Gravelly. Shale fragments. Wet. 28.0' | 562.2 |
| | S | J-5 | 18 | 1 / 1 / 3 | 4 | | 1.5(P) | | | |
| 30 | A | | | | | | | | | |
| | S | J-6 | 12 | 41 / 143 | | 143/5" | | | Gray SHALE. Laminae of Siltstone ranging in thickness from 1/16 to 2 inches irregularly spaced throughout formation. | |
| 35 | C | C-1 | 54 | | | | | | Recovery 90% R.D.Q. 55%<br>Recovery 98% R.D.Q. 33% 39.5' | 550.7 |
| | C | C-2 | 59 | | | | | | | |
| 40 | | | | | | | | | Bottom of boring. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Edward Szewcyk
ENGINEERS REP.: R. Berg

PROJECT: Denison-Harvard Bridge, Cleveland, Ohio

BORING NO: DH-7 SHEET ___ OF ___
STATION 210+18
OFFSET 25' L 4
DATE STARTED 11-22-71 COMPLETED 11-22-71

GROUND WATER: Encountered During Drilling at 13.0 Feet; Depth at Completion of Drilling ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: [ ] Hand Auger; [X] Hollow Stem Auger; [ ] Continous Flight Auger; [ ] Driving Casing; [ ] Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample ___; [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core NX 2.125"ID; [ ] Other ___; [ ] Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE: INTERVAL & TYPE | SAMPLE: NUMBER | SAMPLE: RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS: (Blows per 6 inches) 0-6" / 6"-12" / 12"-18" | "N" | BPF | POCKET PENETROMETER (P) OR TORVANE (T) (tsf) | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | Elevation Datum MSL / ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Soil Classification System ASTM D-2488, Unified | 590.5 |
| | A | | | | | | | | Crushed ROCK and BRICK. Fill. 1.0' | 589.5 |
| 5 | S | J-1 | 3 | 1 / 2 / 2 | 4 | | | | Very loose, Black CINDERS and BRICK fragments. Pill. Damp. 4.0' | 586.5 |
| | A | | | | | | | | | |
| 10 | S | J-2 | 2 | 1 / 2 / 2 | 4 | | | (CL) | Soft, Dark Brown and Gray Silty CLAY. Trace Sand. Brick fragments. Fill. Moist. 13.5' | 577.0 |
| 15 | A | | | | | | | | | |
| | S | J-3 | 18 | 1 / 1 / 1 | 2 | | 0.5(P) | | | |
| 20 | A | | | | | | | (OL) | Soft, Gray Silty CLAY. Trace Sand. Thin layers of decomposed vegetation throughout formation. Moist. 18.5' | 572.0 |
| | S | J-4 | 8 | 2 / 3 / 2 | 5 | | | | Medium, Brown and Gray Sandy CLAY, Silty, Gravelly. | |
| 25 | A | | | | | | 0.5(P) | (CL) | Siltstone fragments. Wet. 24.0' | 566.5 |
| | S | J-5 | 18 | 1 / 1 / 4 | 5 | | | | | |
| 30 | A | | | | | | | (OL) | Medium, Gray Silty CLAY. Trace Sand. Sections of decomposed vegetation in formation. Moist. 28.5' | 562.0 |
| | S | J-6 | 15 | 4 / 6/3" | 100/6" | 100/6" | | | Gray weathered SHALE with Silty Clay. | |
| 35 | C | C-1 | 48 | | | | | | Recovery 80% R.D.Q. 8% 34.8' | 555.7 |
| | C | C-2 | 48 | | | | | | Gray SHALE. Laminae of Siltstone 1/16 to 1 inch thick irregularly spaced throughout formation. Recovery 80% R.D.Q. 33% 39.8' | 550.7 |
| 40 | | | | | | | | | Bottom of boring. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Edward Szewcyk
ENGINEERS REP.: C. Bliss

