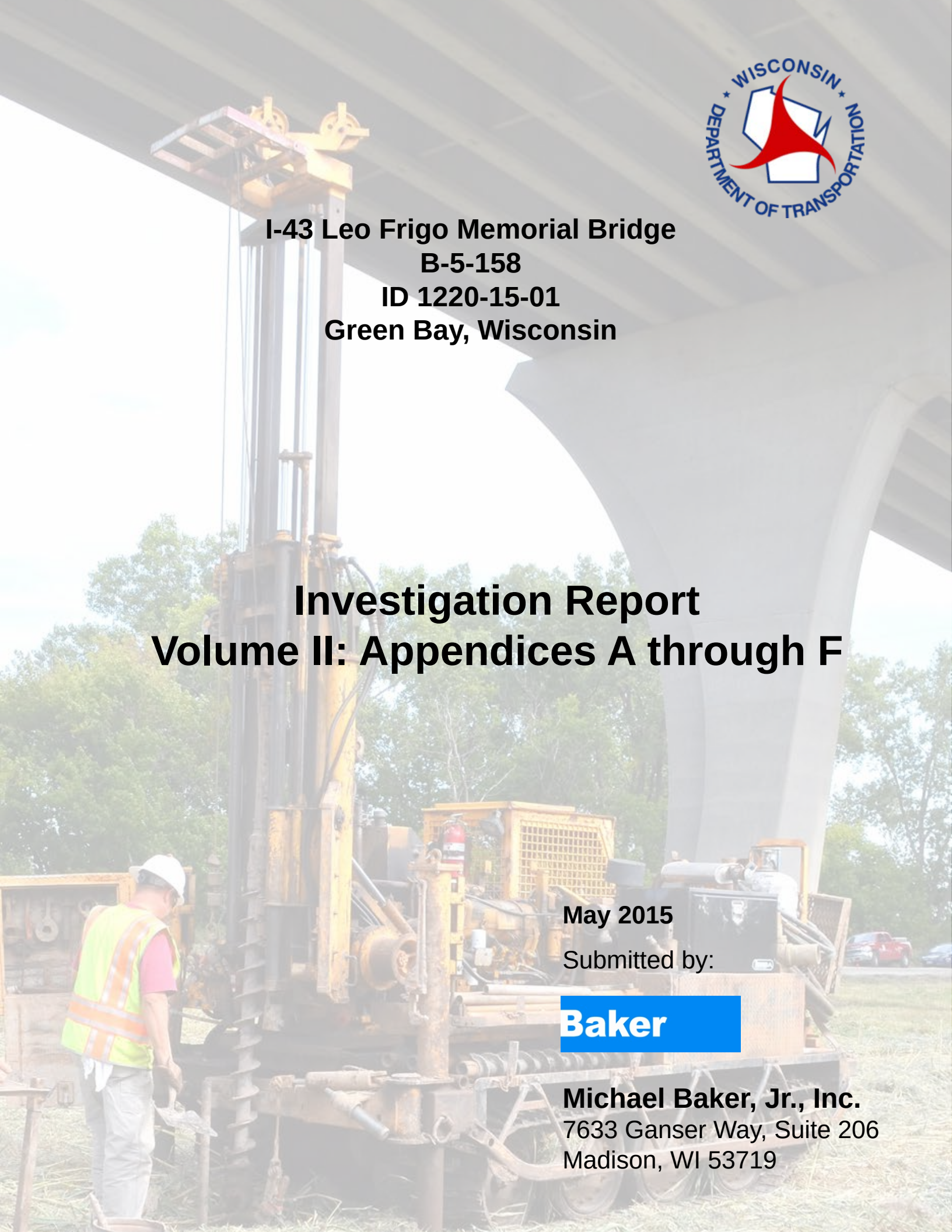


I-43 Leo Frigo Memorial Bridge
B-5-158
ID 1220-15-01
Green Bay, Wisconsin

Investigation Report
Volume II: Appendices A through F

May 2015

Submitted by:

Michael Baker, Jr., Inc.
7633 Ganser Way, Suite 206
Madison, WI 53719

Appendices

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Appendix C: 1975 WisDOT Standard Specifications Related to Piling
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Appendix E: Pile Source Data
Appendix F: Bridge Inspection Report

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Appendix H: Test Boring Logs
Appendix I: Impulse Echo Test Results
Appendix J: Laboratory Test Results for Land Piers

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Appendix A
Desktop Study of Former Land Use

Appendix A – Desktop Study of Former Land Use

Summary of Contents

Initial Background Review by TRC Environmental Corporation (TRC) A2

WDNR GEMS Groundwater Data Review by TRC A61

Initial Background Review
by
TRC Environmental Corporation (TRC)

708 Heartland Trail
Suite 3000
Madison, WI 53717

608-826-3600 PHONE
608-826-3941 FAX

www.TRCsolutions.com

October 4, 2013

Mr. Bob Pearson
Wisconsin Department of Transportation
4802 Sheboygan Avenue
Madison, WI 53707

Subject: I-43 – Leo Frigo Memorial Bridge (B-5-158), Green Bay, Wisconsin
Initial Background Review
WisDOT Project ID #1009-03-51

Dear Mr. Pearson:

The purpose of this letter is to provide Wisconsin Department of Transportation (WisDOT) with the results of the Background Review performed by TRC Environmental Corporation (TRC), for the I-43 Leo Frigo Memorial Bridge (B-5-158) project in Green Bay, Wisconsin. Included with this letter are a total of 7 figures, and a number of attachments, including: the WisDOT 1979 as-built drawings (Attachment 1); Environmental Databases (Attachment 2), including BRRTS, GIS, SHWIM, EDR, and USEPA data; historical aerial photographs and historical topographic maps (Attachment 3); and recent site photographs (Attachment 4).

Background

The I-43 bridge over the Fox River (Leo Frigo Memorial Bridge) in Green Bay has been closed since September 25, 2013 due to settlement of Pier 22, and will require repair. The WisDOT has requested TRC to:

- Review background information, bridge as-built plans, and other information supplied by the WisDOT.
- Research historic land use for the area in and around the Bridge within a reasonable distance to have an understanding of the site setting, including the presence of and depth of historic fill.
- Research possible historic fill characteristics from a desktop analysis/record search.

- Review available databases and files which may contain relevant information on historical land use and fill. The review will include the following sources:
  - WDNR Bureau for Remediation and Redevelopment Tracking System (BRRTS).
  - WDNR Bureau of Remediation and Redevelopment GIS Registry for contaminated site closures.
  - WDNR Groundwater and Environmental Management System (GEMS) database.
  - Personal contact with the WDNR to identify other relevant databases or files. TRC coordinated with the WDNR to obtain information pertaining to sites of concern from the WDNR files.
  - Query of public databases included within a standard EDR Radius Map Report with Geocheck
- Collect and review available historical information for the area. This data collection and review will include:
  - Historical WisDOT highway construction plans
  - Historical aerial photos
  - Sanborn maps, if available
  - USGS topographic maps
- Prepare a sub-regional hydrogeologic conceptual cross-section drawing to provide a regional context.
- Research and use existing data from public websites (such as USGS, WGNHS, USACE, nearby potable well logs, etc.) to make the "conceptual cross-section."
- Evaluate historic data concerning the lake level, river level, or water table fluctuation that might have time variant significance (bridge built in 1978-1979).
- Contact the US Army Corps of Engineers, City and/or County to obtain additional background information on historical land use in area. Conduct interviews/follow-up with other local people who may have additional background knowledge of the history of the area.
- Visit the site to review excavated material, and collect soil samples for Protocol B analysis for waste characterization.

- Prepare a letter-style report, including background documentation. Create basic map showing footprint of "natural" environment and "fill" environment in ROW and 200 feet beyond based on the findings from the investigation. Include cross section(s) and water level information.

WisDOT As-builts

The 1979 I-43 Tower Avenue Bridge (now called Leo Frigo Memorial Bridge) as-built plans were reviewed (Attachment 1). They include subsurface exploration information from the bridge design. Soil borings across the bridge indicate various fill materials near the surface identified as ash, sawdust, cinders, woodchips, logs, foundry sand, and paper mill waste. Depth to bedrock is also described and is discussed later in this report. The as-built drawings show the details for the concrete footings, and the number and depth to which "H" piles were driven at each pier location. Bridge soil boring locations are shown on the attached Figure 1, and the depths of borings are shown on Figure 2.

Environmental Databases

Various databases were reviewed to evaluate the near surface environmental conditions surrounding the I-43 bridge corridor and surrounding area. The review included the WDNR's BRRTS and GIS Registry site, WDNR's Solid and Hazardous Waste Information Systems (SHWIMS), the USEPA's website for Lower Fox River Superfund Site, and an Environmental Data Resources, Inc. (EDR) query (Attachment 2). A summary of the findings from these reviews follows:

WDNR BRRTS and GIS Registry

The name and location of WDNR's BRRTS and GIS Registry sites within approximately ¼-mile of the I-43 bridge corridor are shown on Figure 3. A desktop review was completed for those sites within approximately 500 feet of the bridge corridor. The results of the desktop review of environmental impacts are summarized on Figure 3, and the GIS registry files (if available on-line) are included in Attachment 2.

Most of the sites are closed sites with residual petroleum impacts to soil and groundwater. All of the sites fall outside the I-43 bridge corridor and are not likely to have caused contamination in the shallow fill and soil around the bridge piers. However, sufficient detail was not available for all of the sites to make definitive conclusions.

WDNR Solid Waste

The WDNR SHWIMS database and EDR report (Map ID 24) show Georgia-Pacific owns and operates a landfill (license #2893) near the bridge footprint on the east side of the Fox River, and historical fill associated with this property may be present within the footprint of the bridge. The landfill was previously owned by James River Paper Company, Inc. The approximate location of the existing landfill and historical fill is shown on Figures 3 and 4, previous filling operations for this landfill can be seen in the historical aerial photographs included in Attachment 3, and 3D-renderings of the bridge and landfill area are shown on Figures 5 and 6. It appears from current aerial photographs that the west portion of the landfill is closed, but that the east section is still active. The filling shown on the historical aerial photographs (Attachment 3), indicate that waste material was deposited within the bridge corridor between Piers 13 and 26 (see discussion under Historical Aerial Photographs, below). Depending on the mill processes, certain waste materials can have an acidic pH, and may contain bleaching compounds, each of which have the potential to contribute to corrosion of the piles. TRC is currently obtaining and reviewing additional information for this landfill.

USEPA Fox River Superfund Site

The I-43 bridge crosses the Fox River, and sediment in this section of the river is contained within the Lower Fox River Superfund Site, specifically Operable Unit 4B. The USEPA's website for the Lower Fox River was reviewed and relevant information regarding sediment characteristics and remedial design and status were downloaded from Remedial Design Reports available on-line. The downloaded items are included in Attachment 2, and include: (1) a map of the extent of the Superfund site, (2) maps of the sediment sample locations and sampling results for PCBs near the bridge, (3) maps showing extent of proposed dredging and capping near the bridge, and (4) proposed schedule for the sediment remediation.

The sediment near the bridge contains PCBs at concentrations less than 4 ppm (i.e. this material is not TSCA waste, but would need to be managed as a solid waste if removed). The remedial design for this area calls for dredging and capping, and remediation is anticipated to start in this area in 2015.

EDR

The EDR report identified the bridge location on a number of environmental databases as well as a number of sites in the surrounding area. The EDR Report is included in Attachment 2. The significant database listings that were provided in the EDR report

were previously discussed in this section, i.e., the EDR database search did not identify additional sites beyond those found during the BRRTS, SHWIMS, or USEPA reviews discussed above.

Historical Aerial Photographs

Historical aerial photographs were obtained from various sources and plotted with the bridge overlaid (Attachment 3). Based on a review of aerial photographs over time it appears that filling of the area started between 1938 and 1951, and covered much of the footprint of the pier-supported bridge east of the Fox River – including Piers 13 through 26, which appear to contain between 4 and 10 feet of waste fill materials. Based on a review of the 'as-built' boring logs the piers east of Pier 13 show evidence of soil and other non-waste fill associated with construction, and only traces of anthropomorphic fill, such as ash. Only Piers 40 and 51 west of the Fox River indicate the presence of cinders or wood, and in general just show wetland materials as would be expected in this area. It appears from the photographs that filling around the bridge area ended sometime prior to the beginning of construction. Aerial photographs from 1981 and later show the presence of a constructed landfill south of the newly constructed bridge. A historical map from 1853 is shown as Figure 7, and historical USGS maps of the area are contained in Attachment 3.

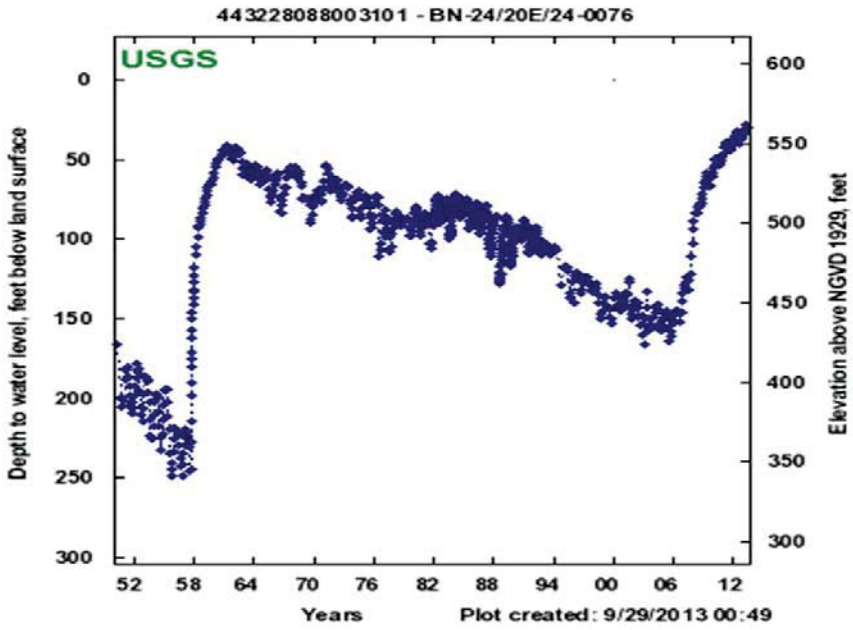
Hydrogeologic Evaluation

Attached is Figure 2 illustrating the geologic cross section at the Leo Frigo Memorial bridge. The shallow borings information (i.e. from the ground surface to the top of bedrock) was taken from the bridge as-built drawings. The deeper bedrock geology is derived from an open file report prepared by Luczaj and Hart, 2009, UW Extension Open File Report 2009-04.

The top of bedrock is the Galena Formation, Member of the Sinnipee Group, which is a dolomite formation, containing interbedded green shaly intervals, especially near the base of the unit (Luczaj, 2008). In this area the Galena Formation is approximately 150 feet thick. On a regional scale, the Galena formation along with the overlying unconsolidated clay unit tends to act as a confining unit (Eaton, 2001) for the underlying more permeable sandstone of the Ancell Group.

In response to the change from using groundwater to surface water by eight municipalities in Brown County, water levels in the deep sandstone aquifer have risen over 100 feet in the last 10 years. The following figure shows the rise in groundwater

elevation in the sandstone aquifer at USGS well BN-24/20E/24-0076, which is located approximately 2,000 feet north of the bridge. The water level recovery events of 1957 and 2007 correspond to the City of Green Bay switching to surface water in 1957, and the remaining area municipalities switching to surface water in 2007.



The attached geologic cross section also shows the increase in water levels in the sandstone aquifer since 2004. The rise in the groundwater level in the bedrock aquifer is decreasing the strength of the downward gradient through the overlying Sinnipee Formation and the overlying clay unit. The rising potentiometric surface has likely caused an increase in the pore pressure of the clay and a potential decrease in the shear strength of the clay.

Excavation Management

On October 1, 2013, TRC visited the bridge, specifically east of the Fox River near pier 22. Photographs are included in Attachment 4. TRC observed materials that had recently been excavated around the piers in that area. The fill material contained ash mixed in

with topsoil and organic material. These observations were consistent with the previous soil borings for the bridge design as well as historic filling identified in the area. A composite sample of the fill material was submitted to a laboratory for TCLP waste characterization analysis. The preliminary results show a neutral pH of 7.6 (other results were not available by the date of this report and will be transmitted separately).

If you have any questions, please feel free to contact Daniel Haak at 608-826-3628, or Jim Morse at (608) 826-3692.

Sincerely,

TRC Environmental Corporation

Daniel Haak, P.E.
Project Manager

James E. Morse
Senior Client Service Manager

cc: Bruce Enke – WisDOT (hard copy and pdf on CD)
Tom Buchholz – WisDOT (hard copy and pdf on CD)
Kathie VanPrice – WisDOT (hard copy and pdf on CD)
Dan Scudder – WisDOT (hard copy and pdf on CD)
Shar TeBeest – WisDOT (hard copy and pdf on CD)

List of Figures

Figure 1	Bridge Layout-Boring Locations & Historic Waterways
Figure 2	Conceptual Geological Cross Section With Historic Potentiometric Surfaces
Figure 3	Environmental Site Locations
Figure 4	Approximate Limits of Historic Fill Near Bridge
Figure 5	3D Rendering-NE Orientation
Figure 6	3D Rendering-SE Orientation
Figure 7	Historic Map of Green Bay 1853-Current Leo Frigo Bridge Overlaid

List of Attachments

Attachment 1	WisDOT As-builts
Attachment 2	Environmental Databases
Attachment 3	Historical Aerial Photographs & Historical Topographic Maps
Attachment 4	Photographs

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References

Eaton, Timothy T., D.A. Hart, K. Bradberry, H. Wang. 2001. *Hydraulic conductivity and specific storage of the Maquoketa shale.* University of Wisconsin Water Resources Institute.

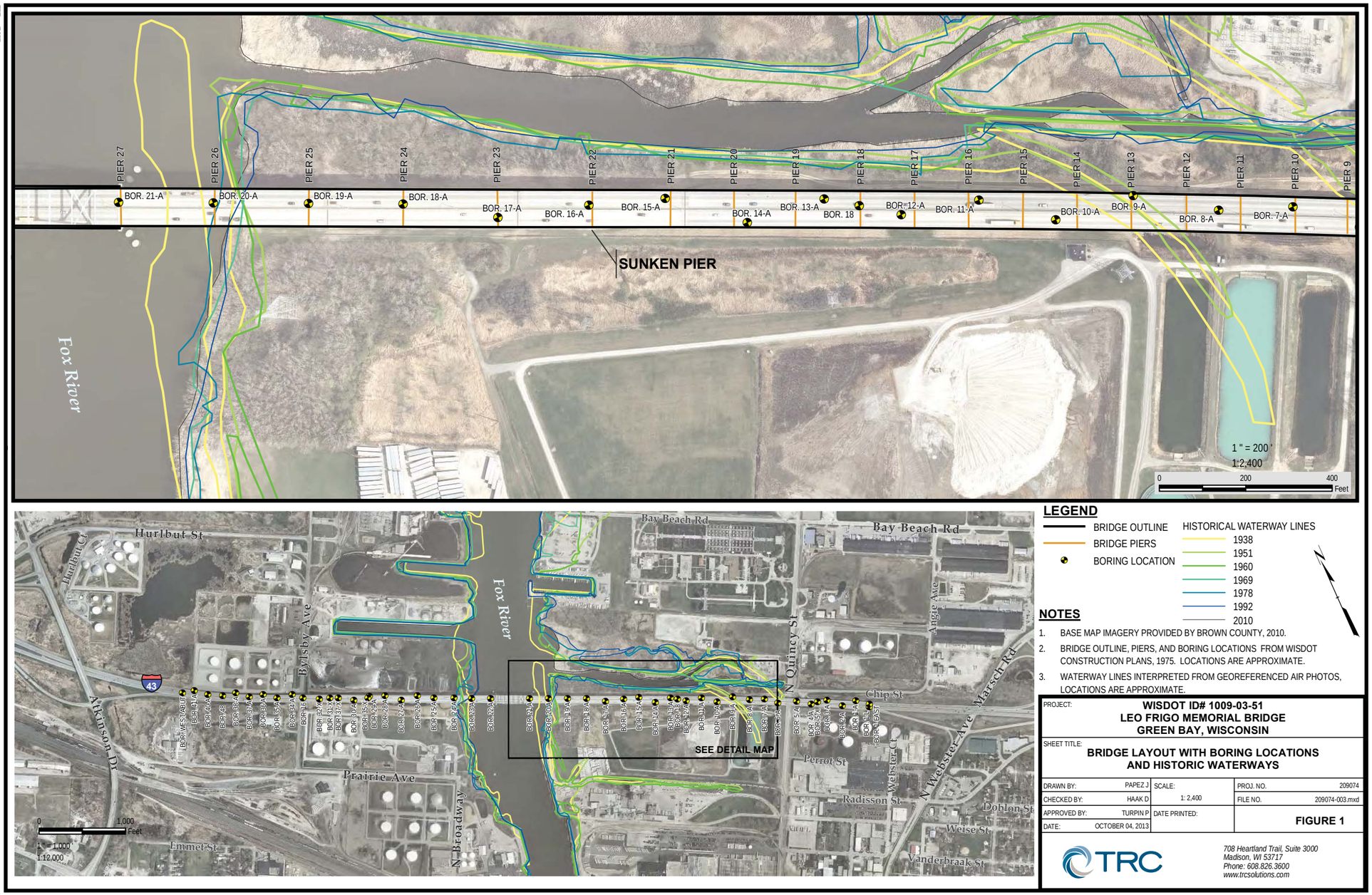
Luczaj, J.A. 2008. Preliminary Geologic Map of the Buried Bedrock Surface, Brown County, Wisconsin. Wisconsin Geological and Natural History Survey, Open File Report 2011-2, 1:100,000 Scale Map Sheet.

Luczaj, J.A., D.A. Hart. 2009. Drawdown in the Northeast Groundwater Management Area (Brown, Outagamie, and Calumet Counties, WI). Final Project Report submitted to the Wisconsin Department of Natural Resources on July 3, 2009; 59 pages.

TRC - GIS

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Map Rotation: 24Degrees

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LEGEND

- BRIDGE OUTLINE
- BRIDGE PIERS
- BORING LOCATION

HISTORICAL WATERWAY LINES
- 1938
- 1951
- 1960
- 1969
- 1978
- 1992
- 2010

NOTES

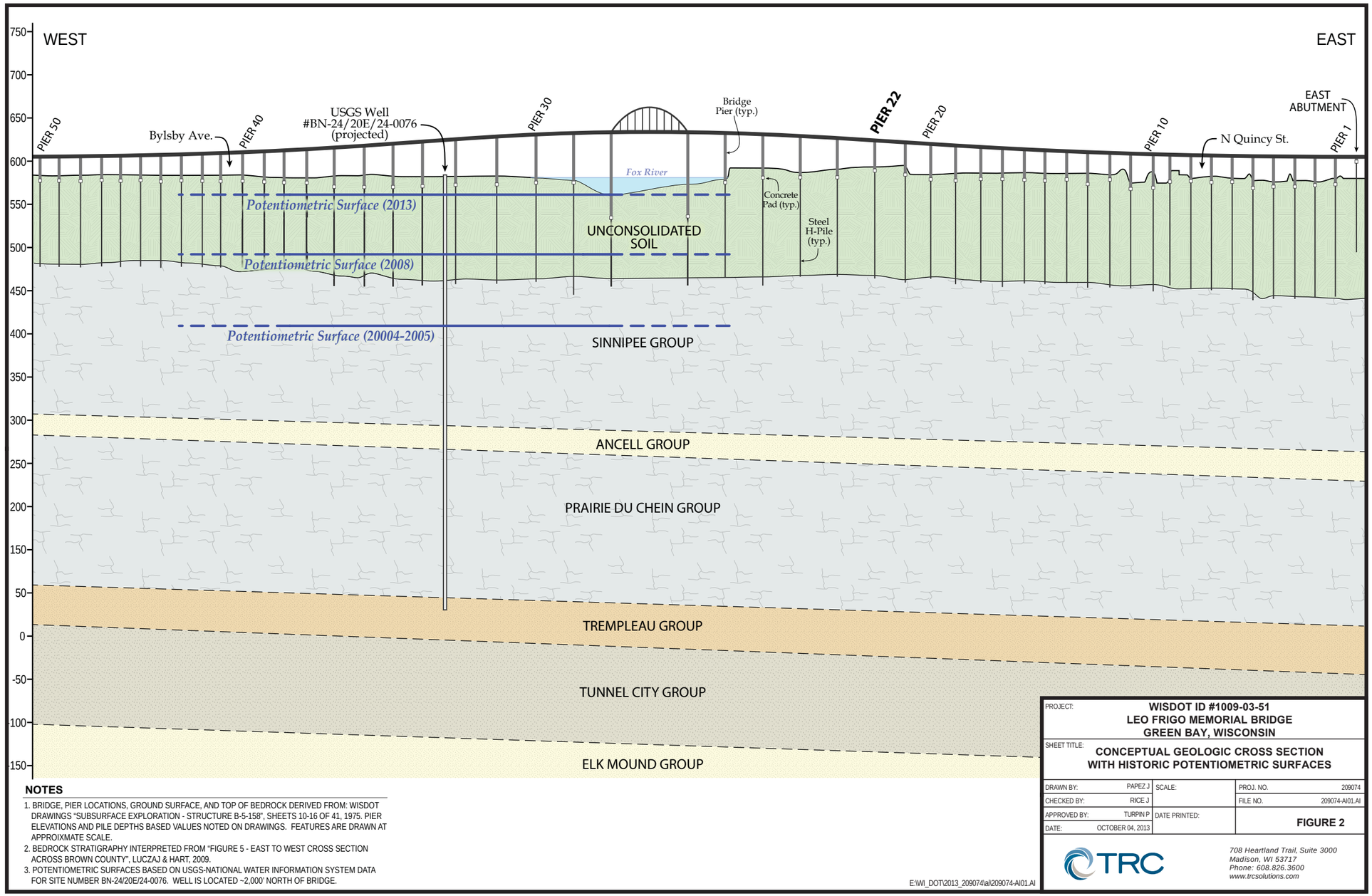
1. BASE MAP IMAGERY PROVIDED BY BROWN COUNTY, 2010.
2. BRIDGE OUTLINE, PIERS, AND BORING LOCATIONS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.
3. WATERWAY LINES INTERPRETED FROM GEOREFERENCED AIR PHOTOS, LOCATIONS ARE APPROXIMATE.

PROJECT:
WISDOT ID# 1009-03-51
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN

SHEET TITLE:
BRIDGE LAYOUT WITH BORING LOCATIONS AND HISTORIC WATERWAYS

DRAWN BY:	PAPEZ J	SCALE: 1: 2,400	PROJ. NO. 209074
CHECKED BY:	HAAK D		FILE NO. 209074-003.mxd
APPROVED BY:	TURPIN P	DATE PRINTED:	**FIGURE 1**
DATE:	OCTOBER 04, 2013		

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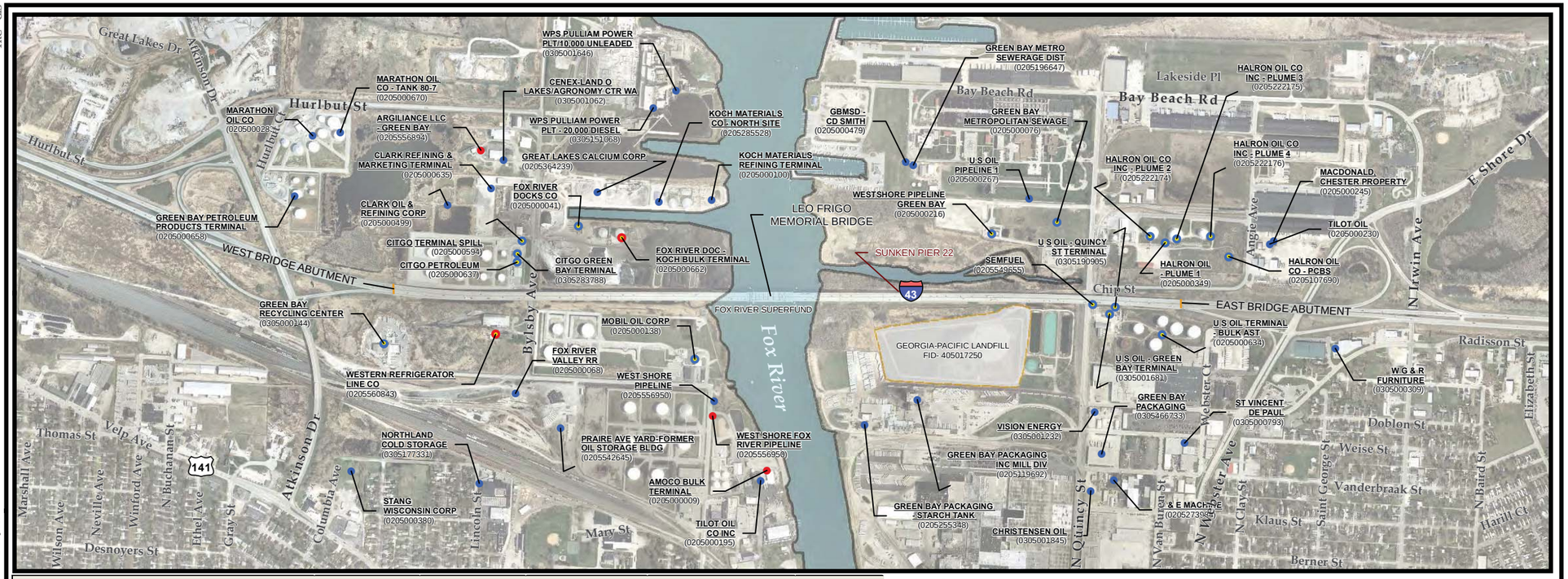
NOTES

1. BRIDGE, PIER LOCATIONS, GROUND SURFACE, AND TOP OF BEDROCK DERIVED FROM: WISDOT DRAWINGS "SUBSURFACE EXPLORATION - STRUCTURE B-5-158", SHEETS 10-16 OF 41, 1975. PIER ELEVATIONS AND PILE DEPTHS BASED VALUES NOTED ON DRAWINGS. FEATURES ARE DRAWN AT APPROIXMATE SCALE.
2. BEDROCK STRATIGRAPHY INTERPRETED FROM "FIGURE 5 - EAST TO WEST CROSS SECTION ACROSS BROWN COUNTY", LUCZAJ & HART, 2009.
3. POTENTIOMETRIC SURFACES BASED ON USGS-NATIONAL WATER INFORMATION SYSTEM DATA FOR SITE NUMBER BN-24/20E/24-0076. WELL IS LOCATED ~2,000' NORTH OF BRIDGE.

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PROJECT:	**WISDOT ID #1009-03-51 LEO FRIGO MEMORIAL BRIDGE GREEN BAY, WISCONSIN**		
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DRAWN BY: PAPEZ J	SCALE:	PROJ. NO.	209074
CHECKED BY: RICE J		FILE NO.	209074-AI01.AI
APPROVED BY: TURPIN P	DATE PRINTED:	**FIGURE 2**	
DATE: OCTOBER 04, 2013			

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SUMMARY OF SITES WITHIN APPROXIMATELY 500 FT OF LEO FRIGO MEMORIAL BRIDGE ROW

SITE NAME	WDNR BRRTS #	STATUS	CONTAMINANT TYPE	DO IMPACTS EFFECT 1-43 BRIDGE ROW?	GIS REGISTRY ATTACHED?
CITGO GREEN BAY TERMINAL	0305283788	CLOSED	PETROLEUM	UNLIKELY	YES
CITGO PETROLEUM	0205000637	CLOSED	LUST- PETROLUEM	UNLIKELY	NO
CITGO TERMINAL SPILL	0205000594	CLOSED	PETROLEUM	UNLIKELY	NO
FOX RIVER DOC - KOCH BULK TERMINAL	0205000662	OPEN	PETROLEUM	UNKNOWN	NO
FOX RIVER DOCKS CO	0205000041	CLOSED	PETROLEUM	NO	YES
GREEN BAY METROPOLITAN SEWAGE	0205000076	CLOSED	PETROLEUM	UNLIKELY	YES
GREEN BAY RECYCLING CENTER	0305000144	CLOSED	LUST- PETROLUEM	UNKNOWN	NO
HALRON OIL CO - PCBS	0205107690	CLOSED	PCBS	UNKNOWN	NO
HALRON OIL CO INC - PLUME 1	0205000349	CLOSED	PETROLEUM	UNLIKELY	YES
HALRON OIL CO INC - PLUME 2	0205222174	CLOSED	PETROLEUM	UNLIKELY	YES
HALRON OIL CO INC - PLUME 3	0205222175	CLOSED	PETROLEUM	UNLIKELY	YES
HALRON OIL CO INC - PLUME 4	0205222176	CLOSED	PETROLEUM	UNLIKELY	YES
MOBIL OIL CORP	0205000138	CLOSED	PETROLEUM	UNLIKELY	YES
SEMFUEL	0205549655	CLOSED	PETROLEUM	POTENTIAL	YES
U S OIL - GREEN BAY TERMINAL	0305001681	CLOSED	LUST- PETROLUEM	POTENTIAL	YES
U S OIL - QUINCY ST TERMINAL	0305190905	CLOSED	LUST- PETROLUEM	UNKNOWN	NO
U S OIL TERMINAL - BULK AST	0205000634	CLOSED	PETROLEUM	POTENTIAL	YES
WESTERN REFRIGERATOR LINE CO	0205560843	OPEN	PETROLEUM	UNKNOWN	NO
WESTSHORE PIPELINE GREEN BAY	0205000216	CLOSED	PETROLEUM	UNLIKELY	YES
GEORGIA-PACIFIC LANDFILL	N/A	OPEN	UNKNOWN	POTENTIAL	N/A
FOX RIVER SUPERFUND SITE	N/A	OPEN	PCBS	YES	N/A

NOTES

1. BASE MAP IMAGERY PROVIDED BY BROWN COUNTY, 2010.
2. BRRTS SITES ACQUIRED FROM WISCONSIN DNR. LOCATIONS ARE APPROXIMATE.
3. PIER LOCATIONS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

LEGEND

- BRRTS CLOSED SITE (SHOWN IN TABLE)
- BRRTS OPEN SITE (SHOWN IN TABLE)
- GEORGIA-PACIFIC LANDFILL (APPROXIMATE LOCATION)
- FOX RIVER SUPERFUND SITE

1 " = 1,000 '
1:12,000

0 1,000 Feet

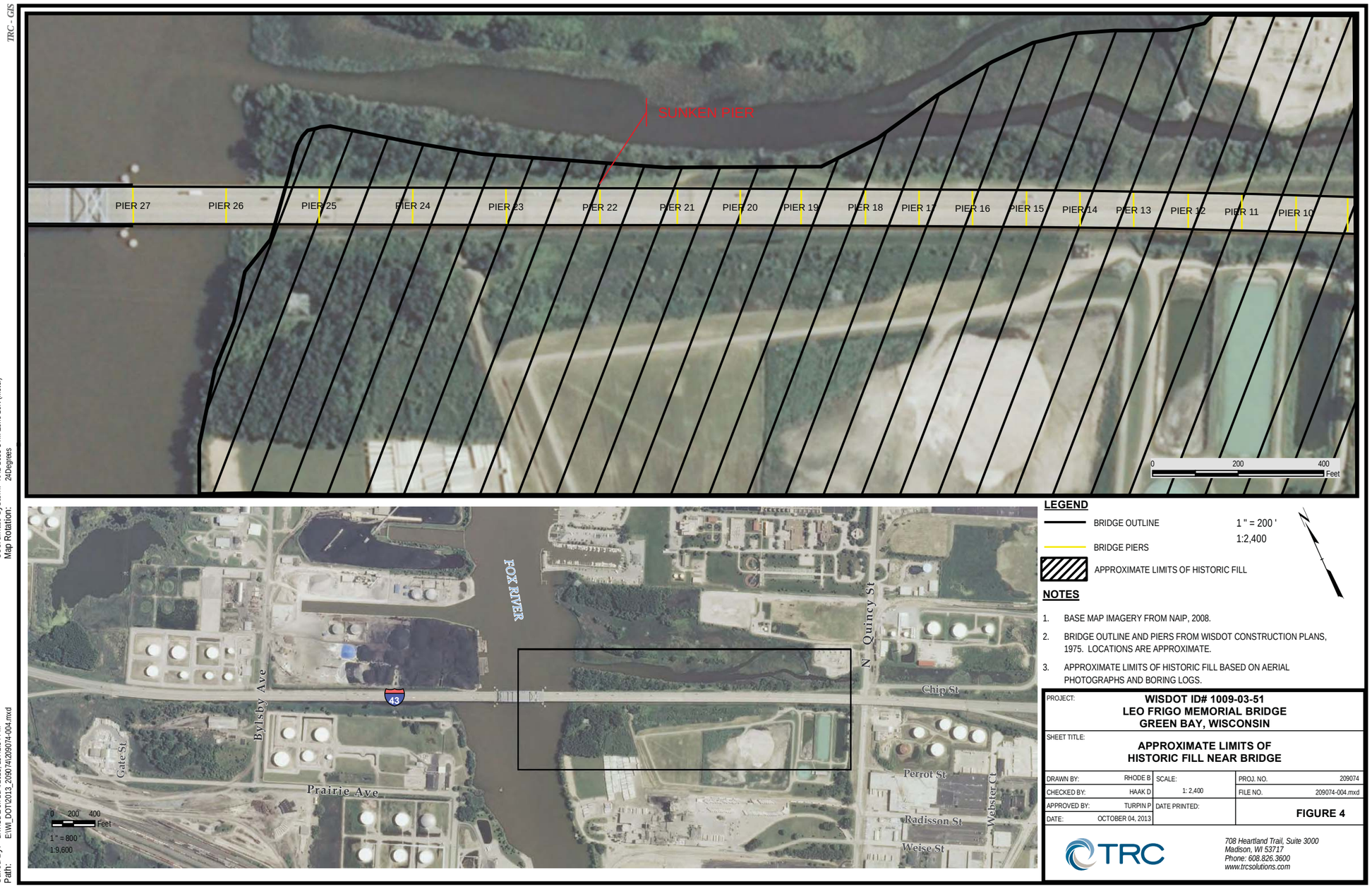
PROJECT: **WISDOT ID# 1009-03-51**
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN

SHEET TITLE: **ENVIRONMENTAL SITE LOCATIONS (WITHIN APPROXIMATELY 1/4 MILE OF BRIDGE)**

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CHECKED BY: SELLWOD A		FILE NO. 209074-003_BRRTS.mxd	
APPROVED BY: TURPIN P	DATE PRINTED:	**FIGURE 3**	
DATE: OCTOBER 04, 2013			

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Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees
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LEGEND

- BRIDGE OUTLINE
- BRIDGE PIERS
- APPROXIMATE LIMITS OF HISTORIC FILL

1 " = 200 '
1:2,400

NOTES

1. BASE MAP IMAGERY FROM NAIP, 2008.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.
3. APPROXIMATE LIMITS OF HISTORIC FILL BASED ON AERIAL PHOTOGRAPHS AND BORING LOGS.

PROJECT:	**WISDOT ID# 1009-03-51 LEO FRIGO MEMORIAL BRIDGE GREEN BAY, WISCONSIN**		
SHEET TITLE:	**APPROXIMATE LIMITS OF HISTORIC FILL NEAR BRIDGE**		
DRAWN BY: RHODE B	SCALE: 1: 2,400	PROJ. NO.	209074
CHECKED BY: HAAK D		FILE NO.	209074-004.mxd
APPROVED BY: TURPIN P	DATE PRINTED:	**FIGURE 4**	
DATE: OCTOBER 04, 2013			

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ALL FEATURES ARE APPROXIMATE. DEPICTED WITH 3X VERTICAL EXAGGERATION. IMAGERY FROM BROWN COUNTY, 2010. ELEVATION MODEL FROM USGS.

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WISDOT ID# 1009-03-51
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN

PERSPECTIVE 3D RENDERING
LOOKING NORTHEAST

DRAWN BY:	PAPEZ J
APPROVED BY:	TURPIN P
PROJ. NO.:	209074
FILE NO.:	209074-005A.mxd
DATE:	OCTOBER 2013

TRC - GIS

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FIGURE 5



ALL FEATURES ARE APPROXIMATE. DEPICTED WITH 3X VERTICAL EXAGGERATION. IMAGERY FROM BROWN COUNTY, 2010. ELEVATION MODEL FROM USGS.

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WISDOT ID# 1009-03-51
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN

PERSPECTIVE 3D RENDERING
LOOKING SOUTHEAST

DRAWN BY:	PAPEZ J
APPROVED BY:	TURPIN P
PROJ. NO.:	209074
FILE NO.:	209074-005B.mxd
DATE:	OCTOBER 2013

TRC - GIS
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FIGURE 6



TRC - GIS

Coordinate System: NAD 1983 HARN WISCRS Brown County Feet (Foot US)
Map Rotation: 0Degrees

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Path: E:\WI_DOT\2013_209074\209074-002a_1853.mxd

LEGEND

CURRENT LEO FRIGO BRIDGE

NOTES

1. BASE MAP PROVIDED BY BROWN COUNTY LAND INFORMATION OFFICE, "HEAD OF GREEN BAY AND ENTRANCE TO FOX RIVER, WISCONSIN", BUREAU OF TOPOGRAPHICAL ENGINEERS WAR DEPARTMENT, 1853.
2. CURRENT STREETS DATA SUPPLIED BY ESRI.

0 3,000 6,000 Feet

1 " = 3,000 '
1:36,000

PROJECT: **WISDOT ID #1009-03-51**
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN

SHEET TITLE:
HISTORIC MAP OF GREEN BAY - 1853
WITH CURRENT LEO FRIGO BRIDGE OVERLAID

DRAWN BY:	PAPEZ J	SCALE:	1: 36,000	PROJ. NO.	209074
CHECKED BY:	HAAK D			FILE NO.	209074-002a_1853.mxd
APPROVED BY:	TURPIN P	DATE PRINTED:		**FIGURE 7**	
DATE:	OCTOBER 04, 2013				

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Attachment 1

WisDOT As-builts

PLAN # 121

PLAN # 121

STATE OF WISCONSIN

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

PLAN AND PROFILE OF PROPOSED

MILWAUKEE - GREEN BAY ROAD

TOWER DRIVE BRIDGE

I.H. 43

BROWN COUNTY

STATE PROJECT NUMBER
1220-5-73

STATE PROJECT	FEDERAL PROJECT	
	PROJECT	CONTRACT #
1220-5-73	I-IG 43-1(71) 116	1

CONTROL OF ACCESS

WITHIN LIMITS OF THE PROJECT WHERE CONTROL OF ACCESS LINE IS SHOWN THUS ##### NO ACCESS IS PERMITTED TO THE HIGHWAY TRAFFIC LANES EXCEPT BY RAMPS AT INTERCHANGES

AS BUILT PLAN

AS BUILT PLAN
NO. 721
SUPERVISOR F. BUTRYMOWICZ
RESIDENT D. PAULI
CONTRACTOR KRAEMER
COMPLETED 4-12-79

Index of Sheets

Sheet No.	1	Title
Sheet No.	2 - 2.1	Typical Cross Sections
Sheet No.	3	Estimate of Quantities
Sheet No.	3	Miscellaneous Quantities
Sheet No.	4 - 4.4	Right of Way Plat
Sheet No.	5 - 5.2	Plan and Profile
Sheet No.	6 - 6.1	Standard Details
Sheet No.	7 - 7.48	Structure Plans
Sheet No.	8 - 8.2	Cross Sections

Total Sheets = 66



Design Designation

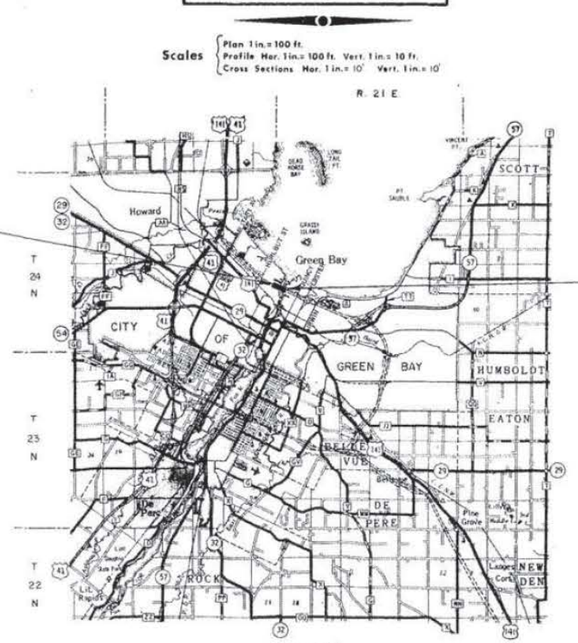
A. D. T. (1974)	= 17,000
A. D. T. (1994)	= 30,000
D. H. V.	= 2,210
D.	= 60%
T.	= 5%
V.	= 60 M.P.H.
ACCESS CONTROL	= FULL

END OF PROJECT 1220-5-73
STA. 884 + 62.02

N = 262,694.972
E = 2,516,705.304
791.100 FEET SOUTH OF AND 419.948 FEET EAST OF THE NORTHWEST CORNER OF LOT 52, FORT HOWARD MILITARY RESERVE, TOWNSHIP 24 NORTH RANGE 20 EAST.

Conventional Signs

State Line
County Line
Township or Range Line
Section Line
New Right of Way Line
Present Right of Way Line
Wire Fence (Woven, Barbed)
Lot Line
Corporate or City Limits
Property Line
Traveled Way or P.E.
Railroads
Base or Survey Line
Culverts in Place
Culverts Required
Drop Inlet
Power Pole
Telephone or Telegraph Pole
Right of Way Markers
Reference Stake for Hubs Only
Marsh
Hedge
Trees
Ground Elevation
Grade Elevation



Total Net Length of Centerline = 0.689 Mi.

BEGINNING OF PROJECT 1220-5-73
STA. 848+22.00

N = 261,326.900
E = 2,520,078.149
116.64 FEET NORTH OF AND 2,769.10 FEET WEST OF THE INTERSECTION OF THE CENTERLINE OF N QUINCY ST AND THE NORTH LINE OF PRIVATE CLAIM NO 44 E S F R. TOWNSHIP 24 NORTH, RANGE 21 EAST.

ALL COORDINATES SHOWN ON THIS PLAN ARE REFERENCED TO THE WISCONSIN COORDINATE SYSTEM CENTRAL ZONE.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

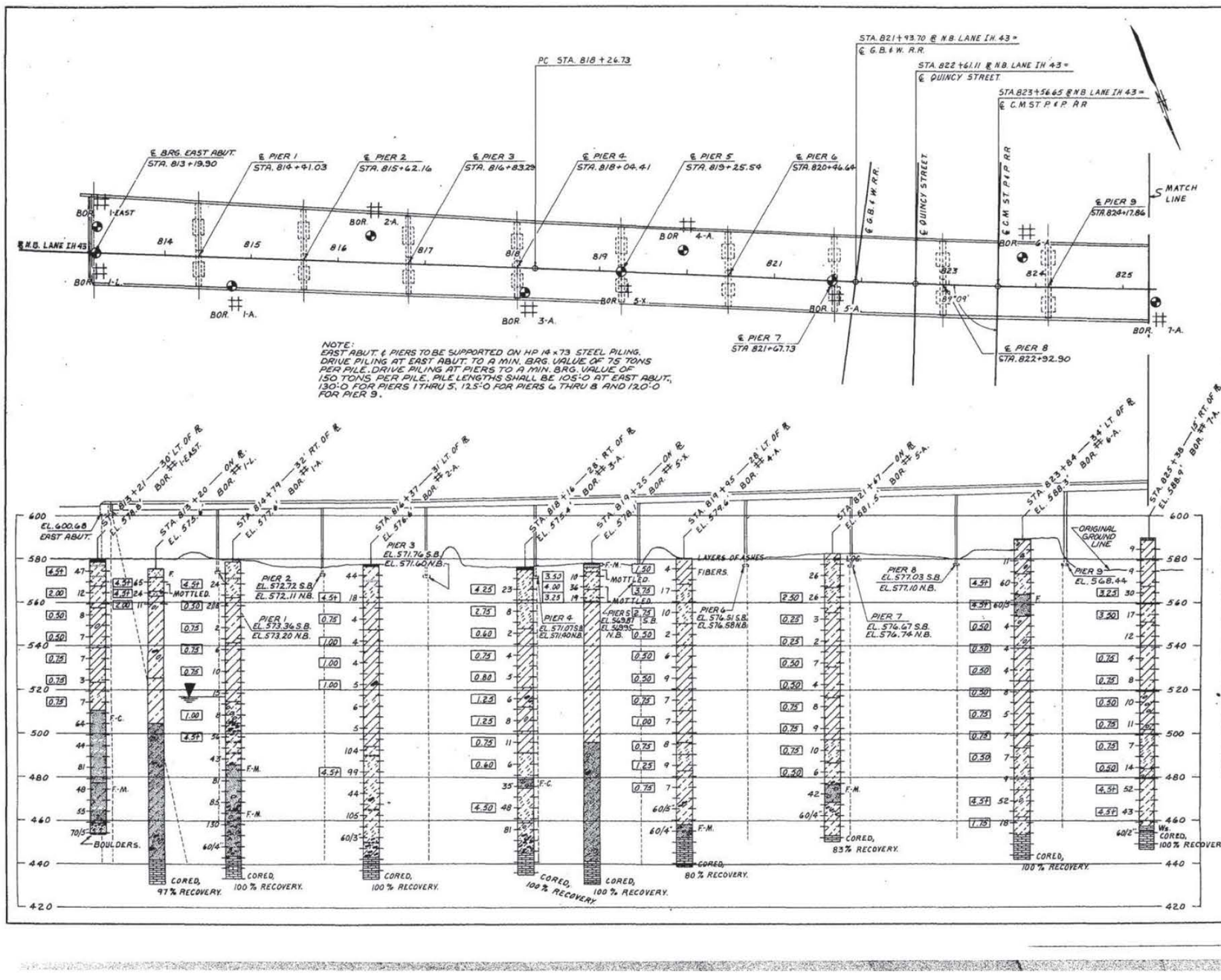
Surveyor DIST. #3 District Checker WFS & GFW
Designer SMH C.O. Checker RAH

Correct:
Date 5/6/76 District Engineer
Recommended for Approval:
Date 8/26/76 Chief of Facilities Development
Approved:
Date 8/27/76 State Highway Engineer

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION 5 WISCONSIN DIVISION
Approved:
Date _____ Division Engineer

FORM E-8-45-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-73	7.9	
FEDERAL PROJECT DESIGNATION		



ABBREVIATIONS

F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound

MATERIAL SYMBOLS

Topsoil, Sand, Gravel, Silt, Peat, Clay, Sandstone, Limestone, Igneous Rock

LEGEND OF PROBING

95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt. Falling 18" on a 2" O. D. Point.

Probing No. / Sta. / Elevation / 7 Average Blows Per Foot / Refusal 95/6

LEGEND OF BORING

Boring No. / Elev. / Sta.
Unconfined Strength — 7.7 7
Blows Per Ft. Using 140# Wt. Falling 30"
Wash Sample
Shelby Tube — S. T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
F.
Boulders or Cobbles
Sand
Silty Clay
So Limestone

Unless otherwise specified, the blows per foot at the locations indicated are based on driving a 2" O. D. x 1.4" I. D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.

SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing. The data presented herein represents the findings of the subsurface explorations made. However, because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area, the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1975	Drawn By NJA	Plans Checked BMW

SUBSURFACE EXPLORATION

SHEET 10 OF 49
X55607

FORM E-B-45-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-73	7.10	
FEDERAL PROJECT DESIGNATION		

P.T. = STA. 834+10.23 ℄ N.B. LANE I.H. 43.

℄ PIER 10 STA. 825+42.91
℄ PIER 11 STA. 826+47.94
℄ PIER 12 STA. 827+92.97
℄ PIER 13 STA. 829+17.98
℄ PIER 14 STA. 830+42.99
℄ PIER 15 STA. 831+68.00
℄ PIER 16 STA. 832+93.00
℄ PIER 17 STA. 834+18.00
℄ PIER 18 STA. 835+43.00
℄ PIER 19 STA. 836+89.00

825 826 827 828 829 830 831 832 833 834 835 836 837 838

℄ N.B. LANE I.H. 43.

BOR. 8-A. BOR. 9-A. BOR. 10-A. BOR. 11-A. BOR. 12-A. BOR. 13-A. BOR. 18.

NOTE:
PIERS TO BE SUPPORTED ON HP 14 x 73 STEEL PILING DRIVEN TO A MIN. BRG. VALUE OF 150 TONS PER PILE. PILE LENGTHS SHALL BE 115'-0 FOR PIER 11, 120'-0 FOR PIERS 9, 10, 13, 14, 15, 16 & 19, 125'-0 FOR PIERS 12 & 17.

MATCH LINE — MATCH LINE

STA. 827+10 ON ℄ BOR. ℄ 8-A EL. 587.9'
STA. 829+09 30' RT. OF ℄ BOR. ℄ 9-A EL. 584.3'
STA. 830+89 2.8' LT. OF ℄ BOR. ℄ 10-A EL. 584.8'
STA. 832+45 15' RT. OF ℄ BOR. ℄ 11-A EL. 586.1'
STA. 834+45 30' LT. OF ℄ BOR. ℄ 12-A EL. 586.0'
STA. 835+43 ON ℄ BOR. ℄ 18. EL. 587.1'
STA. 836+23 15' RT. OF ℄ BOR. ℄ 13-A. EL. 585.8'

ORIGINAL GROUND LINE

PIER 10 EL. 569.29
PIER 11 EL. 568.52
PIER 12 EL. 578.24
PIER 13 EL. 577.77
PIER 14 EL. 579.80
PIER 15 EL. 578.28
PIER 16 EL. 577.76
PIER 17 EL. 578.79
PIER 18 EL. 578.06
PIER 19 EL. 577.70

BLACK FOUNDRY SAND ORGANIC, SOME FIBERS.
SAWDUST, WOODCHIPS, LOGS & CINDERS.
WOODCHIPS, LOGS, ASHES & CINDERS.
WOODCHIPS, LOGS, ASHES & CINDERS.
PAPER MILL WASTE.
WOODCHIPS, SAWDUST, LOGS & ASHES.

CORED, 98 % RECOVERY.
CORED, 91 1/2 % RECOVERY.
CORED, 100 % RECOVERY.
CORED, 100 % RECOVERY.
CORED, 99 % RECOVERY.
CORED, 97 % RECOVERY.
CORED, 100 % RECOVERY.
CORED, 100 % RECOVERY.

600 580 560 540 520 500 480 460 440 420

ABBREVIATIONS

F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound

MATERIAL SYMBOLS

Topsoil, Sand, Gravel, Silt, Peat, Clay, Sandstone, Limestone, Igneous Rock

LEGEND OF PROBING

95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt. Falling 18" on a 2" O. D. Point.

Probing No.
Sta.
Elevation
7 Average Blows Per Foot
Refusal 95/6

LEGEND OF BORING

Boring No.
Elev.
Sta.
Unconfined Strength — 7.7 — 7
Blows Per Ft. Using 140# Wt. Falling 30"
Wash Sample
Shelby Tube — S. T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
F.
Boulders or Cobbles
Sand
Silty Clay
So
Limestone

Unless otherwise specified, the blows per foot at the locations indicated are based on driving a 2" O. D. x 1.4" I. D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.

SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

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No.	Date	Revision	By

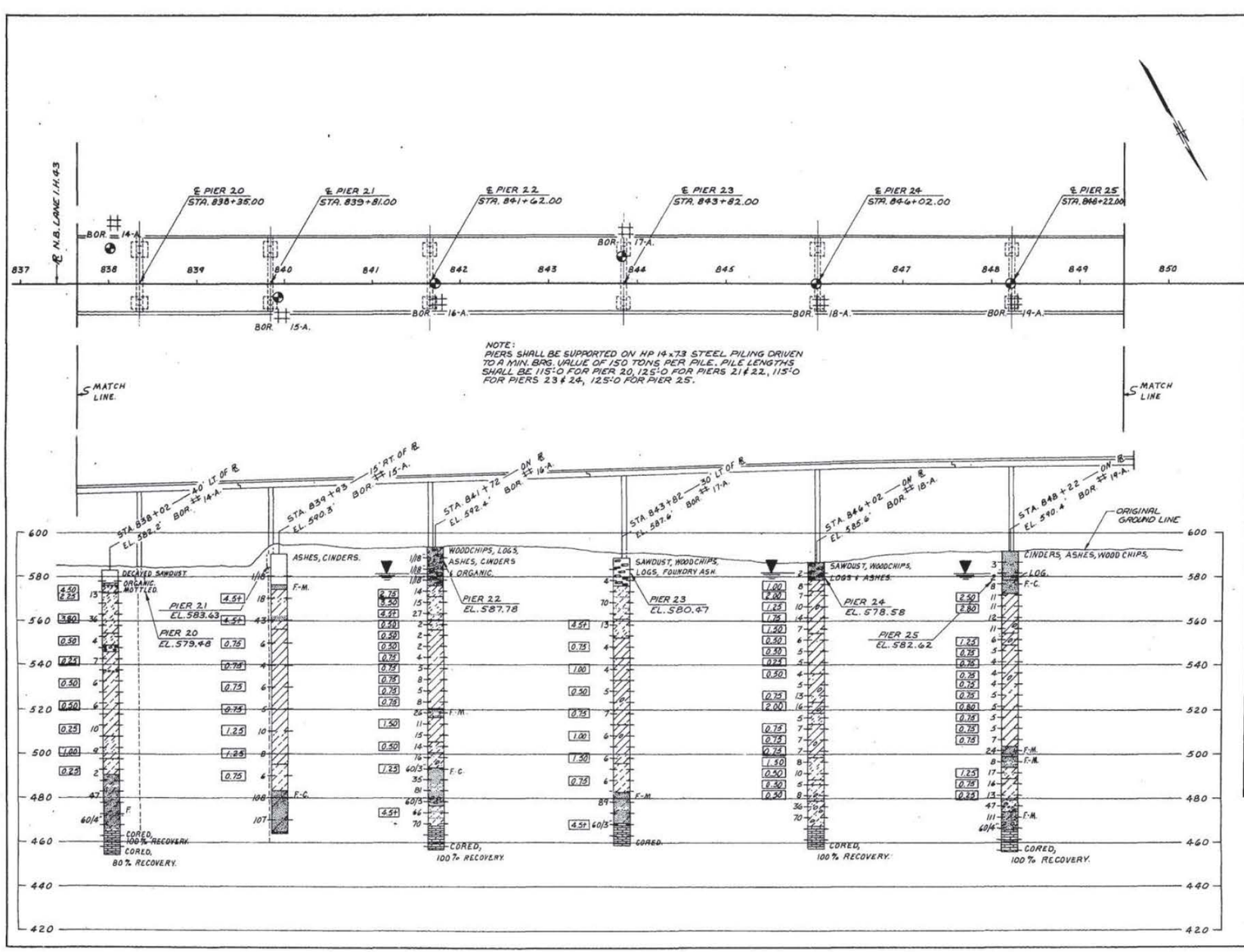
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1975	Drawn By NJA	Plans Checked BMW

SUBSURFACE EXPLORATION

SHEET 11 OF 49
X55608



PROJECT I.D. 1220-5-73 | SHEET NUMBER 7.11 | TOTAL SHEETS
FEDERAL PROJECT DESIGNATION

ABBREVIATIONS

F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound

MATERIAL SYMBOLS

Topsoil, Silt, Sandstone, Sand, Peat, Limestone, Gravel, Clay, Igneous Rock

LEGEND OF PROBING

95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt. Falling 18" on a 2" O. D. Point.
Probing No. Sta. Elevation
7 Average Blows Per Foot
Refusal 95/6

LEGEND OF BORING

Boring No. Sta. Elev.
Unconfined Strength — 7.7
Blows Per Ft. Using 140# Wt. Falling 30"
Wash Sample
Shelby Tube — S. T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
F.
Boulders or Cobbles
Sand
Silty Clay
So Limestone

Unless otherwise specified, the blows per foot at the locations indicated are based on driving a 2" O. D. x 1.4" I. D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.

SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

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No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1975 | Drawn By NJA | Plans Checked BMW

SUBSURFACE EXPLORATION

SHEET 12 OF 49
X55609

FORM E-B-45-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-73		
FEDERAL PROJECT DESIGNATION	7.12	

STA. 854+87.13 R.N.B. LANE I.H. 43 = FOX RIVER ℄ CHANNEL

FOX RIVER

℄ CHANNEL

DOLPHINS (TYPICAL)

℄ N.B. LANE I.H. 43.

86°41'09"

STA. 854+87.13

BOR. # 20-A

BOR. # 21-A

BOR. # 22-A

BOR. # 23-A

BOR. # 24-A

℄ PIER 26 STA. 850+42.00

℄ PIER 27 STA. 852+62.00

℄ PIER 28 STA. 857+12.00

℄ PIER 29 STA. 859+32.00

℄ PIER 30 STA. 861+52.00

℄ MATCH LINE

℄ MATCH LINE.

FOUNDATION DATA

PIERS SUPPORTED ON HP 14×73 STEEL PILES. PIERS 26-29 DRIVEN TO A MIN. BRG. VALUE OF 100 TONS PER PILE. PIER 30 DRIVEN TO A MIN. BRG. VALUE OF 150 TONS PER PILE. EST. 110'-0" LG. AT PIER 26, 80'-0" LG. AT PIERS 27 & 28, 130'-0" LG. AT PIER 29, 115'-0" LG. AT PIER 30.

STA. 850+42 — ON ℄ BOR. # 20-A. EL. 581.5'

AIR. WATER. LITTLE SILT, TRACE OF SHELLS. F. TRACE OF SHELLS. EL. 572.21 PIER 26 TRACE OF WOOD. F-M. F-M. F-C. F. CORED, 100% RECOVERY. CORED, 100% RECOVERY.

STA. 852+62 — ON ℄ BOR. # 21-A. EL. 581.5'

AIR. WATER. F-C, LITTLE SHELLS. TRACE OF SHELLS. F, TRACE OF SHELLS. EL. 538.07 PIER 27 F-M. TRACE OF WOOD. F-C. F. F-C. CORED, 100% RECOVERY. CORED, 100% RECOVERY.

STA. 857+12 — ON ℄ BOR. # 22-A. EL. 581.5'

AIR. WATER. ORGANIC. F. F, TRACE OF SHELLS. ORGANIC, TRACE OF WOOD & SHELLS. LAYER OF HIGHLY DECAYED WOOD. LAYER OF HIGHLY DECAYED WOOD. EL. 537.52 PIER 28 M-C. CORED, 100% RECOVERY. CORED, 99% RECOVERY.

STA. 859+32 — ON ℄ BOR. # 23-A. EL. 581.5'

AIR. WATER. F-M, TRACE TO LITTLE ORGANIC. F, TRACE OF SHELL. EL. 567.52 PIER 29 F. ORGANIC. TRACE OF WOOD. SMALL PIECE OF WOOD. F-M. CORED, 50% RECOVERY. CORED, 100% RECOVERY. CORED, 100% RECOVERY.

STA. 861+52 — ON ℄ BOR. # 24-A. EL. 581.5'

AIR. WATER. F-M, SHELLS. EL. 572.81 PIER 30 FIBROUS PEAT. CORED, 100% RECOVERY. CORED, 100% RECOVERY.

600 580 560 540 520 500 480 460 440 420

ABBREVIATIONS

F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound

MATERIAL SYMBOLS

Topsoil, Sand, Gravel, Silt, Peat, Clay, Sandstone, Limestone, Igneous Rock

LEGEND OF PROBING

95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt. Falling 18" on a 2" O. D. Point.

Probing No.
Sta.
Elevation
7 Average Blows Per Foot
Refusal 95/6

LEGEND OF BORING

Boring No.
Sta.
Elev.
Unconfined Strength — 7.7 — 7
Blows Per Ft. Using 140# Wt. Falling 30"
Wash Sample
Shelby Tube — S. T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
F.
Boulders or Cobbles
Sand
Silty Clay
So
Limestone

Unless otherwise specified, the blows per foot at the locations indicated are based on driving a 2" O. D. x 1.4" I. D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.

SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing. The data presented herein represents the findings of the subsurface explorations made. However, because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area, the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec.	Drawn	Plans Checked
1975	By D.C.M. NJA	KOK

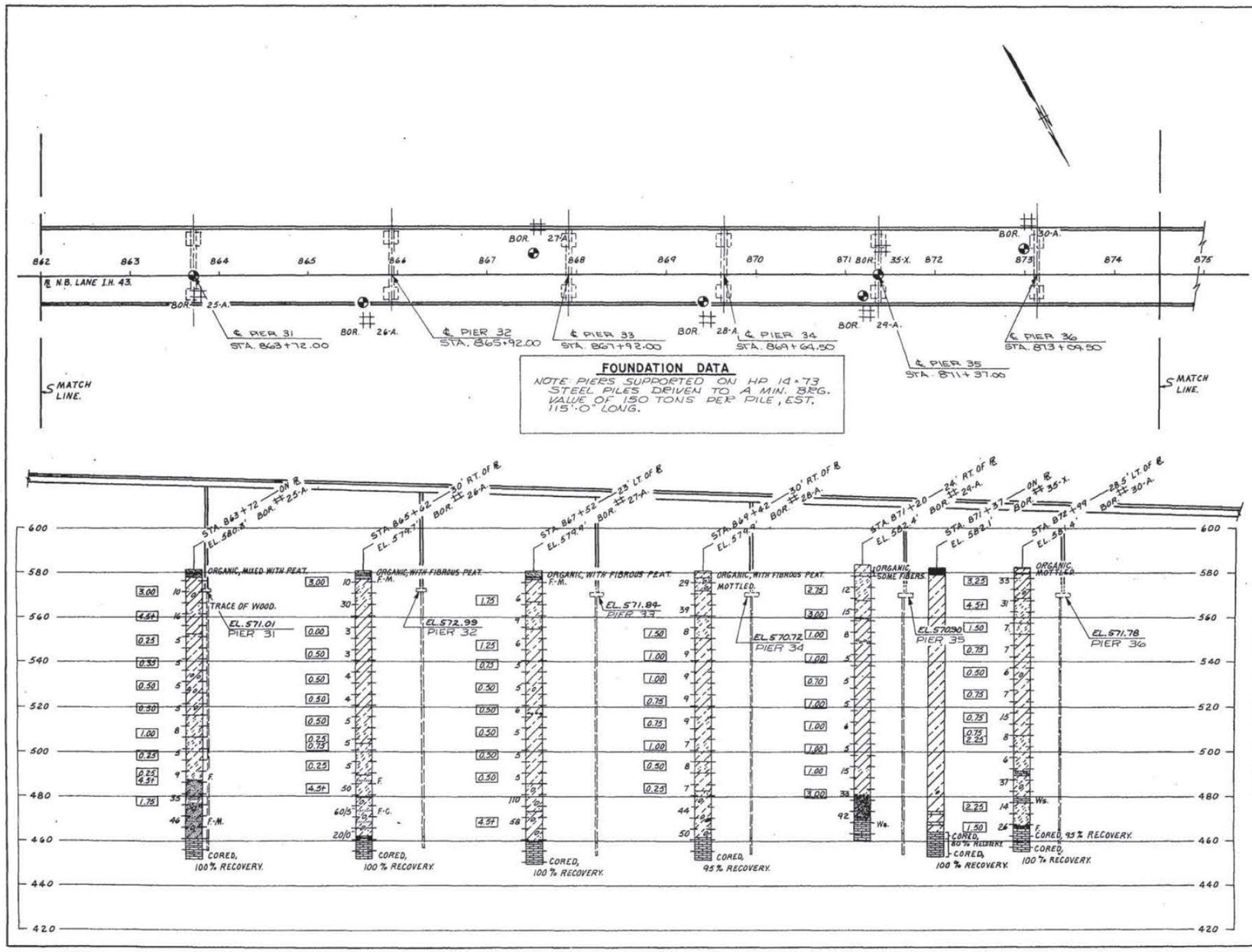
SUBSURFACE EXPLORATION

SHEET 13 OF 49

X55610

FORM E-8-45-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-73	7.13	
FEDERAL PROJECT DESIGNATION		



ABBREVIATIONS

F — Fine M — Medium C — Coarse
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MATERIAL SYMBOLS

Topsoil, Sand, Gravel, Silt, Peat, Clay, Sandstone, Limestone, Igneous Rock

LEGEND OF PROBING

95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt. Falling 18" on a 2" O. D. Point.

Probing No.
Sta.
Elevation
7 Average Blows Per Foot
Refusal 95/6

LEGEND OF BORING

Boring No.
Sta.
Elev.
Unconfined Strength — 7.7
Blows Per Ft. Using 140# Wt. Falling 30"
Wash Sample
Shelby Tube — S. T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
F.
Boulders or Cobbles
Sand
Silty Clay
So
Limestone

Unless otherwise specified, the blows per foot at the locations indicated are based on driving a 2" O. D. x 1.4" I. D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.

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STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1975	Drawn By D.C.M.	N.J.A.	Plans Checked K.O.K.

SUBSURFACE EXPLORATION

SHEET 14 OF 49
X55611

FORM E-B-45-65

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-73	7.14	
FEDERAL PROJECT DESIGNATION		

STA. 879+21 ℄ N.B. LANE I.H. 43 = ℄ BYLSBY AVENUE.

P.C. STA. 883+14.48 ℄ N.B. LANE I.H. 43.

℄ BYLSBY AVENUE.

86°58'17"

℄ N.B. LANE I.H. 43.

874 875 876 877 878 879 880 881 882 883 884 885 886

BOR. 37-X. BOR. 31-X. BOR. 32-X. BOR. 16 BOR. 34-A. BOR. 35-A. BOR. 36-A. BOR. 37-A.

℄ PIER 37 STA. 874+82.00

℄ PIER 38 STA. 876+01.00

℄ PIER 39 STA. 877+32.00

℄ PIER 40 STA. 878+51.00

℄ C.&N.W. TRANS. CO. SPUR LINE STA. 878+76.79

℄ C.&N.W. TRANS. CO. SPUR LINE

℄ C.&N.W. TRANS. CO. SPUR LINE (NOT IN USE)

℄ PIER 41 STA. 879+82.00

℄ PIER 42 STA. 881+02.00

℄ PIER 43 STA. 882+22.00

℄ PIER 44 STA. 883+42.01

℄ PIER 45 STA. 884+62.02

℄ PIER 46 STA. 885+82.08

MATCH LINE.

MATCH LINE.

FOUNDATION DATA

PIERS SUPPORTED ON HP 14×73 STEEL PILES DRIVEN TO A MIN. BRG. VALUE OF 150 TONS PER PILE. EST. 100'-0" LONG.

℄ C.&N.W. TRANS. CO. SPUR LINE

℄ BYLSBY AVE

℄ C.&N.W. TRANS. CO. SPUR LINE

STA. 874+82 EL. 581.5' BOR. # 37-X. 10' LT. OF ℄

STA. 875+77 EL. 582.3' BOR. # 31-X. ON ℄

STA. 877+02 EL. 582.3' BOR. # 32-X. ON ℄

STA. 878+91 EL. 583.1' BOR. # 16 ON ℄

STA. 880+13 EL. 583.1' BOR. # 34-A. 42' RT. OF ℄

STA. 881+91 EL. 582.7' BOR. # 35-A. ON ℄

STA. 883+51 EL. 583.0' BOR. # 36-A. 42' RT. OF ℄

STA. 885+11.5 EL. 583.3' BOR. # 37-A. 11' RT. OF ℄

EL. 579.34 PIER 37

EL. 574.01 PIER 38

EL. 573.01 PIER 39

EL. 573.58 PIER 40

EL. 574.25 PIER 41

EL. 573.10 PIER 42

EL. 573.31 PIER 43

EL. 575.93 (S.) EL. 575.91 (N.) PIER 45

EL. 572.96 PIER 44

CORED, 92% RECOVERY. CORED, 100% RECOVERY.

CORED, 90% RECOVERY.

CORED, 100% RECOVERY.

CORED, 99% RECOVERY.

CORED, 100% RECOVERY.

CORED, 95% RECOVERY.

CORED, 99% RECOVERY.

CORED, 100% RECOVERY.

600 580 560 540 520 500 480 460 440 420

ABBREVIATIONS

F — Fine M — Medium C — Coarse
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MATERIAL SYMBOLS

Topsoil, Sand, Gravel, Silt, Peat, Clay, Sandstone, Limestone, Igneous Rock

LEGEND OF PROBING

95/6=95 Blows for 6" Penetration
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Probing No. Sta. Elevation
7 Average Blows Per Foot
Refusal 95/6

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Boring No. Sta. Elev.
Unconfined Strength — 7.7
Blows Per Ft. Using 140# Wt. Falling 30"
Wash Sample
Shelby Tube — S. T.
Ground Water Elevation
No Ground Water Observed Above This Elevation

Sandy Gravel
F.
Boulders or Cobbles
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No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1973 | Drawn By D.C.H NJA | Plans Checked KOK

SUBSURFACE EXPLORATION

SHEET 15 OF 49

X55612

FORM E-B-45-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-73	7.15	
FEDERAL PROJECT DESIGNATION		

STA. 892+15.93 ℄ N.B. LANE I.H. 43 = STA. 16+06.67 ℄ C.M.N.W. TRANS. CO. (PROPOSED)

℄ N.B. LANE I.H. 43.

885 886 887 888 889 890 891 892 893 894

BOR. 38-A. BOR. 48 BOR. 40-A. BOR. 41-A. BOR. WEST ABUT.

MATCH LINE

℄ PIER 46 STA. 885+82.08 ℄ PIER 47 STA. 887+02.22 ℄ PIER 48 STA. 888+22.47 ℄ PIER 49 STA. 889+42.88 ℄ PIER 50 STA. 890+63.09 ℄ PIER 51 STA. 891+84.33 ℄ BRG. WEST ABUT. STA. 893+02.41

FOUNDATION DATA

PIERS SUPPORTED ON HP 14 × 73 STEEL PILES DRIVEN TO A MIN. BRG. VALUE OF 150 TONS PER PILE, ESTIMATED 100'-0" LONG FOR PIERS 46 - 51 AND WEST ABUT. SUPPORTED ON HP 10 × 42 STEEL PILES DRIVEN TO A MIN. BRG. VALUE OF 75 TONS PER PILE, ESTIMATED 120'-0" LONG.

℄ C.M.N.W. TRANS. CO. (PROPOSED)

EL. 602.01

46' RT. OF ℄ 38-A. STA. 886+71 BOR. EL. 583.3

7' RT. OF ℄ 48 STA. 888+22 BOR. EL. 582.7

3' RT. OF ℄ 40-A. STA. 889+42 BOR. EL. 582.7

27' RT. OF ℄ 41-A. STA. 891+53 BOR. EL. 582.0

17' LT. OF ℄ WEST ABUT. STA. 892+85 BOR. EL. 582.03

EL. 575.95 (S.B.) EL. 575.30 (N.B.) PIER 46

FERROUS, VARIOUS MOTTLED, F. L. F.

EL. 576.35 (S.B.) EL. 575.93 (N.B.) PIER 47

ORGANIC. MOTTLED

EL. 576.03 (S.B.) EL. 575.76 (N.B.) PIER 49

EL. 576.00 (S.B.) EL. 574.23 (N.B.) PIER 48

ORGANIC. F-M. F.

EL. 576.01 (S.) EL. 575.96 (N.) PIER 50

ORGANIC. SOME PEAT. TRACE OF FIBERS. MOTTLED.

EL. 575.98 (S.B.) EL. 575.90 (N.B.) PIER 51

ORGANIC, TRACE OF WOOD. F-M.

EL. 599.51 WEST ABUT.

ORGANIC, SOME FIBERS. TRACE OF FIBERS. F.

600 580 560 540 520 500 480 460 440 420

CORED, 83 % RECOVERY. CORED, 98 % RECOVERY. CORED, 98 % RECOVERY. CORED, 99 % RECOVERY. CORED, 100 % RECOVERY.

ABBREVIATIONS

F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound

MATERIAL SYMBOLS

Topsoil, Silt, Sandstone, Sand, Peat, Limestone, Gravel, Clay, Igneous Rock

LEGEND OF PROBING

95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt. Falling 18" on a 2" O. D. Point.

Probing No. Sta. Elevation 7 Average Blows Per Foot Refusal 95/6

LEGEND OF BORING

Boring No. Sta. Elev.
Unconfined Strength 7.7 7
Blows Per Ft. Using 140# Wt. Falling 30"
Wash Sample
Shelby Tube — S. T.
Ground Water Elevation
No Ground Water Observed Above This Elevation

Sandy Gravel F. Boulders or Cobbles Sand Silty Clay So Limestone

Unless otherwise specified, the blows per foot at the locations indicated are based on driving a 2" O. D. x 1.4" I. D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.

SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing. The data presented herein represents the findings of the subsurface explorations made. However, because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area, the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.

No.	Date	Revison	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B- 5-158

Const. Spec. 1975	Drawn By D.C.M. MJA	Plans Checked KQK

SUBSURFACE EXPLORATION

SHEET 16 OF 49

X55613

Attachment 2

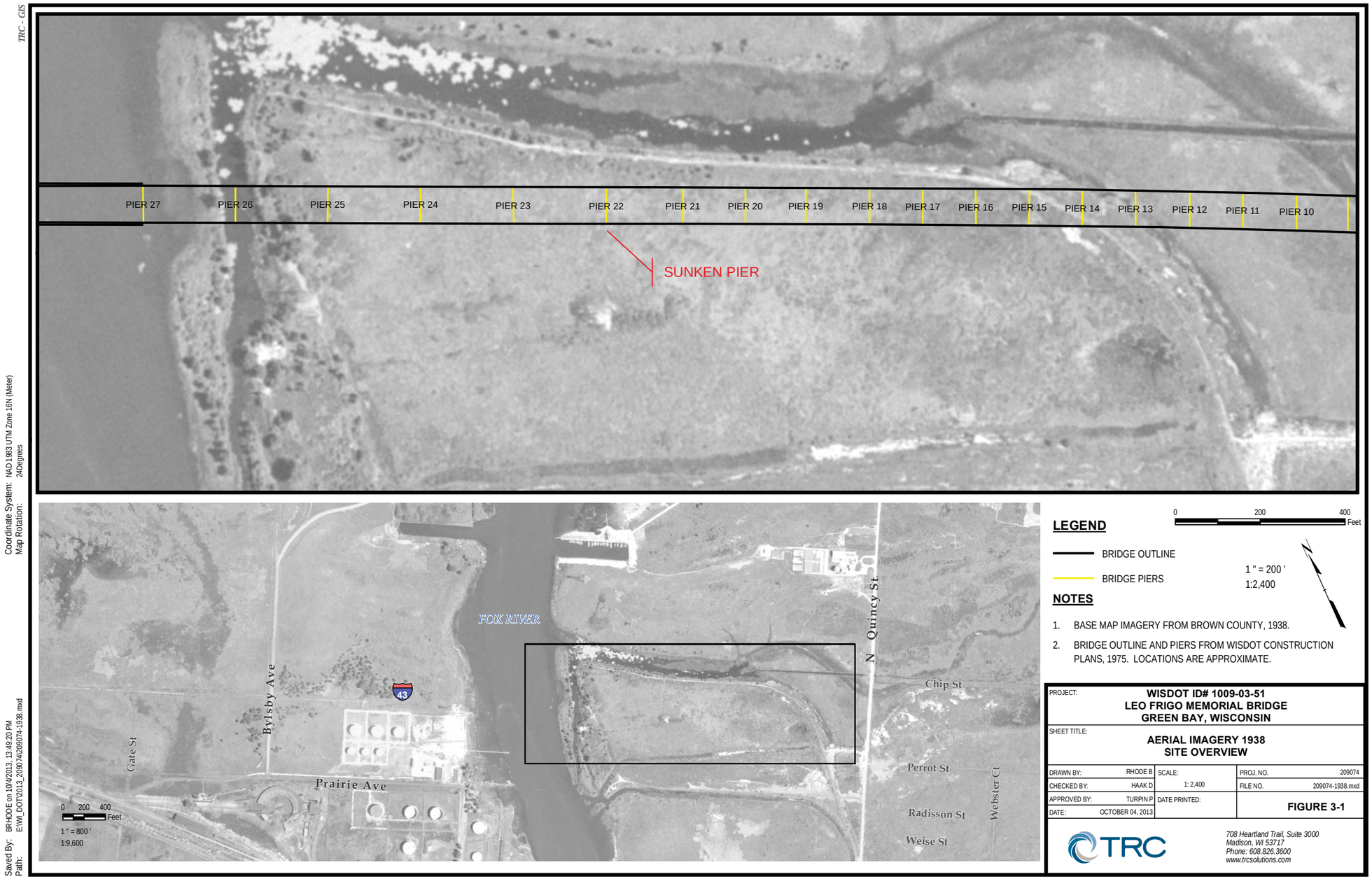
Environmental Databases
(See Attached CD)

- EDR
- Fox River Superfund Site
- GIS Registry Files

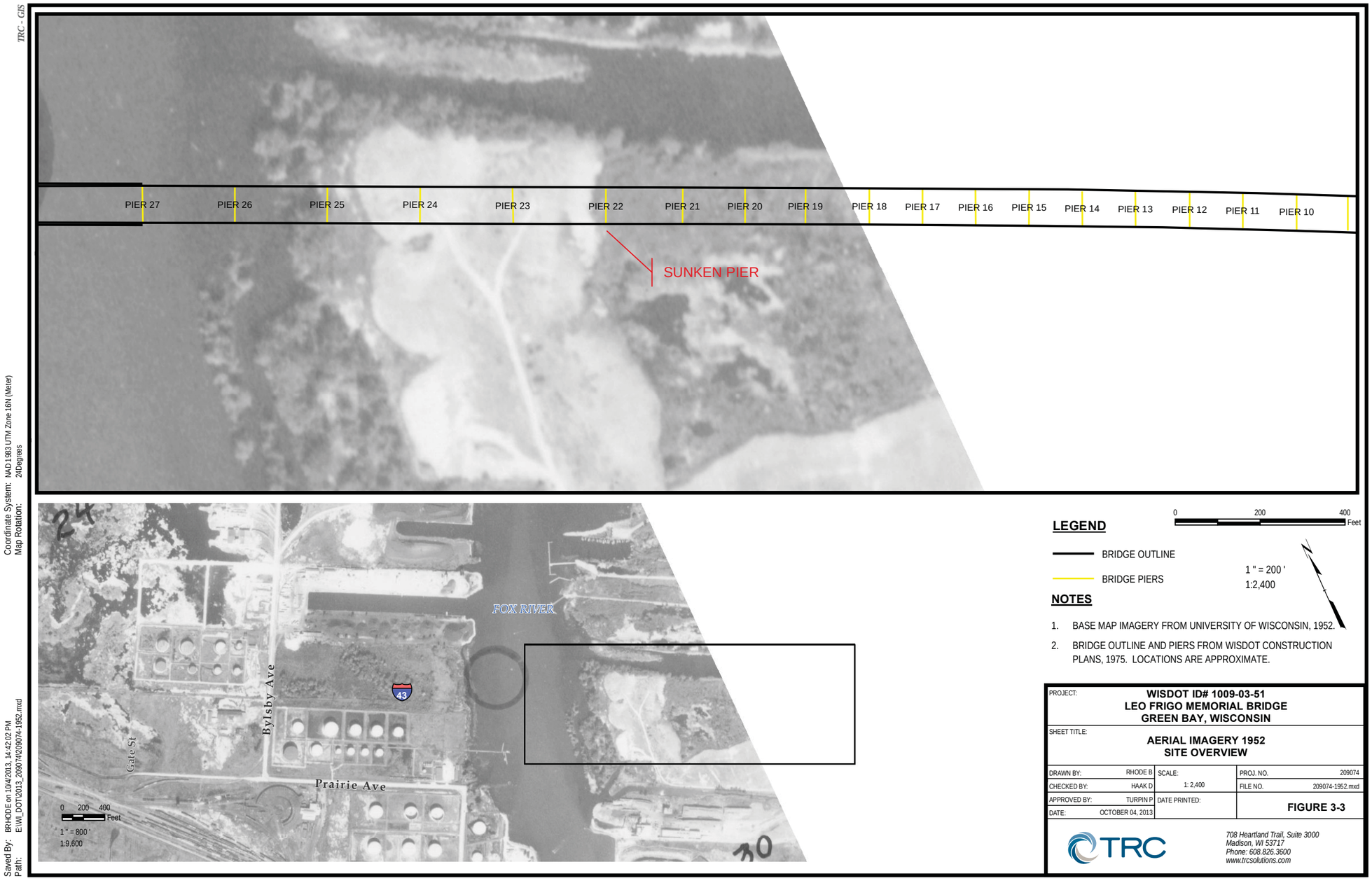
Attachment 3

Historical Aerial Photographs

- 3-1 Aerial Imagery 1938 – Site Overview
- 3-2 Aerial Imagery 1951 – Site Overview
- 3-3 Aerial Imagery 1952 – Site Overview
- 3-4 Aerial Imagery 1960 – Site Overview
- 3-5 Aerial Imagery 1964 – Site Overview
- 3-6 Aerial Imagery 1967 – Site Overview
- 3-7 Aerial Imagery 1969 – Site Overview
- 3-8 Aerial Imagery 1971 – Site Overview
- 3-9 Aerial Imagery 1971 – Site Overview
- 3-10 Aerial Imagery 1978 – Site Overview
- 3-10 Aerial Imagery 1979 – Site Overview
- 3-12 Aerial Imagery 1981 – Site Overview
- 3-13 Aerial Imagery 1982 – Site Overview
- 3-14 Aerial Imagery 1986 – Site Overview
- 3-15 Aerial Imagery 1992 – Site Overview
- 3-16 Aerial Imagery 1998 – Site Overview
- 3-17 Aerial Imagery 2005 – Site Overview
- 3-18 Aerial Imagery 2008 – Site Overview
- EDR Historical Topographic Map Report


TRC - GIS
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PIER 10
SUNKEN PIER
FOX RIVER
Bylsby Ave
Gate St
Prairie Ave
N Quincy St
Chip St
Perrot St
Radisson St
Weise St
Webster Ct
43
0 200 400 Feet
1 " = 800 '
1:9,600
0 200 400 Feet
1 " = 200 '
1:2,400
LEGEND
BRIDGE OUTLINE
BRIDGE PIERS
NOTES
1. BASE MAP IMAGERY FROM BROWN COUNTY, 1938.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.
PROJECT:
WISDOT ID# 1009-03-51
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN
SHEET TITLE:
AERIAL IMAGERY 1938
SITE OVERVIEW
DRAWN BY: RHODE B
CHECKED BY: HAAK D
APPROVED BY: TURPIN P
DATE: OCTOBER 04, 2013
SCALE: 1: 2,400
DATE PRINTED:
PROJ. NO. 209074
FILE NO. 209074-1938.mxd
FIGURE 3-1
708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com
Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees
Saved By: BRHODE on 10/4/2013, 13:49:20 PM
Path: E:\WI_DOT\2013_209074\209074-1938.mxd


TRC - GIS
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SUNKEN PIER
FOX RIVER
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Gate St
Prairie Ave
N Quincy St
Chip St
Perrot St
Radisson St
Weise St
Webster Ct
43
0 200 400 Feet
1 " = 800 '
1:9,600
0 200 400 Feet
1 " = 200 '
1:2,400
LEGEND
BRIDGE OUTLINE
BRIDGE PIERS
NOTES
1. BASE MAP IMAGERY FROM USGS, 1951.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.
PROJECT:
WISDOT ID# 1009-03-51
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN
SHEET TITLE:
AERIAL IMAGERY 1951
SITE OVERVIEW
DRAWN BY: RHODE B
CHECKED BY: HAAK D
APPROVED BY: TURPIN P
DATE: OCTOBER 04, 2013
SCALE: 1: 2,400
DATE PRINTED:
PROJ. NO. 209074
FILE NO. 209074-1951.mxd
FIGURE 3-2
708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com
Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees
Saved By: BRHODE on 10/4/2013, 14:41:15 PM
Path: E:\WI_DOT\2013_209074\209074-1951.mxd


TRC - GIS
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PIER 13
PIER 12
PIER 11
PIER 10
SUNKEN PIER
FOX RIVER
Bylsby Ave
Gate St
Prairie Ave
43
0 200 400 Feet
1 " = 800 '
1:9,600
Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees
Saved By: BRHODE on 10/4/2013, 14:42:02 PM
Path: E:\WI_DOT\2013_209074\209074-1952.mxd
0 200 400 Feet
LEGEND
BRIDGE OUTLINE
BRIDGE PIERS
1 " = 200 '
1:2,400
NOTES
1. BASE MAP IMAGERY FROM UNIVERSITY OF WISCONSIN, 1952.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.
PROJECT:
WISDOT ID# 1009-03-51
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN
SHEET TITLE:
AERIAL IMAGERY 1952
SITE OVERVIEW
DRAWN BY: RHODE B
CHECKED BY: HAAK D
APPROVED BY: TURPIN P
DATE: OCTOBER 04, 2013
SCALE: 1: 2,400
DATE PRINTED:
PROJ. NO. 209074
FILE NO. 209074-1952.mxd
FIGURE 3-3
TRC
708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
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0 200 400 Feet

LEGEND

- BRIDGE OUTLINE
- BRIDGE PIERS

1 " = 200 '
1:2,400

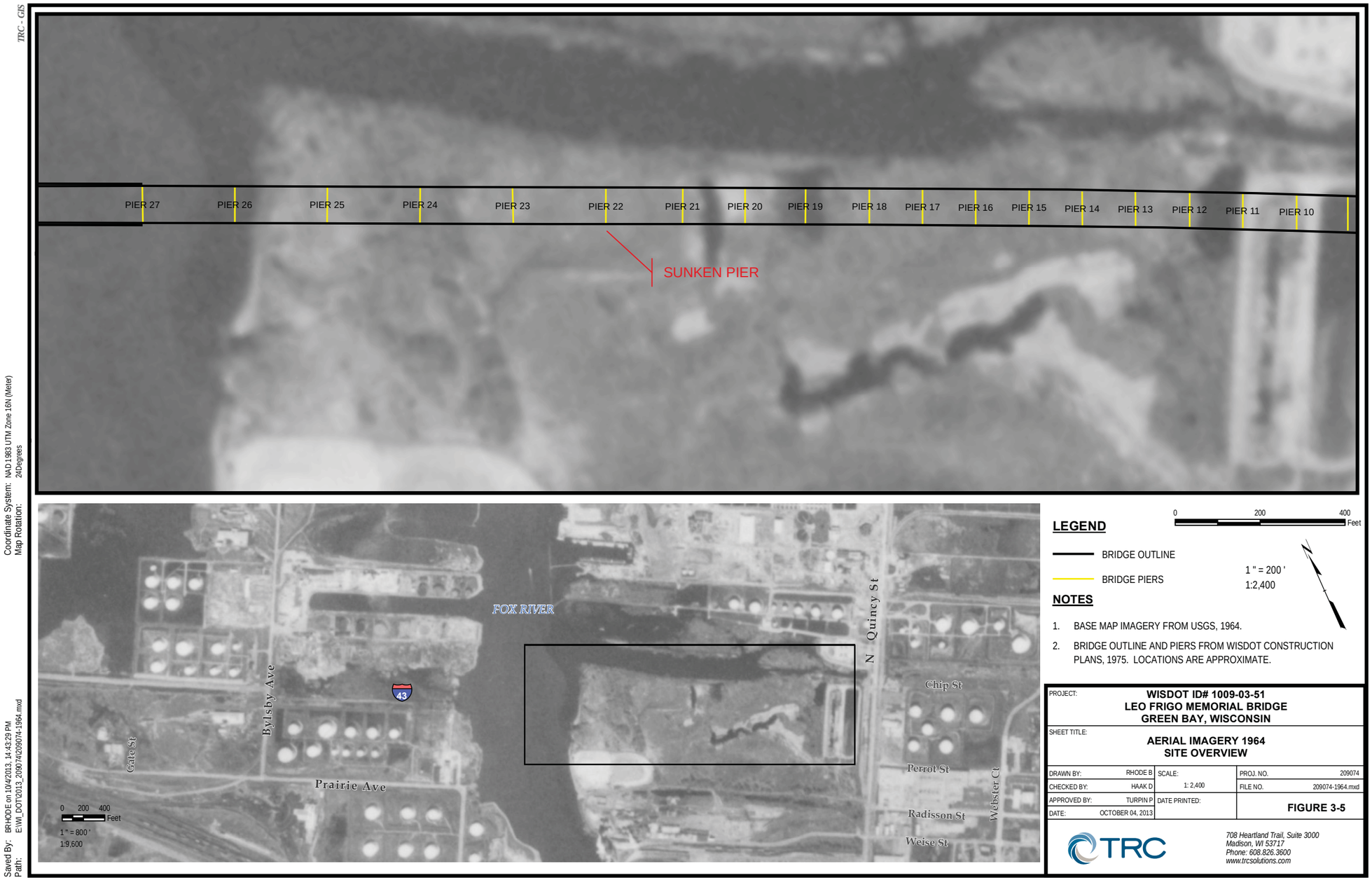
NOTES

1. BASE MAP IMAGERY FROM BROWN COUNTY, 1960.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

PROJECT:	**WISDOT ID# 1009-03-51 LEO FRIGO MEMORIAL BRIDGE GREEN BAY, WISCONSIN**		
SHEET TITLE:	**AERIAL IMAGERY 1960 SITE OVERVIEW**		
DRAWN BY: RHODE B	SCALE: 1: 2,400	PROJ. NO.	209074
CHECKED BY: HAAK D		FILE NO.	209074-1960.mxd
APPROVED BY: TURPIN P	DATE PRINTED:	**FIGURE 3-4**	
DATE: OCTOBER 04, 2013			

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Madison, WI 53717
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TRC - GIS
Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees
Saved By: BRHODE on 10/4/2013, 14:42:40 PM
Path: E:\WI_DOT\2013_209074\209074-1960.mxd



0 200 400 Feet

LEGEND

BRIDGE OUTLINE

BRIDGE PIERS

1 " = 200 '
1:2,400

NOTES

1. BASE MAP IMAGERY FROM USGS, 1964.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

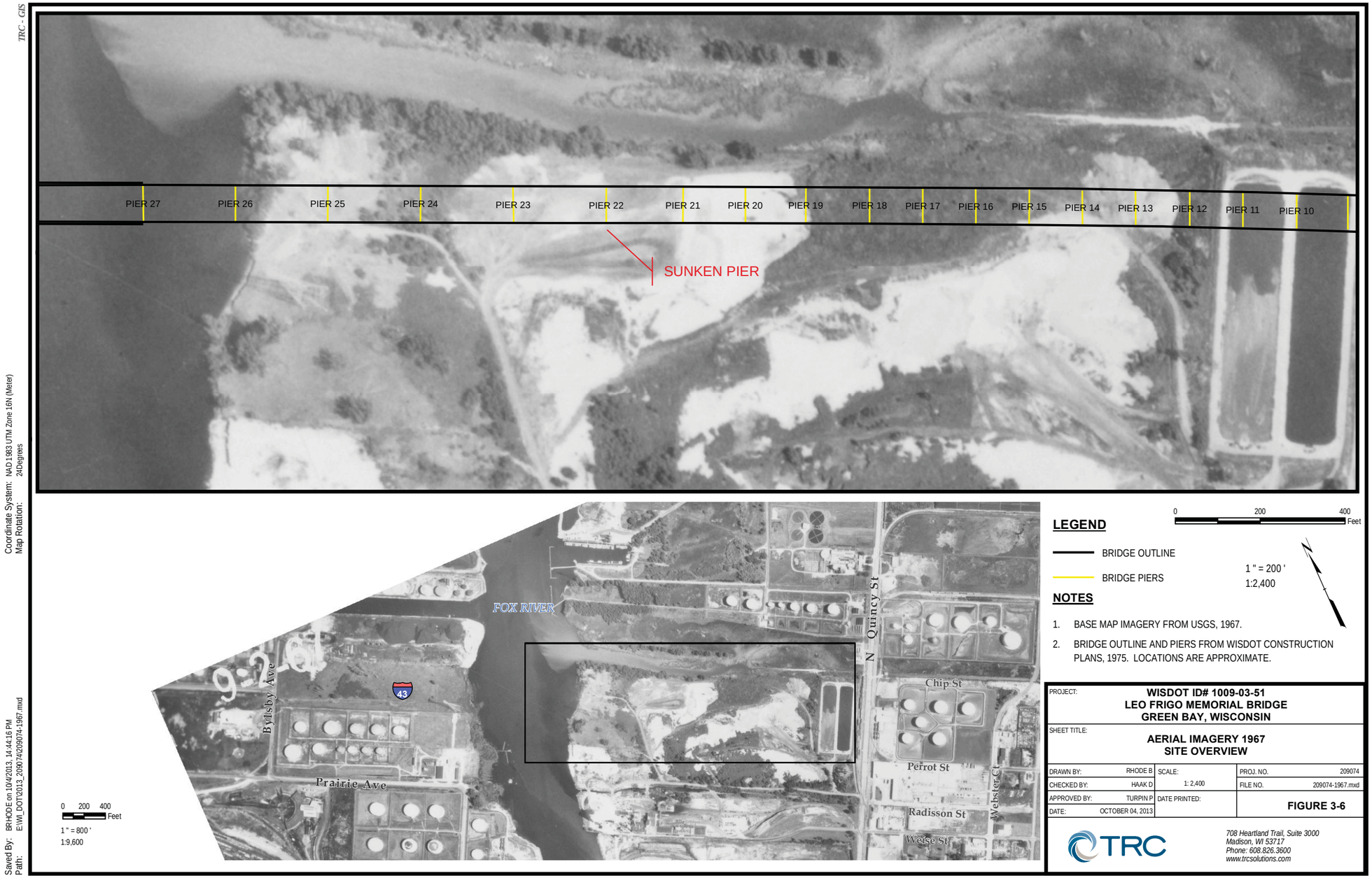
PROJECT:	**WISDOT ID# 1009-03-51 LEO FRIGO MEMORIAL BRIDGE GREEN BAY, WISCONSIN**		
SHEET TITLE:	**AERIAL IMAGERY 1964 SITE OVERVIEW**		
DRAWN BY: RHODE B	SCALE: 1: 2,400	PROJ. NO.	209074
CHECKED BY: HAAK D		FILE NO.	209074-1964.mxd
APPROVED BY: TURPIN P	DATE PRINTED:	**FIGURE 3-5**	
DATE: OCTOBER 04, 2013			

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Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees

Saved By: BRHODE on 10/4/2013, 14:43:29 PM
Path: E:\WI_DOT\2013_209074\209074-1964.mxd


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PIER 12
PIER 11
PIER 10
SUNKEN PIER
FOX RIVER
Bridge Rd
Bridge Rd
Bridge Rd



TRC - GIS

Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees

Saved By: BRHODE on 10/4/2013, 14:45:03 PM
Path: E:\WI_DOT\2013_209074\209074-1969.mxd

0 200 400 Feet

1 " = 200 '
1:2,400

LEGEND

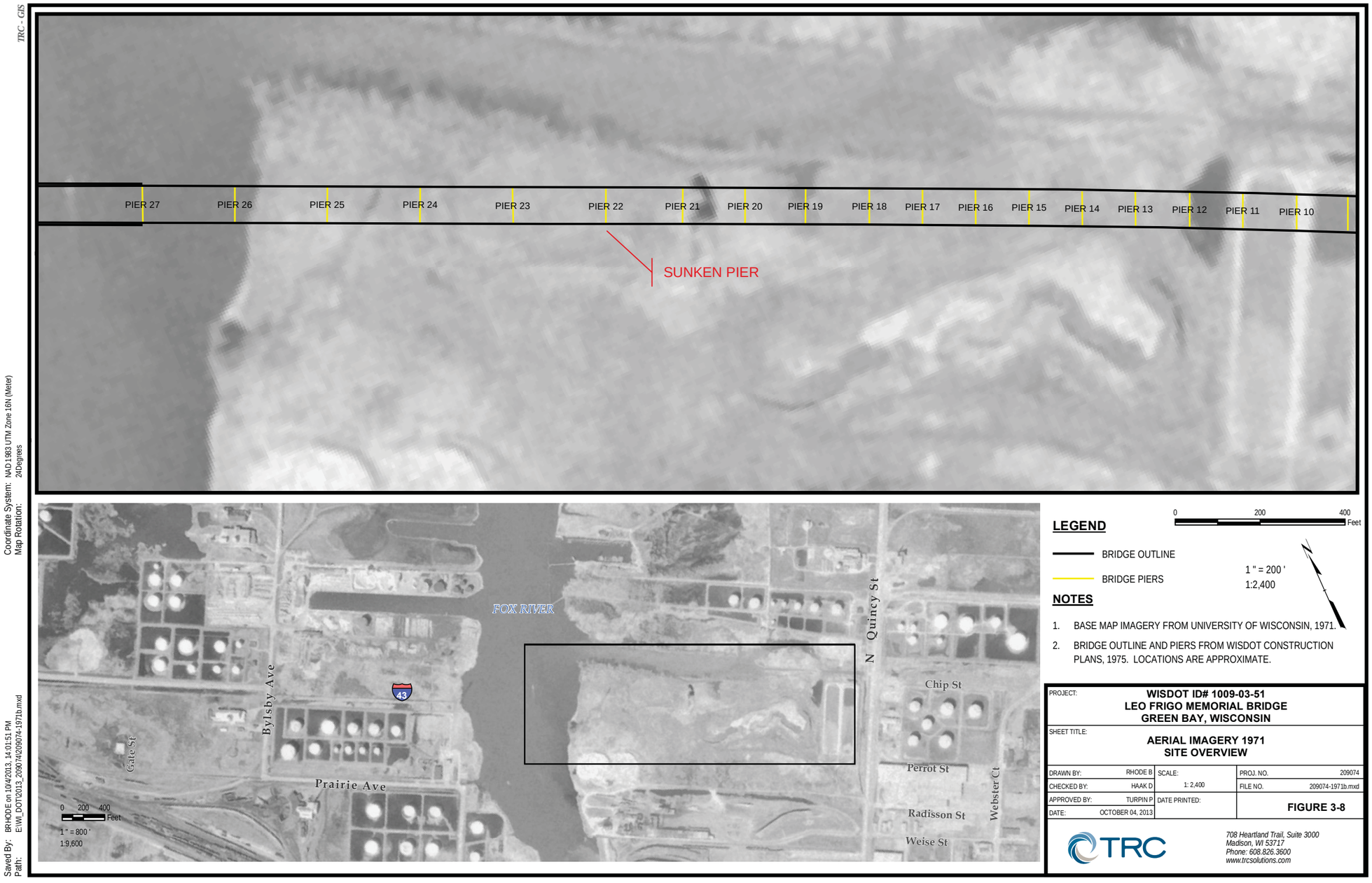
- BRIDGE OUTLINE
- BRIDGE PIERS

NOTES

1. BASE MAP IMAGERY FROM USGS, 1969.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

PROJECT:	**WISDOT ID# 1009-03-51 LEO FRIGO MEMORIAL BRIDGE GREEN BAY, WISCONSIN**		
SHEET TITLE:	**AERIAL IMAGERY 1969 SITE OVERVIEW**		
DRAWN BY: RHODE B	SCALE: 1: 2,400	PROJ. NO.	209074
CHECKED BY: HAAK D		FILE NO.	209074-1969.mxd
APPROVED BY: TURPIN P	DATE PRINTED:	**FIGURE 3-7**	
DATE: OCTOBER 04, 2013			

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Madison, WI 53717
Phone: 608.826.3600
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SUNKEN PIER
FOX RIVER
N Quincy St
Bylsby Ave
Gate St
Prairie Ave
Chip St
Perrot St
Radisson St
Weise St
Webster Ct
43
0 200 400 Feet
1 " = 800 '
1:9,600
0 200 400 Feet
LEGEND
BRIDGE OUTLINE
BRIDGE PIERS
1 " = 200 '
1:2,400
NOTES
1. BASE MAP IMAGERY FROM UNIVERSITY OF WISCONSIN, 1971.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.
PROJECT:
WISDOT ID# 1009-03-51
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN
SHEET TITLE:
AERIAL IMAGERY 1971
SITE OVERVIEW
DRAWN BY: RHODE B
CHECKED BY: HAAK D
APPROVED BY: TURPIN P
DATE: OCTOBER 04, 2013
SCALE: 1: 2,400
DATE PRINTED:
PROJ. NO. 209074
FILE NO. 209074-1971b.mxd
FIGURE 3-8
708 Heartland Trail, Suite 3000
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Phone: 608.826.3600
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Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees
Saved By: BRHODE on 10/4/2013, 14:01:51 PM
Path: E:\WI_DOT\2013_209074\209074-1971b.mxd



TRC - GIS

Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees

Saved By: BRHODE on 10/4/2013, 14:46:21 PM
Path: E:\WI_DOT\2013_209074\209074-1971.mxd