PROJECT: Denison-Harvard Bridge, Cleveland, Ohio

BORING NO: DH-9 SHEET ___ OF ___
STATION 215+10
OFFSET 10' L L
DATE STARTED 11-25-71 COMPLETED 11-26-71

GROUND WATER: Encountered During Drilling at 14.3 Feet; Depth at Completion of Drilling ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: [ ] Hand Auger; [X] Hollow Stem Auger; [ ] Continous Flight Auger; [ ] Driving Casing; [ ] Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample 3"OD x 2.875"ID (Shelby); [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core NX 2.125"ID; [ ] Other ___; [ ] Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE: INTERVAL & TYPE | SAMPLE: NUMBER | SAMPLE: RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS: (Blows per 6 inches) 0-6" / 6"-12" / 12"-18" | "N" | BPF | POCKET PENETROMETER (P) OR TORVANE (T) (tsf) | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | Elevation Datum MSL / ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Soil Classification System ASTM D-2488, Unified | 585.30 |
| | A | | | | | | | | | |
| | S | J-1 | 18 | 2 / 4 / 5 | 9 | | | (CL) | Stiff, Brown Silty CLAY. Trace Sand. Moist. 4.5' | 580.80 |
| 5 | A | | | | | | | | | |
| | U | | 21 | | | | | | Very Soft to Soft, Brown Silty CLAY, Sandy. Laminae of Silt, Clay and Fine Sand ranging in thickness from 1/16 to 1 inch irregularly spaced throughout formation. Moist to wet. | |
| 10 | S | | 18 | 1 / 1 / 1 | 2 | | | (CL) | | |
| | A | | | | | | | | | |
| | S | J-5 | 18 | | 2/18" | | | | 15.0' | 570.30 |
| 15 | A | | | | | | | | | |
| | S | J-6 | 18 | 1 / 3 / 3 | 6 | | | (SW-SM) | Loose, Gray Well-Graded Silty SAND, Gravelly. Saturated. 20.0' | 565.30 |
| 20 | A | | | | | | | | | |
| | S | J-7 | 18 | 2 / 4 / 6 | 10 | | | | Stiff to Very Stiff, Gray Clayey SAND, Silty, Gravelly. Saturated to wet. | |
| 25 | A | | | | | | | (SC) | | |
| | S | J-8 | 18 | 5 / 10 / 12 | 22 | | | | 32.0' | 553.30 |
| 30 | A | | | | | | | | | |
| | S | J-9 | 9 | 65 / 100/3.5" | | 100/3.5" | | | Gray SHALE. Laminae of Siltstone ranging in thickness from 1/16 to 1 inch irregularly spaced throughout formation. Moderately weathered section at approximate depth of 39 to 39.4'. | |
| 35 | A | | | | | | | | | |
| | C | C-1 | 57 | | | | | | | |
| 40 | | | | | | | | | | |
| | C | C-2 | 60 | | | | | | Recovery 95% R.D.Q. 17%<br>Recovery 100% R.D.Q. 37% 45.0' | 540.30 |
| 45 | | | | | | | | | Bottom of boring. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc
LOGGED BY: Lynn Lease
ENGINEERS REP.: R. Berg

PROJECT: Denison-Harvard Bridge, Cleveland, Ohio

BORING NO: DH-6 SHEET ___ OF ___
STATION 207+96
OFFSET 7' R 4
DATE STARTED 11-22-71 COMPLETED 11-22-71

GROUND WATER: Encountered During Drilling at 12.0 Feet; Depth at Completion of Drilling ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: [ ] Hand Auger; [X] Hollow Stem Auger; [ ] Continous Flight Auger; [ ] Driving Casing; [ ] Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample ___; [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core NX 2.125"ID; [ ] Other ___; [ ] Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE: INTERVAL & TYPE | SAMPLE: NUMBER | SAMPLE: RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS: (Blows per 6 inches) 0-6" / 6"-12" / 12"-18" | "N" | BPF | POCKET PENETROMETER (P) OR TORVANE (T) (tsf) | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | Elevation Datum MSL / ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Soil Classification System ASTM D-2488, Unified | 590.6 |
| | A | | | | | | | | Loose, Black Miscellaneous Fill. Wet. 2.0' | 588.6 |
| 5 | S | J-1 | 18 | 2 / 2 / 4 | 6 | | 2.0(P) | | | |
| | A | | | | | | | (CL) | Medium, Brown and Gray Mottled Silty CLAY. Trace Sand. Moist. 14.0' | 576.6 |
| 10 | S | J-2 | 18 | 2 / 2 / 4 | 6 | | 1.5(P) | | | |
| 15 | A | | | | | | | | | |
| | S | J-3 | 18 | 2 / 2 / 3 | 5 | | 1.5(P) | | | |
| 20 | A | | | | | | | | | |
| | S | J-4 | 18 | 1 / 1 / 1 | 2 | | | (CL) | Soft to Medium, Gray Sandy CLAY, Silty, Gravelly. Shale and Siltstone fragments. Wet to saturated. | |
| 25 | A | | | | | | | | | |
| | S | J-5 | 18 | 2 / 3 / 4 | 7 | | | | 28.5' | 562.1 |
| 30 | A | | | | | | | | | |
| | S | J-6 | 6 | 100/6" | | 100/6" | | | Gray SHALE. Siltstone laminae 1/16 to 1 inch thick irregularly spaced throughout formation from 41.0 to 47.5'. | |
| 35 | C | C-1 | 51 | | | | | | | |
| | C | C-2 | 42 | | | | | | | |
| 40 | C | C-3 | 58 | | | | | | | |
| 45 | C | C-4 | 48 | | | | | | Recovery 85% R.D.Q. 68% Recovery 70% R.D.Q. 52%<br>Recovery 138% R.D.Q. 67% Recovery 80% R.D.Q. 26% 47.5' | 543.1 |
| 50 | | | | | | | | | Bottom of boring. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF HNTB