0 200 400 Feet

1 " = 200 '
1:2,400

LEGEND

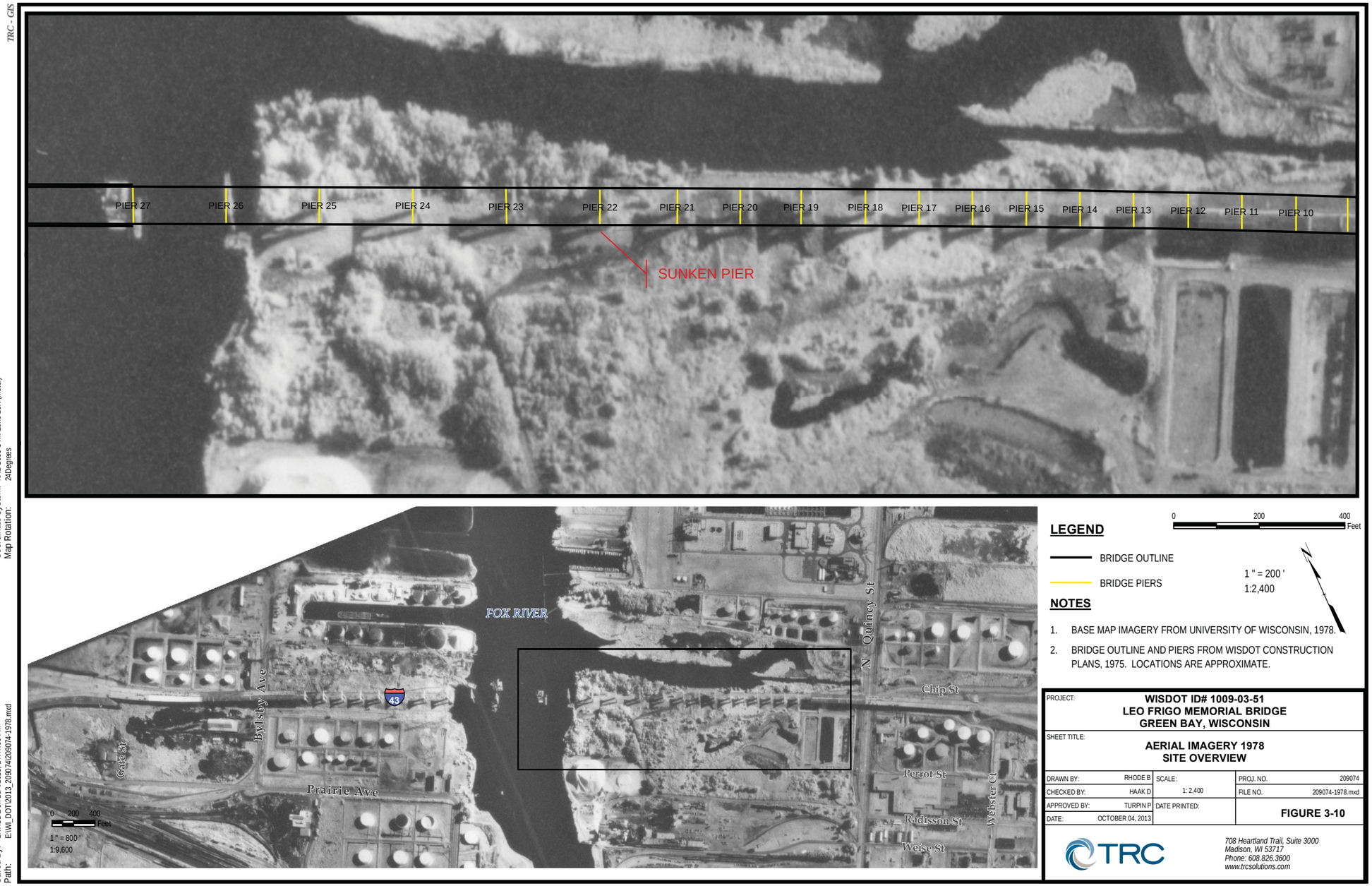
- BRIDGE OUTLINE
- BRIDGE PIERS

NOTES

1. BASE MAP IMAGERY FROM USGS, 1971.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

PROJECT:	**WISDOT ID# 1009-03-51 LEO FRIGO MEMORIAL BRIDGE GREEN BAY, WISCONSIN**		
SHEET TITLE:	**AERIAL IMAGERY 1971 SITE OVERVIEW**		
DRAWN BY: RHODE B	SCALE: 1: 2,400	PROJ. NO.	209074
CHECKED BY: HAAK D		FILE NO.	209074-1971.mxd
APPROVED BY: TURPIN P	DATE PRINTED:	**FIGURE 3-9**	
DATE: OCTOBER 04, 2013			

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TRC - GIS

Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees

Saved By: BRHODE on 10/4/2013, 14:47:00 PM
Path: E:\WI_DOT\2013_209074\209074-1978.mxd

LEGEND

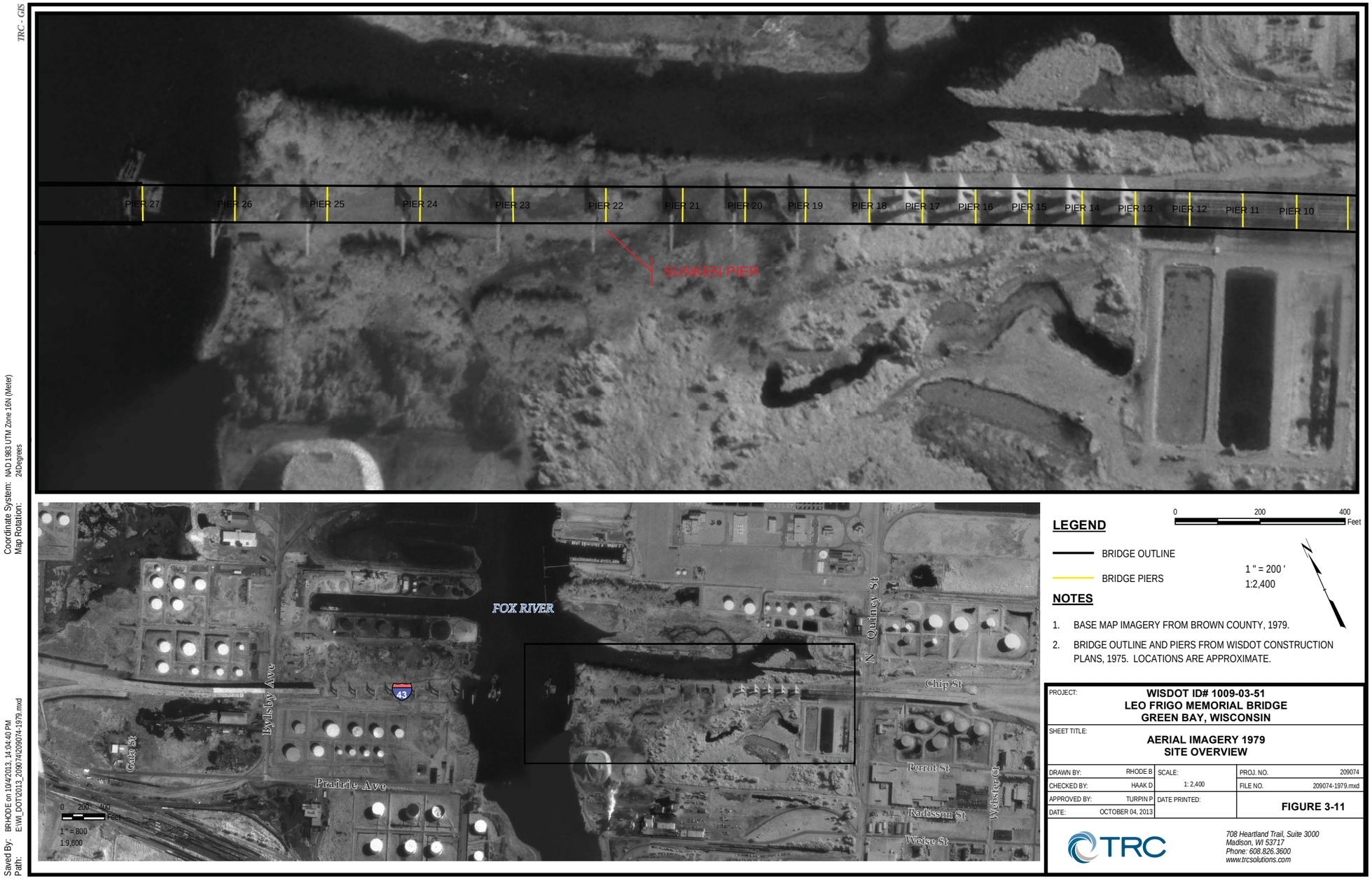
- BRIDGE OUTLINE
- BRIDGE PIERS

NOTES

1. BASE MAP IMAGERY FROM UNIVERSITY OF WISCONSIN, 1978.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

PROJECT:	WISDOT ID# 1009-03-51 LEO FRIGO MEMORIAL BRIDGE GREEN BAY, WISCONSIN		
SHEET TITLE:	AERIAL IMAGERY 1978 SITE OVERVIEW		
DRAWN BY: RHODE B	SCALE: 1: 2,400	PROJ. NO.	209074
CHECKED BY: HAAK D		FILE NO.	209074-1978.mxd
APPROVED BY: TURPIN P	DATE PRINTED:	FIGURE 3-10	
DATE: OCTOBER 04, 2013			

TRC
708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
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TRC - GIS

Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees

Saved By: BRHODE on 10/4/2013, 14:04:40 PM
Path: E:\WI_DOT\2013_209074\209074-1979.mxd

0 200 400 Feet

1 " = 200 '
1:2,400

LEGEND

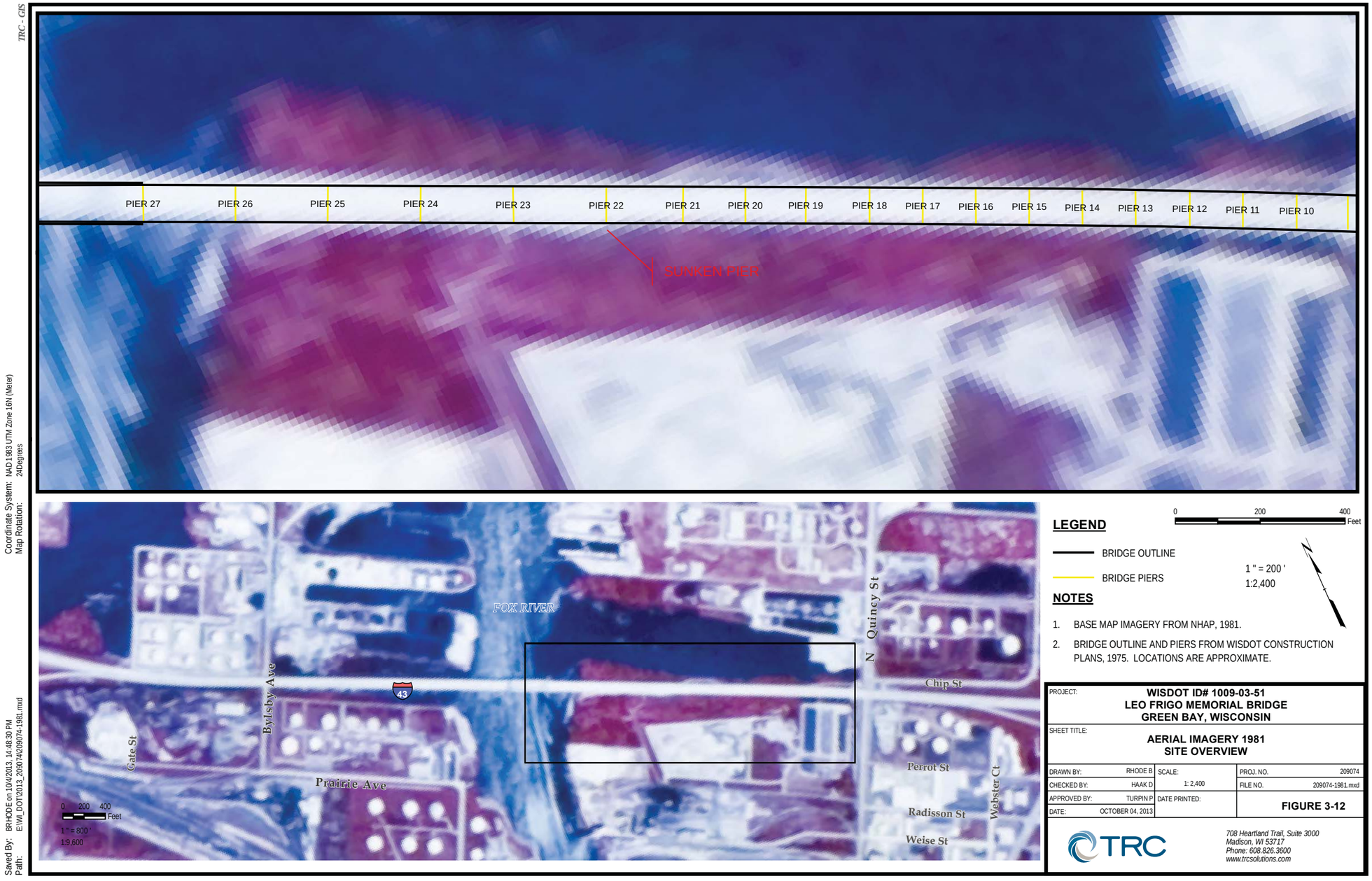
- BRIDGE OUTLINE
- BRIDGE PIERS

NOTES

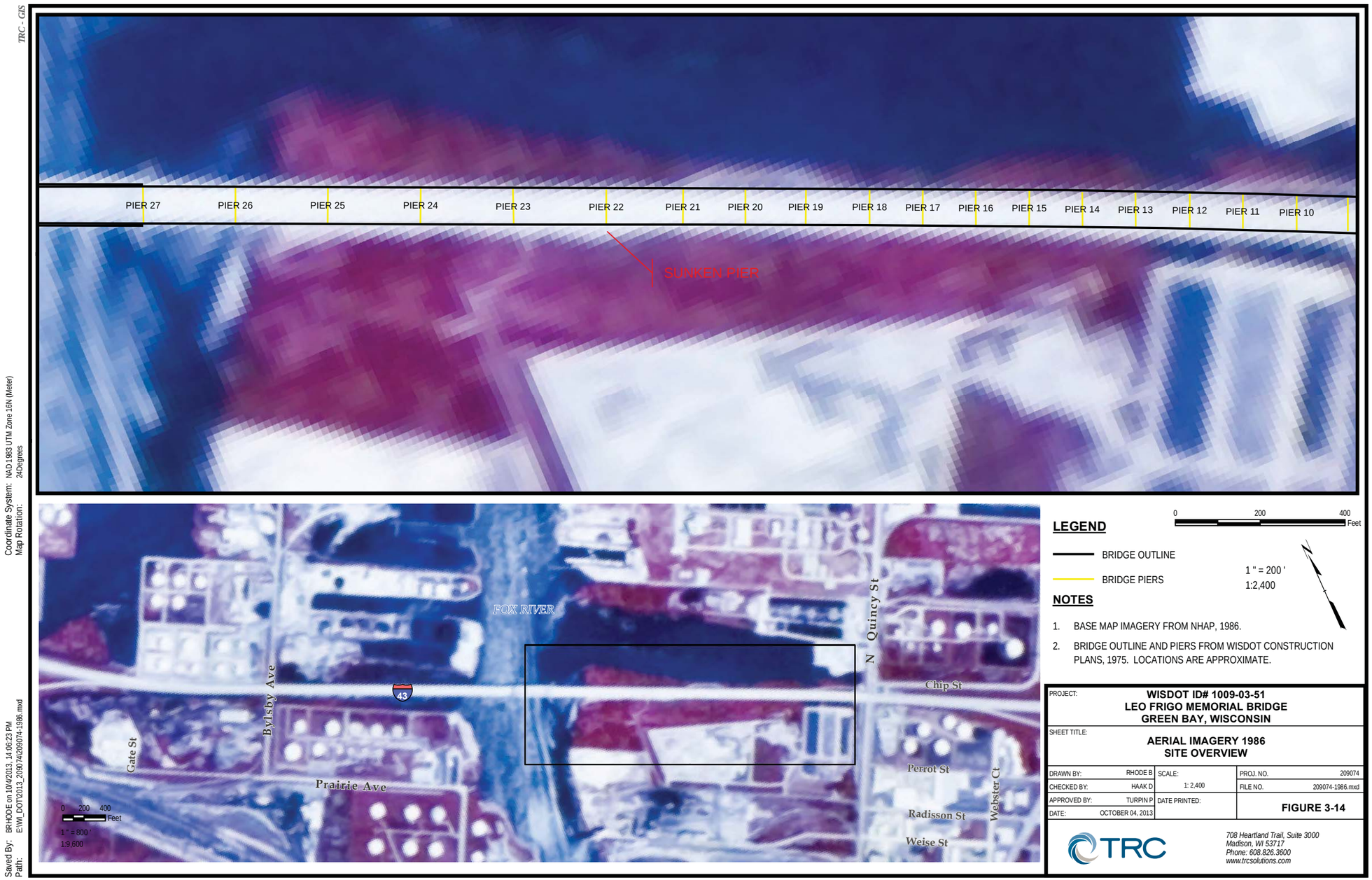
1. BASE MAP IMAGERY FROM BROWN COUNTY, 1979.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

PROJECT:	WISDOT ID# 1009-03-51 LEO FRIGO MEMORIAL BRIDGE GREEN BAY, WISCONSIN		
SHEET TITLE:	AERIAL IMAGERY 1979 SITE OVERVIEW		
DRAWN BY: RHODE B	SCALE: 1: 2,400	PROJ. NO.	209074
CHECKED BY: HAAK D		FILE NO.	209074-1979.mxd
APPROVED BY: TURPIN P	DATE PRINTED:	FIGURE 3-11	
DATE: OCTOBER 04, 2013			

TRC
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PIER 10
SUNKEN PIER
FOX RIVER
N Quincy St
Bylsby Ave
Gate St
Prairie Ave
Chip St
Perrot St
Radisson St
Weise St
Webster Ct
43
0 200 400 Feet
1 " = 800 '
1:9,600
0 200 400 Feet
1 " = 200 '
1:2,400
LEGEND
BRIDGE OUTLINE
BRIDGE PIERS
NOTES
1. BASE MAP IMAGERY FROM NHAP, 1981.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.
PROJECT:
WISDOT ID# 1009-03-51
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN
SHEET TITLE:
AERIAL IMAGERY 1981
SITE OVERVIEW
DRAWN BY: RHODE B
CHECKED BY: HAAK D
APPROVED BY: TURPIN P
DATE: OCTOBER 04, 2013
SCALE: 1: 2,400
DATE PRINTED:
PROJ. NO. 209074
FILE NO. 209074-1981.mxd
FIGURE 3-12
TRC
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Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com
Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees
Saved By: BRHODE on 10/4/2013, 14:48:30 PM
Path: E:\WI_DOT\2013_209074\209074-1981.mxd


TRC - GIS
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SUNKEN PIER
FOX RIVER
N Quincy St
Bylsby Ave
Gate St
Prairie Ave
Chip St
Perrot St
Radisson St
Weise St
Webster Ct
43
0 200 400 Feet
1 " = 800 '
1:9,600
0 200 400 Feet
LEGEND
BRIDGE OUTLINE
BRIDGE PIERS
1 " = 200 '
1:2,400
NOTES
1. BASE MAP IMAGERY FROM NHAP, 1982.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.
PROJECT:
WISDOT ID# 1009-03-51
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN
SHEET TITLE:
AERIAL IMAGERY 1982
SITE OVERVIEW
DRAWN BY: RHODE B
CHECKED BY: HAAK D
APPROVED BY: TURPIN P
DATE: OCTOBER 04, 2013
SCALE: 1: 2,400
DATE PRINTED:
PROJ. NO. 209074
FILE NO. 209074-1982.mxd
FIGURE 3-13
TRC
708 Heartland Trail, Suite 3000
Madison, WI 53717
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Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees
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Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees

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0 200 400 Feet

LEGEND

- BRIDGE OUTLINE
- BRIDGE PIERS

1 " = 200 '
1:2,400

NOTES

1. BASE MAP IMAGERY FROM NHAP, 1986.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

PROJECT:
WISDOT ID# 1009-03-51
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN

SHEET TITLE:
AERIAL IMAGERY 1986
SITE OVERVIEW

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CHECKED BY: HAAK D		FILE NO. 209074-1986.mxd	
APPROVED BY: TURPIN P	DATE PRINTED:	**FIGURE 3-14**	
DATE: OCTOBER 04, 2013			

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Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees

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0 200 400 Feet

1 " = 200 '
1:2,400

LEGEND

- BRIDGE OUTLINE
- BRIDGE PIERS

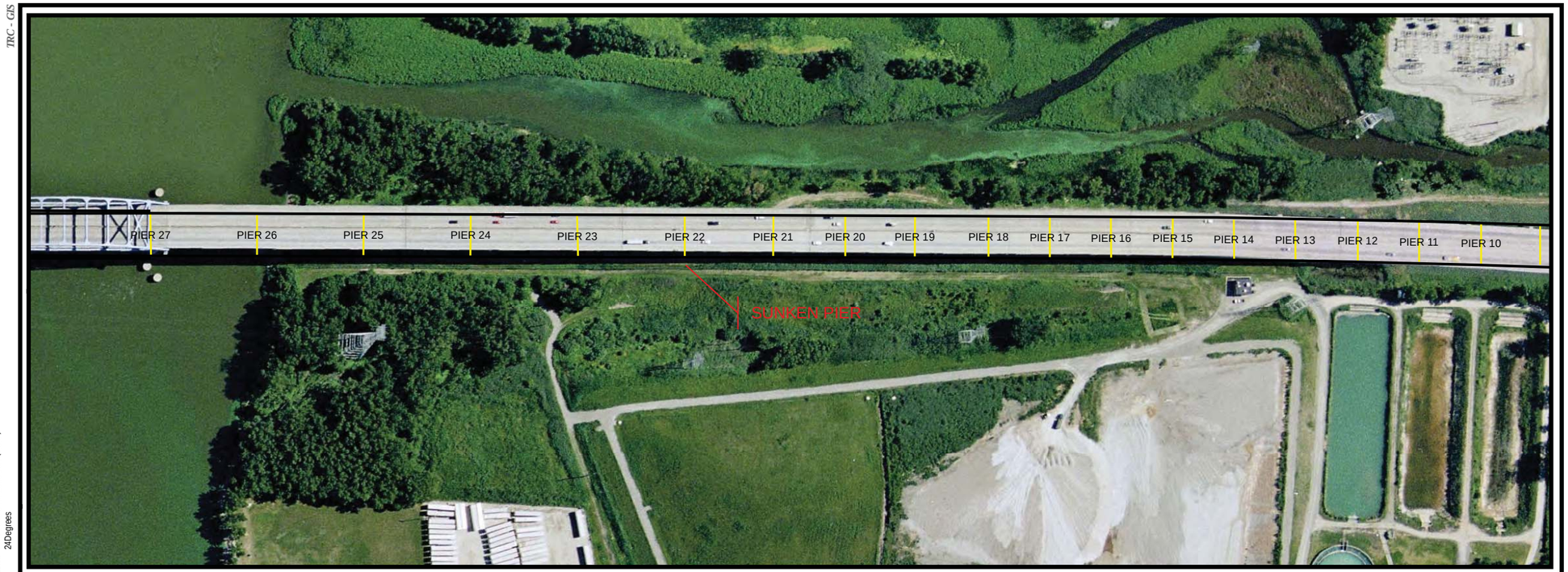
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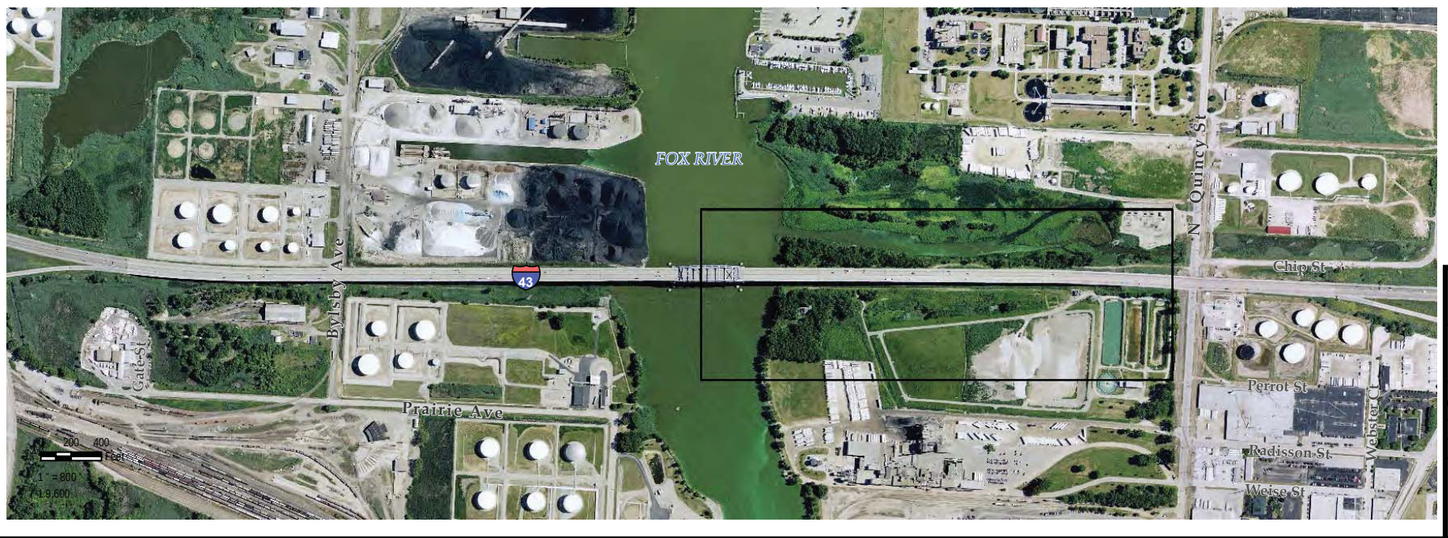
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2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

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CHECKED BY: HAAK D			FILE NO. 209074-1992.mxd
APPROVED BY: TURPIN P		DATE PRINTED:	**FIGURE 3-15**
DATE: OCTOBER 04, 2013			

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PIER 27
PIER 26
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PIER 22
PIER 21
PIER 20
PIER 19
PIER 18
PIER 17
PIER 16
PIER 15
PIER 14
PIER 13
PIER 12
PIER 11
PIER 10
SUNKEN PIER
FOX RIVER
Bylsby Ave
Gate St
Prairie Ave
N Quincy St
Chip St
Perrot St
Radisson St
Weise St
Webster Ct
43
0 200 400 Feet
1 " = 800 '
1:9,600
0 200 400 Feet
1 " = 200 '
1:2,400
LEGEND
BRIDGE OUTLINE
BRIDGE PIERS
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1. BASE MAP IMAGERY FROM USGS, 1998.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.
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LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN
SHEET TITLE:
AERIAL IMAGERY 1998
SITE OVERVIEW
DRAWN BY: RHODE B
CHECKED BY: HAAK D
APPROVED BY: TURPIN P
DATE: OCTOBER 04, 2013
SCALE: 1: 2,400
DATE PRINTED:
PROJ. NO. 209074
FILE NO. 209074-1998.mxd
FIGURE 3-16
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0 200 400 Feet

LEGEND

BRIDGE OUTLINE

BRIDGE PIERS

1 " = 200 '
1:2,400

NOTES

1. BASE MAP IMAGERY FROM USGS, 2005.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

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SHEET TITLE:	**AERIAL IMAGERY 2005 SITE OVERVIEW**

DRAWN BY:	RHODE B	SCALE:	PROJ. NO. 209074
CHECKED BY:	HAAK D	1: 2,400	FILE NO. 209074-2005.mxd
APPROVED BY:	TURPIN P	DATE PRINTED:	**FIGURE 3-17**
DATE:	OCTOBER 04, 2013		

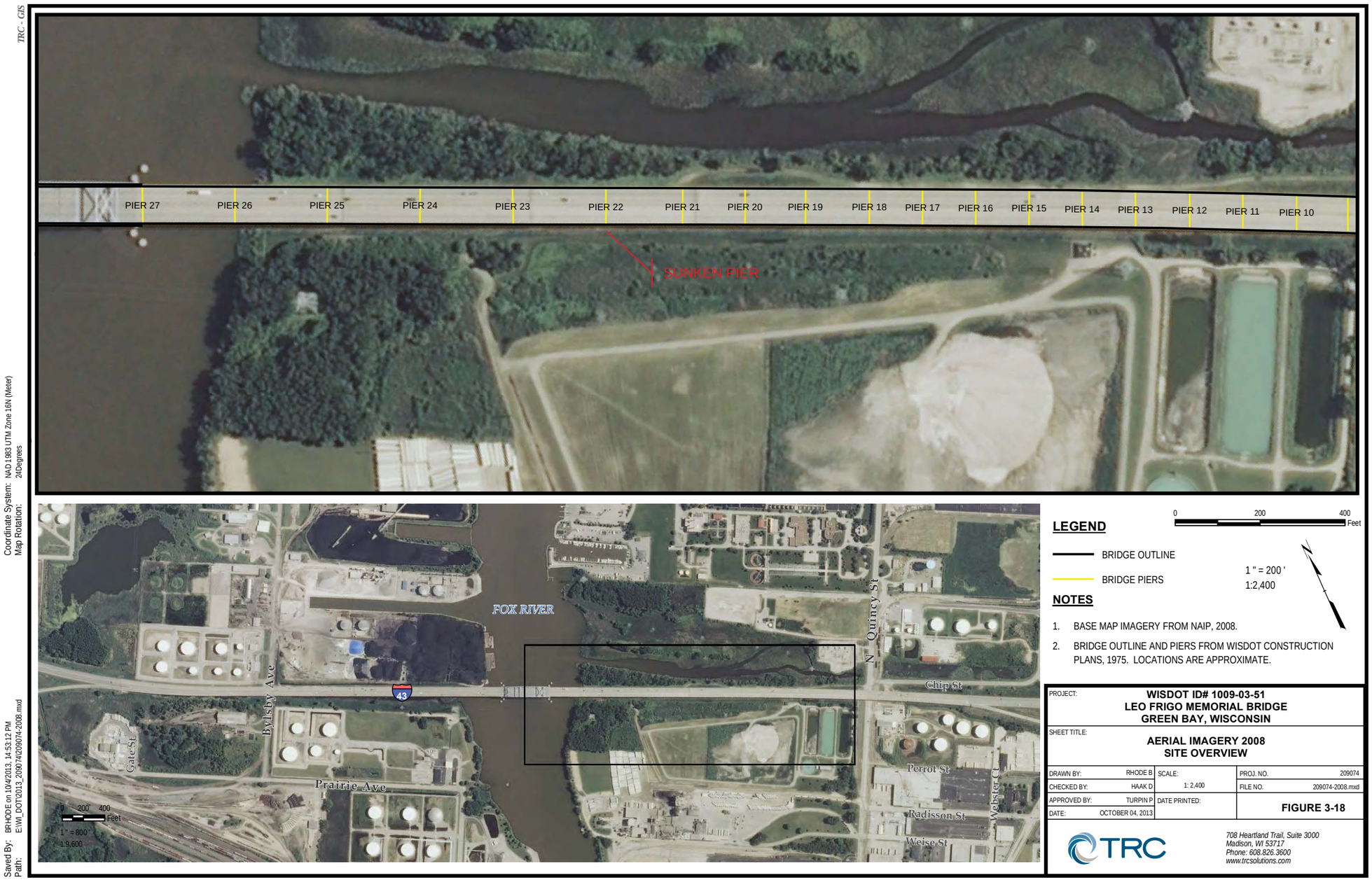
TRC

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Map Rotation: 24Degrees

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Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees

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0 200 400 Feet

LEGEND

- BRIDGE OUTLINE
- BRIDGE PIERS

1 " = 200 '
1:2,400

NOTES

1. BASE MAP IMAGERY FROM NAIP, 2008.
2. BRIDGE OUTLINE AND PIERS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

PROJECT:	**WISDOT ID# 1009-03-51 LEO FRIGO MEMORIAL BRIDGE GREEN BAY, WISCONSIN**		
SHEET TITLE:	**AERIAL IMAGERY 2008 SITE OVERVIEW**		
DRAWN BY: RHODE B		SCALE: 1: 2,400	PROJ. NO. 209074
CHECKED BY: HAAK D			FILE NO. 209074-2008.mxd
APPROVED BY: TURPIN P		DATE PRINTED:	**FIGURE 3-18**
DATE: OCTOBER 04, 2013			

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Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com

I43 WisDOT Green Bay Bridge
I-43 and Fox River
Green Bay, WI 54302

Inquiry Number: 3742604.4
September 30, 2013

EDR Historical Topographic Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

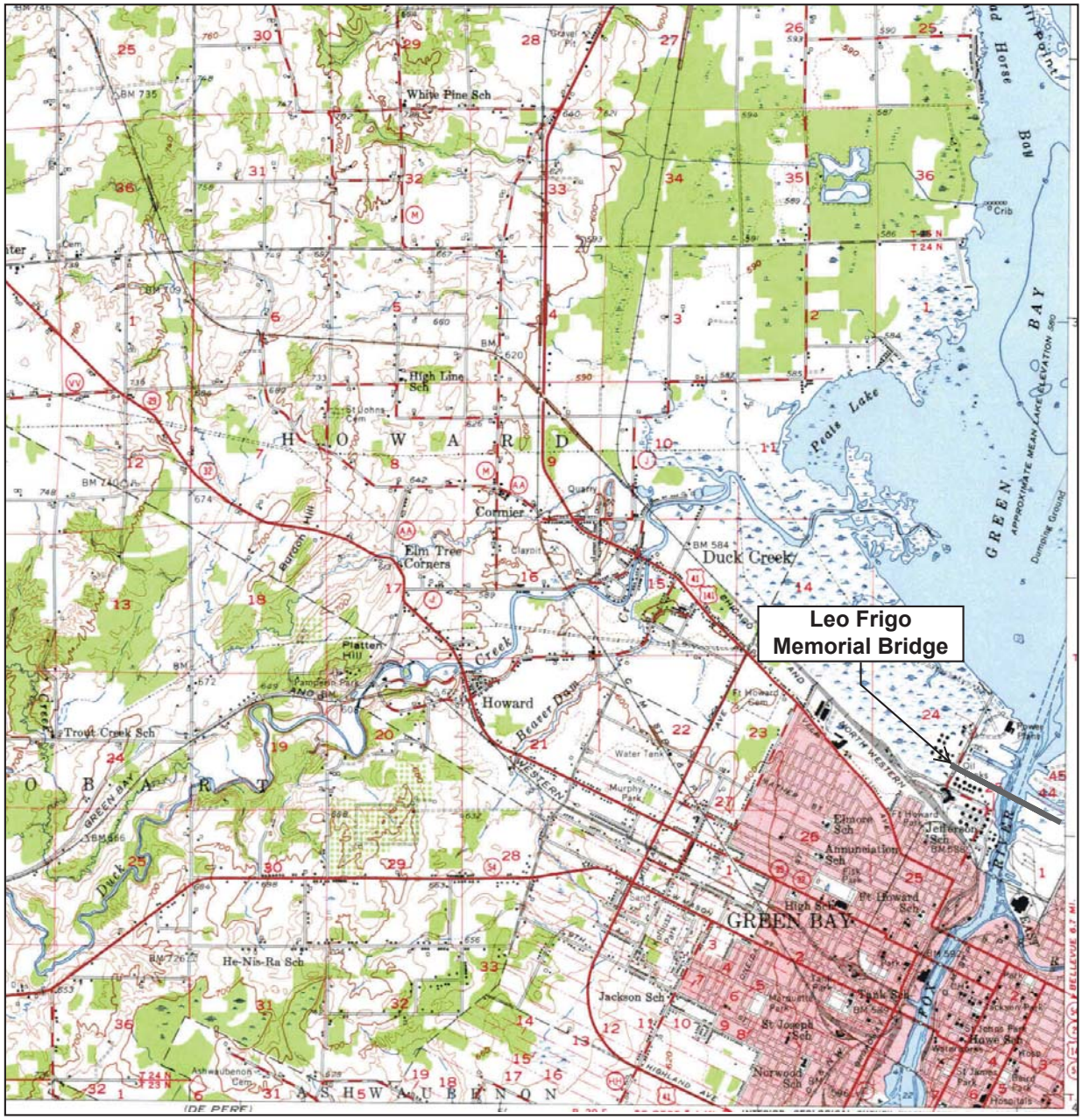
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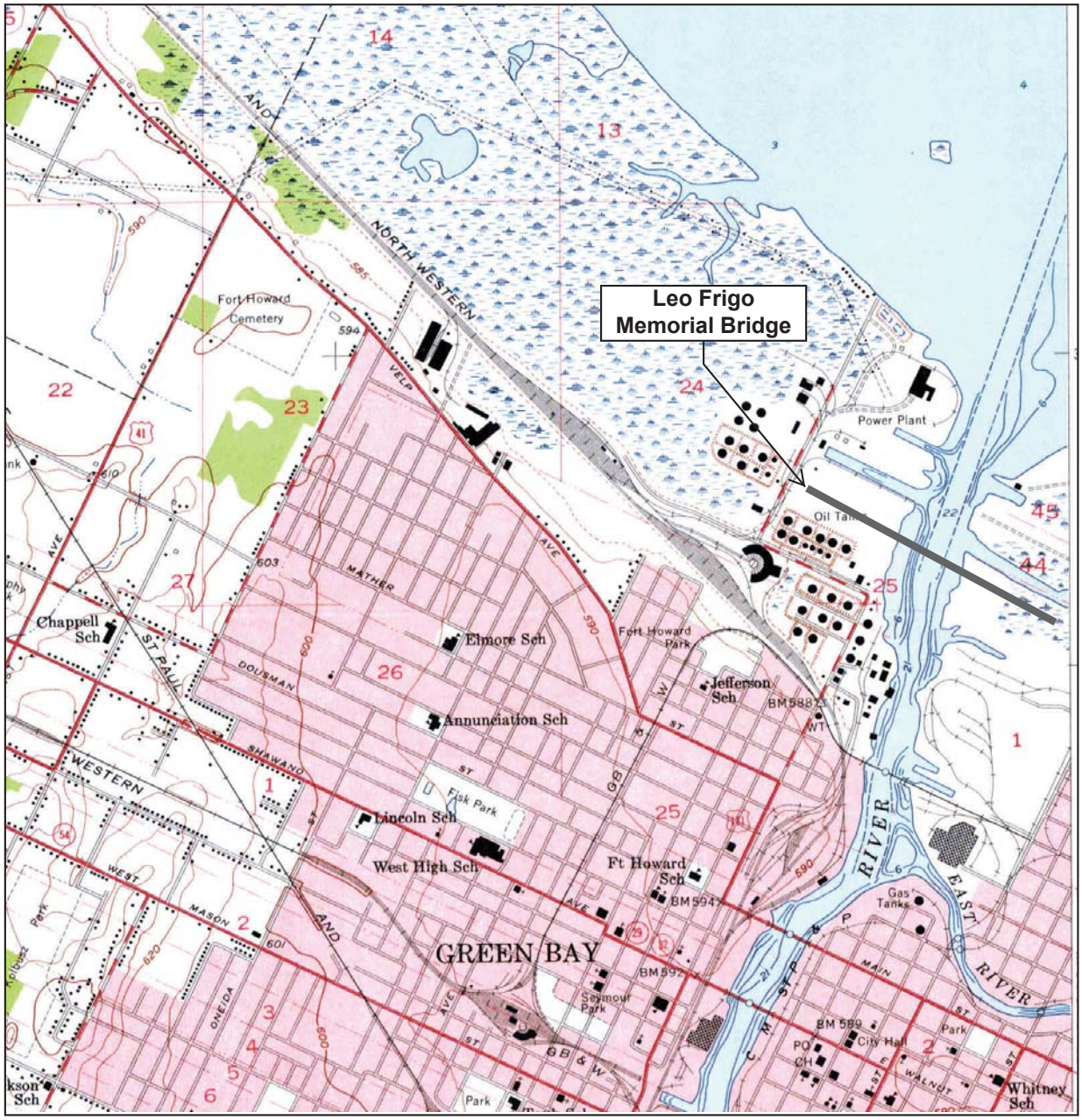
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Historical Topographic Map



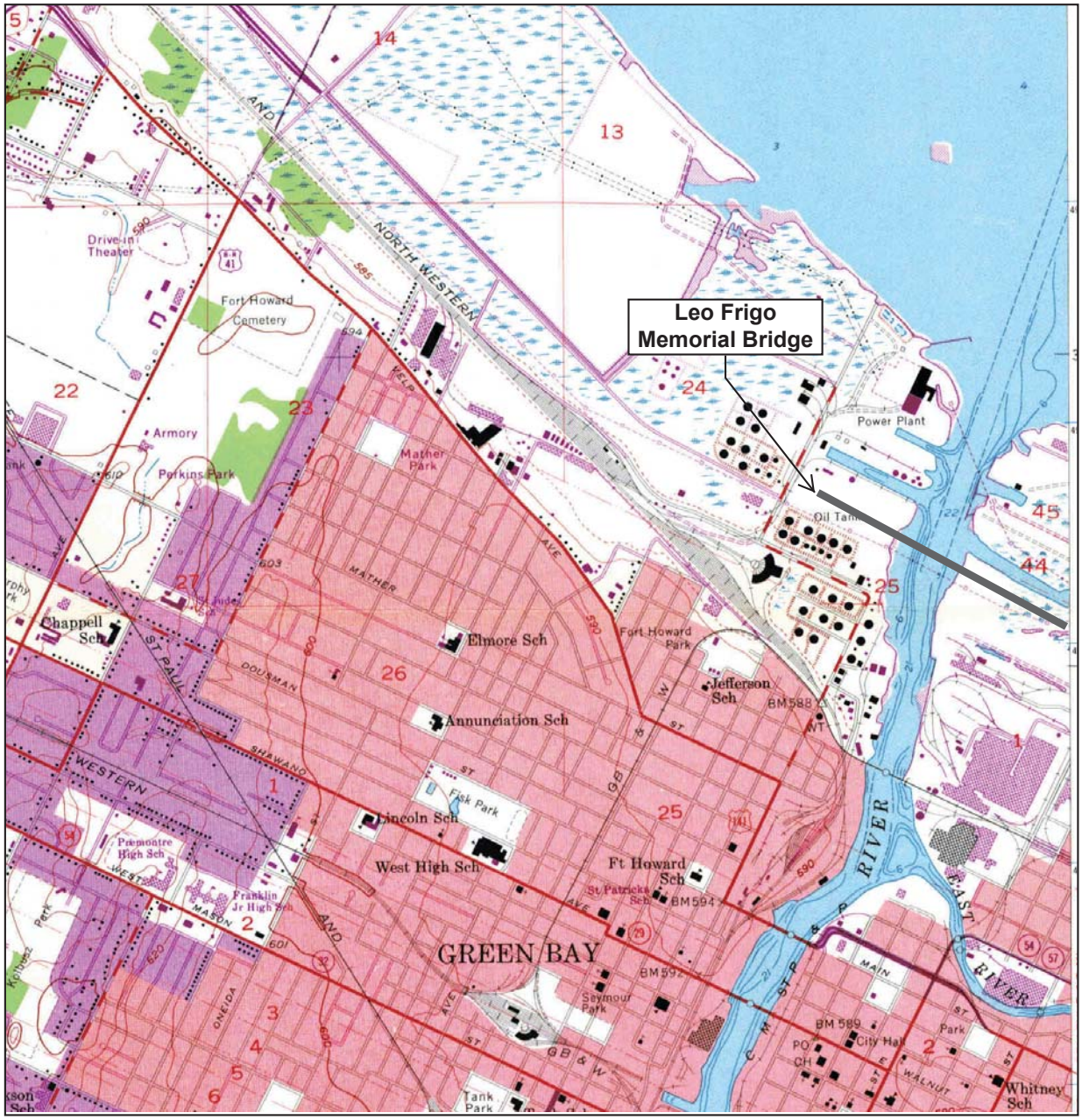
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Historical Topographic Map



N	TARGET QUAD NAME: GREEN BAY WEST MAP YEAR: 1954 SERIES: 7.5 SCALE: 1:24000	SITE NAME: I43 WisDOT Green Bay Bridge ADDRESS: I-43 and Fox River Green Bay, WI 54302 LAT/LONG: 44.5333 / -88.0077	CLIENT: TRC CONTACT: Dave Whitford and Dean INQUIRY#: 3742604.4 RESEARCH DATE: 09/30/2013 Modified by TRC, 10/2/13

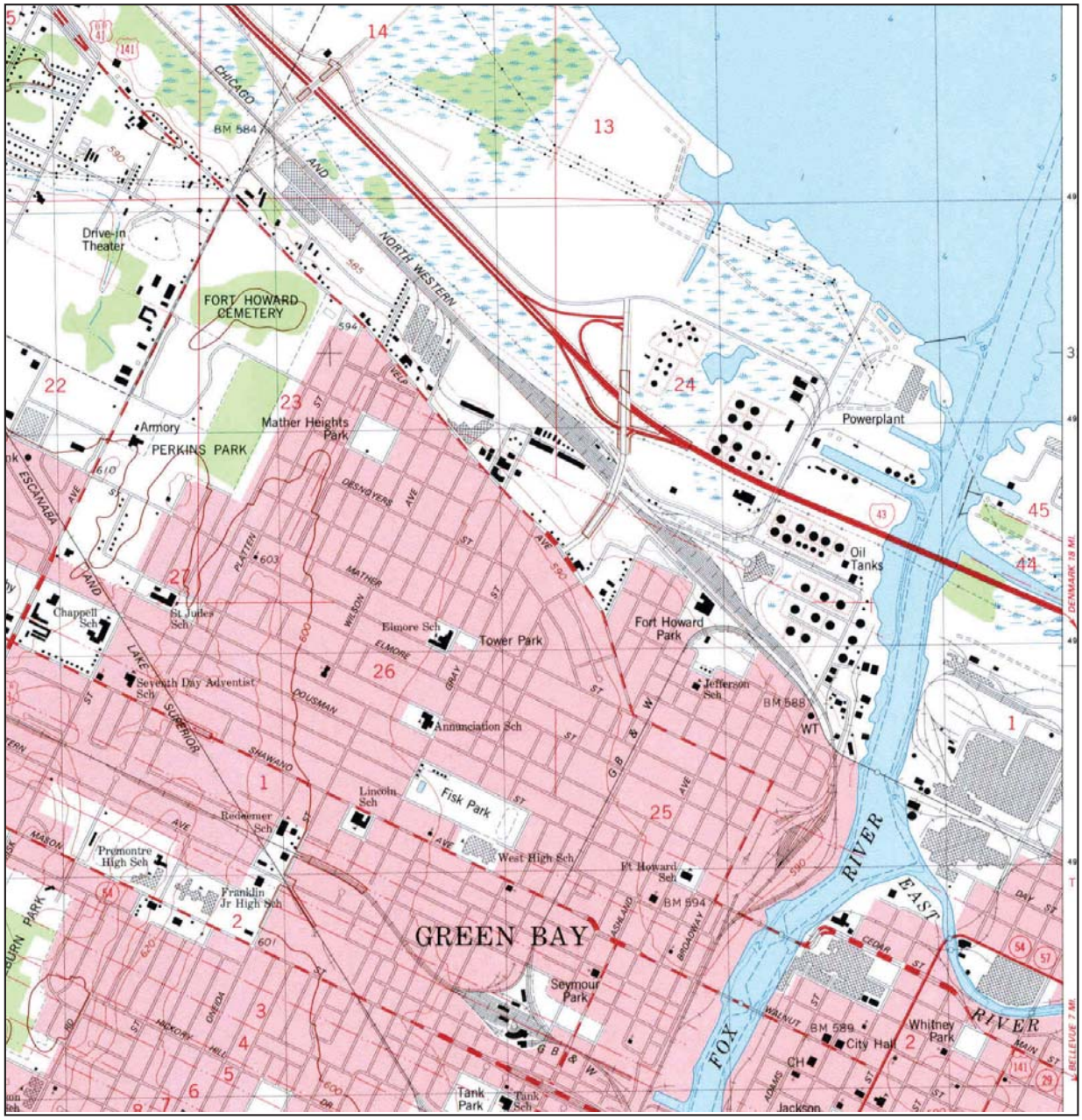
Historical Topographic Map



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	MAP YEAR:	1971	ADDRESS:	I-43 and Fox River	INQUIRY#:	3742604.4
	PHOTOREVISED FROM	:1954		Green Bay, WI 54302	RESEARCH DATE:	09/30/2013
	SERIES:	7.5	LAT/LONG:	44.5333 / -88.0077		
	SCALE:	1:24000				

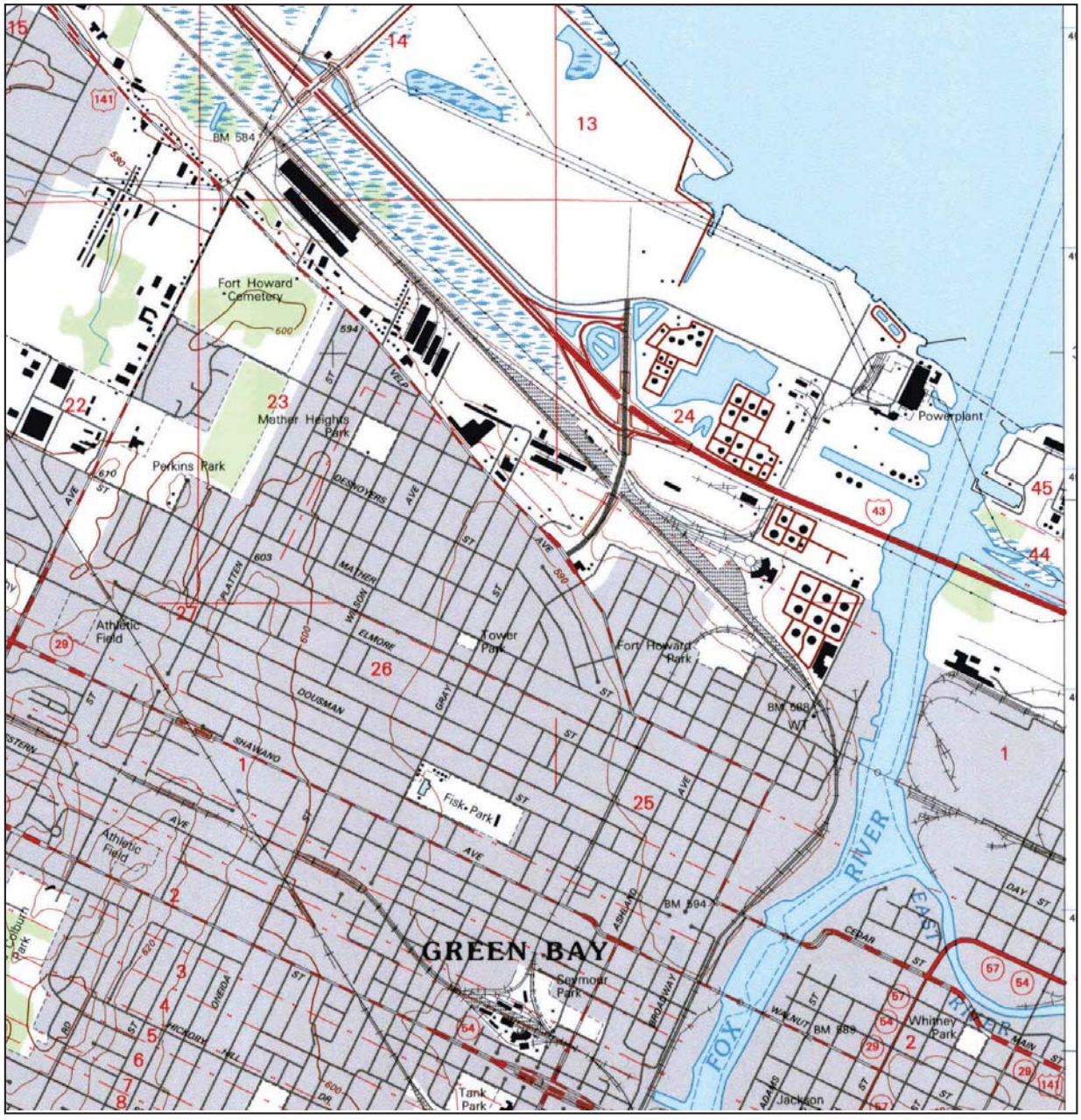
Modified by TRC, 10/2/13

Historical Topographic Map



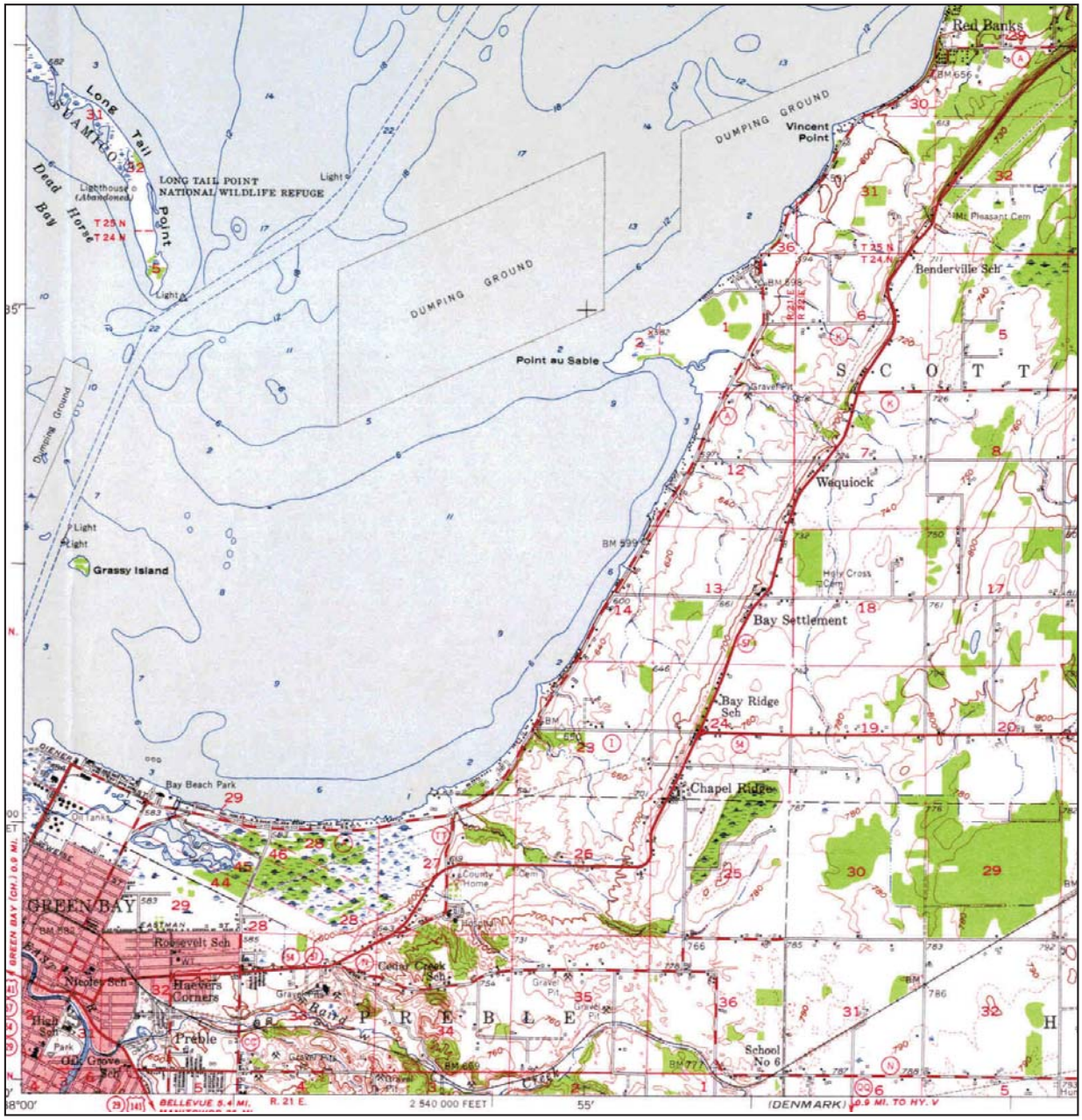
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Historical Topographic Map



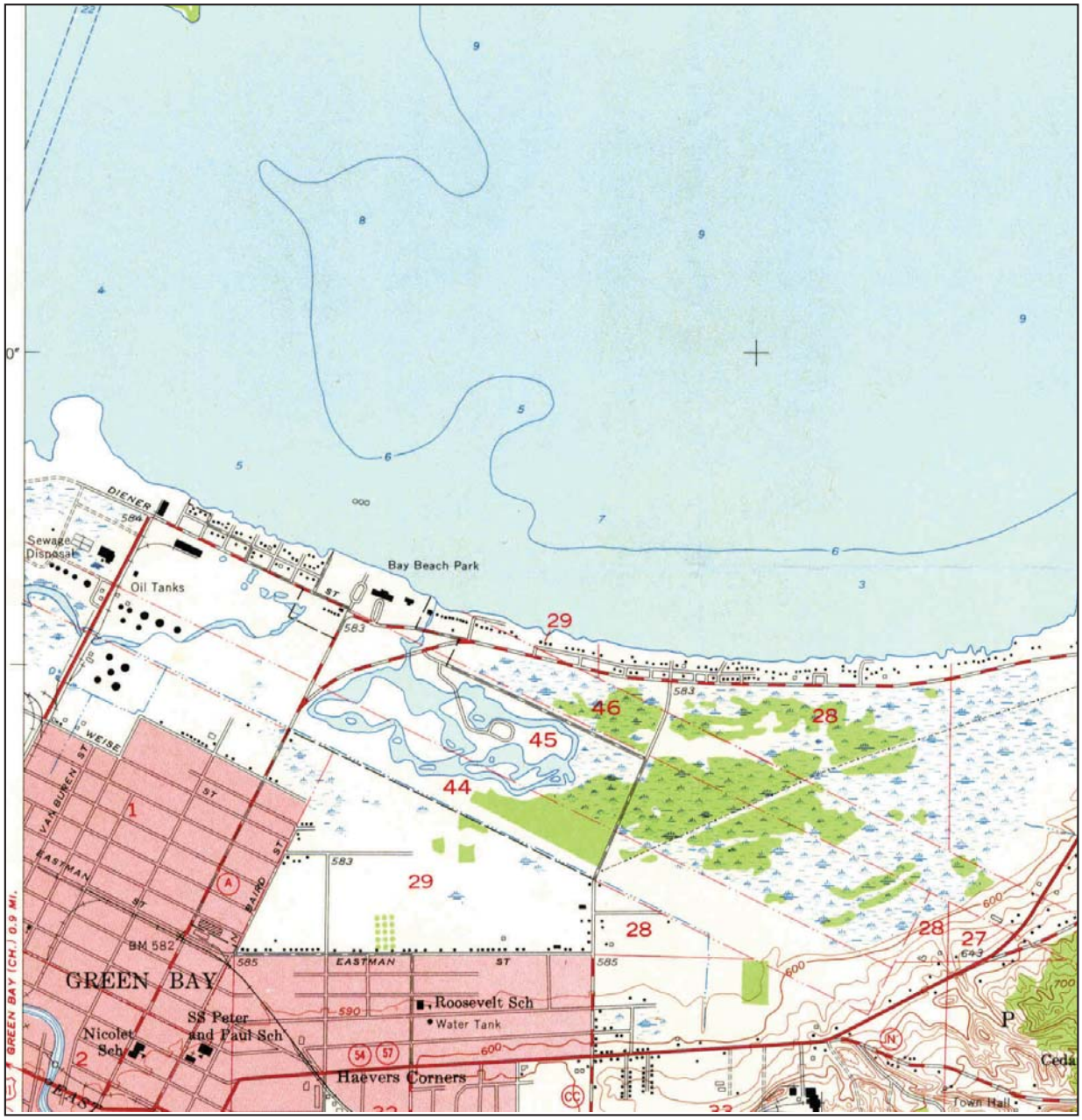
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	NAME:	GREEN BAY WEST	ADDRESS:	I-43 and Fox River Green Bay, WI 54302	CONTACT:	Dave Whitford and Dean
	MAP YEAR:	1992	LAT/LONG:	44.5333 / -88.0077	INQUIRY#:	3742604.4
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Historical Topographic Map



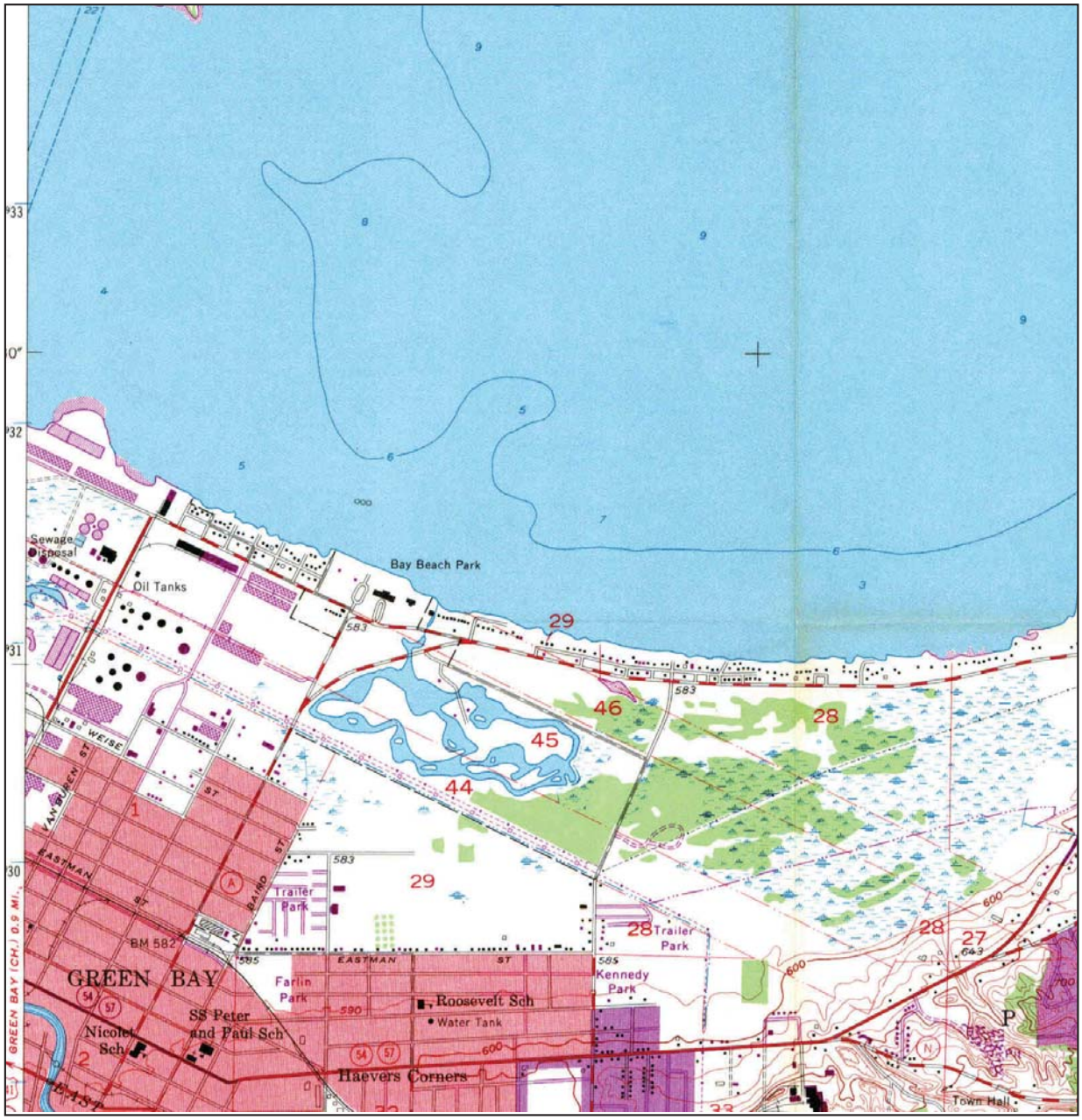
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Historical Topographic Map



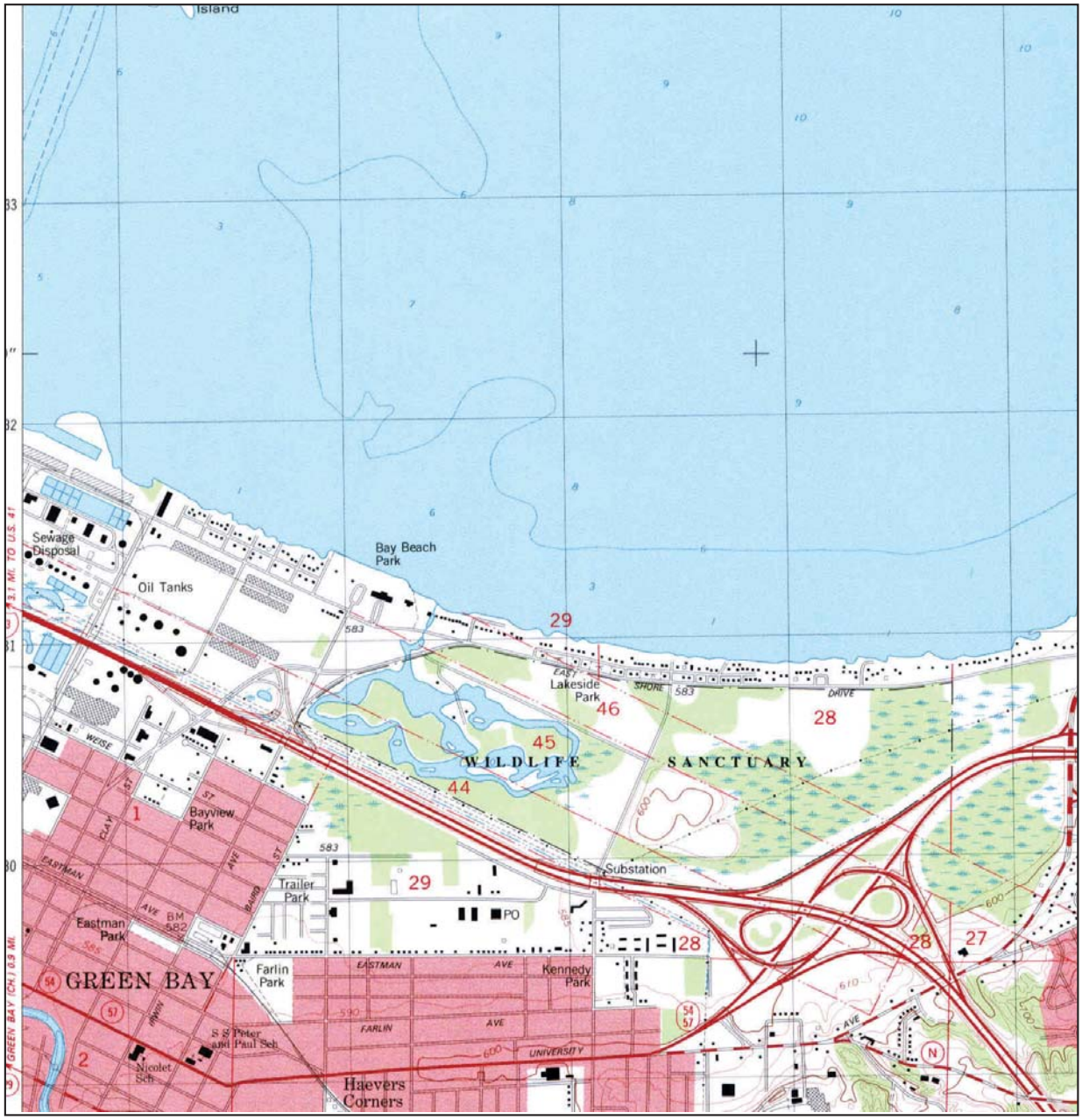
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Historical Topographic Map



N	ADJOINING QUAD NAME: GREEN BAY EAST MAP YEAR: 1971 PHOTOREVISED FROM :1954 SERIES: 7.5 SCALE: 1:24000	SITE NAME: I43 WisDOT Green Bay Bridge ADDRESS: I-43 and Fox River Green Bay, WI 54302 LAT/LONG: 44.5333 / -88.0077	CLIENT: TRC CONTACT: Dave Whitford and Dean INQUIRY#: 3742604.4 RESEARCH DATE: 09/30/2013

Historical Topographic Map



N	ADJOINING QUAD NAME: GREEN BAY EAST MAP YEAR: 1982 SERIES: 7.5 SCALE: 1:24000	SITE NAME: I43 WisDOT Green Bay Bridge ADDRESS: I-43 and Fox River Green Bay, WI 54302 LAT/LONG: 44.5333 / -88.0077	CLIENT: TRC CONTACT: Dave Whitford and Dean INQUIRY#: 3742604.4 RESEARCH DATE: 09/30/2013

Attachment 4

Photographs

Photographic Log

Client Name:	Site Location:	Project No.:
Wisconsin Department of Transportation (WisDOT)	I-43 Leo Frigo Bridge (B-05-0158) Green Bay, WI	TRC: 209074.0000.0000 WisDOT: 1009-03-51

Photo No.	Date
1	10/01/13

Description
Excavation near Pier 22.



Photo No.	Date
2	10/01/13

Description
Excavation near Pier 22.



Photographic Log

Client Name:	Site Location:	Project No.:
Wisconsin Department of Transportation (WisDOT)	I-43 Leo Frigo Bridge (B-05-0158) Green Bay, WI	TRC: 209074.0000.0000 WisDOT: 1009-03-51

Photo No.	Date
3	10/01/13

Description
Excavated materials.



Photo No.	Date
4	10/01/13

Description
Excavated materials showing debris.



WDNR GEMS
Groundwater Data Review
By
TRC Environmental Corporation (TRC)

708 Heartland Trail
Suite 3000
Madison, WI 53717

608-826-3600 PHONE
608-826-3941 FAX

www.TRCsolutions.com

October 9, 2013

Mr. Bob Pearson
Wisconsin Department of Transportation
4802 Sheboygan Avenue
Madison, WI 53707

Subject: I-43 – Leo Frigo Memorial Bridge (B-5-158), Green Bay, Wisconsin
WDNR GEMS Groundwater Data Review
WisDOT Project ID #1009-03-51

Dear Mr. Pearson:

The purpose of this letter is to provide Wisconsin Department of Transportation (WisDOT) with the results of the WDNR GEMS Database review, and the review of the 1989 Ground Water Quality Assessment Report for the Georgia Pacific Northland Landfill (License #2893) performed by TRC Environmental Corporation (TRC), for the I-43 Leo Frigo Memorial Bridge (B-5-158) project in Green Bay, Wisconsin. Included with this letter is an updated site map showing current monitoring well locations for the Georgia Pacific Northland Landfill, concentration vs. time graphs for several water quality parameters, and historical groundwater elevation data taken from the Groundwater Quality Assessment Report prepared by RMT in August 1989.

Review of the Groundwater Quality Assessment Report (RMT, 1989)

The following is a summary of findings from the Ground Water Quality Assessment Report, Northland Landfill. Prepared by RMT in August 1989 for the James River Corporation.

- The report was in response to WDNR concerns about the James River Paper Company Northland landfill. The report is a comprehensive review of the landfill site design, construction and operation, geology, and groundwater quality data and hydrogeology.
- After WDNR evaluation of quarterly groundwater monitoring results from on-site monitoring wells with respect to NR 140, WDNR requested a "Notice of Intent to Modify Plan Approval and Issue PALs for Indicator Parameters" in August, 1987. The notice proposed site-specific PALs for indicator parameters monitored in on-site wells, stating that PALs for iron and chloride had been exceeded.

- 24 borings were performed prior to and during landfill operation, the geology of the landfill site, in descending order, is as follows: 4 to 15 feet of fill, up to 7 feet of discontinuous sand, and 40 to 80 feet of silty clay. A discontinuous silt layer, up to 16 feet thick is found near the top of the silty clay unit.
- The report states that based on the review of logs from soil borings performed near the site, the landfill is situated in an area where extensive pre-existing fill exists. The fill was identified as being composed of wood wastes, foundry wastes, ash, pulp and paper mill wastes, and rubble. Some portions of the fill contained chloride-containing waste from pulp and paper mills, and that these fill materials probably affect local groundwater quality in the shallow zone.
- Groundwater quality in on-site water table observation wells and piezometers has been affected by historical area land uses. In water table wells which are partially screened in the pre-existing fill, there appears to be considerable spatial variability in analyte concentrations. This is consistent with findings indicating that the pre-existing fill material is highly variable in composition, which would result in corresponding spatial variability in groundwater quality.
- Data suggest that the groundwater quality measured in the monitoring wells is due to pre-existing site conditions. Samples collected prior to site construction indicated that the water quality at that time exceeded current standards. Parameter concentrations in on-site monitoring wells have decreased since filling began at the site in 1981. In particular, chlorides and iron concentrations show a statistically significant downward trend since 1981.
- As of the report date (1989) 24 monitoring wells (eight water table wells and 16 piezometers) were installed. Currently there are seven water table wells and four piezometers.
- Vertical gradients were calculated for well nests – downward gradients at the site ranged from 0.6 to 0.33.
- Historically groundwater was generally encountered within 8 feet of the ground surface (Tables 5 and 6 in Attachment 2).

GEMS Groundwater Data Review

As requested, TRC reviewed the data available from the WDNR GEMS database. Below is a summary of the data evaluation.

- GEMS contains data for 11 water table wells and 12 piezometers – of which seven water table wells and four piezometers are included in the current monitoring program (MW-102, MW-103, MW-104R, MW-105, MW-106, MW-108R, MW-109R and MW-102A, MW-103A, MW-105A, and MW-106A). The remaining wells are not listed on the most recent site map provided by WDNR.
- The data review focuses on the wells currently being monitored at the site of the active wells at the Northland Landfill site; MW-102/MW-102A, MW-103/MW-103A, MW-104R, and MW-105/MW-105A are located on the north edge of the landfill. MW-105/MW-105A and MW-104R are located closest to the pier 22 area of the Leo Frigo Memorial Bridge, as shown on the attached Figure 1.
- The groundwater quality parameters selected for review are chloride, pH, sulfate, and specific conductance. Data from 2001–2013 for each of these parameters has been prepared as concentration vs. time graphs (Attachment 1).
- The current groundwater quality at the shallow water table wells shows chloride concentrations above typical natural background levels, and exceed or have exceeded the NR 140 ES/PAL (250/125 mg/L, respectively). This is consistent with the previous observations as stated in the RMT Ground Water Quality Assessment Report relating to the historic fill at the site, as well as for an area located adjacent to a major road way/highway where road deicing and surface water runoff are common.
- pH values at the site wells are within expected ranges.
- Sulfate concentrations at the wells located on the north side of the landfill are slightly elevated – and exceed or have exceeded the NR 140 ES/PAL (250/125 mg/L, respectively).
- Specific Conductance at the water table wells on the north side of the landfill are elevated, as would be expected with the current chloride levels found in the shallow groundwater at the site.

From the data evaluated, no single parameter can be identified as the direct cause for the condition of the affected piers.

If information on the historical monitoring wells at the Northland Landfill can be found, TRC will evaluate the groundwater quality data from 1982-2000 for monitoring locations that are located in the immediate vicinity of the Leo Frigo Bridge.

If requested, TRC will evaluate current groundwater elevation fluctuations in the monitoring wells at the Northland Landfill.

If you have any questions, please feel free to contact Ted O'Connell at 608-826-3648, or Jim Morse at (608) 826-3692.

Sincerely,

TRC Environmental Corporation

Ted O'Connell
Environmental Scientist

James E. Morse
Senior Client Service Manager

cc: Bruce Enke – WisDOT (hard copy and pdf on CD)
Tom Buchholz – WisDOT (hard copy and pdf on CD)
Kathie VanPrice – WisDOT (hard copy and pdf on CD)
Dan Scudder – WisDOT (hard copy and pdf on CD)
Shar TeBeest – WisDOT (hard copy and pdf on CD)
Dan Haak – TRC
Alyssa Sellwood – TRC

List of Figures

Figure 1	Groundwater Monitoring Well Locations

List of Attachments

Attachment 1	Groundwater Quality Graphs – Concentration vs. Time
Attachment 2	Historical Groundwater Elevation Graphs

References

RMT. 1989. Groundwater Quality Assessment, Northland Landfill, Green Bay, Wisconsin. For James River Corporation. August 1989.



TRC - GIS

Coordinate System: NAD 1983 UTM Zone 16N (Meter)
Map Rotation: 24Degrees

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Path: E:\WI_DOT\2013_209074\209074-006.mxd

LEGEND

- MONITORING WELL
- SOIL BORING
- APPROXIMATE BRIDGE PIERS
- PROPERTY BOUNDARY

NOTES

1. BASE MAP IMAGERY PROVIDED BY BROWN COUNTY, 2010.
2. PARCEL INFORMATION SUPPLIED BY BROWN COUNTY.
3. BRIDGE OUTLINE, PIERS, AND BORING LOCATIONS FROM WISDOT CONSTRUCTION PLANS, 1975. LOCATIONS ARE APPROXIMATE.

0 200 400 Feet

1 " = 300 '
1:3,600

PROJECT: **WISDOT ID# 1009-03-51**
LEO FRIGO MEMORIAL BRIDGE
GREEN BAY, WISCONSIN

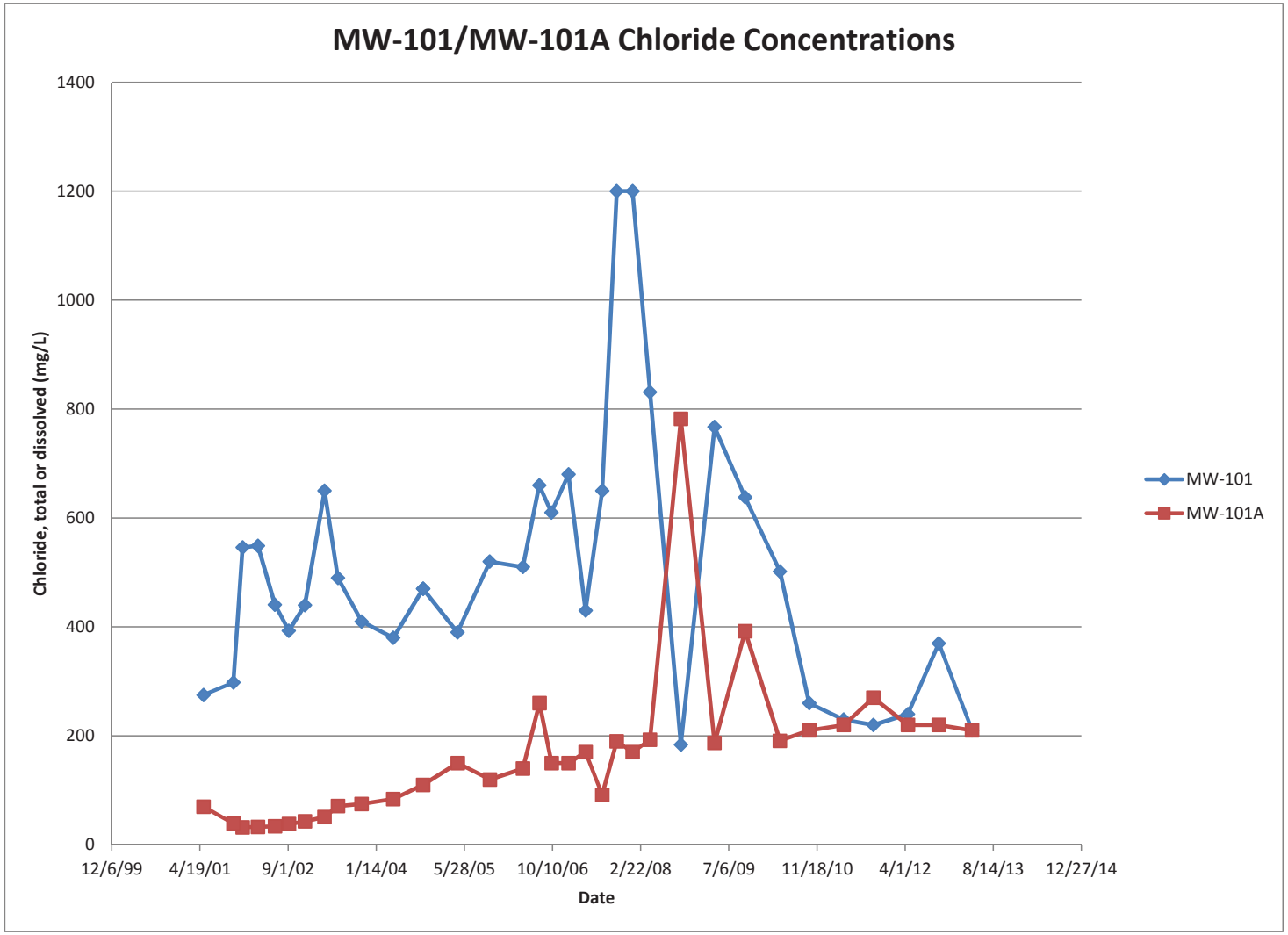
SHEET TITLE:
GROUNDWATER MONITORING WELL LOCATIONS

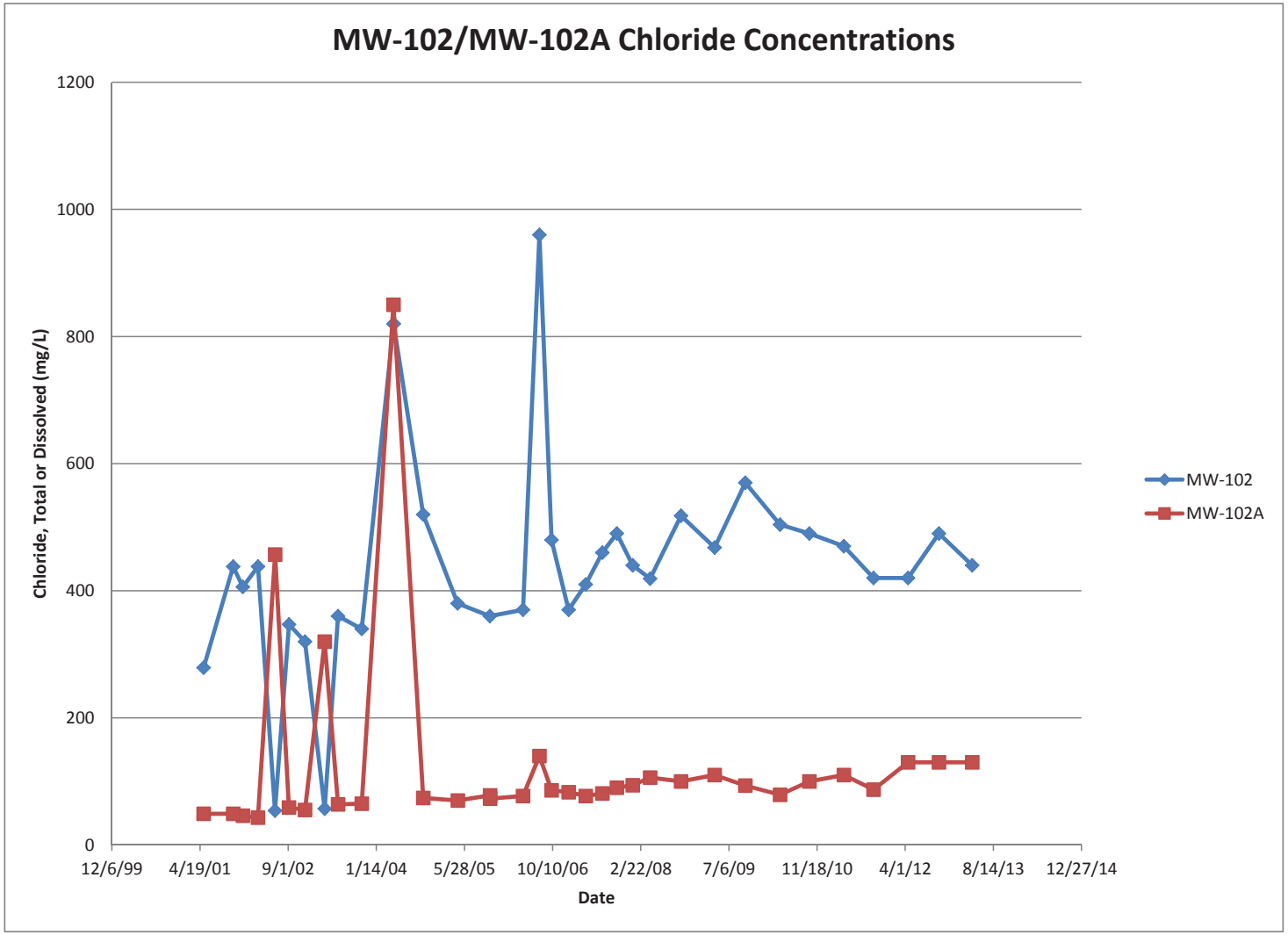
DRAWN BY: PAPEZ J	SCALE: 1: 3,600	PROJ. NO. 209074	
CHECKED BY: O'CONNELL T		FILE NO. 209074-006.mxd	
APPROVED BY: MORSE J	DATE PRINTED:	**FIGURE 1**	
DATE: OCTOBER 09, 2013			

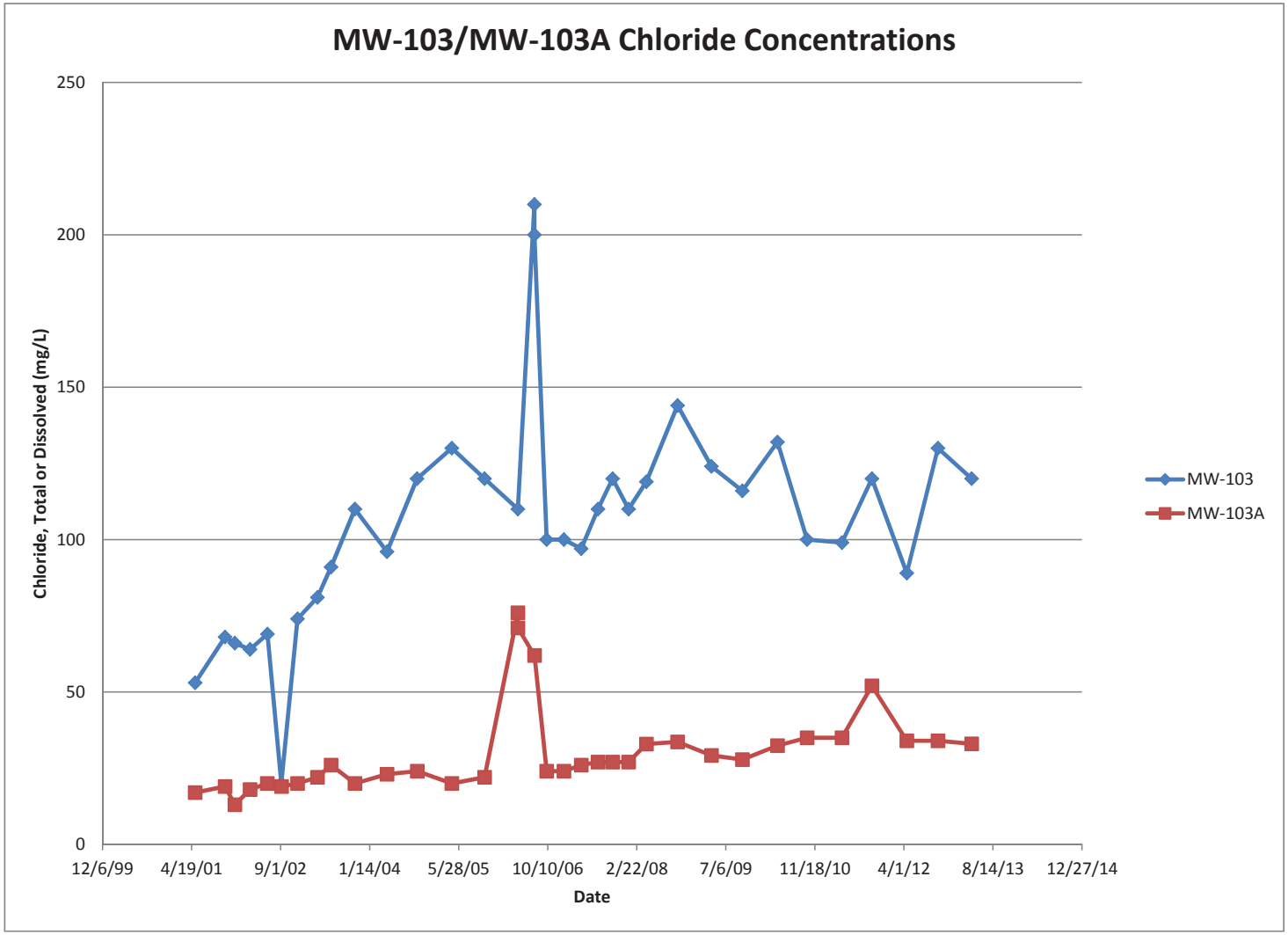
TRC
708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com

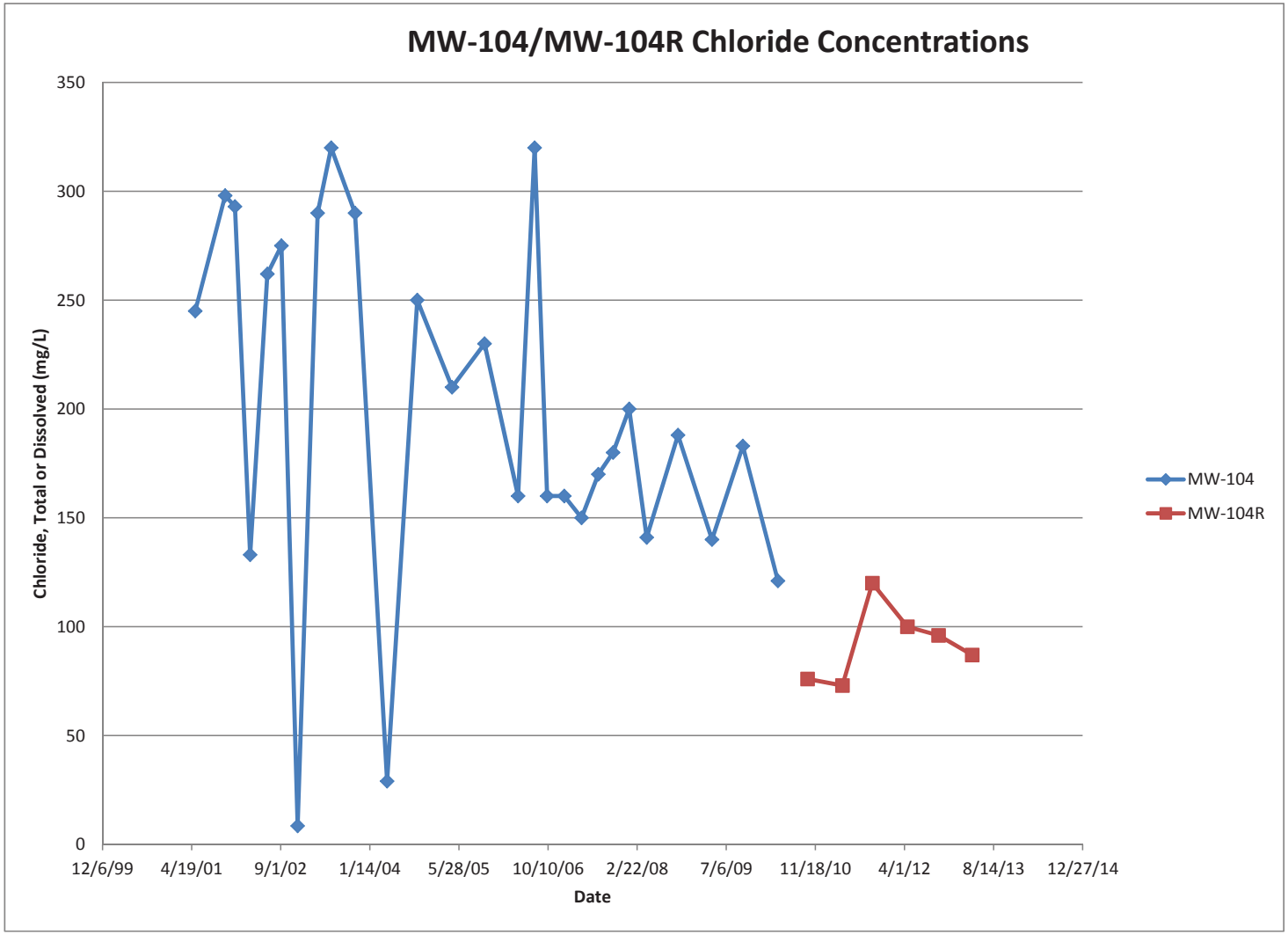
Attachment 1

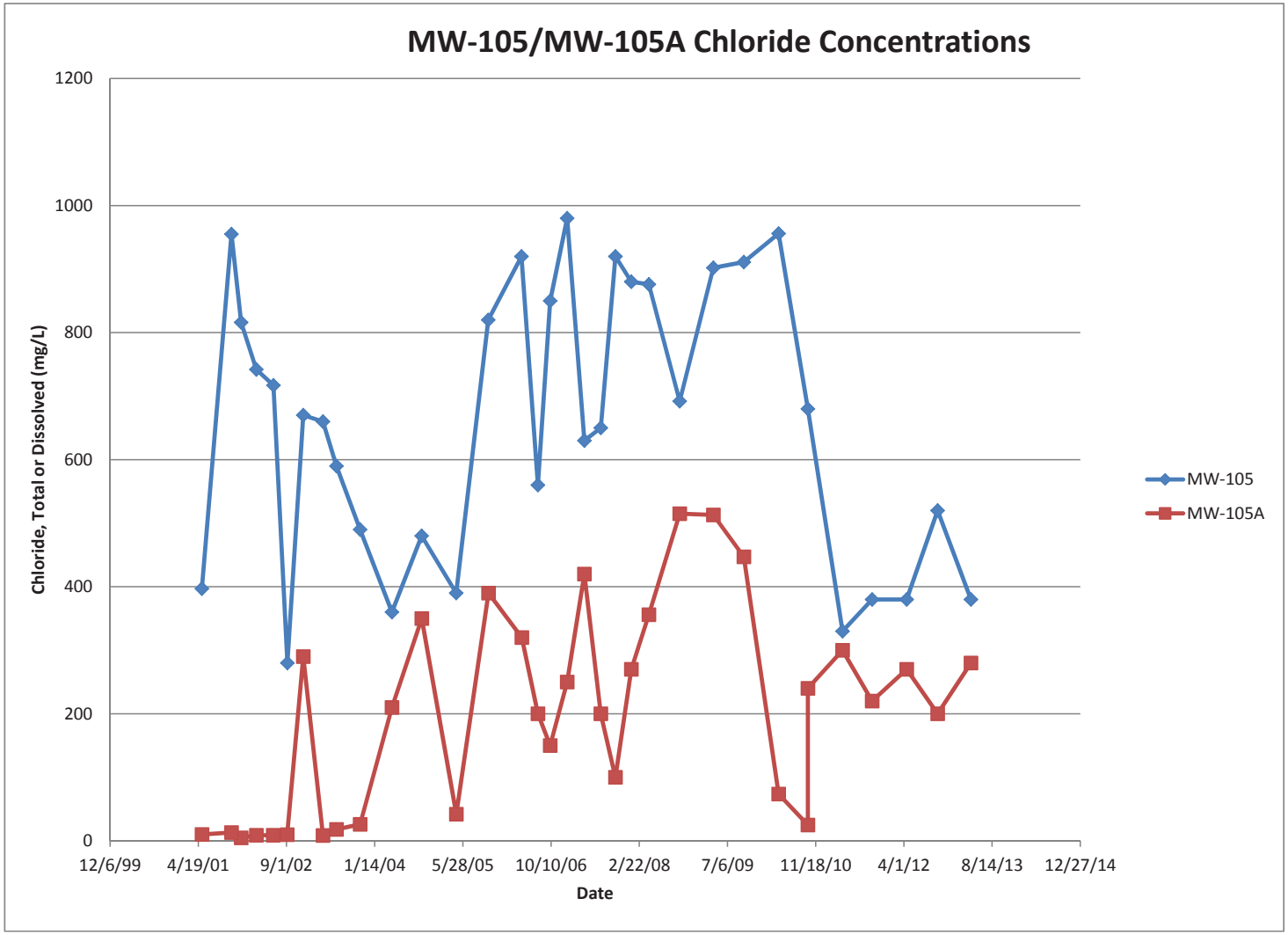
Groundwater Quality Graphs
Concentration vs. Time

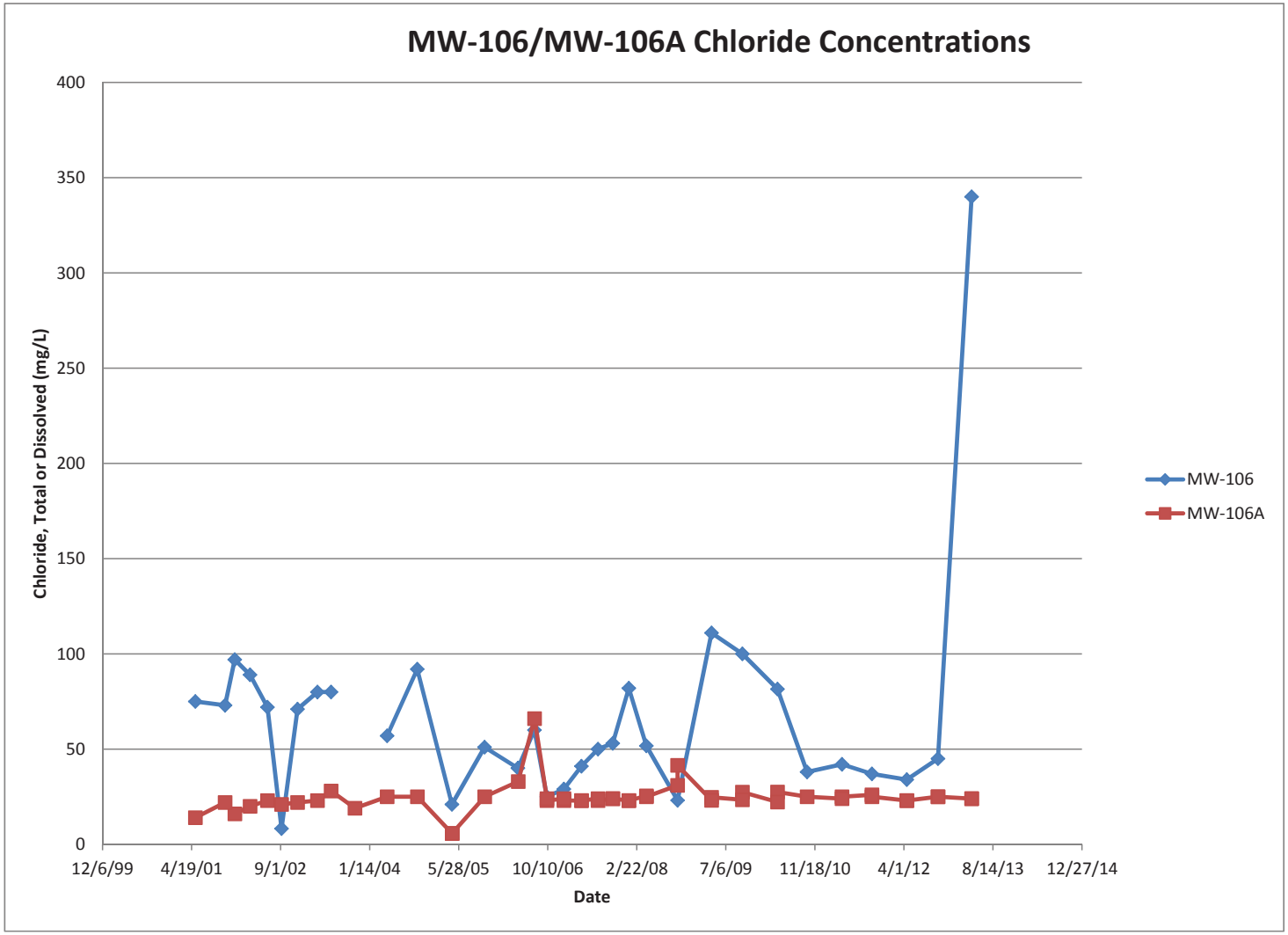

MW-101/MW-101A Chloride Concentrations
Chloride, total or dissolved (mg/L)
1400
1200
1000
800
600
400
200
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-101
MW-101A

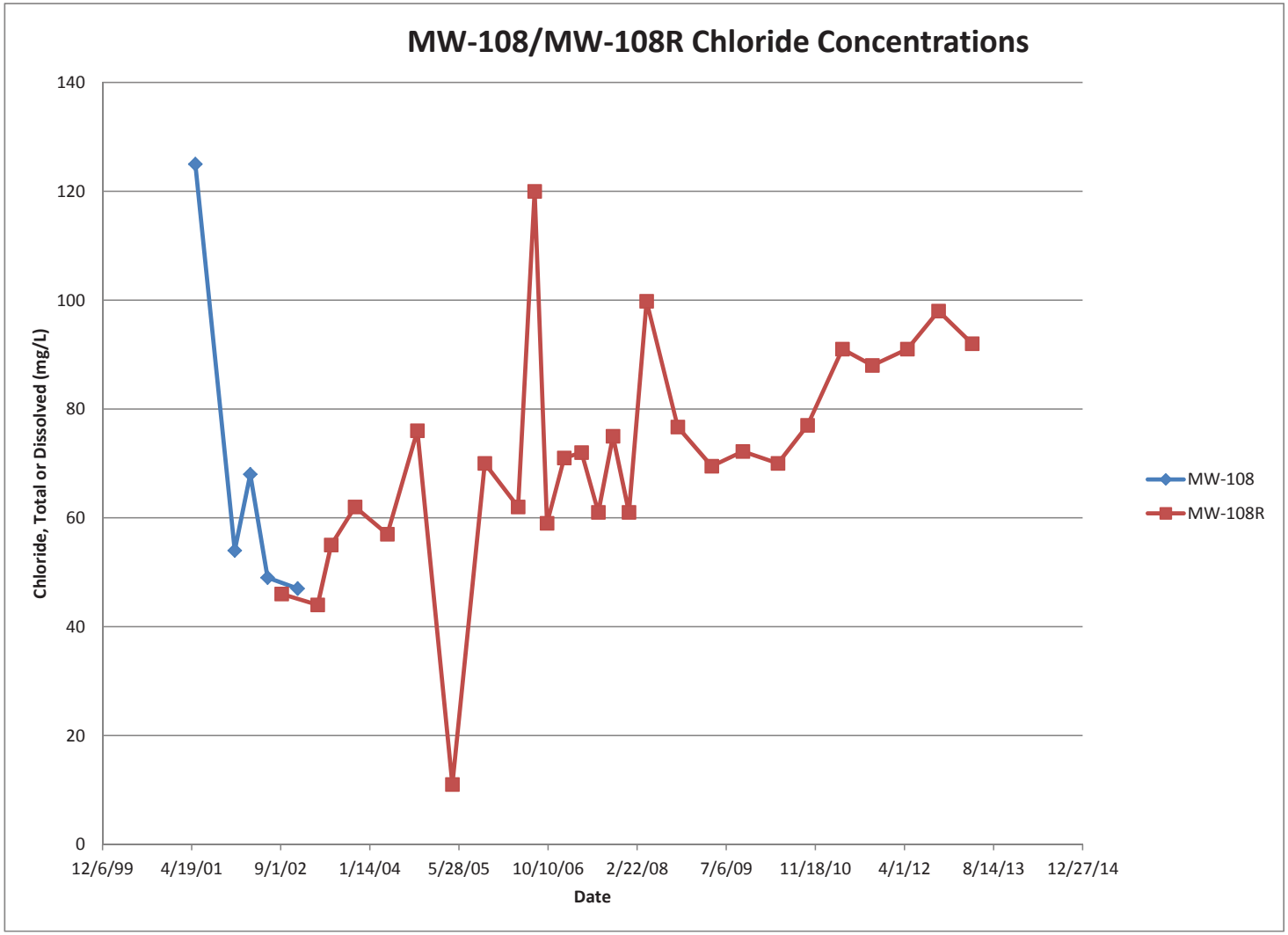

MW-102/MW-102A Chloride Concentrations
Chloride, Total or Dissolved (mg/L)
1200
1000
800
600
400
200
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-102
MW-102A

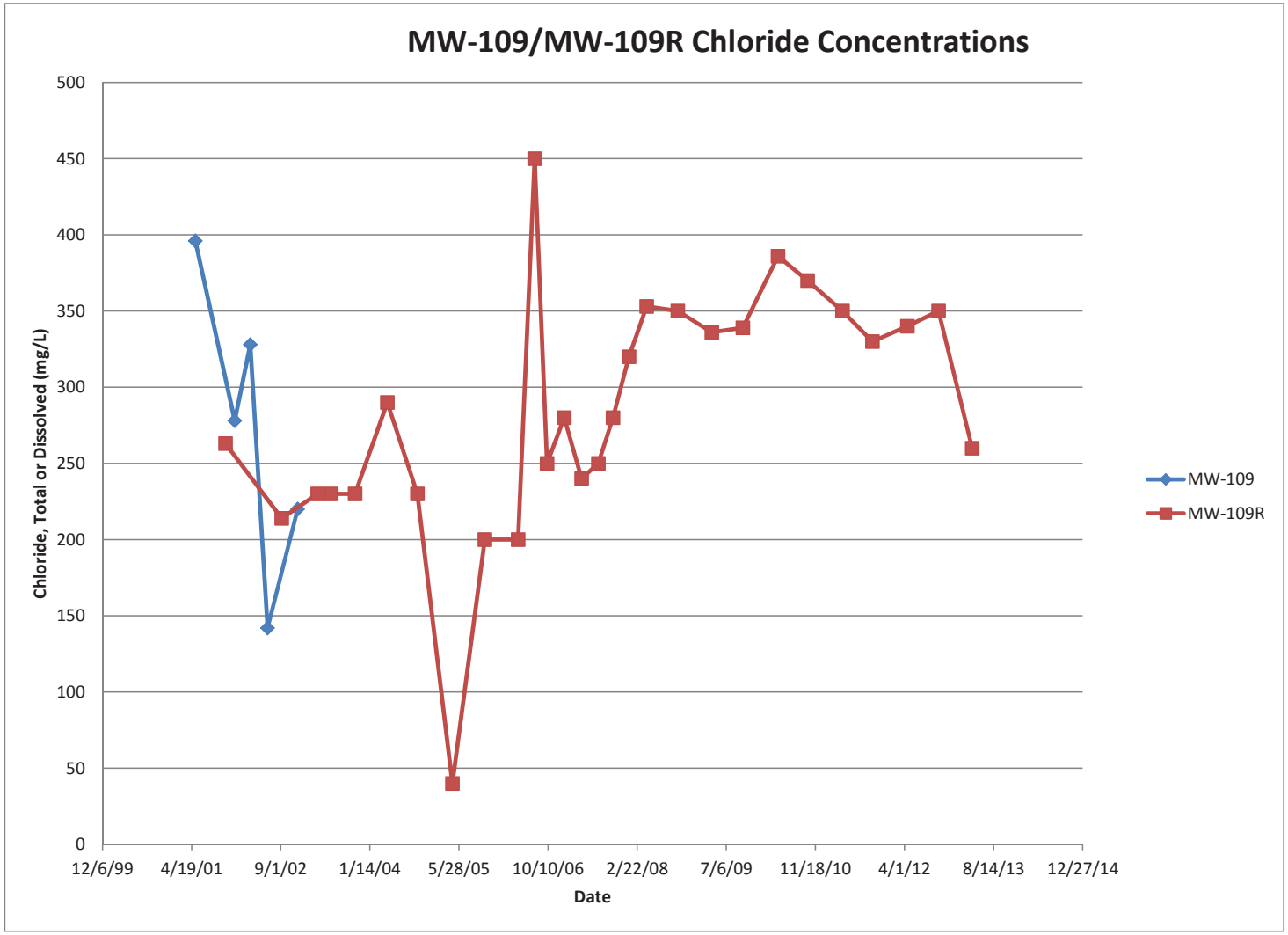

MW-103/MW-103A Chloride Concentrations
Chloride, Total or Dissolved (mg/L)
250
200
150
100
50
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-103
MW-103A

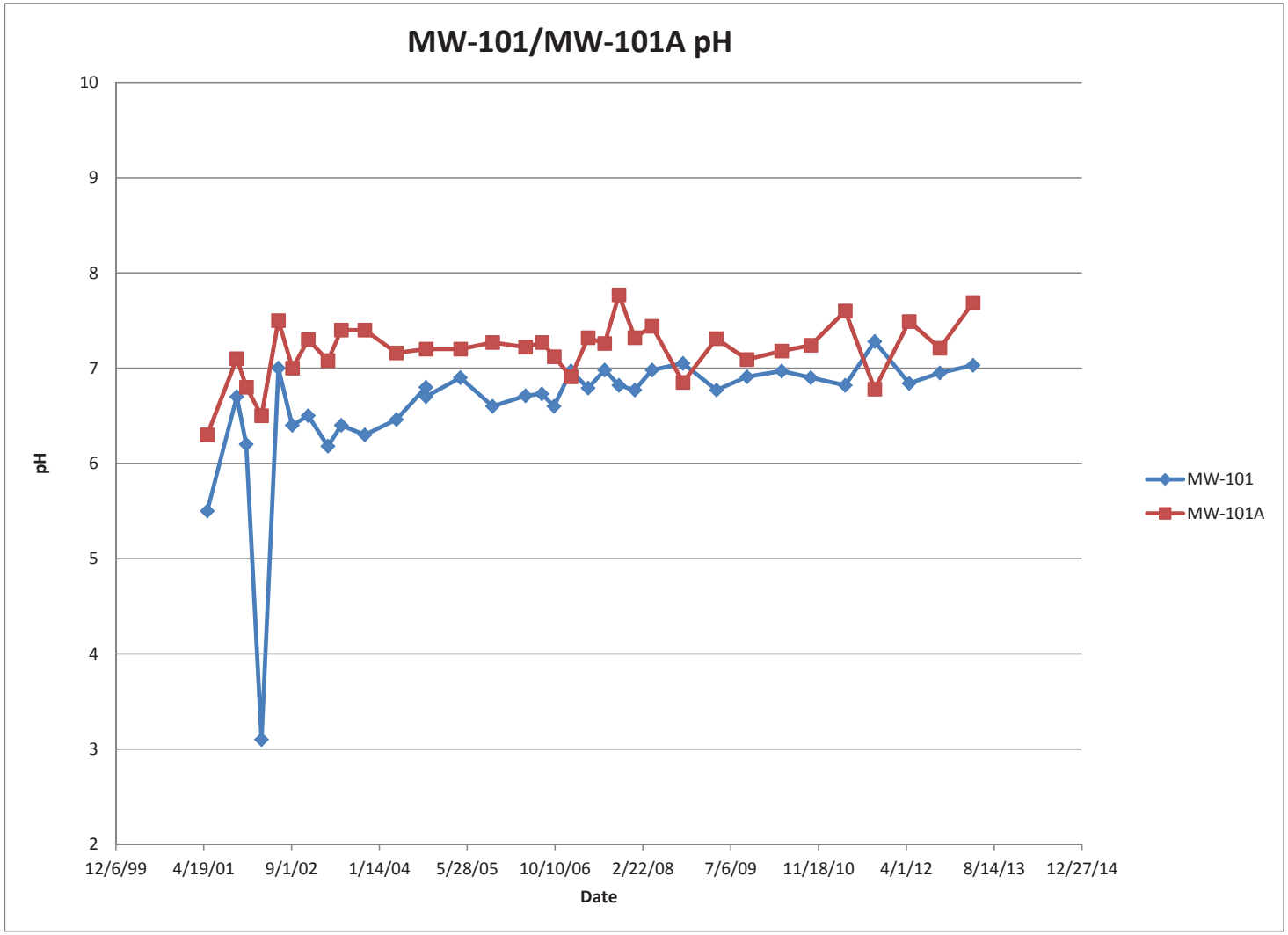

MW-104/MW-104R Chloride Concentrations
Chloride, Total or Dissolved (mg/L)
350
300
250
200
150
100
50
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-104
MW-104R

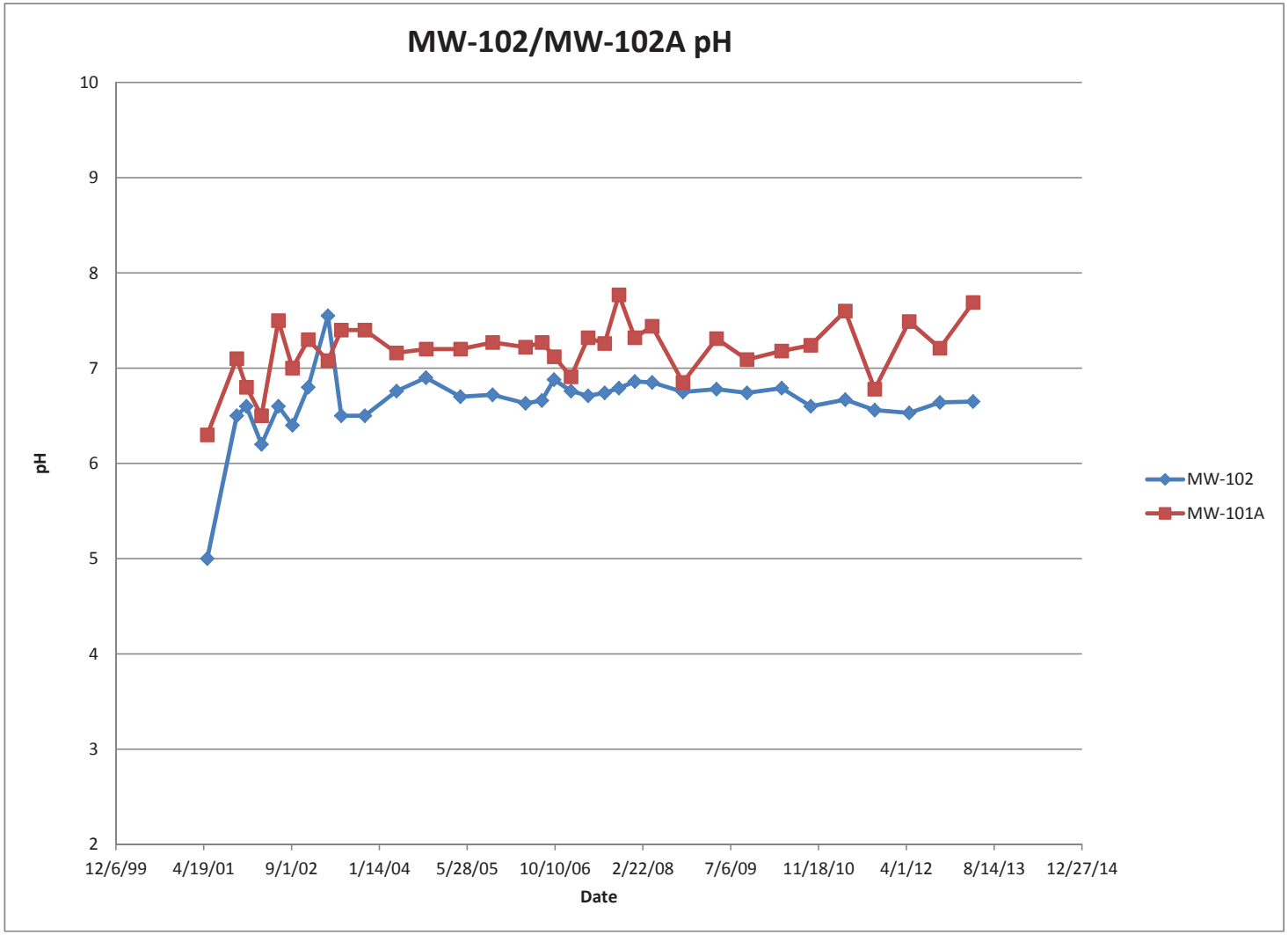

MW-105/MW-105A Chloride Concentrations
Chloride, Total or Dissolved (mg/L)
1200
1000
800
600
400
200
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-105
MW-105A

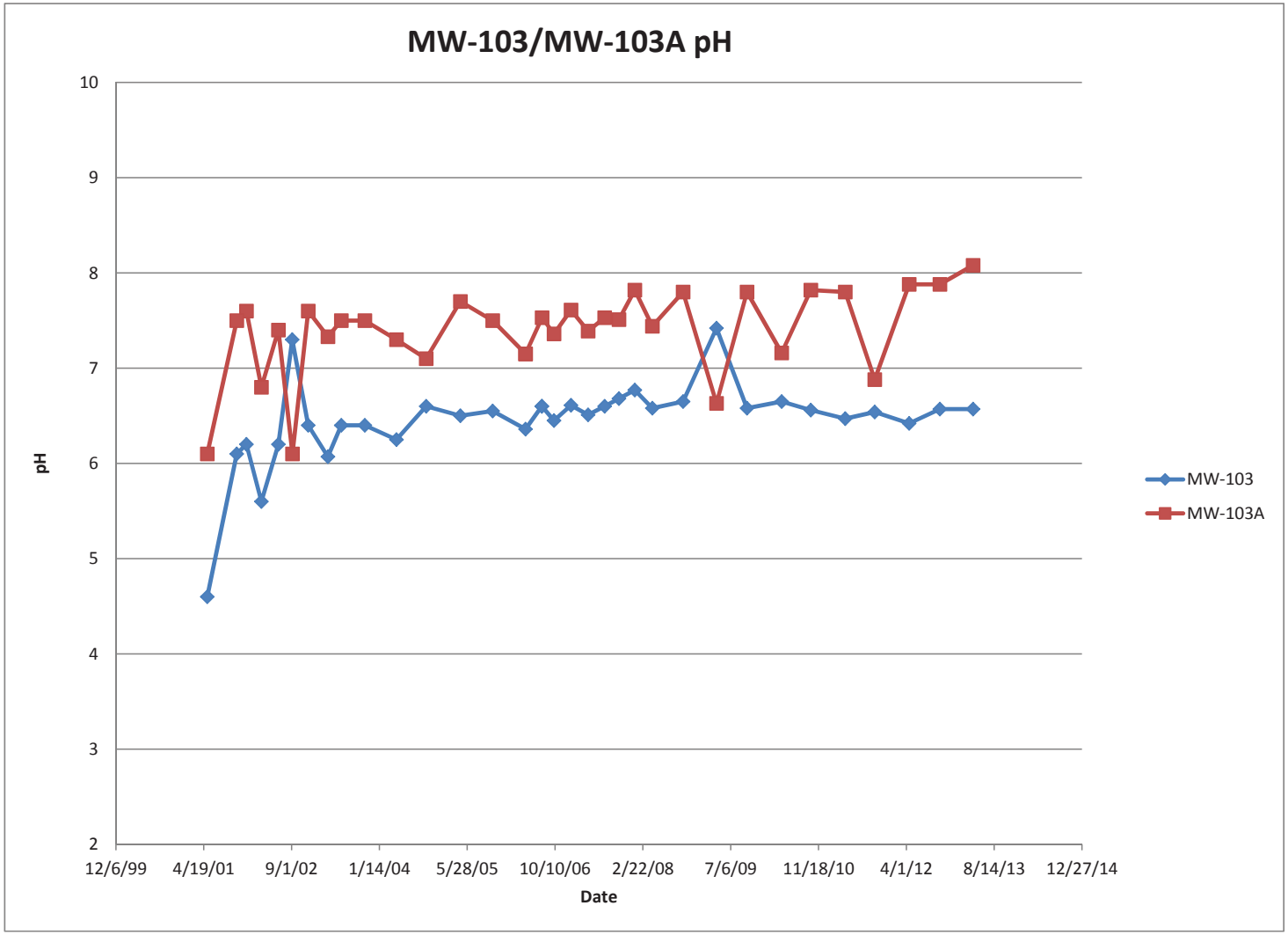

MW-106/MW-106A Chloride Concentrations
Chloride, Total or Dissolved (mg/L)
400
350
300
250
200
150
100
50
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-106
MW-106A

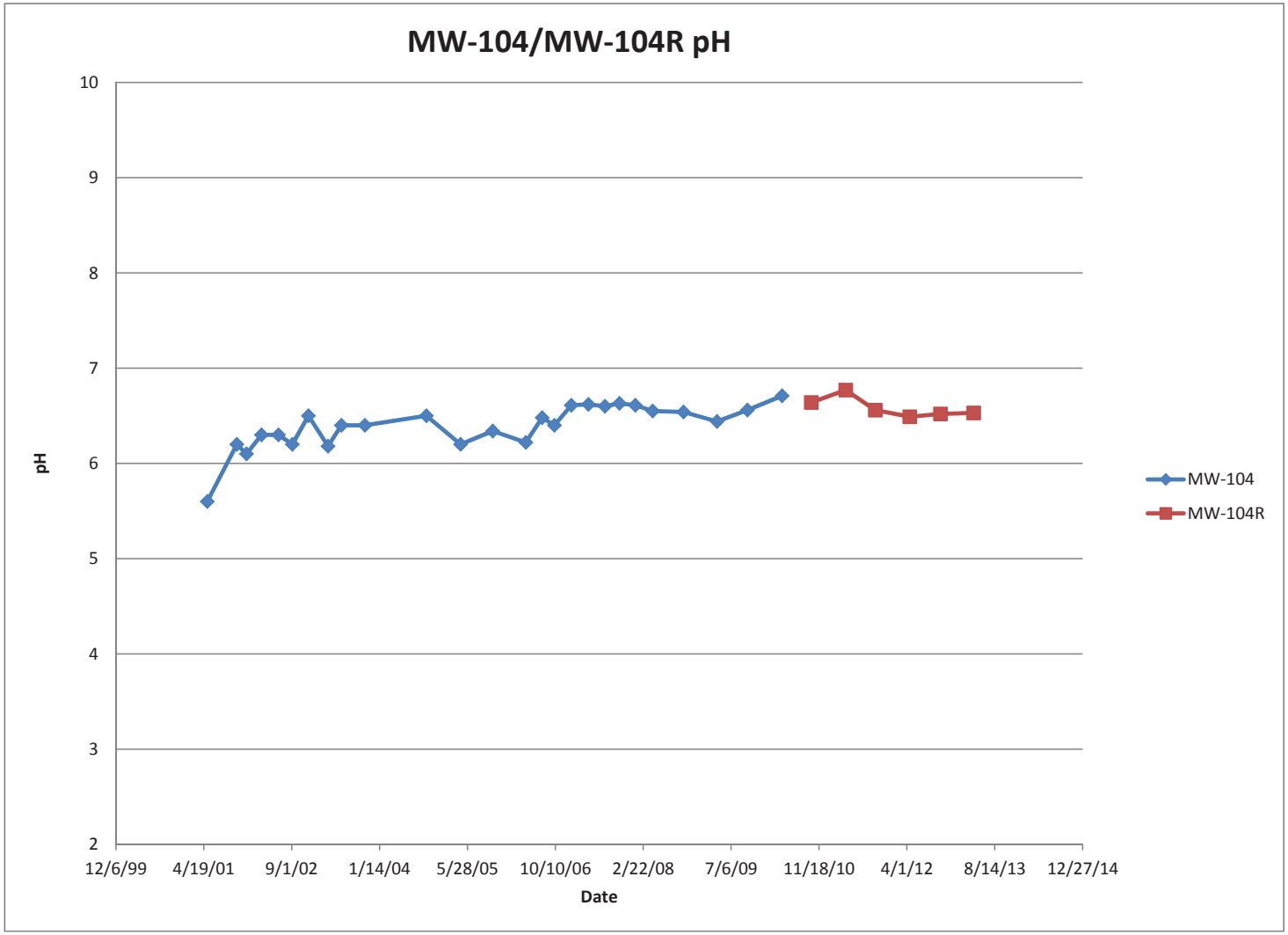

MW-108/MW-108R Chloride Concentrations
Chloride, Total or Dissolved (mg/L)
140
120
100
80
60
40
20
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-108
MW-108R

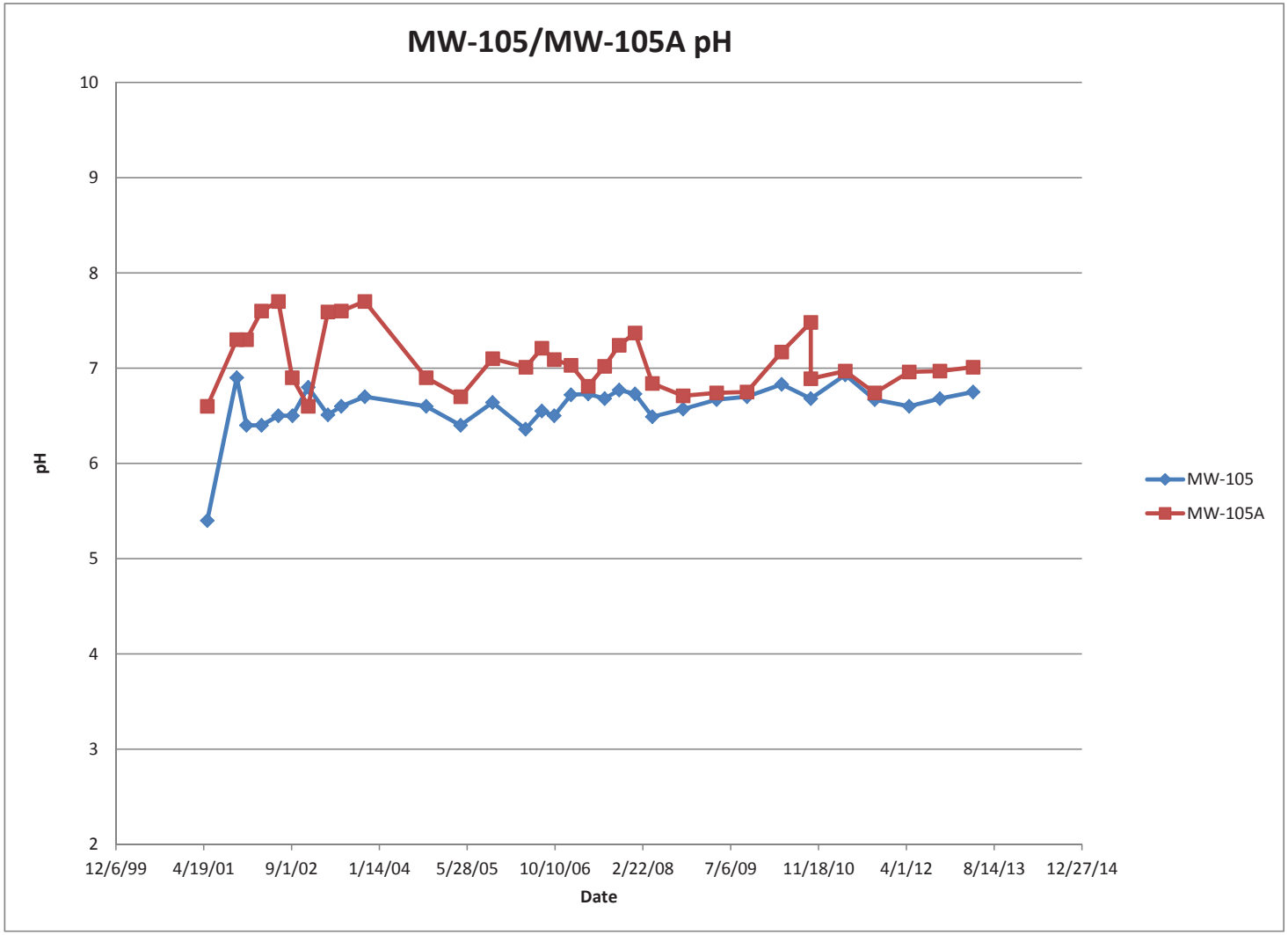

MW-109/MW-109R Chloride Concentrations
Chloride, Total or Dissolved (mg/L)
500
450
400
350
300
250
200
150
100
50
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-109
MW-109R

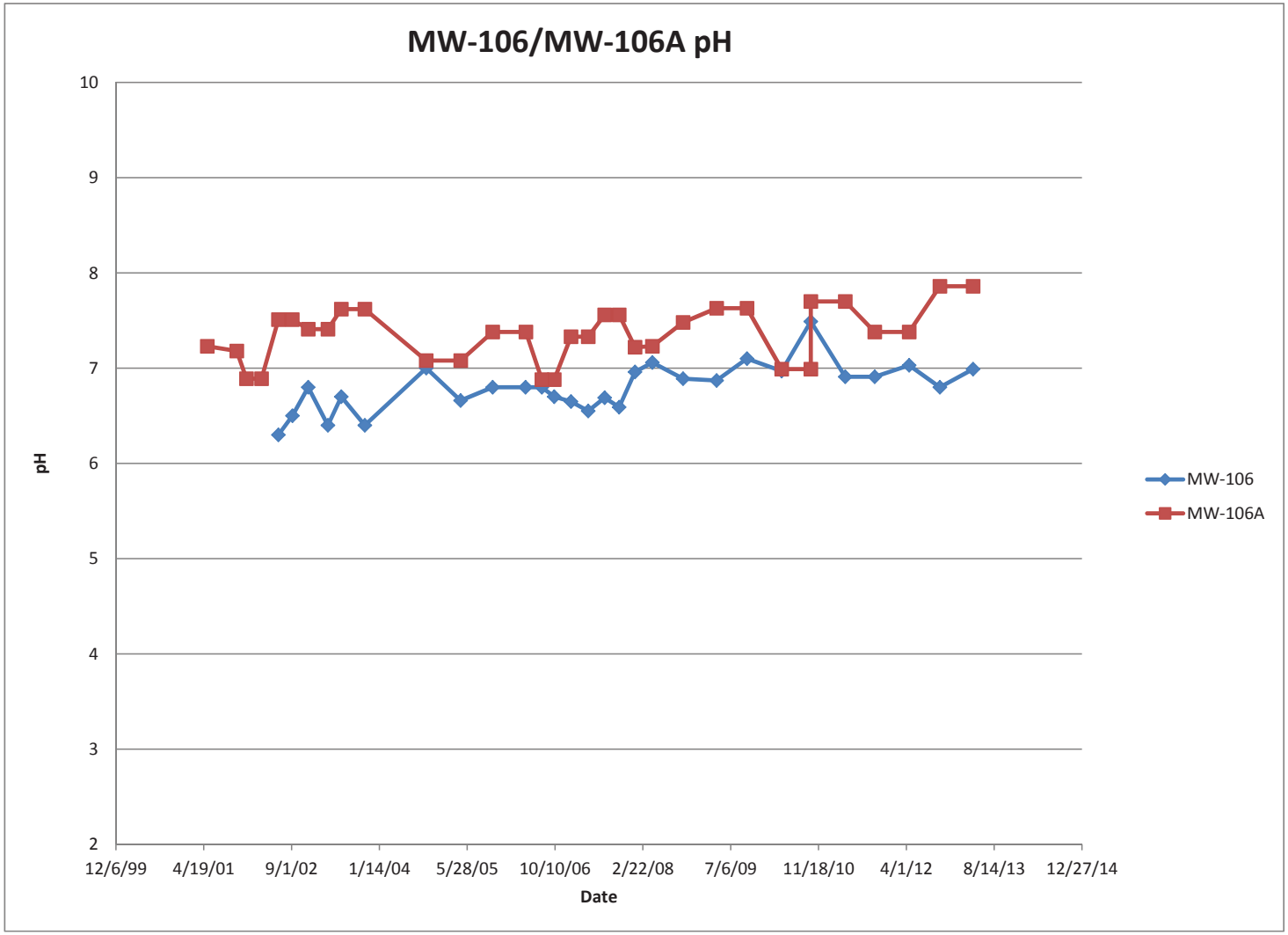

MW-101/MW-101A pH
10
9
8
7
6
5
4
3
2
pH
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-101
MW-101A

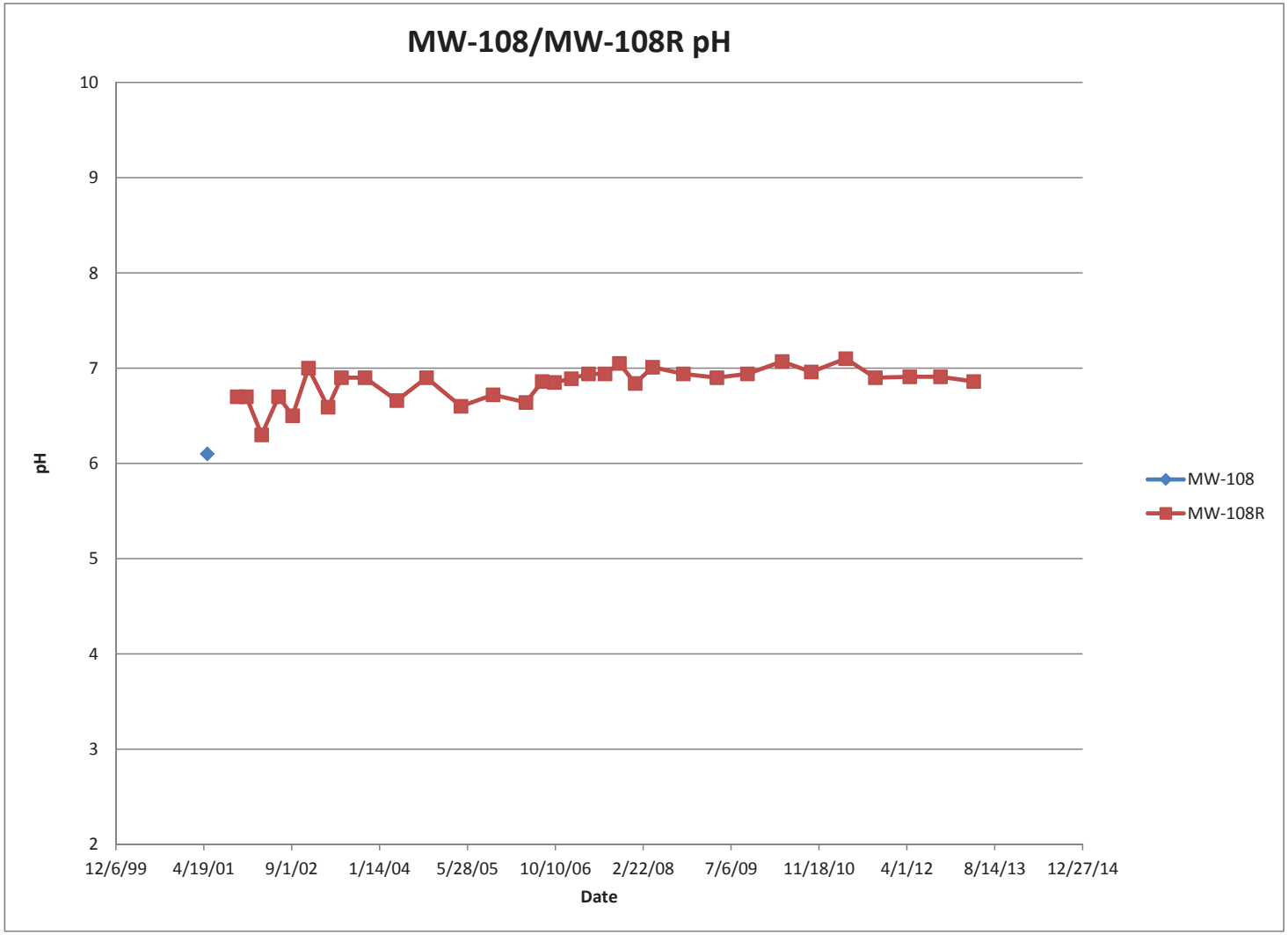

MW-102/MW-102A pH
10
9
8
7
6
5
4
3
2
pH
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-102
MW-101A

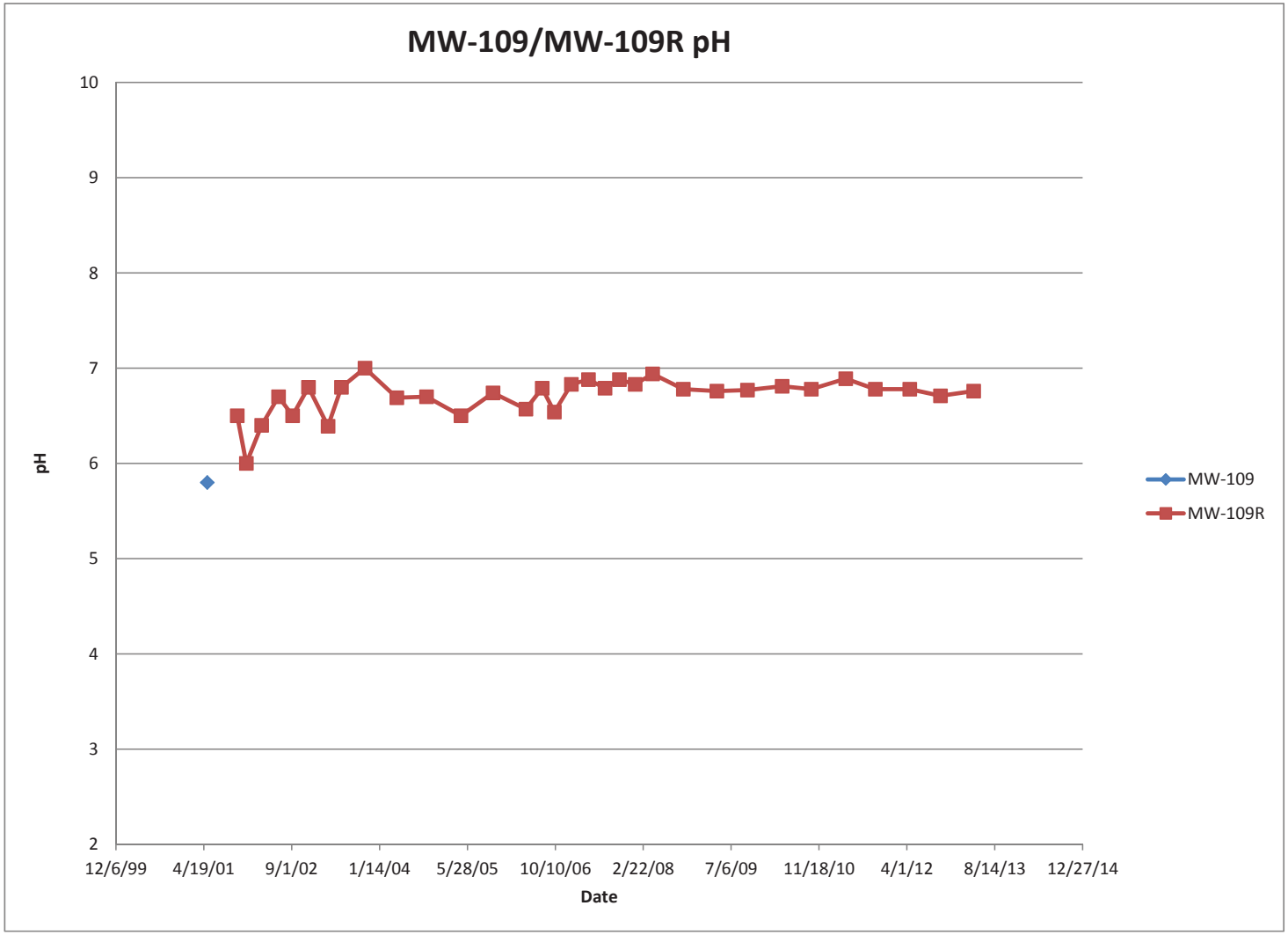

MW-103/MW-103A pH
10
9
8
7
6
5
4
3
2
pH
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-103
MW-103A

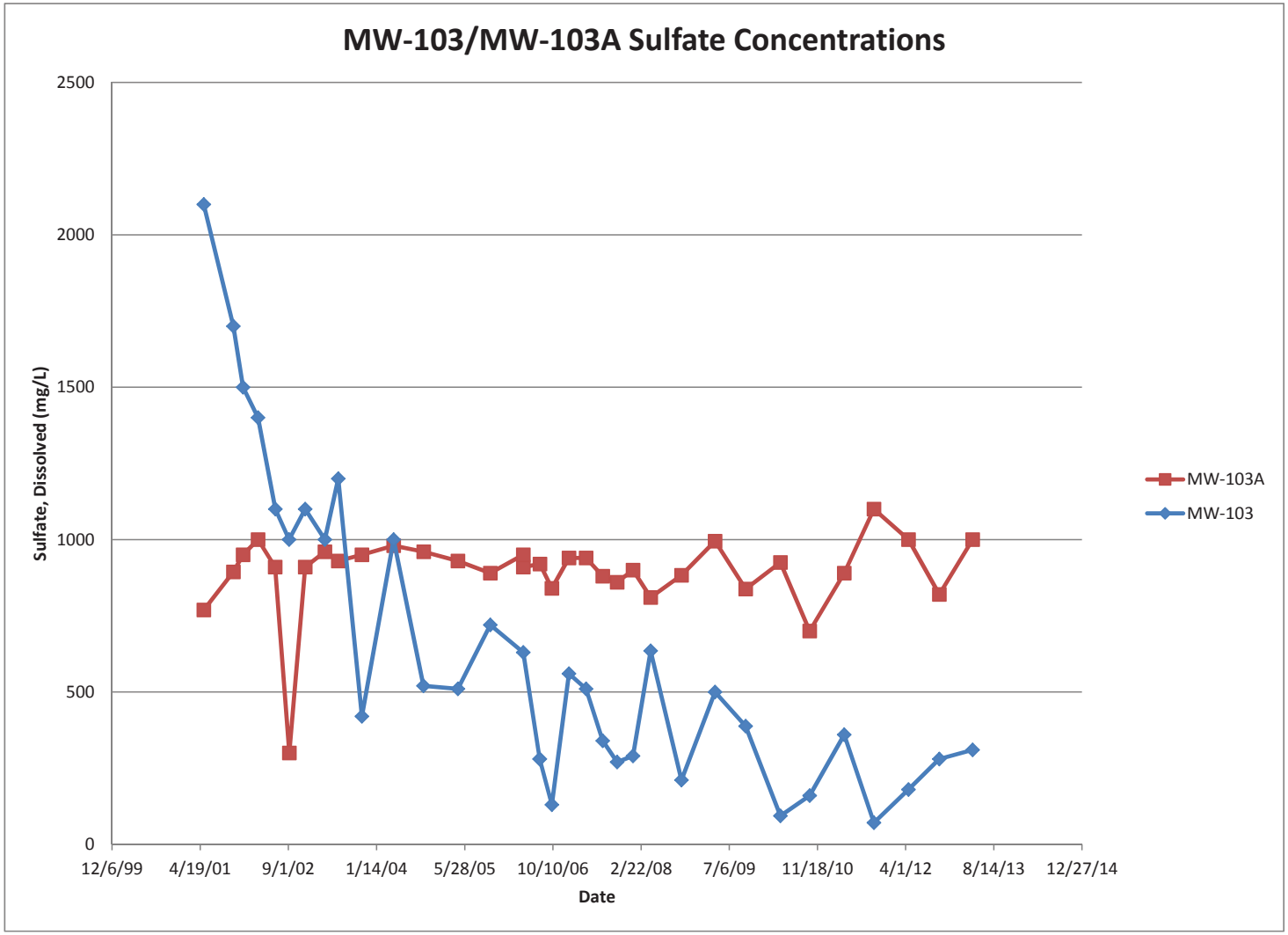

MW-104/MW-104R pH
10
9
8
7
6
5
4
3
2
pH
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-104
MW-104R

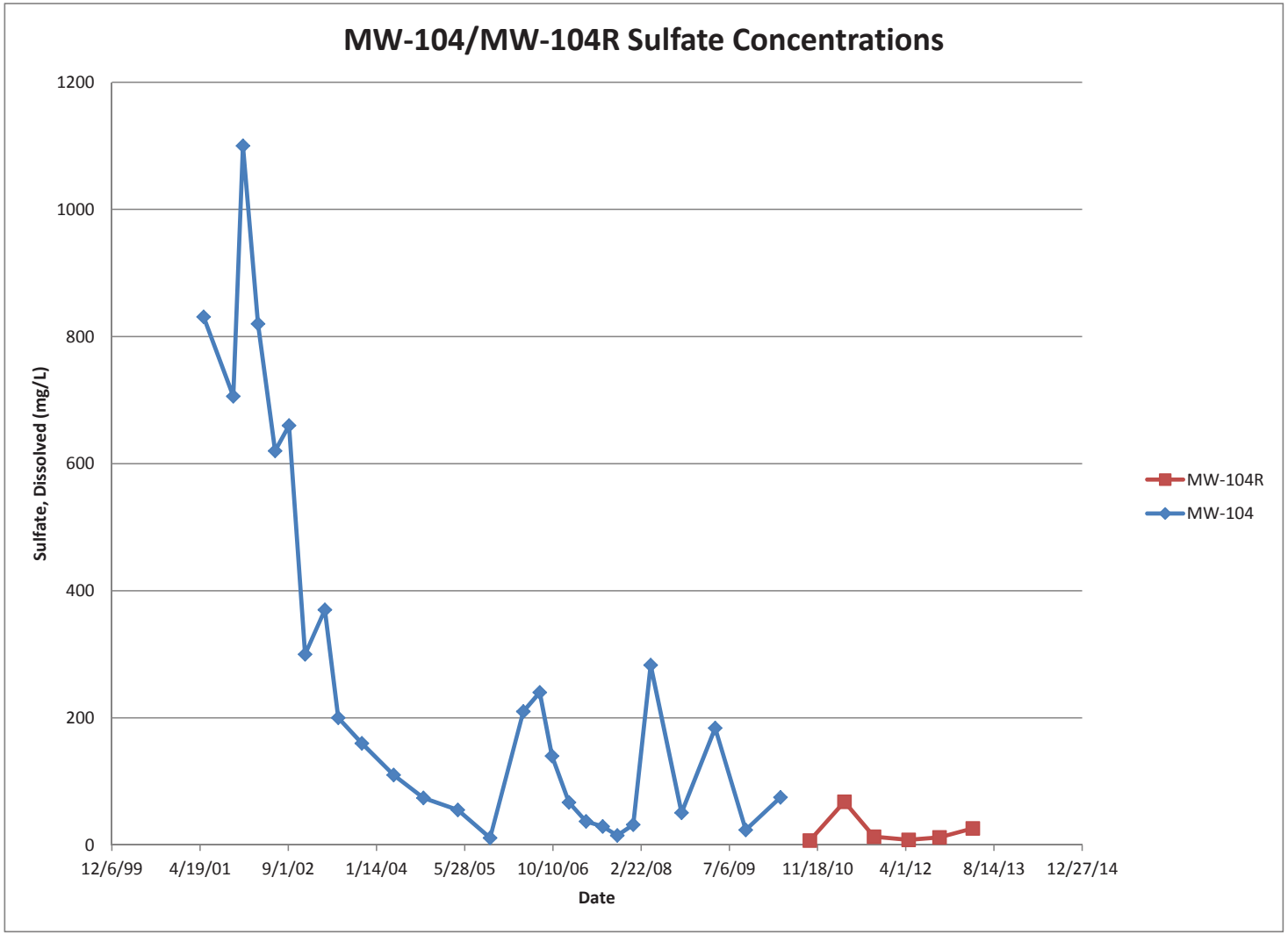

MW-105/MW-105A pH
10
9
8
7
6
5
4
3
2
pH
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-105
MW-105A

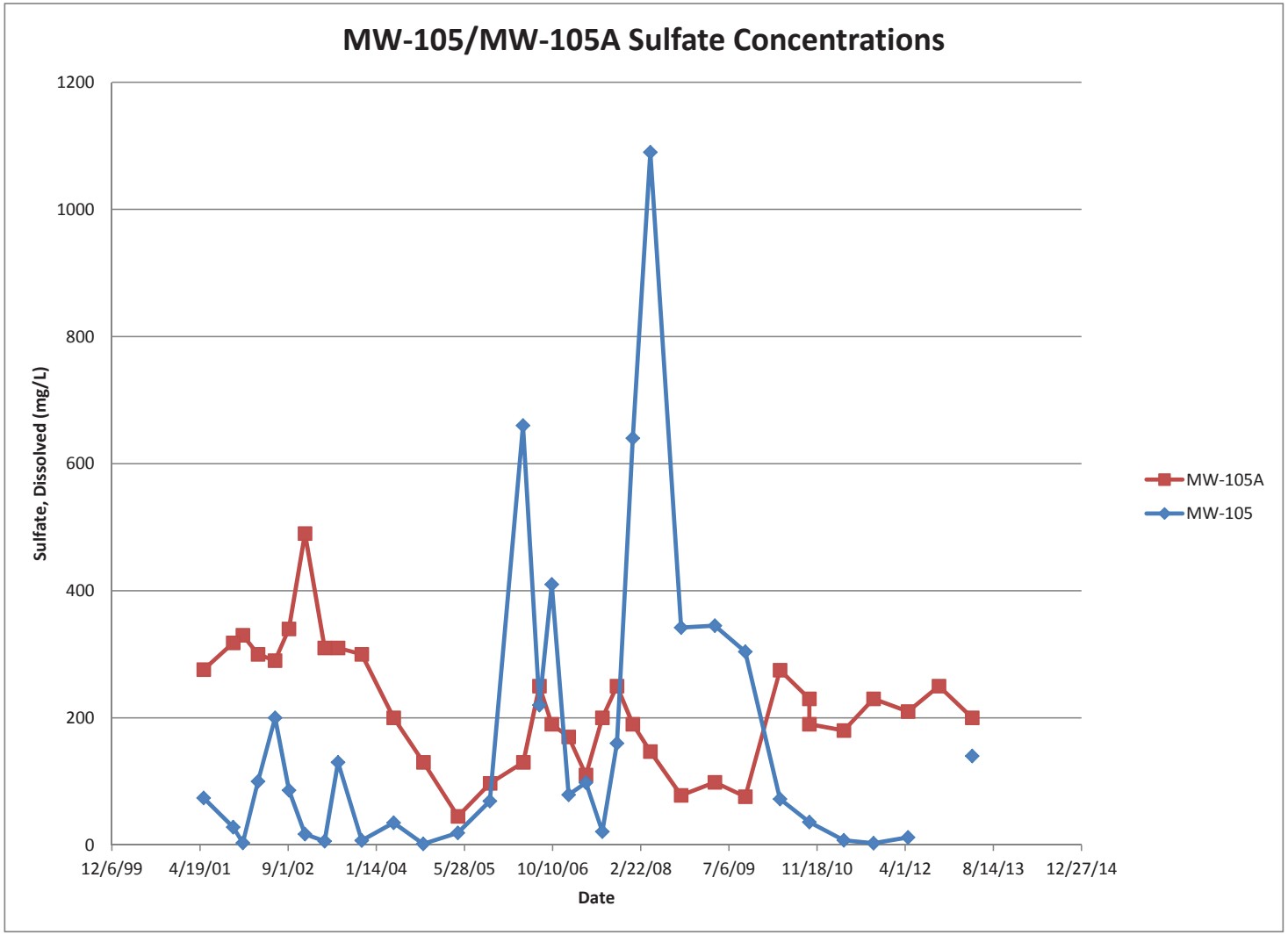

MW-106/MW-106A pH
10
9
8
7
6
5
4
3
2
pH
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-106
MW-106A

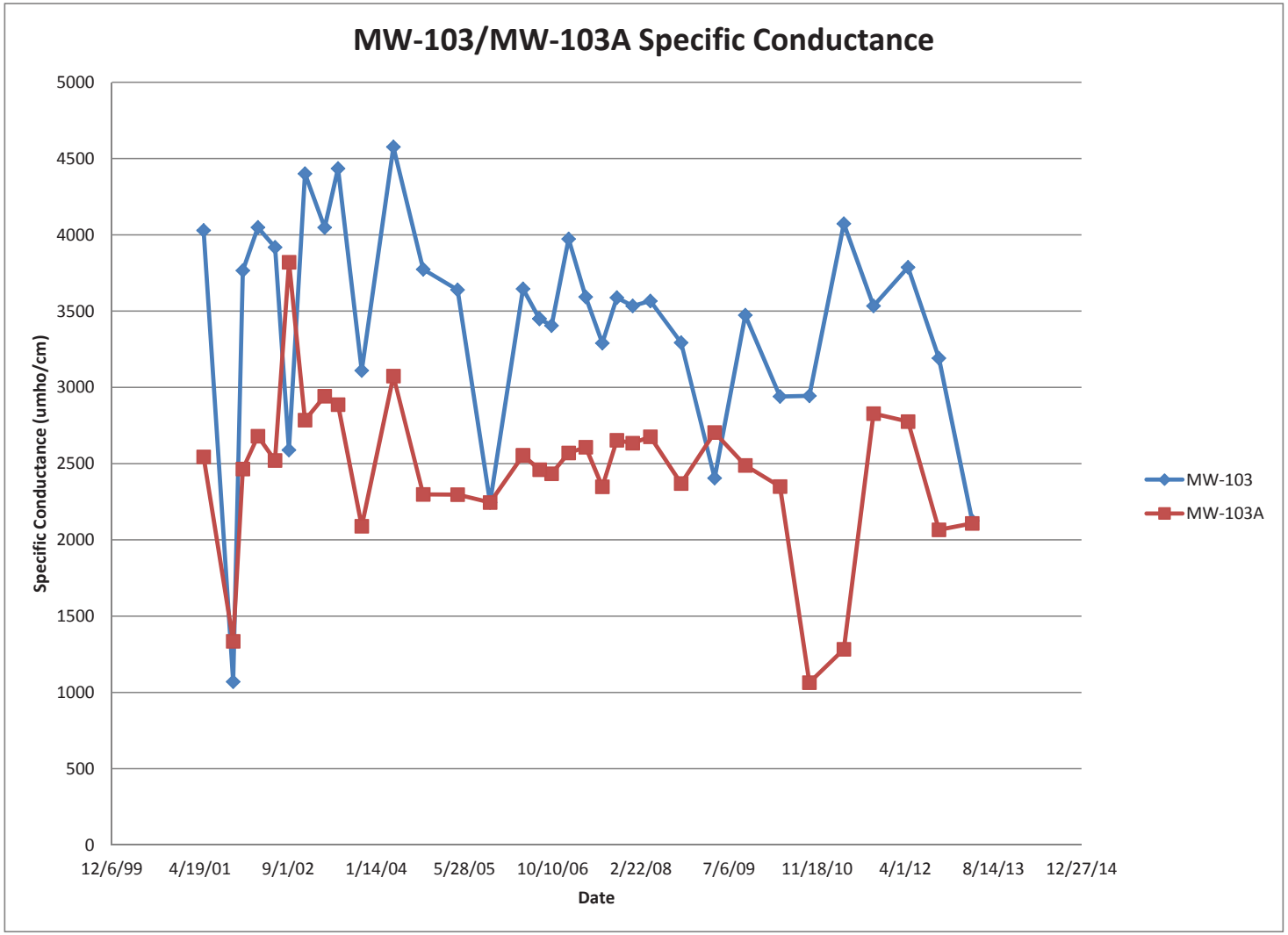

MW-108/MW-108R pH
10
9
8
7
6
5
4
3
2
pH
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-108
MW-108R

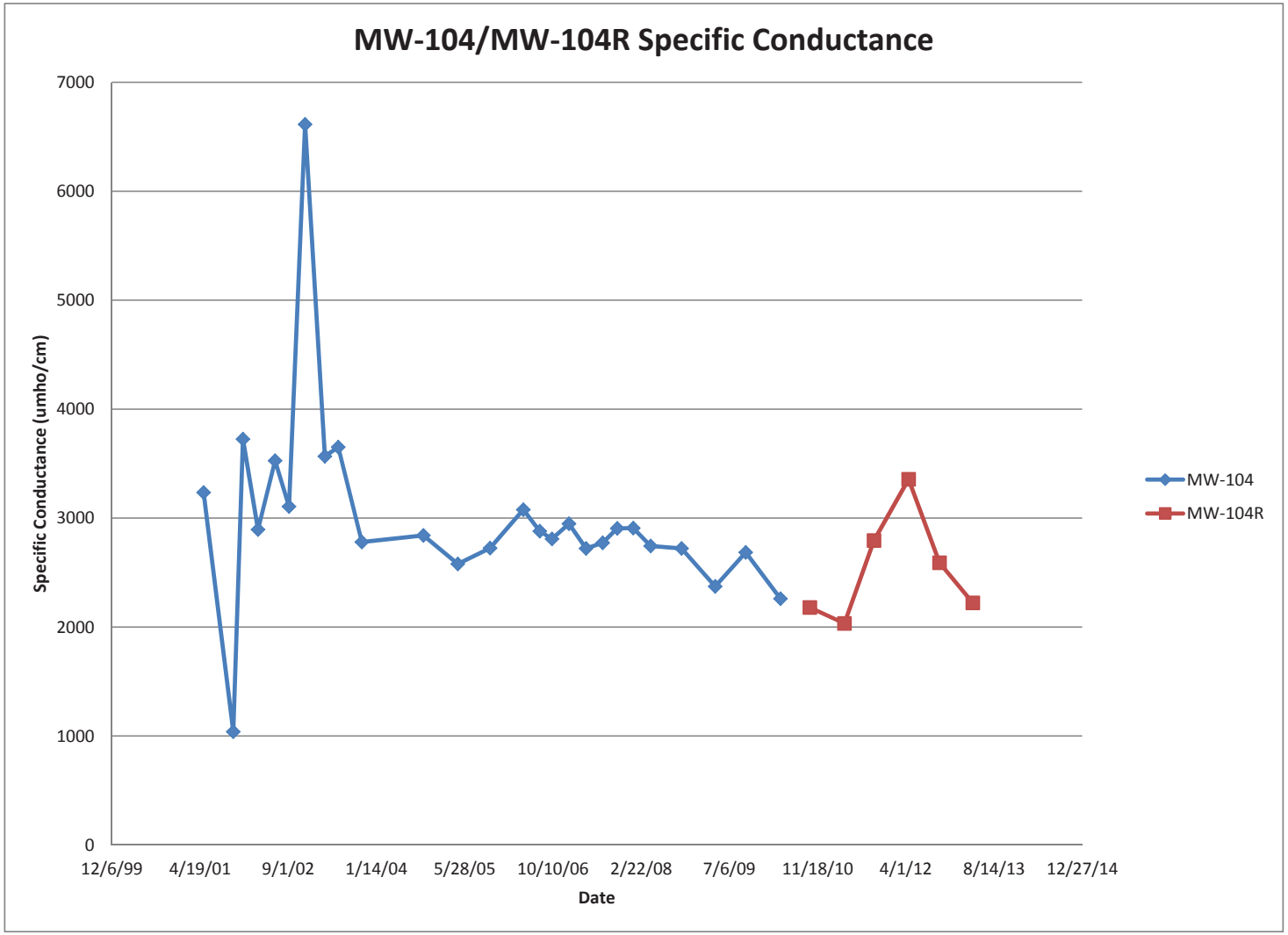

MW-109/MW-109R pH
10
9
8
7
6
5
4
3
2
pH
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-109
MW-109R

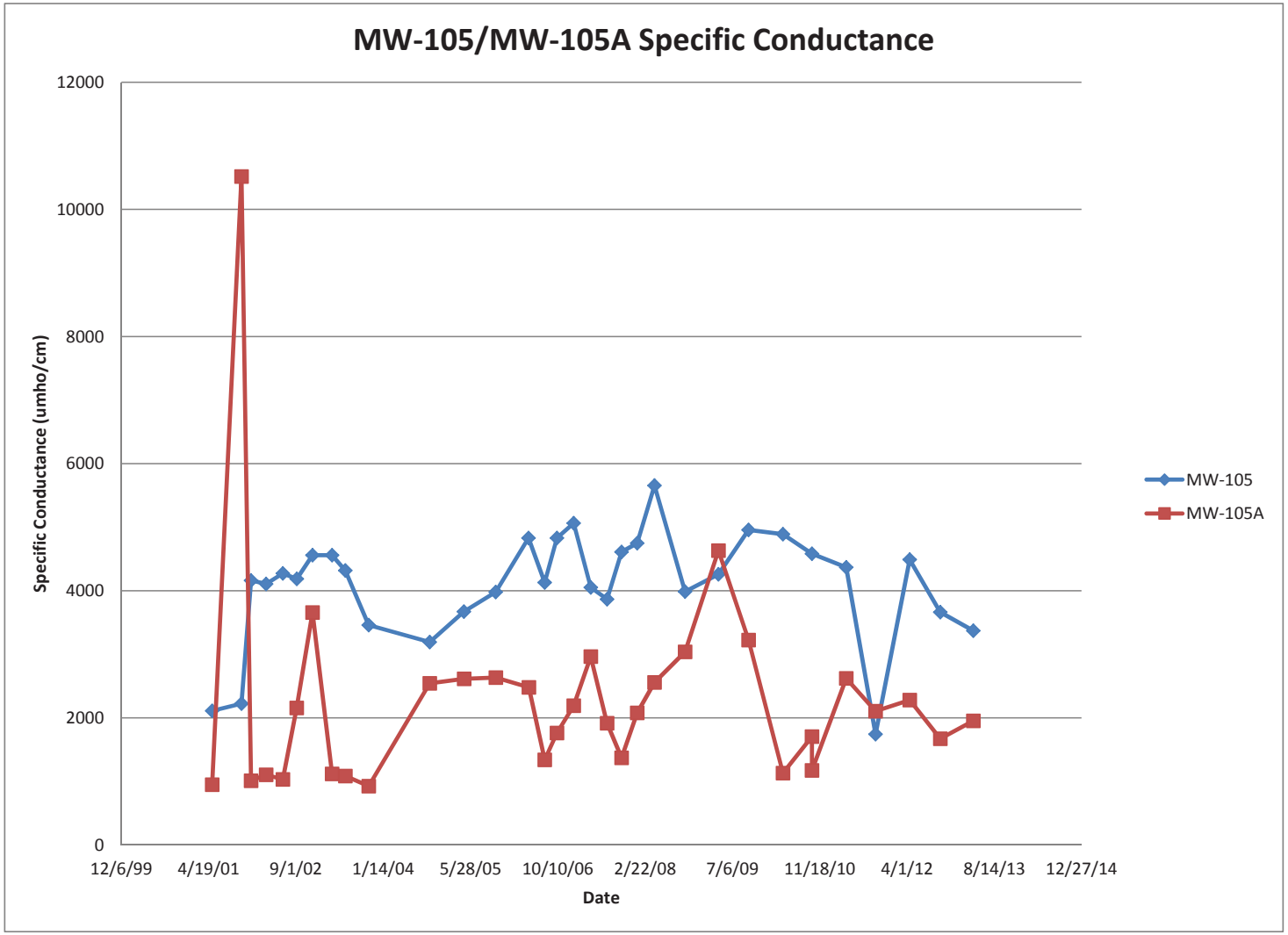

MW-103/MW-103A Sulfate Concentrations
Sulfate, Dissolved (mg/L)
2500
2000
1500
1000
500
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-103A
MW-103


MW-104/MW-104R Sulfate Concentrations
Sulfate, Dissolved (mg/L)
1200
1000
800
600
400
200
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-104R
MW-104


MW-105/MW-105A Sulfate Concentrations
Sulfate, Dissolved (mg/L)
1200
1000
800
600
400
200
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-105A
MW-105


MW-103/MW-103A Specific Conductance
Specific Conductance (umho/cm)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-103
MW-103A

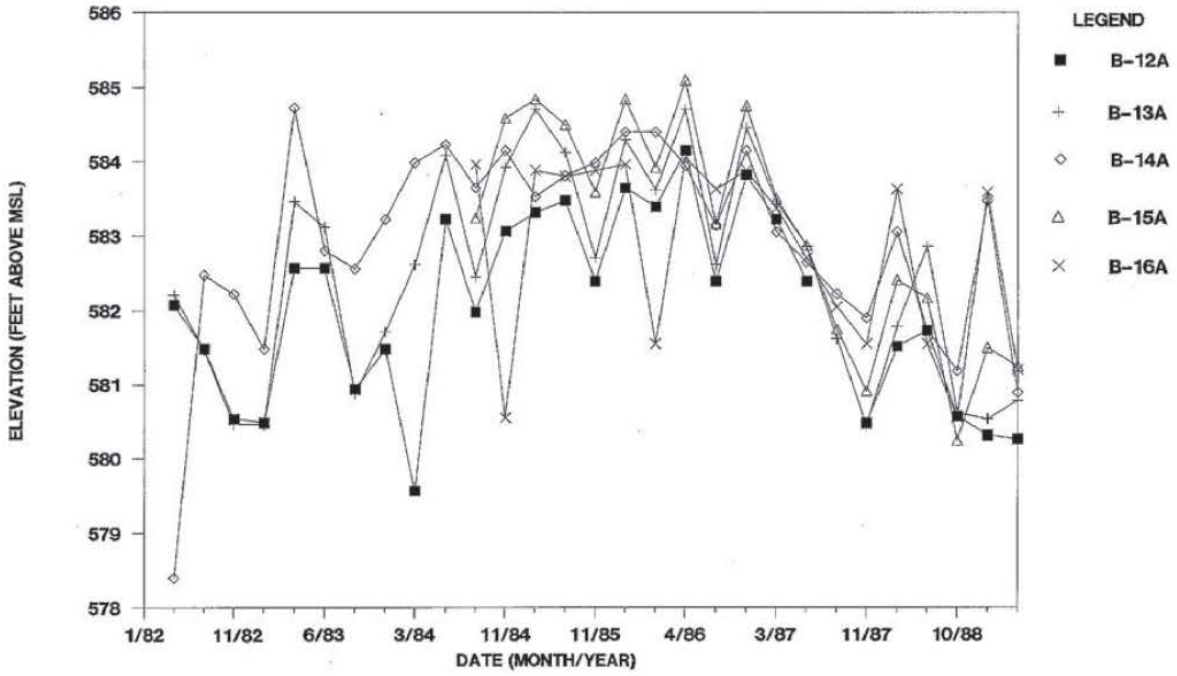

MW-104/MW-104R Specific Conductance
Specific Conductance (umho/cm)
7000
6000
5000
4000
3000
2000
1000
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-104
MW-104R


MW-105/MW-105A Specific Conductance
Specific Conductance (umho/cm)
12000
10000
8000
6000
4000
2000
0
12/6/99
4/19/01
9/1/02
1/14/04
5/28/05
10/10/06
2/22/08
7/6/09
11/18/10
4/1/12
8/14/13
12/27/14
Date
MW-105
MW-105A

Attachment 2

Historical Groundwater Elevation Graphs
(RMT, 1989)

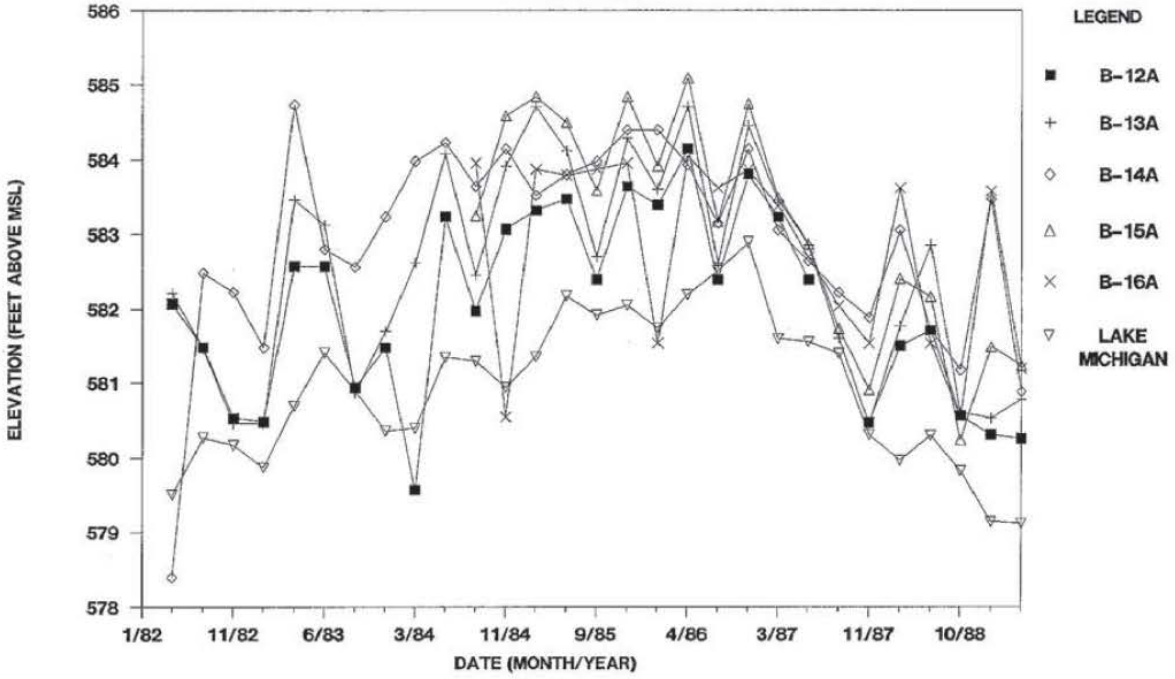
FIGURE 5



GROUNDWATER ELEVATIONS vs. TIME

RMT, 1989

FIGURE 6



LAKE AND GROUNDWATER ELEVATIONS vs. TIME

RMT, 1989

Appendix B
Historic Bridge Construction Plans

Appendix B – Historic Bridge Construction Plans

Summary of Contents

Plan, Overlaid on Aerial Photo, and Profile B2

Substructure Project 1220-5-71: East Abutment thru Pier 8 and Pier 45 thru West Abutment B5

Substructure Project 1220-5-72: Piers 9 thru 25 ..... B62

Substructure Project 1220-5-73: Piers 26 thru 44 ..... B103

PROJECT DESIGNATION	SHEET NO.
1220-5-78	5

BENCH MARKS

NO.	STATION	DESCRIPTION	ELEV.
209	814+	PT. MK. TOP NUT SOUTH SIDE OF SE LEG TOWER NO. 1376	580.48
210	820+	PT. MK. TOP NUT SOUTH SIDE OF SE LEG TOWER NO. 1377	580.90
211	841+45	P.K. NAIL IN 18" MAPLE 22' RT.	595.51

USGS DATUM

NOTE TO ARRIVE AT I.G.L.D. SUBTRACT 0.88 FEET FROM U.S.G.S.

CONSTR. ℄ CURVE NOTES
PI STA. 826+18.64
N 260499.570
E 2522120.411
Δ = 177° 21' 39.2"
D = 0° 10' 00"
T = 791.87'
L = 1583.46'
E = 9.12'
R = 34377.47'

SURVEY ℄ CURVE NOTES
PI = 814+28.23
N 260,167.089
E 2,523,273.206
Δ = 172°-26'-44.7"
D = 7°-33'-15.3"
D = 0°-15'-00"
T = 1513.04'
L = 3,021.70'
E = 49.89'
R = 22,918.31'

STA. 822+61.11 CONSTRUCTION ℄ I.H.43
STA 13+77.37 ℄ QUINCY ST.

STA. 822+17.35 CONST. ℄ I.H. 43
STA. 822+03.25 CONST. ℄ I.H. 43
STA. 821+93.70 CONST. ℄ I.H. 43
STA. 823+13.15 CONST. ℄ I.H. 43
STA. 823+27.30 CONST. ℄ I.H. 43
STA. 823+41.45 CONST. ℄ I.H. 43
STA. 823+56.65 CONST. ℄ I.H. 43

STA. 823+50.50 ACCESS ROAD
STA. 823+35.30 ACCESS ROAD
STA. 823+21.15 ACCESS ROAD
STA. 823+07.00 ACCESS ROAD

STA. 822+54.91 ACCESS RD.
STA. 14+58.29 QUINCY ST.

STA. 827+50 ACCESS ROAD
1-24" X 46' C.P. CL. III
INL. = 580.5 DISCH = 5800

PROFILE FOR ACCESS ROAD - QUINCY TO FOX RIVER

NOTE: ALL GRADES ARE I.G.L.D.

NOTE TO ARRIVE AT U.S.G.S. ADD 0.88 FEET TO I.G.L.D.

UNITED STATES GEODETIC SURVEY DATUM

INTERNATIONAL GREAT LAKES DATUM

U.S.G.S. DATUM

I.G.L. DATUM

U.S.G.S. DATUM I.G.L. DATUM

PRESENT PROFILE

FINISHED GRADE

1600' V.C.

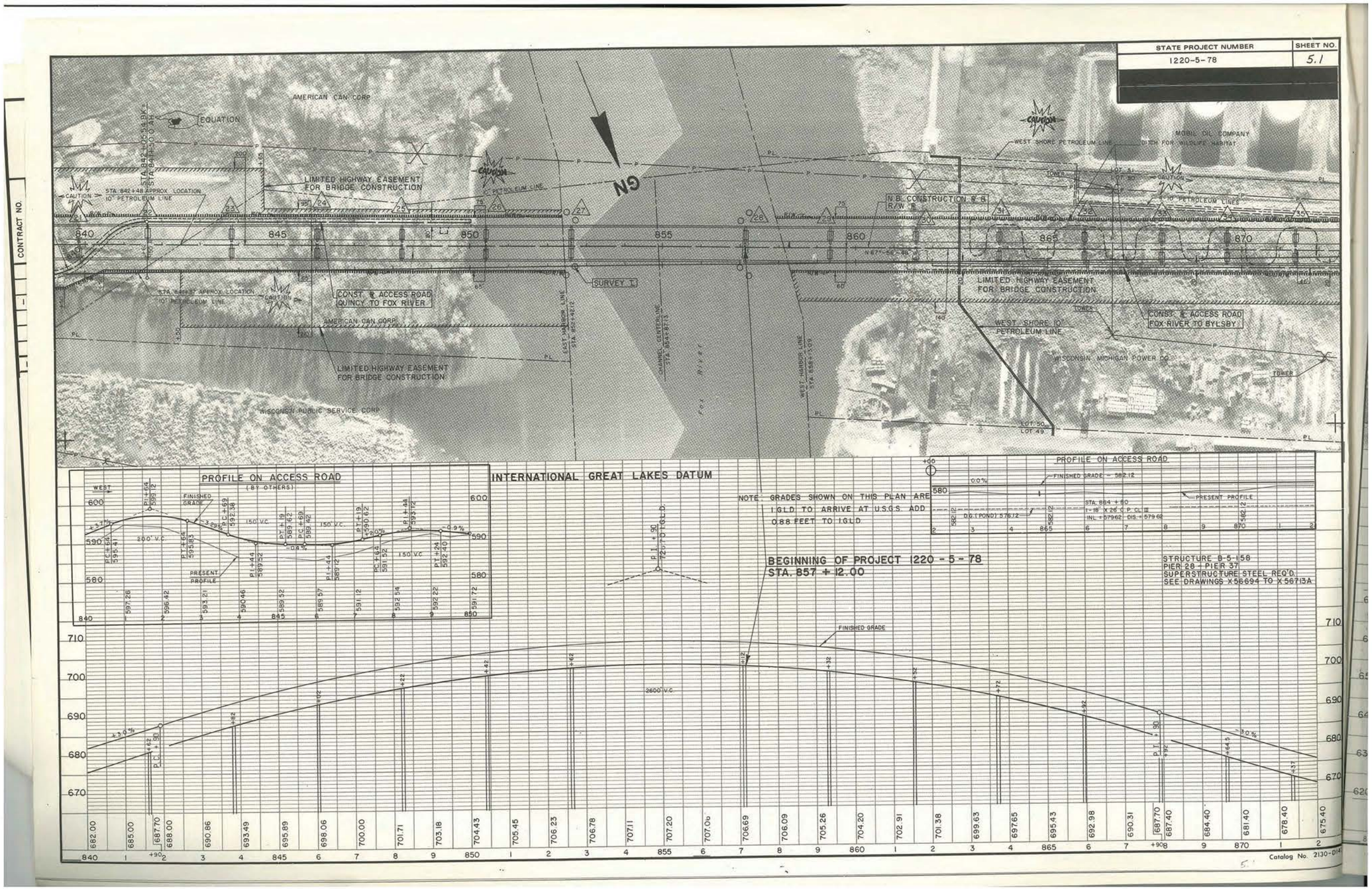
200' V.C.

THIS SHEET FOR INFORMATION ONLY

Catalog No 2130-D142

STATE PROJECT NUMBER	SHEET NO.
1220-5-78	5.1
[redacted]	

CONTRACT NO. [redacted]



STATE PROJECT NUMBER	SHEET NO.
1220-5-78	5.2

BENCH MARKS

NO.	STATION	DESCRIPTION		ELEV.
214	871+52	SPIKE IN 20" POPLAR	200'RT	583.10
215	879+87	GOV'T. MONUMENT	39'RT	583.22

NOTE: TO ARRIVE AT I.G.L.D. SUBTRACT 0.88 FEET FROM USGS

USGS DATUM

WESTERN REFRIGERATOR LINE CO.

H & R PAPER & REFUSE CO., INCORPORATED

CHICAGO & NORTHWESTERN TRANSPORTATION CO.

MOBIL OIL CO.

PETROLEUM LINE EASEMENT

CAUTION 4-10" PETROLEUM LINE

LIMITED HIGHWAY EASEMENT FOR BRIDGE CONSTRUCTION TEMPORARY 1.32 ACRES

STA 879+82 APPROX LOCATION 2-10" PETROLEUM LINES

OFFICE FOR WILDLIFE HABITAT

EAST PORT DRIVE

SOD AND EROSION MAT

SOUTHEAST RAMP

12" SANITARY SEWER ABANDONED

GAS LINE MARKER

870 875 SOUTHBOUND ROADWAY I.H. 43 NORTHBOUND ROADWAY 880 885 890 895 900

LIMITED HIGHWAY EASEMENT FOR BRIDGE CONSTRUCTION

CONSTRUCTION & ACCESS ROAD FOX RIVER TO BYLSBY

STA 876+76.78 C.&N.W. TRANSPORTATION CO. SPUR LINE

STA 879+58 APPROX LOCATION 4-10" PETROLEUM LINES

WISCONSIN MICHIGAN POWER CO.

GEODETIC SURVEY R/W

N.B. CONSTRUCTION ℄ B R/W ℄

N.B. CONSTRUCTION ℄ B ℄ FOR ACCESS ROAD

APPROX LOCATION 5-10" PETROLEUM LINES

CITIES SERVICE OIL CO.

STA 879+75 APPROX LOCATION 8" NATURAL GAS LINE

N.B. CONSTRUCTION ℄ B P.C. = STA. 883+14.43

N.B. CONSTRUCTION ℄ B R/W ℄ CURVE NOTES

P.I.	=	896+87.27
		N. 263,153.51
		E. 2,515,569.18
Δ	=	202°-34'-57.86"
	=	22°-34'-57.86"
D	=	0°-50'
T	=	1,372.78'
L	=	2,709.93'
R	=	6,875.49'
S.E.	=	0.027 FT/FT
R.O.	=	200'

STA 891+30 APPROX LOCATION 2-10" PETROLEUM LINES

S.B. CONSTRUCTION ℄ P.C. = STA. 906+00.00

PROFILE ON ACCESS ROAD

FINISHED GRADE

EXISTING PROFILE

STA. 872+35 I-18 X26 C.P. CL ℄ INL. = 57962 DISC. = 57962

DIGIPOND 776.120

100' V.C.

0.97%

NOTE: TO ARRIVE AT U.S.G.S. ADD 0.88 FEET TO I.G.L.D.

END OF PROJECT 1220-5-78 STA. 874+82.00

I.G.L. DATUM

INTERNATIONAL GREAT LAKES DATUM

UNITED STATES GEODETIC SURVEY DATUM

FINISHED GRADE N.B. ℄

FINISHED GRADE S.B. ℄

FINISHED GRADE N.B. ℄

FINISHED GRADE S.B. ℄

U.S.G.S. DATUM

TOP OF RAIL ELEVATION 584.32 I.G.L.D. 585.00 U.S.G.S.

23' CLEARANCE

N.B. P.I. = 86+66.57 N.B. P.C. = 97+32.58

S.B. P.I. = 86+87.27 S.B. P.C. = 97+33.39

D.G. PT. 0.0%

NORTHBOUND ROADWAY

INTERNATIONAL GREAT LAKES DATUM

UNITED STATE GEODETIC SURVEY DATUM

Catalog No. 2130-D142

WISDOT DTID

FORM E-8 11-69

PROJECT ID 1220-5-71 | SHEET NUMBER 7 | TOTAL SHEETS

FEDERAL PROJECT DESIGNATION

7984'-3 BACK TO BACK OF ABUTMENTS

*ATTACH BEAM TYPE GUARD RAIL TO WING PARAPETS

TRAFFIC VOLUME
IH 43
ADT = 18,900 (1974)
DHV = 10 M P H

DESIGN DATA
LIVE LOAD:
DESIGN RATING: H20 MOD
INVENTORY RATING:
OPERATIONAL RATING:
STRUCTURE IS DESIGNED FOR A FUTURE WEARING SURFACE OF 30 POUNDS PER SQUARE FOOT
ALLOWABLE STRESS DESIGN STRESSES:
CONCRETE f'c ASSIGNED:
SLABS f'c = 4,000 PSI
ALL OTHERS f'c = 3,500 PSI
BAR STEEL REINFORCEMENT (GRADE 40) fs = 20,000 PSI
STRUCTURAL LOW ALLOY STEEL (A S T M A588):
TC AND INCLUDING 4" THICK fy = 21,000 PSI
90' PRESTRESSED GIRDERS: CONCRETE MASONRY f'c = 6,000 PSI
STRANDS 1/2"ϕ 270 K ULTIMATE TENSILE STRENGTH OR 270,000 PSI

FOUNDATION DATA
FOR PILING INFORMATION SEE SUBSURFACE EXPLORATION SHEETS.

SUBSTRUCTURE PROJECT 1220-5-71
EAST ABUTMENT THRU PIER 8 AND PIER 9 S THRU WEST ABUTMENT

PLAN B-5-158

GENERAL NOTES
DRAWINGS SHALL NOT BE SCALED
ALL ELEVATIONS REFER TO INTERNATIONAL GREAT LAKES DATUM (1 G L D) (1955) (U S G S = I G L D + 1.15 FEET)
BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2" CLEAR UNLESS OTHERWISE SHOWN OR NOTED.
THE SLOPE OF FILL IN FRONT OF THE ABUTMENTS SHALL BE COVERED WITH SLOPE PAVING, CRUSHED AGGREGATE, TO THE EXTENT SHOWN ON THIS SHEET AND ON SHEETS 6, 19 & 56.
THE UPPER LIMITS OF EXCAVATION FOR STRUCTURES FOR THE PIERS SHALL BE THE ORIGINAL GROUND LINE.

CURVE DATA

℄ SOUTHWEST RAMP
PI = STA 812+40 RI
Δ = 10°-38'-02.5"
D = 3°-19'-49.8"
T = 160.11
L = 319.29'
R = 1720.34'
SE = 0.057
RD = 1.76'
PC = STA 810+80.70
PT = STA 814+00.00

℄ NB LANE IH 43
PI = STA 826+18.42
Δ = 2°-58'-81"
D = 0°-10'
T = 1741.88'
L = 1383.50'
R = 34,377.47'
SE = NORMAL CROWN
PC = STA 818+26.73
PT = STA 832+10.23

ELEVATION
NORMAL TO SUBSTRUCTURE UNITS

TYPICAL SECTION THRU GREEN BAY & WESTERN RR., C.M.ST.P & P RR. & QUINCY STREET

LAYOUT

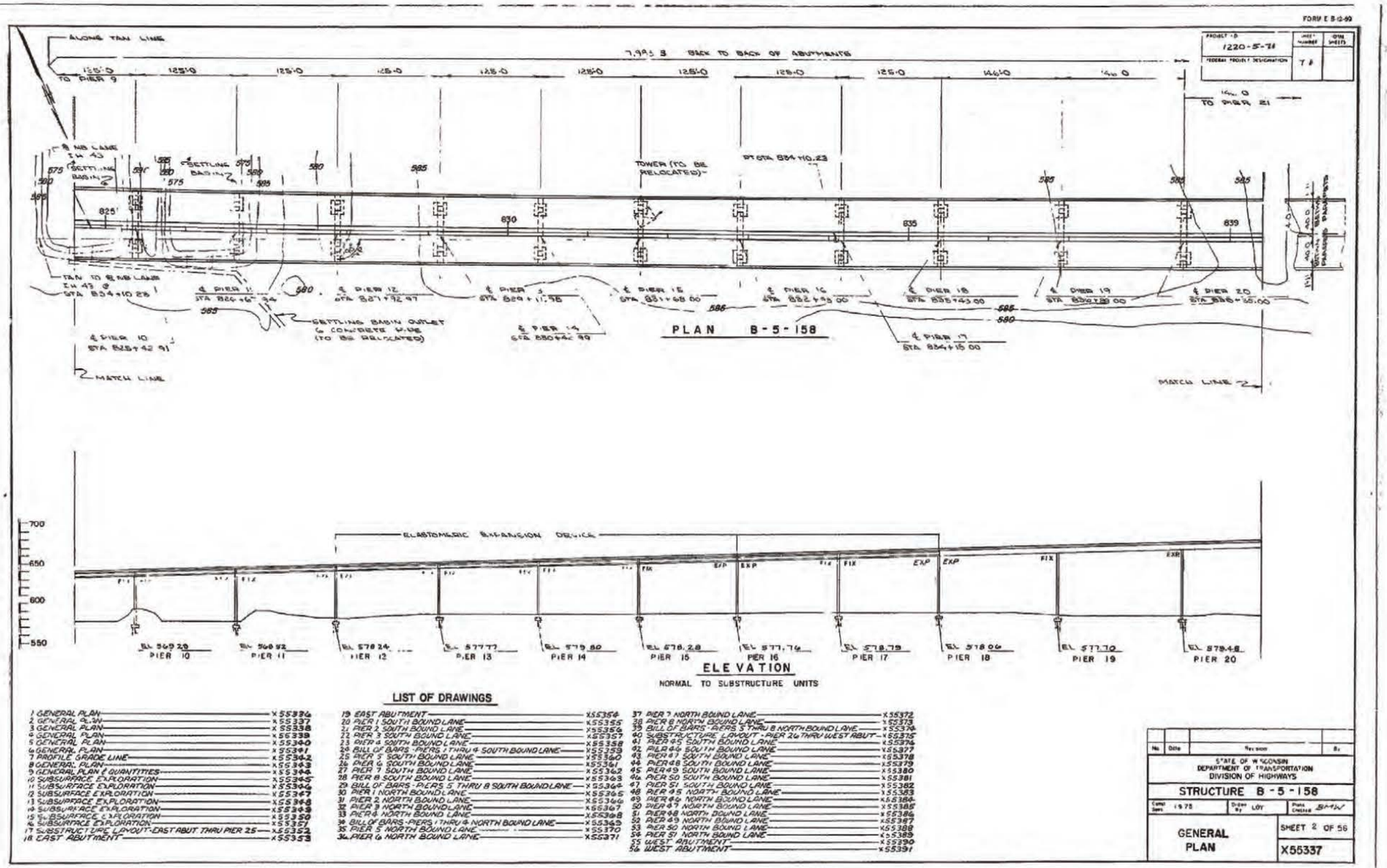
AS BUILT PLAN
DATE 7-'78 BY W J K

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158
INTERSTATE 43 OVER FOX RIVER
County BROWN | City/Village GREEN BAY
Design Spec. A A S H O 1973 | Loads H-20 MOD | Const. Date 1975
Designed By J W M | Design Checked J W M | Drawn By LOY | Plans Checked BMW
Approved W. A Kline 5-3-76
Chief Bridge Engineer | Date

GENERAL PLAN | SHEET 1 OF 56 | X55336



LIST OF DRAWINGS

1 GENERAL PLAN — X55336
2 GENERAL PLAN — X55337
3 GENERAL PLAN — X55338
4 GENERAL PLAN — X55339
5 GENERAL PLAN — X55340
6 GENERAL PLAN — X55341
7 PROFILE GRADE LINE — X55342
8 GENERAL PLAN — X55343
9 GENERAL PLAN & QUANTITIES — X55344
10 SUBSURFACE EXPLORATION — X55345
11 SUBSURFACE EXPLORATION — X55346
12 SUBSURFACE EXPLORATION — X55347
13 SUBSURFACE EXPLORATION — X55348
14 SUBSURFACE EXPLORATION — X55349
15 SUBSURFACE EXPLORATION — X55350
16 SUBSURFACE EXPLORATION — X55351
17 SUBSTRUCTURE LAYOUT-EAST ABUT THRU PIER 25 — X55352
18 EAST ABUTMENT — X55353
19 EAST ABUTMENT — X55354
20 PIER 1 SOUTH BOUND LANE — X55355
21 PIER 2 SOUTH BOUND LANE — X55356
22 PIER 3 SOUTH BOUND LANE — X55357
23 PIER 4 SOUTH BOUND LANE — X55358
24 BILL OF BARS - PIERS 1 THRU 4 SOUTH BOUND LANE — X55359
25 PIER 5 SOUTH BOUND LANE — X55360
26 PIER 6 SOUTH BOUND LANE — X55361
27 PIER 7 SOUTH BOUND LANE — X55362
28 PIER 8 SOUTH BOUND LANE — X55363
29 BILL OF BARS - PIERS 5 THRU 8 SOUTH BOUND LANE — X55364
30 PIER 1 NORTH BOUND LANE — X55365
31 PIER 2 NORTH BOUND LANE — X55366
32 PIER 3 NORTH BOUND LANE — X55367
33 PIER 4 NORTH BOUND LANE — X55368
34 BILL OF BARS - PIERS 1 THRU 4 NORTH BOUND LANE — X55369
35 PIER 5 NORTH BOUND LANE — X55370
36 PIER 6 NORTH BOUND LANE — X55371
37 PIER 7 NORTH BOUND LANE — X55372
38 PIER 8 NORTH BOUND LANE — X55373
39 BILL OF BARS - PIERS 5 THRU 8 NORTH BOUND LANE — X55374
40 SUBSTRUCTURE LAYOUT - PIER 26 THRU WEST ABUT — X55375
41 PIER 45 SOUTH BOUND LANE — X55376
42 PIER 46 SOUTH BOUND LANE — X55377
43 PIER 47 SOUTH BOUND LANE — X55378
44 PIER 48 SOUTH BOUND LANE — X55379
45 PIER 49 SOUTH BOUND LANE — X55380
46 PIER 50 SOUTH BOUND LANE — X55381
47 PIER 51 SOUTH BOUND LANE — X55382
48 PIER 45 NORTH BOUND LANE — X55383
49 PIER 46 NORTH BOUND LANE — X55384
50 PIER 47 NORTH BOUND LANE — X55385
51 PIER 48 NORTH BOUND LANE — X55386
52 PIER 49 NORTH BOUND LANE — X55387
53 PIER 50 NORTH BOUND LANE — X55388
54 PIER 51 NORTH BOUND LANE — X55389
55 WEST ABUTMENT — X55390
56 WEST ABUTMENT — X55391

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

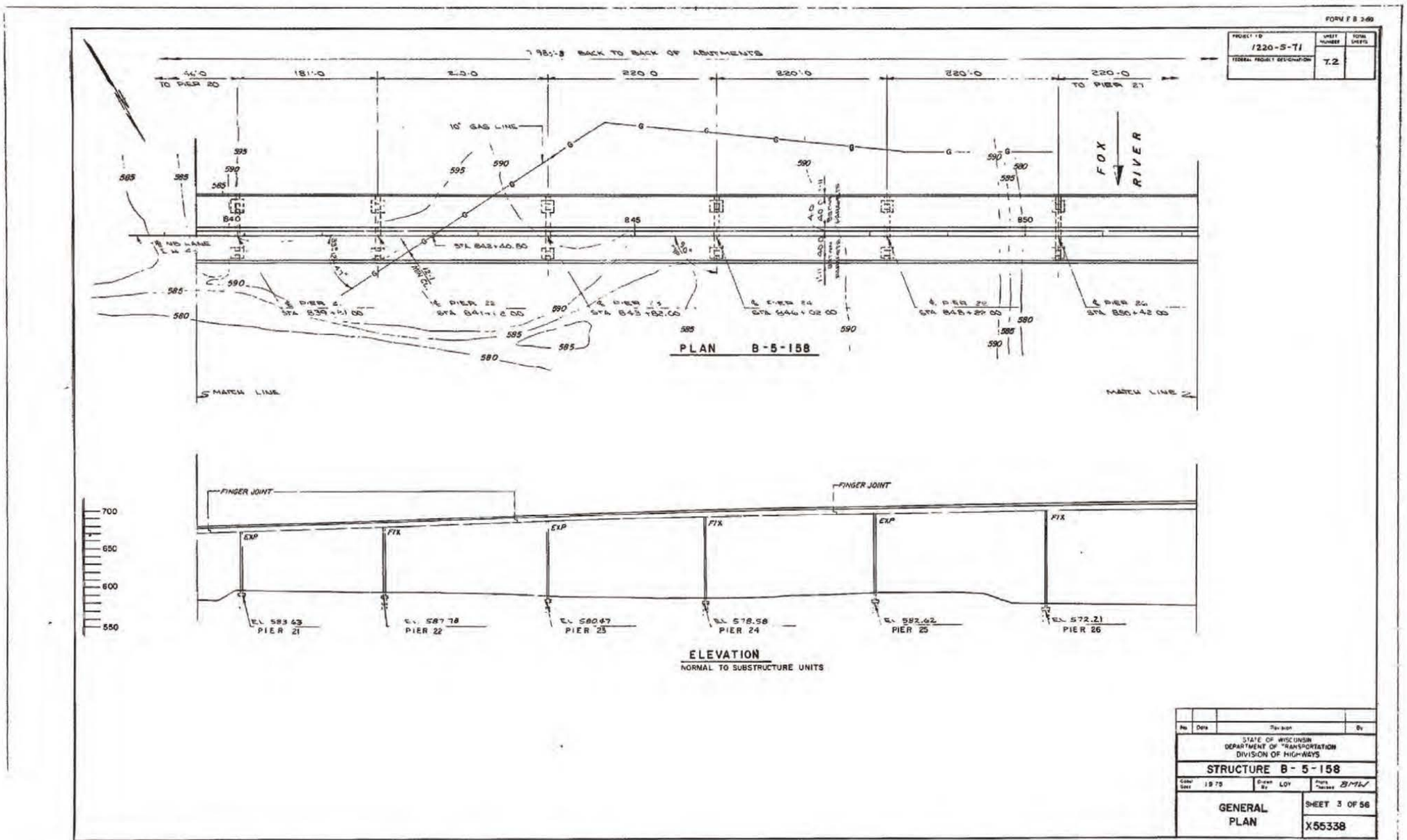
STRUCTURE B-5-158

Const. Start: 1975	Drawn By: LOY	Plans Checked: BMW

GENERAL PLAN

SHEET 2 OF 56

X55337

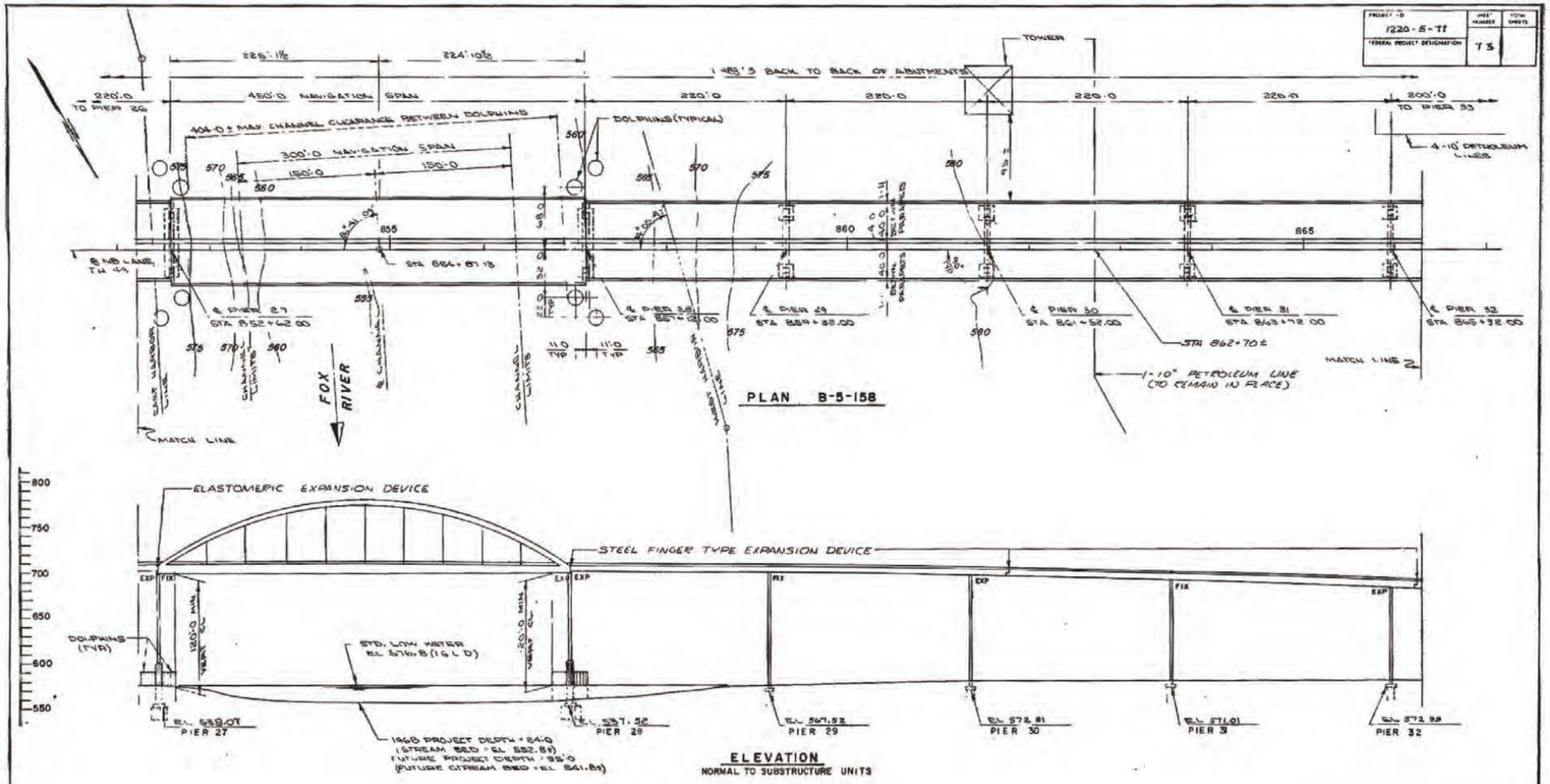

FORM F B 2-69
PROJECT I D
1220-5-71
SHEET NUMBER
7.2
TOTAL SHEETS
FEDERAL PROJECT DESIGNATION
795'-3 BACK TO BACK OF ABUTMENTS
44'-0
TO PIER 20
181'-0
220'-0
220'-0
220'-0
220'-0
TO PIER 27
10" GAS LINE
FOX
RIVER
595
590
585
565
840
845
850
580
STA 843+60.80
2 SPANS @ 40'-0" = 80'-0"
PIER 21
STA 839+21.00
PIER 22
STA 841+12.00
PIER 23
STA 843+82.00
PIER 24
STA 846+02.00
PIER 25
STA 848+22.00
PIER 26
STA 850+42.00
PLAN B-5-158
MATCH LINE
MATCH LINE
FINGER JOINT
FINGER JOINT
EXP
FIX
EXP
FIX
EXP
FIX
700
650
600
550
EL. 583.43
PIER 21
EL. 587.78
PIER 22
EL. 580.47
PIER 23
EL. 578.58
PIER 24
EL. 582.62
PIER 25
EL. 572.21
PIER 26
ELEVATION
NORMAL TO SUBSTRUCTURE UNITS
No.
Date
Revision
By
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
Const. Spec. 1975
Drawn By LOY
Plans Checked BMW
GENERAL PLAN
SHEET 3 OF 56
X55338

WISDOT DTID

WISDOT DTID

FORM F-5-2-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-71	73	
FEDERAL PROJECT DESIGNATION		



No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

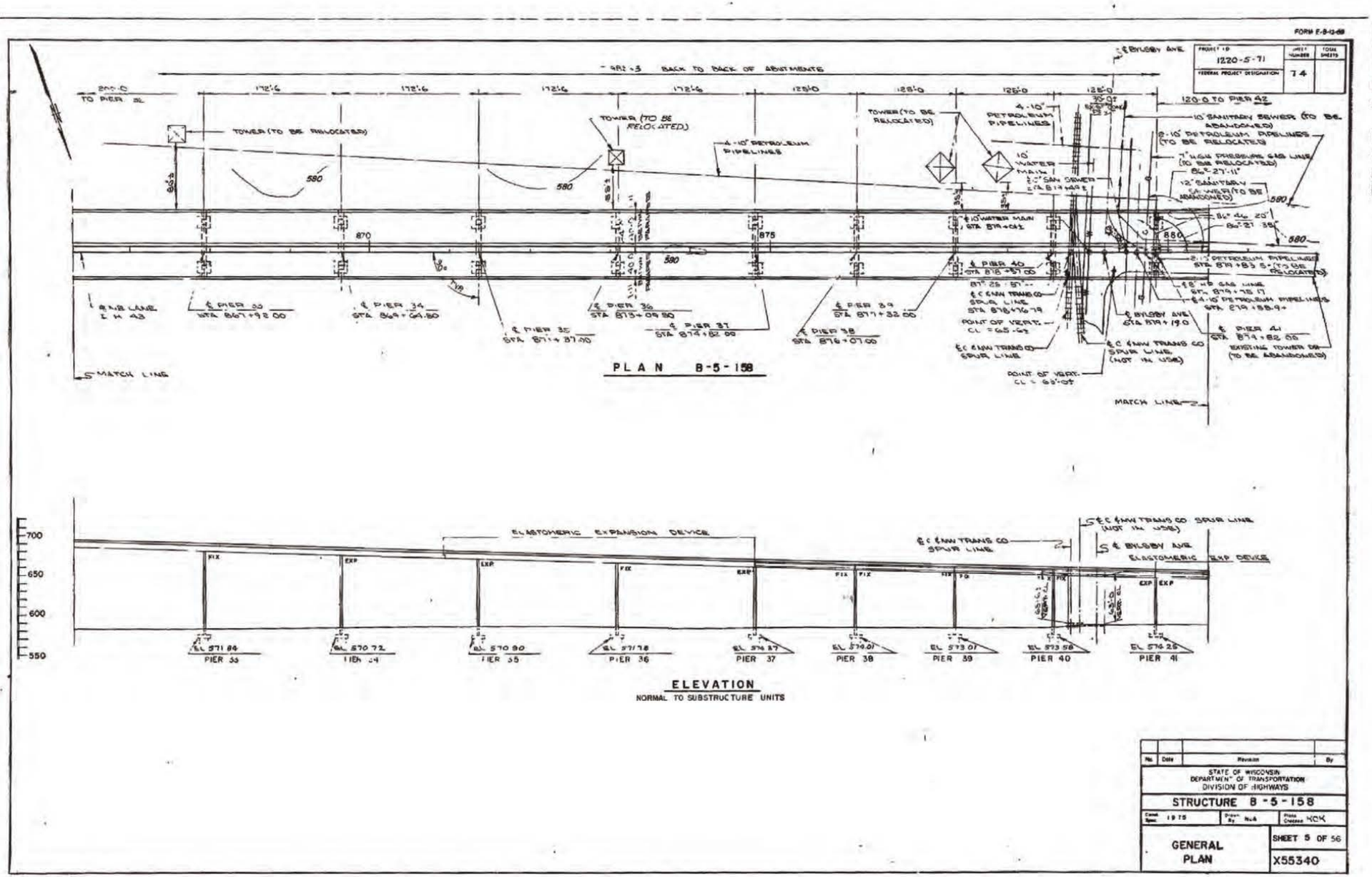
STRUCTURE B-5-158

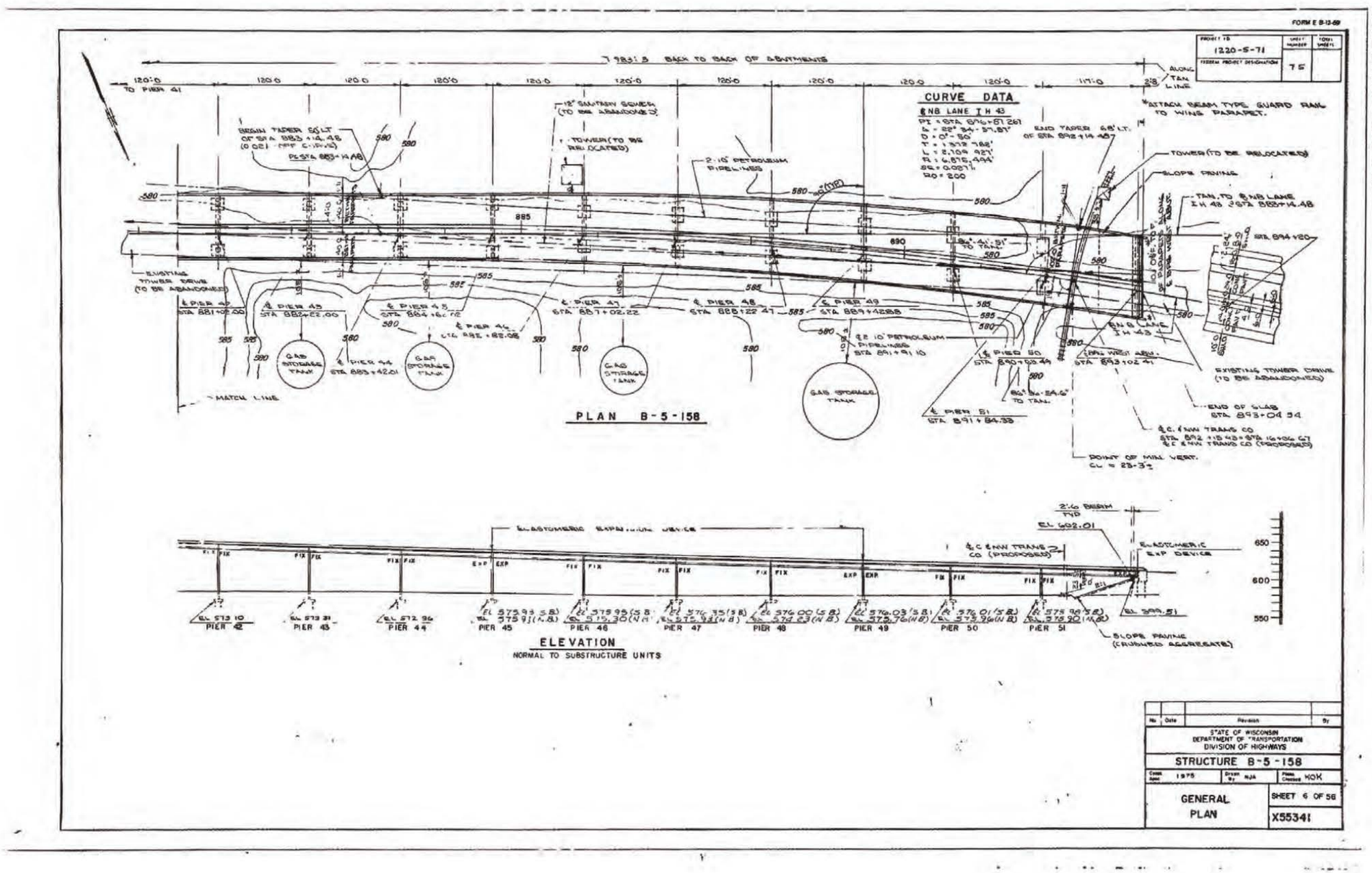
Const. Spec. 1975	Drawn By WJA	Prints Checked KOK

GENERAL PLAN

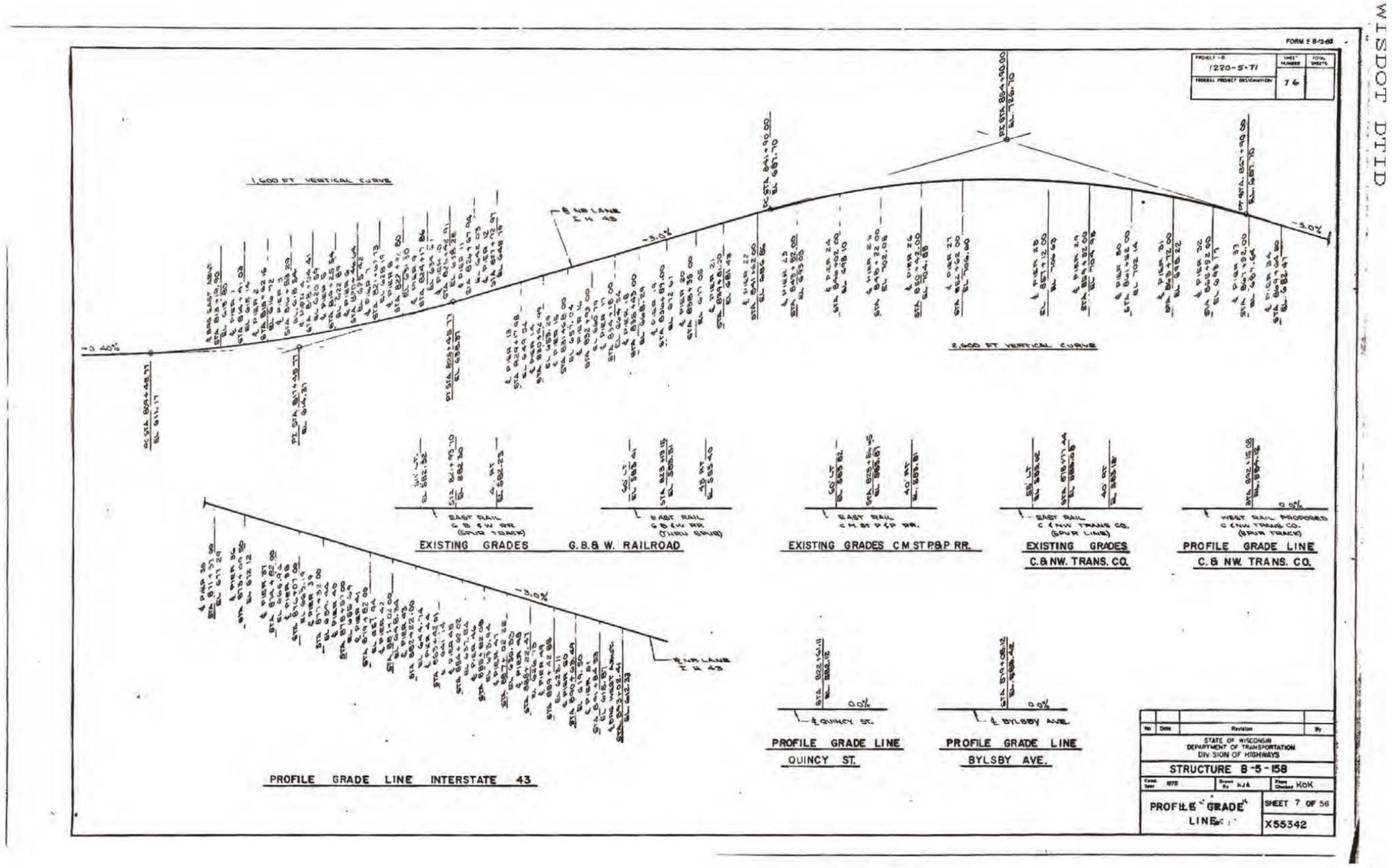
SHEET 4 OF 56

X55339


FORM F-8-12-68
PROJECT ID 1220-5-71
FEDERAL PROJECT DESIGNATION
SHEET NUMBER 74
TOTAL SHEETS
W.S.D.O.T. BTID
BACK TO BACK OF ABUTMENTS
200'-0 TO PIER 32
172'-6
172'-6
172'-6
172'-6
125'-0
125'-0
125'-0
125'-0
120'-0 TO PIER 42
TOWER (TO BE RELOCATED)
TOWER (TO BE RELOCATED)
TOWER (TO BE RELOCATED)
4-10" PETROLEUM PIPELINES
4-10" PETROLEUM PIPELINES
10" WATER MAIN
10" SAN SEWER
10" SANITARY SEWER (TO BE ABANDONED)
8-10" PETROLEUM PIPELINES (TO BE RELOCATED)
7" HIGH PRESSURE GAS LINE (TO BE RELOCATED)
12" SANITARY SEWER (TO BE ABANDONED)
10" WATER MAIN STA 879+04±
2-10" PETROLEUM PIPELINES STA 879+83.5+ (TO BE RELOCATED)
8" HP GAS LINE STA 879+78 (?)
4-10" PETROLEUM PIPELINES STA 879+88.9+
580
590
870
875
880
SB LANE I-H 43
℄ PIER 33 STA 867+92.00
℄ PIER 34 STA 869+61.80
℄ PIER 35 STA 871+87.00
℄ PIER 36 STA 873+09.90
℄ PIER 37 STA 874+82.00
℄ PIER 38 STA 876+07.00
℄ PIER 39 STA 877+32.00
℄ PIER 40 STA 878+57.00
℄ PIER 41 STA 879+82.00
EXISTING TOWER (TO BE ABANDONED)
℄ BYLSBY AVE STA 879+19.0
℄ C & NW TRANS CO SPUR LINE
POINT OF VERT. CL = 65'-0±
MATCH LINE
PLAN B-5-158
700
650
600
550
ELASTOMERIC EXPANSION DEVICE
FIX
EXP
EL 571.84 PIER 33
EL 570.72 PIER 34
EL 570.80 PIER 35
EL 571.78 PIER 36
EL 574.87 PIER 37
EL 574.01 PIER 38
EL 573.01 PIER 39
EL 573.58 PIER 40
EL 574.25 PIER 41
ELEVATION
NORMAL TO SUBSTRUCTURE UNITS
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
GENERAL PLAN
SHEET 5 OF 56
X55340


FORM E B-13-69
PROJECT ID 1220-5-71
FEDERAL PROJECT DESIGNATION
SHEET NUMBER 75
TOTAL SHEETS
983.5 BACK TO BACK OF ABUTMENTS
120'-0 TO PIER 41
120'-0
120'-0
120'-0
120'-0
120'-0
120'-0
120'-0
120'-0
117'-0
2'-8 ALONG TAN LINE
CURVE DATA
℄ NB LANE I H 43
PT = STA 896+81.261
Δ = 22° 34' 37.81"
D = 0° 50'
T = 1312.768'
L = 2.709.921'
R = 6.875.494'
SE = 0.087
e = 2.00
END TAPER 6.8' LT. OF STA 892+14.487
ATTACH BEAM TYPE GUARD RAIL TO WING PARAPET.
BEGIN TAPER 50' LT OF STA 883+14.48 (0.02) (TYP C-I PIER)
PI STA 883+14.48
12" SANITARY SEWER (TO BE ABANDONED)
TOWER (TO BE RELOCATED)
2-16" PETROLEUM PIPELINES
TOWER (TO BE RELOCATED)
SLOPE PAVING
TAN. TO ℄ NB LANE I H 43 ℄ STA 883+14.48
STA 894+20
EXISTING TOWER DRIVE (TO BE ABANDONED)
℄ PIER 42 STA 881+02.00
℄ PIER 43 STA 882+22.00
℄ PIER 44 STA 883+42.01
℄ PIER 45 STA 884+62.02
℄ PIER 46 STA 886+82.08
℄ PIER 47 STA 887+02.22
℄ PIER 48 STA 888+22.47
℄ PIER 49 STA 889+42.88
℄ 12" PETROLEUM PIPELINES STA 891+91.10
℄ PIER 50 STA 890+62.49
℄ PIER 51 STA 891+84.38
℄ NB LANE I H 43
STA WEST ABT. STA 893+02.41
EXISTING TOWER DRIVE (TO BE ABANDONED)
END OF SLAB STA 893+04.34
℄ C & NW TRANS CO STA 892+15.43=STA 10+00.67 ℄ C & NW TRANS CO (PROPOSED)
POINT OF HILL VERT. CL = 25-3½
GAS STORAGE TANK
MATCH LINE
PLAN B-5-158
ELASTOMERIC EXPANSION DEVICE
FIX
EXP
EL 573.10 PIER 42
EL 573.31 PIER 43
EL 572.96 PIER 44
EL 575.93 (S.B.) EL 575.91 (N.B.) PIER 45
EL 575.95 (S.B.) EL 575.30 (N.B.) PIER 46
EL 576.35 (S.B.) EL 575.98 (N.B.) PIER 47
EL 576.00 (S.B.) EL 574.23 (N.B.) PIER 48
EL 576.03 (S.B.) EL 575.76 (N.B.) PIER 49
EL 576.01 (S.B.) EL 575.96 (N.B.) PIER 50
EL 575.96 (S.B.) EL 575.90 (N.B.) PIER 51
2'-6" BEAM TYP
EL 602.01
℄ C & NW TRANS CO (PROPOSED)
ELASTOMERIC EXP DEVICE
EL 599.51
650
600
550
SLOPE PAVING (CRUSHED AGGREGATE)
ELEVATION
NORMAL TO SUBSTRUCTURE UNITS
No. Date Revision By
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
Const. Date 1975
Drawn By MJA
Plans Checked MJK
GENERAL PLAN
SHEET 6 OF 58
X55341

WISDOT DTID


WISDOT DTID
FORM E 8-12-68
PROJECT I.D. 1220-5-71
SHEET NUMBER 76
TOTAL SHEETS
1,600 FT VERTICAL CURVE
2,000 FT VERTICAL CURVE
+3.0%
-3.0%
PT STA 854+90.00
EL 726.70
PT STA 841+90.00
EL 687.70
PT STA 867+90.00
EL 687.70
PROFILE GRADE LINE INTERSTATE 43
EXISTING GRADES G.B.& W. RAILROAD
EAST RAIL C.B.&W. RR. (SPUR TRACK)
EAST RAIL C.B.&W. RR. (THRU SPUR)
EXISTING GRADES C.M.ST.P.&P. RR.
EAST RAIL C.M.ST.P.&P. RR.
EXISTING GRADES C.& NW. TRANS. CO.
EAST RAIL C.& NW. TRANS. CO. (SPUR LINE)
PROFILE GRADE LINE C.& NW. TRANS. CO.
WEST RAIL PROPOSED C.& NW. TRANS. CO. (SPUR TRACK)
PROFILE GRADE LINE QUINCY ST.
E QUINCY ST.
PROFILE GRADE LINE BYLSBY AVE.
E BYLSBY AVE.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PROFILE GRADE LINE
SHEET 7 OF 56
X55342

WISDOT BTID

FORM E-8-12-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-71	7.7	
FEDERAL PROJECT DESIGNATION		

SPANS 19 THRU 27 & 29 THRU 37 SHOWN

SPAN 28

87'-10

40-0 BETWEEN PARAPETS | 4'-0 | 40-0 BETWEEN PARAPETS

1'-11 | 10-0 | 12-0 | 12-0 | 6-0 | 2@20-0 | 6-0 | 12-0 | 12-0 | 10-0 | 1'-11

NOTE POINT A ELEV = POINT B ELEV

0.15% | 0.15% | A | B | 0.15% | 0.15%

N 43 LANE

POINT REF TO ON PROFILE

EL 586.32 AT PIER 27
EL 583.77 AT PIER 28

TIED ARCH SPAN
PIERS 27 & 28

87'-10

40-0 BETWEEN PARAPETS | 4'-0 | 40-0 BETWEEN PARAPETS

1'-11 | 10-0 | 12-0 | 12-0 | 6-0 | 2@20-0 | 6-0 | 12-0 | 12-0 | 10-0 | 1'-11

FLOOR DRAIN TYP.