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Lynn Lease
ENGINEERS REP.: R. Berg

PROJECT: Denison-Harvard Bridge, Cleveland, Ohio

BORING NO: DH-8 SHEET ___ OF ___
STATION 212+40
OFFSET 13' R 4
DATE STARTED 11-19-71 COMPLETED 11-19-71

GROUND WATER: Encountered During Drilling at 13.0 Feet; Depth at Completion of Drilling ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: [ ] Hand Auger; [X] Hollow Stem Auger; [ ] Continous Flight Auger; [ ] Driving Casing; [ ] Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample ___; [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core NX 2.125"ID; [ ] Other ___; [ ] Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE: INTERVAL & TYPE | SAMPLE: NUMBER | SAMPLE: RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS: (Blows per 6 inches) 0-6" / 6"-12" / 12"-18" | "N" | BPF | POCKET PENETROMETER (P) OR TORVANE (T) (tsf) | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | Elevation Datum MSL / ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Soil Classification System ASTM D-2488, Unified | 590.0 |
| | A | | | | | | | | | |
| 5 | S | J-1 | 18 | 1 / 4 / 6 | 10 | | | (CL) | Stiff to medium, Brown and Gray Silty CLAY. Trace Sand. Layer of Silty Sand ½ inch thick at approximate depth of 9.0'. Moist. 13.5' | 576.5 |
| | A | | | | | | | | | |
| 10 | S | J-2 | 18 | 3 / 3 / 3 | 6 | | 3.25(P) | | | |
| 15 | A | | | | | | | | | |
| | S | J-3 | 18 | 1 / 1 / 1 | 2 | | 0.75(P) | (ML-CL) | Soft, Brown and Gray SILT-CLAY, Sandy. Wet. 18.5' | 571.5 |
| 20 | A | | | | | | | | | |
| | S | J-4 | 18 | 1 / 1 / 1 | 2 | | | (CL) | Soft, Brown and Gray Silty CLAY. Trace Sand. Moist. 23.5' | 566.5 |
| 25 | A | | | | | | | | | |
| | S | J-5 | 18 | 1 / 1 / 3 | 4 | | | (SC) | Soft, Brown Clayey SAND with Shale fragments. Wet. 28.5' | 561.5 |
| 30 | S | J-6 | 10 | 25 / 100/4" | | 100/4" | | | Brown and Gray to Gray SHALE. Layer of Gray Silty Clay 1 inch thick at approximate depth of 32.0'. | |
| | C | C-1 | 50 | | | | | | | |
| 35 | C | C-2 | 60 | | | | | | Recovery 83% R.D.Q. 83%<br>Recovery 100% R.D.Q. 90%<br>Recovery 100% R.D.Q. 100% | |
| 40 | | | | | | | | | | |
| | C | C-3 | 62 | | | | | | 44.4' | 545.6 |
| 45 | | | | | | | | | Bottom of boring. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF HNTB

*Note: Subsurface information shown on this drawing was obtained solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed and it is not to be construed as part of the plans governing construction of the project.*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

STRUCTURE FOUNDATION INVESTIGATION

DENISON - HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA.196+97.50 TO
STA.227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN PDJ / DATE 1-10-72 | TRACED CGL / DATE | CHECKED JTC / DATE 1-10-72 | REVIEWED GWT / DATE | REVISED / DATE | SHEET 7/9 |
|---|---|---|---|---|---|

| FHWA REGION | STATE | PROJECT | | |
|---|---|---|---|---|
| 5 | OHIO | | | |

E 9

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Lynn Lease
ENGINEERS REP.: C. Bliss
PROJECT: Denison-Harvard Bridge, Cleveland, Ohio
BORING NO: DB-10 SHEET OF
STATION 218+58
OFFSET 18' R $\mathcal{L}$
DATE STARTED 11-24-71 COMPLETED 11-26-71

GROUND WATER: Encountered During Drilling at 14.5 Feet; Depth at Completion of Drilling 14.5 Feet; Depth After 24 Hours 14.5 Feet