NOTE POINT A ELEV = POINT B ELEV

S 43 LANE

POINT REF TO ON PROFILE GRADE LINE

0.15% | 0.15% | A | B | 0.15% | 0.15%

TYPICAL 3@3 | 4 SPACES @ 9'-1½ = 36'-6 | 3@3

PLATE GIRDER SPANS
PIERS 9 THRU 26 & PIERS 29 THRU 44

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Date	Drawn By	Plans Checked
1975	RJA	KOK

GENERAL PLAN .

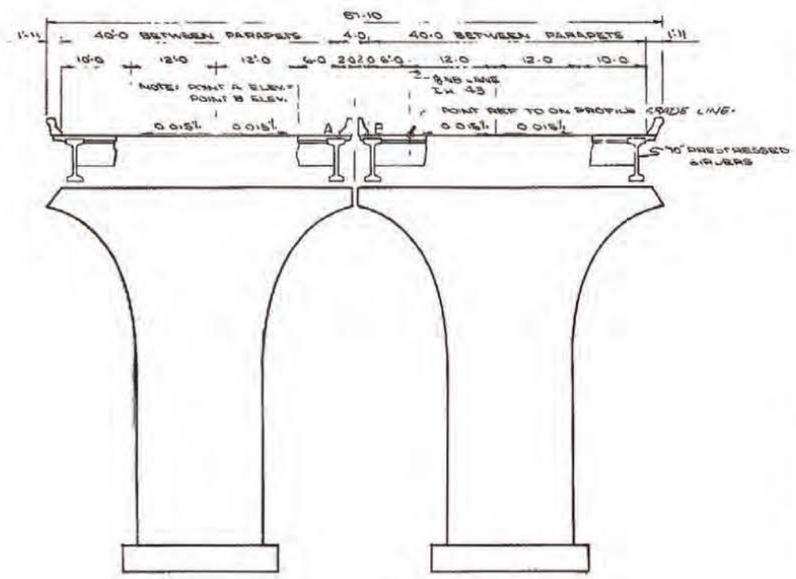
SHEET 8 OF 56

X55343

WISDOT DTID

FORM E 8-12-69

SPANS 6 THRU 18 & 38 THRU 42 SHOWN
SPANS 1 THRU 5 & 44 THRU 52 ROWY WIDTH VARIES
SPANS 1,2, & 43 THRU 45 ROWY SLOPE VARIES
SPANS 46 THRU 52 ROWY SLOPE 0.02%



PRESTRESSED GIRDER SPANS
PIERS 1 THRU 8 & PIERS 45 THRU 51

PROJECT ID	FED NUMBER	STATE SHEETS
1220-5-71	78	
FEDERAL PROJECT DESIGNATION		

TOTAL ESTIMATED QUANTITIES

BID ITEMS	UNIT	EAST ABUT.	PIER 1 S BOUND	PIER 1 N BOUND	PIER 2 S BOUND	PIER 2 N BOUND	PIER 3 S BOUND	PIER 3 N BOUND	PIER 4 S BOUND	PIER 4 N BOUND	PIER 5 S BOUND	PIER 5 N BOUND	PIER 6 S BOUND	PIER 6 N BOUND	PIER 7 S BOUND	PIER 7 N BOUND	PIER 8 S BOUND	PIER 8 N BOUND
EXCAVATION FOR STRUCTURES	L.S.																	
CONCRETE MASONRY	C.Y.	177	182	126	170	136	170	140	183	139	162	162	135	135	147	147	156	156
HIGH STRENGTH BAR STEEL REINFORCEMENT	LBS	8,580	16,780	12,600	11,000	13,250	23,200	18,780	10,870	9,220	22,900	22,490	9,280	11,180	16,740	16,780	12,760	12,760
STEEL PILING DELIVERED AND DRIVEN, HP 14 INCH 73 POUND	L.F.	2,340	1,820	1,560	1,300	1,300	1,820	1,560	1,560	1,170	1,560	1,560	1,250	1,250	1,500	1,500	1,250	1,250
SLOPE PAVING, CRUSHED AGGREGATE	S.Y.	650																
NON BID ITEM																		
POLYVINYL CHLORIDE WATERSTOP	L.F.	105																

TOTAL ESTIMATED QUANTITIES

BID ITEMS	PIER 45 S BOUND	PIER 45 N BOUND	PIER 46 S BOUND	PIER 46 N BOUND	PIER 47 S BOUND	PIER 47 N BOUND	PIER 48 S BOUND	PIER 48 N BOUND	PIER 49 S BOUND	PIER 49 N BOUND	PIER 50 S BOUND	PIER 50 N BOUND	PIER 51 S BOUND	PIER 51 N BOUND	WEST ABUT.	TOTAL
EXCAVATION FOR STRUCTURES																/
CONCRETE MASONRY	206	170	139	170	210	151	228	179	234	134	231	128	234	121	189	5,347
HIGH STRENGTH BAR STEEL REINFORCEMENT	18,040	17,610	19,670	17,360	17,170	15,920	23,190	16,640	17,800	13,990	20,580	13,480	20,980	13,000	8,330	501,630
STEEL PILING, DELIVERED AND DRIVEN, HP 14 INCH 73 POUND	1,200	1,000	1,200	1,000	1,100	1,000	1,200	1,000	1,200	1,000	1,400	1,000	1,400	1,000	2,480	93,330
SLOPE PAVING, CRUSHED AGGREGATE															640	1,290
NON-BID ITEM																
POLYVINYL CHLORIDE WATERSTOP															115	225

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

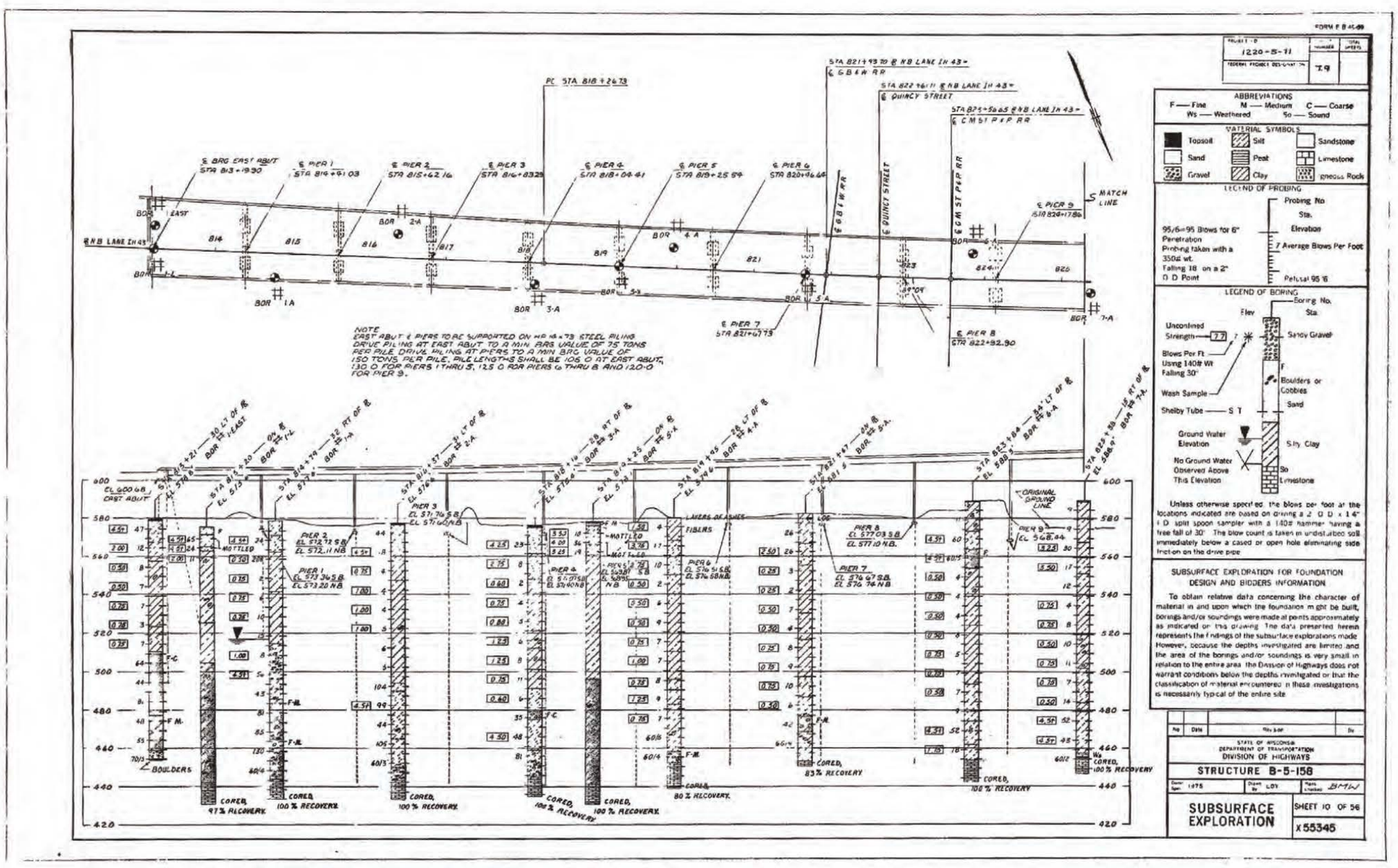
STRUCTURE B-5-158

Const. Spec.	Drawn by	Plans Checked
1975	LOV	BMW

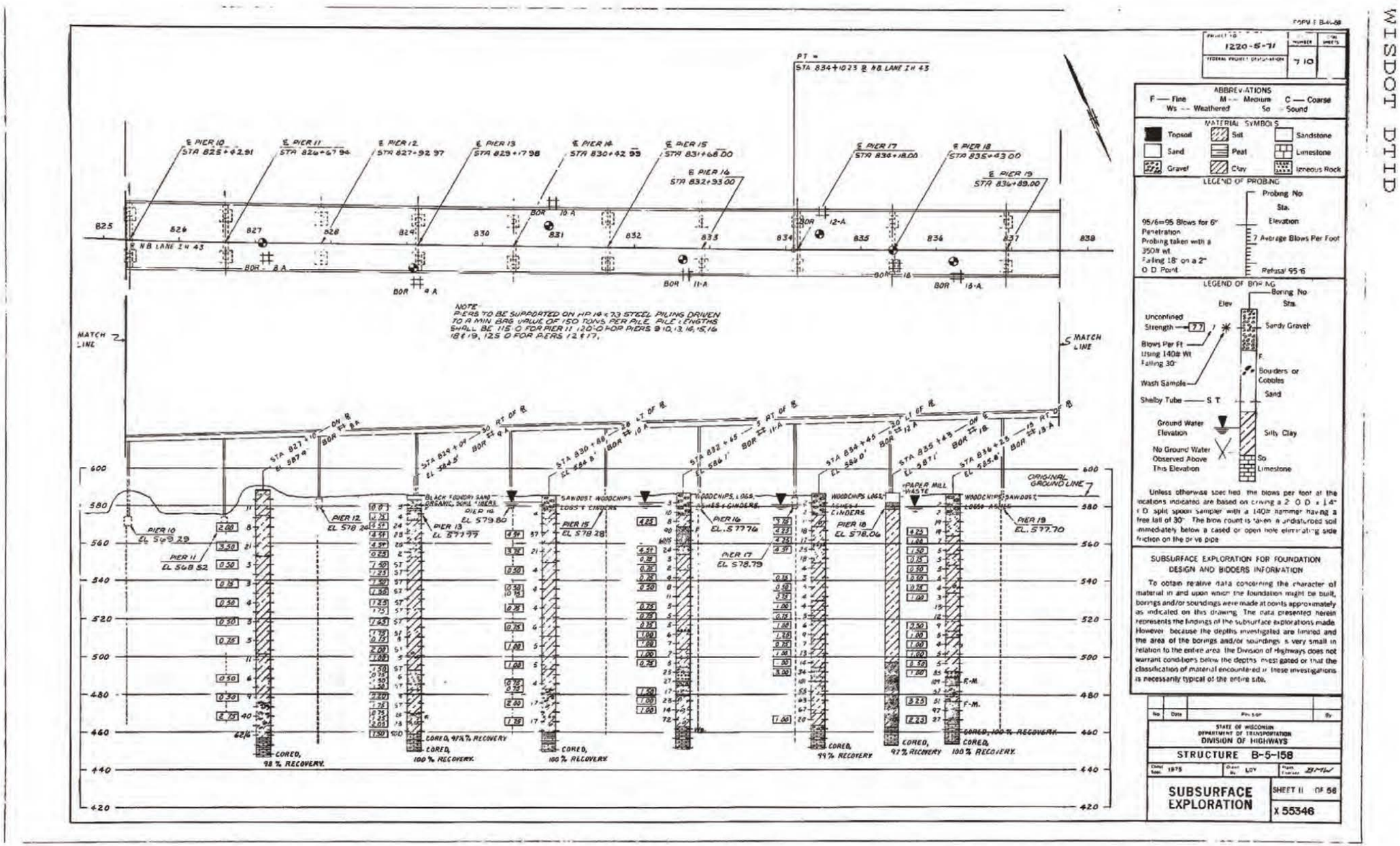
GENERAL PLAN & QUANTITIES

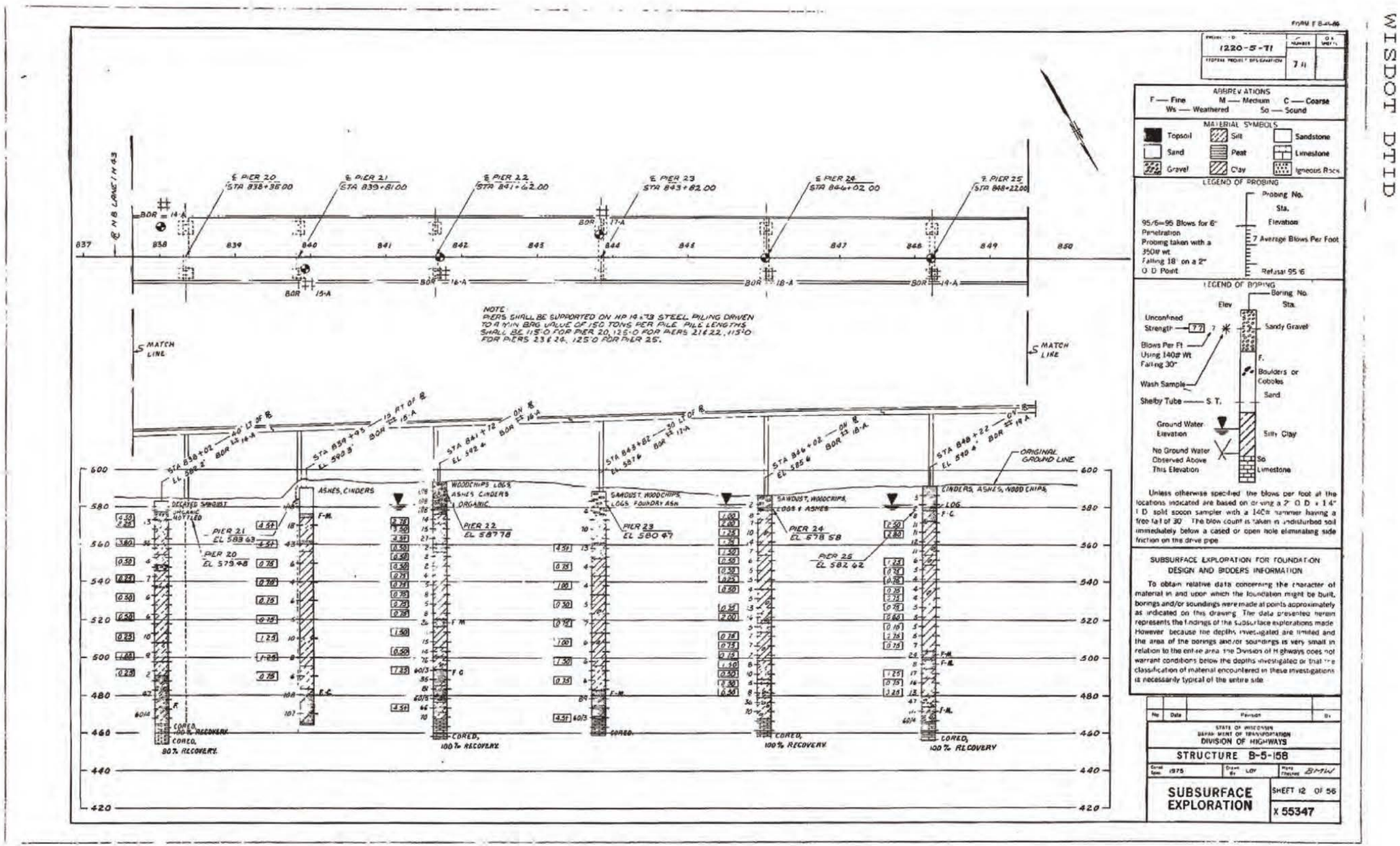
SHEET 9 OF 56

X55344


WISDOT DTID
1220-5-71
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil Silt Sandstone
Sand Peat Limestone
Gravel Clay Gneiss Rock
LEGEND OF PROBING
Probing No
Sta.
Elevation
Average Blows Per Foot
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt. Falling 18" on a 2" O.D. Point
LEGEND OF BORING
Boring No.
Sta.
Elev
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — S.T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
Limestone
Unless otherwise specified, the blows per foot at the locations indicated are based on driving a 2" O.D. x 1 4" I.D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing. The data presented hereon represents the findings of the subsurface explorations made. However, because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area, the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
1975
LOY
SUBSURFACE EXPLORATION
SHEET 10 OF 56
X 55345
PC STA 818+26.73
℄ BRG EAST ABUT STA 813+19.30
℄ PIER 1 STA 816+61.03
℄ PIER 2 STA 815+42.16
℄ PIER 3 STA 816+83.25
℄ PIER 4 STA 818+04.41
℄ PIER 5 STA 819+25.59
℄ PIER 6 STA 820+46.64
℄ PIER 7 STA 821+67.75
℄ PIER 8 STA 822+82.90
℄ PIER 9 STA 824+17.86
STA 821+93.70 ℄ NB LANE IN 43°
℄ G B & W RR
STA 822+16.11 ℄ NB LANE IN 43°
℄ QUINCY STREET
STA 825+56.65 ℄ NB LANE IN 43°
℄ C M ST P & P RR
MATCH LINE
℄ NB LANE IN 43°
NOTE
EAST ABUT & PIERS TO BE SUPPORTED ON HP 14 x 73 STEEL PILING. DRIVE PILING AT EAST ABUT TO A MIN. BRG. VALUE OF 75 TONS PER PILE. DRIVE PILING AT PIERS TO A MIN. BRG. VALUE OF 150 TONS PER PILE. PILE LENGTHS SHALL BE 105'-0" AT EAST ABUT, 120'-0" FOR PIERS 1 THRU 5, 125'-0" FOR PIERS 6 THRU 8 AND 120'-0" FOR PIER 9.
EL 600.68 EAST ABUT
PIER 1 EL 573.34 S.B. EL 573.20 N.B.
PIER 2 EL 572.72 S.B. EL 572.11 N.B.
PIER 3 EL 571.76 S.B. EL 571.60 N.B.
PIER 4 EL 571.05 S.B. EL 571.40 N.B.
PIER 6 EL 574.50 S.B. EL 574.68 N.B.
PIER 7 EL 574.67 S.B. EL 574.74 N.B.
PIER 8 EL 577.03 S.B. EL 577.10 N.B.
EL 588.9
ORIGINAL GROUND LINE
LAYERS OF ASHES
FIBERS
MOTTLED
BOULDERS
CORED, 97 % RECOVERY
CORED, 100 % RECOVERY
CORED, 100 % RECOVERY
CORED, 100 % RECOVERY
CORED, 100 % RECOVERY
CORED, 80 % RECOVERY
CORED, 83 % RECOVERY
CORED, 100 % RECOVERY
CORED, 100 % RECOVERY

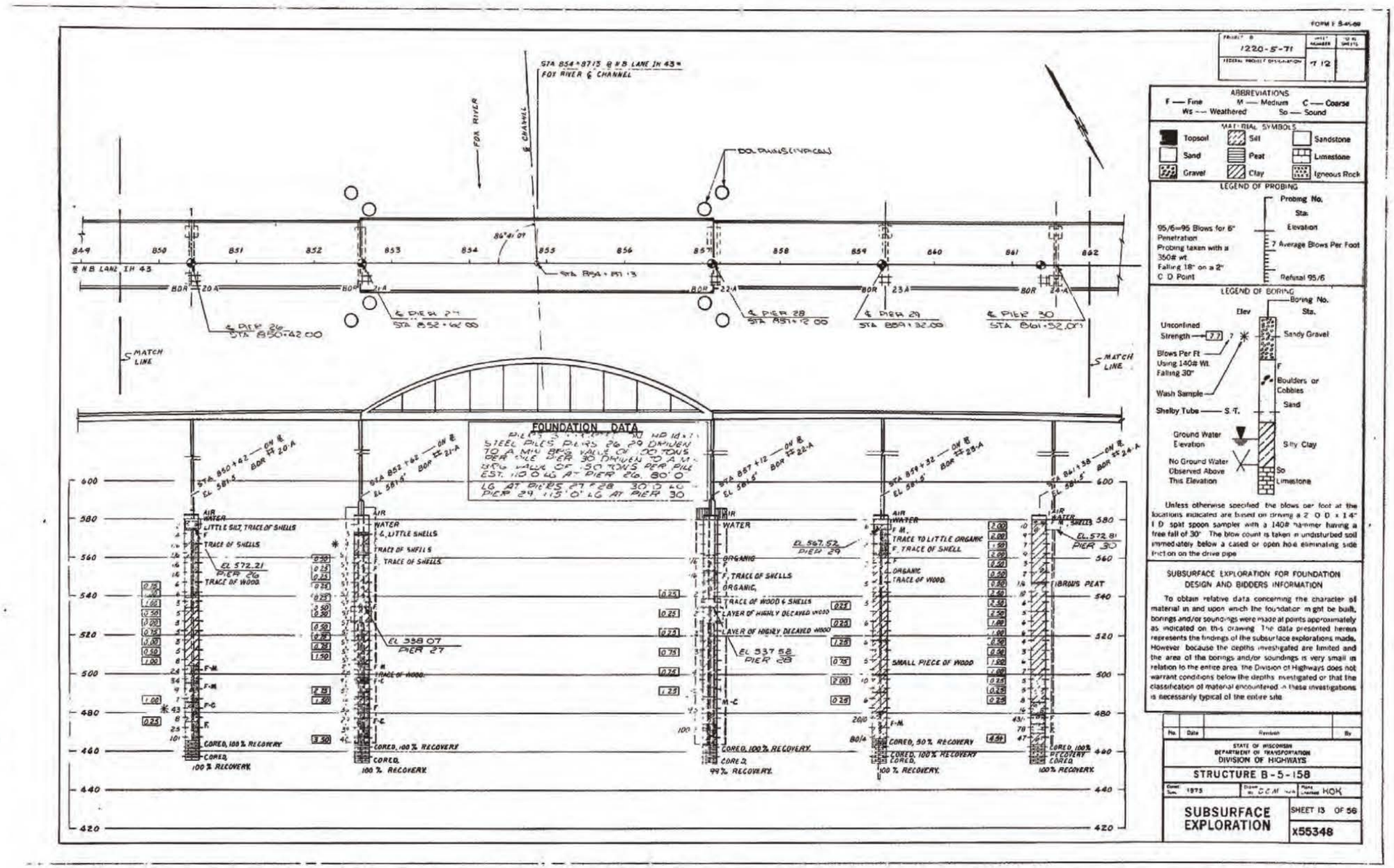
WISDOT DTID


PT = STA 834+1023 @ NB LANE I-H 43
E PIER 10 STA 825+42.91
E PIER 11 STA 826+67.94
E PIER 12 STA 827+92.97
E PIER 13 STA 829+17.98
E PIER 14 STA 830+42.99
E PIER 15 STA 831+68.00
E PIER 16 STA 832+93.00
E PIER 17 STA 834+18.00
E PIER 18 STA 835+43.00
E PIER 19 STA 836+89.00
NB LANE I-H 43
NOTE
PIERS TO BE SUPPORTED ON HP 10 x 7.3 STEEL PILING DRIVEN TO A MIN. BRG VALUE OF 150 TONS PER PILE. PILE LENGTHS SHALL BE 115'-0" FOR PIER 11, 120'-0" FOR PIERS 9, 10, 13, 14, 15, 16 & 19, 125'-0" FOR PIERS 12 & 17.
MATCH LINE
PIER 10 EL 549.29
PIER 11 EL 548.52
PIER 12 EL 578.26
PIER 13 EL 579.97
PIER 14 EL 579.80
PIER 15 EL 578.28
PIER 16 EL. 577.76
PIER 17 EL 578.79
PIER 18 EL 578.06
PIER 19 EL. 577.70
ORIGINAL GROUND LINE
CORED, 98 % RECOVERY.
CORED, 97.4% RECOVERY
CORED, 100 % RECOVERY.
CORED, 100 % RECOVERY
CORED, 99% RECOVERY
CORED, 97% RECOVERY
CORED, 100 % RECOVERY.
BLACK FOUNDRY SAND ORGANIC, SOME FIBERS
SAWDUST WOODCHIPS LOGS & CINDERS
WOODCHIPS LOGS & CINDERS
PAPER MILL WASTE
WOODCHIPS SAWDUST LOGS & ASHES
F-M
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Sand
Gravel
Silt
Peat
Clay
Sandstone
Limestone
Igneous Rock
LEGEND OF PROBING
Probing No
Sta.
Elevation
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt. Falling 18" on a 2" O.D. Point
7 Average Blows Per Foot
Refusal 95/6
LEGEND OF BORING
Boring No
Sta.
Elev
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — S.T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
F.
Bounders or Cobbles
Sand
Silty Clay
So
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O.D. x 1 3/8" I.D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing. The data presented herein represents the findings of the subsurface explorations made. However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.
1220-15-71
7 10
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
SUBSURFACE EXPLORATION
SHEET 11 OF 56
X 55346

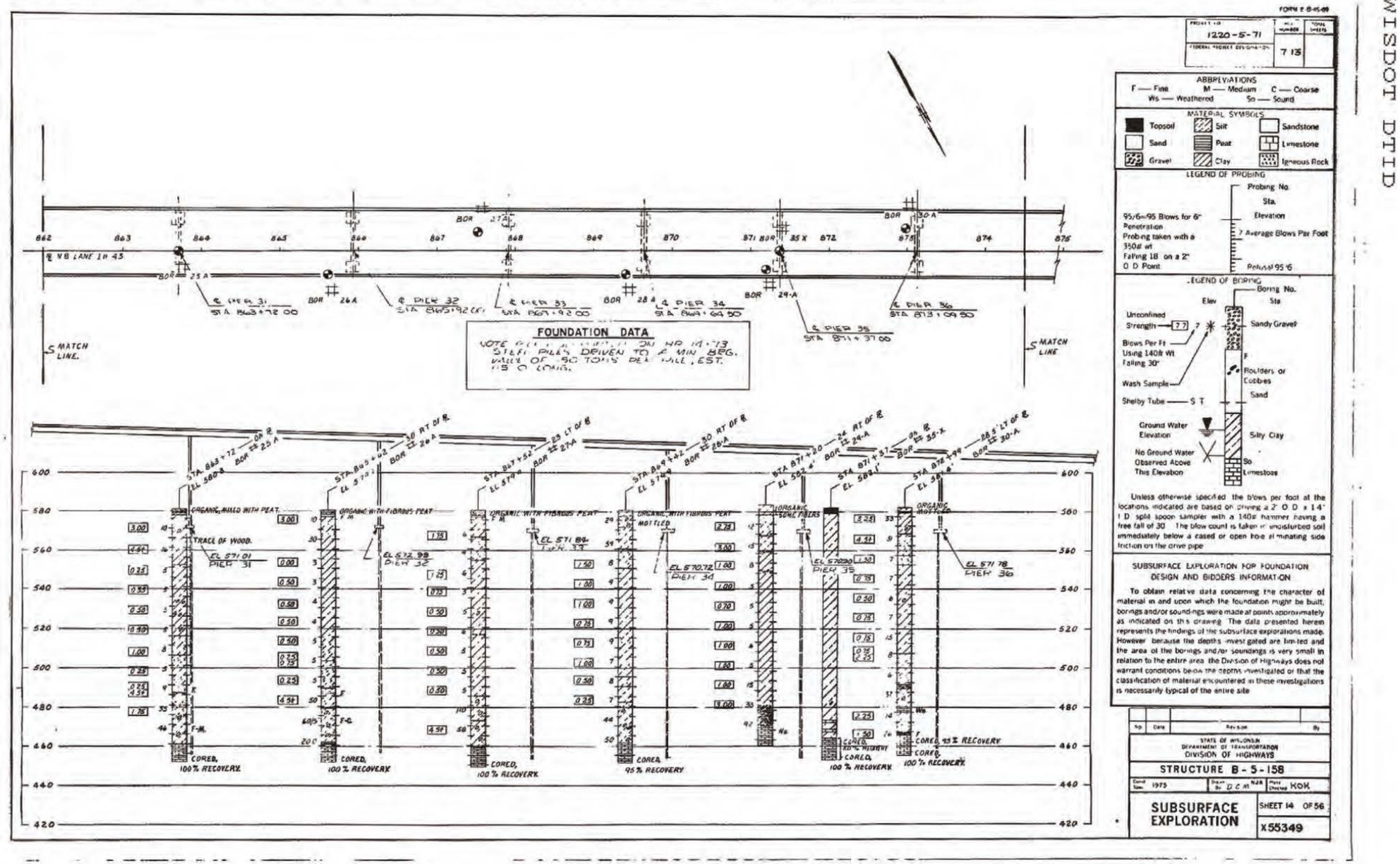

1220-5-71
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Sand
Gravel
Silt
Peat
Clay
Sandstone
Limestone
Igneous Rock
LEGEND OF PROBING
Probing No.
Sta.
Elevation
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18" on a 2" O D Point
Average Blows Per Foot
Refusal 95/6
LEGEND OF BORING
Boring No.
Sta.
Elev
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — S.T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O.D. x 1 4" I.D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing. The data presented herein represents the findings of the subsurface explorations made. However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
SUBSURFACE EXPLORATION
SHEET 12 OF 56
X 55347
E PIER 20 STA 838+36.00
E PIER 21 STA 839+81.00
E PIER 22 STA 841+62.00
E PIER 23 STA 843+82.00
E PIER 24 STA 844+02.00
E PIER 25 STA 848+22.00
NOTE
PIERS SHALL BE SUPPORTED ON HP 14x73 STEEL PILING DRIVEN TO A MIN BRG VALUE OF 150 TONS PER PILE. PILE LENGTHS SHALL BE 115'-0 FOR PIER 20, 125'-0 FOR PIERS 21 & 22, 115'-0 FOR PIERS 23 & 24, 125'-0 FOR PIER 25.
MATCH LINE
PIER 20 EL 579.48
PIER 21 EL 583.63
PIER 22 EL 587.78
PIER 23 EL 580.47
PIER 24 EL 578.58
PIER 25 EL 582.62
ORIGINAL GROUND LINE
CORED, 100% RECOVERY
CORED, 80% RECOVERY

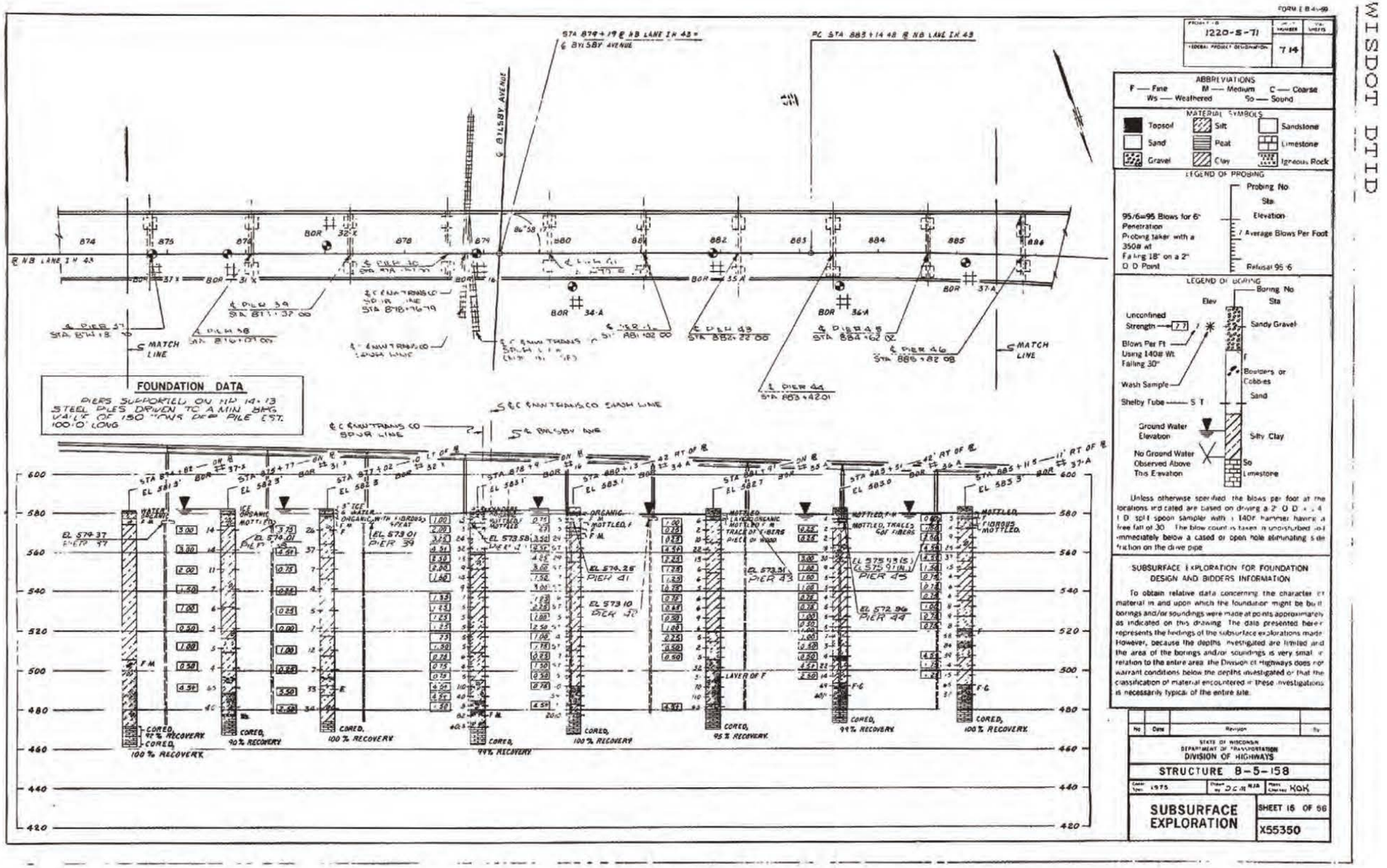
WISDOT DTID

WISDOT DTID

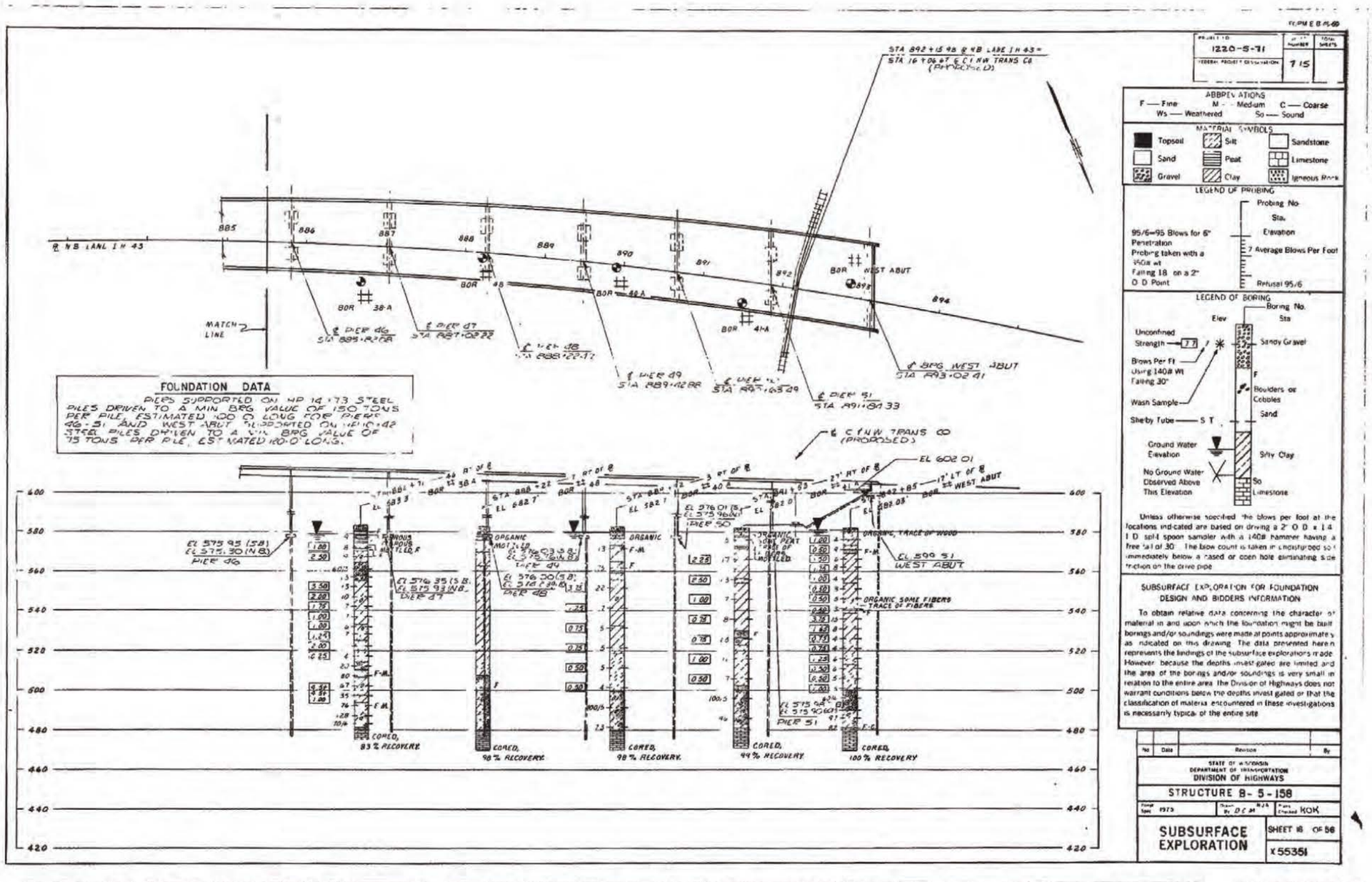

1220-5-71
SHEET NUMBER 7 12
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Sand
Gravel
Silt
Peat
Clay
Sandstone
Limestone
Igneous Rock
LEGEND OF PROBING
Probing No.
Sta.
Elevation
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt. Falling 18" on a 2" C.D. Point
7 Average Blows Per Foot
Refusal 95/6
LEGEND OF BORING
Boring No.
Sta.
Elev
Unconfined Strength
Blows Per Ft Using 140# Wt. Falling 30"
Wash Sample
Shelby Tube — S.T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O.D. x 1.4" I.D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing. The data presented hereon represents the findings of the subsurface explorations made. However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area, the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.
STA 854+87.13 @ N.B. LANE IN 43
FOX RIVER & CHANNEL
FOX RIVER
℄ CHANNEL
84°41' DT
STA 854+87.13
DOLPHINS (TYPICAL)
℄ N.B. LANE IH 43
℄ PIER 26 STA 850+42.00
℄ PIER 27 STA 852+62.00
℄ PIER 28 STA 857+12.00
℄ PIER 29 STA 859+32.00
℄ PIER 30 STA 861+52.00
℄ MATCH LINE
FOUNDATION DATA
PILES 14" x 73" HP 14 x 73
STEEL PILES PIERS 26 29 DRIVEN TO A MIN BRG VALUE OF 90 TONS PER PILE PIER 30 DRIVEN TO A MIN BRG VALUE OF 50 TONS PER PILE
EST. 1100 LG AT PIER 26, 80' 0" LG AT PIERS 27 28 30 & 115' 0" LG AT PIER 29
STA 850+42 — ON ℄ BOR # 20-A — EL 581.5
STA 852+62 — ON ℄ BOR # 21-A — EL 581.5
STA 857+12 — ON ℄ BOR # 22-A — EL 581.5
STA 859+32 — ON ℄ BOR # 23-A — EL 581.5
STA 861+38 — ON ℄ BOR # 24-A — EL 581.5
AIR
WATER
LITTLE SILT, TRACE OF SHELLS
TRACE OF SHELLS
TRACE OF WOOD
EL 572.21 PIER 26
CORED, 100% RECOVERY
CORED, 100% RECOVERY
L, LITTLE SHELLS
TRACE OF SHELLS
EL 538.07 PIER 27
TRACE OF WOOD
CORED, 100% RECOVERY
CORED, 100% RECOVERY
ORGANIC
F, TRACE OF SHELLS
ORGANIC,
TRACE OF WOOD & SHELLS
LAYER OF HIGHLY DECAYED WOOD
EL 537.52 PIER 28
CORE 2, 99% RECOVERY
EL 567.52 PIER 29
F.M.
TRACE TO LITTLE ORGANIC
F, TRACE OF SHELL
ORGANIC
TRACE OF WOOD
SMALL PIECE OF WOOD
CORED, 50% RECOVERY
CORED, 100% RECOVERY
CORED, 100% RECOVERY
SHELLS
EL. 572.81 PIER 30
FIBROUS PEAT
CORED, 100% RECOVERY
CORED, 100% RECOVERY
600
580
560
540
520
500
480
460
440
420
No. Date Revision By
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
Const. Sym. 1975
Drawn by D.C.M.
Plans checked KOK
SUBSURFACE EXPLORATION
SHEET 13 OF 56
X55348

WISDOT DTID

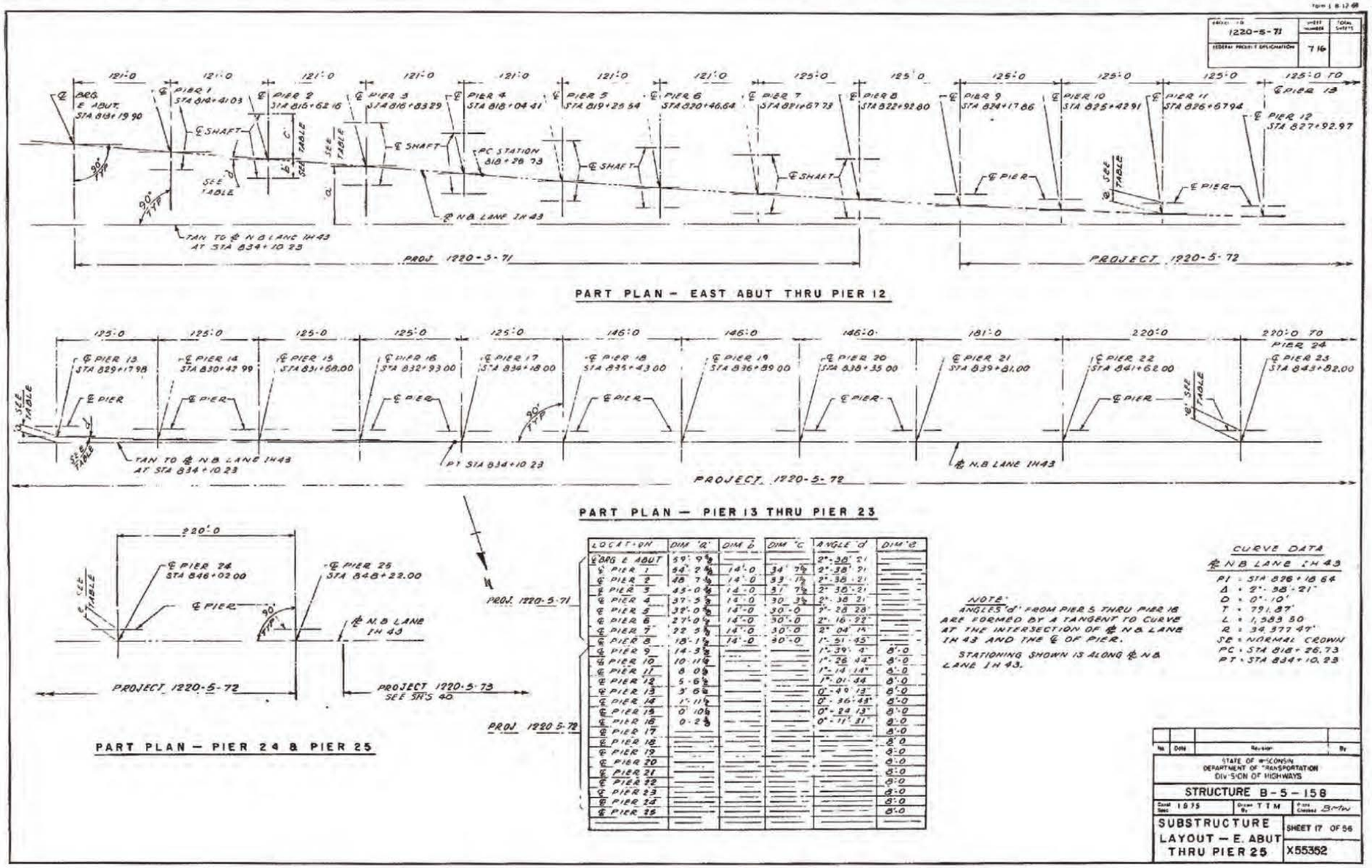

1220-5-71
7 13
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Wa — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Silt
Sandstone
Sand
Peat
Limestone
Gravel
Clay
Igneous Rock
LEGEND OF PROBING
Probing No.
Sta.
Elevation
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18" on a 2" O D Point
Average Blows Per Foot
Refusal 95/6
LEGEND OF BORING
Boring No.
Elev
Sta
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — S T
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O D x 1 4" I D split spoon sampler with a 140# hammer having a free fall of 30" The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing The data presented herein represents the findings of the subsurface explorations made. However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site
FOUNDATION DATA
STEEL PILES DRIVEN TO A MIN BRG. VALUE OF 90 TONS PER PILE, EST.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
1975
SUBSURFACE EXPLORATION
SHEET 14 OF 56
X55349


WISDOT PTID
1220-5-71
714
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Sand
Gravel
Silt
Peat
Clay
Sandstone
Limestone
Igneous Rock
LEGEND OF PROBING
Probing No
Sta
Elevation
Average Blows Per Foot
95/6=95 Blows for 6" Penetration
Probing taker with a 350# wt Falling 18" on a 2" O D Point
Refusal 95/6
LEGEND OF BORING
Boring No
Sta
Elev
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
So
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O D x 1 4" I D split spoon sampler with a 140# hammer having a free fall of 30" The blow count is taken as undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built borings and/or soundings were made at points approximately as indicated on this drawing The data presented hereon represents the findings of the subsurface explorations made However, because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site
FOUNDATION DATA
PIERS SUPPORTED ON HP 14 x 73 STEEL PILES DRIVEN TO A MIN BRG VALUE OF 150 "FWS" DEEP PILE EST. 100'-0" LONG
STA 879+19 ℄ NB LANE I-H 43 = ℄ BYLSBY AVENUE
PC STA 883+14.48 ℄ NB LANE I-H 43
℄ BYLSBY AVENUE
℄ NB LANE I-H 43
MATCH LINE
℄ PIER 39 STA 811+32.00
℄ PIER 38 STA 814+01.00
℄ PIER 37 STA 816+88.18
℄ PIER 45 STA 882+22.00
℄ PIER 46 STA 886+82.08
℄ PIER 44 STA 883+42.01
EL 579.37 PIER 39
EL 573.01 PIER 39
EL 574.25 PIER 41
EL 573.10 PIER 42
EL 573.58 PIER 41
EL 573.51 PIER 43
EL 572.96 PIER 44
EL 575.93 (S) EL 575.91 (N) PIER 45
CORED, 95 % RECOVERY
CORED, 100 % RECOVERY
CORED, 90 % RECOVERY
CORED, 99 % RECOVERY
CORED, 100 % RECOVERY
CORED, 95 % RECOVERY
CORED, 99% RECOVERY
CORED, 100 % RECOVERY
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
SUBSURFACE EXPLORATION
SHEET 15 OF 56
X55350

WISDOT DTID


1220-5-71
715
STA 892+15.98 ℄ 48 LANE I-H 43 =
STA 16+06.67 ℄ C I N W TRANS CO
(PROPOSED)
℄ BRG WEST ABUT
STA 893+02.91
℄ PIER 51
STA 891+84.33
℄ C I N W TRANS CO
(PROPOSED)
EL 602.01
WEST ABUT
EL 599.51
ORGANIC, TRACE OF WOOD
ORGANIC SOME FIBERS
TRACE OF FIBERS
MATCH LINE
℄ PIER 46
STA 885+82.58
℄ PIER 47
STA 887+03.33
℄ PIER 48
STA 888+23.72
℄ PIER 49
STA 889+42.88
℄ PIER "A"
STA 891+63.29
℄ N B LANE I-H 43
EL 575.95 (SB)
EL 575.30 (NB)
PIER 46
EL 576.35 (SB)
EL 575.93 (NB)
PIER 47
EL 576.30 (SB)
EL 576.12 (NB)
PIER 48
EL 576.01 (SB)
EL 575.96 (NB)
PIER 50
EL 575.98 (SB)
EL 575.96 (NB)
PIER 51
CORED, 83% RECOVERY
CORED, 98% RECOVERY
CORED, 98% RECOVERY
CORED, 99% RECOVERY
CORED, 100% RECOVERY
FOUNDATION DATA
PILES SUPPORTED ON HP 14 x 73 STEEL PILES DRIVEN TO A MIN BRG VALUE OF 150 TONS PER PILE, ESTIMATED 100'-0" LONG FOR PIERS 46-51 AND WEST ABUT SUPPORTED ON 14"Ø 42 STEEL PILES DRIVEN TO A MIN BRG VALUE OF 75 TONS PER PILE, ESTIMATED 120'-0" LONG.
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Sand
Gravel
Silt
Peat
Clay
Sandstone
Limestone
Igneous Rock
LEGEND OF PROBING
Probing No.
Sta.
Elevation
95/6=95 Blows for 6" Penetration
Probing taken with a 140# wt Falling 18" on a 2" O.D. Point
Average Blows Per Foot
Refusal 95/6
LEGEND OF BORING
Boring No.
Elev
Sta
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — S.T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O.D. x 1 1/4" I.D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built borings and/or soundings were made at points approximately as indicated on this drawing. The data presented herein represents the findings of the subsurface explorations made. However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of materials encountered in these investigations is necessarily typical of the entire site.
No. Date Revision By
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
1973
Drawn By DCM
Plans Checked KOK
SUBSURFACE EXPLORATION
SHEET 16 OF 58
X55351

WISDOT DTID



LOCATION	DIM 'a'	DIM 'b'	DIM 'c'	ANGLE 'd'	DIM 'e'
℄ BRG E ABUT	59' 9½			2°-38' 21"	
℄ PIER 1	54' 2½	14'-0	34' 7½	2°-38' 21"	
℄ PIER 2	48' 7½	14'-0	33' 1½	2°-38'-21"	
℄ PIER 3	43'-0½	14'-0	31' 7½	2°-38'-21"	
℄ PIER 4	37'-5½	14'-0	30' 3½	2°-38' 21"	
℄ PIER 5	32'-0½	14'-0	30'-0	2°-28' 28"	
℄ PIER 6	27'-0½	14'-0	30'-0	2°-16'-32"	
℄ PIER 7	22' 5½	14'-0	30'-0	2° 04' 14"	
℄ PIER 8	18'-1½	14'-0	30'-0	1°-51'-45"	
℄ PIER 9	14'-3½			1°-39' 4"	8'-0
℄ PIER 10	10'-11½			1°-26' 44"	8'-0
℄ PIER 11	8' 0½			1°-14' 14"	8'-0
℄ PIER 12	5'-6½			1°-01'-44"	8'-0
℄ PIER 13	3' 6½			0°-49' 13"	8'-0
℄ PIER 14	1'-11½			0°-36'-43"	8'-0
℄ PIER 15	0' 10½			0°-24' 13"	8'-0
℄ PIER 16	0'-2½			0°-11' 31"	8'-0
℄ PIER 17					8'-0
℄ PIER 18					8'-0
℄ PIER 19					8'-0
℄ PIER 20					8'-0
℄ PIER 21					8'-0
℄ PIER 22					8'-0
℄ PIER 23					8'-0
℄ PIER 24					8'-0
℄ PIER 25					8'-0

NOTE:
ANGLES 'd' FROM PIER 5 THRU PIER 16 ARE FORMED BY A TANGENT TO CURVE AT THE INTERSECTION OF ℄ N.B. LANE IH 43 AND THE ℄ OF PIER.

STATIONING SHOWN IS ALONG ℄ N.B. LANE IH 43.

CURVE DATA
℄ N.B. LANE IH 43
PI = STA 836+18.64
Δ = 2°-38'-21"
D = 0°-10'
T = 791.87'
L = 1,583.50
R = 34,377.47'
SE = NORMAL CROWN
PC = STA 818+26.73
PT = STA 834+10.23

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Dated: 1975 | Drawn By: T T M | Date Checked: 8-7-75

SUBSTRUCTURE LAYOUT – E. ABUT THRU PIER 25

SHEET 17 OF 56

X55352

WISDOT DTID

ELEVATION
LOOKING EAST

PLAN

PILE PLAN

PILE SPLICE DETAIL

POLYVINYL CHLORIDE WATERSTOP

PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-71	7.17	
FEDERAL PROJECT DESIGNATION		

L	
A	5°-0-66"
B	4°-40-27"
C	4°-20-08"
D	3°-59-49"
E	3°-33-28"
F	3°-13-07"
G	2°-48-46"
H	2°-38-21"

▲ - TYP FROM GIRDER 3 THRU GIRDER 8.
▲▲ - AT GIRDER 3 ONLY
▲▲▲ - TYP FROM GIRDER 10 TO GIRDER 14.
◩ - CONST JOINT - POUR CONCRETE ABOVE THIS JOINT AFTER SUPERSTRUCTURE IS IN PLACE STRIKE OFF AND LEAVE ROUGH.

No.	Date	Revision	By
1	6/12/77	REVISED ABUT WINGS	SAS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1975	Drawn By RJJ	Plans Checked BMW

EAST ABUTMENT

SHEET 18 OF 56

X 55353

WISDOT DLID

● - OPTIONAL KEYED CONSTRUCTION JOINT FORMED BY SURFACED, BEVELED 2x6.

■ - VERTICAL CONSTRUCTION JOINT FORMED BY SURFACED, BEVELED 2"x8" KEYWAY.

◓ - POLYVINYL CHLORIDE WATERSTOP EXTEND BETWEEN INSIDE FACES OF WINGS. SEE DETAILS ON SHT 18

Ⓐ - ¾" - V - GROOVE ON FRONTFACE OF WINGWALL ONLY.

Ⓑ - CONSTRUCTION JOINT - STRIKE OFF AND LEAVE ROUGH AND LEVEL.

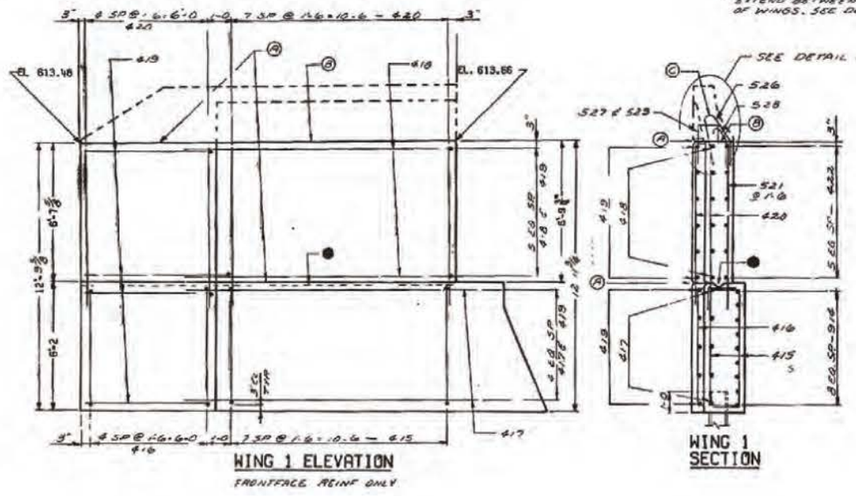
Ⓒ - PARAPET BARS IMBEDDED IN UPPER WING POUR SHALL BE IN PLACE BEFORE UPPER WING POUR IS MADE. FOR DETAILS SEE DETAIL A

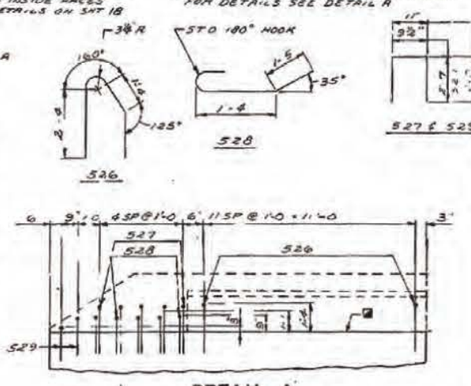
PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-71	718	

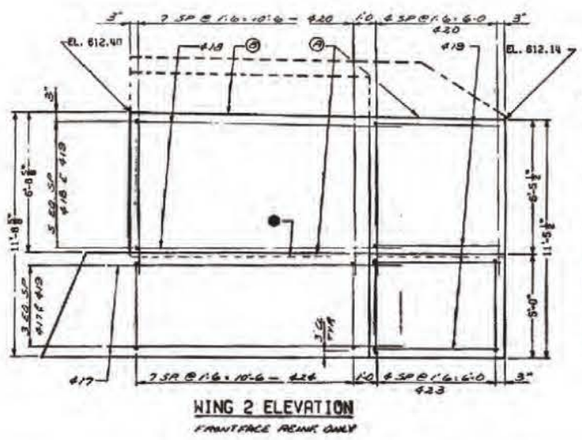
BILL OF BARS — 8580 LBS.

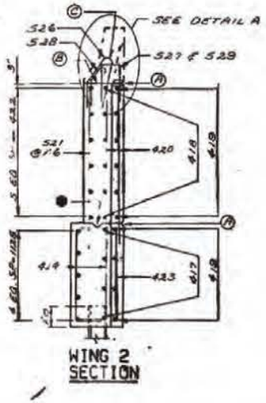
MARK	NO REQD	LENGTH	BEND	LOCATION
401	81	9'-11"	X	BODY - VERT
402	51	10'-8"	X	" "
403	28	26'-0"		" - TRANS
404	12	23'-5"		" "
1105	4	18'-0"	X	" @ WING 1
1106	4	18'-0"	X	" " 2
407	12	26'-6"		" - TRANS - TOP
408	93	7'-5"	X	" - TOP
409	12	32'-0"		" "
410	9	26'-0"		" "
411	82	28'-9"		BACKWALL - TRANS
512	95	19'-9"	X	" - VERT
513	95	4'-6"	X	PAVING BLOCK - VERT
514	3	19'-0"		WING 1 - HORIZ - BF
415	12	8'-7"	X	" " - VERT - FF & BF.
416	10	9'-3"	X	" " " " " "
417	9	14'-0"		WINGS HORIZ - "
418	12	13'-8"	X	" " - "
419	21	7'-1"	X	" " - "
420	26	5'-8"		" - VERT - "
421	26	7'-11"		" - " - BF
422	12	18'-6"	X	" - HORIZ - "
423	10	20'-1"	X	WING 2 - VERT - FF
424	16	8'-5"	X	" " " " "
1123	5	20'-9"	X	" - HORIZ - BF
526	26	5'-10"	X	PARAPET
527	10	5'-10"	X	"
528	8	5'-3"	X	"
529	4	4'-10"	X	"

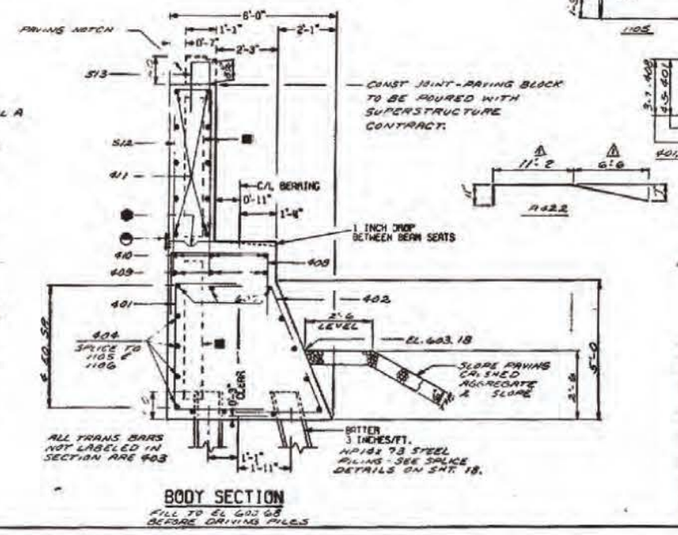
THE FIRST DIGIT OF A THREE DIGIT MARK AND THE FIRST TWO DIGITS OF A FOUR DIGIT MARK SIGNIFIES THE BAR SIZE. ALL DIMENSIONS OF BENT BARS ARE OUT TO OUT OF BAR.

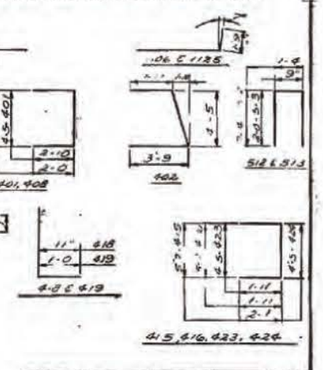












No.	Date	Revision	By
1	8 27 99	REVISED BEND OFFSET	

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

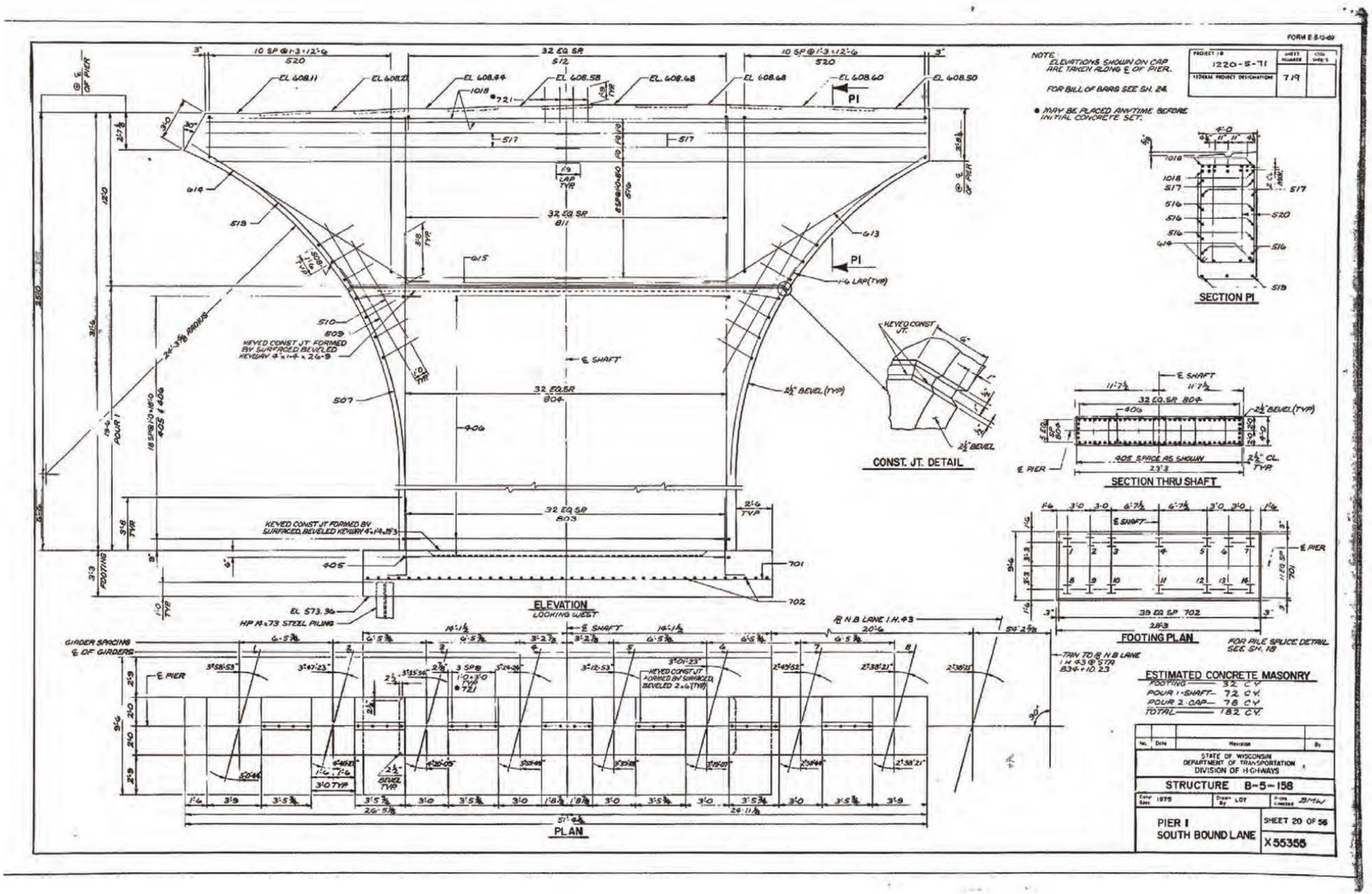
STRUCTURE B-5-158

Const Spec	Drawn By	Plans Checked
1975	R.J.J.	BHW

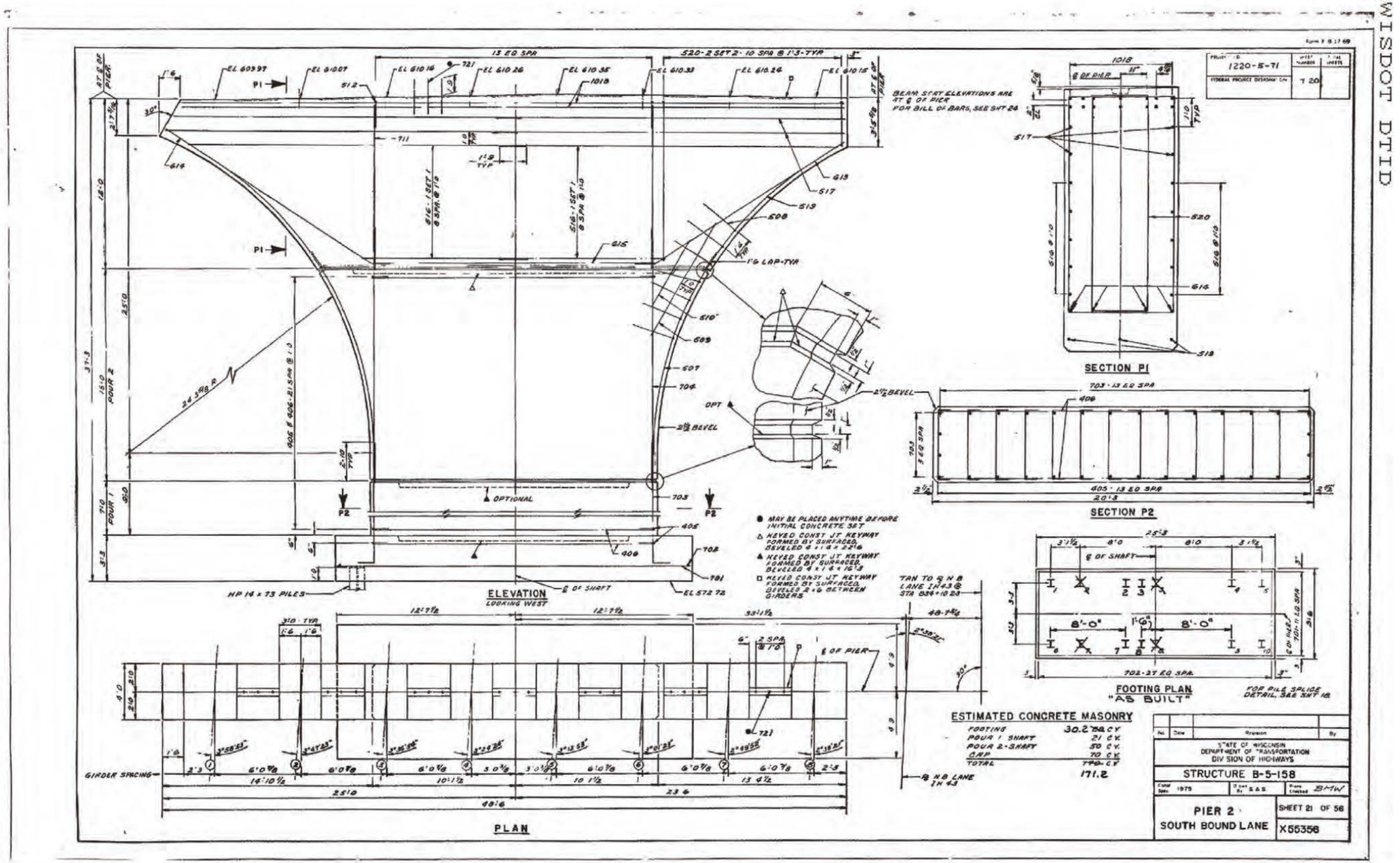
EAST ABUTMENT

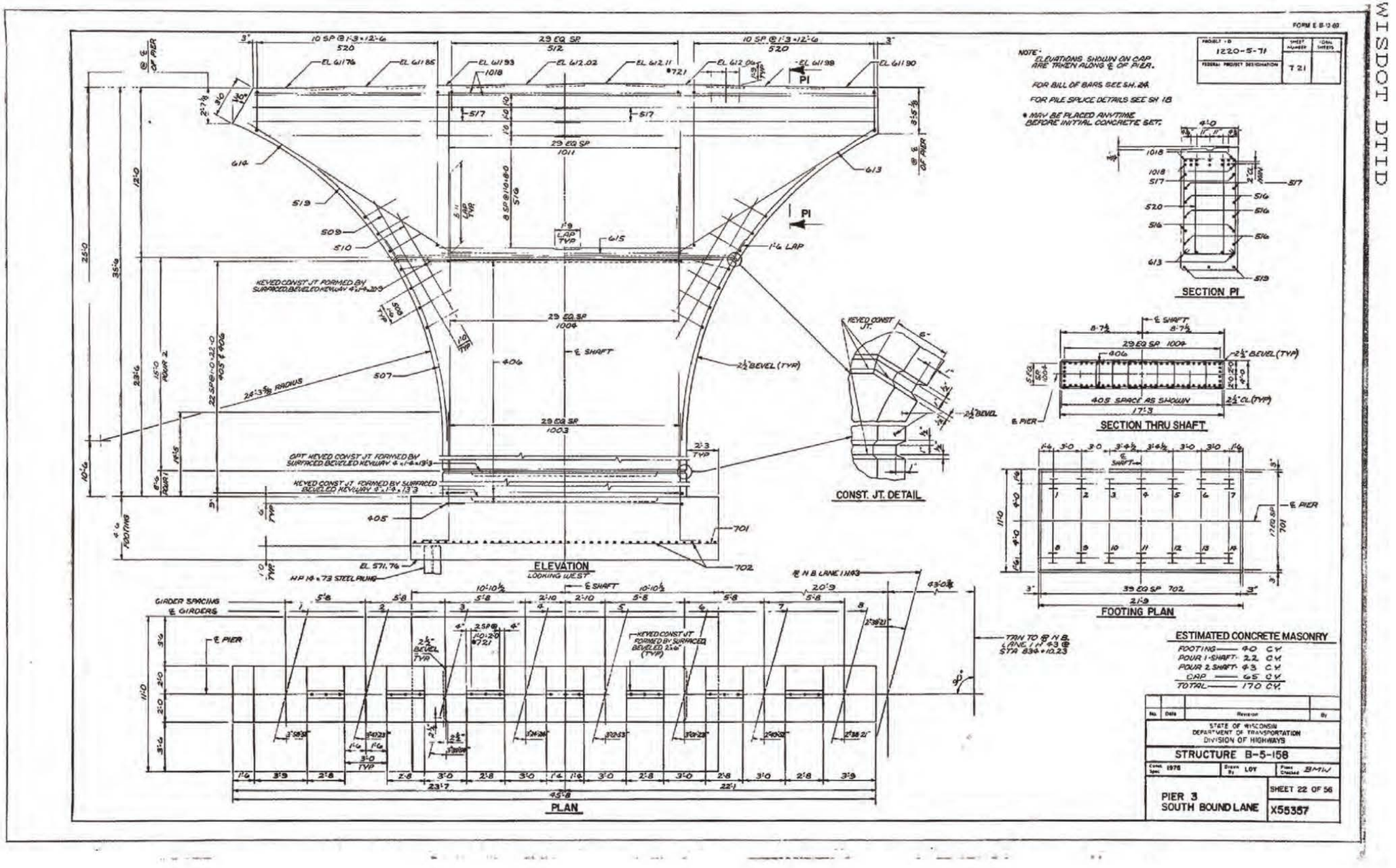
SHEET 19 OF 56

X55354


ELEVATION
LOOKING WEST
PLAN
CONST. JT. DETAIL
SECTION PI
SECTION THRU SHAFT
FOOTING PLAN
NOTE
ELEVATIONS SHOWN ON CAP ARE TAKEN ALONG ℄ OF PIER.
FOR BILL OF BARS SEE SH. 24.
• MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET.
PROJECT I.D. 1220-5-71
SHEET NUMBER 719
ESTIMATED CONCRETE MASONRY
FOOTING 32 C.Y.
POUR 1-SHAFT 72 C.Y.
POUR 2-CAP 78 C.Y.
TOTAL 182 C.Y.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 1
SOUTH BOUND LANE
SHEET 20 OF 56
X 55355

WISDOT DTID


ELEVATION
LOOKING WEST
PLAN
SECTION P1
SECTION P2
FOOTING PLAN
"AS BUILT"
BEAM SEAT ELEVATIONS ARE AT ℄ OF PIER FOR BILL OF BARS, SEE SHT 24
MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET.
KEYED CONST JT KEYWAY FORMED BY SURFACED, BEVELED 4 x 1 ℄ x 2 1/2 ϕ
KEYED CONST JT KEYWAY FORMED BY SURFACED, BEVELED 4 x 1 ℄ x 10 1/2 ϕ
KEYED CONST JT KEYWAY FORMED BY SURFACED, BEVELED 2 ℄ BETWEEN GIRDERS
ESTIMATED CONCRETE MASONRY
FOOTING 302 C.Y.
POUR 1 SHAFT 21 C.Y.
POUR 2-3 SHAFT 50 C.Y.
CAP 70 C.Y.
TOTAL 171.2 C.Y.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 2
SOUTH BOUND LANE
SHEET 21 OF 56
X55356

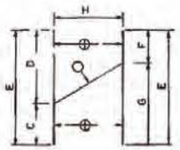

WISDOT DTID
ELEVATION
LOOKING WEST
PLAN
CONST. JT. DETAIL
SECTION PI
SECTION THRU SHAFT
FOOTING PLAN
NOTE: ELEVATIONS SHOWN ON CAP ARE TAKEN ALONG ℄ OF PIER.
FOR BILL OF BARS SEE SH. 24.
FOR PILE SPLICE DETAILS SEE SH 18
* MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET.
ESTIMATED CONCRETE MASONRY
FOOTING — 90 CY
POUR 1-SHAFT- 22 CY
POUR 2-SHAFT- 43 CY
CAP — 65 CY
TOTAL — 170 CY.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 3
SOUTH BOUND LANE
SHEET 22 OF 56
X55357

form I.B 12-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-71		
FEDERAL PROJECT DESIGNATION	T 25	

CUTTING DIAGRAM

MARK		C	D	E	F	G	H	SETS REQD
516	PIER 1	13'0	25'0	38'0	13'0	25'0	9	4
	PIER 2	11'3	23'8	35'1	11'5	23'8	9	4
	PIER 3	9'10	22'3	32'1	9'10	22'3	9	4
	PIER 4	8'9	20'11	29'8	8'9	20'11	9	4
520	PIERS 1-4	12'3	28'6	40'9	12'3	28'6	11	4



○ MARK AND CUT ALL BARS ALONG THIS LINE. MAKE ALL CUTS NORMAL TO BAR AXIS

⊖ BUNDLE AND MARK CUT BARS WITH BAR AND SET NUMBER "H" IS THE NUMBER OF BARS IN A CUTTING DIAGRAM BEFORE CUTTING

BENT BARS SHALL BE BENT AFTER CUTTING

BILL OF BARS

PIER 1 16,780 LBS

MARK	NO REQD	LENGTH
701	12	37-11
702	40	9-2
803	74	6-11
804	74	23-2
405	240	4-9
406	40	22-10
507	6	15 0
508	14	8-4
509	4	10-0
510	4	7-0
811	66	11-9
512	33	5-10
613	4	17-6
614	4	18-9
615	4	23-0
516	18	38-0
517	8	25 10
1018	14	49-6
519	6	11-0
520	22	40-9
721	28	3-6

PIER 2 11,000 LBS

MARK	NO REQD	LENGTH
701	12	24 -
702	28	9 2
703	32	12-11
704	32	17-10
405	322	4 9
406	46	19-10
507	6	15 0
508	14	8 4
509	4	10-0
510	4	7-0
711	28	11-9
512	14	5-10
613	4	17 6
614	4	18 9
615	4	13-9
516	18	38 4
517	8	24 11
1018	14	46-9
519	6	11 0
520	22	40 9
721	21	3-6

PIER 3 23,200 LBS

MARK	NO REQD	LENGTH
701	18	21 5
702	40	10-8
1003	68	19 3
1004	68	20-11
405	264	4-9
406	48	16-10
507	6	15-0
508	14	8-4
509	4	10-0
510	4	7-0
1011	60	11-9
512	30	5-10
613	4	17-6
614	4	18 9
615	4	17-0
516	18	32-1
517	8	22 10
1018	14	43-9
519	6	11-0
520	22	40-9
721	21	3-6

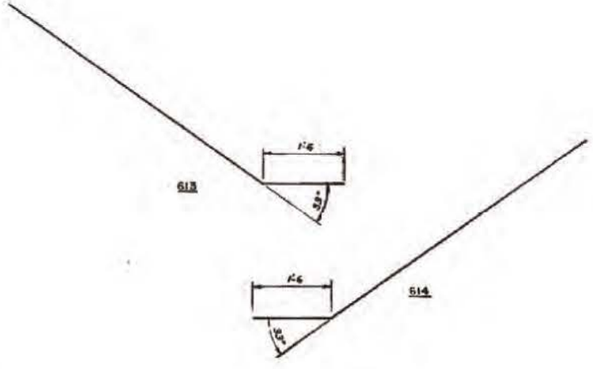
PIER 4 10,870 LBS

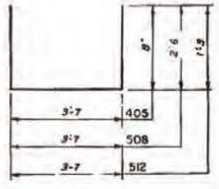
MARK	NO REQD	LENGTH
601	12	18-1
702	25	8 8
703	42	18 2
704	42	17.0
405	196	4 9
406	56	14 2
507	6	15 0
508	14	8 4
509	4	10-0
510	4	7-0
711	38	11-9
512	19	5 10
613	4	17-6
614	4	18 9
615	4	14-3
516	18	29-8
517	8	22-2
1018	14	41 3
519	6	11 0
520	22	40-9

BENT	CUT DIA	LOCATION
		FOOTING
x		"
		SHAFT
x		" & FOOTING
		" " "
x		"
x		" & CAP
		" "
		" "
		CAP
x		" - TOP
x		" - BOTTOM
x		"
		" " "
	x	"
		"
		" - TOP
x		"
x	x	" - STIRRUP
		" DOWEL

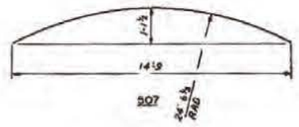
THE FIRST DIGIT OF A THREE DIGIT MARK AND THE FIRST TWO DIGITS OF A FOUR DIGIT MARK SIGNIFIES THE BAR SIZE.
ALL DIMENSIONS OF BENT BARS ARE OUT TO OUT OF BAR

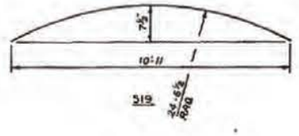












No.	Date	Revised	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const Spec	Drawn By	Date Checked
1973	H.S.H.	8-14-74

BILL OF BARS
PIERS 1 THRU 4
SOUTH BOUND LANE

SHEET 24 OF 56

X55359

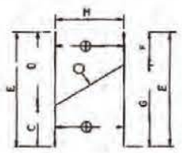
WISDOT DLID

WISDOT DTID

PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-71	723	
FEDERAL PROJECT DESIGNATION		

CUTTING DIAGRAM

MARK		C	D	E	F	G	H	SETS REQD
516	PIER 1	13-0	25-0	38-0	18-0	25-0	9	4
	PIER 2	11-5	21-8	35-1	11-5	23-8	9	4
	PIER 3	9-10	22-2	32-1	9-0	22-3	9	4
	PIER 4	8-9	20-11	29-8	8-9	20-11	9	4
520	PIERS 1-4	12-3	28-6	40-9	12-3	28-6	11	4



○ MARK AND CUT ALL BARS ALONG THIS LINE. MAKE ALL CUTS NORMAL TO BAR AXIS.

Ⓑ BUNDLE AND MARK CUT BARS WITH BAR AND SET NUMBER. "H" IS THE NUMBER OF BARS IN A CUTTING DIAGRAM BEFORE CUTTING.

BENT BARS SHALL BE BENT AFTER CUTTING

BILL OF BARS

PIER 1 16,780 LBS

MARK	NO REQD	LENGTH
701	12	27-11
702	40	9-2
803	74	6-11
804	74	23-2
405	240	4-9
406	40	22-10
507	6	15-0
508	14	8-4
509	4	10-0
510	4	7-0
811	66	11-9
512	33	5-10
613	4	17-6
614	4	18-9
615	4	23-0
516	18	38-0
517	8	25-10
1018	14	49-6
519	6	11-0
520	22	40-9
721	28	3-6

PIER 2 11,000 LBS

MARK	NO REQD	LENGTH
701	12	24-11
702	28	9-2
703	32	12-11
704	32	17-10
405	422	4-9
406	46	19-0
507	6	15-0
508	14	8-4
509	4	10-0
510	4	7-0
711	28	11-9
512	14	5-10
613	4	17-6
614	4	18-9
615	4	19-9
516	18	35-1
517	8	24-11
1018	14	46-9
519	6	11-0
520	22	40-9
721	21	3-6

PIER 3 23,200 LBS.

MARK	NO REQD	LENGTH
701	18	21-5
702	40	10-8
1003	68	19-3
1004	68	20-11
405	264	4-9
406	48	16-10
507	6	15-0
508	14	8-4
509	4	10-0
510	4	7-0
1011	60	11-9
512	30	5-10
613	4	17-6
614	4	18-9
615	4	17-0
516	18	32-1
517	8	23-10
1018	14	43-9
519	6	11-0
520	22	40-9
721	21	3-6

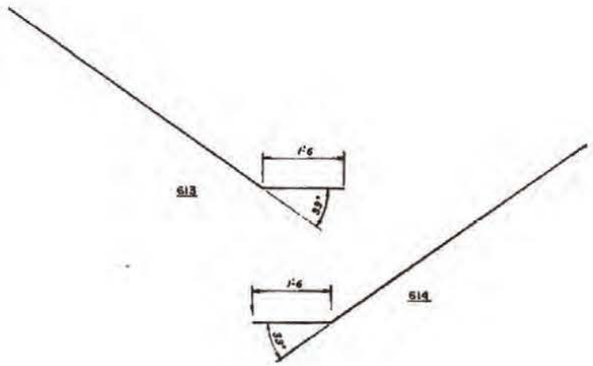
PIER 4 10,870 LBS

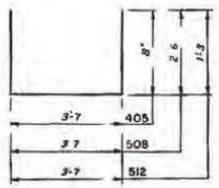
MARK	NO REQD	LENGTH
601	12	18-3
702	25	8-8
703	42	18-2
704	42	17-10
405	196	4-9
406	56	14-2
507	6	15-0
508	14	8-4
509	4	10-0
510	4	7-0
711	18	11-9
512	19	5-10
613	4	17-6
614	4	18-9
615	4	14-3
516	16	29-8
517	8	22-2
1018	14	41-9
519	6	11-0
520	22	40-9

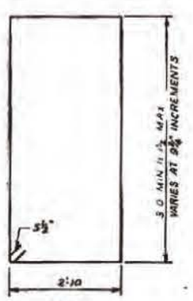
BENT	CUT DIA	LOCATION
		FOOTING
		"
1		"
		SHAFT
X		1 FOOTING
		" "
X		"
X		" 1 CAP
		" "
		" "
		CAP
X		" TOP
X		" BOTTOM
X		" "
		" "
	X	"
		"
		" TOP
X		"
X	X	" STIRRUP
		" DOWEL

THE FIRST DIGIT OF A THREE DIGIT MARK AND THE FIRST TWO DIGITS OF A FOUR DIGIT MARK SIGNIFIES THE BAR SIZE.
ALL DIMENSIONS OF BENT BARS ARE OUT TO OUT OF BAR.

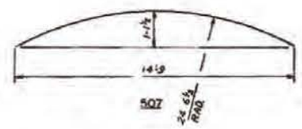


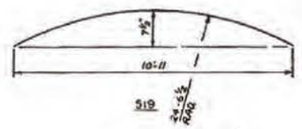






520





No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

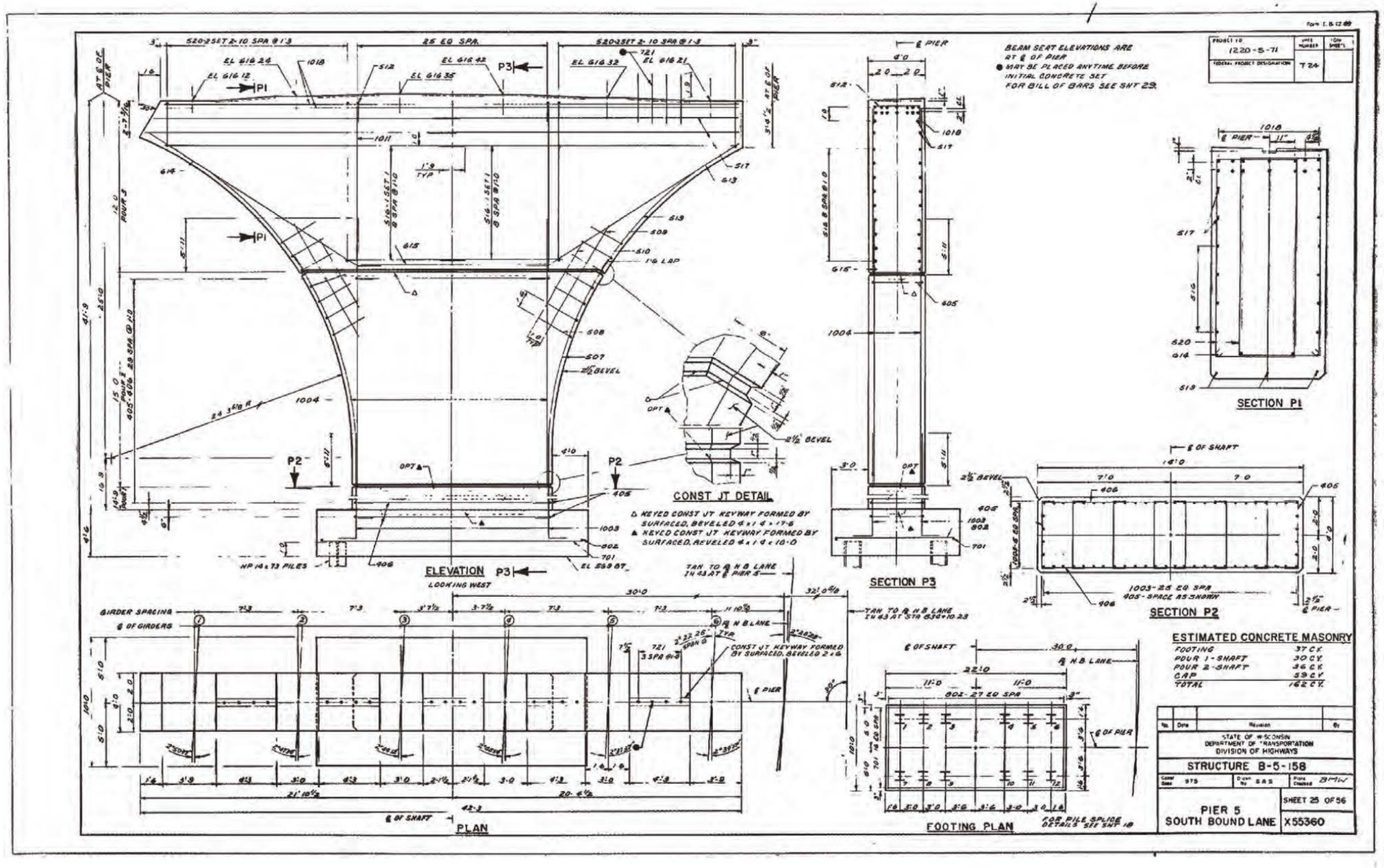
STRUCTURE B-5-158

Detail Sheet	1975	Drawn By	W.B.H.	Plan Checked	B.M.K.

BILL OF BARS
PIERS 1 THRU 4
SOUTH BOUND LANE

SHEET 24 OF 56
X55359

WISDOT PTID


BEAM SEAT ELEVATIONS ARE AT ℄ OF PIER
● MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET
FOR BILL OF BARS SEE SHT 29.
PROJECT ID 1220-5-71
FEDERAL PROJECT DESIGNATION T 24
SECTION P1
SECTION P2
SECTION P3
CONST JT DETAIL
ELEVATION P3
LOOKING WEST
PLAN
FOOTING PLAN
ESTIMATED CONCRETE MASONRY
FOOTING 37 C.Y.
POUR 1 - SHAFT 30 C.Y.
POUR 2 - SHAFT 36 C.Y.
CAP 59 C.Y.
TOTAL 162 C.Y.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 5
SOUTH BOUND LANE
SHEET 25 OF 56
X55360

WISDOT DTID

ELEVATION P3
LOOKING WEST

CONST JT DETAIL

SECTION P1

SECTION P3

SECTION P2

PLAN

FOOTING PLAN

BEAM SEAT ELEVATIONS ARE AT ℄ OF PIER
● MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET
FOR BILL OF BARS, SEE SHT 29

PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-71	125	
FEDERAL PROJECT DESIGNATION		

ESTIMATED CONCRETE MASONRY

FOOTING	13 C.Y.
POUR 1-SHAFT	27 C.Y.
POUR 2-SHAFT	36 C.Y.
CAP	59 C.Y.
TOTAL	135 C.Y.

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Date	Drawn By	Checked
1975	S A S	BMW

PIER 6
SOUTH BOUND LANE

SHEET 26 OF 56
X55361

WISDOT DTID

BEAM SEAT ELEVATIONS ARE AT ℄ OF PIER
● MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET
FOR BILL OF BARS SEE SHT 29
FOR PILE SPLICE DETAIL SEE SH 18.

PROJECT ID 1220-5-71 | SHEET NUMBER 7 26 | TOTAL SHEETS

ELEVATION P3
LOOKING WEST

CONST JT DETAIL

SECTION P1

SECTION P3

SECTION P2

PLAN

FOOTING PLAN

ESTIMATED CONCRETE MASONRY

FOOTING	22 CY
POUR 1 SHAFT	30 CY
POUR 2 SHAFT	36 CY
CAP	59 CY
TOTAL	147 CY

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

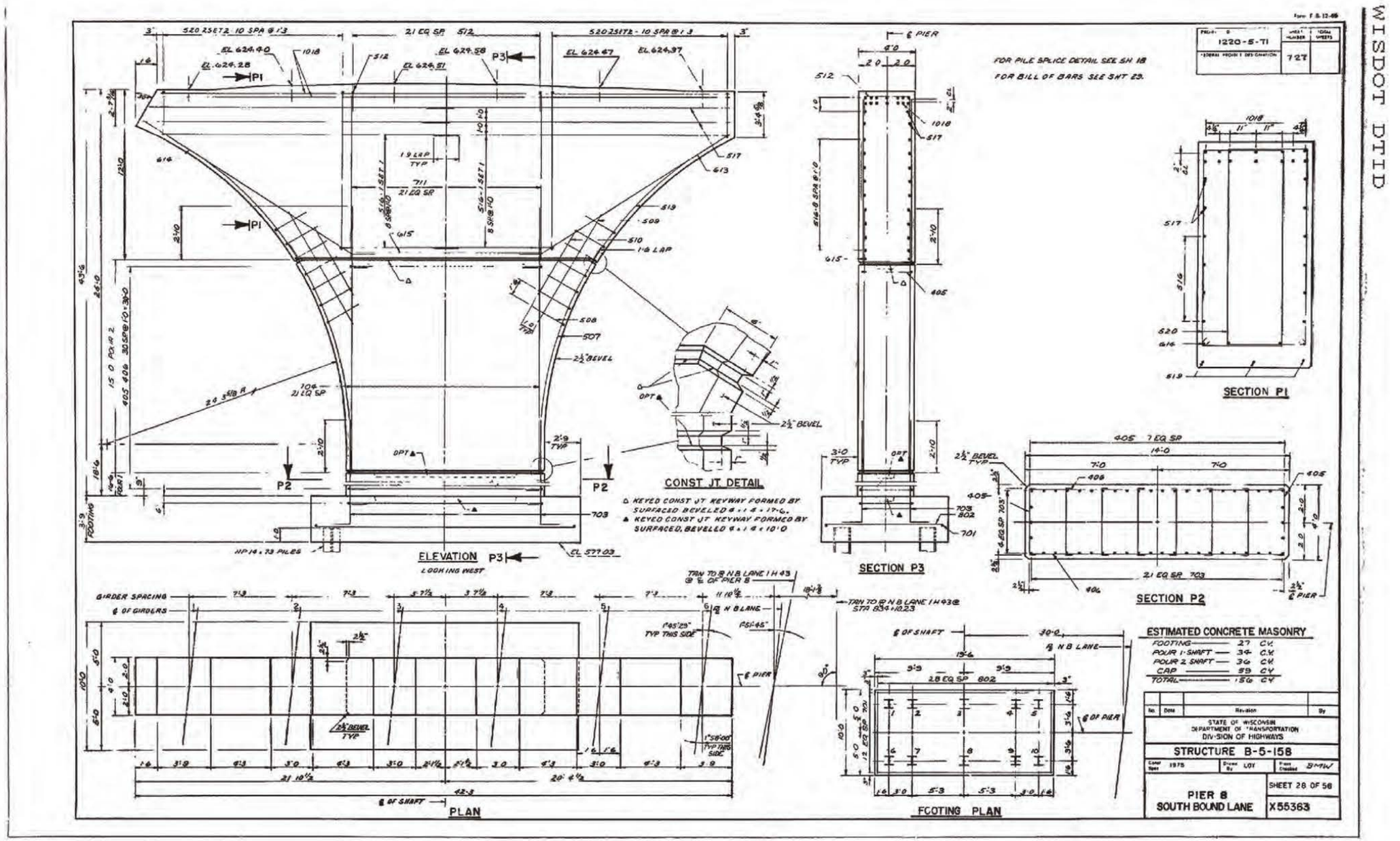
STRUCTURE B-5-158

Const Spec 1975 | Drawn By LDY | Plans Checked SMW

PIER 7
SOUTH BOUND LANE

SHEET 27 OF 56

X55362


WISDOT PTID
1220-5-71
727
FOR PILE SPLICE DETAIL SEE SH 18
FOR BILL OF BARS SEE SHT 23.
ELEVATION P3
LOOKING WEST
SECTION P1
SECTION P3
SECTION P2
CONST JT. DETAIL
PLAN
FOOTING PLAN
ESTIMATED CONCRETE MASONRY
FOOTING 27 CY
POUR 1-SHAFT 34 CY
POUR 2-SHAFT 36 CY
CAP 59 CY
TOTAL 156 CY
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 8
SOUTH BOUND LANE
SHEET 28 OF 56
X55363

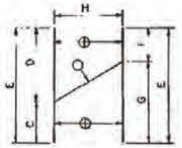
WISDOT DTID

Form S.B. 12-69

PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-71	T 28	
FEDERAL PROJECT DESIGNATION		

CUTTING DIAGRAM

MARK		C	C	E	F	G	H	SETS REQD
516	SET 1	8 6	—	29-3	—	20-9	9	2
	SET 1	—	20 9		8 6	—		2
520	SET 1	12 3	—	40 9	—	28-6	11	2
	SET 1	—	28 6		12 3	—		2



○ MARK AND CUT ALL BARS ALONG THIS LINE MAKE ALL CUTS NORMAL TO BAR AXIS

⊕ BUNDLE AND MARK CUT BARS WITH BAR AND SET NUMBER "H" IS THE NUMBER OF BARS IN A CUTTING DIAGRAM BEFORE CUTTING

BENT BARS SHALL BE BENT AFTER CUTTING

BILL OF BARS

PIER 5 22,900 LBS

MARK	NO REQD	LENGTH
701	17	21-8
802	28	9 8
1003	60	25 6
1004	60	20-11
405	248	4-9
406	62	13-7
507	6	15-0
508	14	8-4
509	4	10 0
510	4	7-0
1011	60	11-9
512	26	5-10
613	4	17-6
614	4	18 9
615	4	14 0
516	18	28-9
517	8	21 10
1018	14	40 6
519	6	11 0
520	22	40-9
721	20	3-6

PIER 6 9,280 LBS

MARK	NO REQD	LENGTH
601	10	17-8
702	18	7-8
703	24	17-11
704	24	17-10
405	319	4 9
406	58	13-7
507	6	15 0
508	14	8-4
509	4	10-0
510	4	7-0
711	20	11-9
512	10	5-10
613	4	17-6
614	4	18-9
615	4	14-0
516	18	28 9
517	8	21-10
1018	14	40-6
519	6	11-0
520	22	40-9
721	20	3-6

PIER 7 16,740 LBS

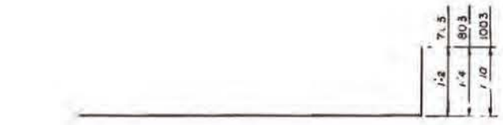
MARK	NO REQD	LENG'TH
701	17	19-2
702	28	9 2
803	68	21-5
804	68	18-8
405	240	4-9
406	60	13-7
507	6	15-0
508	14	8-4
509	4	10 0
510	4	7-0
811	60	11-9
512	30	5-10
613	4	17-6
614	4	18 9
615	4	13 7
516	18	29 3
517	8	21-3
1018	14	40 5
519	6	11 0
520	22	40-9
721	20	3 6

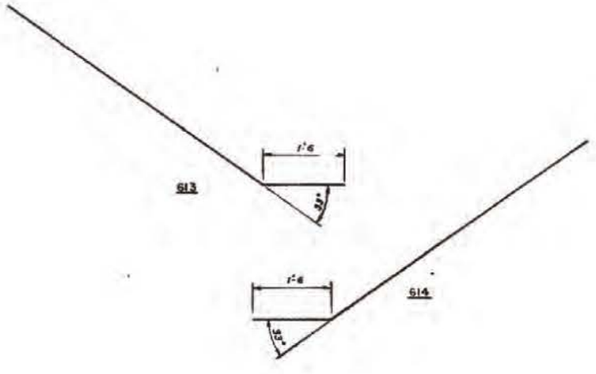
PIER 8 12,760 LBS

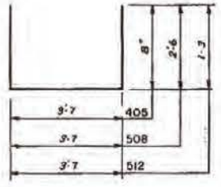
MARK	NO REQD	LENGTH
701	13	19-2
802	29	9-8
703	50	22 11
704	50	17 10
405	256	4-9
406	64	13 7
507	6	15-0
508	14	8-4
509	4	10-0
510	4	7 0
711	44	11 9
512	22	5-10
613	4	17-6
614	4	18-9
615	4	13-7
516	18	29 3
517	8	21-9
1018	14	40-5
519	6	11 0
520	22	40-9

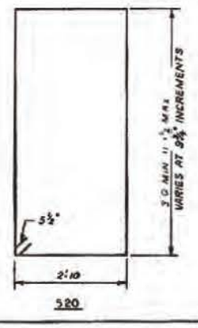
BENT	CUT DIA	LOCATION
		FOOTING
		"
x		"
		SHAFT
x		" & FOOTING
		" " "
x		" "
x		" & CAP
		" " "
		" " "
		CAP
x		" - TOP
x		" - BOTTOM
x		" "
		" "
	X	"
		"
		" - TOP
x		"
x	X	" - STIRRUP
		" DOWEL

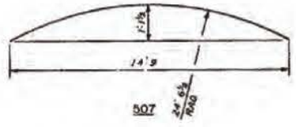
THE FIRST DIGIT OF A THREE DIGIT MARK AND THE FIRST TWO DIGITS OF A FOUR DIGIT MARK SIGNIFIES THE BAR SIZE.
ALL DIMENSIONS OF BENT BARS ARE OUT TO OUT OF BAR.

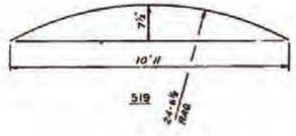












No	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

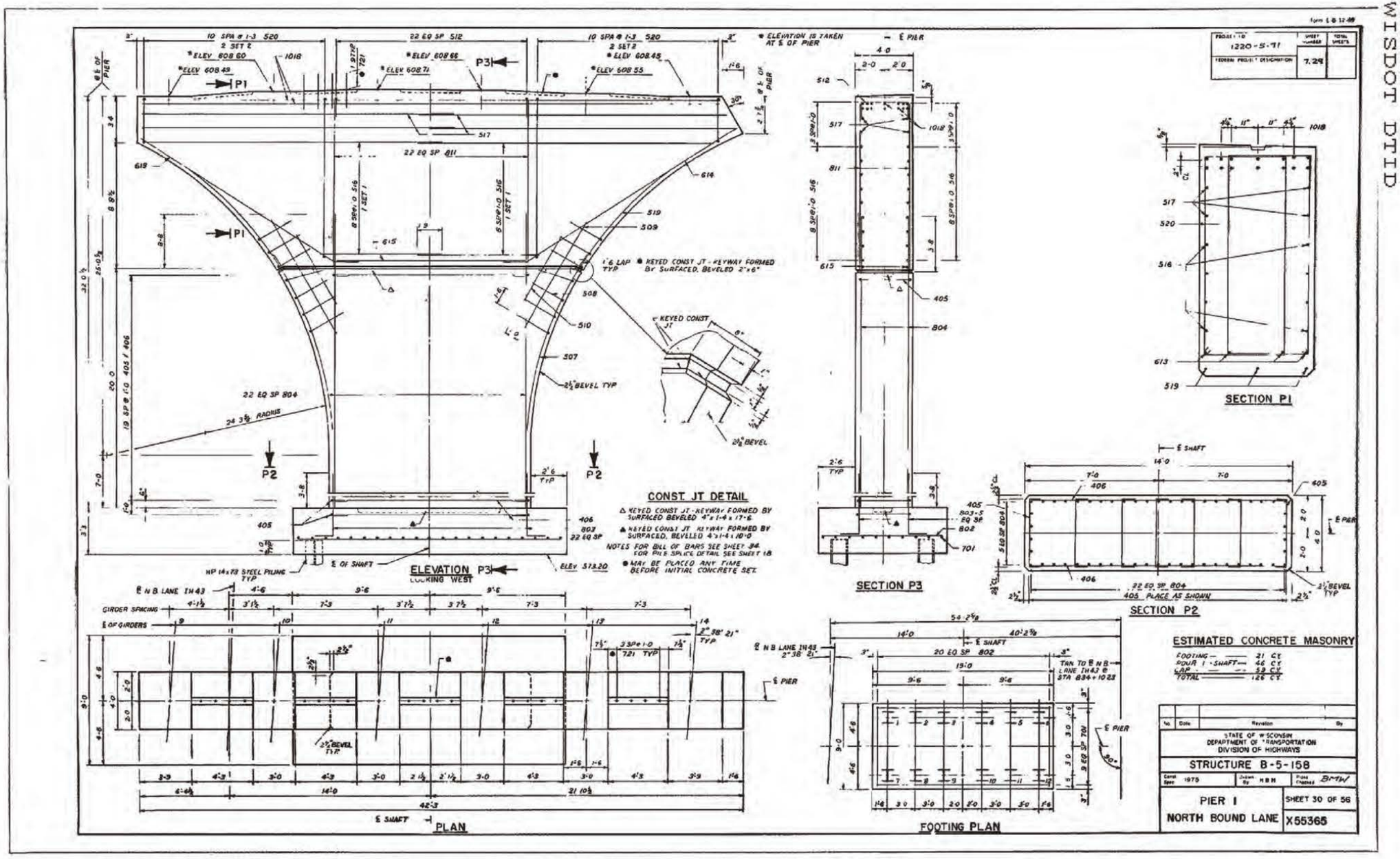
STRUCTURE B-5-158

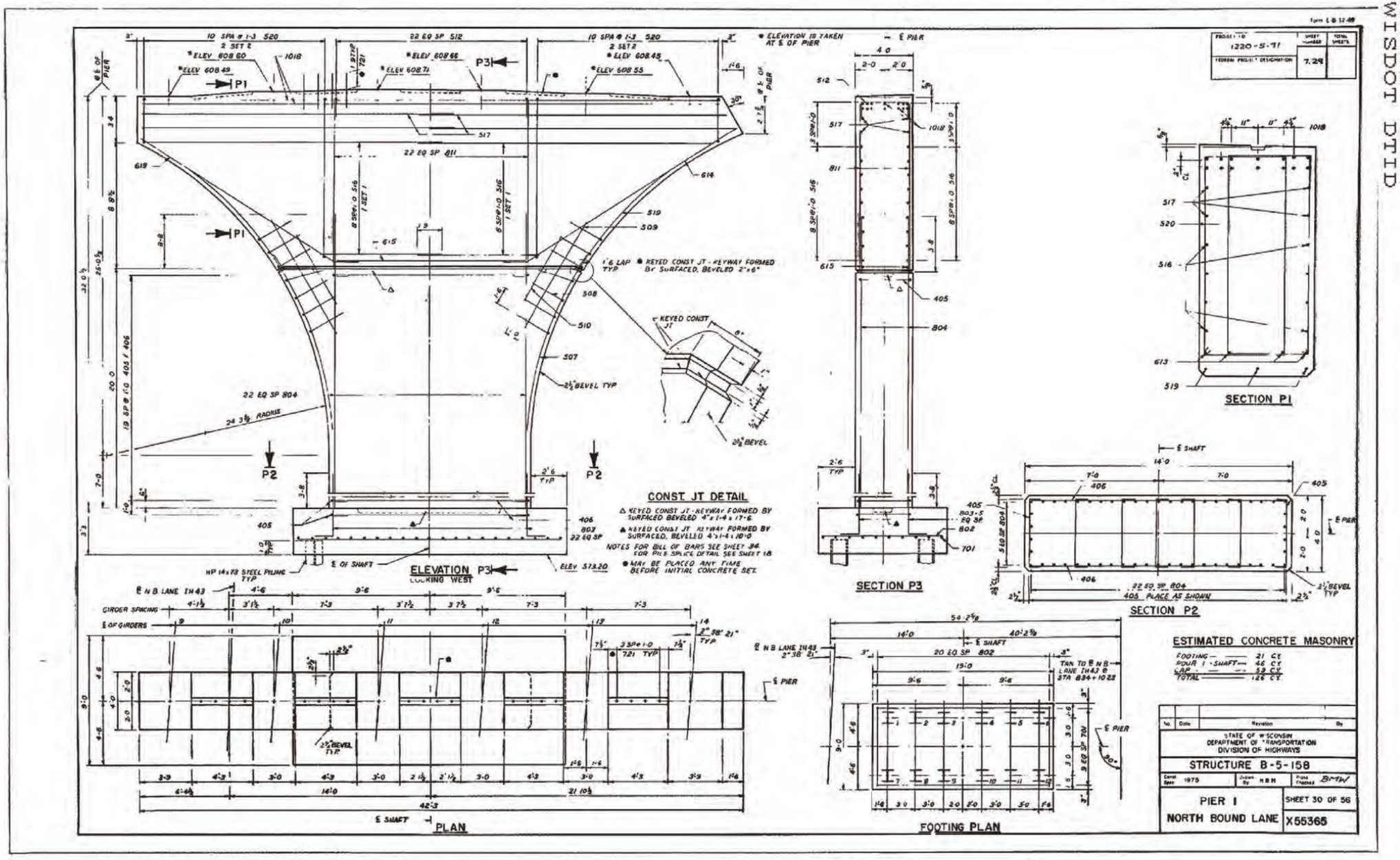
Const. Year	Drawn By	Plans Checked
1975		

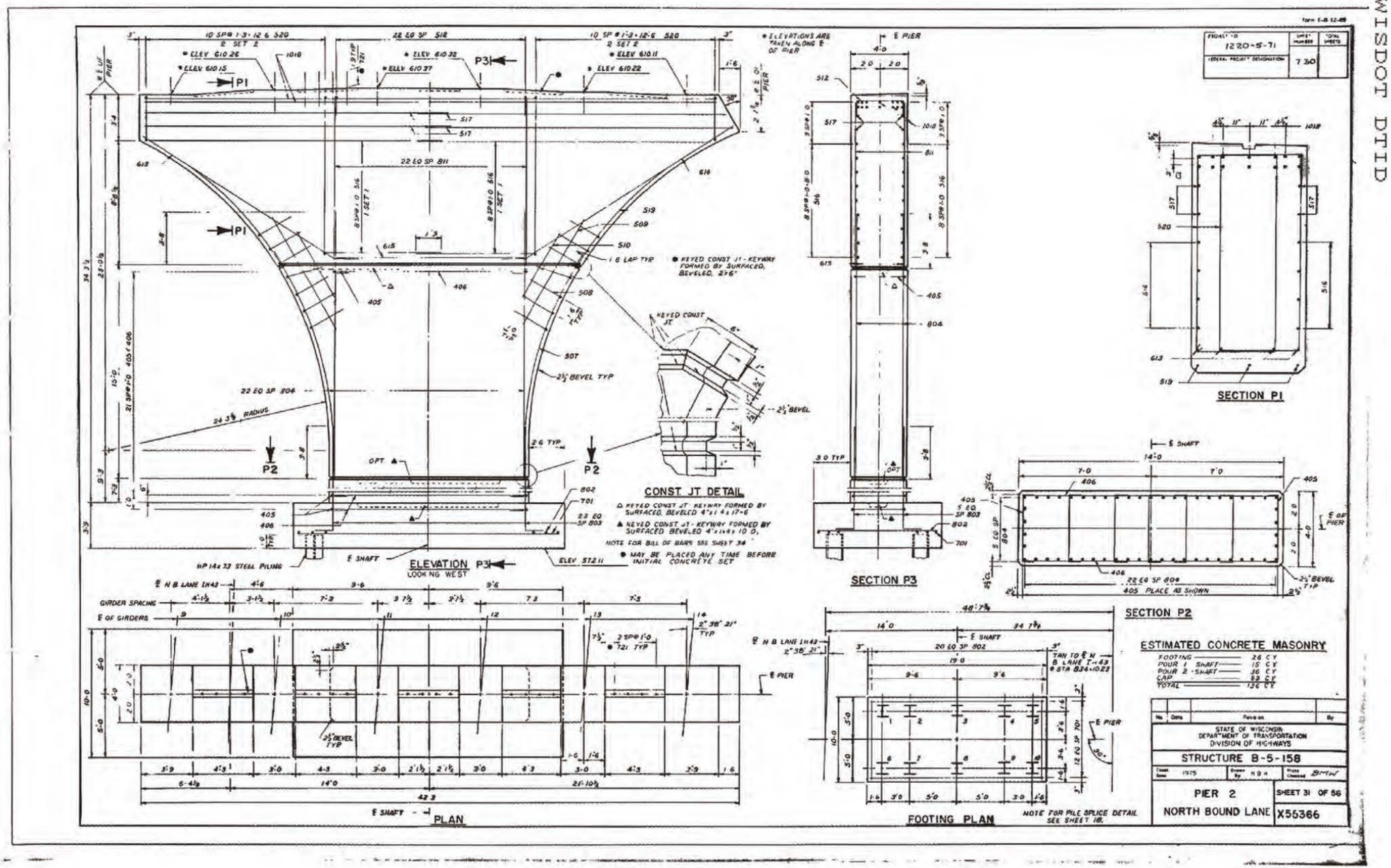
BILL OF BARS
PIERS 5 THRU 8
SOUTH BOUND LANE

SHEET 29 OF 56

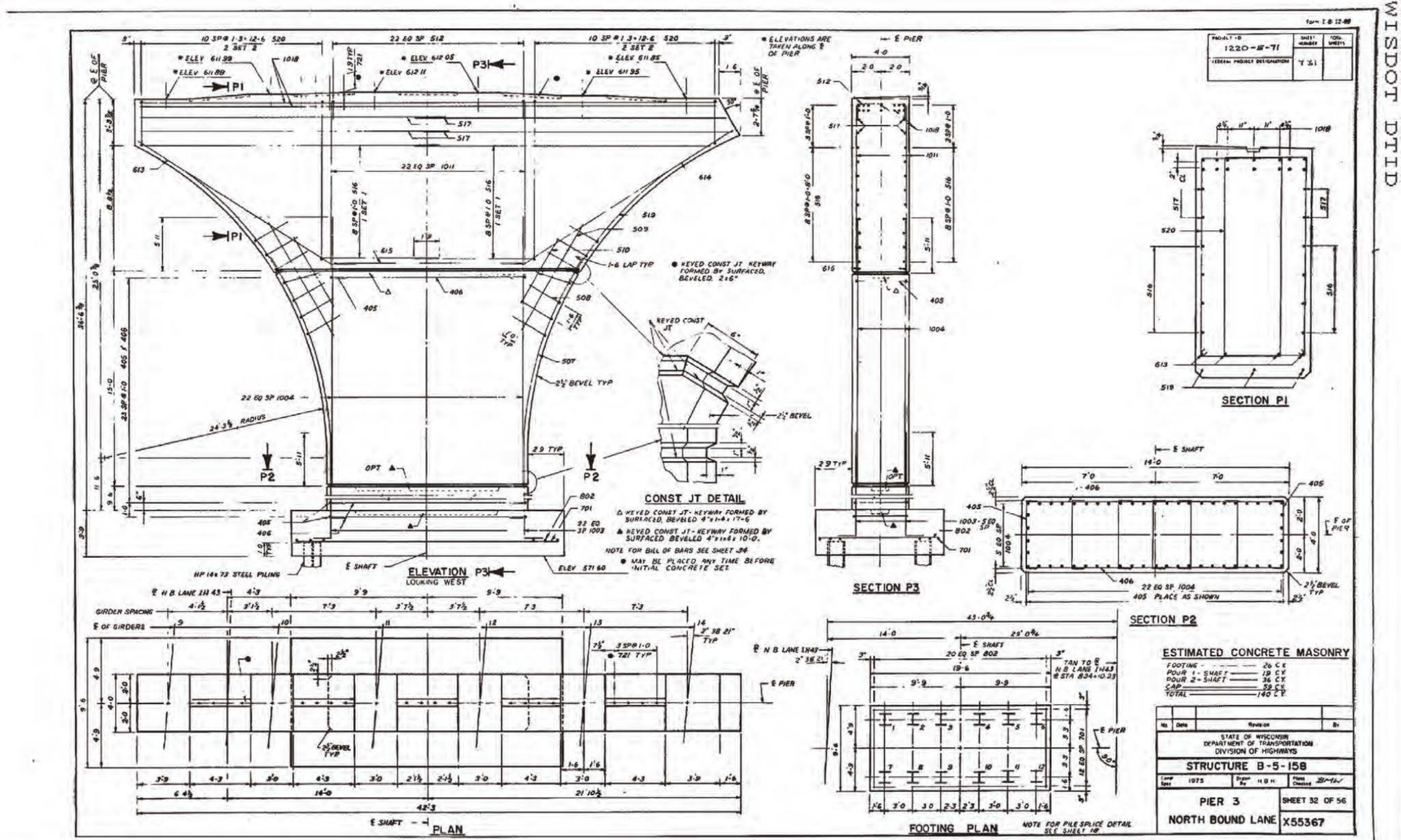
X55364

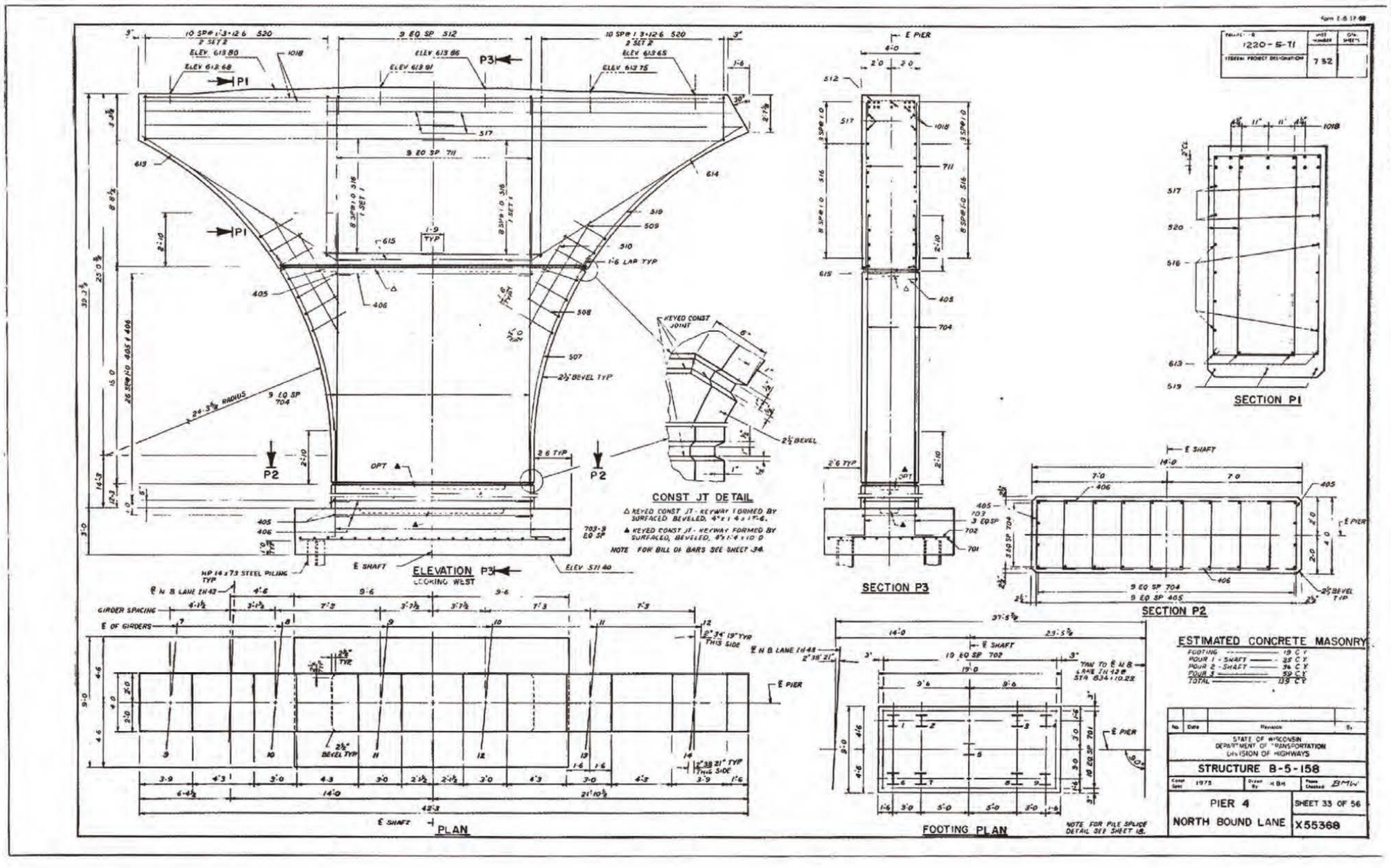

WISCONSIN DEPARTMENT OF TRANSPORTATION
Baker
WISDOT BTID
ELEVATION P3
LOOKING WEST
PLAN
SECTION P1
SECTION P3
SECTION P2
FOOTING PLAN
CONST JT DETAIL
ESTIMATED CONCRETE MASONRY
FOOTING — 21 CY
POUR 1 - SHAFT — 46 CY
LAP — 59 CY
TOTAL — 126 CY
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 1
NORTH BOUND LANE
SHEET 30 OF 56
X55365
1220-5-71
7.29
KEYED CONST JT
2½" BEVEL TYP
HP 14x73 STEEL PILING TYP
ELEV 573.20
℄ OF SHAFT
℄ PIER
℄ N B LANE IH 43
GIRDER SPACING
℄ OF GIRDERS
TAN TO ℄ N B LANE IH 43 @ STA 834+10.23


WISCONSIN DEPARTMENT OF TRANSPORTATION
Baker
WISDOT BTID
ELEVATION P3
LOOKING WEST
PLAN
SECTION P1
SECTION P2
SECTION P3
FOOTING PLAN
CONST JT DETAIL
ESTIMATED CONCRETE MASONRY
FOOTING — 21 CY
POUR 1 - SHAFT — 46 CY
LAP — 59 CY
TOTAL — 126 CY
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 1
NORTH BOUND LANE
SHEET 30 OF 56
X55365
1220-5-71
7.29
10 SPA @ 1-3 = 520
22 EQ SP 512
22 EQ SP 811
22 EQ SP 804
19 SP @ 1'-0 = 405 + 406
HP 14x73 STEEL PILING TYP
E OF SHAFT
E OF PIER
E N B LANE IH 43
GIRDER SPACING
E OF GIRDERS
KEYED CONST JT - KEYWAY FORMED BY SURFACED, BEVELED 2"x6"
1'-6 LAP TYP
2½" BEVEL TYP
2" RADIUS
ELEV 573.20
ELEVATION IS TAKEN AT E OF PIER
MAY BE PLACED ANY TIME BEFORE INITIAL CONCRETE SET
NOTES FOR BILL OF BARS SEE SHEET 34
FOR PILE SPLICE DETAIL SEE SHEET 18
TAN TO E N B LANE IH 43 @ STA 834+10.23
20 EQ SP 802
405 PLACE AS SHOWN
SHAFT
PIER


WISDOT DTID
1220-5-71
7.30
SECTION P1
SECTION P3
SECTION P2
CONST JT DETAIL
ELEVATION P3
LOOKING WEST
PLAN
FOOTING PLAN
ESTIMATED CONCRETE MASONRY
FOOTING 26 C.Y.
POUR 1 SHAFT 15 C.Y.
POUR 2 SHAFT 36 C.Y.
CAP 52 C.Y.
TOTAL 136 C.Y.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 2
NORTH BOUND LANE
SHEET 31 OF 56
X55366

WISDOT PTID


ELEVATION P3
LOOKING WEST
SECTION P3
SECTION P2
SECTION P1
CONST JT DETAIL
PLAN
FOOTING PLAN
E PIER
E SHAFT
HP 14x73 STEEL PILING
ELEV 571.60
NOTE FOR BILL OF BARS SEE SHEET 34
NOTE FOR PILE SPLICE DETAIL SEE SHEET 18
ESTIMATED CONCRETE MASONRY
FOOTING 26 C.Y.
POUR 1 - SHAFT 19 C.Y.
POUR 2 - SHAFT 36 C.Y.
CAP 59 C.Y.
TOTAL 140 C.Y.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 3
NORTH BOUND LANE
SHEET 32 OF 56
X55367
1220-5-71


WISDOT DTID
1220-5-11
7 52
SECTION P1
E PIER
SECTION P3
CONST JT DETAIL
KEYED CONST JOINT
SECTION P2
E SHAFT
ELEVATION P3
LOOKING WEST
PLAN
FOOTING PLAN
ESTIMATED CONCRETE MASONRY
FOOTING ---- 19 C Y
POUR 1 - SHAFT ---- 25 C Y
POUR 2 - SHAFT ---- 34 C Y
POUR 3 ---- 39 C Y
TOTAL ---- 117 C Y
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 4
NORTH BOUND LANE
SHEET 33 OF 56
X55368

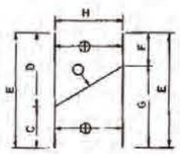
Form E-B 12-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-71	7 33	
FEDERAL PROJECT DESIGNATION		

WISDOT DLID

CUTTING DIAGRAM

MARK		C	D	E	F	G	H	SETS REQ'D
516	SET 1	8-6	—	29 3	—	20 9	9	2
	SET 1	—	20 3		8 6	—		2
520	SET 2	2 3	—	40 9	—	28 6	11	2
	SET 2	—	28 6		12 3	—		2



○ MARK AND CUT ALL BARS ALONG THIS LINE. MAKE ALL CUTS NORMAL TO BAR AXIS.

⊕ BUNDLE AND MARK CUT BARS WITH BAR AND SET NUMBER. H IS THE NUMBER OF BARS IN A CUTTING DIAGRAM BEFORE CUTTING.

BENT BARS SHALL BE BENT AFTER CUTTING.

BILL OF BARS

PIER 1 12,600 LBS

MARK	NO. REQD.	LENGTH
701	10	18 8
802	21	8 8
803	54	6 11
804	54	23 8
405	147	4 9
406	42	13-7
507	6	15-0
508	14	8-4
509	4	10-0
510	4	7-0
811	46	11 9
512	23	5-10
613	4	17-6
614	4	18-9
615	4	13-7
5 16	18	29-3
517	8	21-9
1018	14	40-4
519	6	11-2
520	22	40 9
721	20	3-6

PIER 2 13,250 LBS

MARK	NO. REQD.	LENGTH
701	13	18 8
802	21	9-8
803	54	14-8
804	54	18-8
405	161	4 9
406	48	13-7
507	6	15-0
508	14	8-4
509	4	10-0
510	4	7-0
811	46	11 9
512	23	5 10
613	4	17-6
614	4	18-9
615	4	13-7
516	18	29 3
517	8	21-9
1018	14	40 4
519	6	11 0
520	22	40 9
721	20	3-6

PIER 3 18,780 LBS

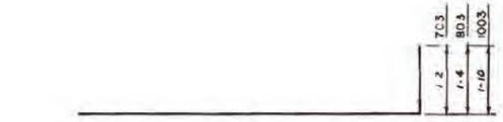
MARK	NO. REQD.	LENGTH
701	13	19-2
802	21	3-2
1003	54	13-6
1004	54	20-11
405	175	4 9
406	50	13 7
507	6	15-0
508	14	8-4
509	4	10 0
510	4	7-0
1011	46	11-9
512	23	5-10
613	4	17 6
614	4	18-9
615	4	13-7
516	18	29 3
517	8	21-9
1018	14	40-4
519	6	11-0
520	22	40-9
721	20	3-6

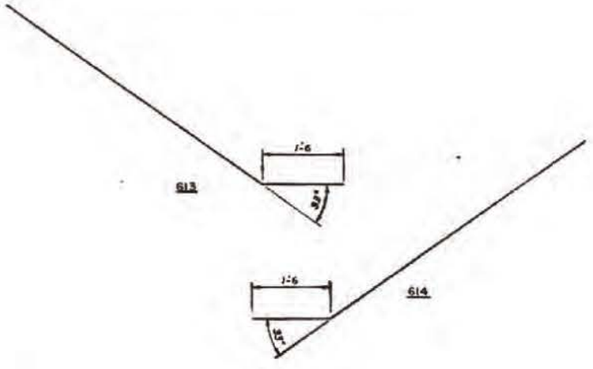
PIER 4 9,220 LBS

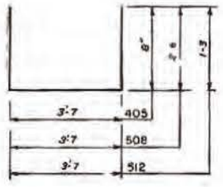
MARK	NO. REQD.	LENGTH
701	11	18 8
702	20	8 8
703	24	17-11
704	24	17 10
405	780	4 9
406	36	13-7
507	6	15-0
508	14	8-4
509	4	10-0
510	4	7-0
711	20	11-9
512	10	5 10
613	4	17 6
614	4	18 9
615	4	13 7
516	18	29 3
517	8	21 9
1018	14	40 4
519	6	11 0
520	22	40 9

BENT	CUT DIA	LOCATION
		FOOTING
		"
X		" - DOWEL
		SHAFT
X		" & FOOTING
		" "
X		" "
X		" & CAP
		" "
		" "
		CAP
X		" - TOP
X		" BOTTOM
X		" "
		" "
	X	" "
		" "
		" - TOP
		" "
X		" "
X	X	" STIRRUP
		" DOWEL

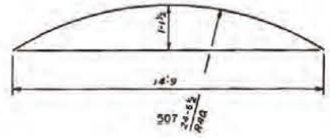
THE FIRST DIGIT OF A THREE DIGIT MARK AND THE FIRST TWO DIGITS OF A FOUR DIGIT MARK SIGNIFIES THE BAR SIZE.
ALL DIMENSIONS OF BENT BARS ARE OUT TO OUT OF BAR.

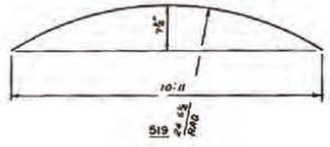












NO.	DATE	REVISIONS	BY

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

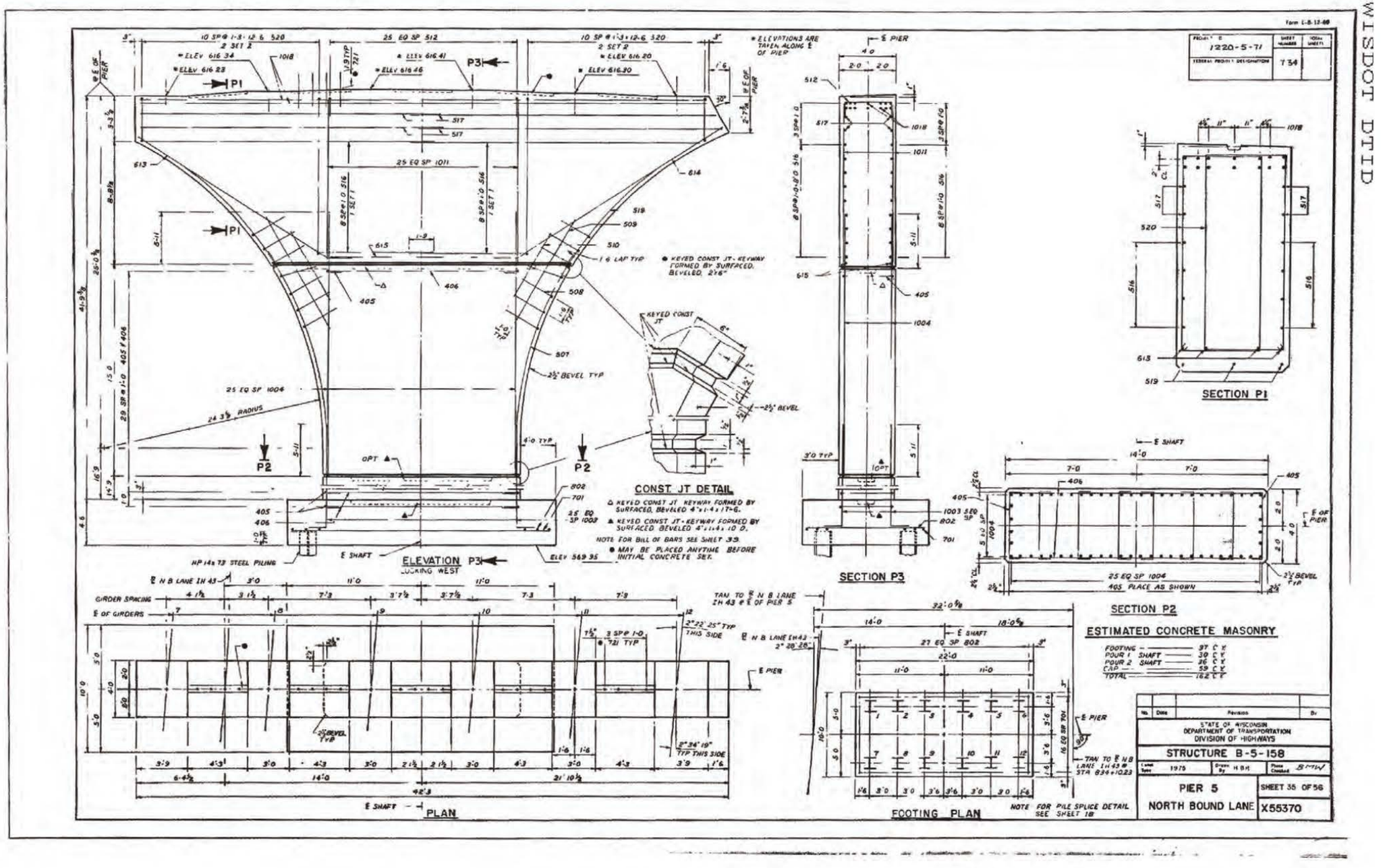
STRUCTURE B-5-158

Const. Spec.	Drawn By	Plans Checked
1975	H B H	Brtn.

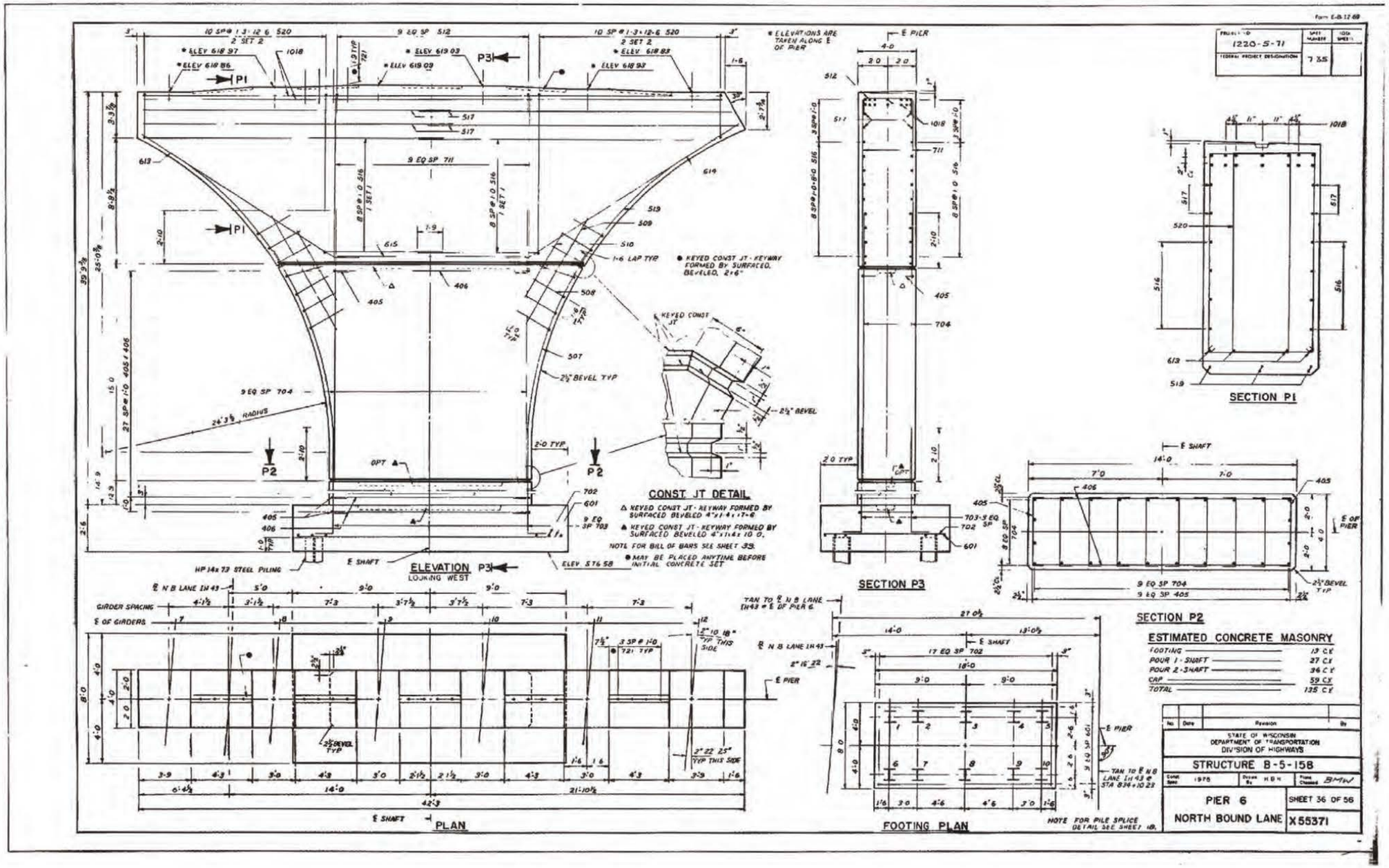
BILL OF BARS
PIERS 1 THRU 4
NORTH BOUND LANE

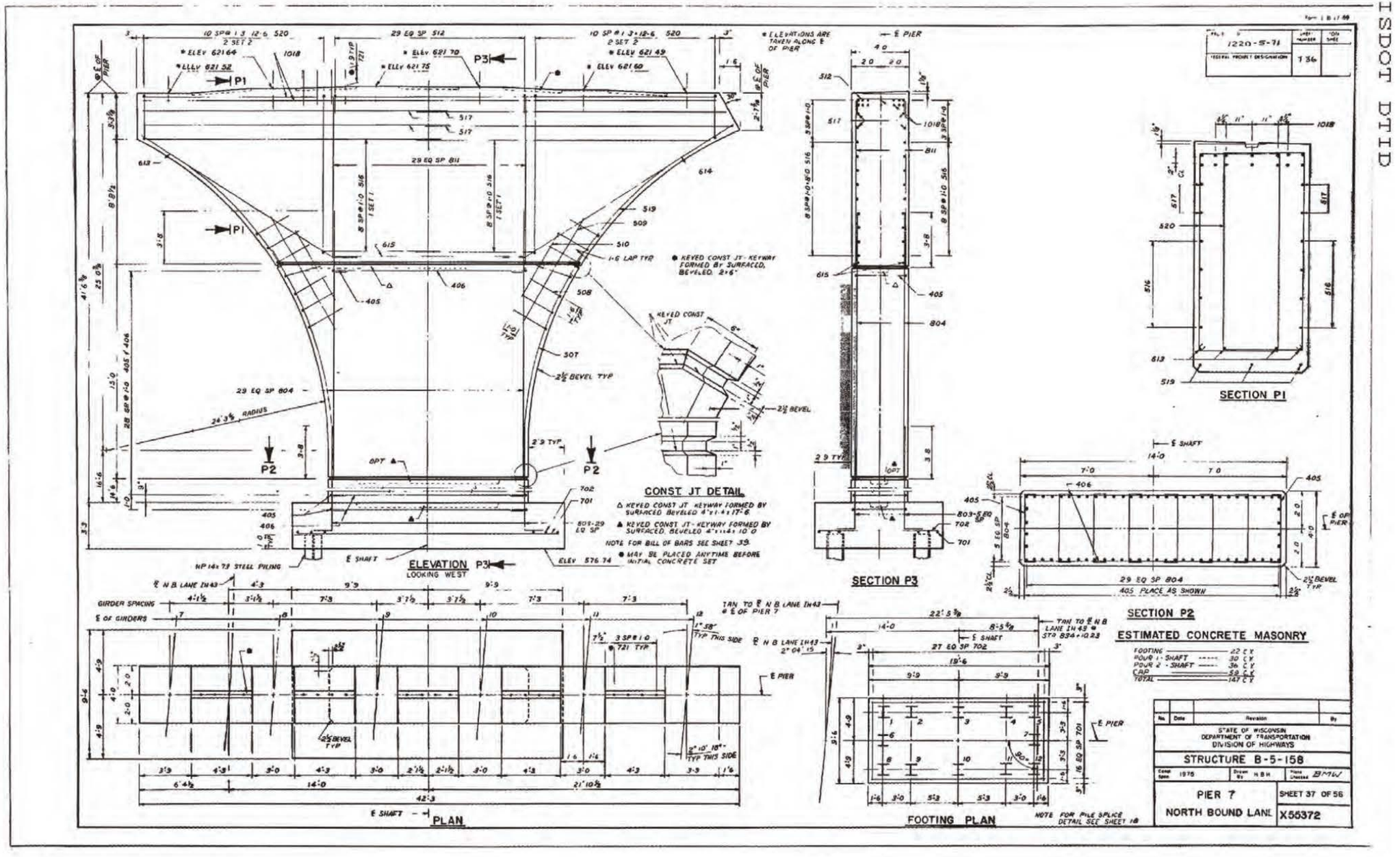
SHEET 34 OF 56

X55369


WISDOT DTID
1220-5-71
T 34
SECTION P1
SECTION P3
SECTION P2
CONST. JT DETAIL
ELEVATION P3
LOOKING WEST
PLAN
FOOTING PLAN
ESTIMATED CONCRETE MASONRY
FOOTING 97 C Y
POUR 1 SHAFT 30 C Y
POUR 2 SHAFT 36 C Y
CAP 59 C Y
TOTAL 162 C Y
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 5
NORTH BOUND LANE
SHEET 35 OF 56
X55370

WISDOT DTID


ELEVATION P3
LOOKING WEST
PLAN
CONST JT DETAIL
SECTION P3
SECTION P1
SECTION P2
FOOTING PLAN
ESTIMATED CONCRETE MASONRY
FOOTING 13 C.Y.
POUR 1 - SHAFT 27 C.Y.
POUR 2 - SHAFT 36 C.Y.
CAP 59 C.Y.
TOTAL 135 C.Y.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 6
NORTH BOUND LANE
SHEET 36 OF 56
X 55371
1220-5-71
735


WISDOT DTID
ELEVATION P3
LOOKING WEST
SECTION P3
SECTION P1
SECTION P2
CONST JT DETAIL
PLAN
FOOTING PLAN
ESTIMATED CONCRETE MASONRY
FOOTING ---- 22 C Y
POUR 1 - SHAFT ---- 30 C Y
POUR 2 - SHAFT ---- 36 C Y
CAP ---- 59 C Y
TOTAL ---- 147 C Y
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 7
NORTH BOUND LANE
SHEET 37 OF 56
X55372

WISDOT DTID

1220-5-71 | 737

ELEVATION P3
LOOKING WEST

PLAN

CONST JT DETAIL

SECTION P1

SECTION P3

SECTION P2

FOOTING PLAN

ESTIMATED CONCRETE MASONRY

FOOTING	27 C.Y.
POUR 1 - SHAFT	34 C.Y.
POUR 2 - SHAFT	36 C.Y.
CAP	59 C.Y.
TOTAL	156 C.Y.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 8 | SHEET 38 OF 56

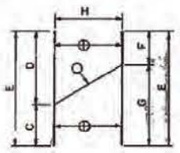
NORTH BOUND LANE | X55373

Form S-B 12-69

BRIDGE ID	SHEET NUMBER	TOTAL SHEETS
1220-5-71		
FEDERAL PROJECT DESIGNATION	T 38	

CUTTING DIAGRAM

MARK		C	D	E	F	J	H	SETS REQD
516	SET 1	8'6	—	29'3	—	20'9	9	2
	SET 2	—	20'9		8'6	-- ''		2
520	SET 2	12'3	—	40'9	—	28'6	11	2
	SET 2	—	28'6		12'3	—		2



○ MARK AND CUT ALL BARS ALONG THIS LINE. MAKE ALL CUTS NORMAL TO BAR AXIS.

Ⓑ BUNDLE AND MARK CUT BARS WITH BAR AND SET NUMBER 'N' IS THE NUMBER OF BARS IN A CUTTING DIAGRAM BEFORE CUTTING.

BENT BARS SHALL BE BENT AFTER CUTTING.

BILL OF BARS

PIER 5 22,490 LBS

MARK	NO REQD	LENGTH
701	17	21'8
802	28	9'8
1003	60	28'6
1004	60	20'11
405	248	4'9
406	62	13'7
507	6	15'0
508	14	8'4
509	4	10'0
510	4	7'0
1011	52	11'9
512	26	5'10
613	4	17'6
614	4	18'9
615	4	13'7
516	12	29'3
517	8	21'9
1018	14	40'4
519	6	11'0
520	22	40'9
721	20	3'6

PIER 6 9,180 LBS

MARK	NO REQD	LENGTH
601	10	17'8
702	18	7'8
703	24	17'11
704	24	17'10
405	290	4'9
406	58	13'7
507	6	15'0
508	14	8'4
509	4	10'0
510	4	7'0
711	30	11'9
512	10	5'10
613	4	17'6
614	4	18'9
615	4	13'7
516	18	29'3
517	8	21'9
1018	14	40'4
519	6	11'0
520	22	40'9
721	20	3'6

PIER 7 16,730 LBS

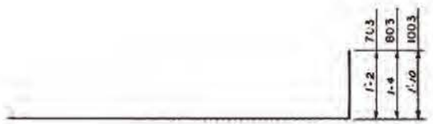
MARK	NO REQD	LENGTH
701	17	19'2
702	28	9'4
803	68	21'5
804	68	18'8
405	240	4'9
406	60	13'7
507	6	15'0
508	14	8'4
509	4	10'0
510	4	7'0
811	60	11'9
512	30	5'10
613	4	17'6
614	4	18'9
615	4	13'7
516	18	29'3
517	8	21'9
1018	14	40'4
519	6	11'0
520	22	40'9
721	20	3'6

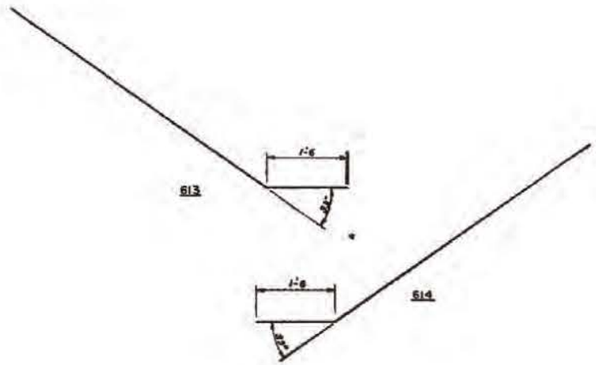
PIER 8 12,760 LBS

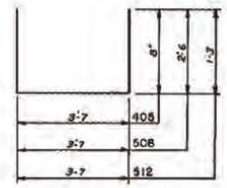
MARK	NO REQD	LENGTH
701	13	19'2
802	29	9'8
703	50	22'11
704	50	17'10
405	256	4'9
406	64	13'7
507	6	15'0
508	18	8'4
509	4	10'0
510	4	7'0
711	44	11'9
512	22	5'10
613	4	17'6
614	4	18'9
615	4	13'7
516	18	29'3
517	8	21'9
1018	14	40'4
519	6	11'0
520	22	40'9

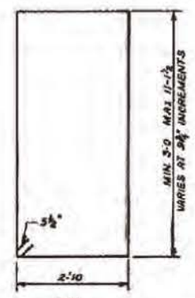
BENT	CUT DIA.	LOCATION
		FOOTING
		" "
K		" " DOWEL
		SHAFT
X		" & FOOTING
		" "
X		" "
X		" & CAP
		" " "
		" "
		CAP
X		" " TOP
X		" " BOTTOM
X		" "
		"
	X	"
		"
		" " TOP
X		"
X	X	" STIRRUP
		" DOWEL

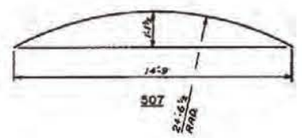
THE FIRST DIGIT OF A THREE DIGIT MARK AND THE FIRST TWO DIGITS OF A FOUR DIGIT MARK SIGNIFIES THE BAR SIZE.
ALL DIMENSIONS OF BENT BARS ARE OUT TO OUT OF BAR.

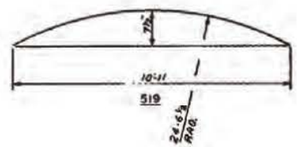












No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Date	Drawn By	Plans Checked
1975	H.B.H.	

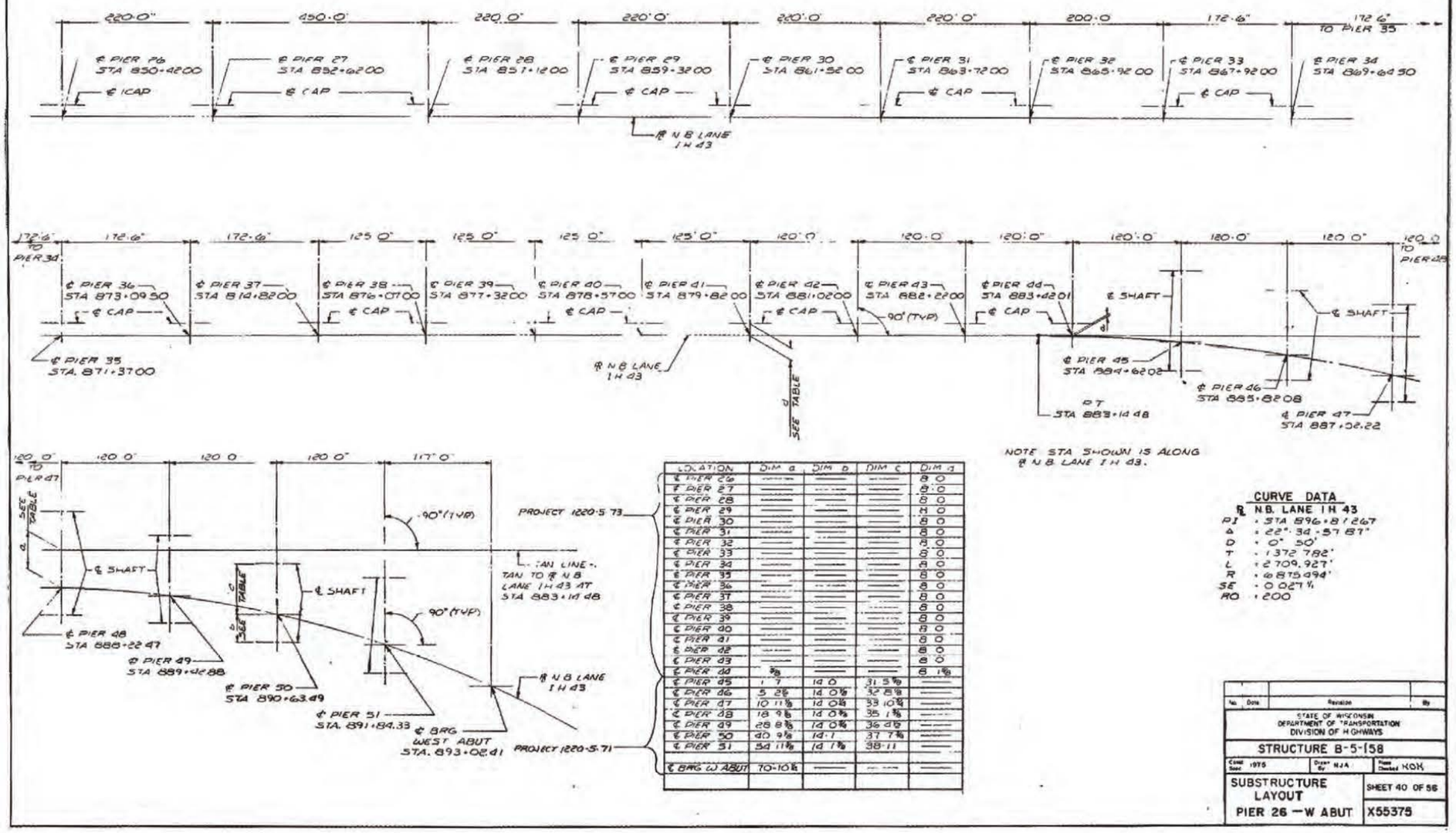
BILL OF BARS
PIERS 5 THRU 8
NORTH BOUND LANE

SHEET 39 OF 56

X55374

WISDOT DTID

PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-71	739	
FEDERAL PROJECT DESIGNATION		



LOCATION	DIM a	DIM b	DIM c	DIM d
℄ PIER 26				8'0
℄ PIER 27				8'0
℄ PIER 28				8'0
℄ PIER 29				11'0
℄ PIER 30				8'0
℄ PIER 31				8'0
℄ PIER 32				8'0
℄ PIER 33				8'0
℄ PIER 34				8'0
℄ PIER 35				8'0
℄ PIER 36				8'0
℄ PIER 37				8'0
℄ PIER 38				8'0
℄ PIER 39				8'0
℄ PIER 40				8'0
℄ PIER 41				8'0
℄ PIER 42				8'0
℄ PIER 43				8'0
℄ PIER 44	9/16			8 1/16
℄ PIER 45	1'7	14'0	31 5/16	
℄ PIER 46	5 2/16	14 0 1/16	32 8/16	
℄ PIER 47	10 11/16	14 0 1/16	33 10 1/16	
℄ PIER 48	18 9/16	14 0 1/16	35 1 1/16	
℄ PIER 49	28 8 1/16	14 0 1/16	36 8 1/16	
℄ PIER 50	40 9/16	14'1	37 7 1/16	
℄ PIER 51	54 11/16	14 1 1/16	38'11	
℄ BRG W ABUT	70-10 1/16			

CURVE DATA
℄ N.B. LANE I H 43
PI : STA 896+81.267
Δ : 22° 34' 57.87"
D : 0° 50'
T : 1372.782'
L : 2709.927'
R : 6875.494'
SE : 0.027 ft
RO : 200

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

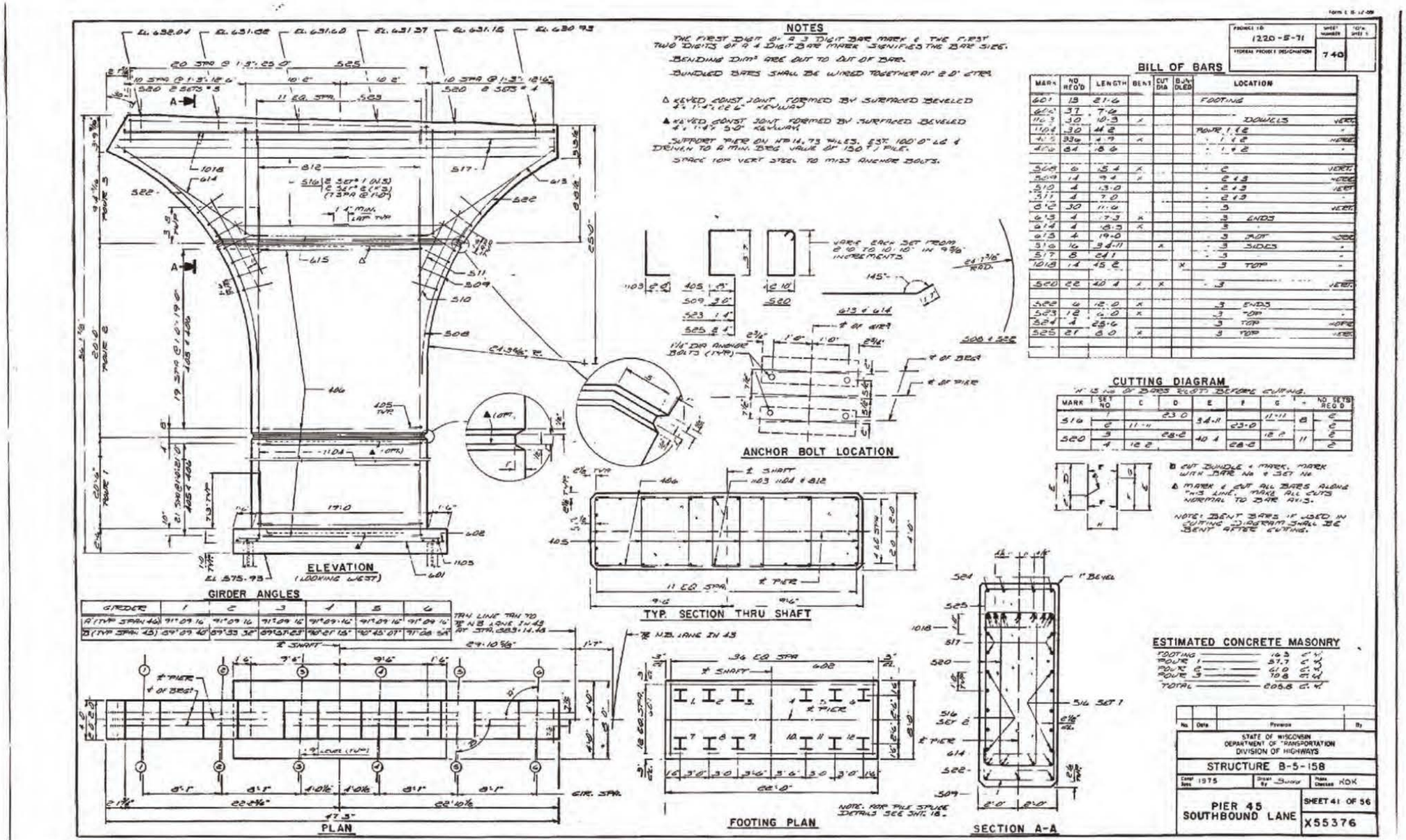
STRUCTURE B-5-158

Const. Date: 1975	Drawn By: N.J.A.	Name Checked: K.O.K.

SUBSTRUCTURE LAYOUT
PIER 26 — W ABUT

SHEET 40 OF 56

X55375


NOTES
THE FIRST DIGIT OF A 3 DIGIT BAR MARK & THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK SIGNIFIES THE BAR SIZE.
BENDING DIM'S ARE OUT TO OUT OF BAR.
BUNDLED BARS SHALL BE WIRED TOGETHER AT 2.0' CTRS.
SUPPORT PIER ON HP 14x73 PILES, EST. 100'-0" LG & DRIVEN TO A MIN. DES. VALUE OF 150 T/PILE.
STRIKE OUT VERT. STEEL TO MISS ANCHOR BOLTS.
BILL OF BARS
CUTTING DIAGRAM
ELEVATION (LOOKING WEST)
PLAN
ANCHOR BOLT LOCATION
TYP. SECTION THRU SHAFT
FOOTING PLAN
SECTION A-A
GIRDER ANGLES
ESTIMATED CONCRETE MASONRY
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 45 SOUTHBOUND LANE
SHEET 41 OF 56
X55376
WISDOT DTID

WISDOT DTID

NOTES

THE FIRST DIGIT OF A 3 DIGIT BAR MARK & THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK SIGNIFIES THE BAR SIZE.

BENDING DIM'S ARE OUT TO OUT OF BAR.

BUNDLED BARS SHALL BE WIRED TOGETHER AT 2'-0" CTRS

* ELEV'S ARE GIVEN AT ℄ OF PIER

△ KEYED CONST JOINT FORMED BY SURFACED BEVELED 3"x 1'-4"x 2'-6" KEYWAY

▲ KEYED CONST. JOINT FORMED BY SURFACED BEVELED 4"x 1'-4"x 15'-0" KEYWAY.

SUPPORT PIER ON HP 14x73 PILES, EST. 100'-0" LG & DRIVEN TO A MIN. BRG. VALUE OF 150 T/ PILE.

□ KEYED CONST JOINT FORMED BY SURFACED BEVELED 2'-6" KEYWAY.

721 BARS MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET.

PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-71	741	
FEDERAL PROJECT DESIGNATION		

BILL OF BARS

MARK	NO REQ'D	LENGTH	BENT	CUT DIA	BUNDLED	LOCATION	
601	11	28 2				FOOTING	
602	24	8 0					
1103	34	10 5	X			- DOWELS	VERT.
1104	34	40 6				POUR 1 & 2	
405	304	4 9	X			- 1 & 2	HORIZ.
406	96	18 6				- 1 & 2	
							VERT.
508	6	5 4	X			- 2	VERT.
509	14	9 4	X			- 2 & 3	HORIZ.
510	4	3 0				- 2 & 3	VERT.
511	4	7 0				- 2 & 3	
612	36	11 6				- 3	VERT.
613	4	17 3	X			- 3 ENDS	
614	4	18 5	X			- 3	"
615	4	19 6				- 3 BOT	HORIZ.
516	16	36 11			X	- 3 SIDES	"
517	8	24 1				- 3	"
1018	14	45 2			X	- 3 TOP	"
520	22	10 1		X		- 3	VERT.
721	23	3 6				- 3 TOP	"
522	4	12 0	X			- 3 ENDS	"
523	15	4 0	X			- 3 TOP	"
524	4	25 6				- 3 TOP	HORIZ.
525	21	15 0	X			- 3 TOP	VERT.

CUTTING DIAGRAM

"N" IS No. OF BARS READ BEFORE CUTTING.

MARK	SET NO	C	D	E	F	G	H	NO SETS REQ'D
516	1		23 0	34 11		11 - 11	8	2
	2	11 - 11			23 0			6
520	3		28 2	10 1		8 2	11	2
	4	12 2			28 6			2

■ CUT BUNDLE & MARK, MARK WITH BAR No & SET No.

▲ MARK & CUT ALL BARS ALONG THIS LINE, MAKE ALL CUTS NORMAL TO BAR AXIS.

NOTE: BENT BARS IF USED IN CUTTING DIAGRAM SHALL BE BENT AFTER CUTTING.

ELEVATION (LOOKING WEST)

SECTION B-B

TYP. SECTION THRU SHAFT

GIRDER ANGLES

GIRDER	1	2	3	4	5	6	
A (TWO SPANS 47')	91°31'28"	91°46'22"	90°01'17"	92°16'11"	92°31'05"	92°45'59"	TAN LINE: TAN TO ℄ N.B. LANE IN 43 AT STA 683+14.48
B (TWO SPANS 46')	91°09'16"	91°09'16"	91°09'16"	91°09'16"	91°09'16"	91° 9'16"	

PLAN

FOOTING PLAN

SECTION A-A

ESTIMATED CONCRETE MASONRY

FOOTING	190	C.Y.
POUR 1	479	C.Y.
POUR 2	410	C.Y.
POUR 3	708	C.Y.
TOTAL	1987	C.Y.

No	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Date	Drawn By	Proj. Checked
1975		HOK

PIER 46
SOUTHBOUND LANE

SHEET 42 OF 56

X55377

WISDOT DTID

NOTES

THE FIRST DIGIT OF A 3 DIGIT BAR MARK IS THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK. SIGNIFIES THE BAR SIZE.

BENDING DIMS ARE OUT TO OUT OF BAR.

BUNDLED BARS SHALL BE WIRED TOGETHER AT 2'-0" CTRS.

* ELEVS ARE GIVEN AT ℄ OF PIER.

△ KEYED CONST JOINT FORMED BY SURFACED BEVELED 4"x 1'-1"x 25'-0" KEVLAR

▲ KEYED CONST JOINT FORMED BY SURFACED BEVELED 4"x 1'-1"x 11'-6" KEVLAR

SUPPORT PIER ON HP 14x73 PILES, EST. 100'-0" LG & DRIVEN TO A MIN BRG VALUE OF 150 T / PILE.

□ KEYED CONST JOINT FORMED BY 2'x 6' SURFACED BEVELED KEYWAY.

721 BARS MAY BE PLACED ANYTIME BEFORE INITAL CONCRETE SET. (SEE "PLAN FOR LOCATION)

PROJECT ID 1220-5-71 — WISDOT NUMBER — TOTAL SHEETS

FEDERAL PROJECT DESIGNATION — 742

BILL OF BARS

MARK	NO REQ'D	LENGTH	BENT	CUT DIA	BUNDLED	LOCATION	
601	14	24 2				FOOTING	
602	65	8-6					
603	56	6-9	X			DOWELS	VERT.
604	56	36-8				PIER 1 & 2	
605	400	4-9	X			" 1 & 2	HORIZ
606	68	21 0				" 1 & 2	
505	8	5 4	X			" 2	VERT.
509	14	9-4	X			" 2 & 3	HORIZ
510	4	3 0				" 2 & 3	VERT
511	4	7 0				" 2 & 3	"
812	56	11 6				" 3	VERT.
613	4	7 3	X			" 3 ENDS	"
614	4	18-0	X			" 3 "	"
615	2	21 6				" 3 BOT.	HORIZ
516	16	37-5		X		" 3 SIDES	"
517	8	28-6				" 3	"
1018	14	22-5			X	" 3 TOP	"
1019	14	30 5			X	" 3 "	"
520	88	40 4	X	X		" 3	VERT.
*721	16	3-4				" 3 TOP	"
522	6	2 0	X			" 3 ENDS	"
523	23	6-0	X			" 3 TOP	"
524	4	23 6				" 3 TOP	HORIZ
525	21	8-0	X			" 3 TOP	VERT.

GIRDER ANGLES

GIRDER	1	2	3	3A	4	5	6
A (TYP SPAN 40)	92° 33' 04"	92° 15' 00"	92° 5' 53"	93° 08' 54"	93° 26' 34"	93° 38' 31"	93° 44' 23"
B (TYP SPAN 41)	91° 31' 26"	91° 46' 22"	92° 01' 17"	—	92° 16' 11"	92° 31' 05"	92° 45' 59"

CUTTING DIAGRAM

"H" IS ONE OF BARS CUT BEFORE CUTTING.

MARK	SET NO	C	D	E	F	G	H	NO SETS REQ'D
516	1		21 3	37-5		13-2	6	8
	2	13-2			24 3			8
520	3		28 2	40-4		16 2	11	8
	4	16 2			28 5			8

▲ CUT BUNDLE & MARK. MARK WITH BAR No. & SET No.

△ MARK & CUT ALL BARS ALONG THIS LINE. MAKE ALL CUTS NORMAL TO BAR ± 1.5.

NOTE: BENT BARS IF USED IN CUTTING DIAGRAM SHALL BE BENT AFTER CUTTING.

ESTIMATED CONCRETE MASONRY

FOOTING	26.0 C.Y.
PIER 1	19.8 C.Y.
PIER 2	46.4 C.Y.
PIER 3	15.9 C.Y.
TOTAL	210.1 C.Y.

ELEVATION (LOOKING WEST)

PLAN

SECTION B-B

TYP. SECTION THRU SHAFT

FOOTING PLAN

SECTION A-A

No	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const Spec 1975 | Drawn By Binder | Plans Checked KOK

PIER 47
SOUTHBOUND LANE

SHEET 43 OF 56

X55378

WISDOT DTID

NOTES

THE FIRST DIGIT OF A 3 DIGIT BAR MARK & THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK SIGNIFIES THE BAR SIZE.

BENDING DIM^S ARE OUT TO OUT OF BAR.

BUNDLED BARS SHALL BE WIRED TOGETHER AT 2'-0" CTRS.

* ELEV.^S ARE GIVEN AT ℄ OF PIER

△ KEYED CONST JOINT FORMED BY SURFACED BEVELED 3" x 1'-4" x 27'-9" KEYWAY

▲ KEYED CONST JOINT FORMED BY SURFACED BEVELED 4" x 1'-4" x 20'-3" KEYWAY.

SUPPORT PIER ON HP 14x73 PILES. EST. 100'-0" LG & DRIVEN TO A MIN. BRG. VALUE OF 150 T/PILE.

□ KEYED CONST JOINT FORMED BY 2'-6" SURFACED BEVELED KEYWAY.

721 BARS MAY BE PLACED ANYTIME BEFORE INITAL CONCRETE SET.

PROJECT ID 1220-5-71 | SHEET NO. 743

FEDERAL PROJECT DESIGNATION

BILL OF BARS

MARK	NO. REQ'D	LENGTH	BENT	CUT DIA	BUNDLED	LOCATION	
801	15	27 6				FOOTING	
802	30	10 6				"	
1103	46	11 1	X			DOWELS	VERT
1104	46	32 7				PIER PIPE	"
405	330	4 9	X			"	HORZ
406	60	23 9				"	
508	6	15 4	X			" 1 PZ	VERT
509	14	9 4	X			" 1 PZ	HORZ
510	4	4 3 0				" 1 PZ	VERT
511	4	1 0				" 1 PZ	"
612	46	11 6				" 2	"
613	4	17 1	X			" 2 ENDS	
614	4	8 3	X			" 2 "	
615	8	20 3				" 2 BOT	HORZ
516	16	40 3		X		" 2 SIDES	"
517	8	26 11				" 2 "	"
1018	14	23 0			X	" 2 TOP	"
1019	14	32 6			X	" 2 "	"
520	22	20 4	X	X		" 2	VERT
721	20	3 6				" 2 TOP	"
562	4	12 0	X			" 2 ENDS	"
523	20	6 0	X			" 2 TOP	"
524	4	25 6				" 2 TOP	HORZ
525	21	8 8				" 2 TOP	VERT

GIRDER ANGLES

GIRDER	1	2	3	3A	4	5	6
A (TYP SPAN 49)	13°09'59"	93°29'29"	93°48'56"	94°08'25"	94°27'54"	94°47'.1	95°06'48"
B (TYP 5 SPAN 48)	92°33'06"	92°45'01"	92°56'.59"	93°08'46"	93°20'39"	93°32'31"	93°44'28"

CUTTING DIAGRAM

"N" IS NO. OF BARS REQ'D BEFORE CUTTING.

MARK	SET NO	C	D	E	F	G	-	NO SETS REQ'D
516	1		25-8	40 3		14 7	B	2
	2	14 7			25 8			2
560	3		28-2	40 1		12 2	11	2
	4	12 2			28 2			2

B CUT BUNDLE 1 MARK, MARK WITH BAR No 4 SET No

A MARK 1 CUT ALL BARS ALONG T-3 LINE. MAKE ALL CUTS NORMAL TO BAR AXIS.

NOTE: BENT BARS IF USED IN CUTTING DIAGRAM SHALL BE BENT AFTER CUTTING.

ESTIMATED CONCRETE MASONRY

FOOTING	38.0 C.Y.
POUR 1	103.1 C.Y.
POUR 2	91.1 C.Y.
TOTAL	228.2 C.Y.

ELEVATION (LOOKING WEST)

TYP SECTION THRU SHAFT

PLAN

SECTION B-B

FOOTING DETAILS

SECTION A-A

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

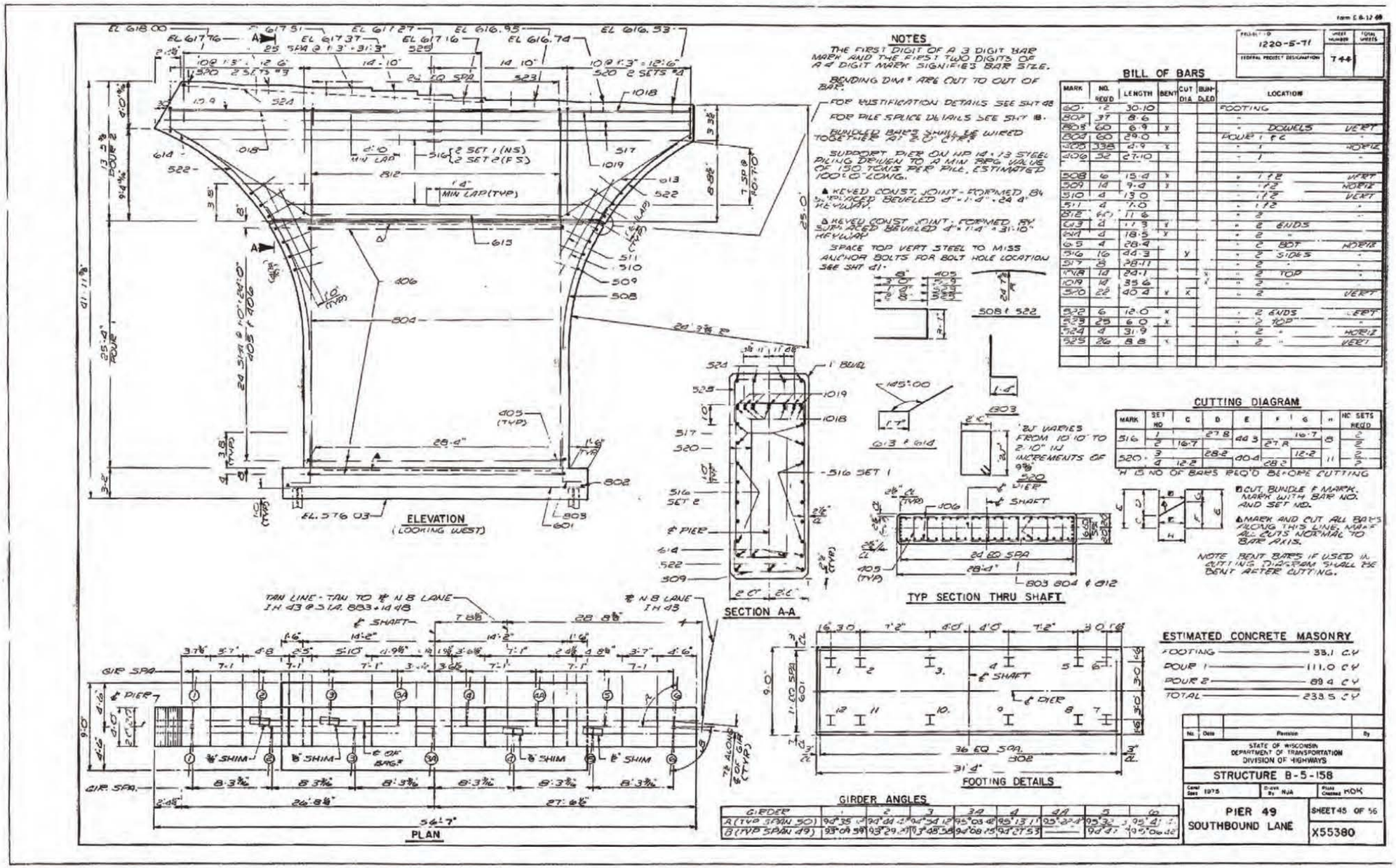
STRUCTURE B-5-158

Date 1975	Drawn By N/A	Plans Checked HDK

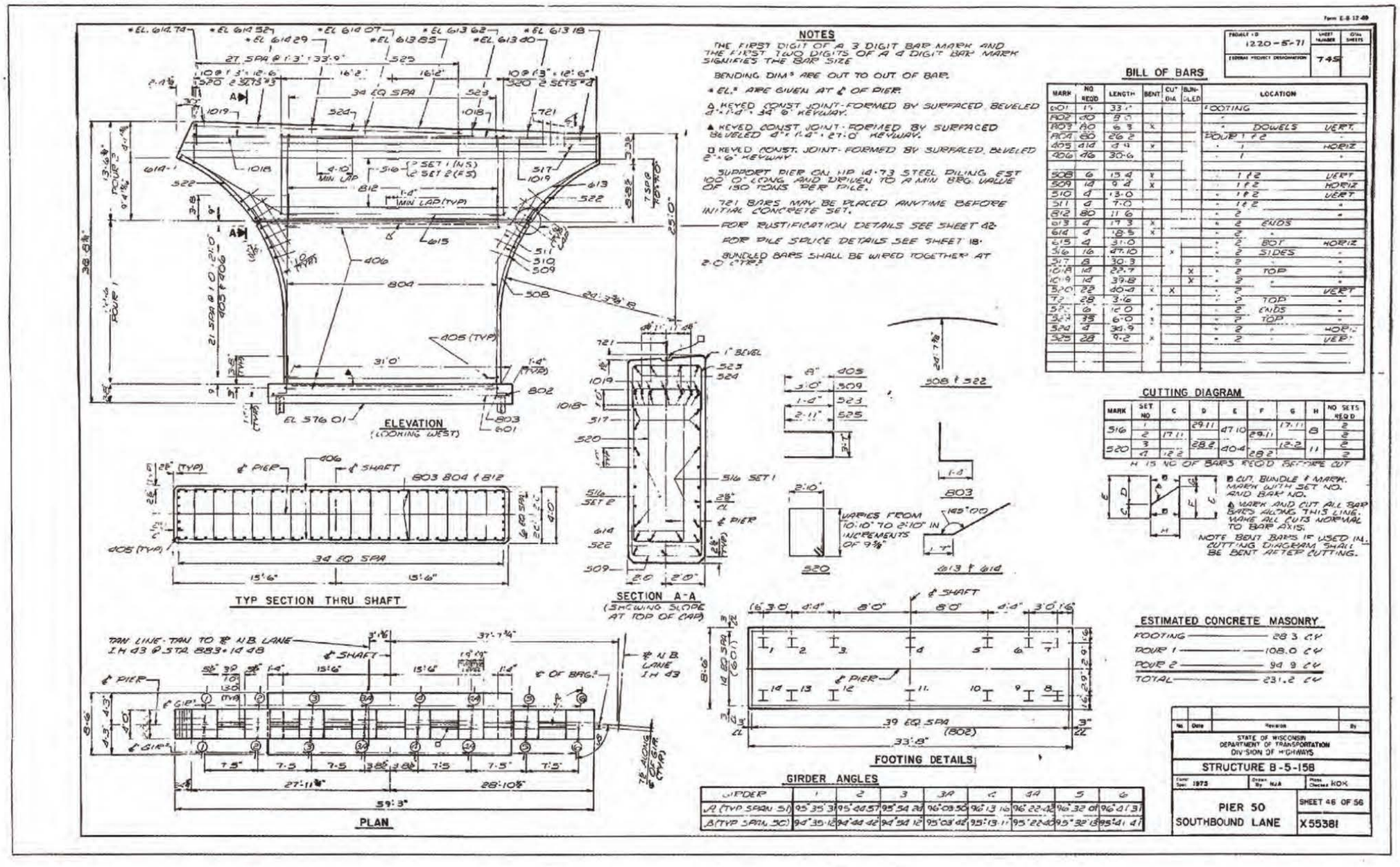
PIER 48
SOUTHBOUND LANE

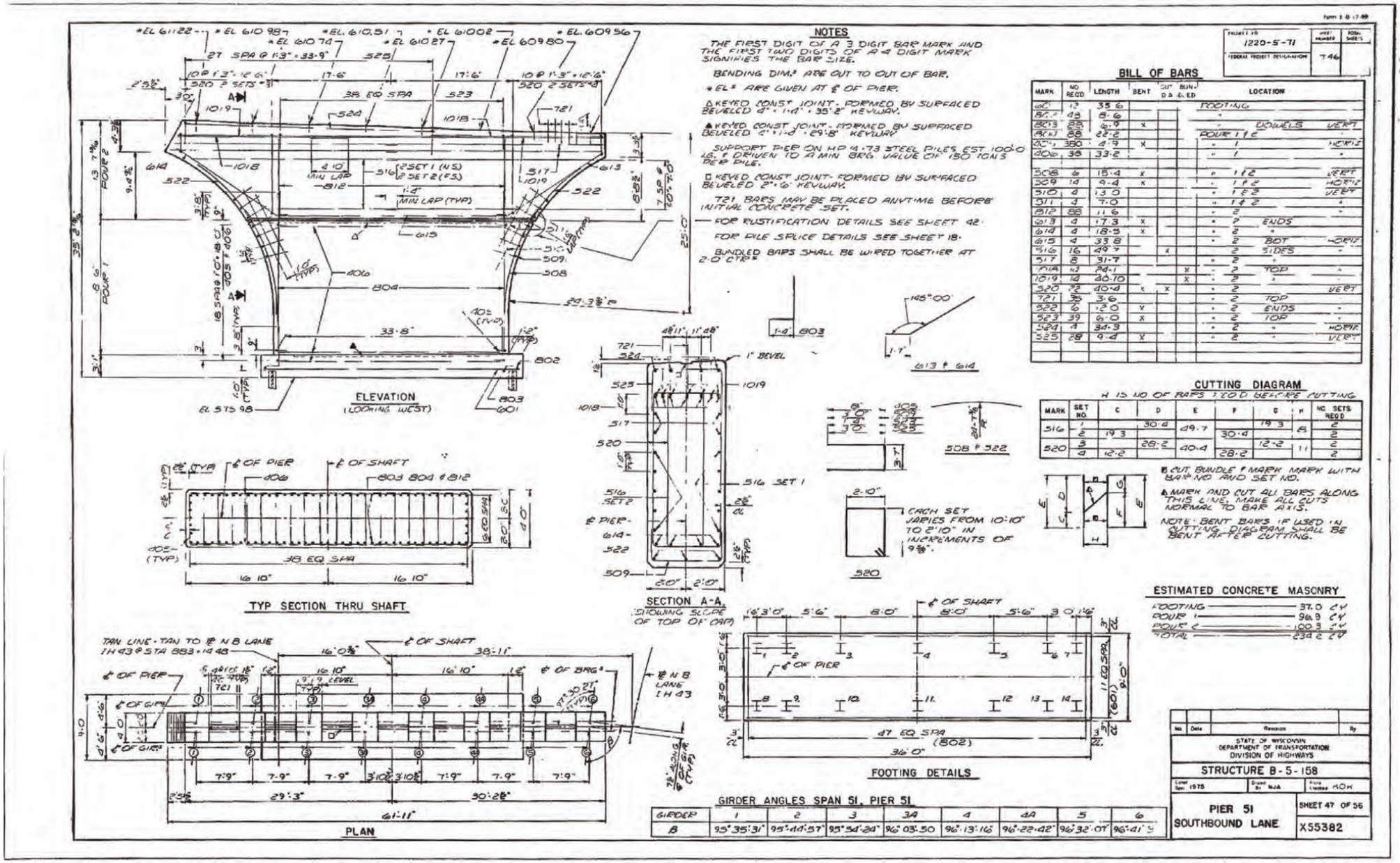
SHEET 44 OF 56

X55379


NOTES
THE FIRST DIGIT OF A 3 DIGIT BAR MARK AND THE FIRST TWO DIGITS OF A 4 DIGIT MARK SIGNIFIES BAR SIZE.
BENDING DIM^S ARE OUT TO OUT OF BAR.
FOR JUSTIFICATION DETAILS SEE SHT 48
FOR PILE SPLICE DETAILS SEE SHT 18.
BUNDLED BARS SHALL BE WIRED TOGETHER AT 2'-0" CTRS.
SUPPORT PIER ON HP 14 x 73 STEEL PILING DRIVEN TO A MIN BRG VALUE OF 150 TONS PER PILE, ESTIMATED 100'-0" LONG.
▲ KEYED CONST. JOINT - FORMED BY SURFACE BEVELED 4"x1:4"x24'-0" HEYWAY.
▲ KEYED CONST. JOINT - FORMED BY SURFACE BEVELED 4"x1:4"x31'-10" HEYWAY.
SPACE TOP VERT STEEL TO MISS ANCHOR BOLTS FOR BOLT HOLE LOCATION SEE SHT 41.
BILL OF BARS
CUTTING DIAGRAM
ELEVATION (LOOKING WEST)
SECTION A-A
TYP SECTION THRU SHAFT
PLAN
FOOTING DETAILS
GIRDER ANGLES
ESTIMATED CONCRETE MASONRY
FOOTING 38.1 C.Y
POUR 1 111.0 C.Y
POUR 2 89.4 C.Y
TOTAL 238.5 C.Y
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 49
SOUTHBOUND LANE
SHEET 45 OF 56
X55380
WISDOT DTID

WISDOT DTID


NOTES
THE FIRST DIGIT OF A 3 DIGIT BAR MARK AND THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK SIGNIFIES THE BAR SIZE
BENDING DIM^S ARE OUT TO OUT OF BAR.
* EL.^S ARE GIVEN AT ℄ OF PIER.
Δ KEYED CONST JOINT-FORMED BY SURFACED BEVELED 4"x1'-4"x34'-6" KEYWAY.
▲ KEYED CONST JOINT-FORMED BY SURFACED BEVELED 4"x1'-4"x27'-0" KEYWAY.
□ KEYED CONST. JOINT-FORMED BY SURFACED, BEVELED 2"x6" KEYWAY
SUPPORT PIER ON HP 14x73 STEEL PILING EST 100'-0" LONG AND DRIVEN TO A MIN BRG. VALUE OF 150 TONS PER PILE.
721 BARS MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET.
FOR RUSTIFICATION DETAILS SEE SHEET 42.
FOR PILE SPLICE DETAILS SEE SHEET 18.
BUNDLED BARS SHALL BE WIRED TOGETHER AT 2.0' (TYP.)
BILL OF BARS
CUTTING DIAGRAM
ELEVATION (LOOKING WEST)
TYP SECTION THRU SHAFT
SECTION A-A (SHOWING SLOPE AT TOP OF CAP)
PLAN
FOOTING DETAILS
GIRDER ANGLES
ESTIMATED CONCRETE MASONRY
FOOTING 28.3 CY
POUR 1 108.0 CY
POUR 2 94.9 CY
TOTAL 231.2 CY
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 50
SOUTHBOUND LANE
SHEET 46 OF 56
X55381


NOTES
THE FIRST DIGIT OF A 3 DIGIT BAR MARK AND THE FIRST TWO DIGITS OF A 4 DIGIT MARK SIGNIFIES THE BAR SIZE.
BENDING DIM.S ARE OUT TO OUT OF BAR.
*EL.S ARE GIVEN AT ℄ OF PIER.
△ KEYED CONST JOINT - FORMED BY SURFACED BEVELED 4"x1'-0"x35'-2" KEYWAY.
▲ KEYED CONST JOINT - FORMED BY SURFACED BEVELED 4"x1'-0"x29'-8" KEYWAY.
SUPPORT PIER ON HP 14x73 STEEL PILES EST 100'-0 LG. F DRIVEN TO A MIN BRG. VALUE OF 150 TONS PER PILE.
□ KEYED CONST JOINT - FORMED BY SURFACED BEVELED 2"x6" KEYWAY.
721 BARS MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET.
— FOR RUSTIFICATION DETAILS SEE SHEET 42
FOR PILE SPLICE DETAILS SEE SHEET 18.
BUNDLED BARS SHALL BE WIRED TOGETHER AT 2.0 CTRS
PROJECT I.D. 1220-5-71
FEDERAL PROJECT DESIGNATION 746
BILL OF BARS
CUTTING DIAGRAM
H IS NO OF BARS TIED BEFORE CUTTING
ESTIMATED CONCRETE MASONRY
FOOTING 37.0 CY
POUR 1 96.9 CY
POUR 2 100.3 CY
TOTAL 234.2 CY
ELEVATION (LOOKING WEST)
SECTION A-A SHOWING SLOPE OF TOP OF CAP
TYP SECTION THRU SHAFT
PLAN
FOOTING DETAILS
GIRDER ANGLES SPAN 51, PIER 51
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 51
SOUTHBOUND LANE
SHEET 47 OF 56
X55382

WISDOT DTID

WISDOT DTID

NOTES

THE FIRST DIGIT OF A 3 DIGIT BAR MARK & THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK SIGNIFIES THE BAR SIZE.

BEND LINE DIMS ARE OUT TO OUT OF BAR.

BUNDLED BARS SHALL BE WIRED TOGETHER AT 2'-0" CTRS.

△ KEYED CONST JOINT FORMED BY SURFACED BEVELED 4" x 1'-4" x 17'-6" KEYWAY

▲ KEYED CONST JOINT FORMED BY SURFACED BEVELED 4" x 1'-4" x 10'-0" KEYWAY

SUPPORT PIER ON HP 14x73 PILES, EST 100'-0" LG & DRIVEN TO A MIN. BRG. VALUE OF 150 T / PILE.

NOTE: STAGE TOP VERT. STEEL TO MISS ANCHOR BOLTS.

PROJECT ID 1220-5-71 | SHEET NUMBER 141 | TOTAL SHEETS

BILL OF BARS

MARK	NO REQD	LENGTH	BENT	CUT DIA	BUNDLED	LOCATION	
401	11	19'-0				FOOTING	
402	22	9'-0				"	
403	30	11'-4	X			" DOWELS	VERT
1104	30	40'-0				PIER 1	
405	312	1'-9	X			" 1 & 2	HORIZ
406	76	13'-6				" 1 & 2	"
509	6	15'-1	X			" 2	VERT.
510	14	9'-4	X			" 2 & 3	HORIZ
511	4	13'-0				" 2 & 3	VERT
511	4	7'-0				" 2 & 3	
812	30	11'-6				" 3	VERT.
613	4	17'-3	X			" 3 ENDS	
614	4	18'-3	X			" 3	
615	4	14'-0				" 3 BOT	HORIZ
516	16	29'-11		X		" 3 SIDES	"
517	8	21'-9				" 3	"
1018	14	40'-8			X	" 3 TOP	"
520	22	40'-1	X	X		" 3	VERT.
522	16	12'-0	X			" 3 ENDS	"
523	12	6'-0	X			" 3 TOP	"
524	4	22'-0				" 3 TOP	HORIZ
525	18	8'-0	X			" 3 TOP	VERT

CUTTING DIAGRAM

"x" IS NO. OF BARS REQ'D BEFORE CUTTING.

MARK	SET NO.	C	D	E	F	G	H	NO SETS REQ'D
516	1		20'-6	29'-11		9'-5	B	2
	2	9'-5			20'-6			2
520	3		28'-6	40'-1		12'-2		2
	4	12'-2			28'-6		11	2

B CUT BUNDLE 4 MARK, MIRROR WITH BAR No 4 SET No.

A MARK & CUT ALL BARS ALONG THIS LINE. MAKE ALL CUTS NORMAL TO BAR AXIS.

NOTE: BENT BARS IF USED IN CUTTING DIAGRAM SHALL BE BENT AFTER CUTTING.

ESTIMATED CONCRETE MASONRY

FOOTING	246	C.Y.
PIER 1	180	C.Y.
PIER 2	166	C.Y.
PIER 3	610	C.Y.
TOTAL	1698	C.Y.

ELEVATION (LOOKING WEST)

PLAN

ANCHOR BOLT HOLE LOCATION

TYP. SECTION THRU SHAFT

FOOTING PLAN

SECTION A-A

No	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

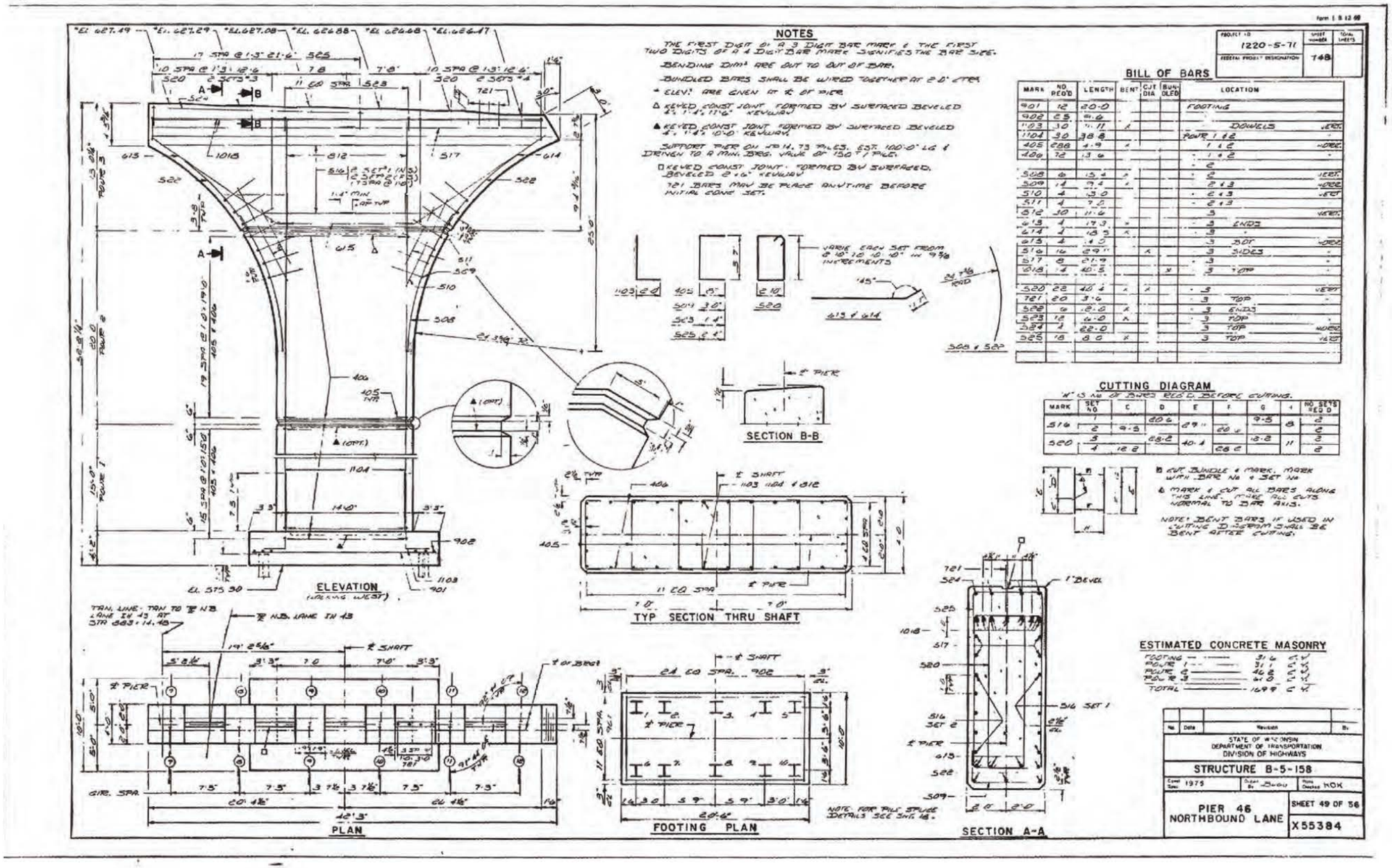
STRUCTURE B-5-158

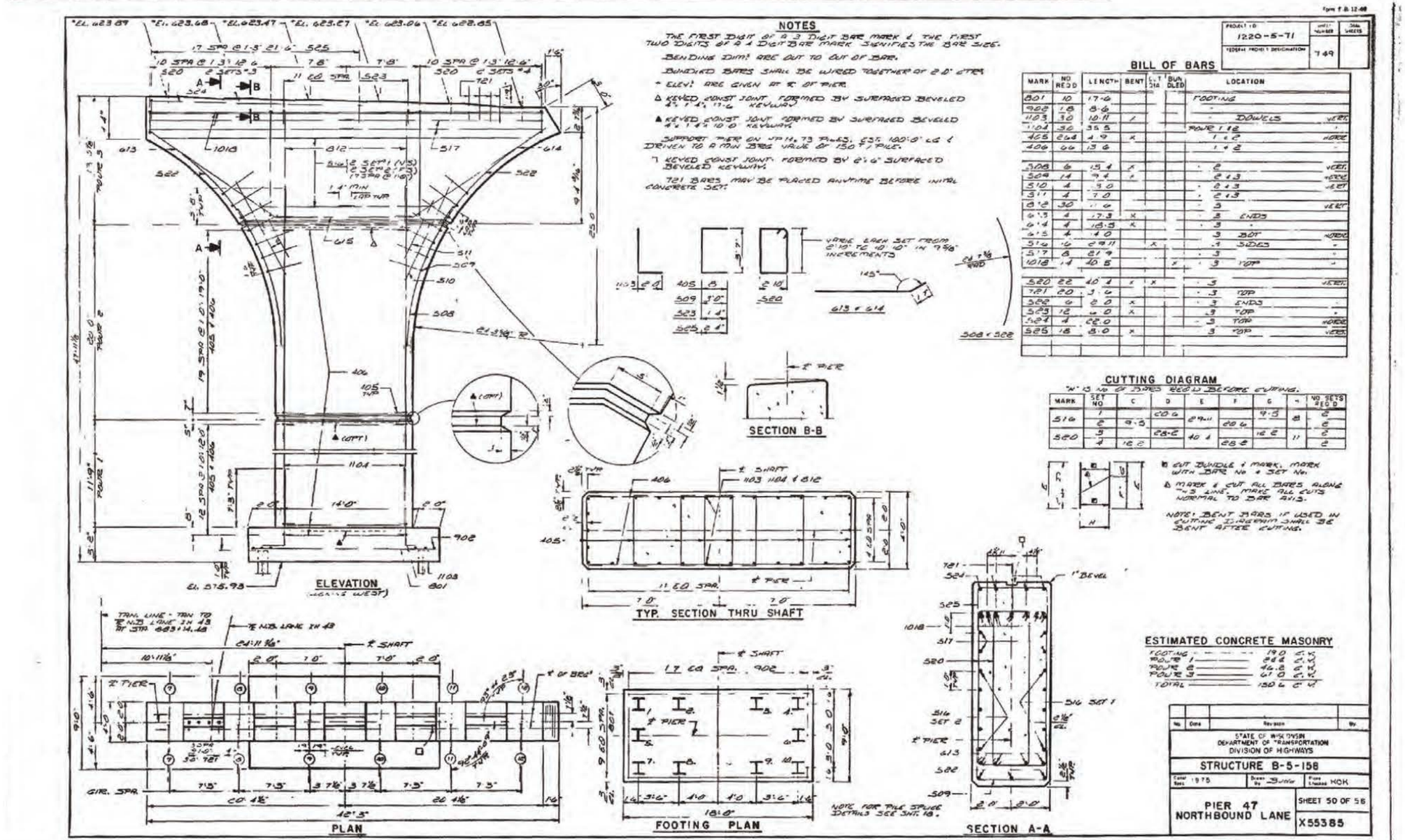
Const Year 1975 | Drawn By S.J.O.H.D. | Traced By KOK

PIER 45
NORTHBOUND LANE

SHEET 48 OF 56

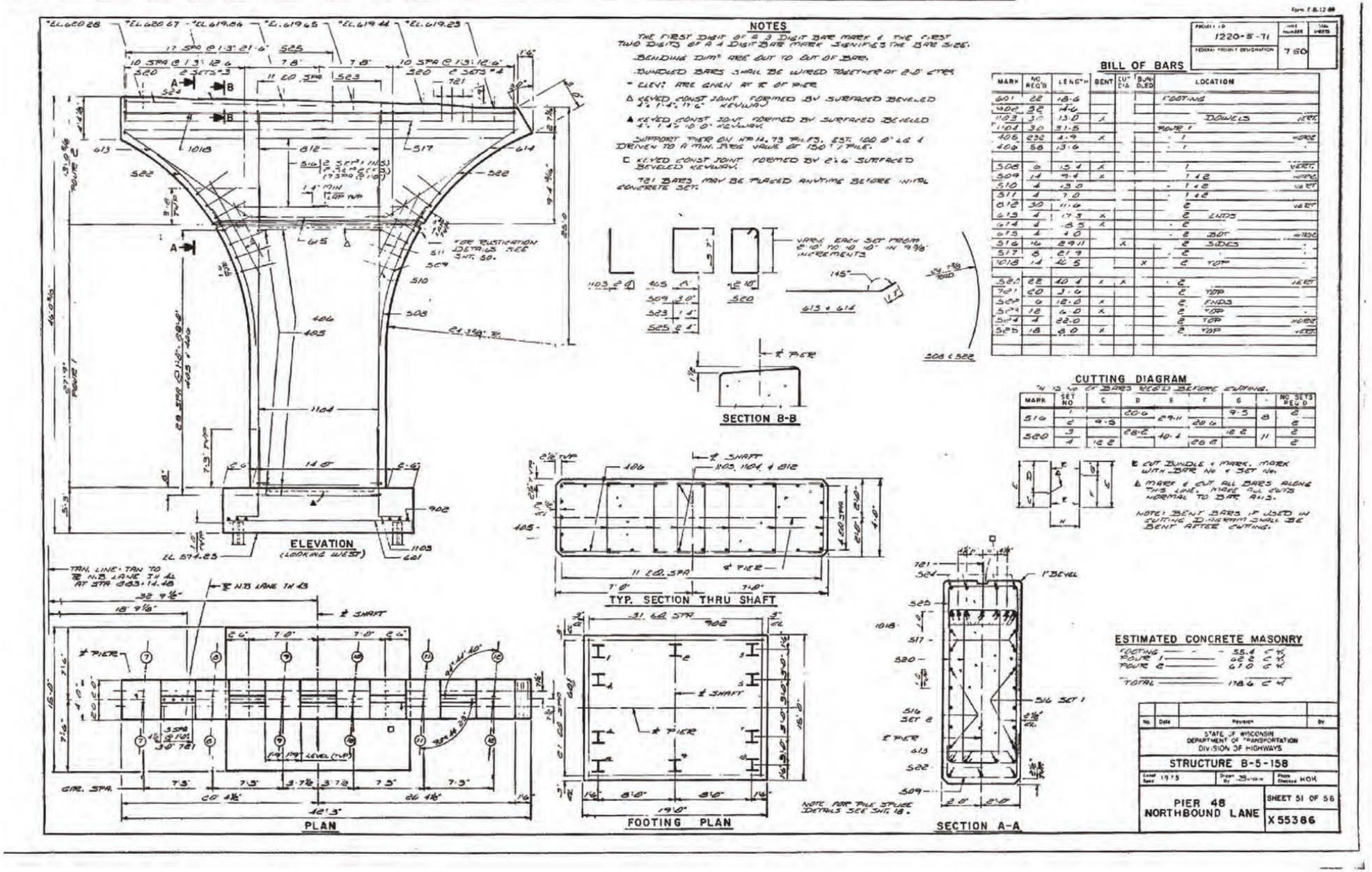
X55383


NOTES
THE FIRST DIGIT OF A 3 DIGIT BAR MARK & THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK SIGNIFIES THE BAR SIZE.
BENDING DIMS ARE OUT TO OUT OF BAR.
BUNDLED BARS SHALL BE WIRED TOGETHER AT 2'-0" CTRS.
* ELEVS. ARE GIVEN AT ℄ OF PIER.
△ KEYED CONST JOINT FORMED BY SURFACED BEVELED 4" x 1'-4" x 11'-6" KEWAUNEE
▲ KEYED CONST JOINT FORMED BY SURFACED BEVELED 4" x 1'-4" x 10'-0" KEWAUNEE
SUPPORT PIER ON PILES, 73 PILES, EST. 100'-0" LG & DRIVEN TO A MIN. BRG. VALUE OF 150 T PILE.
□ KEYED CONST JOINT FORMED BY SURFACED, BEVELED 2 x 6" KEWAUNEE
721 BARS MAY BE PLACE ANYTIME BEFORE INITIAL CONC SET.
PROJECT I.D. 1220-5-71
FEDERAL PROJECT DESIGNATION 148
BILL OF BARS
CUTTING DIAGRAM
ELEVATION
PLAN
SECTION B-B
TYP SECTION THRU SHAFT
FOOTING PLAN
SECTION A-A
ESTIMATED CONCRETE MASONRY
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 46
NORTHBOUND LANE
SHEET 49 OF 56
X55384


NOTES
THE FIRST DIGIT OF A 3 DIGIT BAR MARK & THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK SIGNIFIES THE BAR SIZE.
BEND DIM.' ARE OUT TO OUT OF BAR.
BUNDLED BARS SHALL BE WIRED TOGETHER AT 2'-0" CTRS.
* ELEV.' ARE GIVEN AT ℄ OF PIER.
△ KEYED CONST JOINT FORMED BY SURFACED BEVELED 4" x 1'-4" x 13'-6" KEYWAY.
▲ KEYED CONST JOINT FORMED BY SURFACED BEVELED 4" x 1'-4" x 10'-0" KEYWAY.
SUPPORT PIER ON 19 - 14" x 73 PILES, E57, 100'-0" LG ℄ DRIVEN TO A MIN BRG VALUE OF 150 T / PILE.
⌐ KEYED CONST JOINT FORMED BY 2'-6" SURFACED BEVELED KEYWAY.
721 BARS MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET.
BILL OF BARS
PROJECT ID 1220-5-71
FEDERAL PROJECT DESIGNATION 749
MARK | NO REQ'D | LENGTH | BENT | L.T. SIM. | BUNDLED | LOCATION
CUTTING DIAGRAM
"N" IS NO. OF BARS REQ'D BEFORE CUTTING.
MARK | SET NO. | C | D | E | F | G | NO. SETS REQ'D
ESTIMATED CONCRETE MASONRY
FOOTING 190 C.Y.
PIER 1 284 C.Y.
PIER 2 46.0 C.Y.
PIER 3 61.0 C.Y.
TOTAL 150 4 C.Y.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 47
NORTHBOUND LANE
SHEET 50 OF 56
X55385
ELEVATION
PLAN
FOOTING PLAN
SECTION B-B
TYP. SECTION THRU SHAFT
SECTION A-A

WISDOT DTID

WISDOT DTID


NOTES
THE FIRST DIGIT OF A 3 DIGIT BAR MARK & THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK SIGNIFIES THE BAR SIZE.
BENDING DIM^S ARE OUT TO OUT OF BAR.
BUNDLED BARS SHALL BE WIRED TOGETHER AT 2-0" CTRS.
* ELEV: ARE GIVEN AT ℄ OF PIER.
△ KEYED CONST JOINT FORMED BY SURFACED BEVELED 2" x 4" x 11'-6" KEVLIAR.
▲ KEYED CONST JOINT FORMED BY SURFACED BEVELED 4" x 4" x 10'-0" KEVLIAR.
SUPPORT PIER ON HP 14x73 PILES, EST. 100'-0" LG & DRIVEN TO A MIN. PILE VALUE OF 150 T/PILE.
□ KEYED CONST JOINT FORMED BY 2" x 6" SURFACED BEVELED KEVLIAR.
721 BARS MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET.
BILL OF BARS
PROJECT ID 1220-5-71
FEDERAL PROJECT DESIGNATION 7 SO
MARK | NO REQ'D | LENGTH | BENT | CUT DIA | BUNDLED | LOCATION
601 | 22 | 18-6 | | | | FOOTING
602 | 32 | 44-6 | | | | "
1103 | 30 | 13-0 | X | | | DOWELS
1104 | 30 | 31-5 | | | | ROUTE 1
405 | 232 | 4-9 | X | | | " 1 "
406 | 58 | 13-6 | | | | " 1 "
508 | 6 | 15-4 | X | | | " 1 "
509 | 14 | 9-4 | X | | | " 1 & 2
510 | 4 | 13-0 | | | | " 1 & 2
511 | 4 | 7-0 | | | | " 1 & 2
612 | 30 | 11-6 | | | | " 2
613 | 4 | 17-3 | X | | | " 2 ENDS
614 | 4 | 18-5 | X | | | " 2
615 | 4 | 4-0 | | | | " 2 BOT
516 | 16 | 29-11 | | X | | " 2 SIDES
517 | 8 | 21-9 | | | | " 2
1018 | 14 | 46-5 | | | X | " 2 TOP
520 | 28 | 40-4 | X | X | | " 2
721 | 60 | 3-6 | | | | " 2 TOP
522 | 6 | 12-0 | X | | | " 2 ENDS
523 | 12 | 6-0 | X | | | " 2 TOP
524 | 4 | 22-0 | | | | " 2 TOP
525 | 18 | 8-0 | X | | | " 2 TOP
CUTTING DIAGRAM
"A" IS ½ OF BARS REQ'D BEFORE CUTTING.
MARK | SET NO | C | D | E | F | G | NO SETS REQ'D
516 | 1 | | 20-6 | 29-11 | 20-6 | 9-5 | 8 | 2
 | 2 | 9-5 | | | | | | 2
520 | 3 | | 28-2 | 40-4 | 28-2 | 18-2 | 11 | 2
 | 4 | 18-2 | | | | | | 2
℄ CUT BUNDLE & MARK, MARK WITH BAR No & SET No.
℄ MARK & CUT ALL BARS ALONG THIS LINE. MAKE ALL CUTS NORMAL TO BAR AXIS.
NOTE: BENT BARS IF USED IN CUTTING DIAGRAM SHALL BE BENT AFTER CUTTING.
ESTIMATED CONCRETE MASONRY
FOOTING — 55.4 C.Y.
POUR 1 — 62.6 C.Y.
POUR 2 — 61.0 C.Y.
TOTAL — 178.6 C.Y.
ELEVATION (LOOKING WEST)
SECTION B-B
PLAN
FOOTING PLAN
TYP. SECTION THRU SHAFT
SECTION A-A
FOR ILLUSTRATION DETAILS SEE SHT. 50.
VARY EACH SET FROM ℄ 10'-10" TO 10'-10" IN 9⅜" INCREMENTS
NOTE: FOR PILE STRIKE DETAILS SEE SHT. 18.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 48
NORTHBOUND LANE
SHEET 51 OF 56
X 55386

WISDOT DTID

NOTES

THE FIRST DIGIT OF A 3 DIGIT BAR MARK & THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK SIGNIFIES THE BAR SIZE.