BORING METHOD: [X] Hollow Stem Auger

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample 3"OD x 2.875"ID(Shelby); [A] Auger Hollow Stem 8"OD x 3½"ID; [C] Rock Core NX 2.125"ID

| Depth Below Surface (Feet) | Sample Interval & Type | Sample Number | Recovery (In.) | Standard Penetration Test Results (Blows per 6 inches) 0-6" / 6"-12" / 12-18" | "N" BPF | Pocket Penetrometer (P) & Torvane (T) (tsf) | Soil Classification | Soil Description (Color, Consistency, Modifier, MATERIAL, Moisture) — Soil Classification System ASTM D-2488, Unified | Elevation Datum MSL / Elevation |
|---|---|---|---|---|---|---|---|---|---|
| | A | | | | | | | | |
| 5 | S | J-1 | 18 | 2 / 2 / 3 | 5 | | (ML) | Loose, Brown Sandy SILT. Trace Clay. Damp. | 13.5' 574.21 |
| 10 | S | J-3 | 18 | 2 / 3 / 3 | 6 | | | | |
| | U | Q-2 | 24 | | | | | | |
| | A | | | | | | | | |
| 15 | S | J-4 | 18 | 1 / 0 / 1 | 1 | | (ML) | Very Soft, Gray Clayey SILT, Sandy. Wet. | 16.5' 571.21 |
| | U | Q-5 | 24 | | | | (SW-SM) | Medium, Gray Well-Graded Silty SAND, Gravelly. Saturated. | 23.5' 564.21 |
| 20 | S | J-6 | 18 | 11 / 8 / 7 | 15 | | | | |
| | A | | | | | | | | |
| 25 | S | J-7 | 18 | 1 / 0 / 1 | 1 | | (SP-SM) | Very Loose, Gray Poorly-Graded Silty SAND. Trace Gravel. Layer of Gray Clayey Silt 1.5 inches thick at approximate depth of 24.0'. Wet. | 28.5' 559.21 |
| | A | | | | | | | | |
| 30 | S | J-8 | 18 | 4 / 5 / 7 | 12 | | (SW-SM) | Medium, Gray Well-Graded Silty SAND, Gravelly. Wet. | 32.5' 555.21 |
| | A | | | | | | | | |
| 35 | S | J-9 | 7 | 100/7" | 100/7" | | | Gray SHALE. Laminae of Siltstone ranging in thickness from 1/16 to 1 inch irregularly spaced throughout formation. | |
| | C | C-1 | 120 | | | | | | |
| 40 | | | | | | | | | |
| 45 | | | | | | | | Recovery 100% R.D.Q. 29% | 44.5' 543.21 |
| | | | | | | | | Bottom of boring. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Edward Szewcyk
ENGINEERS REP.: R. Berg
PROJECT: Denison-Harvard Bridge, Cleveland, Ohio
BORING NO: DB-11 SHEET OF
STATION 221+37
OFFSET 11' L $\mathcal{L}$
DATE STARTED 11-18-71 COMPLETED 11-19-71

GROUND WATER: Encountered During Drilling at 17.2 Feet

BORING METHOD: [X] Hollow Stem Auger

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample; [A] Auger Hollow Stem 8"OD x 3½"ID; [C] Rock Core NX 2.125"ID

| Depth Below Surface (Feet) | Sample Interval & Type | Sample Number | Recovery (In.) | Standard Penetration Test Results (Blows per 6 inches) 0-6" / 6"-12" / 12-18" | "N" BPF | Pocket Penetrometer (P) & Torvane (T) (tsf) | Soil Classification | Soil Description (Color, Consistency, Modifier, MATERIAL, Moisture) — Soil Classification System ASTM D-2488, Unified | Elevation Datum MSL / Elevation |
|---|---|---|---|---|---|---|---|---|---|
| | A | | | | | | | | |
| 5 | S | J-1 | 18 | 14 / 14 / 29 | 43 | | | Dense, Brown CINDERS and SLAG. Fill. Damp. | 6.0' 587.9 |
| | A | | | | | | (ML-CL) | Medium, Brown SILT-CLAY, Sandy. Possible Fill. Moist. | 11.5' 582.4 |
| 10 | S | J-2 | 4 | 3 / 3 / 3 | 6 | | | | |
| | A | | | | | | (SP-SM) | Very Loose to Loose, Brown Fine Silty SAND. Damp to saturated. | 20.0' 573.9 |
| 15 | S | J-3 | 18 | 2 / 2 / 3 | 5 | | | | |
| | A | | | | | | | | |
| 20 | S | J-4 | 18 | 2 / 2 / 2 | 4 | | | | |
| | A | | | | | | (SP) | Medium, Gray Medium and Fine SAND. Minor Gravel. Trace Silt. Saturated. | 29.9' 564.9 |
| 25 | S | J-5 | 18 | 4 / 5 / 6 | 11 | | | | |
| | A | | | | | | (CL) | Hard, Gray Silty CLAY with Shale fragments. Moist. | 29.5' 564.4 |
| 30 | S | J-6 | 18 | 1 / 4 / 90 | 94 | | | | |
| | C | C-1 | 12 | | | | | Gray SHALE. Highly weathered zone from approximate depth of 39.5 to 40.5'. Laminae of Siltstone ranging in thickness from 1/16 to 1 inch irregularly spaced in Shale formation from approximate depth of 47.0 to 50.5'. | |
| 35 | C | C-2 | 36 | | | | | | |
| 40 | | | | | | | | | |
| 45 | C | C-3 | 116 | | | | | Recovery 50% R.D.Q. 0% | |
| | | | | | | | | Recovery 38% R.D.Q. 0% | |
| 50 | | | | | | | | Recovery 97% R.D.Q. 40% | 50.5' 543.4 |
| | | | | | | | | Bottom of boring. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Edward Szewcyk
ENGINEERS REP.: R. Berg
PROJECT: Denison-Harvard Bridge, Cleveland, Ohio
BORING NO: DB-12 SHEET OF
STATION 222+70
OFFSET $\mathcal{L}$
DATE STARTED 11-22-71 COMPLETED 11-22-71

GROUND WATER: Encountered During Drilling at Surface Seepage Feet

BORING METHOD: [X] Hollow Stem Auger

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample 3"OD x 2.875"ID(Shelby); [A] Auger Hollow Stem 8"OD x 3½"ID; [C] Rock Core NX 2.125"ID

| Depth Below Surface (Feet) | Sample Interval & Type | Sample Number | Recovery (In.) | Standard Penetration Test Results (Blows per 6 inches) 0-6" / 6"-12" / 12-18" | "N" BPF | Pocket Penetrometer (P) & Torvane (T) (tsf) | Soil Classification | Soil Description (Color, Consistency, Modifier, MATERIAL, Moisture) — Soil Classification System ASTM D-2488, Unified | Elevation Datum MSL / Elevation |
|---|---|---|---|---|---|---|---|---|---|
| | A | | | | | | | Stiff, Dark Brown Silty CLAY with Cinders, Sand, Slag and Glass fragments. Fill. Moist. | 5.0' 588.6 |
| 5 | S | J-1 | 18 | 9 / 6 / 4 | 10 | | (CL) | Soft, Black and Gray Silty CLAY. Sea Shells. Fill. Moist. | 10.0' 583.6 |
| 10 | S | J-2 | 18 | 1 / 2 / 1 | 3 | T=0-1.5(P) | | | |
| | A | | | | | | (CL) | Stiff, Brown Silty CLAY. Trace Sand. Fill. Moist. | 15.0' 578.6 |
| 15 | S | J-3 | 18 | 2 / 5 / 5 | 10 | T=.25-2.75(P) | | | |
| | A | | | | | | | Gray Silty CLAY, Sandy with Wood, Brick and Glass fragments. Fill. Moist. | 20.5' 573.1 |
| 20 | U | J-4 | 5 | | | | | | |
| | A | | | | | | | | |
| 25 | S | J-5 | 18 | 2 / 3 / 3 | 6 | =0.5(P) | (CL) | Medium to Stiff, Gray Silty CLAY. Trace Sand. Moist. | 31.0' 562.6 |
| | A | | | | | | | | |
| 30 | U | Q-6 | 24 | | | =1.25(P) | | | |
| | A | J-7 | 10 | 4 / 63 / 163/6" | | =0.6(T) =2.5(P) | | | |
| 35 | C | C-1 | 90 | | | | | Gray SHALE. Laminae of Siltstone 1/16 to 1 inch thick irregularly spaced throughout formation. Recovery 75% R.D.Q. 14% | 42.0' 551.6 |
| 40 | | | | | | | | Bottom of boring. | |
| 45 | | | | | | | | | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

*Note: Subsurface information shown on this drawing was obtained solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed and it is not to be construed as part of the plans governing construction of the project.*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

STRUCTURE FOUNDATION INVESTIGATION
DENISON - HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 133+97.50 TO
STA. 227+37.75
CUYAHOGA COUNTY OHIO

| DRAWN | TRACED | CHECKED | REVIEWED | REVISED |
|---|---|---|---|---|
| C.S.L. | | | | |
| DATE 1-10-72 | DATE | DATE 1-10-72 | DATE | SHEET 3/9 |

| FHWA REGION | STATE | PROJECT | | |
|---|---|---|---|---|
| 5 | OHIO | | | |

9/9

CUYAHOGA COUNTY
C.R. 37 AND C.R. 43

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Edward Szewcyk
ENGINEERS REP.: R. Berg
PROJECT: Denison-Harvard Bridge, Cleveland, Ohio
BORING NO.: DH-13 SHEET ___ OF ___
STATION: 223+60
OFFSET: 15' L. ℄
DATE STARTED 11-23-71 COMPLETED 11-23-71