BENDING DIMS ARE OUT TO OUT OF BAR.

BUNDLED BARS SHALL BE WIRED TOGETHER AT 2.0 CTRS.

△ KEYED CONST JOINT FORMED BY SURFACED BEVELLED 1:1 & 17.6 KEYWAY.

▲ KEYED CONST JOINT FORMED BY SURFACED BEVELLED 1:1 & 10.0 KEYWAY.

SUPPORT PIER ON HP 14.73 X 73 FT. EST. 100.0 FT. LG & DRIVEN TO A MIN 3RD VALVE OF 150 T / PILE.

SPACE TOP VERT. STEEL TO MISS ANCHOR BOLTS.

BILL OF BARS

MARK	NO REQ'D	LENGTH	BENT	CUT DIA	BUNDLED	LOCATION	
501	9	19..				FOOTING	
502	20	6.6				"	
1103	30	11.4	L			DOWELS	VERT.
1104	30	27.8				POUR 1	
405	200	4.4	X			"	HORZ.
406	50	13.6				"	
508	6	15.4	X			1	VERT.
509	14	9.4	X			1 & 2	HORZ.
510	4	13.6				1 & 2	VERT.
511	4	7.5				1 & 2	
512	30	11.6				2	VERT.
613	4	17.9	X			2 ENDS	
614	4	18.3	X			2	
615	4	4.0				2 BOT	HORZ.
516	16	29.1		X		2 SIDES	"
517	8	21.9				2	"
1018	14	10.5			X	2 TOP	"
520	22	40.1	X	X		2	VERT.
522	6	12.0	X			2 ENDS	
523	12	6.0	X			2 TOP	"
524	4	22.0				2 TOP	HORZ.
525	18	8.0	X			2 TOP	VERT.

CUTTING DIAGRAM

IF 13 OR MORE BARS REQ'D BEFORE CUTTING.

MARK	SET NO.	C	D	E	F	G	-	NO SETS REQ'D
516	1		20 6	29.11		9.5	B	2
	2	9.5			20 6			2
520	3		28.2	40.1		18.2		2
	4	18.2			28.6		11	2

B CUT BUNDLE & MARK, MARK WITH BAR No & SET No.

A MARK & CUT ALL BARS ALONG THIS LINE. MAKE ALL CUTS NORMAL TO BAR AXIS.

NOTE: BENT BARS IF USED IN CUTTING DIAGRAM SHALL BE BENT AFTER CUTING.

ESTIMATED CONCRETE MASONRY

FOOTING	181 C.Y.
POUR 1	364 C.Y.
POUR 2	413 C.Y.
TOTAL	1338 C.Y.

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1975 | Drawn By: 23.1 WW | Prints Checked HDH

PIER 49
NORTHBOUND LANE

SHEET 52 OF 56

X 55387

WISDOT DTID

NOTES

THE FIRST DIGIT OF A 3 DIGIT BAR MARK IS THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK SIGNIFIES THE BAR SIZE.

BENDING DIMS ARE OUT TO OUT OF BAR.

BUNDLED BARS SHALL BE WIRED TOGETHER AT 2.0 CTRS

* ELEVS ARE GIVEN AT ℄ OF PIER

△ KEYED CONST JOINT FORMED BY SURFACED BEVELED 2" x 1'-6" x 17'-6" KEYWAY

▲ KEYED CONST JOINT FORMED BY SURFACED BEVELED 4" x 1'-6" x 10'-0" KEYWAY

SUPPORT PIER ON HP 14x73 PILES EST. 100'-0" LG & DRIVEN TO A MIN BRG VALUE OF 150 T/PILE.

□ KEYED CONST JOINT FORMED BY 2'-6" SURFACED BEVELED KEYWAY.

721 BARS MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET.

PROJECT ID 1220-5-71 | SHEET NUMBER | NO. SHEETS

STRUCTURE PROJECT DESIGNATION 752

BILL OF BARS

MARK	NO REQ'D	LENGTH	BENT	CUT DIA	BUNDLED	LOCATION	
601	17	17-6				FOOTING	
902	18	8-6					
1103	36	10-11	X			DOWELS	VERT.
1104	30	24-6				POUR 1	
405	176	4-9	X			1	HORIZ
406	44	13-6				1	
509	6	15-4	X			1	VERT.
209	14	9-4	X			1 1/2	HORIZ
510	4	13-6				1 1/2	VERT.
511	4	7-6				1 1/2	"
612	30	11-6				2	VERT.
613	4	17-3	X			2 ENDS	
614	4	18-5	X			2 "	
615	4	4-6				2 BOT	HORIZ
516	16	29-11		X		2 SIDES	"
517	8	21-9				2	"
1018	12	40-5		X		2 TOP	"
520	22	40-3	X	X		2	VERT
721	20	3-6				6 TOP	
508	6	12-6	X			2 ENDS	"
523	12	6-0	X			2 TOP	"
524	4	26-6				2 TOP	HORIZ
525	16	8-0				2 TOP	VERT.

CUTTING DIAGRAM

N = No OF BARS CUT BEFORE CUTTING.

MARK	SET NO	C	D	E	F	G		NO SETS REQ'D
516	1		20-6	29-11		9-5	B	16
	2	4-5			20-6	12-8		16
520	3		28-2	40-3	12-8		11	2
	4	12-2			28-2			2

B CUT BUNDLE 1 MARK, MARK WITH BAR No 1 SET No.

A MARK 1 CUT ALL BARS ALONG THIS LINE MAKE ALL CUTS NORMAL TO BAR 4'-3

NOTE: BENT BARS IF USED IN CUTTING DIAGRAM SHALL BE BENT AFTER CUTTING.

ESTIMATED CONCRETE MASONRY

FOOTING	90 C.Y.
POUR 1	47.9 C.Y.
POUR 2	41.3 C.Y.
TOTAL	128.2 C.Y.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

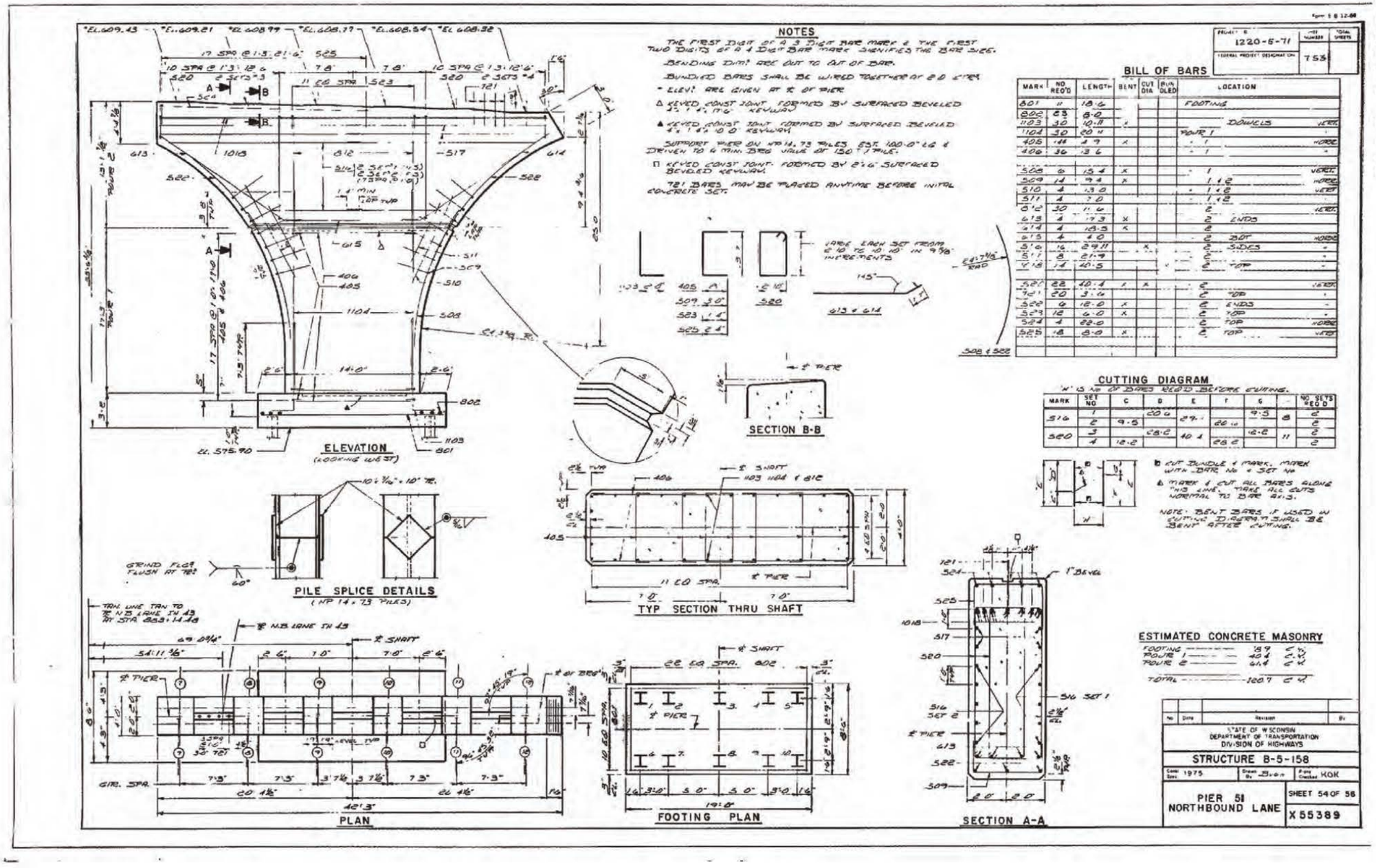
Date 1975 | Drawn By | Plans Checked KOK

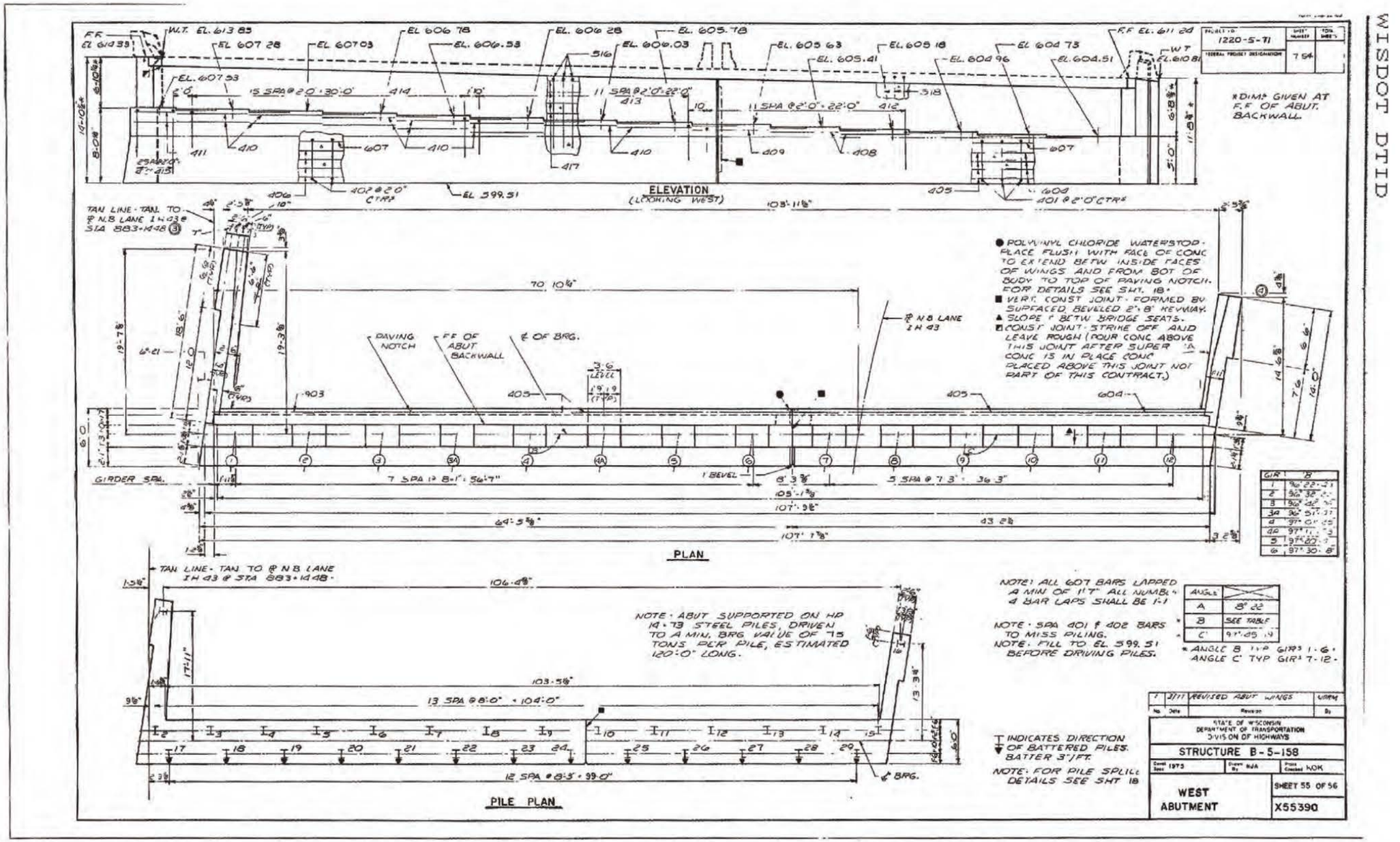
PIER 50
NORTHBOUND LANE

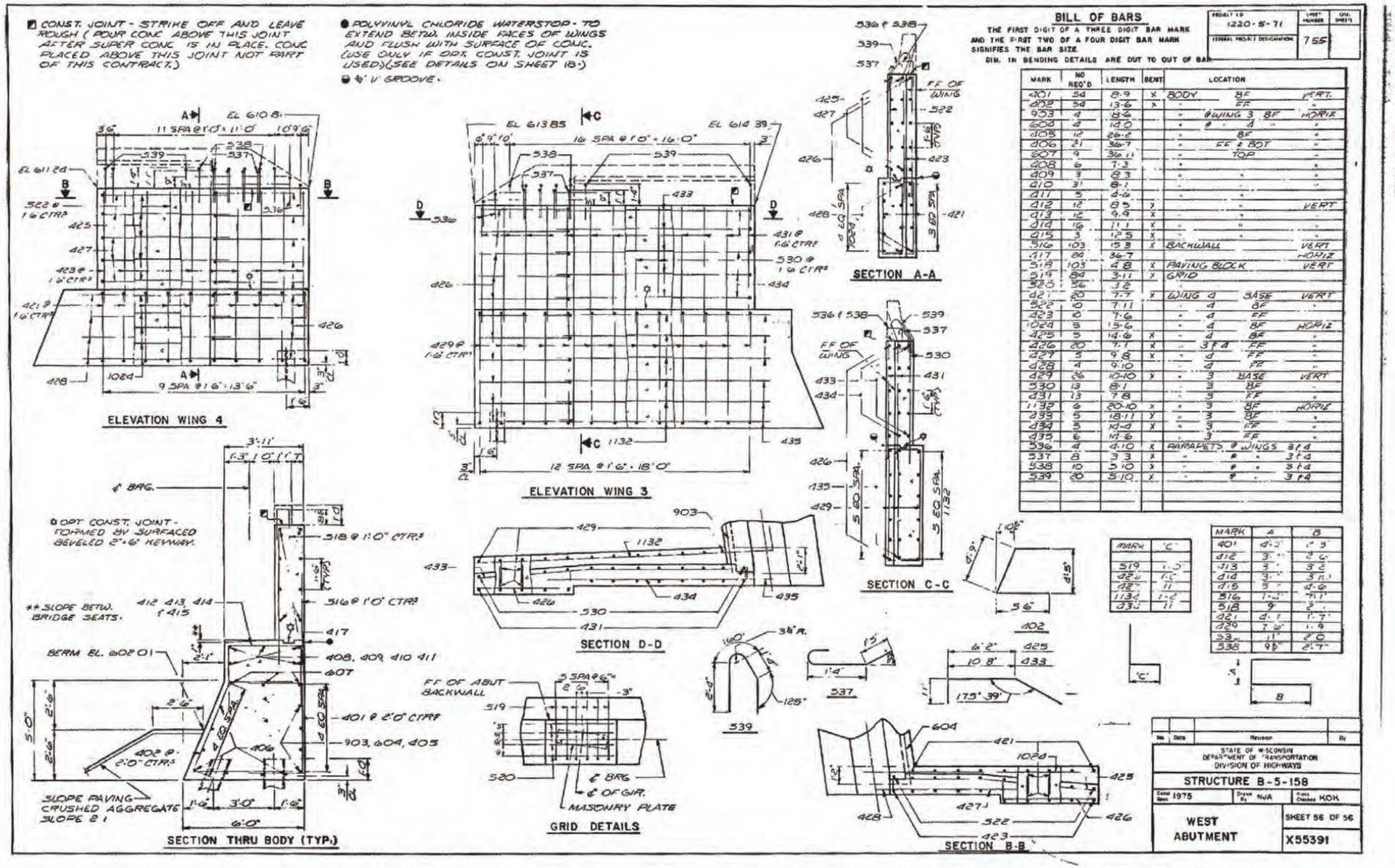
SHEET 53 OF 56

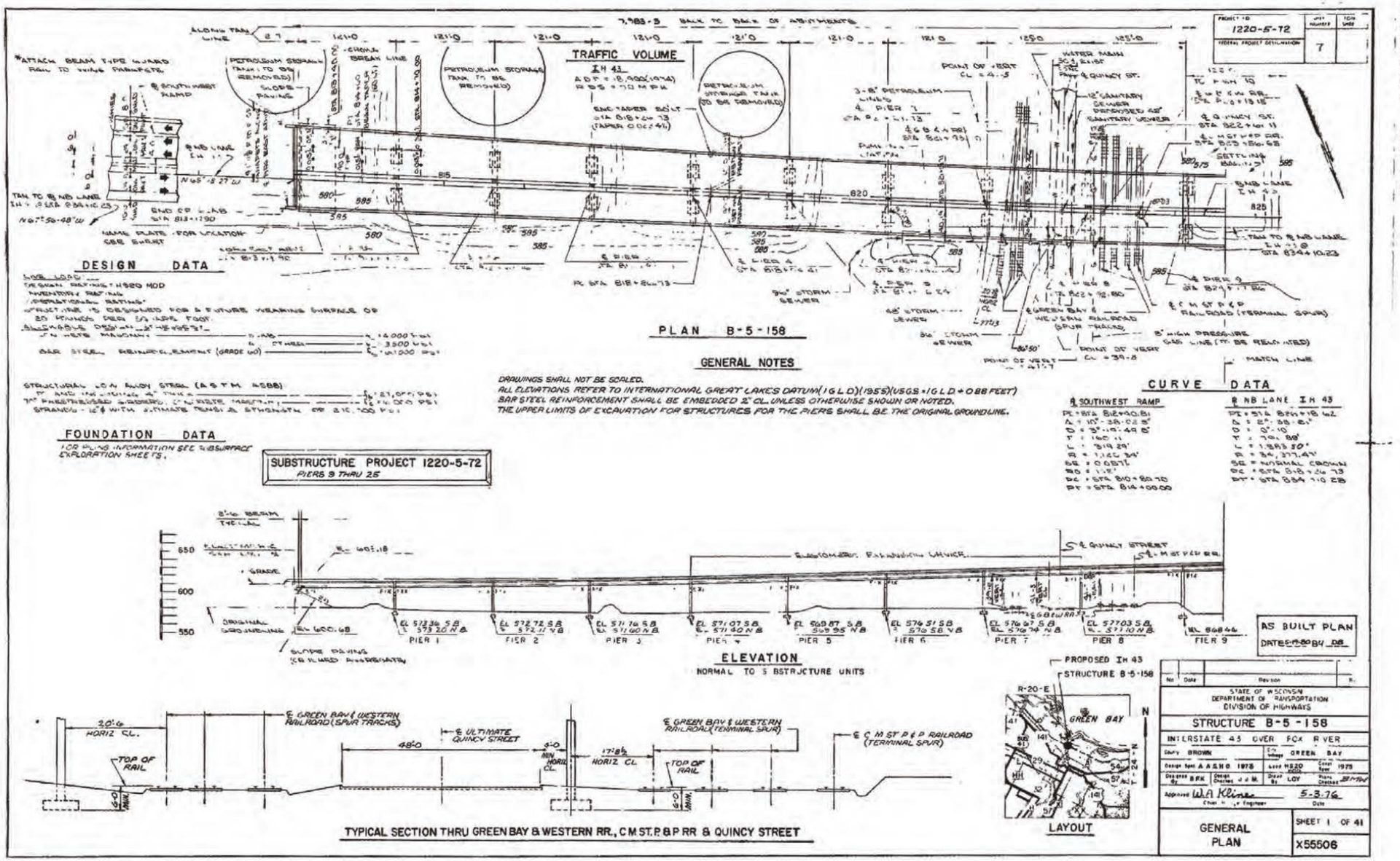
X55388

WISDOT DTID

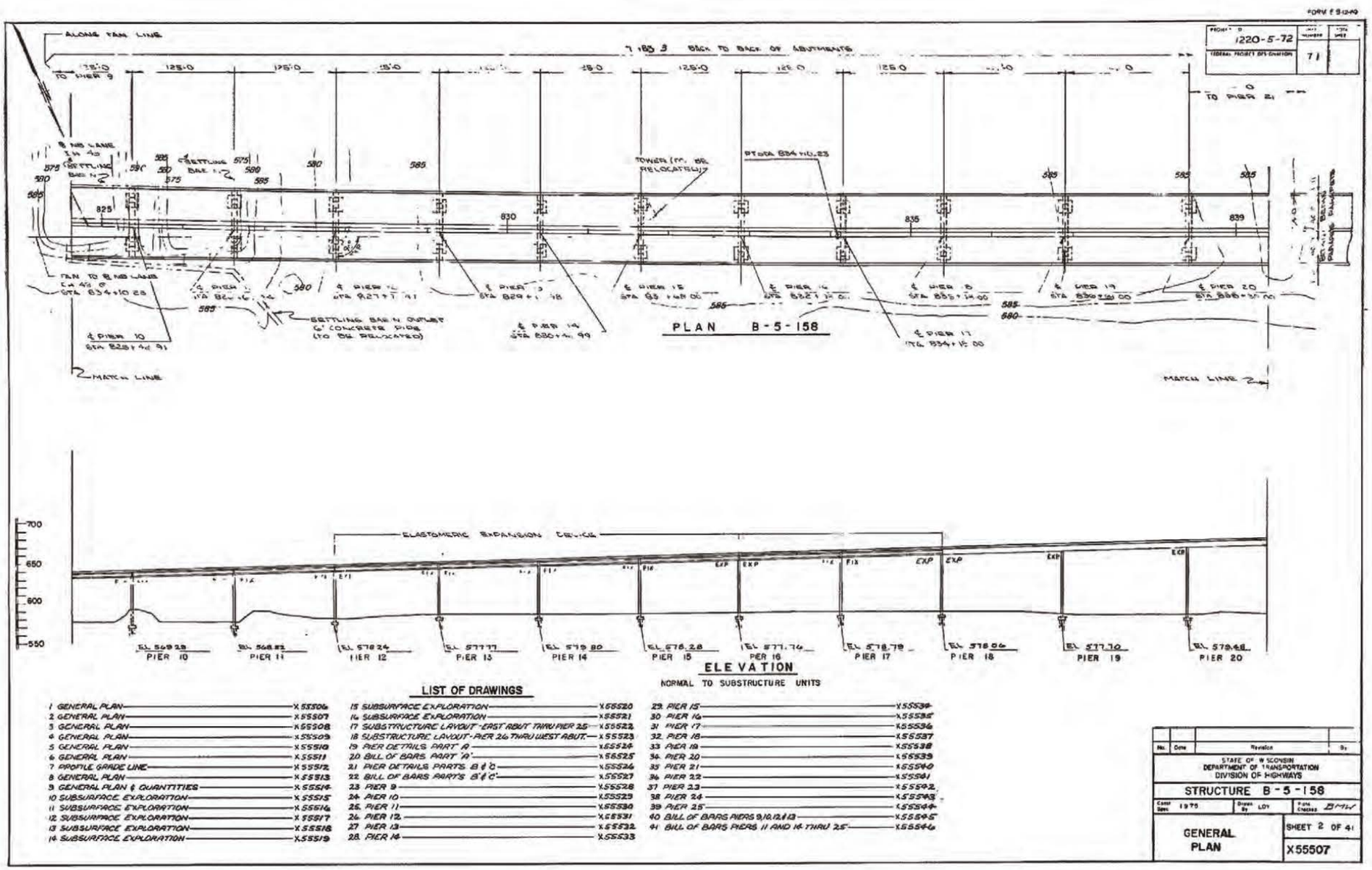

NOTES
THE FIRST DIGIT OF A 3 DIGIT BAR MARK & THE FIRST TWO DIGITS OF A 4 DIGIT BAR MARK SIGNIFIES THE BAR SIZE.
BENDING DIM! ARE OUT TO OUT OF BAR.
BUNDLED BARS SHALL BE WIRED TOGETHER AT 2.0 C'RS.
* ELEV! ARE GIVEN AT ℄ OF PIER
△ KEYED CONST JOINT FORMED BY SURFACED BEVELED 2"x 4"x 1'-11" KEVLAR
▲ KEYED CONST JOINT FORMED BY SURFACED BEVELED 2"x 4"x 10'-0" KEVLAR
SUPPORT PIER ON HP 14.73 PILES EST 100'-0" LG & DRIVEN TO A MIN. BRG VALUE OF 150 T / PILE.
□ KEYED CONST JOINT FORMED BY 2'-6" SURFACED BEVELED KEVLAR.
721 BARS MAY BE PLACED ANYTIME BEFORE INITAL CONCRETE SET.
BILL OF BARS
FED. PROJECT NO. 1220-6-71
FEDERAL PROJECT DESIGNATION 753
MARK | NO REQ'D | LENGTH | BENT | CUT DIA | BUNDLED | LOCATION
801 | 11 | 18'-6 | | | | FOOTING
802 | 65 | 8'-0 | | | | "
1103 | 30 | 10'-11 | x | | | DOWELS VERT.
1104 | 30 | 20' H | | | | POUR 1 "
405 | 144 | 4'9 | x | | | " HORIZ.
406 | 36 | 13'6 | | | | " "
508 | 6 | 15'4 | x | | | " VERT.
509 | 14 | 9'4 | x | | | 1 1/2 HORIZ.
510 | 4 | 13'0 | | | | " 1 1/2 VERT.
511 | 4 | 7'0 | | | | " 1 1/2 "
512 | 30 | 11'6 | | | | 2 "
613 | 4 | 17'3 | x | | | 2 ENDS
614 | 4 | 18'3 | x | | | 2 "
515 | 4 | 4'0 | | | | 2 BOT HORIZ.
516 | 16 | 29'11 | | x | | 2 SIDES "
517 | 8 | 21'9 | | | | 2 " "
518 | 12 | 40'5 | | | | 2 TOP "
520 | 22 | 40'4 | x | x | | 2 "
521 | 20 | 3'4 | | | | 2 TOP "
522 | 6 | 18'0 | x | | | 2 ENDS "
523 | 12 | 6'0 | x | | | 2 TOP "
524 | 4 | 22'0 | | | | 2 TOP HORIZ.
525 | 18 | 8'0 | x | | | 2 TOP VERT.
CUTTING DIAGRAM
'N' IS NO OF BARS REQ'D BEFORE CUTTING.
MARK | SET NO | C | D | E | F | G | | NO SETS REQ'D
516 | 1 | | 20'6 | 29'- | | 9'5 | B | 2
" | 2 | 9'5 | | | 20'6 | | | 2
560 | 3 | | 28'2 | 40'1 | | 12'2 | 11 | 2
" | 4 | 12'2 | | | 28'2 | | | 2
a CUT BUNDLE 1 MARK, MATCH WITH BAR No 1 SET No
b MARK 1 CUT ALL BARS ALONE THIS LINE, THIS ALL CUTS NORMAL TO BAR 61'3.
NOTE: BENT BARS IF USED W CUTTING DIAGRAM SHALL BE BENT AFTER CUTTING.
ELEVATION (LOOKING WEST)
SECTION B-B
PILE SPLICE DETAILS (HP 14 x 73 PILES)
TYP SECTION THRU SHAFT
PLAN
FOOTING PLAN
SECTION A-A
ESTIMATED CONCRETE MASONRY
FOOTING 189 C.Y.
POUR 1 404 C.Y.
POUR 2 614 C.Y.
TOTAL 1207 C.Y.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
Date 1975
Drawn By
Plans Checked KOK
PIER 51
NORTHBOUND LANE
SHEET 54 OF 56
X 55389


ELEVATION (LOOKING WEST)
PLAN
PILE PLAN
* DIMS GIVEN AT F.F. OF ABUT. BACKWALL.
● POLYVINYL CHLORIDE WATERSTOP - PLACE FLUSH WITH FACE OF CONC TO EXTEND BETW INSIDE FACES OF WINGS AND FROM BOT OF BODY TO TOP OF PAVING NOTCH. FOR DETAILS SEE SHT. 18.
■ VERT. CONST JOINT - FORMED BY SURFACED, BEVELED 2" x 8" KEYWAY.
▲ SLOPE ↑ BETW BRIDGE SEATS.
◩ CONST JOINT - STRIKE OFF AND LEAVE ROUGH (POUR CONC ABOVE THIS JOINT AFTER SUPER 'A' CONC IS IN PLACE CONC PLACED ABOVE THIS JOINT NOT PART OF THIS CONTRACT.)
NOTE: ALL 607 BARS LAPPED A MIN. OF 1'-7" ALL NUMBER 4 BAR LAPS SHALL BE 1-1
NOTE - SPA 401 & 402 BARS TO MISS PILING.
NOTE - FILL TO EL. 599.51 BEFORE DRIVING PILES.
NOTE: ABUT SUPPORTED ON HP 14-73 STEEL PILES, DRIVEN TO A MIN. BRG VALUE OF 75 TONS PER PILE, ESTIMATED 120'-0" LONG.
INDICATES DIRECTION OF BATTERED PILES. BATTER 3":1FT.
NOTE: FOR PILE SPLICE DETAILS SEE SHT 18
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
WEST ABUTMENT
SHEET 55 OF 56
X55390
1220-5-71
WISDOT DTID


CONST. JOINT - STRIKE OFF AND LEAVE ROUGH (POUR CONC ABOVE THIS JOINT AFTER SUPER CONC IS IN PLACE. CONC PLACED ABOVE THIS JOINT NOT PART OF THIS CONTRACT.)
POLYVINYL CHLORIDE WATERSTOP - TO EXTEND BETW. INSIDE FACES OF WINGS AND FLUSH WITH SURFACE OF CONC. (USE ONLY IF OPT. CONST. JOINT IS USED)(SEE DETAILS ON SHEET 18)
¾" V GROOVE.
BILL OF BARS
THE FIRST DIGIT OF A THREE DIGIT BAR MARK AND THE FIRST TWO OF A FOUR DIGIT BAR MARK SIGNIFIES THE BAR SIZE.
DIM. IN BENDING DETAILS ARE OUT TO OUT OF BAR
PROJECT ID 1220-5-71
FEDERAL PROJECT DESIGNATION
SHEET NUMBER 755
TOTAL SHEETS
MARK | NO REG'D | LENGTH | BENT | LOCATION
401 54 8-9 X BODY BF VERT.
402 54 13-6 X " FF "
403 4 8-6 " @WING 3 BF HORIZ
404 4 14-0 " @ " 4 " "
405 12 28-2 " BF "
406 21 36-7 " FF & BOT "
407 9 36-11 " TOP "
408 6 7-3 " " "
409 3 8-3 " " "
410 31 8-1 " " "
411 5 2-6 " " "
412 12 8-3 X " VERT
413 12 9-9 X " "
414 16 11-1 X " "
415 3 12-5 X " "
516 103 15-8 X BACKWALL VERT
417 84 36-7 " HORIZ
518 103 4-8 X PAVING BLOCK VERT
519 84 3-11 X GRID
525 36 1-8 " "
421 20 7-7 X WING 4 BASE VERT
422 10 7-11 " " 4 BF "
423 10 7-6 " " 4 FF "
1024 5 15-6 " " 4 BF HORIZ
425 5 14-9 X " 4 BF "
426 20 7-1 X " 3 & 4 FF "
427 5 9-8 X " 4 FF "
428 4 9-10 " " 4 FF "
429 26 10-10 X " 3 BASE VERT
530 13 8-1 " " 3 BF "
431 13 7-8 " " 3 FF "
1132 6 20-10 X " 3 BF HORIZ
433 5 18-11 X " 3 BF "
434 5 10-3 X " 3 FF "
435 6 11-6 " " 3 FF "
536 4 4-10 X PARAPETS @ WINGS 3 & 4
537 8 3-3 X " " 3 & 4
538 10 5-10 X " " 3 & 4
539 20 5-10 X " " 3 & 4
ELEVATION WING 4
ELEVATION WING 3
SECTION A-A
SECTION C-C
SECTION D-D
SECTION THRU BODY (TYP.)
GRID DETAILS
SECTION B-B
OPT. CONST. JOINT - FORMED BY SURFACED BEVELED 2"x6" KEYWAY.
SLOPE BETW. BRIDGE SEATS.
BERM EL. 602.01
SLOPE PAVING CRUSHED AGGREGATE SLOPE 2:1
FF OF ABUT BACKWALL
FF OF WING
MASONRY PLATE
MARK | 'C'
MARK | A | B
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
Const. Spec. 1975
Drawn By N/A
Prints Checked KOK
WEST ABUTMENT
SHEET 56 OF 56
X55391
WISDOT DTID


PLAN B-5-158
DESIGN DATA
FOUNDATION DATA
SUBSTRUCTURE PROJECT 1220-5-72
PIERS 9 THRU 25
GENERAL NOTES
DRAWINGS SHALL NOT BE SCALED.
ALL ELEVATIONS REFER TO INTERNATIONAL GREAT LAKES DATUM(1 G L D)(1955)(USGS +1 G L D + 0 88 FEET)
BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2" CL. UNLESS OTHERWISE SHOWN OR NOTED.
THE UPPER LIMITS OF EXCAVATION FOR STRUCTURES FOR THE PIERS SHALL BE THE ORIGINAL GROUNDLINE.
TRAFFIC VOLUME
IH 43
CURVE DATA
SOUTHWEST RAMP
NB LANE IH 43
ELEVATION
NORMAL TO SUBSTRUCTURE UNITS
TYPICAL SECTION THRU GREEN BAY & WESTERN RR., C M ST.P.&P RR & QUINCY STREET
LAYOUT
PROPOSED IH 43
STRUCTURE B-5-158
AS BUILT PLAN
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
INTERSTATE 43 OVER FOX R VER
BROWN
GREEN BAY
GENERAL PLAN
SHEET 1 OF 41
X55506
1220-5-72
WISDOT DTID

WISDOT DTID



LIST OF DRAWINGS

1 GENERAL PLAN X55506
2 GENERAL PLAN X55507
3 GENERAL PLAN X55508
4 GENERAL PLAN X55509
5 GENERAL PLAN X55510
6 GENERAL PLAN X55511
7 PROFILE GRADE LINE X55512
8 GENERAL PLAN X55513
9 GENERAL PLAN & QUANTITIES X55514
10 SUBSURFACE EXPLORATION X55515
11 SUBSURFACE EXPLORATION X55516
12 SUBSURFACE EXPLORATION X55517
13 SUBSURFACE EXPLORATION X55518
14 SUBSURFACE EXPLORATION X55519
15 SUBSURFACE EXPLORATION X55520
16 SUBSURFACE EXPLORATION X55521
17 SUBSTRUCTURE LAYOUT - EAST ABUT THRU PIER 25 X55522
18 SUBSTRUCTURE LAYOUT - PIER 26 THRU WEST ABUT. X55523
19 PIER DETAILS PART 'A' X55524
20 BILL OF BARS PART 'A' X55525
21 PIER DETAILS PARTS B & C X55526
22 BILL OF BARS PARTS B & C X55527
23 PIER 9 X55528
24 PIER 10 X55529
25 PIER 11 X55530
26 PIER 12 X55531
27 PIER 13 X55532
28 PIER 14 X55533
29 PIER 15 X55534
30 PIER 16 X55535
31 PIER 17 X55536
32 PIER 18 X55537
33 PIER 19 X55538
34 PIER 20 X55539
35 PIER 21 X55540
36 PIER 22 X55541
37 PIER 23 X55542
38 PIER 24 X55543
39 PIER 25 X55544
40 BILL OF BARS PIERS 9,10,12 & 13 X55545
41 BILL OF BARS PIERS 11 AND 14 THRU 25 X55546

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Date 1975 | Drawn By LOY | Plans Checked BMW

GENERAL PLAN

SHEET 2 OF 41

X55507

WISDOT DTID

FORM E B-14-66

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-72	7.2	
FEDERAL PROJECT DESIGNATION		

1993.5 BACK TO BACK OF ABUTMENTS

146.0 TO PIER 20 | 181.0 | 240.0 | 220.0 | 220.0 | 220.0 | 220.0 TO PIER 27

10' G&S LINE

FOX RIVER

STA. 842+40.60

℄ PIER 20 STA. 837+91.00 | ℄ PIER 21 STA. 841+12.00 | ℄ PIER 22 STA. 843+82.00 | ℄ PIER 23 STA. 846+08.00 | ℄ PIER 24 STA. 848+32.00 | ℄ PIER 25 STA. 850+42.00

PLAN B-5-158

MATCH LINE

MATCH LINE

FINGER JOINT

FINGER JOINT

EXP | FIX | EXP | FIX | EXP | FIX

700
650
600
550

El. 593.63 PIER 21 | El. 587.78 PIER 22 | El. 580.67 PIER 23 | El. 578.58 PIER 24 | El. 582.62 PIER 25 | El. 572.21 PIER 26

ELEVATION
NORMAL TO SUBSTRUCTURE UNITS

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

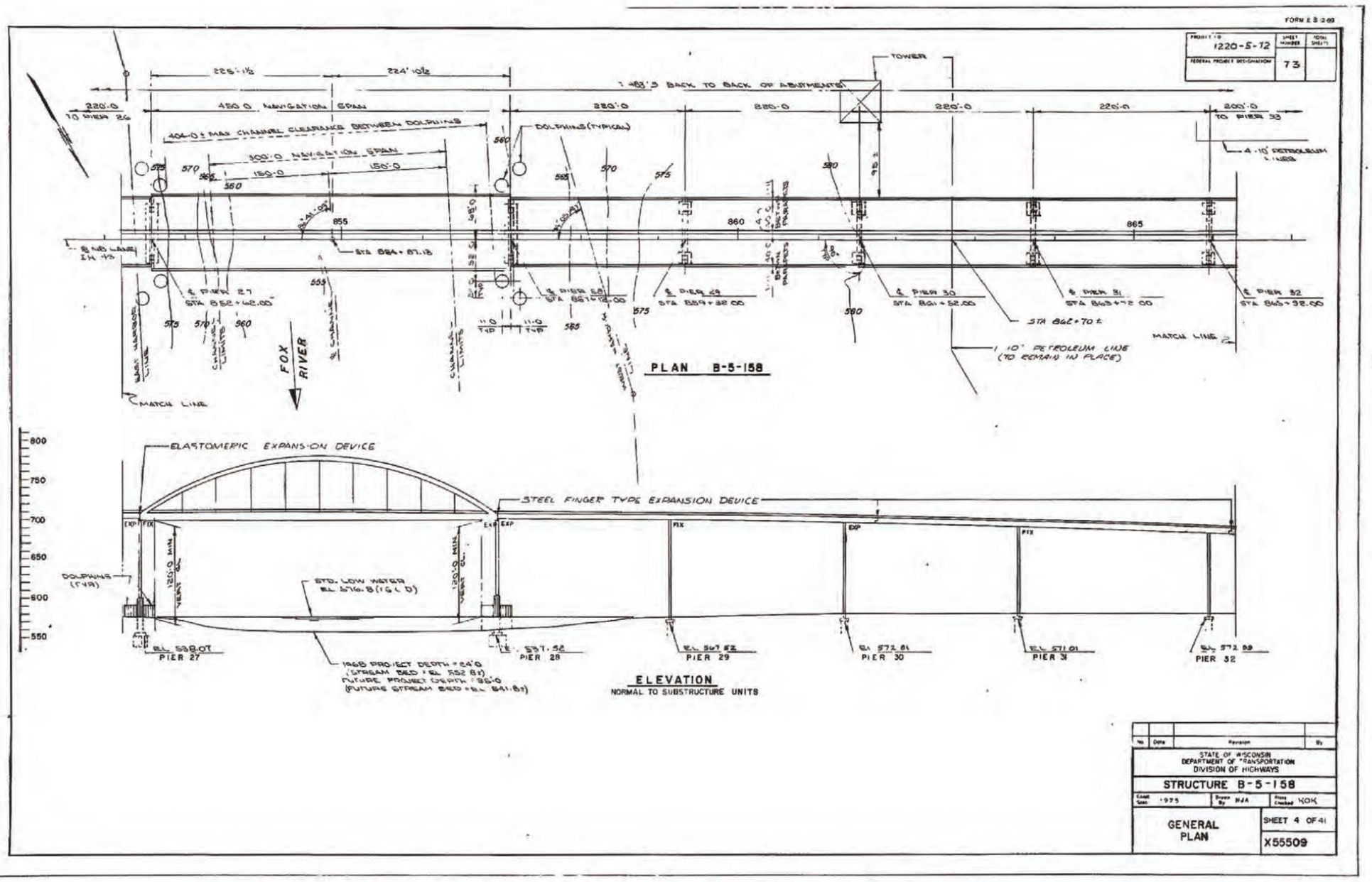
STRUCTURE B-5-158

Const. Spec.	Drawn By	Plans Checked
1975	LOY	BMW

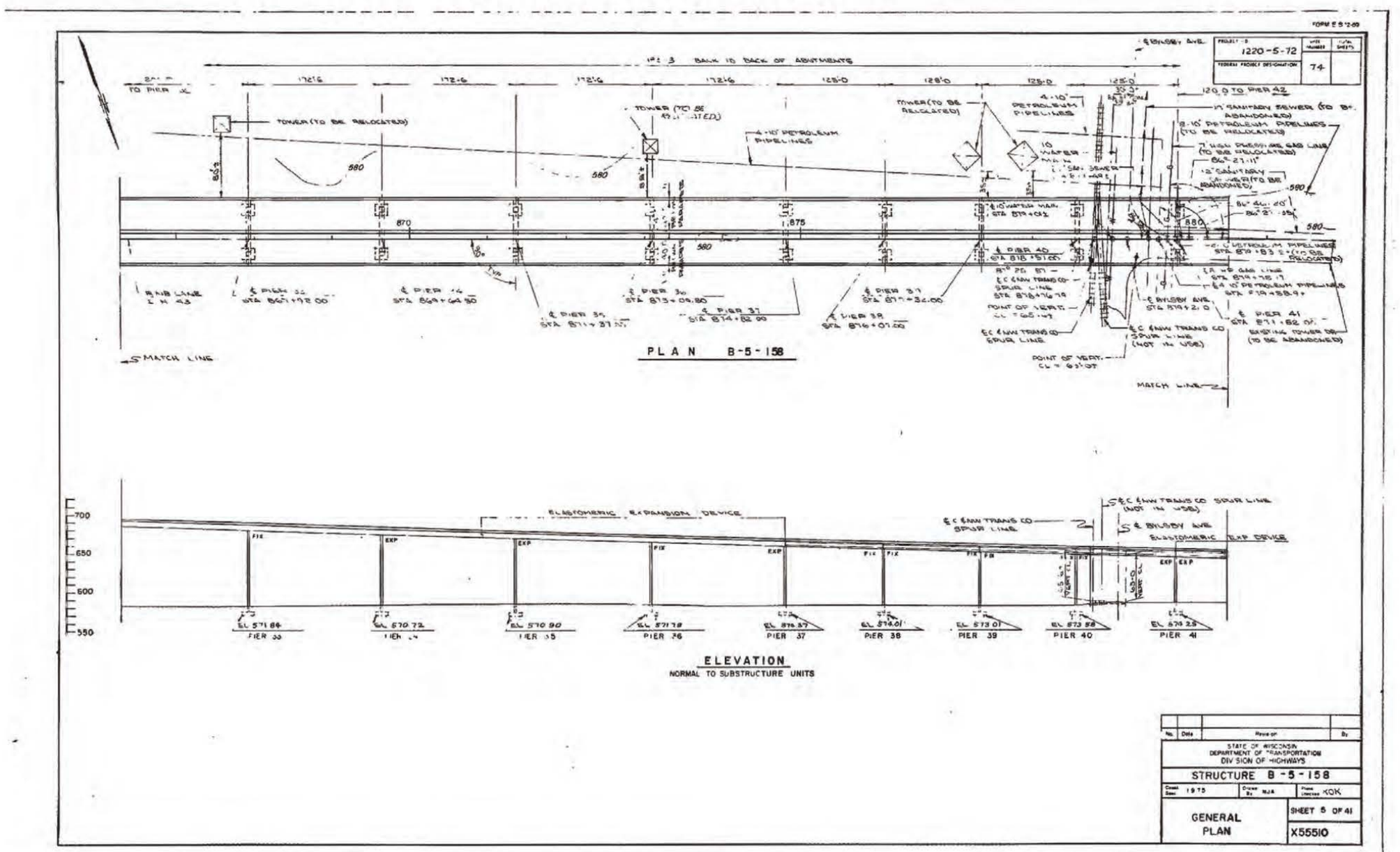
GENERAL PLAN

SHEET 3 OF 41

X55508


FORM E 3 2-69
1220-5-12
73
225'-1½
224'-10½
1,463'-3 BACK TO BACK OF ABUTMENTS
TOWER
220'-0
10 PIER 26
450'-0 NAVIGATION SPAN
220'-0
220'-0
220'-0
200'-0
TO PIER 33
404'-0 ± MAX CHANNEL CLEARANCE BETWEEN DOLPHINS
DOLPHINS (TYPICAL)
300'-0 NAVIGATION SPAN
150'-0
150'-0
4-10" PETROLEUM LINES
8°-41'-05"
8°-41'-05"
98'-0
855
860
865
STA 864+87.18
E NB LANE I-43
PIER 27
STA 852+62.00
PIER 28
STA 857+12.00
PIER 29
STA 859+32.00
PIER 30
STA 861+52.00
PIER 31
STA 863+72.00
PIER 32
STA 865+92.00
STA 862+70 ±
1-10" PETROLEUM LINE (TO REMAIN IN PLACE)
MATCH LINE
MATCH LINE
FOX RIVER
PLAN B-5-158
800
750
700
650
600
550
ELASTOMERIC EXPANSION DEVICE
STEEL FINGER TYPE EXPANSION DEVICE
EXP
FIX
EXP
FIX
EXP
FIX
EXP
DOLPHINS (TYP)
120'-0 MIN VERT CL
STD. LOW WATER EL 577.6 (IGLD)
120'-0 MIN VERT CL
EL 538.07
PIER 27
EL 537.52
PIER 28
EL 567.82
PIER 29
EL 572.81
PIER 30
EL 571.01
PIER 31
EL 572.59
PIER 32
1968 PROJECT DEPTH = 24'0
(STREAM BED = EL 552.81)
FUTURE PROJECT DEPTH = 55'-0
(FUTURE STREAM BED = EL 541.81)
ELEVATION
NORMAL TO SUBSTRUCTURE UNITS
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
1975
MJA
KOK
GENERAL PLAN
SHEET 4 OF 41
X55509

WISDOT DTID

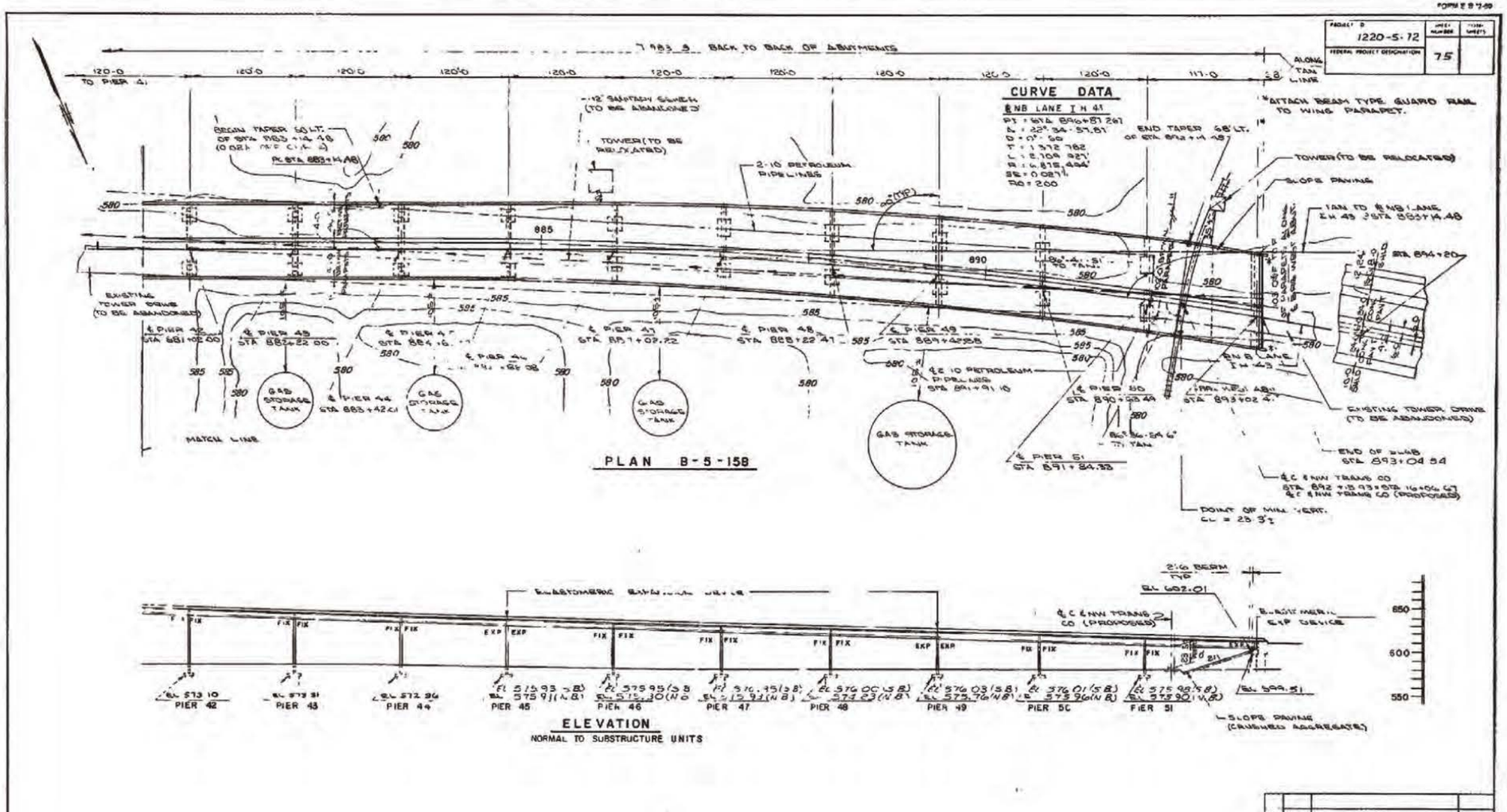

1220-5-72
74
TOWER (TO BE RELOCATED)
4-10" PETROLEUM PIPELINES
10" WATER MAIN
12" SANITARY SEWER (TO BE ABANDONED)
8-10" PETROLEUM PIPELINES (TO BE RELOCATED)
7" HIGH PRESSURE GAS LINE (TO BE RELOCATED)
12" SANITARY SEWER (TO BE ABANDONED)
℄ PIER 40
STA 878+51.65
℄ PIER 41
STA 879+21.0
℄ PIER 42
STA 879+58.9+
℄ PIER 35
STA 871+37.77
℄ PIER 36
STA 873+09.80
℄ PIER 37
STA 874+82.00
℄ PIER 38
STA 876+07.00
℄ PIER 39
STA 877+34.00
℄ PIER 33
STA 867+92.00
℄ PIER 34
STA 869+64.50
BNB LINE L H 43
℄ MATCH LINE
PLAN B-5-158
ELASTOMERIC EXPANSION DEVICE
EC E&W TRANS CO SPUR LINE
EC E&W TRANS CO SPUR LINE (NOT IN USE)
℄ BYLSBY AVE
ELASTOMERIC EXP DEVICE
EL 571.84 PIER 33
EL 570.72 PIER 34
EL 570.90 PIER 35
EL 571.78 PIER 36
EL 574.37 PIER 37
EL 574.01 PIER 38
EL 573.01 PIER 39
EL 573.88 PIER 40
EL 574.25 PIER 41
ELEVATION
NORMAL TO SUBSTRUCTURE UNITS
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
1975
KOK
GENERAL PLAN
SHEET 5 OF 41
X55510

WISDOT DTID

WISDOT BTID

PROJECT ID 1220-5-72 | SHEET NUMBER 75 | TOTAL SHEETS

FEDERAL PROJECT DESIGNATION



No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Date	Drawn By	Prev. Checked
1975	MJA	HOK

GENERAL PLAN

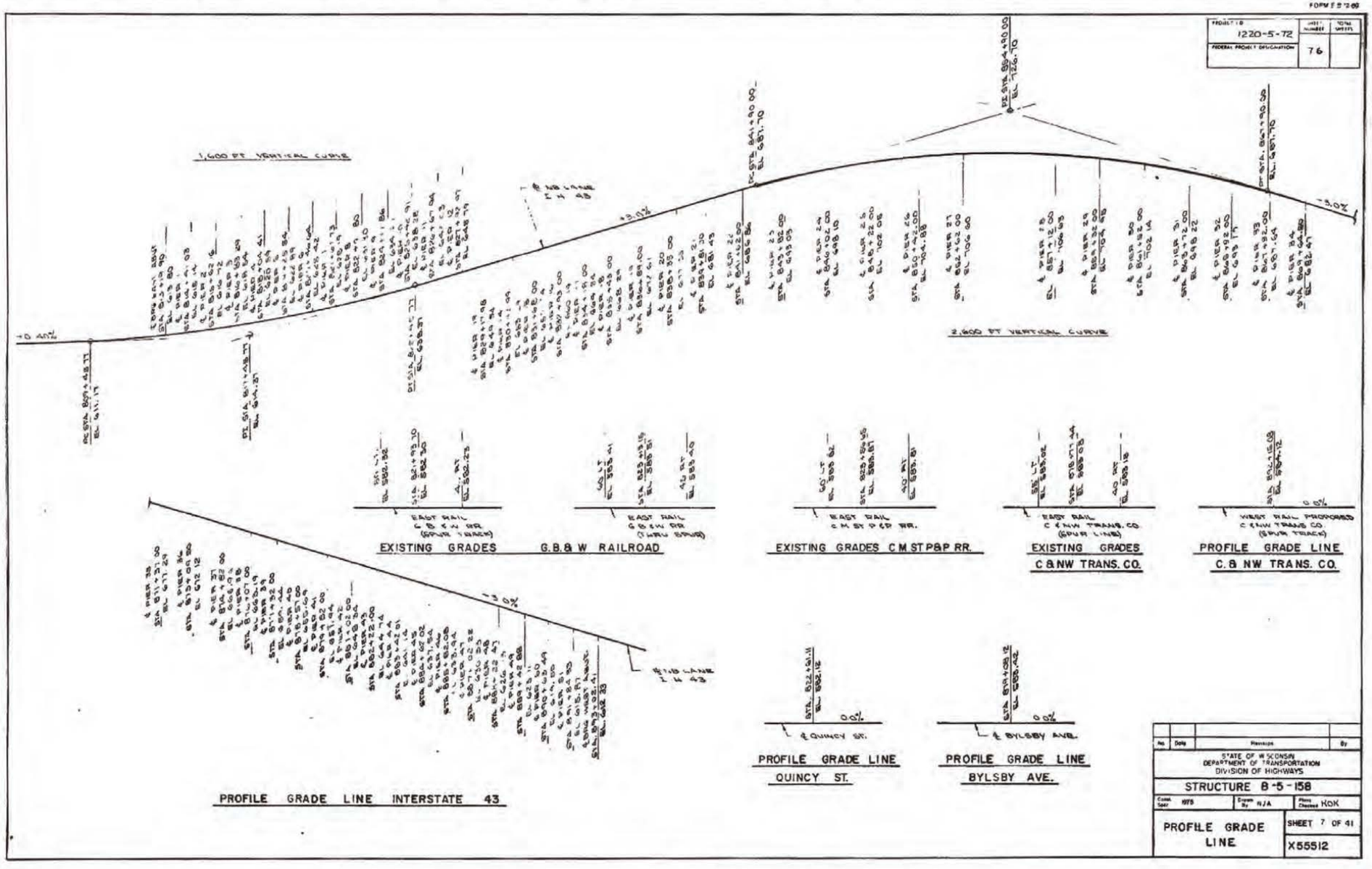
SHEET 6 OF 41

X5551

WISDOT DTID

FORM 5-2-72

PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-72	76	
FEDERAL PROJECT DESIGNATION		



No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

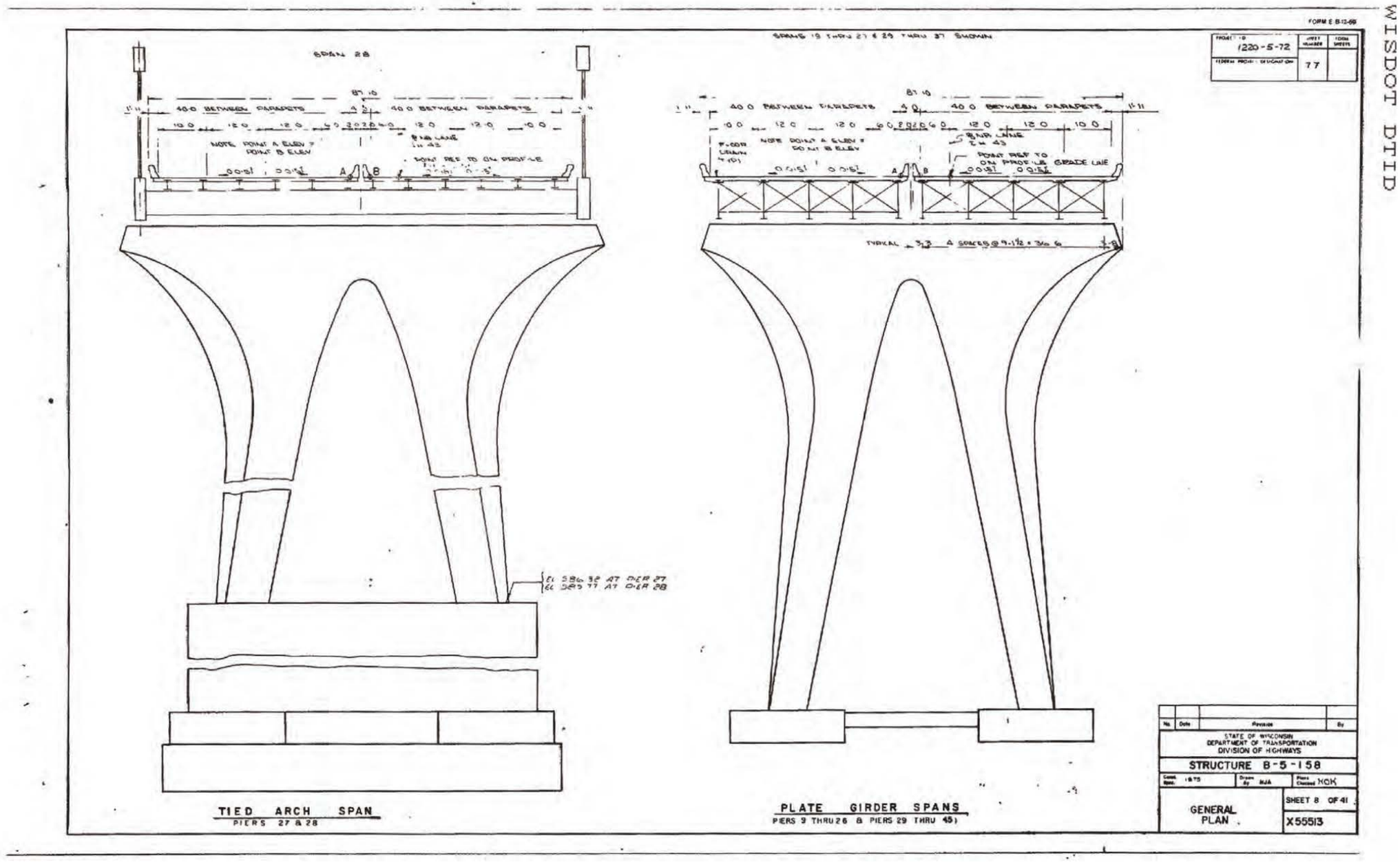
STRUCTURE B-5-158

Const. Year 1975	Drawn By N/A	Plans Checked KOK

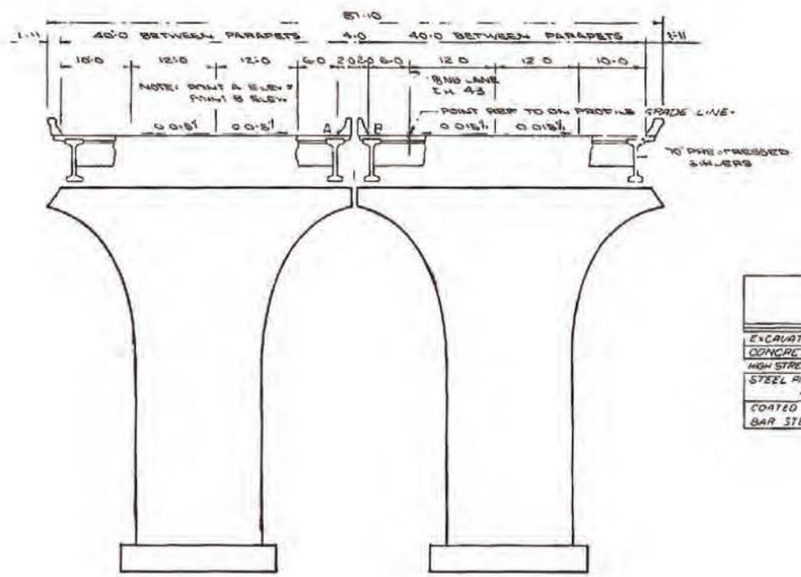
PROFILE GRADE LINE

SHEET 7 OF 41

X55512


SPANS 9 THRU 27 & 29 THRU 37 SHOWN
SPAN 28
40'-0" BETWEEN PARAPETS
NOTE POINT A ELEV = POINT B ELEV
POINT REF TO ON PROFILE GRADE LINE
TYPICAL 3 @ 3 SPACES @ 9-1/2" = 3'-0"
EL 586.38 AT ℄ PIER 27
EL 585.77 AT ℄ PIER 28
TIED ARCH SPAN
PIERS 27 & 28
PLATE GIRDER SPANS
PIERS 9 THRU 26 & PIERS 29 THRU 45
FROM I-D 1220-5-72
SHEET NUMBER 77
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
GENERAL PLAN
SHEET 8 OF 41
X55513
WISDOT DTID

SPANS 7 THRU 18 & 38 THRU 42 SHOWN
SPANS 1 THRU 6 & 44 THRU 52 RDWY WIDTH VARIES
SPANS 1,2, & 43 THRU 45 RDWY SLOPE VARIES
SPANS 46 THRU 52 RDWY SLOPE 0.02"/'



PRESTRESSED GIRDER SPANS
PIERS 1 THRU 8 & PIERS 46 THRU 51

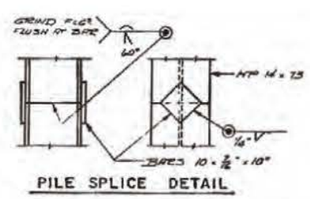
FORM F 9 3-60

PROJECT I.D.	SHEET NUMBER	CON SHEETS
1220-5-72	78	
FEDERAL PROJECT DESIGNATION		

WISDOT DTID

TOTAL ESTIMATED QUANTITIES

BID ITEMS	UNIT	PIER 9	PIER 10	PIER 11	PIER 12	PIER 13	PIER 14	PIER 15	PIER 16	PIER 17	PIER 18	PIER 19	PIER 20	PIER 21	PIER 22	PIER 23	PIER 24	PIER 25	TOTAL
EXCAVATION FOR STRUCTURES	L.S.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
CONCRETE MASONRY	C.Y.	784	743	824	774	837	785	873	928	916	939	987	956	984	1014	1116	1205	1188	15875
HIGH STRENGTH BAR STEEL REINFORCEMENT	LBS.	82370	82390	88530	81630	87210	86630	96610	100280	102290	103840	123470	122310	125410	126210	138110	134150	134590	1863980
STEEL PILING, DELIVERED AND DRIVEN HP 14 INCH 73 POUND	L.F.	~~4320~~ 4084	~~3480~~ 3402	~~4040~~ 3888	~~4080~~ 4551	~~4080~~ 4442	3880 4339	~~4320~~ 4352	~~4080~~ 3929	~~4320~~ 4085	~~3360~~ 3264	~~3880~~ 3917	~~3680~~ 3715	~~4320~~ 3664	5080 4291	~~4400~~ 4254	~~4040~~ 4133	~~4040~~ 4123	72320 68253
COATED HIGH STRENGTH BAR STEEL REINFORCEMENT	LBS.	2,940	2560	2,800	2760	2760	2620	2610	2,380	2470	2540	2520	2680	4350	2820	2,710	2770	2,770	47080



PILE SPLICE DETAIL

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

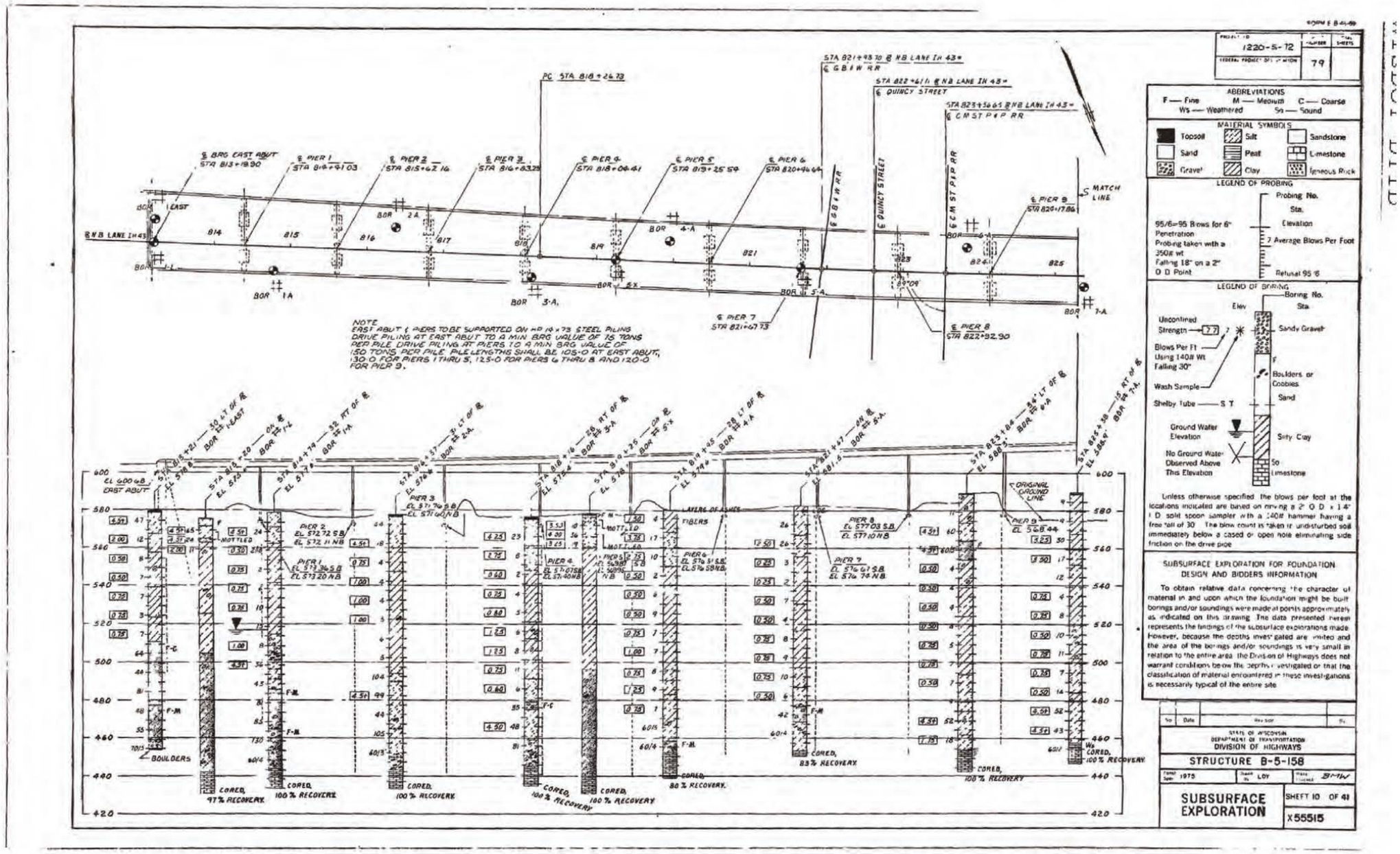
STRUCTURE B-5-158

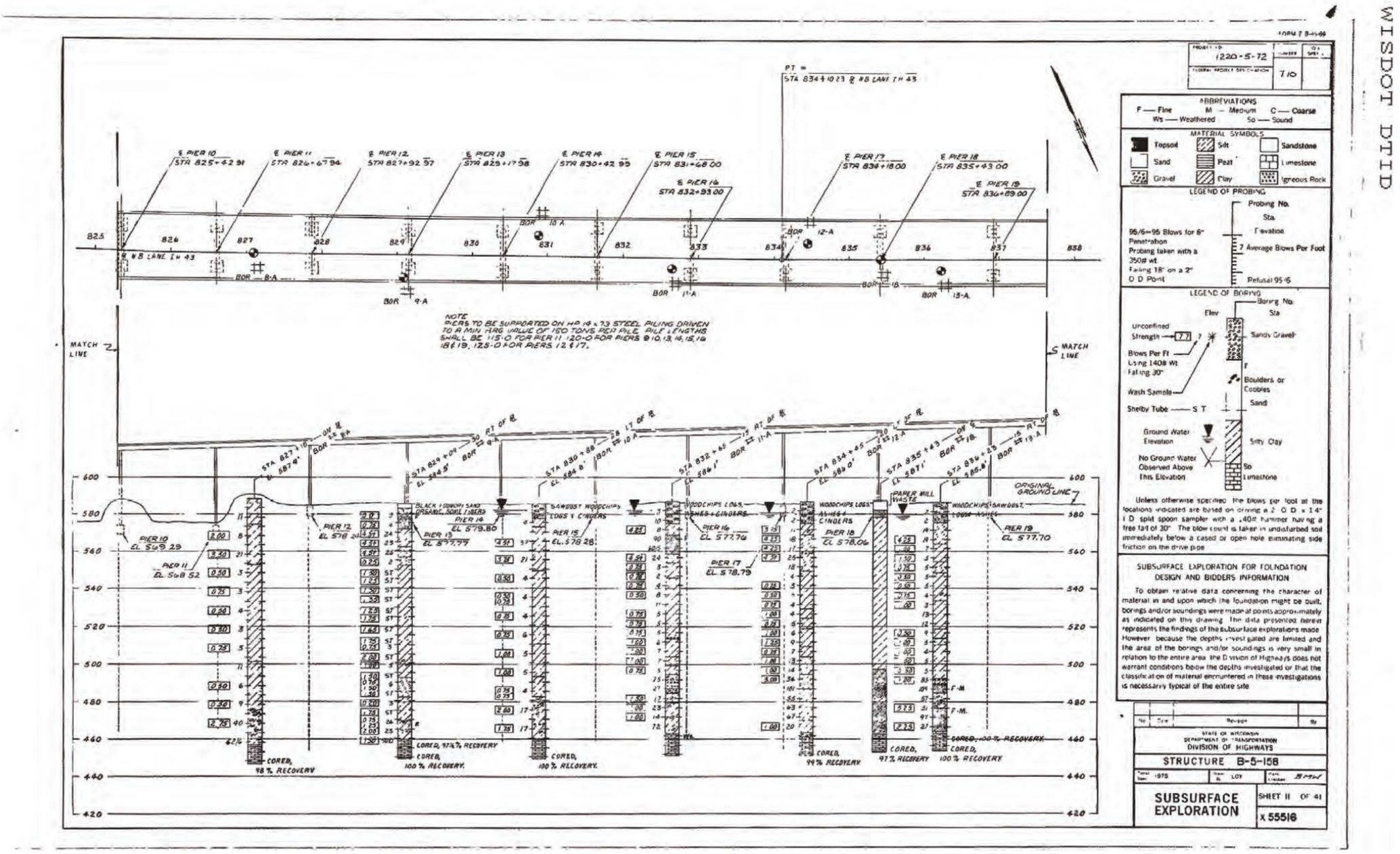
Const. Spec. 575	Drawn By LOY	Plans Checked BMW

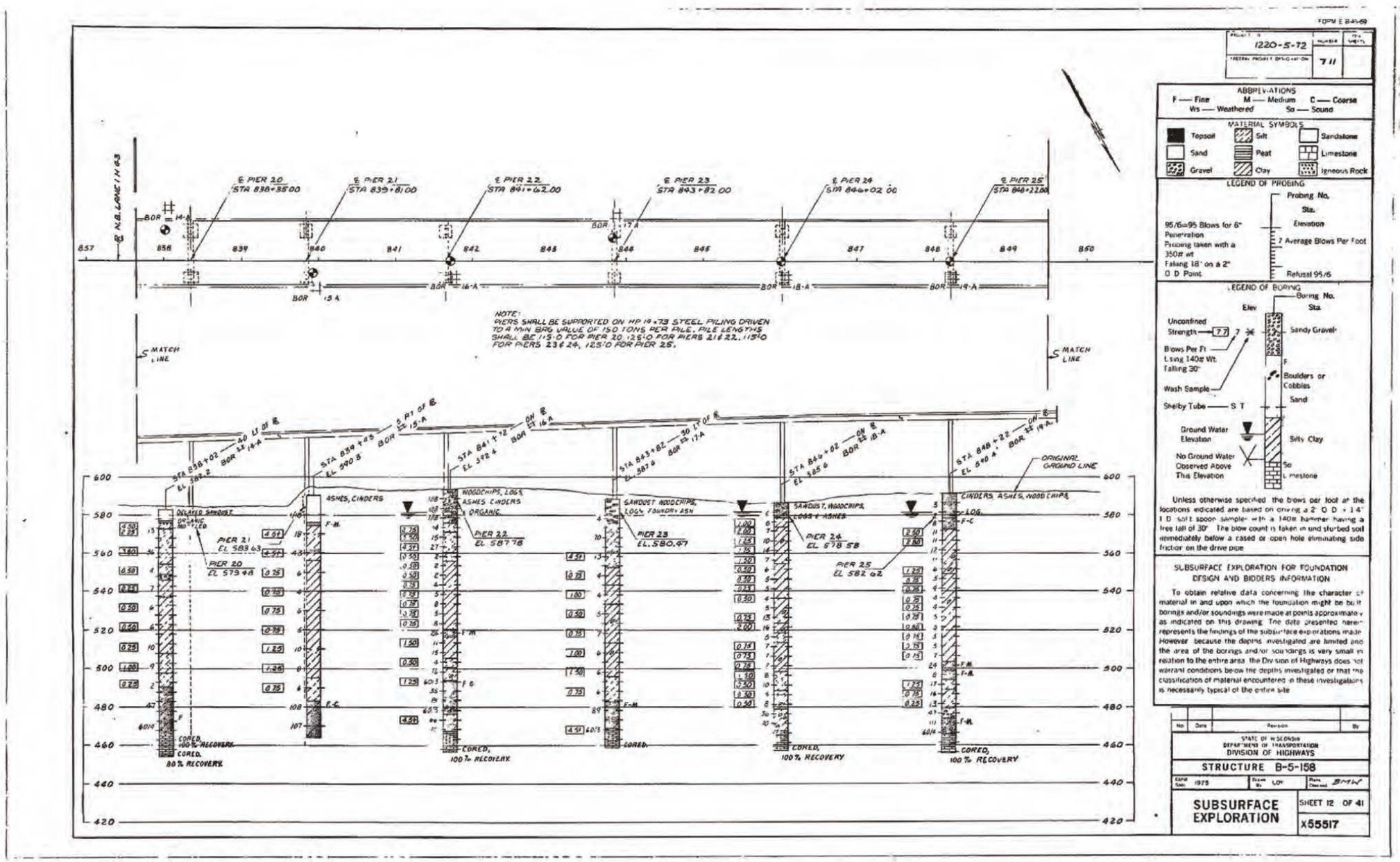
GENERAL PLAN & QUANTITIES

SHEET 9 OF 41

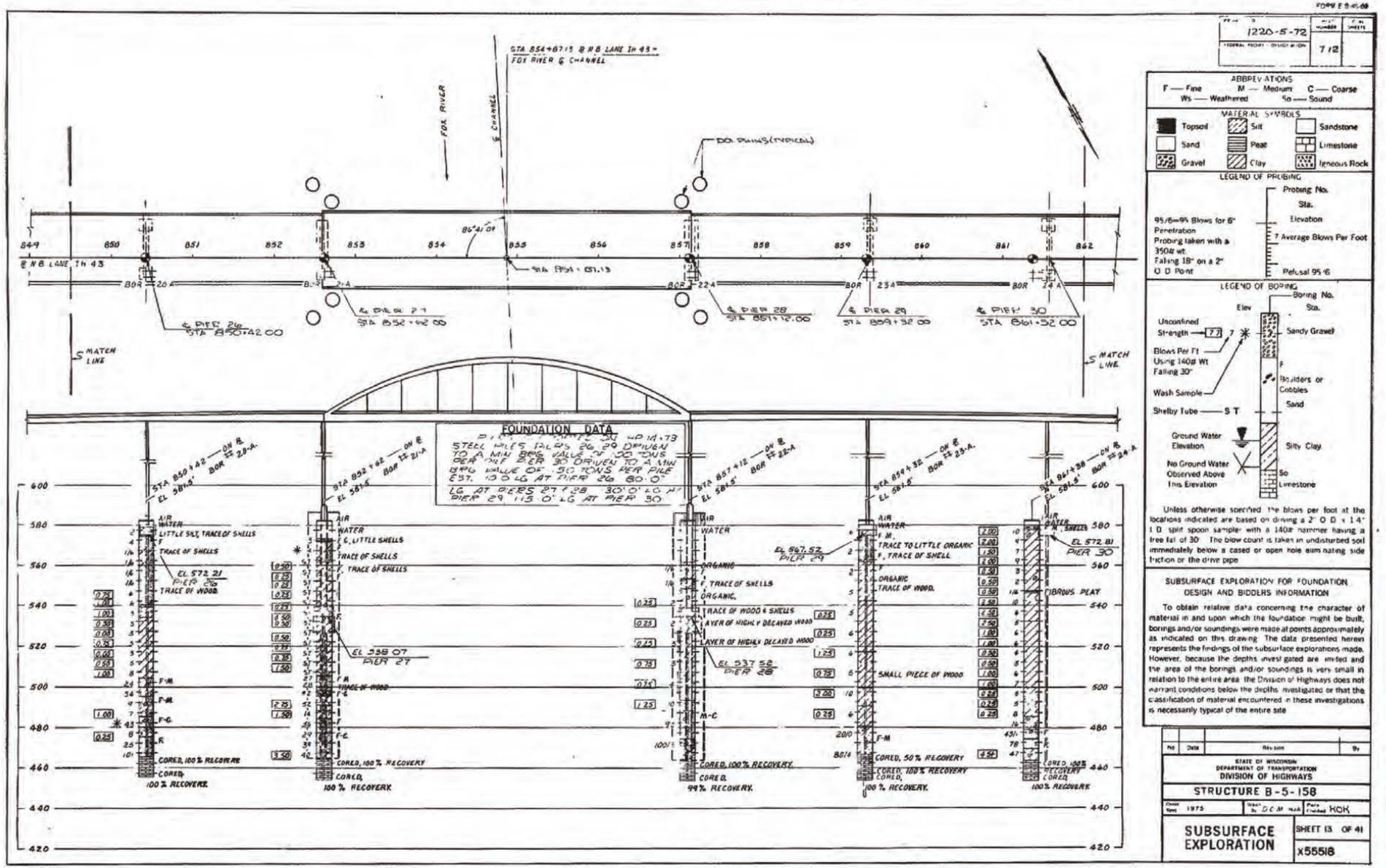
X55514


1220-5-72
79
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered Sn — Sound
MATERIAL SYMBOLS
Topsoil
Sand
Gravel
Silt
Peat
Clay
Sandstone
Limestone
Igneous Rock
LEGEND OF PROBING
Probing No.
Sta.
Elevation
Average Blows Per Foot
Refusal 95 /6
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18" on a 2" O D Point
LEGEND OF BORING
Boring No.
Elev
Sta
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — S T
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O D x 1 4/" I D split spoon sampler with a 140# hammer having a free fall of 30" The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built borings and/or soundings were made at points approximately as indicated on this drawing The data presented herein represents the findings of the subsurface explorations made However, because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
SUBSURFACE EXPLORATION
SHEET 10 OF 41
X55515
NOTE
EAST ABUT & PIERS TO BE SUPPORTED ON HP 18 x 73 STEEL PILING DRIVE PILING AT EAST ABUT TO A MIN BRG VALUE OF 75 TONS PER PILE DRIVE PILING AT PIERS 1 TO 9 MIN BRG VALUE OF 150 TONS PER PILE PILE LENGTHS SHALL BE 105-0 AT EAST ABUT, 130-0 FOR PIERS 1 THRU 5, 125-0 FOR PIERS 6 THRU 8 AND 120-0 FOR PIER 9.
PC STA 818+24.73
℄ BRG EAST ABUT STA 813+19.90
℄ PIER 1 STA 814+91.03
℄ PIER 2 STA 815+62.16
℄ PIER 3 STA 816+83.29
℄ PIER 4 STA 818+04.41
℄ PIER 5 STA 819+25.54
℄ PIER 6 STA 820+46.64
℄ PIER 7 STA 821+67.73
℄ PIER 8 STA 822+92.90
℄ PIER 9 STA 824+17.84
STA 821+93.70 ℄ NB LANE IN 43=
℄ G B & W RR
STA 822+41.11 ℄ NB LANE IN 43=
℄ QUINCY STREET
STA 823+36.65 ℄ NB LANE IN 43=
℄ C M ST P & P RR
MATCH LINE
℄ NB LANE IN 43
EAST ABUT
PIER 1
PIER 2
PIER 3
PIER 4
PIER 5
PIER 6
PIER 7
PIER 8
PIER 9
EL 600.48 EAST ABUT
BOULDERS
MOTTLED
LAYERS OF ASHES
FIBERS
ORIGINAL GROUND LINE
CORED, 97% RECOVERY
CORED, 100% RECOVERY
CORED, 100% RECOVERY
CORED, 100% RECOVERY
CORED, 100% RECOVERY
CORED, 80% RECOVERY
CORED, 83% RECOVERY
CORED, 100% RECOVERY
CORED, 100% RECOVERY
600
580
560
540
520
500
480
460
440
420


WISDOT DTID
1220-5-72
7 10
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Silt
Sandstone
Sand
Peat
Limestone
Gravel
Clay
Igneous Rock
LEGEND OF PROBING
Probing No.
Sta.
Elevation
7 Average Blows Per Foot
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18" on a 2" O D Point
Refusal 95/6
LEGEND OF BORING
Boring No.
Elev
Sta
Unconfined Strength
Sandy Gravel
Blows Per Ft Using 140# Wt Falling 30"
Boulders or Cobbles
Wash Sample
Sand
Shelby Tube — S T
Silty Clay
Ground Water Elevation
No Ground Water Observed Above This Elevation
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2 O D x 1 4" I D split spoon sampler with a 140# hammer having a free fall of 30" The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing The data presented hereon represents the findings of the subsurface explorations made However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
SUBSURFACE EXPLORATION
SHEET 11 OF 41
X 55516
PT = STA 834+10.23 ℄ WB LANE I-H 43
℄ PIER 10 STA 825+42.91
℄ PIER 11 STA 826+67.94
℄ PIER 12 STA 827+92.97
℄ PIER 13 STA 829+17.98
℄ PIER 14 STA 830+42.99
℄ PIER 15 STA 831+68.00
℄ PIER 16 STA 832+93.00
℄ PIER 17 STA 834+18.00
℄ PIER 18 STA 835+43.00
℄ PIER 19 STA 836+69.00
NOTE
PIERS TO BE SUPPORTED ON HP 14 x 73 STEEL PILING DRIVEN TO A MIN -196 VALUE OF 150 TONS PER PILE PILE LENGTHS SHALL BE 115'-0 FOR PIER 11 120'-0 FOR PIERS 9 10 13 14 15 16 18 & 19, 125'-0 FOR PIERS 12 & 17.
MATCH LINE
℄ WB LANE I-H 43
PIER 10 EL 549.29
PIER 11 EL 548.52
PIER 12 EL 578.26
PIER 13 EL 577.77
PIER 14 EL 579.80
PIER 15 EL 578.28
PIER 16 EL 577.76
PIER 17 EL 578.79
PIER 18 EL 578.06
PIER 19 EL 577.70
ORIGINAL GROUND LINE
CORED, 98 % RECOVERY
CORED, 97.4% RECOVERY
CORED, 100 % RECOVERY
CORED, 100 % RECOVERY
CORED, 99 % RECOVERY
CORED, 97 % RECOVERY
CORED, 100 % RECOVERY


WISDOT DTID
FORM E 84-69
1220-5-72
7 11
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Sand
Gravel
Silt
Peat
Clay
Sandstone
Limestone
Igneous Rock
LEGEND OF PROBING
Probing No.
Sta.
Elevation
7 Average Blows Per Foot
Refusal 95/6
95/6=95 Blows for 6" Penetration Probing taken with a 350# wt Falling 18" on a 2" O D Point
LEGEND OF BORING
Boring No.
Elev
Sta.
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — S T
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O D x 1 4" I D split spoon sampler with a 140# hammer having a free fall of 30" The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built borings and/or soundings were made at points approximately as indicated on this drawing The data presented here represents the findings of the subsurface explorations made However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site
E PIER 20 STA 838+35.00
E PIER 21 STA 839+81.00
E PIER 22 STA 841+62.00
E PIER 23 STA 843+82.00
E PIER 24 STA 846+02.00
E PIER 25 STA 848+22.00
E N.B. LANE I-H 43
BOR 14-A
BOR 15-A
BOR 16-A
BOR 17-A
BOR 18-A
BOR 19-A
NOTE:
PIERS SHALL BE SUPPORTED ON HP 10 x 73 STEEL PILING DRIVEN TO A MIN BRG VALUE OF 150 TONS PER PILE. PILE LENGTHS SHALL BE 115'-0 FOR PIER 20, 125'-0 FOR PIERS 21 & 22, 115'-0 FOR PIERS 23 & 24, 125'-0 FOR PIER 25.
MATCH LINE
MATCH LINE
PIER 20 EL 579.48
PIER 21 EL 583.63
PIER 22 EL 587.78
PIER 23 EL. 580.47
PIER 24 EL 578.58
PIER 25 EL 582.02
ORIGINAL GROUND LINE
DECAYED SAWDUST ORGANIC MOTTLED
ASHES, CINDERS
WOODCHIPS, LOGS, ASHES CINDERS ORGANIC
SAWDUST WOODCHIPS, LOGS FOUNDRY ASH
SAWDUST, WOODCHIPS, LOGS & ASHES
CINDERS, ASHES, WOOD CHIPS, LOG
CORED, 80% RECOVERY
CORED, 100% RECOVERY
CORED
CORED, 100% RECOVERY
CORED, 100% RECOVERY
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
SUBSURFACE EXPLORATION
SHEET 12 OF 41
X55517

WISDOT DTID



FORM E 9-45.08

1220-5-72	SHEET NUMBER 7 12	TOTAL SHEETS
FEDERAL PROJECT NUMBER		

ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound

MATERIAL SYMBOLS
Topsoil, Silt, Sandstone, Sand, Peat, Limestone, Gravel, Clay, Igneous Rock

LEGEND OF PROBING
Probing No.
Sta.
Elevation
7 Average Blows Per Foot
Refusal 95/6
95/6=9½ Blows for 6" Penetration
Probing taken with a 350# wt. Falling 18" on a 2" O D Point

LEGEND OF BORING
Boring No.
Elev
Sta.
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — S T
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
So
Limestone

Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O D x 1 4" I D split spoon sampler with a 140# hammer having a free fall of 30" The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction or the drive pipe

SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing The data presented hereon represents the findings of the subsurface explorations made However, because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site

Prd	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

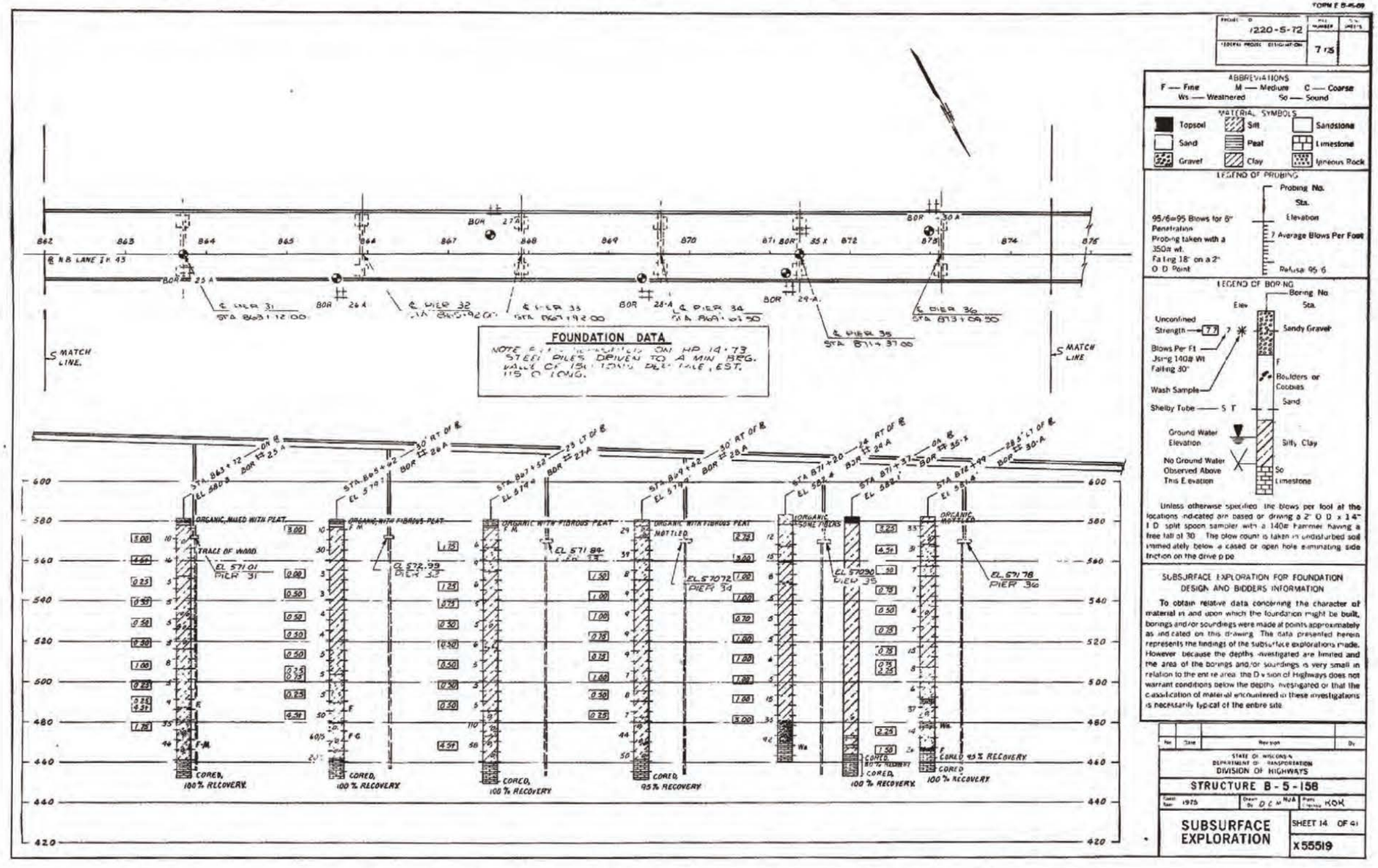
Date 1975 | Drawn by D C M | Plans Checked KOK

SUBSURFACE EXPLORATION

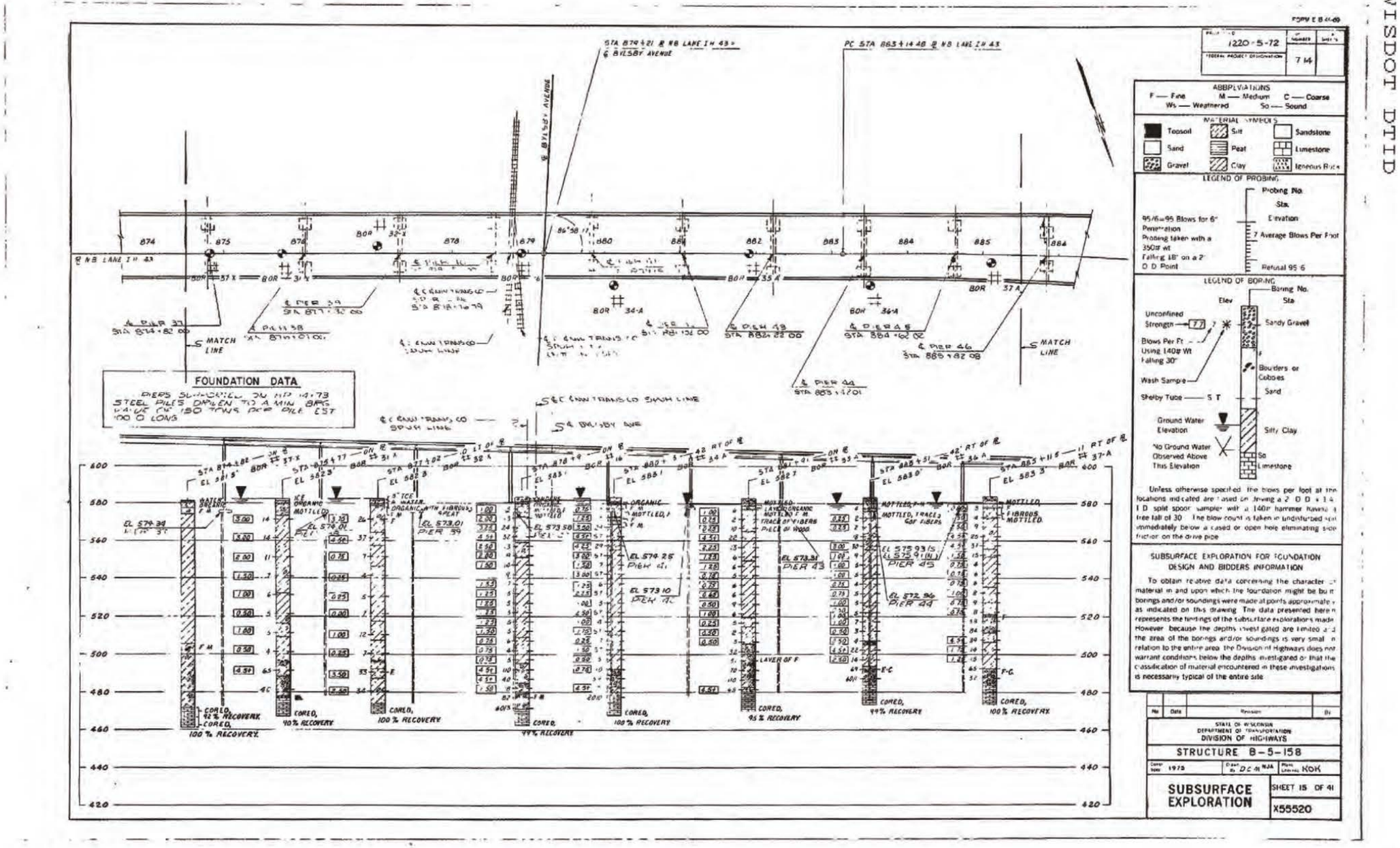
SHEET 13 OF 41

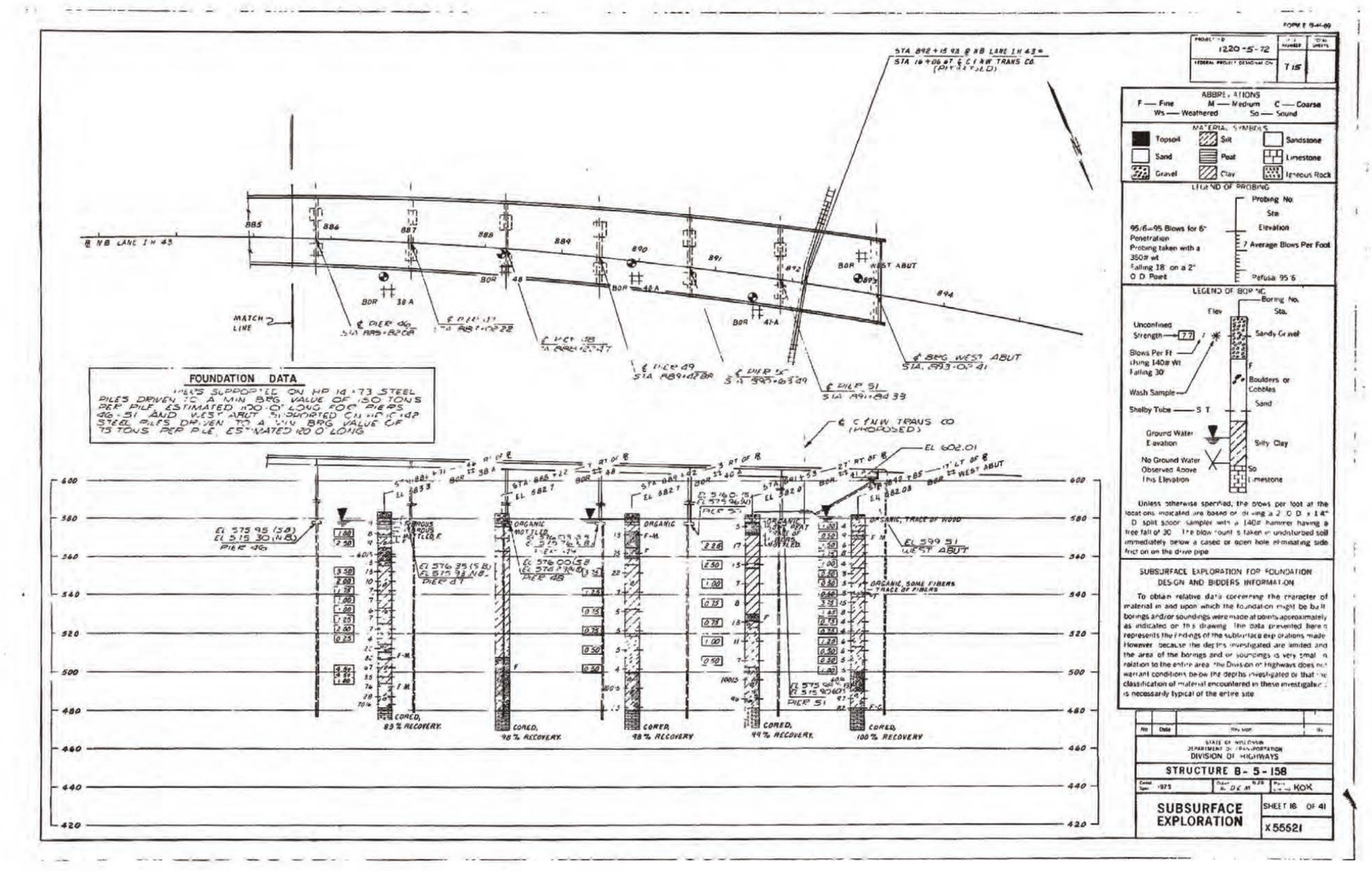
X55518

WISDOT DTID


FORM E 5-15-09
PROJECT ID 1220-5-72
FED. PROJ. DESIGNATION
SHEET NUMBER 7 13
TOTAL SHEETS
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Sand
Gravel
Silt
Peat
Clay
Sandstone
Limestone
Igneous Rock
LEGEND OF PROBING
Probing No.
Sta.
Elevation
? Average Blows Per Foot
Refusal 95/6
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt.
Falling 18" on a 2" O D Point
LEGEND OF BORING
Boring No.
Sta.
Elev
Unconfined Strength
Blows Per Ft
Using 140# Wt
Falling 30"
Wash Sample
Shelby Tube — S T
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
So Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O D x 1 4" I D split spoon sampler with a 140# hammer having a free fall of 30 The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive p pe
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing The data presented herein represents the findings of the subsurface explorations made. However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site
FOUNDATION DATA
NOTE E ... ON HP 14 • 73 STEEL PILES DRIVEN TO A MIN BRG. VALUE OF 150 TONS PILE TIP ELEV. 115 0 LONG.
862 863 864 865 866 867 868 869 870 871 872 873 874 875
℄ NB LANE I H 43
BOR 25 A
BOR 26 A
BOR 27 A
BOR 28-A
BOR 29-A
BOR 30 A
℄ PIER 31 STA 863+12.00
℄ PIER 32 STA 865+92.00
℄ PIER 33 STA 868+92.00
℄ PIER 34 STA 871+92.50
℄ PIER 35 STA 873+14.00
℄ PIER 36 STA 873+69.50
℄ MATCH LINE.
℄ MATCH LINE
STA 863+72 — 0ft ℄ BOR 25 A EL 580.8
STA 865+42 — 30' RT OF ℄ BOR 26 A EL 579.7
STA 867+52 — 23' LT OF ℄ BOR 27 A EL 579.4
STA 869+82 — 30' RT OF ℄ BOR 28 A EL 579.7
STA 871+20 — 24' RT OF ℄ BOR 29 A EL 582.4
STA 871+37 — 0ft ℄ BOR 30 A EL 582.1
STA 873+49 — 28.5' LT OF ℄ BOR 30-A EL 581.4
ORGANIC, MIXED WITH PEAT
TRACE OF WOOD
EL 571.01 PIER 31
ORGANIC WITH FIBROUS PEAT
EL 572.99 PIER 32
ORGANIC WITH FIBROUS PEAT
EL 571.84 PIER 33
ORGANIC WITH FIBROUS PEAT NOT TILED
EL 570.72 PIER 34
ORGANIC SOME FIBERS
EL 570.90 PIER 35
ORGANIC MOTTLED
EL 571.78 PIER 36
CORED, 100 % RECOVERY
CORED, 100 % RECOVERY
CORED, 100 % RECOVERY
CORED, 95 % RECOVERY
CORED 80 % RECOVERY
CORED, 100 % RECOVERY
CORED 95 % RECOVERY
CORED 100 % RECOVERY
600 580 560 540 520 500 480 460 440 420
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
Date 1975 Drawn By D C M Traced By NJA Plans Checked By KOK
SUBSURFACE EXPLORATION
SHEET 14 OF 41
X 55519

WISDOT DTID

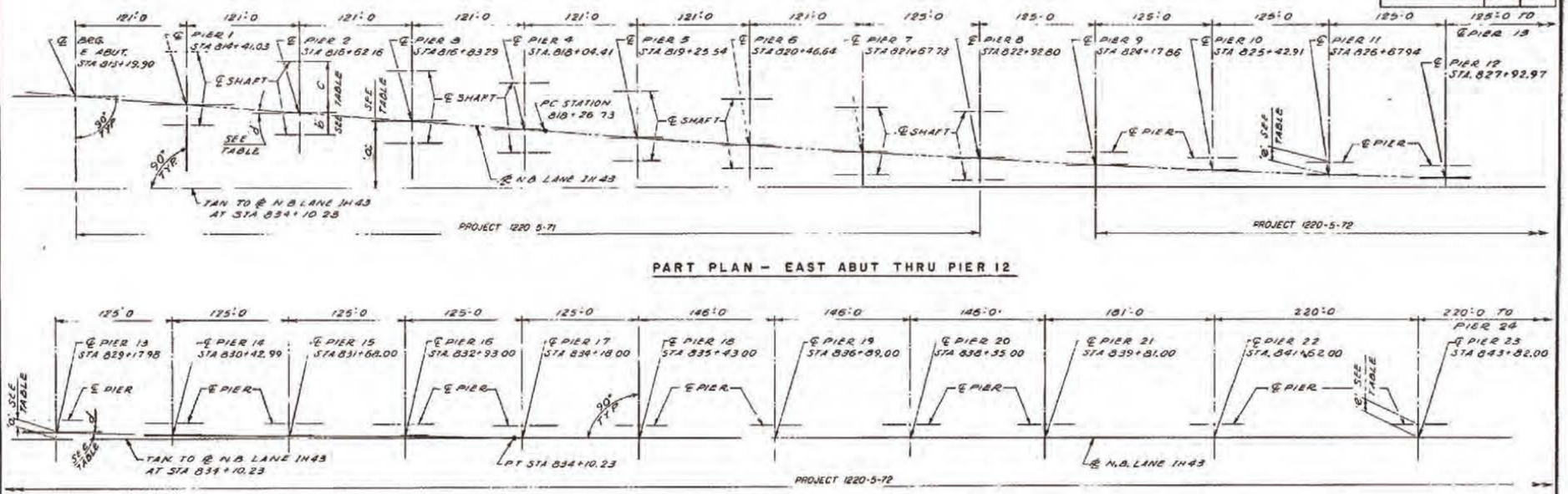

1220-5-72
7 14
ABBREVIATIONS
F — Fine
M — Medium
C — Coarse
Ws — Weathered
So — Sound
MATERIAL SYMBOLS
Topsoil
Sand
Gravel
Silt
Peat
Clay
Sandstone
Limestone
LEGEND OF PROBING
Probing No.
Sta.
Elevation
7 Average Blows Per Foot
Refusal 95/6
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18" on a 2" O.D. Point
LEGEND OF BORING
Boring No.
Sta
Elev
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — 5 T
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
So
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O.D. x 1 3/8" I.D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built borings and/or soundings were made at points approximately as indicated on this drawing. The data presented herein represents the findings of the subsurface explorations made. However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.
FOUNDATION DATA
PIERS SUPPORTED ON HP 14x73 STEEL PILES DRIVEN TO A MIN BRG VALUE OF 150 TONS PER PILE EST 100'-0" LONG
STA 874+21 ℄ NB LANE I-43 & BYLSBY AVENUE
PC STA 883+14.48 ℄ NB LANE I-43
℄ BYLSBY AVENUE
℄ PIER 39 STA 877+32.00
℄ PIER 41 STA 879+01.00
℄ PIER 43 STA 882+22.00
℄ PIER 44 STA 883+17.01
℄ PIER 45 STA 884+60.02
℄ PIER 46 STA 885+82.08
MATCH LINE
SEC ENN TRANS'D SWSH LINE
EL 579.34
EL 579.01 PIER 39
EL 579.25 PIER 41
EL 573.10 PIER 43
EL 573.01 PIER 44
EL 575.93 (N.) EL 575.41 (N.) PIER 45
EL 572.96 PIER 46
CORED, 92 % RECOVERY
CORED, 100 % RECOVERY
CORED, 90% RECOVERY
CORED, 100 % RECOVERY
CORED, 99% RECOVERY
CORED, 100 % RECOVERY
CORED, 95 % RECOVERY
CORED, 99% RECOVERY
CORED, 100 % RECOVERY
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
1975
DRAWN BY DC-IN NJA
PLANS CHECKED KOK
SUBSURFACE EXPLORATION
SHEET 15 OF 41
X55520


STA 892+15.93 ℄ NB LANE I-N 43 =
STA 16+06.87 ℄ C.M.N.W. TRANS CO.
(PROPOSED)
℄ NB LANE I-N 43
885
886
887
888
889
890
891
892
894
BOR 38A
BOR 48
BOR 48A
BOR 41A
BOR WEST ABUT
MATCH LINE
℄ PIER 46
STA 885+82.08
℄ PIER 47
STA 888+02.22
℄ PIER 48
STA 889+42.47
℄ PIER 49
STA 891+28.28
℄ PIER 50
STA 893+63.29
℄ PILE 51
STA 894+84.33
℄ BRG. WEST ABUT
STA. 893+02.41
℄ C.M.N.W. TRANS CO.
(PROPOSED)
EL 602.01
FOUNDATION DATA
PIERS SUPPORTED ON HP 14 x 73 STEEL PILES DRIVEN TO A MIN. BRG. VALUE OF 150 TONS PER PILE. ESTIMATED 100'-0" LONG FOR PIERS 46-51 AND WEST ABUT SUPPORTED ON HP 12 x 42 STEEL PILES DRIVEN TO A MIN. BRG. VALUE OF 75 TONS PER PILE. ESTIMATED 120'-0" LONG
EL 575.95 (SB)
EL 515.30 (NB)
PIER 46
EL 576.35 (SB)
EL 515.92 (NB)
PIER 47
EL 576.00 (SB)
EL 576.29 (NB)
PIER 48
EL 575.96 (SB)
EL 575.96 (NB)
PIER 49
EL 575.90 (SB)
EL 575.90 (NB)
PIER 50
EL 575.90 (SB)
EL 515.90 (NB)
PIER 51
EL 599.51
WEST ABUT
ORGANIC MOTTLED
ORGANIC
ORGANIC, TRACE OF WOOD
ORGANIC, SOME FIBERS - TRACE OF FIBERS
CORED, 83% RECOVERY.
CORED, 98% RECOVERY.
CORED, 98% RECOVERY.
CORED, 99% RECOVERY.
CORED, 100% RECOVERY.
600
580
560
540
520
500
480
460
440
420
PROJECT ID 1220-5-72
FEDERAL PROJECT DESIGNATION
TOTAL SHEETS 115
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Silt
Sandstone
Sand
Peat
Limestone
Gravel
Clay
Igneous Rock
LEGEND OF PROBING
Probing No.
Sta.
Elevation
95/6-95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18" on a 2" O.D. Point
Average Blows Per Foot
Refusal 95/6"
LEGEND OF BOR'NG
Boring No.
Elev.
Sta.
Unconfined Strength
Blows Per Ft. Using 140# Wt. Falling 30"
Wash Sample
Shelby Tube
S.T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
Limestone
Unless otherwise specified, the blows per foot at the locations indicated are based on driving a 2.0" O.D. x 1.4" I.D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built borings and/or soundings were made at points approximately as indicated on this drawing. The data presented here represents the findings of the subsurface explorations made. However, because the depths investigated are limited and the area of the borings and or soundings is very small in relation to the entire area, the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.
No. Date Revision By
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
Const. Spec. 1975
Submitted 9-78
Drawn by D.E.M.
Traced by
Checked by KOK
SUBSURFACE EXPLORATION
SHEET 16 OF 41
X 55521

WISDOT DTID

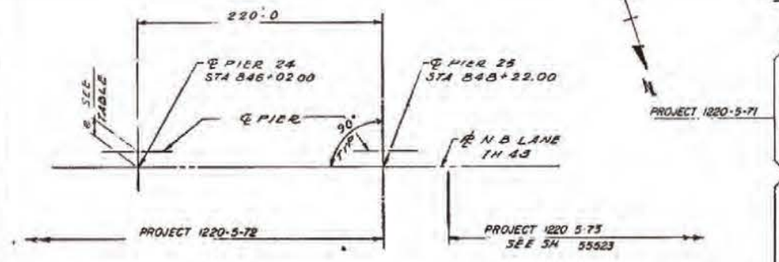
WISDOT DTID

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-72	7.16	
FEDERAL PROJECT DESIGNATION		



PART PLAN – EAST ABUT THRU PIER 12

PART PLAN – PIER 13 THRU PIER 23



PART PLAN – PIER 24 & PIER 25

LOCATION	DIM 'a'	DIM 'b'	DIM 'c'	ANGLE 'd'	DIM 'e'
℄ BRG E ABUT	50'-9⅝			2°-38'-21"	
℄ PIER 1	54'-2⅝	14'-0	34'-7½	2°-38'-21"	
℄ PIER 2	48'-7½	14'-0	33'-1½	2°-38'-21"	
℄ PIER 3	43'-0⅝	14'-0	31'-7½	2°-38'-21"	
℄ PIER 4	37'-5⅝	14'-0	30'-3½	2°-38'-21"	
℄ PIER 5	32'-0⅝	14'-0	30'-0	2°-28'-28"	
℄ PIER 6	27'-0⅝	14'-0	30'-0	2°-16'-22"	
℄ PIER 7	22'-5⅝	14'-0	30'-0	2°-04'-15"	
℄ PIER 8	18'-1⅝	14'-0	30'-0	1°-51'-43"	
℄ PIER 9	14'-3⅝			1°-39'-14"	8'-0
℄ PIER 10	10'-11⅝			1°-26'-44"	8'-0
℄ PIER 11	8'-0⅝			1°-14'-14"	8'-0
℄ PIER 12	5'-6½			1°-01'-44"	8'-0
℄ PIER 13	3'-0⅝			0°-49'-13"	8'-0
℄ PIER 14	1'-1⅞			0°-36'-43"	8'-0
℄ PIER 15	0'-10⅛			0°-24'-13"	8'-0
℄ PIER 16	0'-2⅝			0°-11'-31"	8'-0
℄ PIER 17					8'-0
℄ PIER 18					8'-0
℄ PIER 19					8'-0
℄ PIER 20					8'-0
℄ PIER 21					8'-0
℄ PIER 22					8'-0
℄ PIER 23					8'-0
℄ PIER 24					8'-0
℄ PIER 25					8'-0

NOTE:
ANGLES 'd' FROM PIER 5 THRU PIER 16 ARE FORMED BY A TANGENT TO CURVE AT THE INTERSECTION OF ℄ N B LANE IH 43 AND THE ℄ OF PIER.