GROUND WATER: Encountered During Drilling at 13.5 Feet; Depth of Completion of Drilling ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: Hand Auger; [X] Hollow Stem Auger; Continuous Flight Auger; Driving Casing; Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample 3"OD x 2.875"ID(Shelby); [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core NX 2.125"ID; Other ___; Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE: INTERVAL & TYPE | SAMPLE: NUMBER | SAMPLE: RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS: 0-6" | 6-12" | 12-18" | "N" | BPF | POCKET PENETROMETER (P) or TORVANE (T) (tsf) | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | ELEVATION Datum MSL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Soil Classification System: ASTM D-2488, Unified | ELEVATION 599.5 |
| 5 | A | | | | | | | | | | Loose, Brown SAND, CINDERS, SLAG, SILT and GRAVEL. Layer of Black Clayey Silt 1 inch thick at approximate depth of 6.0'. Fill. Wet. 6.5' | 593.0 |
| 10 | S | J-1 | 18 | 6 | 5 | 2 | 7 | | | | | |
| | A | | | | | | | | | (CL) | Stiff, Gray Silty CLAY. Moist. 12.0' | 587.5 |
| | U | Q-2 J-3 | 24 | | | | | | 1.5(P) | | | |
| 15 | A | | | | | | | | 0.75(T) | | | |
| | S | J-4 | 18 | 2 | 4 | 6 | 10 | | 1.0(P) | | | |
| 20 | A | | | | | | | | 2.5(P) | | Stiff, Gray Silty CLAY with Laminae of Silt, Clay and Fine Sand ranging in thickness from 1/16 to 2 inches irregularly spaced throughout formation. Moist. | |
| | U | Q-5 J-6 | 24 | | | | | | 0.85(T) | (CL) | | |
| | S | J-7 | 18 | 3 | 5 | 5 | 10 | | 1.0(P) | | | |
| 25 | A | | | | | | | | 3.75(P) | | | |
| | U | Q-8 J-9 | 24 | | | | | | 0.55(T) | | 27.0' | 572.5 |
| | S | J-10 | 18 | 5 | 6 | 10 | 16 | | 2.25(P) | | | |
| 30 | A | | | | | | | | | | | |
| | S | J-11 | 18 | 2 | 4 | 6 | 10 | | 1.0(P) | (CL) | Stiff to Very Stiff, Gray Silty CLAY. Trace Sand and Gravel. Moist. 37.5' | 562.0 |
| 35 | A | | | | | | | | | | | |
| | U | Q-12 J-13 | 18 | | | | | | | | | |
| | S | J-14 | 17 | 4+ | 8+ | 100+ /5" | 100/4 5" | | 1.0(P) | | | |
| 40 | A | | | | | | | | | | | |
| | C | C-1 | 39 | | | | | | | | Gray SHALE. Laminae of Siltstone ranging in thickness from 1/16 to 1 inch irregularly spaced throughout formation. Weathered sections at 40 to 40.2' and 48.5 to 48.6'. | |
| 45 | C | C-2 | 57 | | | | | | | | Recovery 65% R.D.Q. 13% | |
| 50 | C | C-3 | 48 | | | | | | | | Recovery 95% R.D.Q. 28% | |
| | | | | | | | | | | | Recovery 80% R.D.Q. 38% 54.0' | 545.5 |
| 55 | | | | | | | | | | | Bottom of boring. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Edward Szewcyk
ENGINEERS REP.: R. Berg
PROJECT: Denison-Harvard Bridge, Cleveland, Ohio
BORING NO.: DH-14 SHEET ___ OF ___
STATION: 225+60
OFFSET: 15' N. ℄
DATE STARTED 11-16-71 COMPLETED 11-17-71