STATIONING SHOWN IS ALONG ℄ N.B. LANE IH 43.

CURVE DATA
℄ N.B. LANE IH 43
PI = STA 826+18.64
Δ = 2°-38'-21"
D = 0°-10'
T = 791.67'
L = 1,583.50
R = 34 377.47'
SE = NORMAL CROWN
PC = STA 818+26.73
PT = STA 834+10.23

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

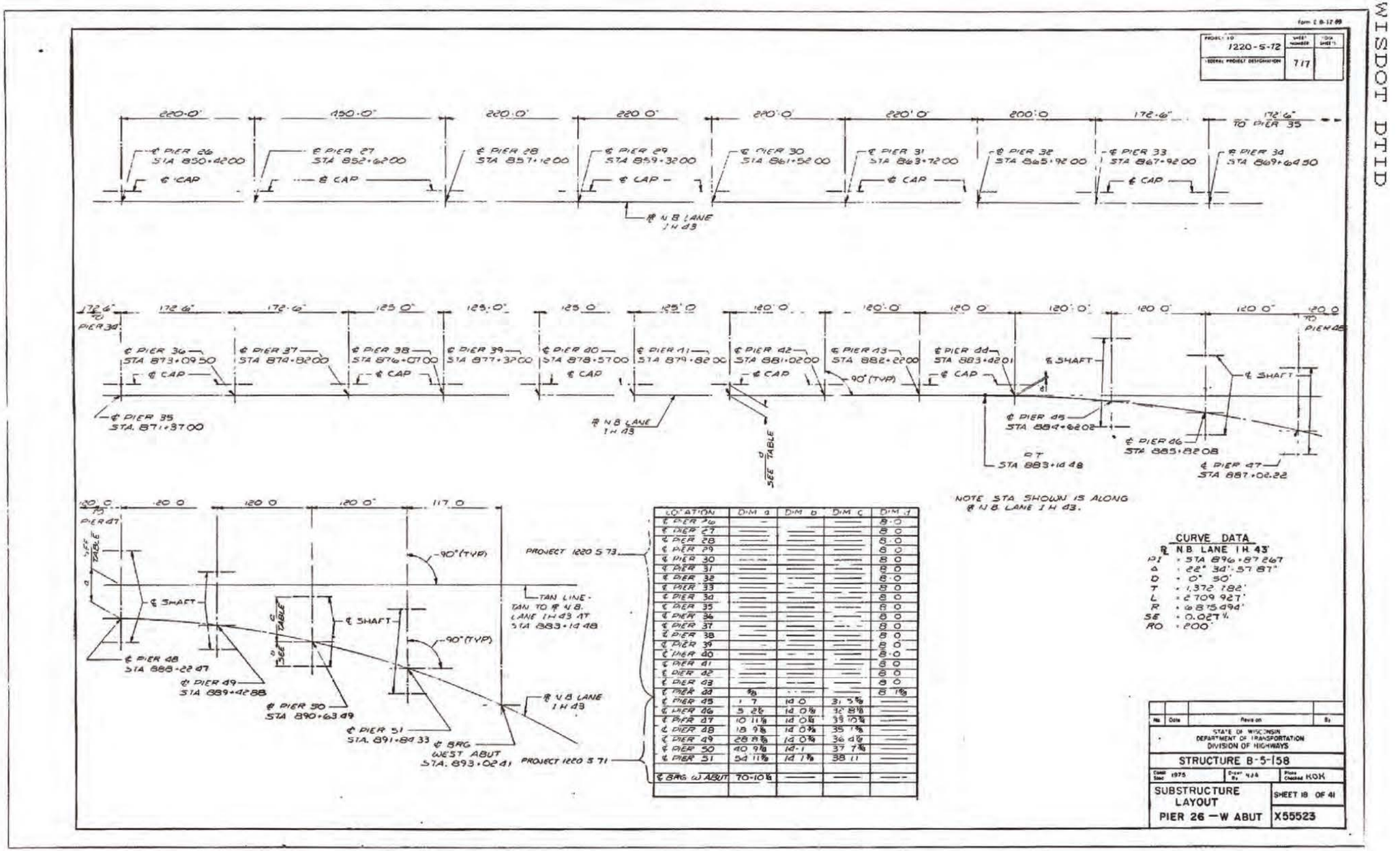
STRUCTURE B-5-158

Const. Date: 1975	Drawn By: T T M	Plans revised: BMW

SUBSTRUCTURE LAYOUT – E. ABUT THRU PIER 25

SHEET 17 OF 41

X55522


WISDOT DTID
1220-5-72
717
220'-0" 150'-0" 220'-0" 220'-0" 290'-0" 220'-0" 200'-0" 172'-6" 172'-6" TO PIER 35
℄ PIER 26 STA 850+42.00
℄ PIER 27 STA 852+62.00
℄ PIER 28 STA 857+12.00
℄ PIER 29 STA 859+32.00
℄ PIER 30 STA 861+52.00
℄ PIER 31 STA 863+72.00
℄ PIER 32 STA 865+92.00
℄ PIER 33 STA 867+92.00
℄ PIER 34 STA 869+64.50
℄ CAP
℄ N.B. LANE I H 43
172'-6" TO PIER 35 172'-6" 172'-6" 125'-0" 125'-0" 125'-0" 125'-0" 120'-0" 120'-0" 120'-0" 120'-0" 120'-0" 120'-0" 120'-0" TO PIER 48
℄ PIER 36 STA 873+09.50
℄ PIER 37 STA 874+82.00
℄ PIER 38 STA 876+07.00
℄ PIER 39 STA 877+32.00
℄ PIER 40 STA 878+57.00
℄ PIER 41 STA 879+82.00
℄ PIER 42 STA 881+02.00
℄ PIER 43 STA 882+22.00
℄ PIER 44 STA 883+42.01
90° (TYP)
℄ SHAFT
℄ PIER 35 STA. 871+37.00
℄ PIER 45 STA 884+66.02
℄ PIER 46 STA 885+82.08
℄ PIER 47 STA 887+02.22
PT STA 883+16.48
SEE TABLE
NOTE STA SHOWN IS ALONG ℄ N.B. LANE I H 43.
120'-0" TO PIER 47 120'-0" 120'-0" 120'-0" 117'-0"
SEE TABLE
℄ PIER 48 STA 888+22.07
℄ PIER 49 STA 889+42.88
℄ PIER 50 STA 890+63.49
℄ PIER 51 STA. 891+84.33
℄ BRG. WEST ABUT STA. 893+02.41
TAN LINE - TAN TO ℄ N.B. LANE I H 43 AT STA 883+16.48
℄ N.B. LANE I H 43
PROJECT 1220-5-73
PROJECT 1220-5-71
LOCATION DIM a DIM b DIM c DIM d
℄ PIER 26 — — — 8'-0
℄ PIER 27 — — — 8'-0
℄ PIER 28 — — — 8'-0
℄ PIER 29 — — — 8'-0
℄ PIER 30 — — — 8'-0
℄ PIER 31 — — — 8'-0
℄ PIER 32 — — — 8'-0
℄ PIER 33 — — — 8'-0
℄ PIER 34 — — — 8'-0
℄ PIER 35 — — — 8'-0
℄ PIER 36 — — — 8'-0
℄ PIER 37 — — — 8'-0
℄ PIER 38 — — — 8'-0
℄ PIER 39 — — — 8'-0
℄ PIER 40 — — — 8'-0
℄ PIER 41 — — — 8'-0
℄ PIER 42 — — — 8'-0
℄ PIER 43 — — — 8'-0
℄ PIER 44 9/16 — — 8 1/16
℄ PIER 45 1'-7 10'-0 31'-5 9/16 —
℄ PIER 46 5'-2 5/16 10'-0 1/16 32'-8 1/16 —
℄ PIER 47 10'-11 1/16 10'-0 1/16 33'-10 3/16 —
℄ PIER 48 18'-9 3/16 10'-0 3/16 35'-1 3/16 —
℄ PIER 49 28'-8 3/16 10'-0 1/16 36'-4 5/16 —
℄ PIER 50 40'-9 1/16 10'-1 37'-7 1/16 —
℄ PIER 51 54'-11 1/16 10'-1 1/16 38'-11 —
℄ BRG. W. ABUT 70'-10 1/16 — — —
CURVE DATA
℄ N.B. LANE I H 43
PI = STA 896+87.267
Δ = 22° 30' 57.87"
D = 0° 50'
T = 1,372.782'
L = 2,709.927'
R = 6,875.494'
SE = 0.027 ft.
RO = 200'
No. Date Revision By
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
Const. Spec. 1975 Project No. 4.2.4 Plans Checked KOK
SUBSTRUCTURE LAYOUT
PIER 26 — W ABUT
SHEET 18 OF 41
X55523

WISDOT DTID

FORM E 8-12-69

1001, 1002, 1003, 1004 - PIERS 9 THRU 17
1101, 1102, 1103, 1104 - PIERS 18 THRU 25

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-72		
FEDERAL PROJECT DESIGNATION	7 18	

CAP PLAN

ELEVATION

SECTION A1

SECTION A2

SECTION THRU CAP BETWEEN GIRDERS
PIERS 9, 10, 11, 13, 14, 15 & 17 ONLY.

SECTION A3

BUNDLED BARS LAYOUT

SECTION A4

SECTION A5

NOTE FOR BILL OF BARS SEE SH 20.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Spec 1975 | Drawn BAS | Plans Checked BMW

PIER DETAILS
PART A

SHEET 19 OF 41

X55524

Form C.B.12.68

PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-72	719	
FEDERAL PROJECT DESIGNATION		

NOTE THE FIRST DIGIT OF A THREE DIGIT MARK AND THE FIRST TWO DIGITS OF A FOUR DIGIT MARK SIGNIFIES THE BAR SIZE.

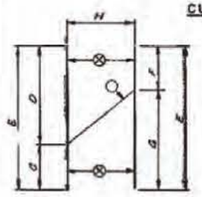
ALL BAR DIMENSIONS ARE OUT TO OUT

① PIERS 9 THRU 17
② PIERS 18 THRU 25
③ PIERS 9 THRU 25
④ PIERS 9,10,11,13,14,15 & 17 ONLY

† NUMBER REQUIRED AND WEIGHT ARE FOR EACH PIER

† PIERS 9,10,11,13,14,15 & 17 45,510 LBS.
† PIERS 12 & 16 45,220 LBS.
† PIERS 18 THRU 25 47,930 LBS.

CUTTING DIAGRAM



○ MARK AND CUT ALL BARS ALONG THIS LINE MAKE ALL CUTS NORMAL TO BAR AXIS

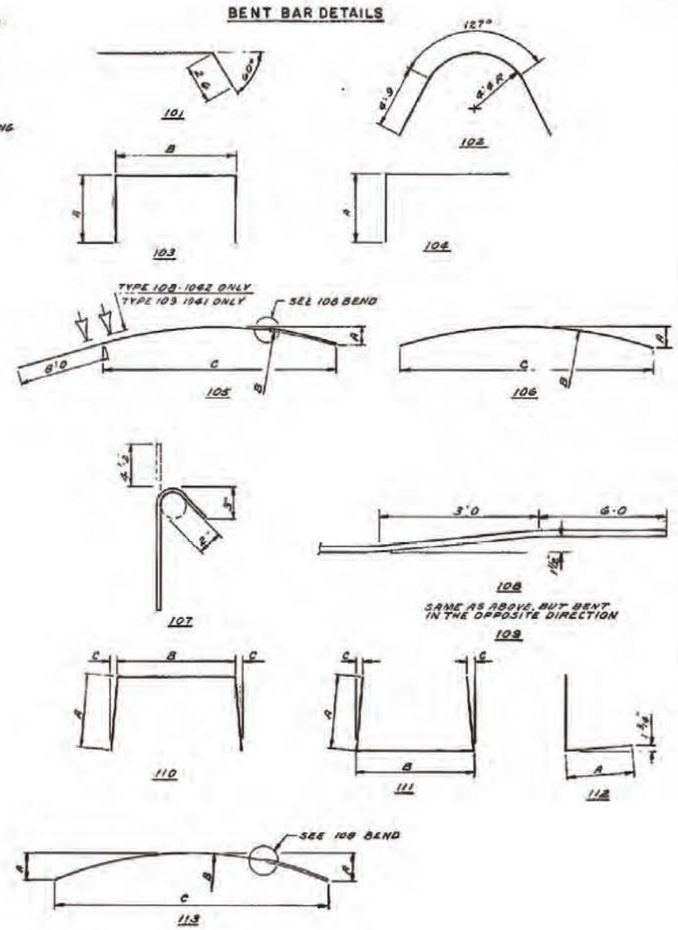
⊗ BUNDLE AND MARK CUT BARS WITH BAR AND SET NUMBER

"H" IS THE NUMBER OF BARS IN A CUTTING DIAGRAM BEFORE CUTTING

BENT BARS SHALL BE BENT AFTER CUTTING

MARK	C.	D	E	F	G	H	SETS REQD.
1007	SET 1	14-11	32 3	47 2	14 11	32 3	9	2
511	SET 2	7-7	13-5	21-0	7 7	13-5	9	4
513	SET 3	7 1½	12 3½	19 5	7 1½	12 3½	6	4
430	SET 4	16 6	20-6	37-0	16 6	20-6	7	8
431	SET 5	13 6	16 1	29 7	13-6	16 1	7	8
432	SET 6	11 0	13-3	24-0	11 0	13-3	6	8
434	SET 7	23-5	30-3	53-8	23-5	30-3	7	4
435	SET 8	17-6	22 6	39-10	17-6	22-6	7	4
436	SET 9	14 0	16 8	30-8	14-0	16 8	6	4

BENT BAR DETAILS



WIRE BARS TOGETHER AS SHOWN AT 2.0 CENTERS.

BUNDLING DETAIL

BILL OF BARS

MARK	NO REQD	LENGTH CUT	BUND	BEND TYPE	BEND DIMENSIONS A	B	C	LOCATION
1001	14	60-0	X	101				CAP-TOP
1002	14	37-8	X	101				" "
1003	12	60-0	X					" "
1004	12	32 7	X					" "
1101	14	60-0	X	101				CAP-TOP
1102	14	39-2	X	101				" "
1103	12	60-0	X					" "
1104	12	34-1	X					" "
1005	22	60-0						CAP-SIDES
1006	4	39-0						" "
1007	9	47 2	X					" "
1008	5	23-0						" BOTTOM
108	7	13-0		102				" & SHAFT
510	64	9-5		110	2 0	5-8	1"	"
511	18	21 0	X	112	4-4½			"
512	18	9-4		103	2 5	4 8		"
513	12	19-5	X	104	3 7			"
514	12	13-0		104	3-7			"
515	92	9-6						"
516	23	15 6		110	7-1	5 8	3"	"
517	23	16-1		111	5 0	6 9	2"	"
1018	10	27-0		105	10"	55-6	18-10	SHAFT & CAP
1019	20	26-8		108 - BOTH ENDS				" " "
1020	36	26-3		108	"	"		" " "
1021	8	27-3		108	"	"		" " "
1022	8	27-11		108	"	"		" " "
1023	8	28-8		108	"	"		" " "
1024	4	17-2		108 ONE END				" " "
1025	8	36-11		113	3 8½	47-3	36-0	" " "
1026	4	29-1		106	2-1	50 0	28-8	" " "
1027	4	29-7		106	2 1	52-9	29-4	" " "
1028	4	30-0		106	2-0	55 6	29 5	" " "
1029	10	33-5		113	2 4½	38 3	32 11½	" " "
430	28	37-0	X	104	6-4			" - TIES
431	28	29 7	X	105	4-7			"
432	24	25-0	X	104	4 3			"
433	40	16-5		103	6 0	4 8		"
434	14	53-8	X	107				"
435	14	39-10	X	107				"
436	12	30-9	X	107				"
437	90	5-1		107				"
438	40	5-10		103	8"	4 8		"
439	80	5-0		107				"
440	1868	2-5		107				"
1041	2	27-0		105-108				" - CORNER
1042	2	27-0		105-108	BOTH ENDS			" "
743	40	3-6						CAP-DOWELS-BETW GIRDERS

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Local Spec. 1975 | Drawn By S.A.S | Plans Checked BMW

BILL OF BARS
PART A

SHEET 20 OF 41

X 55525

WISDOT DTID

FORM E 8-12-69

PROJECT I.D. 1220-5-12 | SHEET NUMBER 720 | TOTAL SHEETS

FEDERAL PROJECT DESIGNATION

NOTE: VERTICAL BARS IN PART C ARE 1199.

° INDICATES VERT BARS FROM PART 'C'

* INDICATES VERT BARS FROM PART 'B'

SECTION B1

HORIZ. BARS NOT INDICATED ARE #7@

FOR VERT BAR STEEL IN PART 'B' SEE ELEVATION PART 'B'.

SECTION B2

SECTION B3

SECTION C1

SECTION C2

SECTION C3

1050 THRU 1069 - PIERS 9 THRU 17
1151 THRU 1169 - PIERS 18 THRU 25

ELEVATION

END VIEW

ELEVATION PART 'B'

POINT OF TANGENCY

FOR BILL OF BARS OF PARTS B & C SEE SH 22

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1975 | Drawn By LOY | Plans Checked BMW

PIER DETAILS
PARTS 'B' & 'C'

SHEET 21 OF 41

X55526

WISDOT DTID

FORM E 5-12-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-72	721	
FEDERAL PROJECT DESIGNATION		

BILL OF BARS - PART 'B'

PIERS 11,14,15,16 & 17 19,850 LBS. EA.
PIERS 18 THRU 25 24,520 LBS. EA.

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSIONS A	B	C	LOCATION
1050	16	36-1	110	58-3			COLUMN
1051	4	36-1	"	56-10½			"
1052	4	36-1	"	55-6			"
1053	4	36-1	"	54-1½			"
1054	4	36-1	"	52-9			"
1055	4	36-1	"	51-4½			"
1056	4	36-1	"	50-0			"
1057	4	36-1	"	48-7½			"
1058	16	36-1	"	47-3			"
1059	4	36-1	"	45-0			"
1060	4	35-10	109	170°	24-0		"
1061	4	35-10	"	171°	24-0		"
1062	4	35-11	"	172°	24-1		"
1063	4	35-11	"	173°	24-1		"
1064	4	35-11	"	174°	24-1		"
1065	4	36-0	"	175°	24-2		"
1066	4	36-0	"	176°30'	24-2		"
1067	4	36-0	"	177°30'	24-2		"
1068	4	36-1	"	178°30'	24-3		"
1069	28	36-1					"
1150	16	36-1	110	58-3			COLUMN
1151	4	36-1	"	56-10½			"
1152	4	36-1	"	55-6			"
1153	4	36-1	"	54-1½			"
1154	4	36-1	"	52-9			"
1155	4	36-1	"	51-4½			"
1156	4	36-1	"	50-0			"
1157	4	36-1	"	48-7½			"
1158	16	36-1	"	47-3			"
1159	4	36-1	"	45-0			"
1160	4	35-10	109	170°	24-0		"
1161	4	35-10	"	171°	24-0		"
1162	4	35-11	"	172°	24-1		"
1163	4	35-11	"	173°	24-1		"
1164	4	35-11	"	174°	24-1		"
1165	4	36-0	"	175°	24-2		"
1166	4	36-0	"	176°30'	24-2		"
1167	4	36-0	"	177°30'	24-2		"
1168	4	36-1	"	178°30'	24-3		"
1169	28	36-1					"

① ②

BILL OF BARS - PART 'B'

PIERS 11 & 14 THRU 25 9,370 LBS. EA.

MARK	NO. REQD.	LENGTH	BEND TYPE	BEND DIMENSIONS A	B	C	LOCATION
470	80	12-0	104	5-1			COLUMN
471	80	7-4	107				"
472	80	5-6	"				"
473	20	18-10	103	7-2	4-8		"
474	40	7-6	107				"
475	120	3-8	"				"
476	2440	2-6	"				"
477	80	10-8	104	5-5½			"
478	80	5-9	107				"
479	80	5-10	"				"
480	20	18-9	103	7-1½	4-8		"
481	40	7-6	107				"
482	40	19-1	103	5-5½	7-8		"
483	80	5-2	107				"
484	80	6-2	"				"
485	20	17-10	103	6-8	4-8		"
486	40	7-0	107				"

NOTE
THE FIRST DIGIT OF A THREE DIGIT MARK AND THE FIRST TWO DIGITS OF A FOUR DIGIT MARK SIGNIFIES THE BAR SIZE.

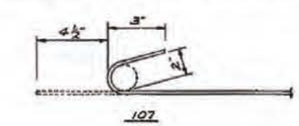
ALL BAR DIMENSIONS ARE OUT TO OUT OF BAR.

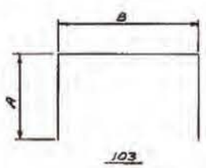
① PIERS 11, 14, 15, 16 & 17.
② PIERS 18 THRU 25.

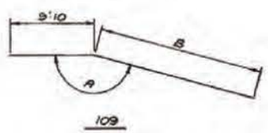
BILL OF BARS - PART 'C'

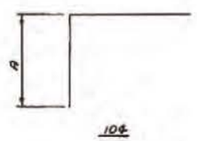
PIERS 23, 24 & 25 34,670 LBS. EA.

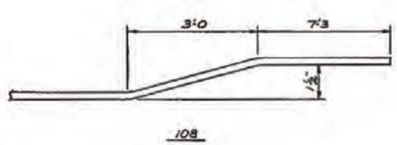
MARK	NO. REQD	LENGTH	BEND TYPE	BEND DIMENSIONS A	B	C	LOCATION
475	120	3-8	107				COLUMN
476	2560	2-4	"				"
483	240	5-2	"				"
487	40	19-9	103	6-1½	7-8		"
488	80	6-6	107				"
489	20	16-6	103	6-0	4-8		"
490	40	6-4	107				"
491	40	20-5	103	6-5½	7-8		"
492	80	6-10	107				"
493	20	15-2	103	5-4	4-8		"
494	40	5-8	107				"
495	40	21-1	103	6-3½	7-8		"
496	80	7-2	107				"
497	20	13-10	103	4-8	4-8		"
498	120	5-0	107				"
1199	128	37-6	108 EA END				"

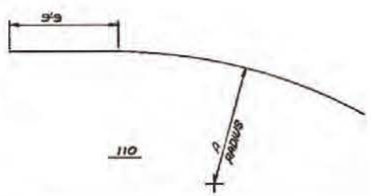












No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

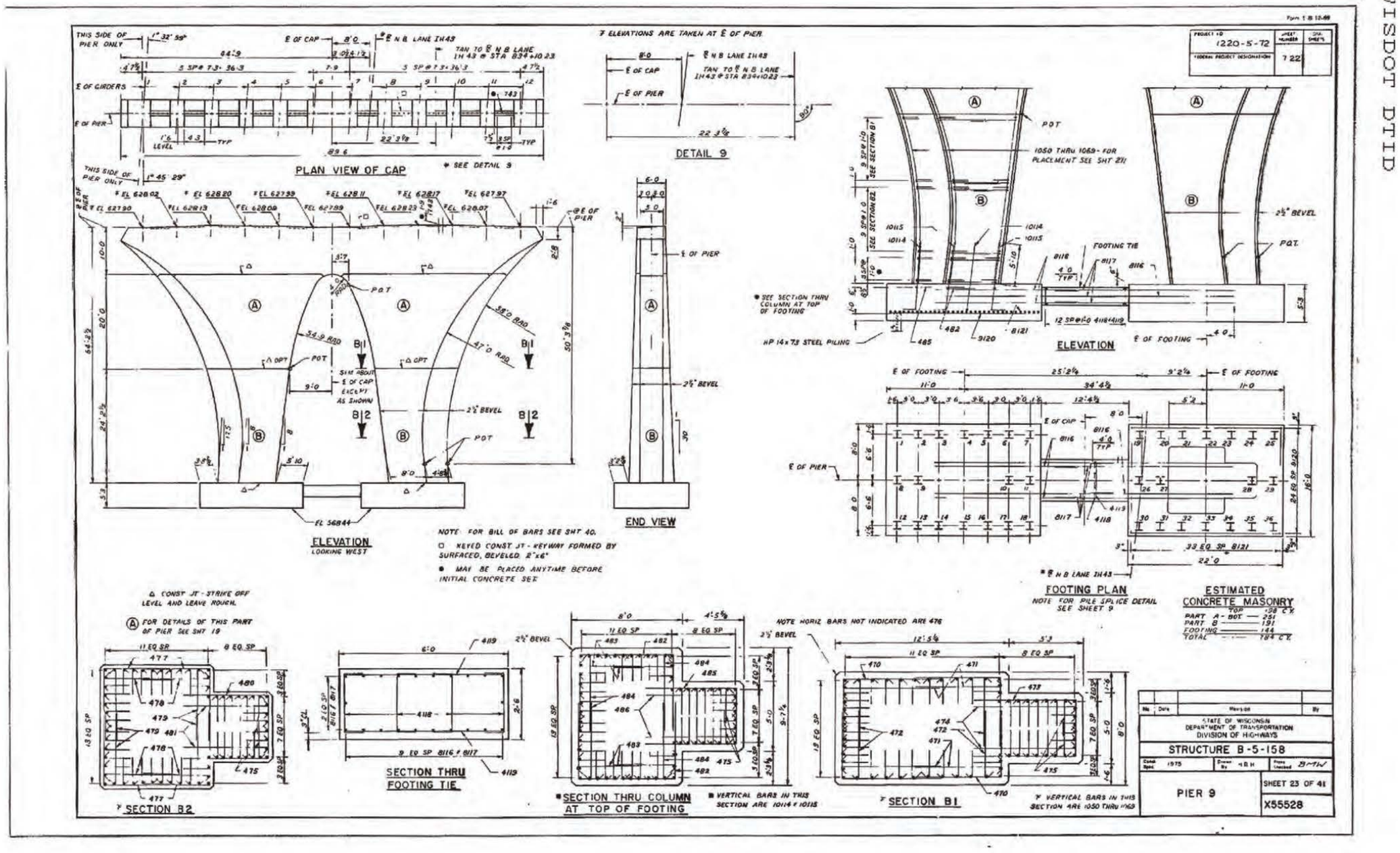
STRUCTURE B-5-158

Const. Year: 1975	Drawn By: LOY	Plans Checked: BMW

BILL OF BARS
PARTS 'B' & 'C'

SHEET 22 OF 41

X 55527


PLAN VIEW OF CAP
DETAIL 9
ELEVATION
LOOKING WEST
END VIEW
ELEVATION
FOOTING PLAN
SECTION B2
SECTION THRU FOOTING TIE
SECTION THRU COLUMN AT TOP OF FOOTING
SECTION B1
ESTIMATED CONCRETE MASONRY
PART A - BOT — 251
PART B — 191
FOOTING — 144
TOTAL — 584 C.Y.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 9
SHEET 23 OF 41
X55528

WISDOT DTID

WISDOT DTID

PLAN VIEW OF CAP

DETAIL 10

ELEVATION
LOOKING WEST

END VIEW

ELEVATION

FOOTING PLAN

ESTIMATED CONCRETE MASONRY

SECTION B2

SECTION THRU FOOTING TIE

SECTION THRU COLUMN AT TOP OF FOOTING

SECTION B1

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 10

SHEET 24 OF 41

X55529

WISDOT DTID

PROJECT ID 1220-5-72 | SHEET NUMBER 724

PLAN VIEW OF CAP

DETAIL II

ELEVATION

ELEVATION
LOOKING WEST

END VIEW

FOOTING PLAN
NOTE FOR PILE SPLICE DETAIL SEE SHEET 9.

SECTION THRU FOOTING TIE

SECTION THRU COLUMN AT TOP OF FOOTING

SECTION C1

ESTIMATED CONCRETE MASONRY

TOP	190 C.Y.
PART A - BOT	251
PART B	234
PART C	12
FOOTING	131
TOTAL	826 C.Y.

Δ CONST JT STRIKE OFF LEVEL AND LEAVE ROUGH

(A) FOR DETAILS OF THIS PART OF PIER SEE SHT 19.

(B) FOR DETAILS OF THIS PART OF PIER SEE SHT 21.

□ KEYED CONST JT - KEYWAY FORMED BY SURFACED, BEVELED, 2½".

● MAY BE PLACED ANY TIME BEFORE INITIAL CONCRETE SET.

FOR THE BILL OF BARS SEE SHT 41

NOTE HORIZ BARS NOT INDICATED ARE 476 VERTICAL BARS NOT INDICATED ARE 10114 AND 10115.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER II

SHEET 25 OF 41

X55530

WISDOT DTID

PLAN VIEW OF CAP

DETAIL 12

ELEVATION
LOOKING WEST

END VIEW

ELEVATION

FOOTING PLAN

SECTION B2

SECTION THRU FOOTING TIE

SECTION THRU COLUMN AT TOP OF FOOTING

SECTION B1

ESTIMATED CONCRETE MASONRY

TOP	98 C Y
PART A - 801	254
PART B	198
FOOTING	127
TOTAL	774 C Y

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158.

PIER 12

SHEET 26 OF 41

X55531

PLAN VIEW OF CAP

DETAIL 13

ELEVATION
LOOKING WEST

END VIEW

ELEVATION

FOOTING PLAN

SECTION B2

SECTION THRU FOOTING TIE

SECTION THRU COLUMN AT TOP OF FOOTING

SECTION B1

ESTIMATED CONCRETE MASONRY

PART A	TOP	198 CY
	BOT	231
PART B		227
FOOTING		181
TOTAL		837 CY

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 13

SHEET 27 OF 41

X55532

WISDOT DTID

PROJECT ID 1220-5-12 | SHEET NUMBER 727

PLAN VIEW OF CAP

ELEVATION
LOOKING WEST

DETAIL 14

ELEVATION

FOOTING PLAN

SECTION THRU FOOTING TIE

SECTION THRU COLUMN AT TOP OF FOOTING

SECTION C1

ESTIMATED CONCRETE MASONRY

	TOP	BOT
PART A		231
PART B		234
PART C		21
FOOTING		81
TOTAL		785 C Y

FOR BILL OF BARS SEE SHT 41

△ CONST JT - STRIKE OFF LEVEL AND LEAVE ROUGH.

Ⓐ FOR DETAILS OF THIS PART OF PIER SEE SHT 19.

Ⓑ FOR DETAILS OF THIS PART OF PIER SEE SHT 21.

□ KEYED CONST JT - KEYWAY FORMED BY SURFACED, BEVELED, 2'6".

■ MAY BE PLACED ANY TIME BEFORE INITIAL CONCRETE SET.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 14

SHEET 28 OF 41

X 55533

PLAN VIEW OF CAP

DETAIL 15

ELEVATION
LOOKING WEST

ELEVATION

END VIEW

FOOTING PLAN

SECTION THRU
FOOTING TIE

SECTION THRU COLUMN
AT TOP OF FOOTING

** SECTION C1

ESTIMATED
CONCRETE MASONRY

TOP	132 C.Y.
PART A – BOT	231
PART B	234
PART C	48
FOOTING	141
TOTAL	876 C.Y.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 15

SHEET 29 OF 41

X55534

WISDOT DTID

PLAN VIEW OF CAP

DETAIL 16

ELEVATION

FOOTING PLAN

ELEVATION
LOOKING WEST

SECTION THRU
FOOTING TIE

END VIEW

SECTION THRU COLUMN
AT TOP OF FOOTING

SECTION C1

ESTIMATED
CONCRETE MASONRY

PART A -	TOP	198 C Y
	BOT	231
PART B		234
PART C		75
FOOTING		170
TOTAL		928 C Y

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

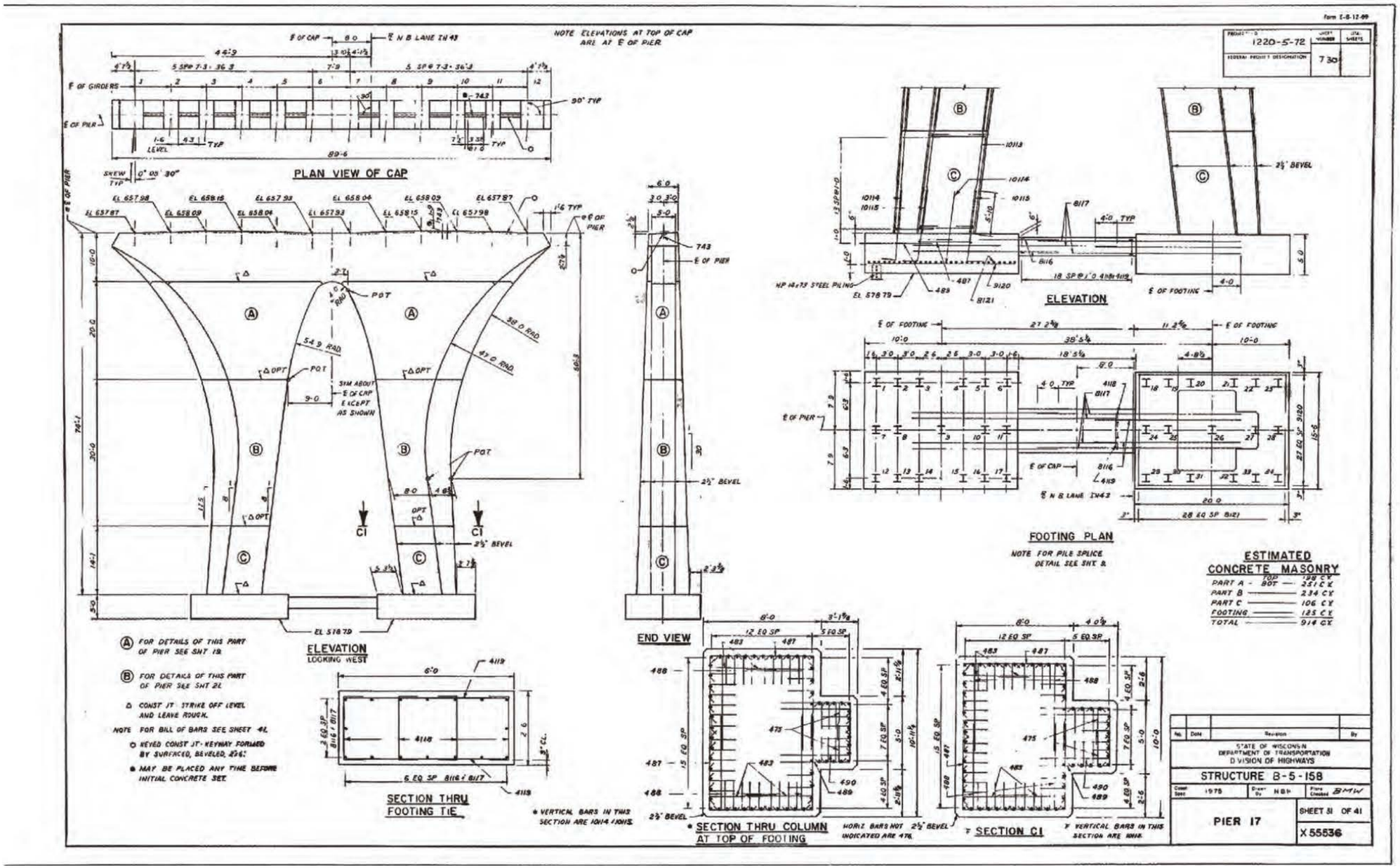
STRUCTURE B-5-158

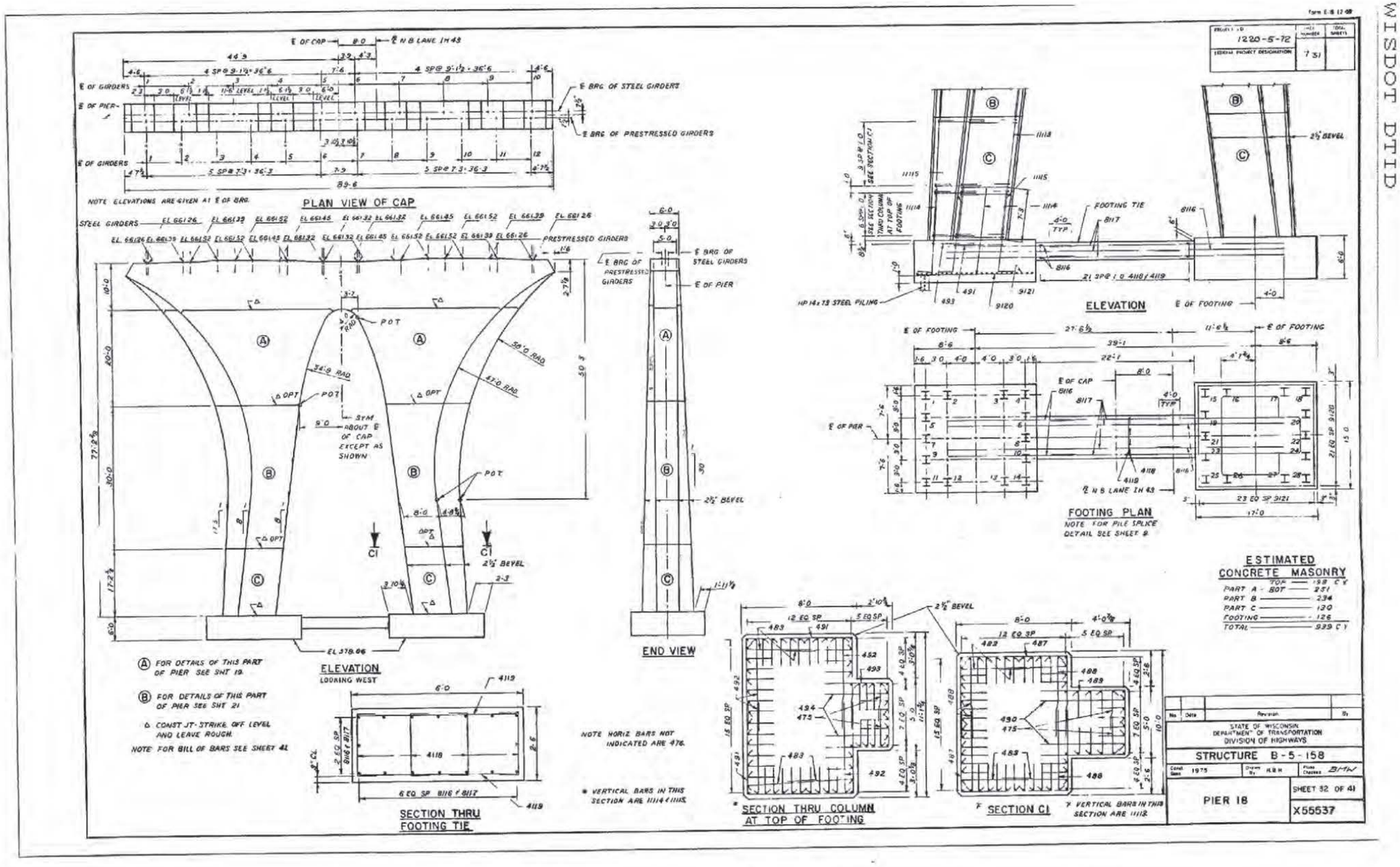
PIER 16

SHEET 30 OF 41

X55535

WISDOT DTID


NOTE ELEVATIONS AT TOP OF CAP ARE AT ℄ OF PIER
PLAN VIEW OF CAP
ELEVATION
LOOKING WEST
END VIEW
ELEVATION
FOOTING PLAN
NOTE FOR PILE SPLICE DETAIL SEE SHT 8
SECTION THRU FOOTING TIE
SECTION THRU COLUMN AT TOP OF FOOTING
SECTION C1
ESTIMATED CONCRETE MASONRY
PART A - TOP 198 CY
PART A - BOT 251 CY
PART B 234 CY
PART C 106 CY
FOOTING 185 CY
TOTAL 974 CY
Ⓐ FOR DETAILS OF THIS PART OF PIER SEE SHT 19.
Ⓑ FOR DETAILS OF THIS PART OF PIER SEE SHT 21.
△ CONST JT: STRIKE OFF LEVEL AND LEAVE ROUGH.
NOTE FOR BILL OF BARS SEE SHEET 41.
○ KEYED CONST JT - KEYWAY FORMED BY SURFACED, BEVELED, 2'x6".
* MAY BE PLACED ANY TIME BEFORE INITIAL CONCRETE SET.
* VERTICAL BARS IN THIS SECTION ARE 10114 / 10115.
* VERTICAL BARS IN THIS SECTION ARE 8118.
HORIZ BARS NOT INDICATED ARE #7.
1220-5-72
730
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
1975
HBH
SMW
PIER 17
SHEET 31 OF 41
X 55536


PLAN VIEW OF CAP
NOTE ELEVATIONS ARE GIVEN AT ℄ OF BRG.
ELEVATION
LOOKING WEST
END VIEW
ELEVATION
FOOTING PLAN
NOTE FOR PILE SPLICE DETAIL SEE SHEET 9
SECTION THRU FOOTING TIE
SECTION THRU COLUMN AT TOP OF FOOTING
SECTION C1
ESTIMATED CONCRETE MASONRY
TOP — 198 C Y
PART A - BOT — 251
PART B — 234
PART C — 130
FOOTING — 126
TOTAL — 939 C Y
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 18
SHEET 32 OF 41
X55537
1220-5-72
731
WISDOT DTID

WISDOT BTID

PLAN VIEW OF CAP

SECTION THRU FOOTING TIE

ELEVATION
LOOKING WEST

END VIEW

ELEVATION

FOOTING PLAN

ESTIMATED CONCRETE MASONRY

TOP	198 C Y
PART A — BOT	251
PART B	234
PART C	155
FOOTING	149
TOTAL	987 C Y

SECTION THRU COLUMN AT TOP OF FOOTING

SECTION C1

NOTE HORIZ BARS NOT INDICATED ARE #6

* VERTICAL BARS IN THIS SECTION ARE 1114 & 1115

* VERTICAL BARS IN THIS SECTION ARE 1113

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 19

SHEET 33 OF 41

X 55538

WISDOT DTID

PLAN VIEW OF CAP

SECTION THRU FOOTING TIE

ELEVATION

ELEVATION
LOOKING WEST

END VIEW

FOOTING PLAN

SECTION THRU COLUMN AT TOP OF FOOTING
VERTICAL BARS IN THIS SECTION ARE 1114 & 1115.

SECTION C1
VERTICAL BARS IN THIS SECTION ARE 1113.

NOTE HORIZ BARS NOT INDICATED ARE 476

NOTE FOR PILE SPLICE DETAIL SEE SHT 9

ESTIMATED CONCRETE MASONRY

PART A TOP	108 C Y
BOT	251
PART B	234
PART C	189
FOOTING	85
TOTAL	956 C Y

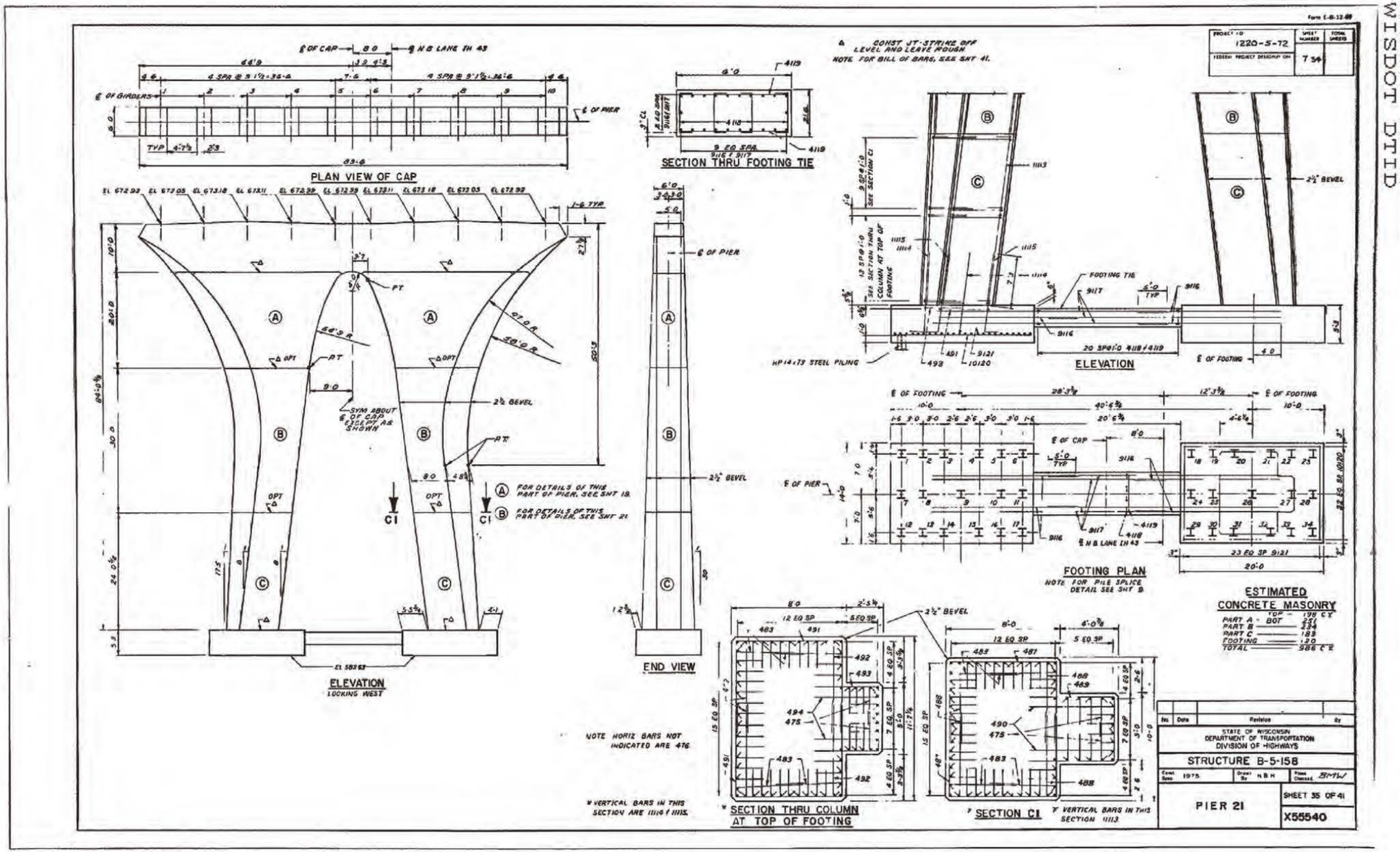
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 20

SHEET 34 OF 41

X56539


WISDOT BTID
PROJECT I.D. 1220-5-72
SHEET NUMBER 7 34
PLAN VIEW OF CAP
SECTION THRU FOOTING TIE
CONST JT-STRIKE OFF LEVEL AND LEAVE ROUGH
NOTE FOR BILL OF BARS, SEE SHT 41.
ELEVATION
FOOTING PLAN
NOTE FOR PILE SPLICE DETAIL SEE SHT 9
ESTIMATED CONCRETE MASONRY
TOP - 198 C.Y.
PART A - BOT 251
PART B 234
PART C 183
FOOTING 120
TOTAL 986 C.Y.
ELEVATION LOOKING WEST
END VIEW
NOTE HORIZ BARS NOT INDICATED ARE 476
SECTION THRU COLUMN AT TOP OF FOOTING
SECTION C1
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 21
SHEET 35 OF 41
X55540

WISDOT PTID

PLAN VIEW OF CAP

SECTION THRU FOOTING TIE

ELEVATION
LOOKING WEST

END VIEW

ELEVATION

FOOTING PLAN

NOTE FOR PILE SPLICE DETAIL SEE SHT 9

ESTIMATED CONCRETE MASONRY

	TOP	
PART A	BOT	198 C Y 251
PART B		324
PART C		170
FOOTING		163
TOTAL		1016 C Y

*SECTION THRU COLUMN AT TOP OF FOOTING

†SECTION C1

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 22

SHEET 36 OF 41

X 55541

PLAN VIEW OF CAP

ELEVATION LOOKING WEST

END VIEW

SECTION THRU FOOTING TIE

ELEVATION

FOOTING PLAN

NOTE FOR PILE SPLICE DETAIL SEE SHT 9.

SECTION THRU COLUMN AT TOP OF FOOTING

SECTION D1

ESTIMATED CONCRETE MASONRY

PART A -	TOP	198 C.Y.
	BOT	251
PART B		256
PART C		229
PART D		45
FOOTING		157
TOTAL		1114 C.Y.

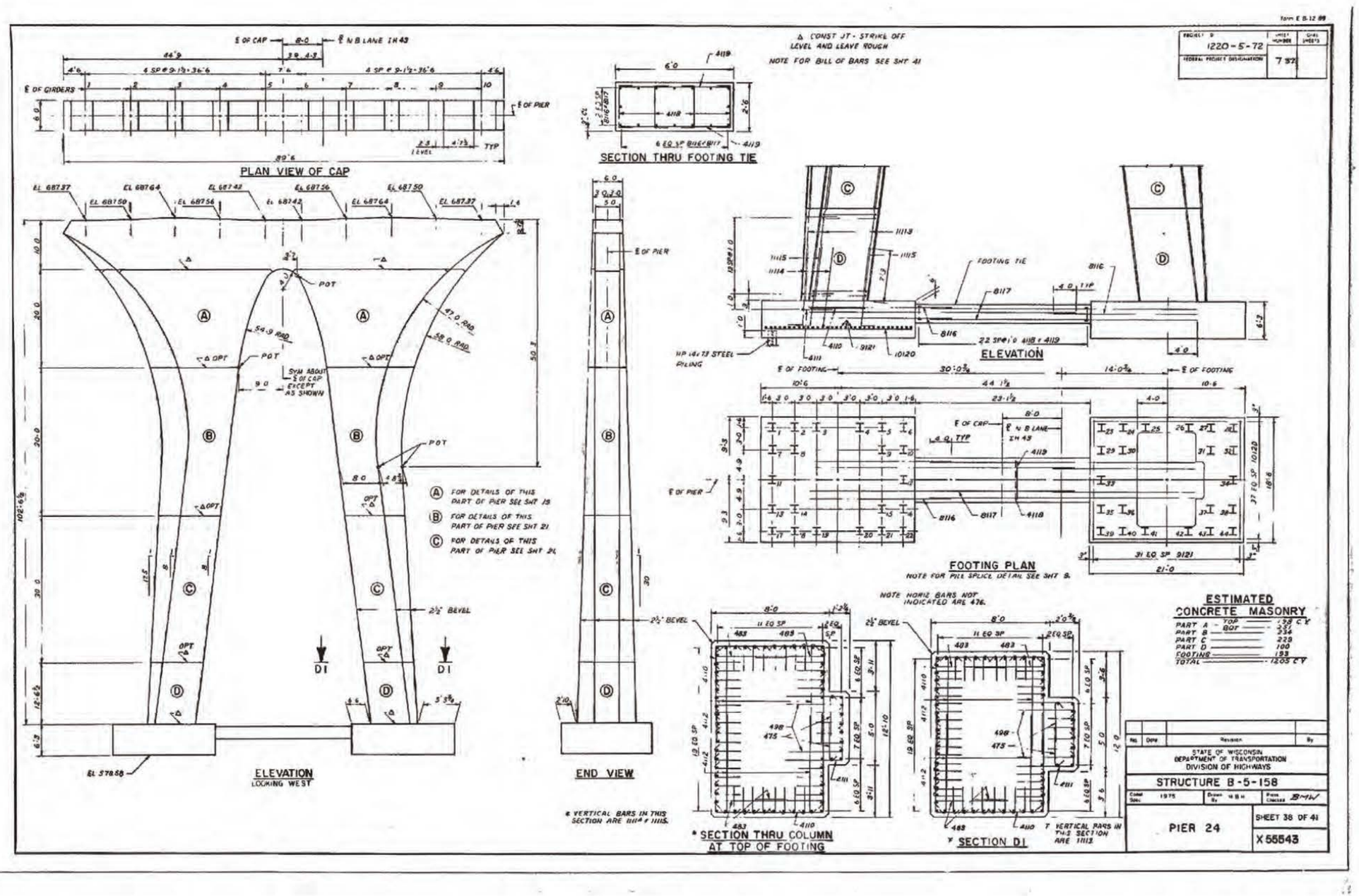
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 23

SHEET 37 OF 41

X55542


PLAN VIEW OF CAP
ELEVATION
LOOKING WEST
END VIEW
SECTION THRU FOOTING TIE
ELEVATION
FOOTING PLAN
NOTE FOR PILE SPLICE DETAIL SEE SHT 9.
* SECTION THRU COLUMN AT TOP OF FOOTING
Y SECTION D1
ESTIMATED CONCRETE MASONRY
PART A TOP 198 C.Y.
PART A BOT 251
PART B 234
PART C 229
PART D 100
FOOTING 193
TOTAL 1205 C.Y.
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 24
SHEET 38 OF 41
X 55543
1220-5-72
7 57

WISDOT DTID

WISDOT DLID

PLAN VIEW OF CAP

SECTION THRU FOOTING TIE

ELEVATION
LOOKING WEST

END VIEW

ELEVATION

FOOTING PLAN

SECTION THRU COLUMN AT TOP OF FOOTING

SECTION D1

ESTIMATED CONCRETE MASONRY

	TOP	
PART A	807	251
PART B		234
PART C		229
PART D		98
FOOTING		178
TOTAL		1188 C.Y.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

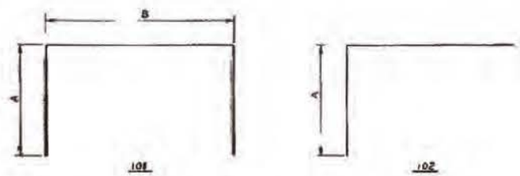
PIER 25

SHEET 39 OF 41

X55544

WISDOT DTID

FROJ.	I.D.	Sheet Number	Cross Section
	1220-5-12		
FEDERAL PROJECT DESIGNATION		739	



BILL OF BARS — PART B & FOOTING

PIER 9			PIER 10			PIER 12			PIER 13										
40,000 LBS.			40,040 LBS			39,170 LBS			44,460 LBS.										
MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	BEND TYPE	BEND A	BEND B					LOCATION
1050	16	30-3	1050	16	33-11	1050	16	31-1	1050	16	35-1	107	58°3						COLUMN
1051	4	30-4	1051	4	34-0	1051	4	31-2	1051	4	35-2	107	56-10½						"
1052	4	30-4	1052	4	34-0	1052	4	31-2	1052	4	35-2	107	55-6						"
1053	4	30-4	1053	4	34-0	1053	4	31-2	1053	4	35-2	107	54-1½						"
1054	4	30-4	1054	4	34-0	1054	4	31-2	1054	4	35-2	107	52-9						"
1055	4	30-4	1055	4	34-0	1055	4	31-2	1055	4	35-2	107	51-4½						"
1056	4	30-4	1056	4	34-0	1056	4	31-2	1056	4	35-2	107	50-0						"
1057	4	30-4	1057	4	34-0	1057	4	31-2	1057	4	35-2	107	48-7½						"
1058	16	30-4	1058	16	34-0	1058	16	31-2	1058	16	35-2	107	47-3						"
1059	4	30-3	1059	4	33-11	1059	4	31-1	1059	4	35-1	107	75-0						"
1060	4	30-1	1060	4	33-9	1060	4	30-11	1060	4	34-11	104	170°						"
1061	4	30-11	1061	4	33-9	1061	4	30-11	1061	4	34-11	104	171°						"
1062	4	30-1	1062	4	33 9	1062	4	30-11	1062	4	34-11	104	172°						"
1063	4	30-2	1063	4	33-10	1063	4	31 0	1063	4	35-0	104	173°						"
1064	4	30-2	1064	4	33 10	1064	4	31-0	1064	4	35-0	104	174°						"
1065	4	30-2	1065	4	33-10	1065	4	31 0	1065	4	35-0	104	175°						"
1066	4	30-3	1066	4	33-11	1066	4	31-1	1066	4	35-1	104	177°						"
1067	4	30-3	1067	4	33 11	1067	4	31-1	1067	4	35-1	104	178°						"
1068	4	30-3	1068	4	33-11	1068	4	31-1	1068	4	35-1	104	179°						"
1069	28	30-3	1069	28	33-11	1069	28	31-1	1069	28	35-1	106							"
470	80	12-0	470	80	12-0	470	80	12-0	470	80	12-0	102	5-1						"
471	80	7-4	471	80	7-4	471	80	7-4	471	80	7-4	105							"
472	80	5-6	472	80	5-6	472	80	5-6	472	80	5-6	105							"
473	20	18-10	473	20	18-10	473	20	18-10	473	20	18-10	101	7-2	4-8					"
474	40	7-6	474	40	7-6	474	40	7-6	474	40	7-6	105							"
475	96	3-8	475	112	3-8	475	100	3 8	475	116	3-8	105							"
476	2112	2-4	476	2464	2-4	476	2200	2-4	476	2552	2 4	105							"
477	80	10-9	477	80	10-9	477	80	10-9	477	80	10-9	102	5-4						"
478	80	5-9	478	80	5-9	478	80	5-9	478	80	5-9	105							"
479	80	5-10	479	80	5-10	479	80	5-10	479	80	5-10	105							"
480	20	18-9	480	20	18-9	480	20	18-9	480	20	18-9	101	7-1½	4-8					"
481	40	7-6	481	40	7-6	481	40	7-6	481	40	7 6	105							"
482	20	18-8	482	36	18-11	482	24	18-9	482	40	19 1	101	▲	7-8					" AND FOOTING
483	32	5-2	483	64	5-2	483	40	5-2	483	72	5 2	105							"
484	32	5-11	484	64	6-1	484	40	6-0	484	72	6 2	105							"
485	10	17-10	485	18	17-10	485	12	17 10	485	20	17-10	101	6-8	4-8					" AND FOOTING
486	16	7-0	486	32	7 0	486	20	7-0	486	36	7-0	105							"
10114	84	11-6	10114	84	10-7	10114	84	11-7	10116	84	12 1	102	1-10						FOOTING DOWEL
10115	44	11-4	10115	44	10 7	10115	44	11-7	10115	44	12-1	103							"
* 8116	22	20-0	8116	18	26-0	8116	20	20-0	8116	20	20 0								" TIE
* 8117	22	26-3	8117	18	27-1	8117	20	26-7	8117	20	27 5								" "
* 4118	52	3-2	4118	72	3-3	4118	68	3 3	4118	56	3-3	101	0-8	2-1					" "
* 4119	26	5-8	4119	36	5-8	4119	34	5 8	4119	28	5 8								" "
9120	50	21 8	9120	44	16-8	9120	42	17 2	9120	50	21-2								"
8121	68	15-8	8121	42	14-8	9121	46	16 2	9121	56	15-8								"

THE FIRST DIGIT OR THE FIRST AND SECOND DIGITS OF A BAR MARK SIGNIFIES THE BAR SIZE
ALL BAR DIMENSIONS ARE OUT TO OUT OF BAR.

* COATED BARS

▲"A" DIMENSION BAR 482 PIER 9 - 5'7
PIER 10 - 5'8½
PIER 12 - 5'7½
PIER 13 - 5'9½

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec.	Drawn By	Traced By
1975	H S N	B-TH

BILL OF BARS
PIERS 9,10,12 & 13

SHEET 40 OF 41

X55545

Form F 8 17 89

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-72	140	
FEDERAL PROJECT DESIGNATION		

BILL OF BARS — PART C & FOOTING

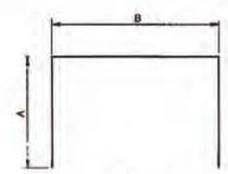
PIER 11			PIER 14			PIER 15			PIER 16			PIER 17			PIER 18			PIER 19			PIER 20			PIER 21			PIER 22			BEND			
16,600 LBS			14,520 LBS			24,490 LBS			28,220 LBS			30,030 LBS.			38,560 LBS.			44,170 LBS.			43,170 LBS.			47,940 LBS			47,210 LBS.						
MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	TYPE	A	B	LOCATION
475	8	3-8	475	12	3-8	475	28	3-8	475	40	3-8	475	56	3-8	475	68	3-8	475	84	3-8	475	100	3-8	475	96	3-8	475	92	3-8	105			COLUMN
476	176	2-4	476	264	2-4	476	616	2-4	476	880	2-4	476	1232	2-4	476	1436	2-4	476	1848	2-4	476	2200	2-4	476	2112	2-4	476	2024	2-4	105			"
483	16	5-2	483	24	5-2	483	56	5-2	483	80	5-2	483	112	5-2	483	136	5-2	483	168	5-2	483	200	5-2	483	192	5-2	483	184	5-2	105			"
487	12	19-3	487	16	19-3	487	32	19-6	487	44	19-9	487	60	20-0	487	40	19-9	487	40	19-3	487	52	20-0	487	40	19-9	487	44	19-9	101	▲	7-8	" AND FOOTING PIERS 11,14-17
488	16	6-3	488	24	6-3	488	56	6-4	488	80	6-6	488	112	6-7	488	80	6-6	488	80	6-6	488	104	6-7	488	80	6-6	488	88	6-6	105			"
489	6	16-6	489	8	16-6	489	16	16-6	489	22	16-6	489	30	16-6	489	20	16-6	489	20	16-6	489	26	16-6	489	20	16-6	489	22	16-6	101	6-0	4-8	" AND FOOTING PIERS 11,14-17
490	8	6-4	490	12	6-4	490	28	6-4	490	40	6-4	490	56	6-4	490	40	6-4	490	40	6-4	490	52	6-4	490	40	6-4	490	44	6-4	105			"
															491	32	20-9	491	48	20-6	491	52	20-9	491	60	20-9	491	52	20-8	101	▲	7-8	" AND FOOTING PIER 18-22
															492	56	6-3	492	88	6-10	492	96	7-0	492	112	7-0	492	96	6-11	105			"
															493	16	15-2	493	24	15-2	493	26	16-5	493	30	15-1	493	26	15-0	101	▲	4-8	" AND FOOTING PIER 18-22
															494	28	5-8	494	44	5-9	494	48	5-6	494	56	5-8	494	48	5-7	105			"
						10113	128	12-6	10113	128	16-0	10113	128	20-1	10113	128	24-7	10113	128	27-10	10113	128	32-2	10113	128	31-6	10113	128	29-10	106			"
10114	76	12-11	10114	76	12-11	10114	76	11-7	10114	76	12-2	10114	76	11-1	10114	76	13-7	10114	76	13-4	10114	76	11-10	10114	76	12-10	10114	76	13-7	108			FOOTING DOWEL
10115	52	12-11	10115	52	12-11	10115	52	11-7	10115	52	12-2	10115	52	11-1	10115	52	13-7	10115	52	13-4	10115	52	11-10	10115	52	12-10	10115	52	13-7	103			" "
8116	20	20-0	8116	18	20-0	8116	18	20-0	8116	16	20-0	8116	16	20-0	8116	16	20-0	8116	16	20-0	8116	16	20-0	8116	22	20-0	8116	18	20-0				" TIE
* 8117	20	27-10	8117	18	28-2	8117	18	28-11	8117	16	29-8	8117	16	30-6	8117	16	31-4	8117	16	31-10	8117	16	32-9	8117	22	33-7	8117	18	32-3				" "
* 4118	60	3-3	4118	76	3-3	4118	64	3-3	4118	64	3-3	4118	76	3-3	4118	88	3-3	4118	16	3-3	4118	104	3-3	4118	84	3-3	4118	76	3-3	101	0-8	2-1	" "
* 4119	30	5-8	4119	38	5-8	4119	32	5-8	4119	32	5-8	4119	38	5-8	4119	44	5-8	4119	38	5-8	4119	52	5-8	4119	42	5-8	4119	38	5-8				"
9120	30	20-8	9120	44	16-8	9120	52	20-8	9120	52	21-8	9120	56	19-8	9120	44	16-8	10120	48	20-8	8120	40	16-8	10120	46	19-8	10120	50	21-2				"
9121	64	14-8	8121	36	13-8	9121	54	15-2	9121	62	16-2	8121	58	15-2	9121	48	14-8	9121	58	15-2	7121	46	14-8	9121	48	13-8	9121	62	15-8				"

* COATED BARS

BILL OF BARS — PART D & FOOTING

PIER 23			PIER 24			PIER 25			BEND					
25,330 LBS			40,430 LBS			38,870 LBS.								
MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	MARK	NO REQ'D	LENGTH	TYPE	A	B	C	D	LOCATION
475	24	3-8	475	32	3-8	475	52	3-8	105					COLUMN
476	528	2-4	476	1144	2-4	476	1144	2-4	105					"
483	48	5-2	483	104	5-2	483	104	5-2	105					"
498	24	4-4	498	52	4-4	498	52	4-4	105					"
4110	28	21-6	4110	56	21-10	4110	56	21-10	101	▲	7-8			" AND FOOTING
4111	14	12-6	4111	28	12-6	4111	28	12-6	101	4-0	4-8			" " "
4112	48	7-5	4112	104	7-7	4112	104	7-7	105					"
			11113	128	19-11	11113	128	19-8	106					"
11114	60	19-5	11114	80	13-10	11114	60	13-10	108					FOOTING DOWEL
11115	68	19-5	11115	68	13-10	11115	68	13-10	103					" "
* 8116	16	20-0	8116	16	20-0	8116	16	20-0						" TIE
* 8117	16	35-1	8117	16	36-2	8117	16	36-1						" "
* 4118	88	3-3	4118	92	3-3	4118	92	3-3	101	0-8	2-1			" "
* 4119	44	5-8	4119	46	5-8	4119	46	5-8						" "
10120	50	20-8	10120	76	20-8	10120	64	20-8						"
9121	60	15-2	9121	64	18-2	9121	64	16-8						"

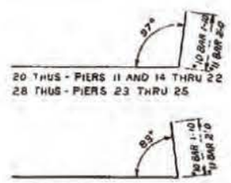
THE FIRST DIGIT OR THE FIRST AND SECOND DIGITS OF A BAR MARK SIGNIFIES THE BAR SIZE.
ALL BAR DIMENSIONS ARE OUT TO OUT OF BAR.



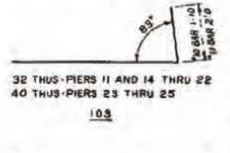
101

▲ DIMENSION "A"

BAR	487	491	493	4110
PIER 11	5-10½	—	—	—
PIER 14	5-10½	—	—	—
PIER 15	6-0	—	—	—
PIER 16	6-1½	—	—	—
PIER 17	6-3	—	—	—
PIER 18	6-1½	6-4½	5-4	—
PIER 19	6-1½	6-6	5-4	—
PIER 20	6-3	6-7½	5-1½	—
PIER 21	6-1½	6-7	5-3½	—
PIER 22	6-1½	6-7	5-8	—
PIER 23	—	—	—	7-0
PIER 24	—	—	—	7-2
PIER 25	—	—	—	7-2

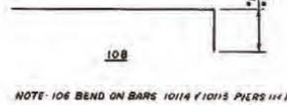


20 THUS - PIERS 11 AND 14 THRU 22
28 THUS - PIERS 23 THRU 25



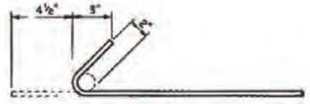
32 THUS - PIERS 11 AND 14 THRU 22
40 THUS - PIERS 23 THRU 25

103

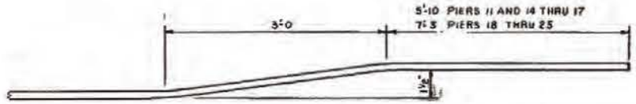


108

NOTE - 106 BEND ON BARS 10114 & 10115 PIERS 11 & 14



105



106
BEND BOTH ENDS OF BAR 10113 & 11113
PIERS 17-22
BEND ONE END OF BAR 11113
FOR PIERS 24 AND 25.

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec.	Drawn By	Proj. Engr.
1975	H.B.N.	BMW

BILL OF BARS
PIERS 11 AND
14 THRU 25

SHEET 41 OF 41

X55546

WISDOT DTID

FORM E 8 11-69

PROJECT I.D. 1220-5-73 — SHEET NUMBER 7 — TOTAL SHEETS

FEDERAL PROJECT DESIGNATION

*ATTACH BEAM TYPE GUARD RAIL TO WING PARAPETS.

TRAFFIC VOLUME
I-43
ADT = 18,900 (1974)
R 98 = 70 M P H

PLAN B-5-158

DESIGN DATA

LIVE LOAD:
DESIGN RATING: HS20 MOD
INVENTORY RATING:
OPERATIONAL RATING:
STRUCTURE IS DESIGNED FOR A FUTURE WEARING SURFACE OF 20 POUNDS PER SQUARE FOOT.
ALLOWABLE DESIGN STRESSES:
CONCRETE MASONRY: SLAB — f_c = 4,000 PSI; ALL OTHER — f_c = 3,500 PSI
BAR STEEL REINFORCEMENT (GRADE 60) — f_s = 60,000 PSI

STRUCTURAL LOW ALLOY STEEL (A S T M A588):
TO AND INCLUDING 4" THICK — f_y = 21,000 PSI
36" PRESTRESSED GIRDERS, CONCRETE MASONRY — f'_c = 6,000 PSI
STRANDS - 1/2"ϕ W EH ULTIMATE TENSILE STRENGTH OF 270,000 PSI

FOUNDATION DATA
FOR PILING INFORMATION SEE SUBSURFACE EXPLORATION SHEETS.

SUBSTRUCTURE PROJ 1220-5-73
PIERS 26 THRU 44

GENERAL NOTES
DRAWINGS SHALL NOT BE SCALED
BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2" CLEAR UNLESS OTHERWISE SHOWN OR NOTED.
ALL ELEVATIONS REFER TO INTERNATIONAL GREAT LAKES DATUM (1 6 L D) (1955) (U S G S + 1 6 L D. = 588 FEET).
THE UPPER LIMITS OF EXCAVATION FOR STRUCTURES FOR THE PIERS SHALL BE THE ORIGINAL GROUND LINE.
COATED BAR STEEL REINFORCEMENT USED IN FOOTING TIES.
SEE BILL OF BARS AND QUANTITY LISTING.

CURVE DATA

℄ SOUTHWEST RAMP
PI = STA 822+40.81
Δ = 10° 38' 02.5"
D = 3° 19' 49.8"
T = 160.11'
L = 319.38'
R = 1720.34'
SE = 0.057
RO = 1.5%
BC = STA 820+80.70
ET = STA 824+00.08

℄ NB LANE I-H 43
PI = STA 826+18.42
Δ = 2° 38' 21"
D = 0° 10'
T = 791.68'
L = 1583.30'
R = 34,377.49'
SE = NORMAL CROWN
BC = STA 818+26.78
ET = STA 834+10.23

ELEVATION
NORMAL TO SUBSTRUCTURE UNITS

TYPICAL SECTION THRU GREEN BAY & WESTERN RR., C.M ST.P & P RR. & QUINCY STREET

LAYOUT

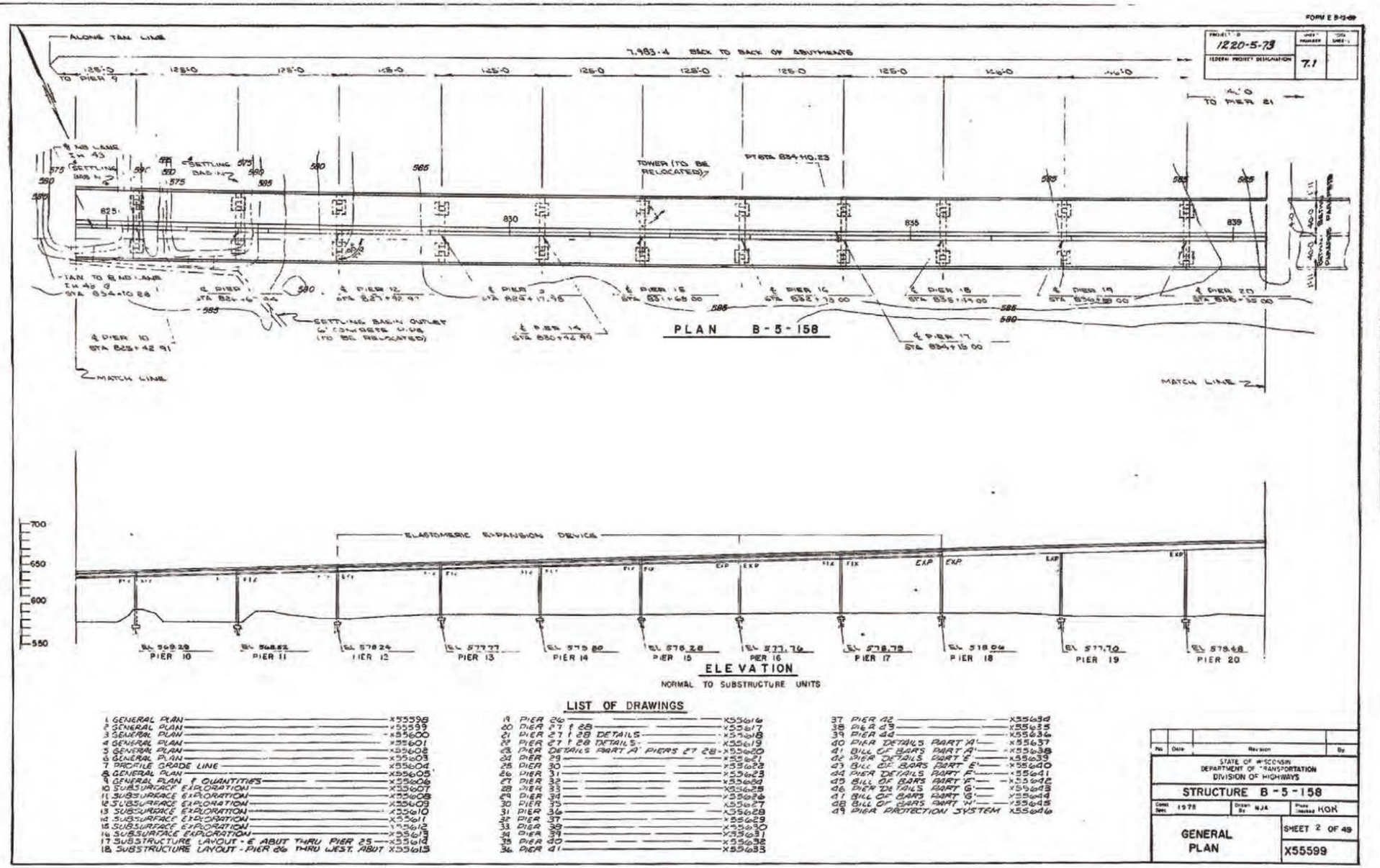
AS BUILT PLAN
DATE 11-'81 BY W.J.K.

PROPOSED I-H 43
STRUCTURE B-5-158

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158
INTERSTATE 43 OVER FOX RIVER
County BROWN — City or Village GREEN BAY
Design Spec A A S H O 1973 — Load HS20 MOD — Const Year 1975
Designed By CDW — Detailed By — Checked By CR — Drawn By MJA — Plans Checked By KOK
Approved W.A. Kline, Chief Bridge Engineer — 8-26-76 Date

GENERAL PLAN — SHEET 1 OF 49 — X55598



ELEVATION
NORMAL TO SUBSTRUCTURE UNITS

LIST OF DRAWINGS

1 GENERAL PLAN — X55598
2 GENERAL PLAN — X55599
3 GENERAL PLAN — X55600
4 GENERAL PLAN — X55601
5 GENERAL PLAN — X55602
6 GENERAL PLAN — X55603
7 PROFILE GRADE LINE — X55604
8 GENERAL PLAN — X55605
9 GENERAL PLAN & QUANTITIES — X55606
10 SUBSURFACE EXPLORATION — X55607
11 SUBSURFACE EXPLORATION — X55608
12 SUBSURFACE EXPLORATION — X55609
13 SUBSURFACE EXPLORATION — X55610
14 SUBSURFACE EXPLORATION — X55611
15 SUBSURFACE EXPLORATION — X55612
16 SUBSURFACE EXPLORATION — X55613
17 SUBSTRUCTURE LAYOUT - ℄ ABUT THRU PIER 25 — X55614
18 SUBSTRUCTURE LAYOUT - PIER 26 THRU WEST ABUT — X55615
19 PIER 26 — X55616
20 PIER 27 & 28 — X55617
21 PIER 27 & 28 DETAILS — X55618
22 PIER 27 & 28 DETAILS — X55619
23 PIER DETAILS PART A' PIERS 27 28 — X55620
24 PIER 29 — X55621
25 PIER 30 — X55622
26 PIER 31 — X55623
27 PIER 32 — X55624
28 PIER 33 — X55625
29 PIER 34 — X55626
30 PIER 35 — X55627
31 PIER 36 — X55628
32 PIER 37 — X55629
33 PIER 38 — X55630
34 PIER 39 — X55631
35 PIER 40 — X55632
36 PIER 41 — X55633
37 PIER 42 — X55634
38 PILE 43 — X55635
39 PIER 44 — X55636
40 PIER DETAILS PART A' — X55637
41 BILL OF BARS PART A' — X55638
42 PIER DETAILS PART E' — X55639
43 BILL OF BARS PART E' — X55640
44 PIER DETAILS PART F' — X55641
45 BILL OF BARS PART F' — X55642
46 PIER DETAILS PART G' — X55643
47 BILL OF BARS PART G' — X55644
48 BILL OF BARS PART H' — X55645
49 PIER PROTECTION SYSTEM — X55646

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

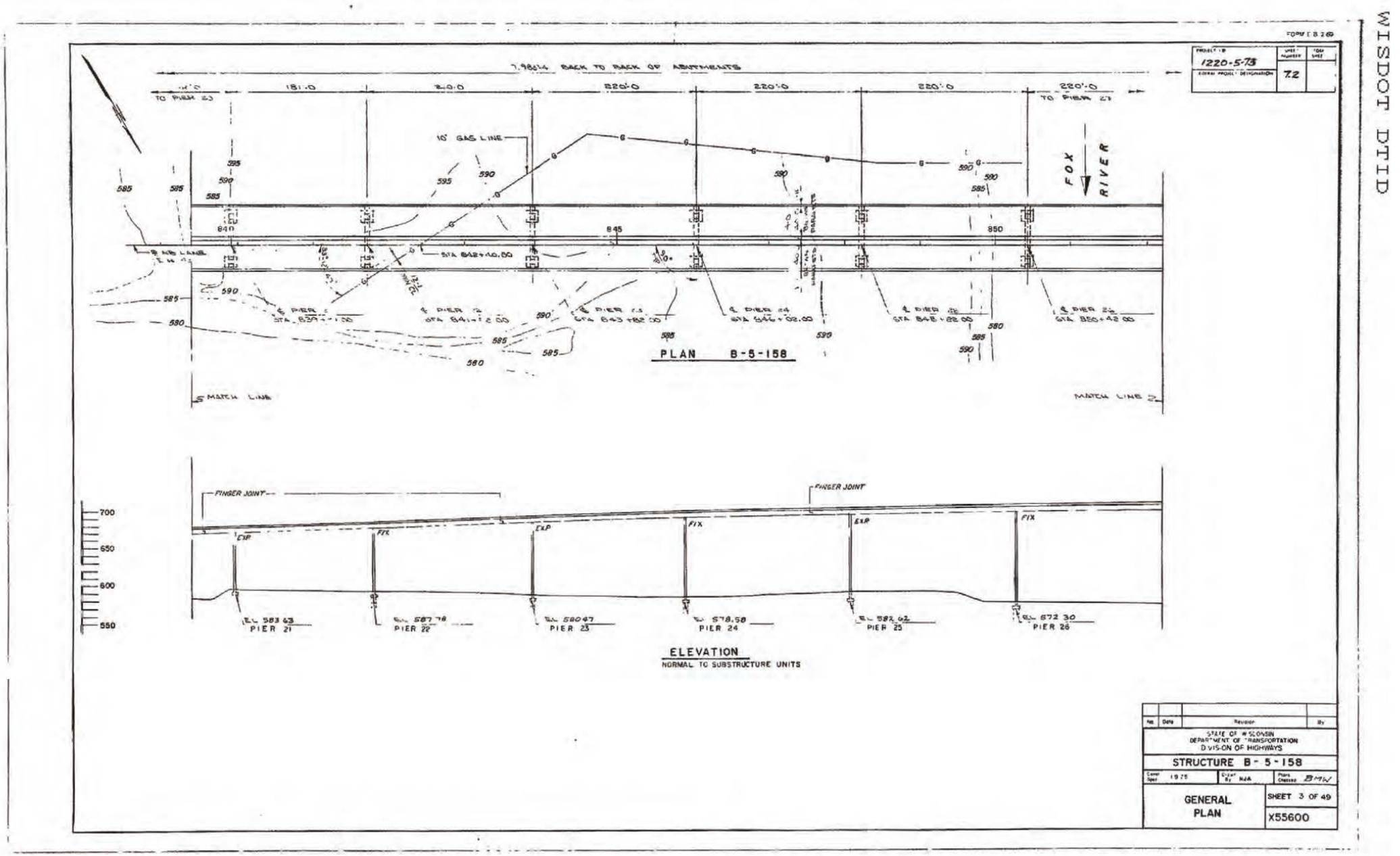
STRUCTURE B-5-158

Const. Spec. 1978	Drawn By NJA	Plans Checked KGH

GENERAL PLAN

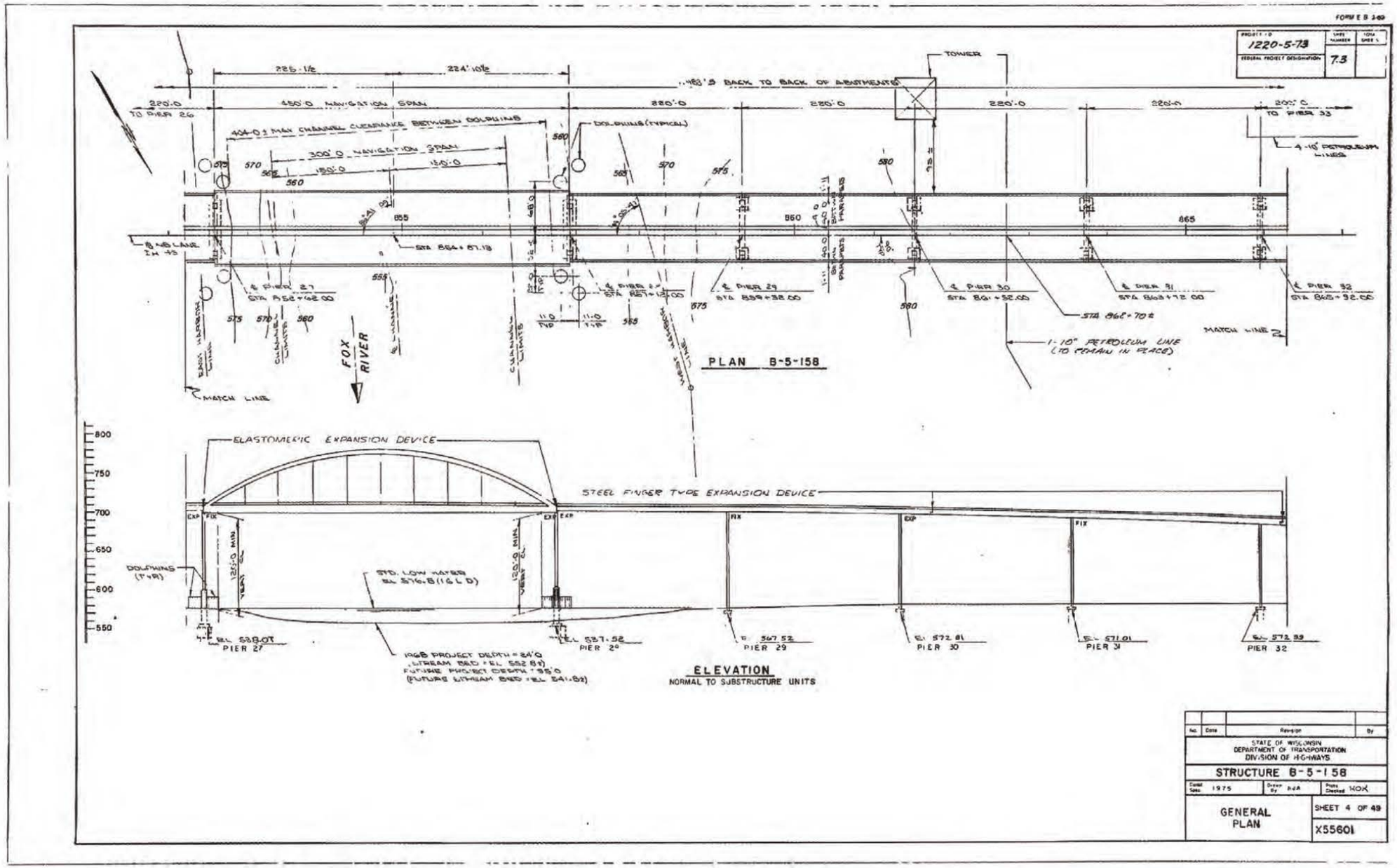
SHEET 2 OF 49

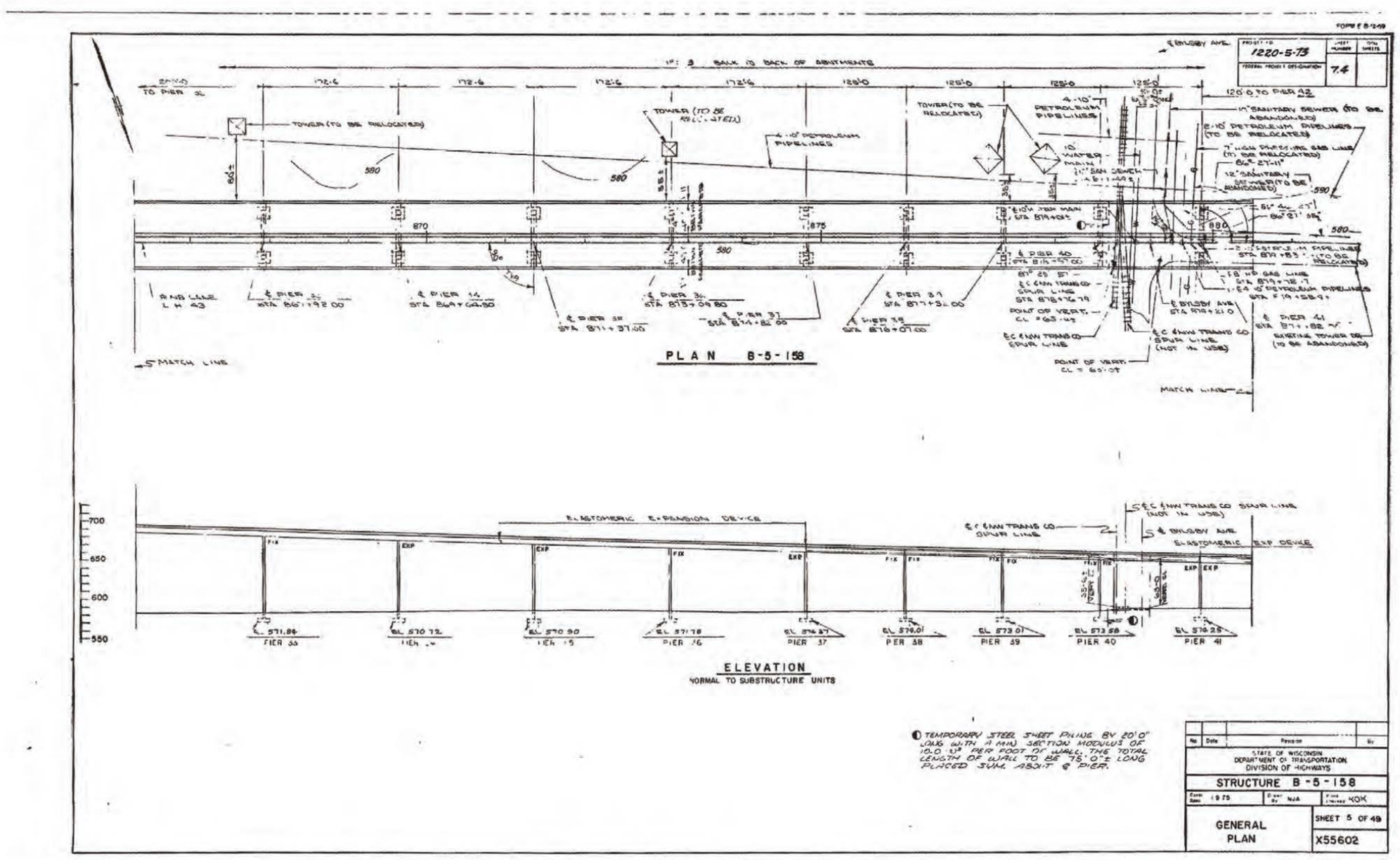
X55599


1,980.4' BACK TO BACK OF ABUTMENTS
181'-0
240'-0
220'-0
220'-0
220'-0
220'-0
TO PIER 20
TO PIER 27
10" GAS LINE
FOX RIVER
℄ NB LANE
STA 842+10.00
℄ PIER 21 STA 839+77.00
℄ PIER 22 STA 841+72.00
℄ PIER 23 STA 843+82.00
℄ PIER 24 STA 846+92.00
℄ PIER 25 STA 848+22.00
℄ PIER 26 STA 850+42.00
PLAN B-5-158
MATCH LINE
MATCH LINE
FINGER JOINT
FINGER JOINT
EXP
FIX
EXP
FIX
EXP
FIX
700
650
600
550
EL 583.63 PIER 21
EL 587.76 PIER 22
EL 580.47 PIER 23
EL 578.58 PIER 24
EL 582.62 PIER 25
EL 672.30 PIER 26
ELEVATION
NORMAL TO SUBSTRUCTURE UNITS
PROJECT I.D. 1220-5-73
SHEET NUMBER 7.2
TOTAL SHEETS
No. Date Revision By
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
Const. Spec. 1975
Drawn By N.M.A.
Plans Checked BMW
GENERAL PLAN
SHEET 3 OF 49
X55600

WISDOT DTID

WISDOT DTID

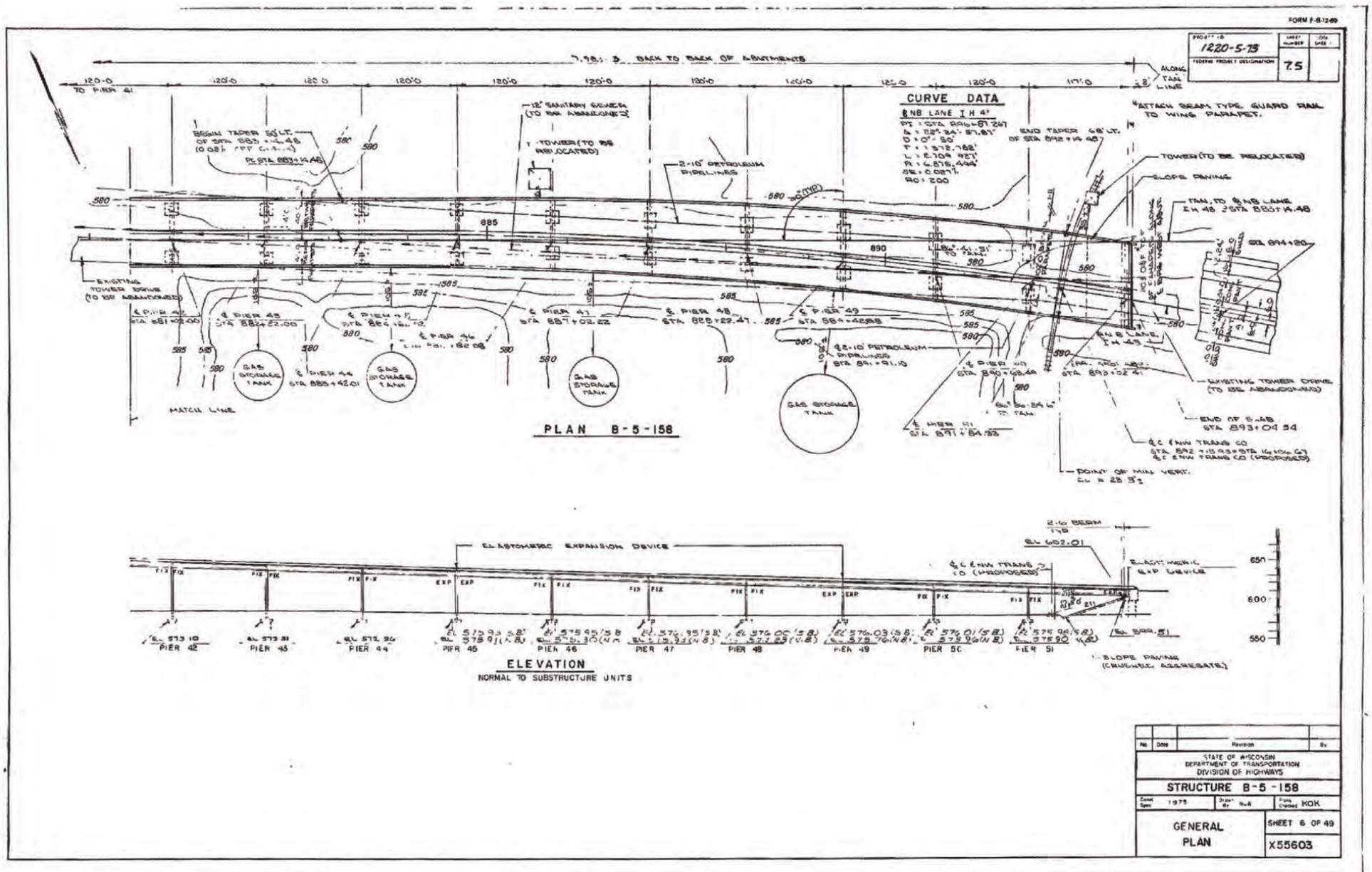

PROJECT I.D. 1220-5-73
FEDERAL PROJECT DESIGNATION 7.3
TOWER
225'-11/2
224'-10 1/2
450'-0 BACK TO BACK OF ABUTMENTS
220'-0
450'-0 NAVIGATION SPAN
220'-0
220'-0
220'-0
200'-0
TO PIER 26
TO PIER 33
404'-0± MIN CHANNEL CLEARANCE BETWEEN DOLPHINS
DOLPHINS (TYPICAL)
300'-0 NAVIGATION SPAN
150'-0
150'-0
4-16" PETROLEUM LINES
STA 864+67.18
℄ PIER 27 STA 856+62.00
℄ PIER 28 STA 861+12.00
℄ PIER 29 STA 859+32.00
℄ PIER 30 STA 861+52.00
℄ PIER 31 STA 863+72.00
STA 866+70±
℄ PIER 32 STA 865+92.00
MATCH LINE
1-10" PETROLEUM LINE (TO REMAIN IN PLACE)
FOX RIVER
PLAN B-5-158
ELASTOMERIC EXPANSION DEVICE
STEEL FINGER TYPE EXPANSION DEVICE
EXP
FIX
DOLPHINS (TYP)
STD. LOW WATER EL 576.8 (1965 D)
EL 538.07 PIER 27
EL 537.52 PIER 28
EL 567.52 PIER 29
EL 572.81 PIER 30
EL 571.01 PIER 31
EL 573.39 PIER 32
PGB PROJECT DEPTH = 24'0
(STREAM BED = EL 552.81)
FUTURE PROJECT DEPTH = 35'0
(FUTURE STREAM BED = EL 541.81)
ELEVATION
NORMAL TO SUBSTRUCTURE UNITS
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
Const. Spec. 1975
Drawn By HAA
Proj. Checked WOK
GENERAL PLAN
SHEET 4 OF 49
X55601


1220-5-73
7.4
PLAN B-5-158
ELEVATION
NORMAL TO SUBSTRUCTURE UNITS
ELASTOMERIC EXPANSION DEVICE
TEMPORARY STEEL SHEET PILING BY 20'0" LONG WITH A MIN SECTION MODULUS OF 10.0 in³ PER FOOT OF WALL. THE TOTAL LENGTH OF WALL TO BE 75'0"± LONG PLACED SYM. ABOUT ℄ PIER.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
GENERAL PLAN
SHEET 5 OF 49
X55602

WISDOT PTID

FORM F-8-12-69

PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-73	75	
FEDERAL PROJECT DESIGNATION		



No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec.	Drawn By	Plans Checked
1975		KOK

GENERAL PLAN

SHEET 6 OF 49

X55603

WISDOT DTID

FORM E 8-12-99

PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-75	76	
FEDERAL PROJECT DESIGNATION		

1600 FT VERTICAL CURVE

8600 FT VERTICAL CURVE

+3.0%

-3.0%

+0.40%

PROFILE GRADE LINE INTERSTATE 43

EXISTING GRADES G.B.& W RAILROAD

EXISTING GRADES C M ST P&P RR.