GROUND WATER: Encountered During Drilling at 23.9 Feet; Depth of Completion of Drilling ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: Hand Auger; [X] Hollow Stem Auger; Continuous Flight Auger; Driving Casing; Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample 3"OD x 2.875"ID(Shelby); [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core NX 2.125"ID; Other ___; Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE: INTERVAL & TYPE | SAMPLE: NUMBER | SAMPLE: RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS: 0-6" | 6-12" | 12-18" | "N" | BPF | POCKET PENETROMETER (P) or TORVANE (T) (tsf) | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | ELEVATION Datum MSL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Soil Classification System: ASTM D-2488, Unified | ELEVATION 674.50 |
| 5 | A | | | | | | | | | | Concrete Chunks and Miscellaneous Fill. 6.0' | 668.50 |
| 10 | S | J-1 | 8 | 4 | 2 | 3 | 5 | | | (SM) | | |
| | A | | | | | | | | | | Loose to very loose, Brown Silty SAND. Trace to minor Gravel. Wood and Concrete fragments. Fill. Damp to wet. | |
| 15 | S | J-2 | 12 | 2 | 3 | 3 | 6 | | | | | |
| | A | | | | | | | | | | | |
| 20 | S | J-3 | 12 | 1 | 2 | 2 | 4 | | | | | |
| | A | | | | | | | | | | 25.5' | 649.00 |
| 25 | S | J-4 | 9 | | | | | 2/18" | | | | |
| | A | | | | | | | | | | | |
| 30 | S | J-5 | 18 | 3 | 5 | 8 | 13 | | | | | |
| | A | | | | | | | | | | | |
| 35 | U | Q-6 J-7 | 24 | | | | | | 1.5-2.5 (P) .525(T) | (CL) | Stiff, Gray Silty CLAY with laminae of Silt, Clay and fine Sand ranging in thickness from 1/16 inch to 2 inches irregularly spaced throughout formation. Moist. | |
| | A | | | | | | | | | | | |
| 40 | S | J-8 | 18 | 2 | 5 | 8 | 13 | | | | | |
| | A | | | | | | | | | | | |
| 45 | S | J-9 | 18 | 2 | 4 | 6 | 10 | | .75-1.25 (P) | | | |
| | A | | | | | | | | | | | |
| 50 | U | Q-10 J-11 | 24 | | | | | | 1.75(P) 0.640.7 (T) | | | |
| | A | | | | | | | | | | | |
| 55 | S | J-12 | 18 | 3 | 4 | 6 | 10 | | 1.5(P) | (CL) | | |
| | A | | | | | | | | | | | |
| 60 | U | Q-13 J-14 | 24 | | | | | | 1.5(P) 0.75(T) | | | |
| | A | | | | | | | | | | | |
| 65 | S | J-15 | 18 | 3 | 4 | 4 | 8 | | 1.0(P) | | | |
| | A | | | | | | | | | | | |
| 70 | U | Q-16 J-17 | 24 | | | | | | 1.75(P) .75(T) | | 70.5' | 604.00 |
| | A | | | | | | | | | | | |
| 75 | S | J-18 | 18 | 4 | 5 | 7 | 12 | | | (CL) | Stiff, Gray Silty CLAY. Minor Sand. Moist. | |
| | A | | | | | | | | | | | |
| 80 | U | Q-19 J-20 | 24 | | | | | | 1.0(P) .55 .65(T) | | | |
| | A | | | | | | | | | | | |
| 85 | S | J-21 | 18 | 4 | 6 | 8 | 14 | | | | 85.0' | 589.50 |
| | A | | | | | | | | | | | |
| 90 | S | J-22 | 18 | 4 | 5 | 6 | 11 | | | | | |
| 95 | A | | | | | | | | | | | |
| 100 | U | Q-23 J-24 | | | | | | | 1.75(P) 0.9(T) | (CL) | Stiff to very stiff, Gray Silty CLAY. Trace Sand and Gravel. Moist. | |
| | S | J-25 | 13 | 6 | 8 | 12 | 20 | | 1.0(P) | | | |
| 105 | A | | | | | | | | | | | |
| 110 | S | J-26 | 18 | 6 | 10 | 12 | 22 | | 1.5(P) | | | |
| 115 | A | | | | | | | | | | 117.5' | 557.00 |
| 120 | C | C-1 | 54 | | | | | | | | Gray SHALE. Laminae of Gray Siltstone ranging in thickness from 1/16 to ½ inch from 127.0 to 129.0'. Moderately weathered zone 3 inches thick at approximate depth of 123.9'. | |
| 125 | C | C-2 | 60 | | | | | | | | Recovery 90% and 100%. R.D.Q. 80% and 90% 129.0' | 545.50 |
| 130 | | | | | | | | | | | Bottom of boring. | |

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS HNTB

## BORING LOG

EXPLORATION CONTRACTOR: Herron Testing Laboratories, Inc.
LOGGED BY: Edward Szewcyk
ENGINEERS REP.: R. Berg
PROJECT: Denison-Harvard Bridge, Cleveland, Ohio
BORING NO.: DH-15 SHEET ___ OF ___
STATION: 227+45
OFFSET: 30' L
DATE STARTED 11-15-71 COMPLETED 11-15-71

GROUND WATER: Encountered During Drilling at ▼8.0 Feet; Depth of Completion of Drilling ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet; Depth After ___ Hours ___ Feet

BORING METHOD: Hand Auger; [X] Hollow Stem Auger; Continuous Flight Auger; Driving Casing; Rotary (Mud) Drilling; ___ Depth Mud Started

SAMPLER TYPE & SIZE: [S] Split Barrel 2"OD x 1-3/8"ID; [U] Undisturbed Sample 3"OD x 2.875"ID(Shelby); [A] Auger Hollow Stem 8"OD x 3¼"ID; [C] Rock Core ___; Other ___; Other ___

| DEPTH BELOW SURFACE (FEET) | SAMPLE: INTERVAL & TYPE | SAMPLE: NUMBER | SAMPLE: RECOVERY (IN.) | STANDARD PENETRATION TEST RESULTS: 0-6" | 6-12" | 12-18" | "N" | BPF | POCKET PENETROMETER (P) or TORVANE (T) (tsf) | SOIL CLASSIFICATION | SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture) | ELEVATION Datum MSL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Soil Classification System: ASTM D-2488, Unified | ELEVATION 677.0 |
| 5 | S | J-1 | 14 | 5 | 7 | 6 | 13 | | | (SM) | Medium, Brown Silty SAND. Minor Gravel. Fill. Damp. 5.0' | 672.0 |
| 10 | S | J-2 | 14 | 2 | 3 | 6 | 9 | | | (SM) | Loose to medium, Brown Silty SAND. Trace Gravel. Damp. | |
| 15 | S | J-3 | 14 | 6 | 9 | 12 | 21 | | | | 17.0' | 660.0 |
| 20 | S | J-4 | 18 | 5 | 5 | 6 | 11 | | | (ML-CL) | Stiff Gray SILT-CLAY. Trace Sand with laminae of Silt, Clay and fine Sand ranging in thickness from 1/16 inch to 2 inches irregularly spaced throughout formation. Moist. 20.0' | 657.0 |
| 25 | S | J-5 | 17 | 2 | 1 | 3 | 4 | | (0.75(P) | | | |
| 30 | U | Q-6 J-7 | 24 | | | | | | (0.55(T) 1.5(P) | (CL) | Soft to stiff, Gray Silty CLAY. Trace Sand with laminae of Silt, Clay and fine Sand ranging in thickness from 1/16 inch to 2 inches irregularly spaced throughout formation. Moist. | |
| 35 | S | J-8 | 14 | 3 | 3 | 5 | 8 | | 1.25(P) | | | |
| 40 | S | J-9 | 18 | 3 | 4 | 5 | 9 | | 1.0(P) | | | |
| 45 | S | J-10 | 18 | 3 | 4 | 6 | 10 | | | (CL) | Soft to stiff, Gray Silty CLAY. Trace Sand with laminae of Silt, Clay and Fine Sand ranging in thickness from 1/16 inch to 2 inches irregularly spaced throughout formation. Moist. 45.0' | 632.0 |
| 50 | S | J-11 | 18 | 4 | 5 | 6 | 11 | | 1.5(P) | | | |
| 55 | S | J-12 | 18 | 4 | 4 | 5 | 9 | | | (CL) | Stiff, Gray Silty CLAY. Trace Sand. Moist. | |
| 60 | S | J-13 | 18 | 3 | 5 | 6 | 11 | | 1.5(P) | | | |
| 65 | S | J-14 | 18 | 3 | 5 | 6 | 11 | | 1.25(P) | | 65.0' | 612.0 |
| 70 | S | J-15 | 18 | 2 | 3 | 4 | 7 | | | (CL) | Medium, Gray Silty CLAY with laminae of Silt, Clay and fine Sand ranging in thickness from 1/16 inch to 2 inches irregularly spaced throughout formation. Moist. 70.0' | 607.0 |
| 75 | S | J-16 | 18 | | | | * | | | (CL) | Very stiff to stiff, Gray Silty CLAY. Minor Sand. Moist. | |
| 80 | S | J-17 | 13 | 6 | 9 | 15 | 23 | | | (CL) | | |
| | S | J-18 | 18 | 4 | 7 | 8 | 15 | | 1.5(P) | | 85.0' | 592.0 |
| | | | | | | | | | | | Bottom of boring. | |

* No blow counts recorded.

** Very slow water seepage from approximately 55.0' down through layers of moist Silt.

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*Note: Subsurface information shown on this drawing was obtained solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed and it is not to be construed as part of the plans governing construction of the project.*

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

STRUCTURE FOUNDATION INVESTIGATION
DENISON-HARVARD BRIDGE
OVER CUYAHOGA RIVER VALLEY
STA. 196+97.50 TO
STA. 227+37.75

CUYAHOGA COUNTY OHIO

| DRAWN | CHECKED | REVIEWED | REVISED |
|---|---|---|---|
| CSL DATE 1-10-72 | DATE 1-10-72 | DATE | DATE |

SHEET 9/9