EXISTING GRADES C & NW TRANS. CO.

PROFILE GRADE LINE C & NW. TRANS. CO.

PROFILE GRADE LINE QUINCY ST.

PROFILE GRADE LINE BYLSBY AVE.

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1975	Drawn By A.J.A.	Plans Checked NOK

PROFILE GRADE LINE — SHEET 7 OF 49

X55604

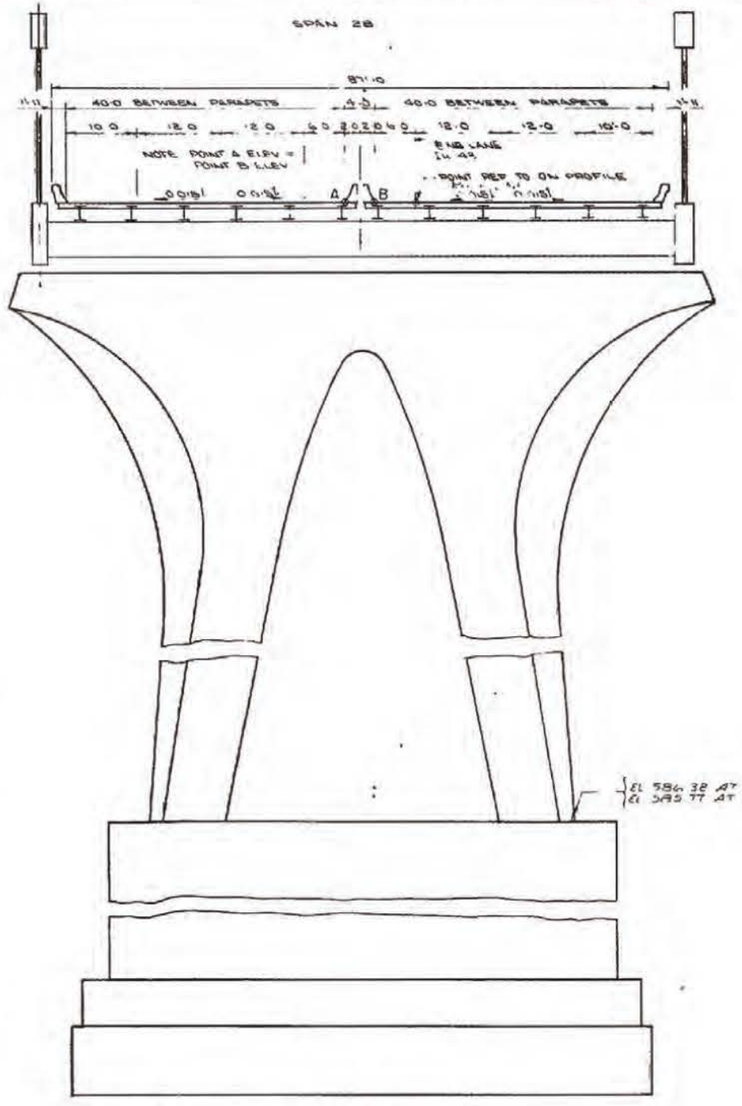
WISDOT DTID

FORM E 9-749

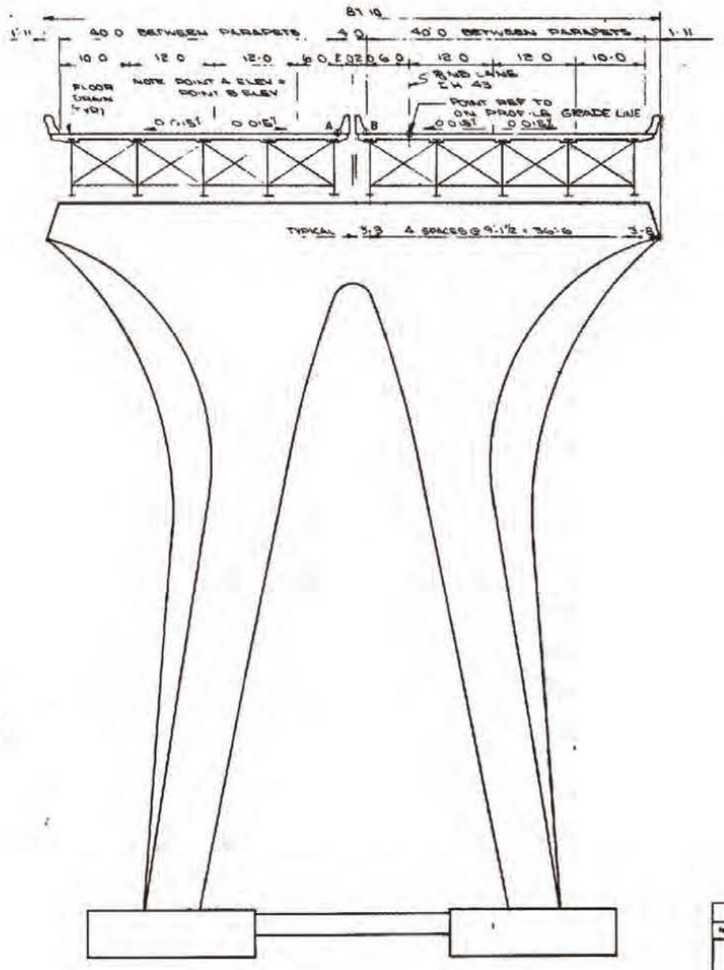
PROJECT ID	SHEET NUMBER	SH SHEETS
1220-5-73	7.7	
FEDERAL PROJECT DESIGNATION		

SPANS 19 THRU 27, & 29 THRU 37 SHOWN
SPANS 10 THRU 18 & 38 THRU 45 ARE 70° PRESTRESSED BEAMS.

SPAN 28



TIED ARCH SPAN
PIERS 27 & 28



GIRDER SPANS
PIERS 9 THRU 26 & PIERS 29 THRU 44

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

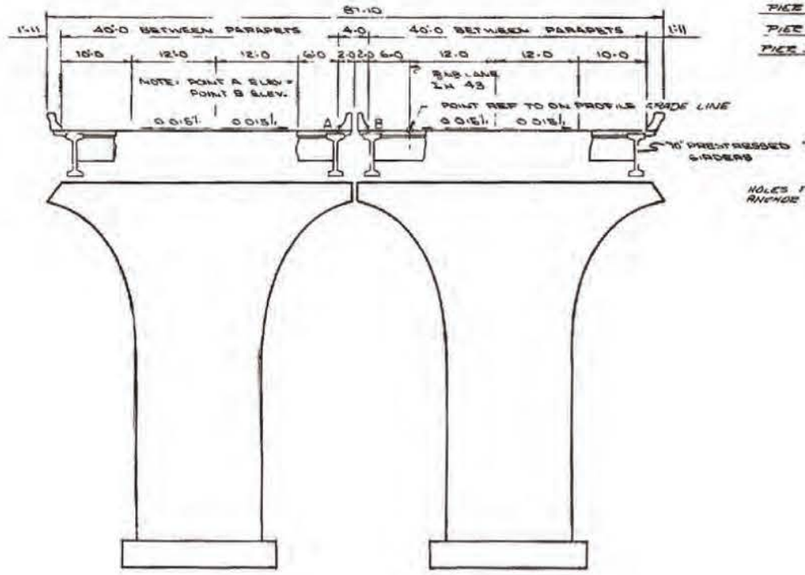
Const. Year 1975	Drawn By MJA	Plans Checked HOK

GENERAL PLAN

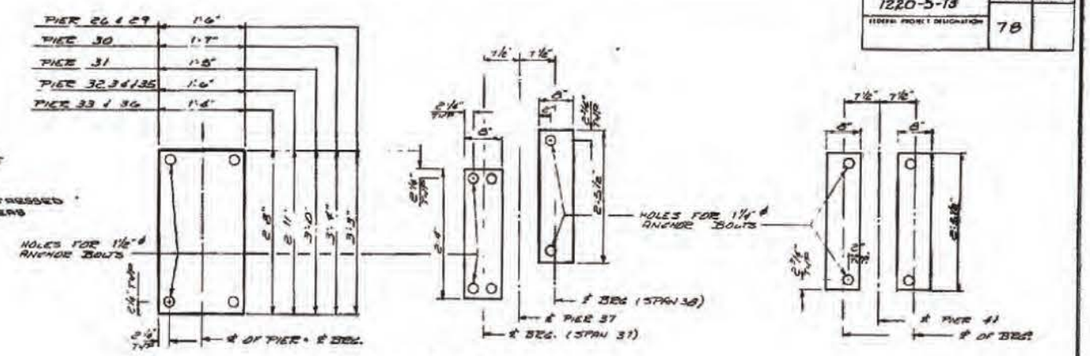
SHEET 8 OF 49

X55605

SPANS 1 THRU 18 & 38 THRU 42 SHOWN
SPANS 1 THRU 6 & 44 THRU 52 ROWY WIDTH VARIES
SPANS 1-2, & 43 THRU 45 ROWY SLOPE VARIES
SPANS 46 THRU 52 ROWY SLOPE 0.021⅛



PRESTRESSED GIRDER SPANS
PIERS 1 THRU 8 & PIERS 46 THRU 51

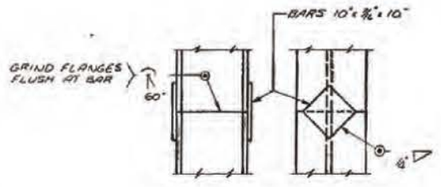


ANCHOR BOLT LOCATION DETAILS
(ANCHOR BOLTS & MASONRY TO NOT PART OF THIS CONTRACT)

PROJECT ID	UNIT NUMBER	DWG SHEETS
1220-5-78	78	
STRUCTURE DESIGN PROJECT DESIGNATION		

"AS BUILT" TOTAL ESTIMATED QUANTITIES

BID ITEMS	UNIT	PIER 26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	TOTAL
EXCAVATION FOR STRUCTURES	LS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
COFFERDAMS	LS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
CONCRETE MASONRY	C.Y.	1386	4322	4328	1421	1234	1337	1162	1201	1146	1117	1060	936	928	907	914	822	870	782	820	25,699
CONCRETE MASONRY SEAL	C.Y.	—	5074	5074	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10,148
HIGH STRENGTH BAR STEEL REINFORCEMENT	LBS.	167380	337920	339260	172840	137400	161010	129900	139550	123510	119440	118890	89217	97350	86350	103200	78400	93310	75410	61310	2,657,450
~~STEEL PILING DELIVERED AND DRIVEN HP 14 INCH 73 POUND~~	L.F.	7,800	10,920	9,250	6,850	4,850	4,600	4,320	3,567	3,894	4,008	3,415	2,631	3,423	2,928	3,997	2,776	3,084	2,775	3,171	88,223
DOLPHINS	EA.	—	—	—	—	—	154	—	—	—	—	—	—	—	—	—	—	—	—	—	154
METAL CONDUIT - 1½ INCH	L.F.	—	—	—	—	400	—	—	—	—	—	—	—	—	—	—	—	—	—	—	400
TEMPORARY STEEL SHEET PILING	S.F.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1500	—	—	—	—	1,500
EPOXY HIGH STRENGTH BAR STEEL REINFORCEMENT	LBS	3240	—	—	3520	3520	3150	3150	2870	2870	2870	2760	2760	2760	2760	2760	2760	2760	2760	2310	38,970



PILE SPLICE DETAILS

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

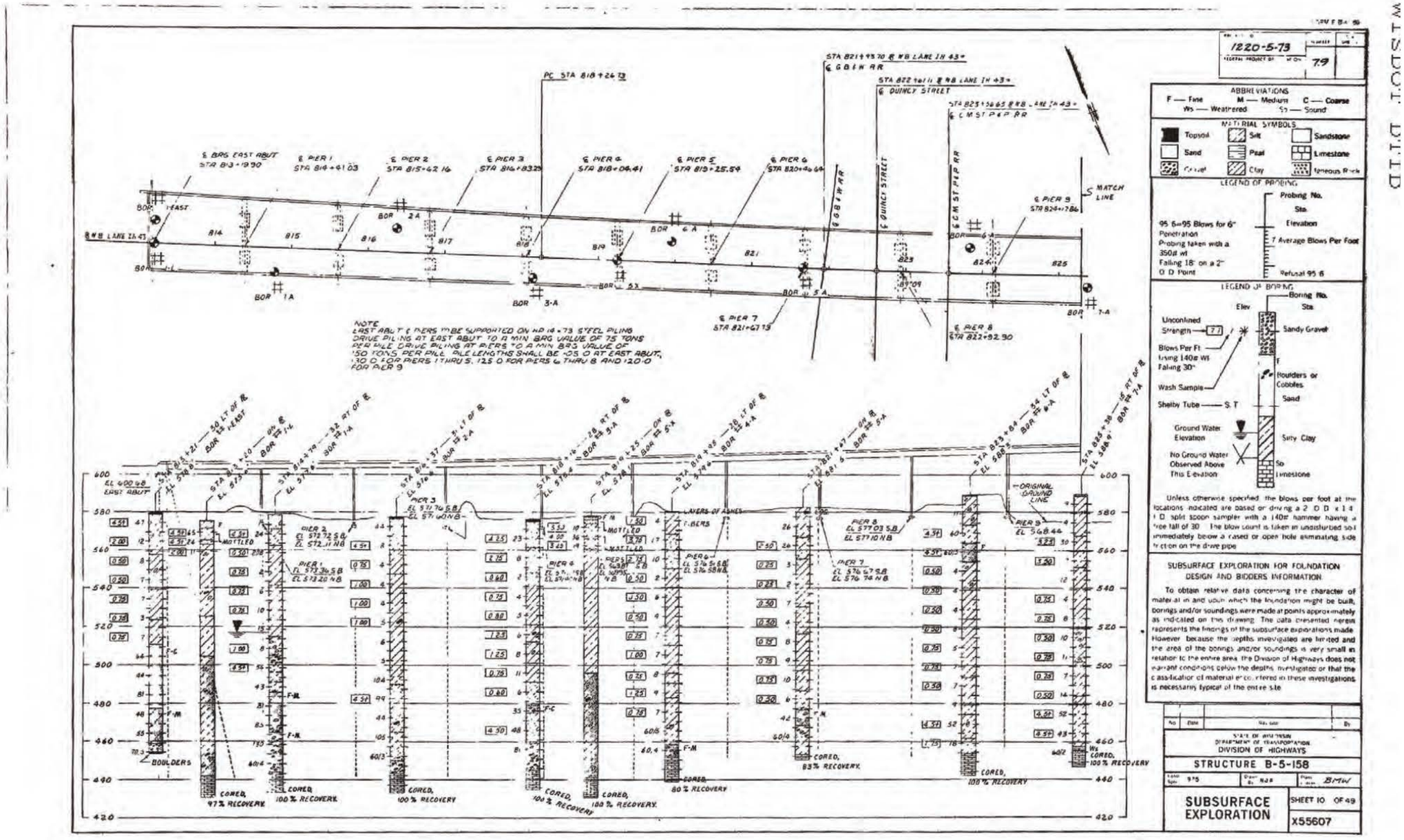
STRUCTURE B-5-158

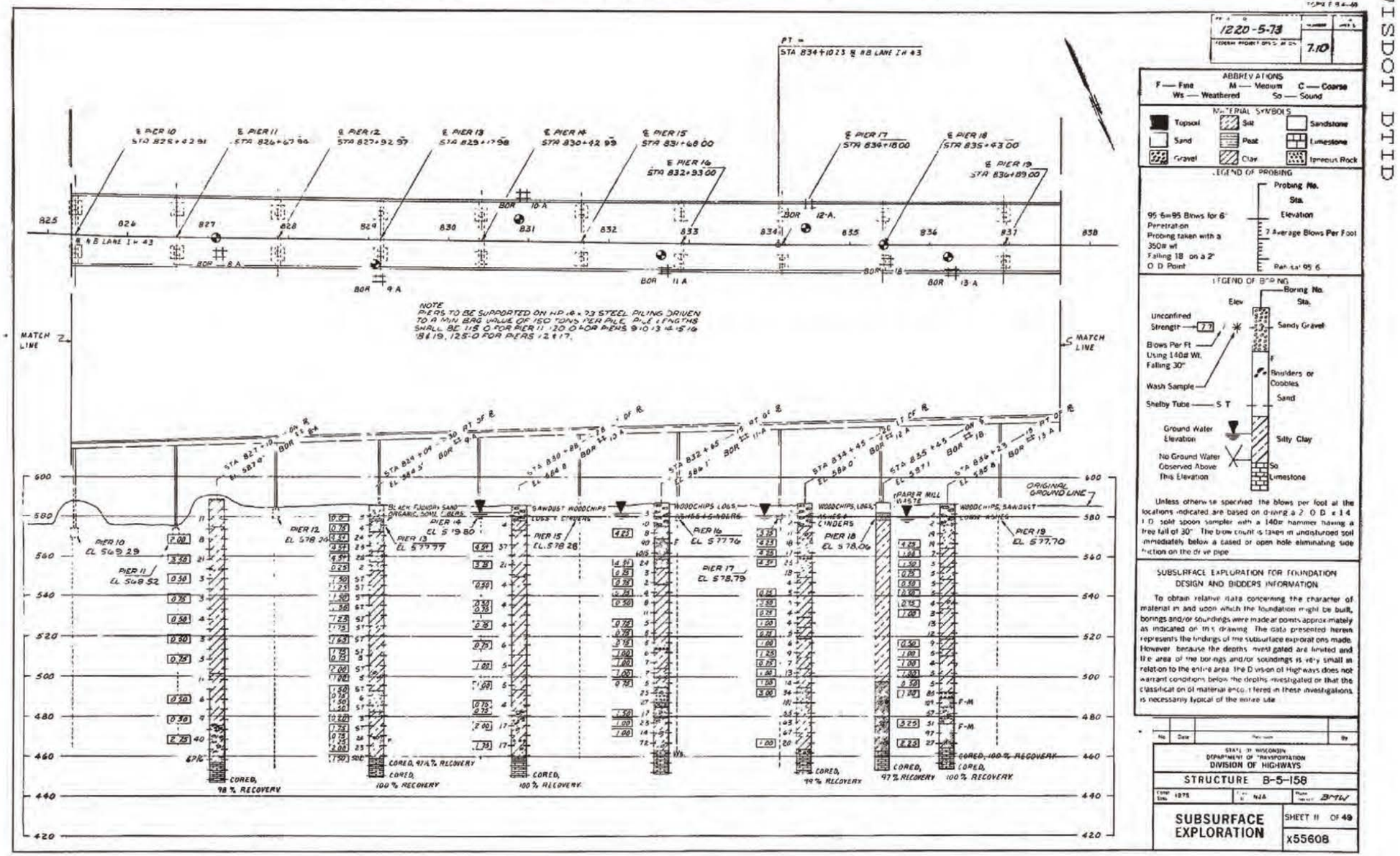
Const. Year	Drawn By	Prev. Checked
1975	NJA	HOM

GENERAL PLAN & QUANTITIES

SHEET 9 OF 49

X55606


1220-5-73
79
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered Sd — Sound
MATERIAL SYMBOLS
Topsoil
Silt
Sandstone
Sand
Peat
Limestone
Clay
LEGEND OF PROBING
Probing No.
Sta.
Elevation
7 Average Blows Per Foot
95 6=95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18" on a 2" O D Point
Refusal 95 6
LEGEND OF BORING
Boring No.
Sta.
Elev
Unconfined Strength
Sandy Gravel
Blows Per Ft using 140# Wt Falling 30"
Boulders or Cobbles
Wash Sample
Sand
Shelby Tube — S. T
Ground Water Elevation
Silty Clay
No Ground Water Observed Above This Elevation
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2 0 O D x 1 4 1 D split spoon sampler with a 140lb hammer having a free fall of 30 The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing The data presented herein represents the findings of the subsurface explorations made However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
SUBSURFACE EXPLORATION
SHEET 10 OF 49
X55607
PC STA 818+24.73
E BRG EAST ABUT STA 813+19.90
E PIER 1 STA 814+41.03
E PIER 2 STA 815+42.16
E PIER 3 STA 816+43.29
E PIER 4 STA 818+04.41
E PIER 5 STA 819+25.54
E PIER 6 STA 820+46.66
E PIER 7 STA 821+67.79
E PIER 8 STA 822+92.90
E PIER 9 STA 824+17.84
E QUINCY STREET
E C M ST P & P RR
E G B & W RR
MATCH LINE
NOTE
EAST ABUT & PIERS TO BE SUPPORTED ON HP 10 x 7.3 STEEL PILING DRIVE PILING AT EAST ABUT TO A MIN BRG VALUE OF 75 TONS PER PILE DRIVE PILING AT PIERS TO A MIN BRG VALUE OF 150 TONS PER PILE PILE LENGTHS SHALL BE 105 0 AT EAST ABUT, 130 0 FOR PIERS 1 THRU 5, 125 0 FOR PIERS 6 THRU 8 AND 120 0 FOR PIER 9
EL 600 48 EAST ABUT
EL 579 6
EL 587 5
EL 576 4
EL 573 2
EL 570 0
EL 566 8
EL 563 6
EL 560 4
EL 557 2
EL 554 0
EL 550 8
EL 547 6
EL 544 4
EL 541 2
EL 538 0
EL 534 8
EL 531 6
EL 528 4
EL 525 2
EL 522 0
EL 518 8
EL 515 6
EL 512 4
EL 509 2
EL 506 0
EL 502 8
EL 499 6
EL 496 4
EL 493 2
EL 490 0
EL 486 8
EL 483 6
EL 480 4
EL 477 2
EL 474 0
EL 470 8
EL 467 6
EL 464 4
EL 461 2
EL 458 0
EL 454 8
EL 451 6
EL 448 4
EL 445 2
EL 442 0
EL 438 8
EL 435 6
EL 432 4
EL 429 2
EL 426 0
EL 422 8
EL 419 6
EL 416 4
EL 413 2
EL 410 0
PIER 1 EL 573 36 S B EL 573 20 N B
PIER 2 EL 572 72 S B EL 572 11 N B
PIER 3 EL 571 74 S B EL 571 60 N B
PIER 6 EL 574 56 S B EL 574 58 N B
PIER 7 EL 576 67 9 B EL 576 74 N B
PIER 8 EL 577 03 S B EL 577 10 N B
PIER 9 EL 568 44
LAYERS OF ASHES
ORIGINAL GROUND LINE
BOULDERS
CORED, 97% RECOVERY
CORED, 100% RECOVERY
CORED, 100% RECOVERY
CORED, 100% RECOVERY
CORED, 100% RECOVERY
CORED, 80% RECOVERY
CORED, 83% RECOVERY
CORED, 100% RECOVERY
CORED, 100% RECOVERY


1220-5-73
7.10
WISDOT DTID
PT = STA 834+1023 ℄ NB LANE I-43
℄ PIER 10 STA 825+42.91
℄ PIER 11 STA 826+67.96
℄ PIER 12 STA 827+92.97
℄ PIER 13 STA 829+17.98
℄ PIER 14 STA 830+42.99
℄ PIER 15 STA 831+68.00
℄ PIER 16 STA 832+93.00
℄ PIER 17 STA 834+18.00
℄ PIER 18 STA 835+43.00
℄ PIER 19 STA 836+68.00
℄ NB LANE I-43
BOR 8-A
BOR 9-A
BOR 10-A
BOR 11-A
BOR 12-A
BOR 13-A
BOR 18
NOTE
PIERS TO BE SUPPORTED ON HP 10 x 42 STEEL PILING DRIVEN TO A MIN. BRG VALUE OF 150 TONS PER PILE. PILE LENGTHS SHALL BE: 115'-0" FOR PIER 11, 120'-0" FOR PIERS 9, 10, 13, 14, 15, 16, 18 & 19, 125'-0" FOR PIERS 12 & 17.
MATCH LINE
MATCH LINE
ORIGINAL GROUND LINE
PIER 10 EL 568.29
PIER 11 EL 568.52
PIER 12 EL 578.20
PIER 13 EL 579.77
PIER 14 EL 579.80
PIER 15 EL 578.26
PIER 16 EL 577.76
PIER 17 EL 578.79
PIER 18 EL 578.06
PIER 19 EL 577.70
BLACK FLORIDA SAND ORGANIC SOIL LENS
SAWDUST WOODCHIPS LOGS & DEBRIS
WOODCHIPS LOGS SHALE & LADERS
WOODCHIPS, LOGS, SHALE & CINDERS
PAPER MILL WASTE
WOODCHIPS, SAWDUST LOGS ASHES
CORED, 98 % RECOVERY
CORED, 97.4% RECOVERY
CORED, 100 % RECOVERY
CORED, 100 % RECOVERY
CORED, 99 % RECOVERY
CORED, 97 % RECOVERY
CORED, 100 % RECOVERY
CORED, 100 % RECOVERY
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Sand
Gravel
Silt
Peat
Clay
Sandstone
Limestone
Igneous Rock
LEGEND OF PROBING
Probing No.
Sta.
Elevation
95-6=95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18" on a 2" O.D. Point
7 Average Blows Per Foot
Ref. Lvl 95.6
LEGEND OF BORING
Boring No.
Sta.
Elev
Unconfined Strength
Blows Per Ft. Using 140# Wt. Falling 30"
Wash Sample
Shelby Tube — S.T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
So. Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O.D. x 1 1/4" I.D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing. The data presented herein represents the findings of the subsurface explorations made. However, because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area, the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.
No. Date Revision By
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
SUBSURFACE EXPLORATION
SHEET 11 OF 49
x55608

WISDOT DTID

1220-5-73 | 7.11

NOTE
PIERS SHALL BE SUPPORTED ON HP 14x73 STEEL PILING DRIVEN TO A MIN BRG VALUE OF 150 TONS PER PILE. PILE LENGTHS SHALL BE 115'0 FOR PIER 20, 125-0 FOR PIERS 21 & 22, 115'0 FOR PIERS 23 & 24, 125-0 FOR PIER 25.

ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered Sd — Sound

MATERIAL SYMBOLS
Topsoil, Silt, Sandstone, Sand, Peat, Limestone, Gravel, Clay, Igneous Rock

LEGEND OF PROBING
Probing No., Sta., Elevation
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18" on a 2" O D Point
7 Average Blows Per Foot
Refusal 95 6

LEGEND OF BORING
Boring No., Sta., Elev
Unconfined Strength — 7.7
Blows Per Ft Using 140# Wt Falling 30
Wash Sample
Shelby Tube — S T
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel, Boulders or Cobbles, Sand, Silty Clay, Limestone

Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2 O D x 1 4 I D split spoon sampler with a 140lt hammer having a free fa l of 30 The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe

SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

To obtain relative data concerning the character of material in and upon which the foundation might be built borings and/or soundings were made at points approximately as indicated on this drawing The data presented herein represents the findings of the subsurface explorations made However because the depths investigated are limited and the area of the borings and or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

SUBSURFACE EXPLORATION

SHEET 12 OF 49

X55609

WISDOT DTID

STA 854+87.13 B W B LANE IN 43=
FOX RIVER & CHANNEL

FOX RIVER

E CHANNEL

DOLPHINS (TYPICAL)

849 850 851 852 853 854 855 856 857 858 859 860 861 862

86°41'01"

STA 854+87.13

℄ N B LANE IN 43

BOR 20 A BOR 21 A BOR 22 A BOR 23 A BOR 24 A

℄ PIER 26 STA 850+42.00

℄ PIER 27 STA 852+92.00

℄ PIER 28 STA 857+12.00

℄ PIER 29 STA 859+82.00

℄ PIER 30 STA 861+52.00

℄ MATCH LINE

℄ MATCH LINE

FOUNDATION DATA

PIERS 26, 29 HP 10 x 42
STEEL PILES PIERS 26-29 DRIVEN TO A MIN BRG VALUE OF 100 TONS PER PILE
PIER 27 DRIVEN TO A MIN BRG VALUE OF 150 TONS PER PILE
EST. TIPS ALL AT PIER 26 90'-0"
EST. TIPS ALL AT PIER 29 90'-0"
LG AT PIERS 27 & 28 130'-0" LG AT PIER 29 115'-0" LG AT PIER 30.

STA 850+42 — ON ℄ BOR ℄ 20-A — EL 581.3'
STA 852+92 — ON ℄ BOR ℄ 21-A — EL 581.6'
STA 857+12 — ON ℄ BOR ℄ 22-A — EL 581.5'
STA 859+82 — ON ℄ BOR ℄ 23-A — EL 581.4'
STA 861+52 — ON ℄ BOR ℄ 24-A — EL 581.5'

600 580 560 540 520 500 480 460 440 420

AIR WATER
TRACE OF SHELLS
EL 572.21 PIER 26
TRACE OF WOOD
F-M
F-C
CORED, 100% RECOVERY
CORED, 100 % RECOVERY.

AIR WATER
F, LITTLE SHELLS
TRACE OF SHELLS
TRACE OF SHELLS.
EL 538.07 PIER 27
TRACE OF WOOD
F-M
F-C
CORED, 100% RECOVERY
CORED, 100 % RECOVERY.

AIR WATER
ORGANIC
F, TRACE OF SHELLS
ORGANIC
TRACE OF WOOD & SHELLS
LAYER OF HIGHLY DECAYED WOOD
LAYER OF HIGHLY DECAYED WOOD
EL 537.58 PIER 28
M-C
CORED, 100% RECOVERY.
CORE D.
99% RECOVERY.

AIR WATER
EL 567.53 PIER 29
F, M
TRACE TO LITTLE ORGANIC
F, TRACE OF SHELL
ORGANIC
TRACE OF WOOD
SMALL PIECE OF WOOD
F-M
CORED, 50% RECOVERY
CORED, 100% RECOVERY
CORED.
100 % RECOVERY.

AIR WATER
F, M
TRACE OF SHELLS
EL 572.81 PIER 30
FIBROUS PEAT
CORED, 100% RECOVERY
CORED.
100% RECOVERY.

FORM F 8-45-89

1220-5-73
FEDERAL PROJ. BRSG-(M-D)-
7.12

ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound

MATERIAL SYMBOLS
Topsoil, Silt, Sandstone
Sand, Peat, Limestone
Gravel, Clay, Igneous Rock

LEGEND OF PROBING
Probing No.
Sta.
Elevation
7 Average Blows Per Foot
Refusal 95/6
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt. Falling 18" on a 2" O D Point

LEGEND OF BORING
Boring No.
Sta.
Elev
Unconfined Strength — 7.7 — ?
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — S. T.
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
F
Boulders or Cobbles
Sand
Silty Clay
So
Limestone

Unless otherwise specified, the blows per foot at the locations indicated are based on driving a 2" O D x 1 4" I D split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.

SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing. The data presented herein represents the findings of the subsurface explorations made. However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area, the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

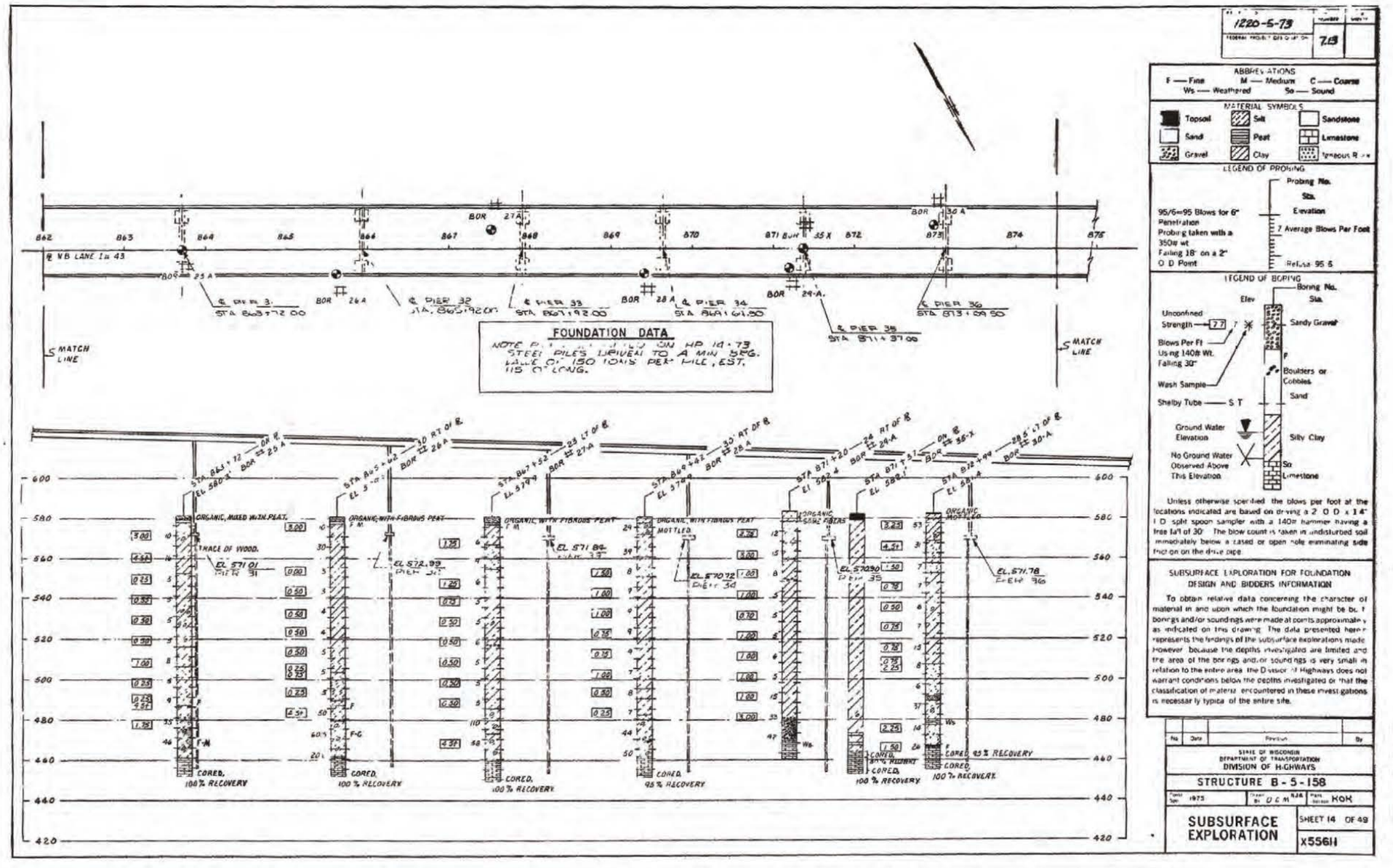
STRUCTURE B-5-158

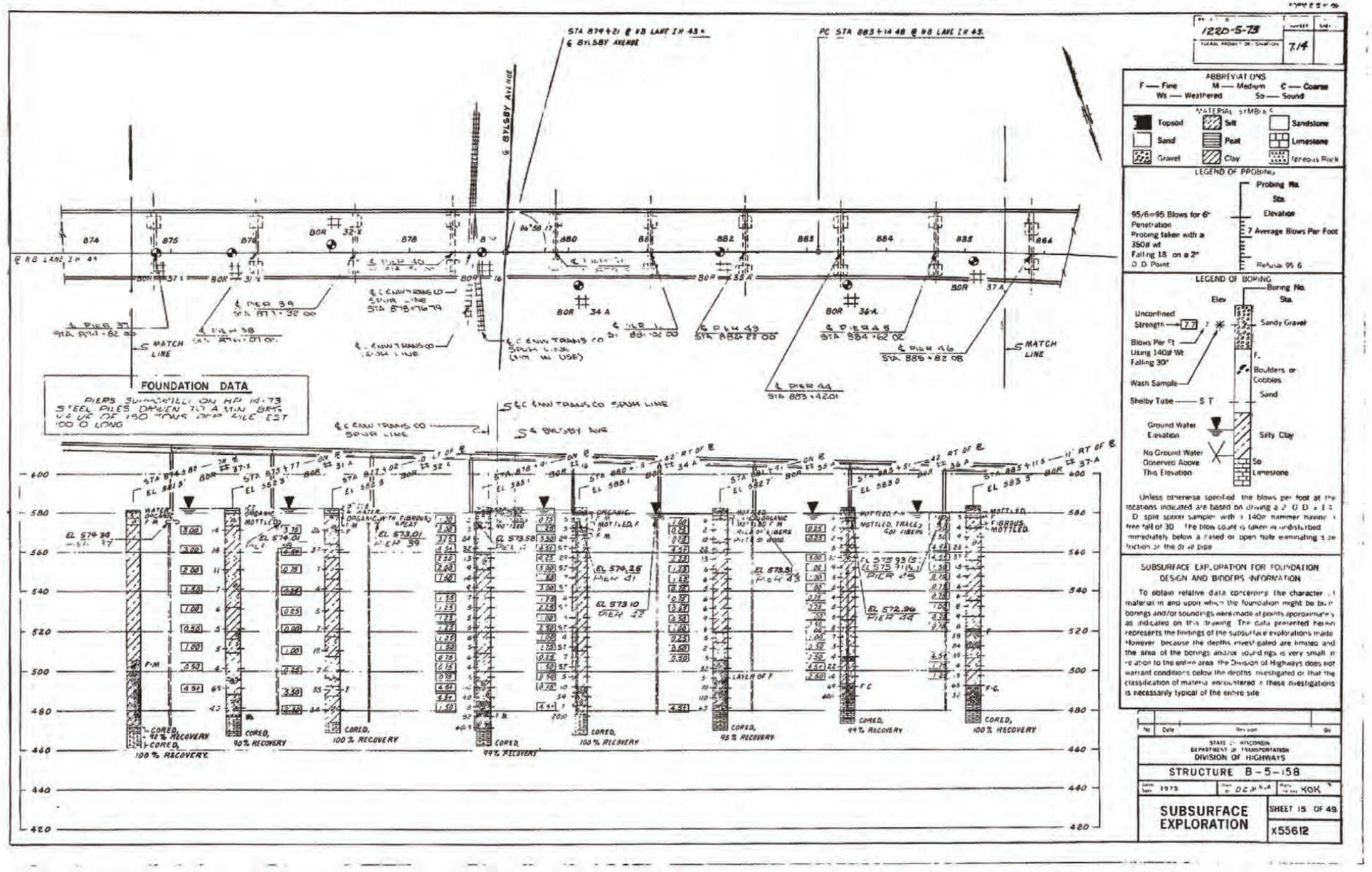
Const. Type 1975 | Drawn By D.C.M. | Traced By KOK

SUBSURFACE EXPLORATION

SHEET 13 OF 49

X55610


1220-5-73
7.13
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Silt
Sandstone
Sand
Peat
Limestone
Gravel
Clay
LEGEND OF PROBING
Probing No.
Sta.
Elevation
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18" on a 2" O D Point
7 Average Blows Per Foot
Refusal 95 6
LEGEND OF BORING
Boring No.
Sta.
Elev
Unconfined Strength
Sandy Gravel
Blows Per Ft Using 140# Wt. Falling 30"
Boulders or Cobbles
Wash Sample
Sand
Shelby Tube — S T
Ground Water Elevation
Silty Clay
No Ground Water Observed Above This Elevation
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2 O D x 14" I D split spoon sampler with a 140# hammer having a free fall of 30" The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built borings and/or soundings were made at points approximately as indicated on this drawing The data presented here represents the findings of the subsurface explorations made However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.
FOUNDATION DATA
NOTE PILES DRIVEN ON HP 10 · 73
STEEL PILES DRIVEN TO A MIN BEG. VALUE OF 150 TONS PER PILE, EST. 115 0' LONG.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
1973
SUBSURFACE EXPLORATION
SHEET 14 OF 49
X5561


1220-5-75
714
ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound
MATERIAL SYMBOLS
Topsoil
Silt
Sandstone
Sand
Peat
Limestone
Gravel
Clay
Igneous Rock
LEGEND OF PROBING
Probing No.
Sta.
Elevation
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18 on a 2" O D Point
7 Average Blows Per Foot
Refusal 95 6
LEGEND OF BORING
Boring No.
Sta.
Elev
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — S T
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
Limestone
Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2 0 D x 1 5 D split spoon sampler with a 140# hammer having a free fall of 30 The blow count is taken in undisturbed material immediately below a cased or open hole eliminating the reduction of the drive pipe
SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION
To obtain relative data concerning the character of material in and upon which the foundation might be built borings and/or soundings were made at points approximately as indicated on this drawing The data presented herein represents the findings of the subsurface explorations made However because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area the Division of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site
FOUNDATION DATA
PIERS SUBMERSIBLE ON HP 10 73
STEEL PILES DRIVEN TO A MIN BRG VALUE OF 150 TONS AND A TIP EL 100 0 LONG
STA 879+21 @ NB LANE IN 43 + & BYLSBY AVENUE
PC STA 883+14 48 @ NB LANE IN 43
& BYLSBY AVE NUE
& PIER 37 STA 874+82 80
& PIER 39 STA 877+32 00
& PIER 41 STA 880+82 00
& PIER 43 STA 882+22 00
& PIER 45 STA 884+62 00
& PIER 46 STA 885+82 08
& PIER 44 STA 883+42 01
MATCH LINE
& C R&W TRANS CO SPUR LINE
& C R&W TRANS CO SPUR LINE (NOT IN USE)
& BYLSBY AVE
STA 874+82 EL 581 3
STA 875+77 EL 582 3
STA 877+02 EL 582 8
STA 878+91 EL 583 1
STA 880+ 3 EL 583 1
STA 881+91 EL 582 7
STA 883+51 EL 583 0
STA 885+11 5 EL 583 3
EL 579 30 PIER 37
EL 579 01 PIER 39
EL 573 01 PIER 39
EL 573 58 PIER 41
EL 574 25 PIER 41
EL 573 10 PIER 43
EL 573 31 PIER 43
EL 575 93 (S) EL 575 71 (N) PIER 45
EL 572 96 PIER 44
CORED, 92 % RECOVERY
CORED, 100 % RECOVERY
CORED, 90% RECOVERY
CORED, 100 % RECOVERY
CORED, 99% RECOVERY
CORED, 100 % RECOVERY
CORED, 95 % RECOVERY
CORED, 99 % RECOVERY
CORED, 100 % RECOVERY
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
1975
DCH
KOK
SUBSURFACE EXPLORATION
SHEET 15 OF 49
X55612

WISDOT DTID

WISDOT DTID

1220-5-73

7.15

ABBREVIATIONS
F — Fine M — Medium C — Coarse
Ws — Weathered So — Sound

MATERIAL SYMBOLS
Topsoil, Silt, Sandstone, Sand, Peat, Limestone, Gravel, Clay, Igneous Rock

LEGEND OF PROBING
Probing No.
Sta.
Elevation
95/6=95 Blows for 6" Penetration
Probing taken with a 350# wt Falling 18" on a 2" O.D. Point
7 Average Blows Per Foot
Refusal 95/6

LEGEND OF BORING
Boring No.
Sta.
Elev
Unconfined Strength
Blows Per Ft Using 140# Wt Falling 30"
Wash Sample
Shelby Tube — S.T
Ground Water Elevation
No Ground Water Observed Above This Elevation
Sandy Gravel
Boulders or Cobbles
Sand
Silty Clay
Limestone

Unless otherwise specified the blows per foot at the locations indicated are based on driving a 2" O.D. x 1 1/8" I.D. split spoon sampler with a 140# hammer having a free fall of 30". The blow count is taken in undisturbed soil immediately below a cased or open hole eliminating side friction on the drive pipe.

SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

To obtain relative data concerning the character of material in and upon which the foundation might be built borings and/or soundings were made at points approximately as indicated on this drawing. The data presented here represents the findings of the subsurface explorations made. However, because the depths investigated are limited and the area of the borings and or soundings is very small in relation to the entire area, the State of Highways does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.

FOUNDATION DATA
PIERS SUPPORTED ON HP 14 x 73 STEEL PILES DRIVEN TO A MIN. BRG. VALUE OF 150 TONS PER PILE. ESTIMATED 100.0 LONG FOR PIERS 46-51 AND WEST ABUT. SUPPORTED ON HP 14 x 89 ST. STL. PILES DRIVEN TO A MIN. BRG. VALUE OF 75 TONS PER PILE. ESTIMATED 100.0 LONG.

STA 892+15.93 ℄ NB LANE I-43 = STA 16+06.67 ℄ C.T.H.W. TRANS. CO.

℄ NB LANE I-43

MATCH LINE

℄ PIER 46 STA 885+82.08

℄ PIER 47 STA 887+32.22

℄ PIER 48 STA 888+32.47

℄ PIER 49 STA 889+42.88

℄ PIER 50 STA 890+65.09

℄ PIER 51 STA 891+84.33

℄ BRG. WEST ABUT STA 893+02.41

BOR 38-A

BOR 48

BOR 48-A

BOR 49-A

BOR WEST ABUT

℄ C.T.H.W. TRANS. CO. (PROPOSED)

EL 602.01

EL 599.31 WEST ABUT

EL 575.95 (S.B.) EL 575.30 (N.B.) PIER 46

EL 576.35 (S.B.) EL 575.93 (N.B.) PIER 47

EL 576.00 (S.B.) EL 576.13 (N.B.) PIER 48

EL 575.30 (N.B.) PIER 50

EL 575.93 (N.B.) EL 575.30 (S.B.) PIER 51

ORGANIC MOTTLED

ORGANIC, TRACE OF WOOD

ORGANIC, SOME FIBERS TRACE OF FIBERS

CORED, 83% RECOVERY

CORED, 98% RECOVERY

CORED, 98% RECOVERY

CORED, 99% RECOVERY

CORED, 100% RECOVERY

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

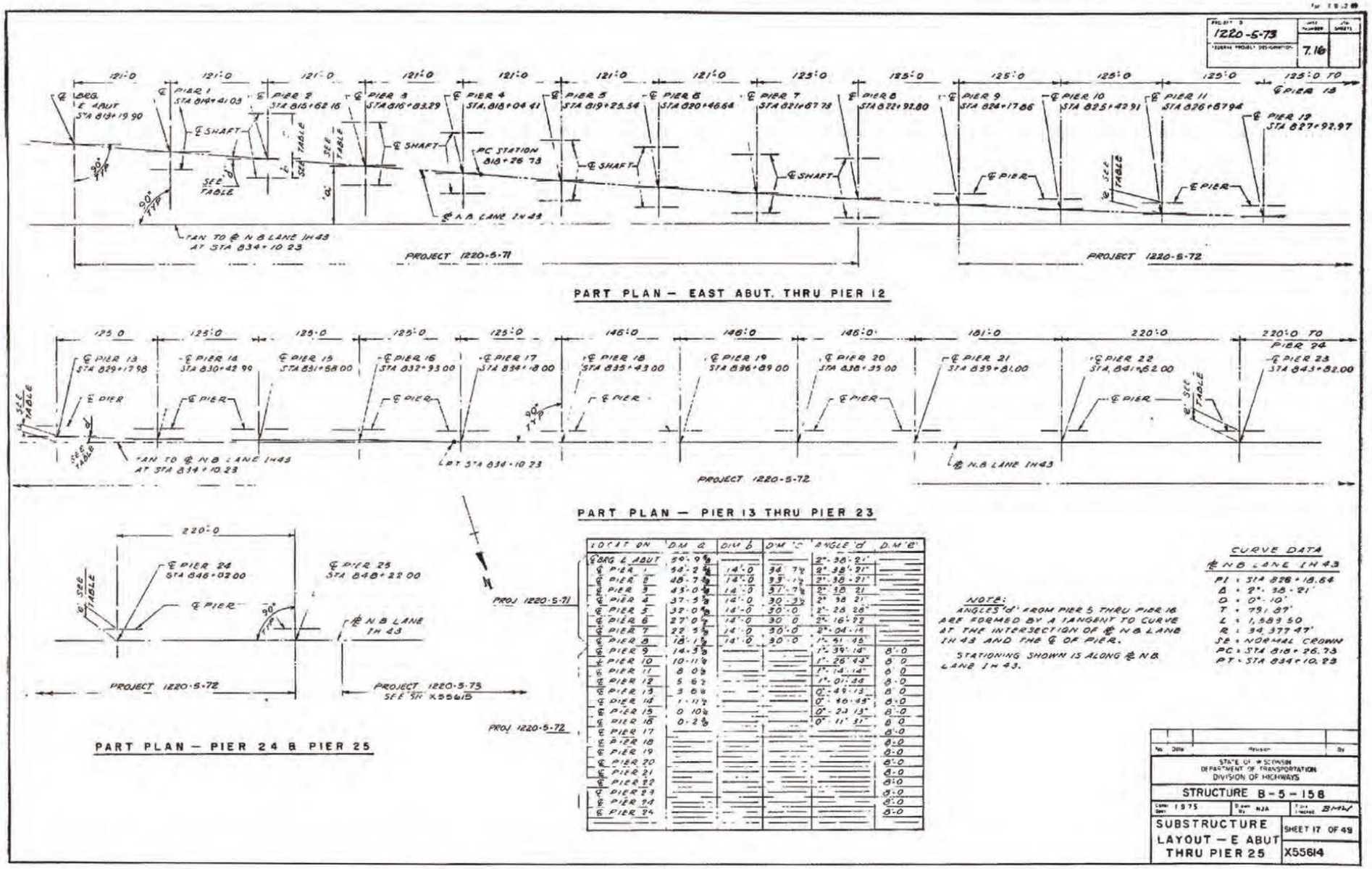
STRUCTURE B-5-158

1973 DCM KOK

SUBSURFACE EXPLORATION

SHEET 16 OF 49

X55613



LOCATION	DIM a	DIM b	DIM c	ANGLE d	DIM e
℄ BRG L ABUT	50'-9⅝			2°-38'-21"	
PIER 1	54'-2⅝	14'-0	34'-7½	2°-38'-21"	
PIER 2	48'-7⅝	14'-0	33'-11½	2°-38'-21"	
PIER 3	43'-0⅝	14'-0	31'-7½	2°-38'-21"	
PIER 4	37'-5⅝	14'-0	30'-3½	2°-38'-21"	
PIER 5	32'-0⅝	14'-0	30'-0	2°-28'-28"	
PIER 6	27'-0⅞	14'-0	30'-0	2°-16'-92"	
PIER 7	22'-5⅞	14'-0	30'-0	2°-04'-19"	
PIER 8	18'-1⅞	14'-0	30'-0	1°-51'-45"	
PIER 9	14'-5⅞			1°-39'-18"	8'-0
PIER 10	10'-11⅞			1°-26'-93"	8'-0
PIER 11	8'-0⅞			1°-14'-14"	8'-0
PIER 12	5'-6⅞			1°-01'-44"	8'-0
PIER 13	3'-6⅜			0°-49'-13"	8'-0
PIER 14	1'-11⅞			0°-36'-43"	8'-0
PIER 15	0'-10⅜			0°-24'-13"	8'-0
PIER 16	0'-2⅜			0°-11'-51"	8'-0
PIER 17					8'-0
PIER 18					8'-0
PIER 19					8'-0
PIER 20					8'-0
PIER 21					8'-0
PIER 22					8'-0
PIER 23					8'-0
PIER 24					8'-0
℄ PIER 24					8'-0

WISDOT DTID

1220-5-73 | 7.17

220'-0" | 450'-0" | 220'-0" | 220'-0" | 220'-0" | 220'-0" | 200'-0" | 172'-6" | 172'-6" TO PIER 35

℄ PIER 26 STA 850+42.00 ℄ CAP
℄ PIER 27 STA 852+62.00 ℄ CAP
℄ PIER 28 STA 857+12.00
℄ PIER 29 STA 859+32.00 ℄ CAP
℄ PIER 30 STA 861+52.00
℄ PIER 31 STA 863+72.00 ℄ CAP
℄ PIER 32 STA 865+92.00
℄ PIER 33 STA 867+92.00 ℄ CAP
℄ PIER 34 STA 869+64.30

℄ N.B. LANE I-H 43

172'-6" TO PIER 31 | 172'-6" | 172'-6" | 125'-0" | 125'-0" | 125'-0" | 125'-0" | 120'-0" | 120'-0" | 120'-0" | 120'-0" | 120'-0" | 120'-0" | 120'-0" TO PIER 48

℄ PIER 36 STA 873+09.50 ℄ CAP
℄ PIER 37 STA 874+82.00
℄ PIER 38 STA 876+67.00 ℄ CAP
℄ PIER 39 STA 877+32.00
℄ PIER 40 STA 878+57.00 ℄ CAP
℄ PIER 41 STA 879+82.00
℄ PIER 42 STA 881+02.00 ℄ CAP
℄ PIER 43 STA 882+22.00
90° (TYP)
℄ PIER 44 STA 883+42.01 ℄ CAP
℄ SHAFT
℄ SHAFT

℄ PIER 35 STA 871+37.00

℄ N.B. LANE I-H 43

SEE TABLE

℄ PIER 45 STA 884+62.02
℄ PIER 46 STA 885+82.08
℄ PIER 47 STA 887+02.22

PT STA 883+14.48

NOTE STA SHOWN IS ALONG ℄ N.B. LANE I-H 43

120'-0" TO PIER 47 | 120'-0" | 120'-0" | 120'-0" | 117'-0"

SEE TABLE

℄ SHAFT
℄ SHAFT
90° (TYP)
90° (TYP)

TAN LINE - TAN TO ℄ N.B. LANE I-H 43 AT STA 883+14.48

PROJ 1220-5-73

℄ PIER 48 STA 888+22.47
℄ PIER 49 STA 889+42.88
℄ PIER 50 STA 890+63.09
℄ PIER 51 STA. 891+84.33
℄ BRG. WEST ABUT STA 893+02.41

℄ N.B. LANE I-H 43

PROJ 1220-5-71

LOCATION	DIM a	DIM b	DIM c	DIM d
℄ PIER 26				8'-0
℄ PIER 27				8'-0
℄ PIER 28				8'-0
℄ PIER 29				8'-0
℄ PIER 30				8'-0
℄ PIER 31				8'-0
℄ PIER 32				8'-0
℄ PIER 33				8'-0
℄ PIER 34				8'-0
℄ PIER 35				8'-0
℄ PIER 36				8'-0
℄ PIER 37				8'-0
℄ PIER 38				8'-0
℄ PIER 39				8'-0
℄ PIER 40				8'-0
℄ PIER 41				8'-0
℄ PIER 42				8'-0
℄ PIER 43				8'-0
℄ PIER 44	9⅝			6 1⅝
℄ PIER 45	1'-7	14'-0	31'-3⅝	
℄ PIER 46	5'-2⅝	14'-0⅛	32'-8⅝	
℄ PIER 47	10'-11⅝	14'-0⅛	33'-10⅝	
℄ PIER 48	18'-9⅛	14'-0⅝	35'-1⅝	
℄ PIER 49	26'-8⅝	14'-0⅝	36'-4⅛	
℄ PIER 50	40'-9⅛	14'-1	37'-7⅛	
℄ PIER 51	54'-1⅞	14'-1⅝	38'-11	
℄ BRG W ABUT	10'-10⅝			

CURVE DATA
℄ N.B. LANE I-H 43
PI = STA 896+87.267
Δ = 22° 34' 37.87"
D = 0° 50'
T = 1376.782'
L = 2709.927'
R = 6875.494'
SE = 0.027 ft/ft
RO = 200'

No.	Date	Revision	By

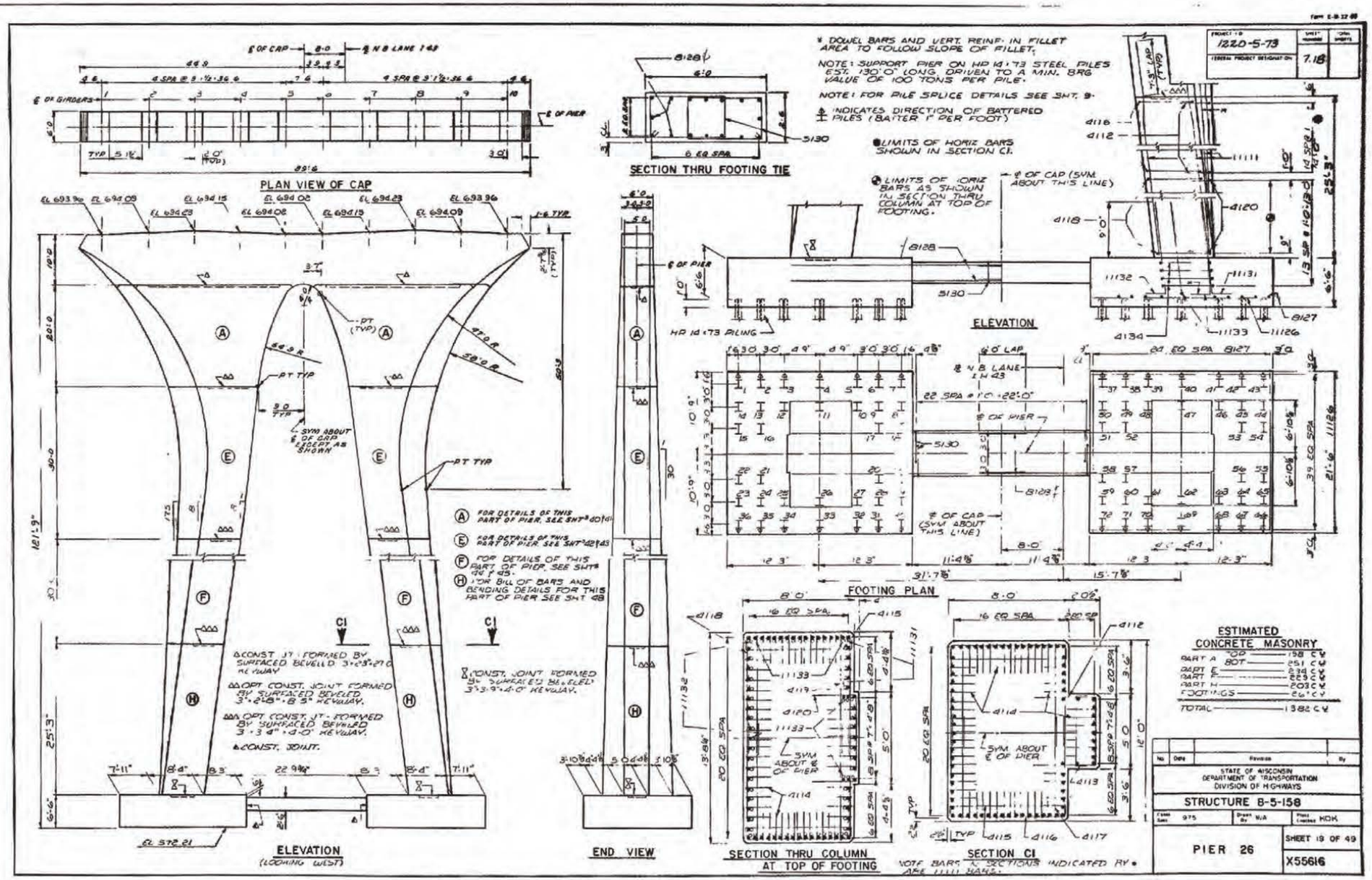
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

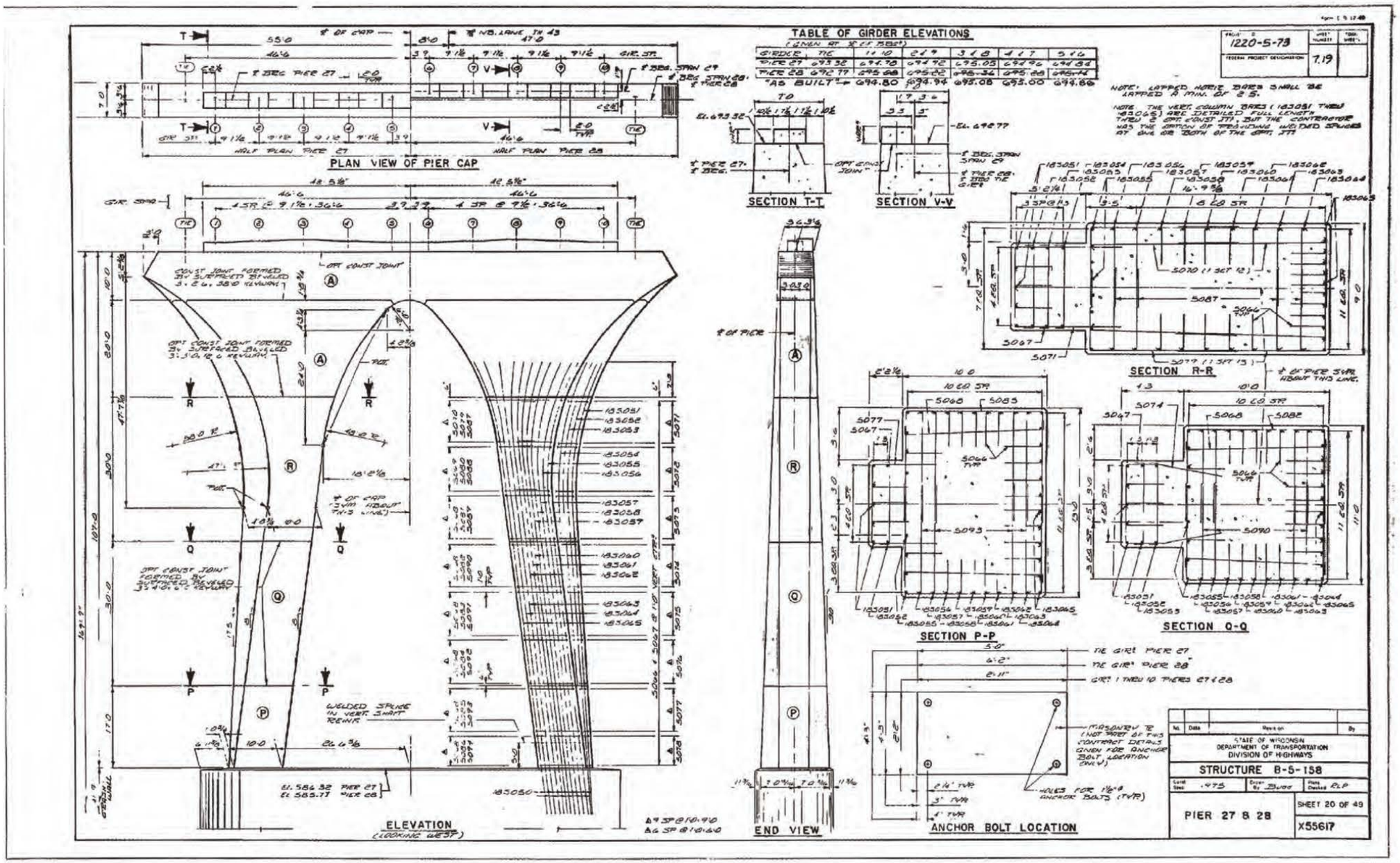
STRUCTURE B-5-158

Date 1975 | Drawn By NJA | Traced By KOK

SUBSTRUCTURE LAYOUT
PIER 26 — W ABUT

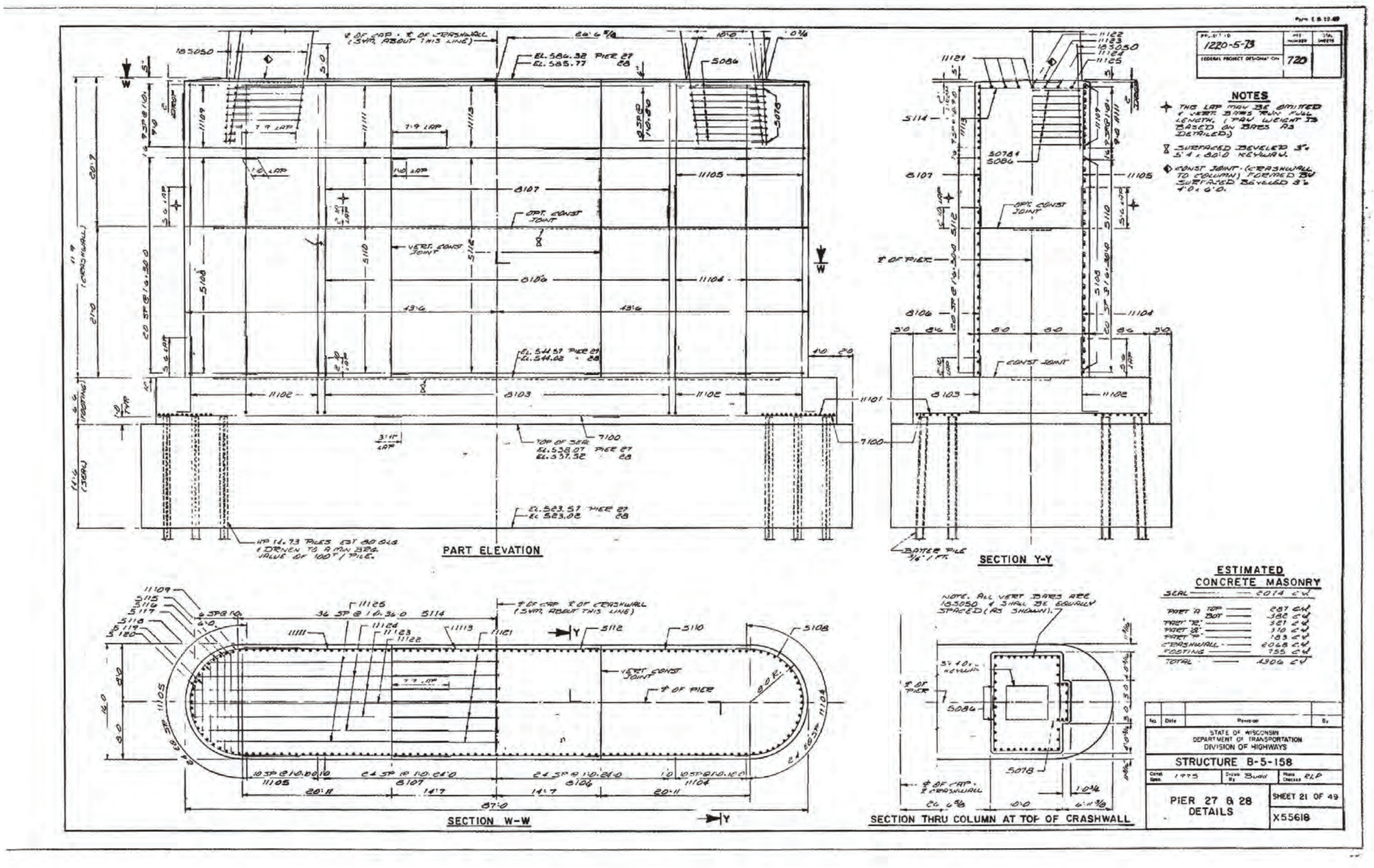
SHEET 18 OF 49
X55615


PLAN VIEW OF CAP
ELEVATION
(LOOKING WEST)
SECTION THRU FOOTING TIE
END VIEW
ELEVATION
FOOTING PLAN
SECTION THRU COLUMN AT TOP OF FOOTING
SECTION CI
ESTIMATED CONCRETE MASONRY
PART A TOP 198 C.Y.
PART A BOT 251 C.Y.
PART E 234 C.Y.
PART H 203 C.Y.
FOOTINGS 296 C.Y.
TOTAL 1382 C.Y.
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 26
SHEET 19 OF 49
X55616
1220-5-73
7.18
WISDOT DTID


TABLE OF GIRDER ELEVATIONS
1220-5-73
7.19
PLAN VIEW OF PIER CAP
SECTION T-T
SECTION V-V
SECTION R-R
SECTION P-P
SECTION Q-Q
ELEVATION
(LOOKING WEST)
END VIEW
ANCHOR BOLT LOCATION
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 27 & 28
SHEET 20 OF 49
X55617

WISDOT DTID

WISDOT DTID


PART ELEVATION
SECTION Y-Y
SECTION W-W
SECTION THRU COLUMN AT TOP OF CRASHWALL
NOTES
ESTIMATED CONCRETE MASONRY
STRUCTURE B-5-158
PIER 27 & 28 DETAILS
SHEET 21 OF 49
X55618
1220-5-73
720

BILL OF BARS (PIERS 27 & 28)

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSIONS A	B	C	LOCATION
11001	2	61-0	**	91	5 1		CAP HORIZ
11002	16	34 A	**	181	5 6		"
1003	12	59 7	**	181	4 10		"
11004	10	33 4	**	171	4 9		"
1005	34	40 8	**				"
11006	14	32-6					"
1007	10	55 11	*				"
1008	5	32-0					"
7009	7	23-0		141			"
5010	100	5 4		B1	3 5	6 1	ST EQUIP VERT
5011	100	15 4		B1	3 5	6 1	"
5012	50	18 7		71	6 8	6 1	41°55 "
5013	100	16 11		12	4 11		65°05 "
5014	50	25 9		71	6 8	9 8	41°55 "
5015	62	16 10		B2	4 10½	6 1	41°55 "
5016	41	17 2		B3	5 2½	6 1	65°05 "
5017	15	29-2					TOP HORIZ
5018	85	10 4		B1	2 11	3 10	" VERT
11019	64	29-8		12	4B 4	4 0	7-3 "
11020	4	24 6		B3			7-3 "
11021	8	29-5		81			7-3 "
11022	16	29 0		81			7-3 "
1023	32	28 3		81			7-3 "
11024	20	27-4		81			7-3 "
11025	4	61-3		B3			7-3 "
026	4	23-3		15			7-3 "
1027	16	32 8		12	4 5		7-3 "
028	4	30 5		82	6 5		7-3 "
029	4	30-3		82	6 5		7-3 "
030	4	30 7		82	5 9 5		7-3 "
1031	10	30 7		82	5B 5		7-3 "
5032	86	18 9	*	71	5 1		STIRRUP
5035	48	38-5	*	171	5 2		"
5034	64	32 0	*	71	5 7		"
5035	7	36 10	*	B1	5 8	⊕	" TIE
5036	7	53 4	*	B1	5 8	⊕	"
5037	8	40 10	*	B1	5 8	⊕	" "
5038	28	31 10		101			" "
5039	28	26-4		101			" "
5040	24	16-8		101			" "
5041	40	7-6		B1	5 8	10½	" "
5042	2624	2-10		101			" "
5043	80	6-0		A1			" "

MARK	NO REQ'D	LENGTH						LOCATION
183050	90	14-7						SHAFT (IN CRISSWALL) VERT
183051	10	111 3		C1	18 5	49 3		" PART 12 #12 "
183052	4	80 3		C1	39 8	44 2		" " #10 "
183053	4	48 3		C1	40 11	37 1		" " #12 "
183054	4	38 3		D1	32 2			" " #12 "
183055	16	80 10		C1	47 5	49 7		" " #10 "
183056	4	80 7		C1	45 0	51 4		" " #12 "
183057	4	80 4		C1	46 6	52 10		" " #12 "
183058	4	80 7		C1	46 0	54 10		" " #12 "
183059	4	80 4		C1	46 6	56 4		" " #12 "
183060	4	80 1		C1	46 0	57 10		" " #12 "
183061	4	79 10		C1	48 0	59 4		" " #12 "
183062	4	79 10		C1	48 0	60 10		" " #12 "
183063	4	79 10						" " #12 "
183064	4	80 4		C1	54 0	64 4		" " #12 "
183065	24	80 10		C1	48 5	62 7		" " #12 "
5066	3422	2 10		A1				" " #10 HORIZ
5067	334	7-2		B1	5 8	10½		" " #6 "
5068	228	11-8		B1	9 8	10½		" " #6 "
5069	80	7-2		A1				" " #6
5070	40	16-11	*	A1				" " #6
5071	20	20 6		B1	5 8	7-6		" " #6
5072	20	20 6		B1	5 8	7-6		" " #6
5073	20	19-10		B1	5-8	7-2		" " #6
5074	20	18-5		B4				" " A
5075	20	17-6		B1	5 8	6 0		" " A
5076	20	16 0		B1	5 8	5 3		" " A
5077	20	14 10		B1	5 8	4 8		" " P
5078	32	13 4		B1	5 8	3 11		" " P
5079	10	27 5	*	F1	5-0½			" " #6
5080	60	12-9		F1	4 C			" " #6

CUTTING DIAGRAM *

MARK	SET NO	D	E	F	G	H		SETS REQ'D
11001	1	24 11		55-11		31 0	5	2
	2		31 0		24 11			2
5032	3	21 8	27-1	40 9	21 8	27 1	7	4
5033	4	17 3	21 2	38 5	17-3	21 2	7	4
5034	5	14 10	17 2	32 0	14 10	17 2	6	4
5035	6	18 5		56-10	18 5	38 5	7	1
	7		38-5					1
5036	8	20 5		55-4		34 11	7	1
	9		34-11		20-5			1
5037	10	21 3		50-10		29 7	6	1
	11		29-7		21-3			1
5070	12	9-6	7 5	6-11	7 5	9-6	10	4
5079	13	14 10	12 9	27-5	12 9	14 10	10	4

NOTE: '7' IS No OF BARS REQ'D BEFORE CUTTING.
NOTE BENT BARS IF USED IN CUTTING DIAS. SHALL BE BENT AFTER CUTTING.

▲ CUT BUNDLE & MARK. MARK WITH BAR No. & SET No.

■ MARK & CUT ALL BARS ALONG THIS LINE. MAKE ALL CUTS NORMAL TO BAR AXIS.

⊕ 5035 VARY DIM. B FROM 6-6 TO 16-6 IN INCREMENTS OF 1-0.
5036 VARY DIM. B FROM 7-6 TO 16-9 IN INCREMENTS OF 1-6½.
5037 VARY DIM. B FROM 7-11 TO 16-1 IN INCREMENTS OF 10½

WIRE BARS TOGETHER AT 2'-0" CTRS

BUNDLING DETAILS **

Bill of Bars Continued

							SHAFT	PART	#	HOOKS
5081	40	22 8		B1	4 8	6 7			A	
5082	40	23 4		B1	9 8	6 11			A	
5083	40	24 0		B1	9 8	7 3			A	
5084	40	24 8		B1	9 8	7 7			A	
5085	40	25 4		B1	9 8	7 11			P	
5086	64	26 0		B1	9 8	8 3			P	
5087	160	6 4		A1					#2	
5088	160	6 8		A1					#2	
5089	160	7 0		A1					#2	
5090	160	7 4		A1					A	
5091	160	7 8		A1					A	
5092	160	8 0		A1					A	
5093	160	8 4		A1					A	
5094	16	9 8		A1					P	

1100	99	34-1					FOOTING
11101	147	38 6					"
11102	90	12 6		F1	6 0		" DOWELS VERT
6103	98	9-5		F1	1-3		" "
11104	90	20 6					CRISSWALL "
11105	90	20 5					" "
6106	98	23 10					" "
6107	98	20 5					" "
5108	32	28 3		N2	1 10		" ENDS HORIZ
11109	20	40 1		N2	7-9		" "
5110	64	22 11					" "
11111	40	28 10					" "
5112	42	28 10					" "
11113	20	28 10					" "
5114	73	15 8					TOP "
5115	2	15 3					" "
5116	2	14 9					" "
5117	2	13-9					" "
5118	2	12-6					" "
5119	2	11 0					" "
5120	2	9 3					" "
11121	7	28 10					" "
11122	2	34-5					" "
11123	4	34-2					" "
11124	4	33 4					" "
11125	4	33 10					" "

INDICATES BATTERED PILES. (BATTER ¾" / FT IN DIRECTION OF ARROW)

NOTE: SUPPORT PILE ON 40° W. 73 PILES, EST. 60'-0 LONG, 1 DRIVEN TO A MIN. BEARING VALUE OF 100 T / PILE.

NOTE: FOR PILE SPLICE DETAILS SEE SHT. 9.

PROJECT ID 1220-5-73 | SHEET NUMBER 7.21 | No. SHEETS

FEDERAL PROJECT DESIGNATION

← ℄ OF COL. & ℄ OF FOOTING

196 @ 3'-0 (588'-0) 11101

11 SP @ 4'-0 = 44'-0 | 11 SP @ 4'-0 = 44'-0

FOOTING PLAN

BUNDLING DETAILS **

DETAIL "E"

NOTES

(BILL OF BARS)

BILL OF BARS AS LISTED IS FOR ONE PIER. (MARK QUANTITY REQ'D FOR EACH PIER. LABEL WITH BAR NO & PIER NO.)

THE FIRST DIGIT OF A FOUR DIGIT MARK & THE FIRST TWO DIGITS OF A FIVE DIGIT MARK SIGNIFIES THE BAR SIZE.

DIMENSIONS IN BENDING DETAILS ARE OUT TO OUT OF BAR.

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. -9705 | Drawn By JS-waldr | Plans Checked PLP

PIER 27 & 28 DETAILS

SHEET 22 OF 49

X55619

WISDOT DTID

CAP PLAN

ELEVATION

SECTION A1

SECTION A2

SECTION A3

SECTION A4

SECTION A5

SECTION A6

NOTE: SECTIONS A2 AND A3 SIMILAR EXCEPT AS NOTED OR SHOWN OTHERWISE.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B 5 158

PIER DETAILS
PART A PIERS 27,28

SHEET 23 OF 49

X55620

WISDOT DTID

PLAN VIEW OF CAP

ELEVATION (LOOKING WEST)

END VIEW

SECTION THRU FOOTING TIE

SECTION THRU COLUMN AT TOP OF FOOTING

ELEVATION

FOOTING PLAN

SECTION C1

NOTE BARS IN SECTIONS INDICATED BY • ARE ||||| BARS.

ESTIMATED CONCRETE MASONRY

PART A TOP	188 C.Y.
PART A BOT	231 C.Y.
PART E	1400 C.Y.
PART F	242 C.Y.
PART H	1400 C.Y.
FOOTINGS	2670 C.Y.
TOTAL	1421 C.Y.

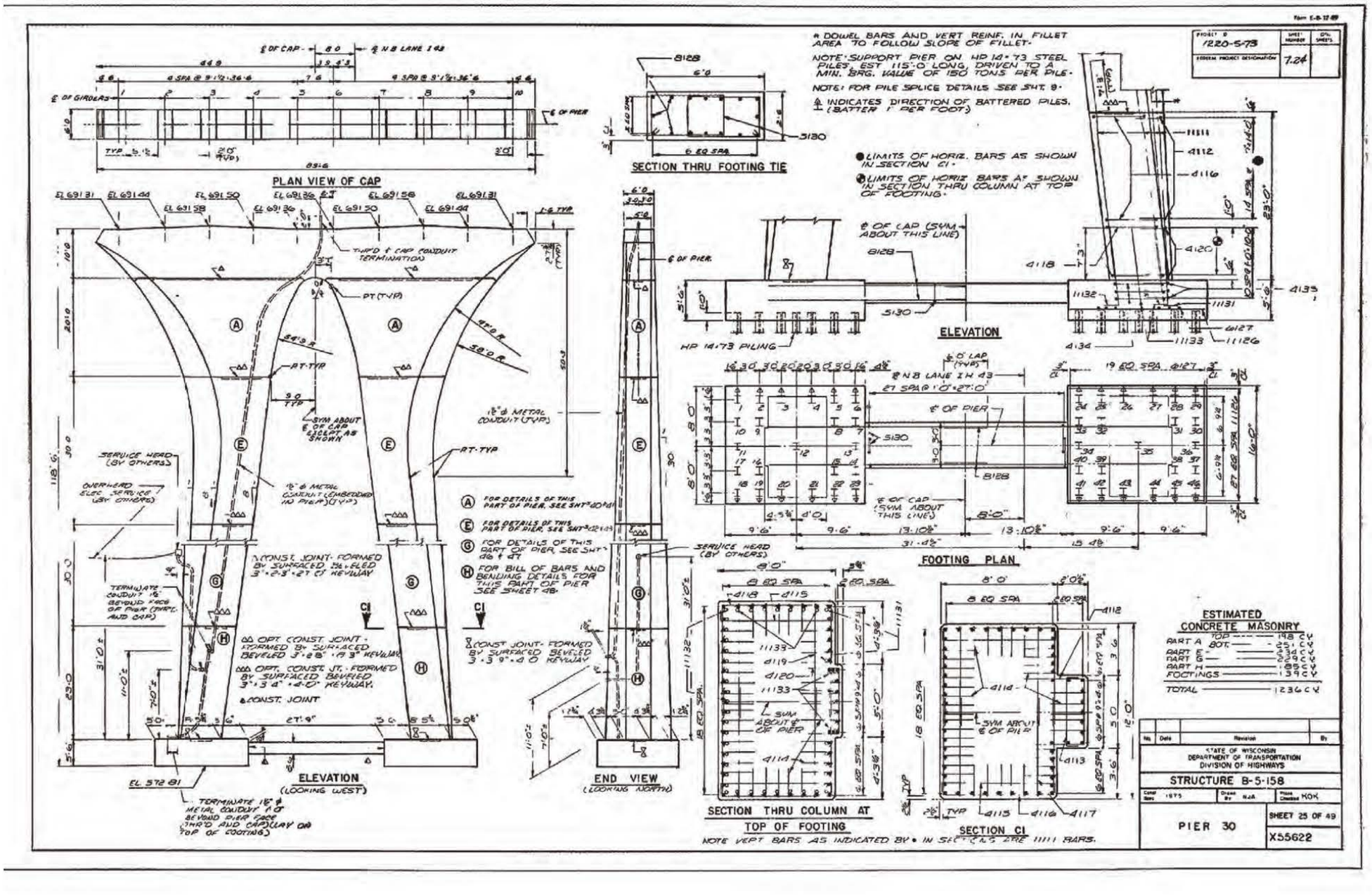
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 29

SHEET 24 OF 49

X55621


PLAN VIEW OF CAP
ELEVATION
(LOOKING WEST)
SECTION THRU FOOTING TIE
ELEVATION
FOOTING PLAN
END VIEW
(LOOKING NORTH)
SECTION THRU COLUMN AT TOP OF FOOTING
SECTION CI
ESTIMATED CONCRETE MASONRY
TOP 198 CY
PART A BOT. 251 CY
PART E 234 CY
PART G 209 CY
PART H 189 CY
FOOTINGS 1394 CY
TOTAL 2364 CY
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 30
SHEET 25 OF 49
X55622

WISDOT DTID

PLAN VIEW OF CAP

ELEVATION (LOOKING WEST)

END VIEW

SECTION THRU FOOTING TIE

ELEVATION

FOOTING PLAN

SECTION THRU COLUMN AT TOP OF FOOTING

SECTION C1

NOTE: FOR PILE SPLICE DETAILS, SEE SHT. 9.

▲ INDICATES DIRECTION OF BATTERED PILES. BATTER 1" PER FOOT.

● LIMITS OF HORIZ BARS AS SHOWN IN SECTION C1.

❷ LIMITS OF HORIZ BARS AS SHOWN IN SECTION THRU COLUMN AT TOP OF FTG.

△ CONST. JOINT: FORMED BY SURFACED BEVELED 3"-2'3"-2'0" KEYWAY. ▲ OPT CONST JOINT: FORMED BY SURFACED BEVELED 3"-2'8"-3'3" KEYWAY

△△ OPT. CONST. JOINT: FORMED BY SURFACED BEVELED 3"-3'-4"-4'0" KEYWAY.

▲ CONST. JOINT - FORMED BY SURFACED, BEVELED 3"-3'-9"-4'0" KEYWAY

NOTE SUPPORT PIER ON HP 14"x73 STEEL PILES EST. 115'0" LONG, DRIVEN TO A MIN BRG. VALUE OF 150 TONS PER PILE.

ESTIMATED CONCRETE MASONRY

PART A	TOP	148 CY
	BOT	251 CY
PART E		238 CY
PART F		224 CY
PART H		152 CY
FOOTINGS		273 CY
TOTAL		1337 CY

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 31

SHEET 26 OF 49

X55623

PROJECT ID 1220-5-73 — SHEET NUMBER 725

WISDOT DTID

NOTE: FOR PILE SPLICE DETAILS SEE SHT. 9.

↑ INDICATES DIRECTION OF BATTERED PILES ("BATTER 1" PER FOOT")

● LIMITS OF HORIZ BARS AS SHOWN IN SECTION C1.

● LIMITS OF HORIZ BARS AS SHOWN IN SECTION THRU COLUMN AT TOP OF FOOTING.

PROJECT ID 1220-5-73 | SHEET NUMBER 7.26 | FEDERAL PROJECT DESIGNATION

PLAN VIEW OF CAP

SECTION THRU FOOTING TIE

ELEVATION

ELEVATION (LOOKING WEST)

END VIEW

ELEVATION

FOOTING PLAN

SECTION THRU COLUMN AT TOP OF FOOTING

SECTION C1

ESTIMATED CONCRETE MASONRY

PART A	TOP	98 C.Y.
	BOT	251 C.Y.
PART G		634 C.Y.
PART H		294 C.Y.
FOOTINGS		135 C.Y.
TOTAL		1162 C.Y.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Date 1975 | Drawn By NJA | Plans Checked MOH

PIER 32

SHEET 27 OF 49

X55624

WISDOT DTID

PLAN VIEW OF CAP

ELEVATION (LOOKING WEST)

SECTION THRU FOOTING TIE

NOTE: SUPPORT PIER ON HP 14 x 73 STEEL PILES EST. 115'-0" LONG AND DRIVEN TO A MIN. BRG VALUE OF 150 TONS PER PILE.

± INDICATES DIRECTION OF BATTERED PILES. BATTER 1" PER FOOT

● LIMITS OF HORIZ BARS AS SHOWN IN SECTION C1.

● LIMITS OF HORIZ. BARS AS SHOWN IN SECTION AT TOP OF FOOTING THRU COLUMN.

ELEVATION

FOOTING PLAN

END VIEW

SECTION C1

SECTION AT TOP OF FTG. THRU COLUMN

FOR DETAILS OF THIS PART OF PIER, SEE SHT'S 30 & 31

FOR DETAILS OF THIS PART OF PIER, SEE SHT'S 32 & 33

FOR BILL OF BARS AND REBAR DETAILS FOR THIS PART OF PIER SEE SHT 28.

△ CONST. JOINT FORMED BY SURFACED BEVELED 3" x 2'-3" x 27'-0" KEYWAY.

△△ OPT. CONST. JOINT - FORMED BY SURFACED BEVELED 3" x 2'-8" x 8'-5" KEYWAY.

NOTE FOR PILE SPLICE DETAILS SEE SHT. 9.

△△ OPT. CONST. JOINT FORMED BY SURFACED BEVELED 3" x 3'-0" x 4'-0" KEYWAY.

⊠ CONST. JOINT FORMED BY SURFACED, BEVELED 3" x 3'-9" x 4'-0" KEYWAY

▲ CONST. JOINT

NOTE ALL VERT BARS IN SECTIONS INDICATED BY • ARE ..... BARS UNLESS SHOWN OR NOTED OTHERWISE

ESTIMATED CONCRETE MASONRY

PART A	TOP	198 C.Y.
	BOT	251 C.Y.
PART E		234 C.Y.
PART H		297 C.Y.
FOOTINGS		221 C.Y.
TOTAL		1201 C.Y.

PROJECT ID 1220-5-79 — FEDERAL PROJECT DESIGNATION 727

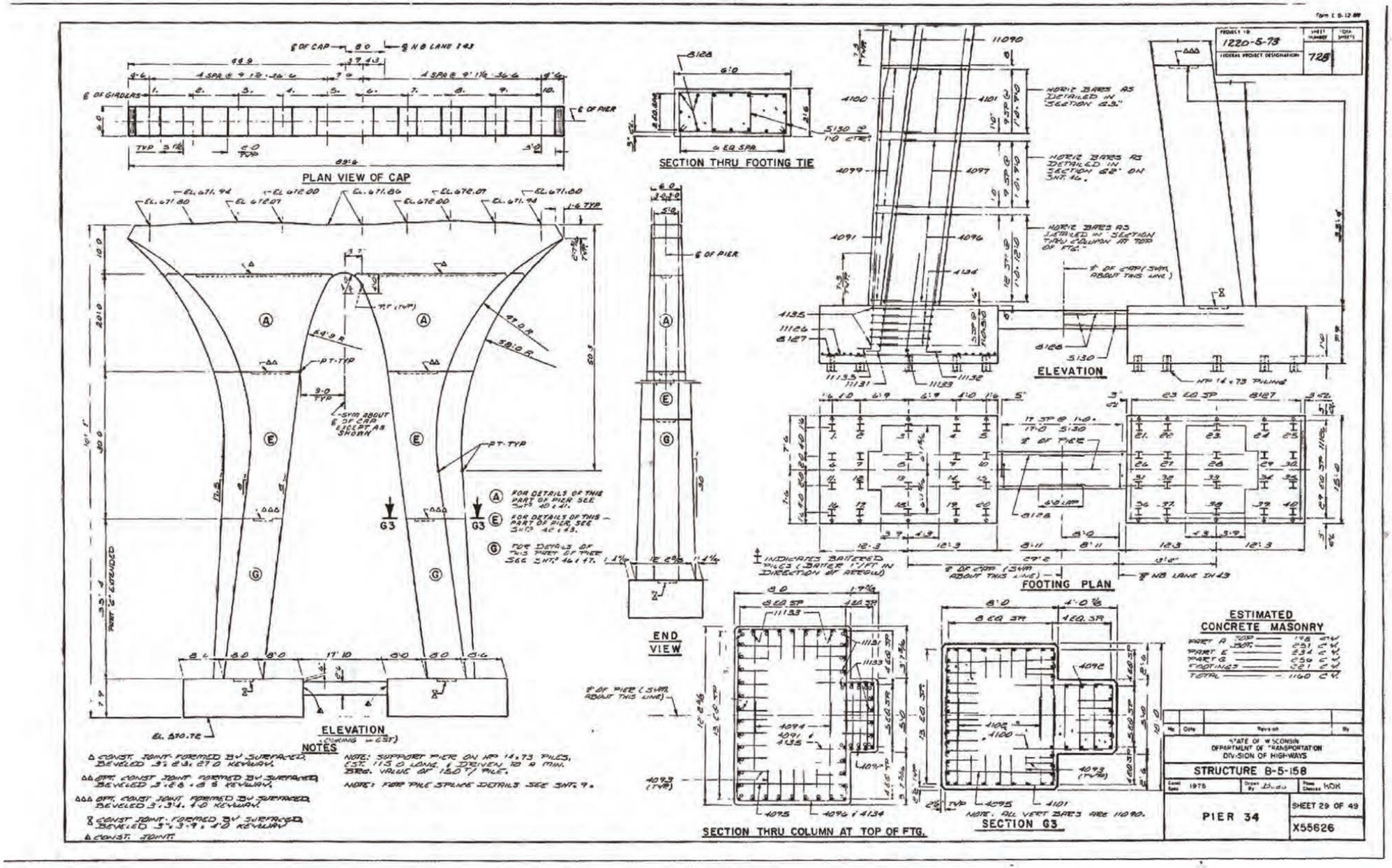
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

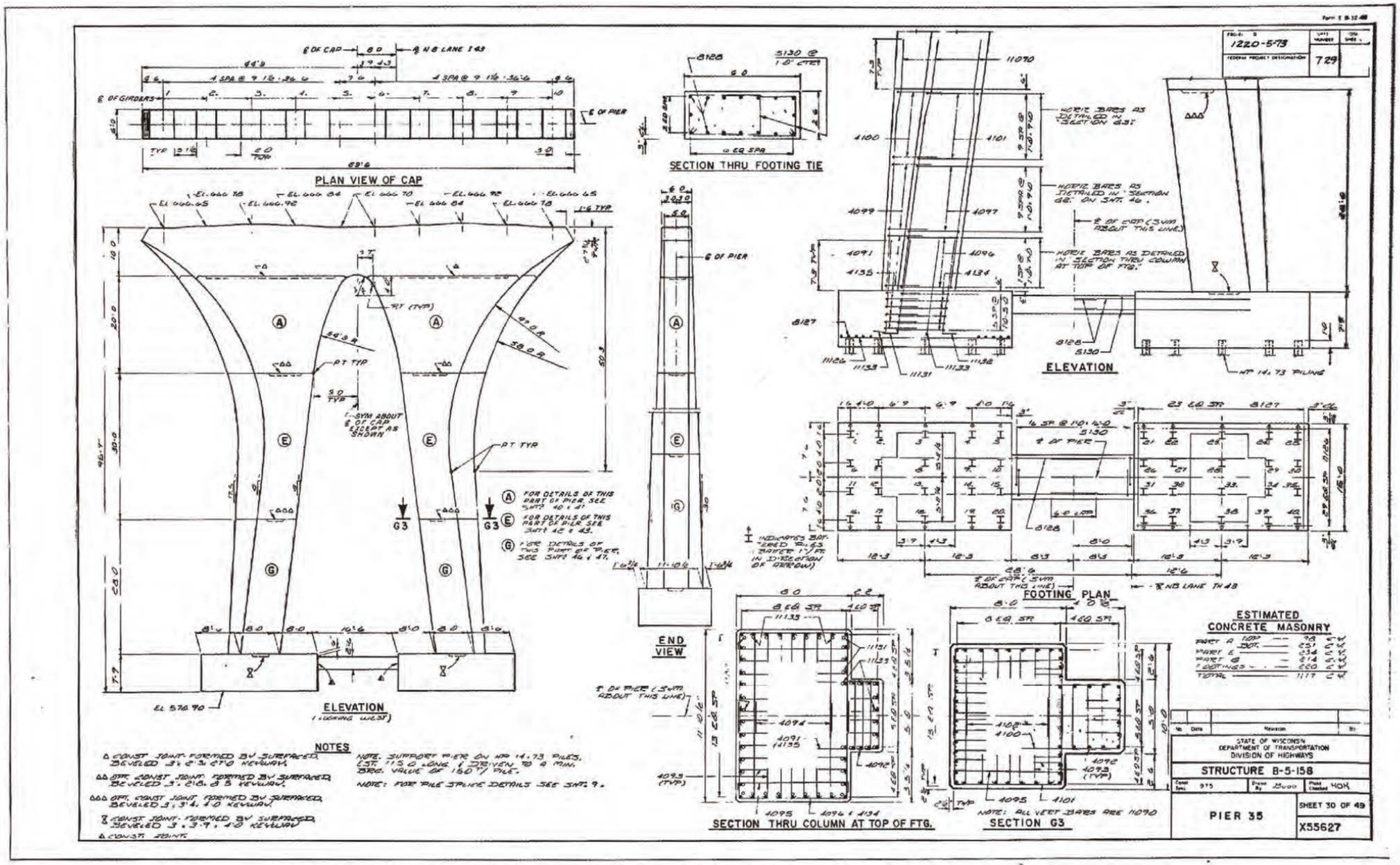
STRUCTURE B-5-158

PIER 33

SHEET 28 OF 43

X55625


PLAN VIEW OF CAP
ELEVATION
NOTES
END VIEW
SECTION THRU FOOTING TIE
ELEVATION
FOOTING PLAN
SECTION THRU COLUMN AT TOP OF FTG.
SECTION G3
ESTIMATED CONCRETE MASONRY
PART A 198
PART E 231
PART G 234
FOOTINGS 559
TOTAL 1160
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 34
SHEET 29 OF 49
X55626
1220-5-73
725


PLAN VIEW OF CAP
ELEVATION
(LOOKING WEST)
SECTION THRU FOOTING TIE
END VIEW
ELEVATION
SECTION THRU COLUMN AT TOP OF FTG.
FOOTING PLAN
SECTION G3
NOTES
Δ CONST. JOINT. FORMED BY SURFACED, BEVELED 3:2.3 CTO KEWAUNEE.
ΔΔ OPT. CONST. JOINT. FORMED BY SURFACED, BEVELED 3:2.0. & 5 KEWAUNEE.
ΔΔΔ OPT. CONST. JOINT. FORMED BY SURFACED, BEVELED 3:3.4, 1.0 KEWAUNEE.
‡ CONST. JOINT. FORMED BY SURFACED, BEVELED 3:3.9, 1.0 KEWAUNEE
Δ CONSTR. JOINT.
NOTE: SUPPORT PIER ON HP 14.73 PILES, EST. 115.0 LONG, DRIVEN TO A MIN. DES. VALUE OF 160 T/ PILE.
NOTE: FOR PILE SPLICE DETAILS SEE SHT. 9.
ESTIMATED CONCRETE MASONRY
PART A 100' — 98 C.Y.
100' — 251 C.Y.
PART E — 234 C.Y.
PART G — 614 C.Y.
FOOTINGS — 220 C.Y.
TOTAL — 1117 C.Y.
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 35
SHEET 30 OF 49
X55627
1220-5-73
729

WISDOT DTID

WISDOT DTID

PLAN VIEW OF CAP

ELEVATION (LOOKING WEST)

SECTION THRU FOOTING TIE

ELEVATION

FOOTING PLAN

END VIEW

SECTION THRU COLUMN AT TOP OF FTG.

SECTION F3

ESTIMATED CONCRETE MASONRY

PART A	TOP	195
	BOT.	251
PART E		214
PART F		135
FOOTINGS		602
TOTAL		1060

NOTES

△ CONST. JOINT FORMED BY SURFACED, BEVELED 3:12 & 27.0 KEYWAY.

△△ OPT. CONST. JOINT FORMED BY SURFACED, BEVELED 3:12 & 8.5 KEYWAY.

△△△ OPT. CONST. JOINT, FORMED BY SURFACED, BEVELED 3:12, 4.0 KEYWAY.

⊼ CONST. JOINT FORMED BY SURFACED, BEVELED 3:12 & 4.0 KEYWAY.

△ CONST. JOINT.

NOTE: SUPPORT PIER ON HP 14.73 PILES, EST. 115.0 LONG & DRIVEN TO A MIN. BRG. VALUE OF 150 T/PILE.

NOTE: FOR PILE SPLICE DETAILS SEE SHT. 9.

PROJECT I.D. 1220-5-73	SHEET NUMBER 7.30		
FEDERAL PROJECT DESIGNATION			

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 975	Drawn By JS-dd	Plans Checked KOK

PIER 36

SHEET 31 OF 49

X55628

WISDOT DTID

PLAN VIEW OF CAP

TABLE OF GIRDER ELEVATIONS (GIVEN AT ℄ OF BRG.)

℄ SECTION	1	2	3	4	5	6	7	8	9	10	11	12
SPAN 38	659.98	660.09	660.20	660.26	660.15	660.04	660.14	660.15	660.24	660.20	660.09	659.98
SPAN 37	659.87	660.03	660.14	660.04	659.93	659.93	660.04	660.14	660.03	659.87	—	—

SECTION THRU COLUMN AT TOP OF FTG.

SECTION F3
(ALL VERT BARS ARE 9090)

ELEVATION

ELEVATION
(LOOKING WEST)

END VIEW

FOOTING PLAN

SECTION THRU FOOTING TIE

NOTES

△ CONST. JOINT. FORMED BY SUPERIOR BEVELED 3:12.3, 27'-0 KEYWAY

△△ CONST. JOINT. FORMED BY SUPERIOR BEVELED 3:12.0, 8.5 KEYWAY

△△△ CONST. JOINT FORMED BY SUPERIOR BEVELED 3:-3.4, 4.0 KEYWAY

⧖ CONST. JOINT FORMED BY SUPERIOR BEVELED 3:3.9, 4.0 KEYWAY

△ CONST. JOINT

NOTE: SUPPORT PIPE ON HP 14.73 PILES. EST. 100'-0 LONG & DRIVEN TO A MIN BRG VALUE OF 50T/PILE.

NOTE: FOR PILE SPLICE DETAILS SEE SHT. 9.

ESTIMATED CONCRETE MASONRY

PART A	TOP	179
	BOT.	651
PART C		634
PART F		134
FOOTINGS		93
TOTAL		936 C.Y.

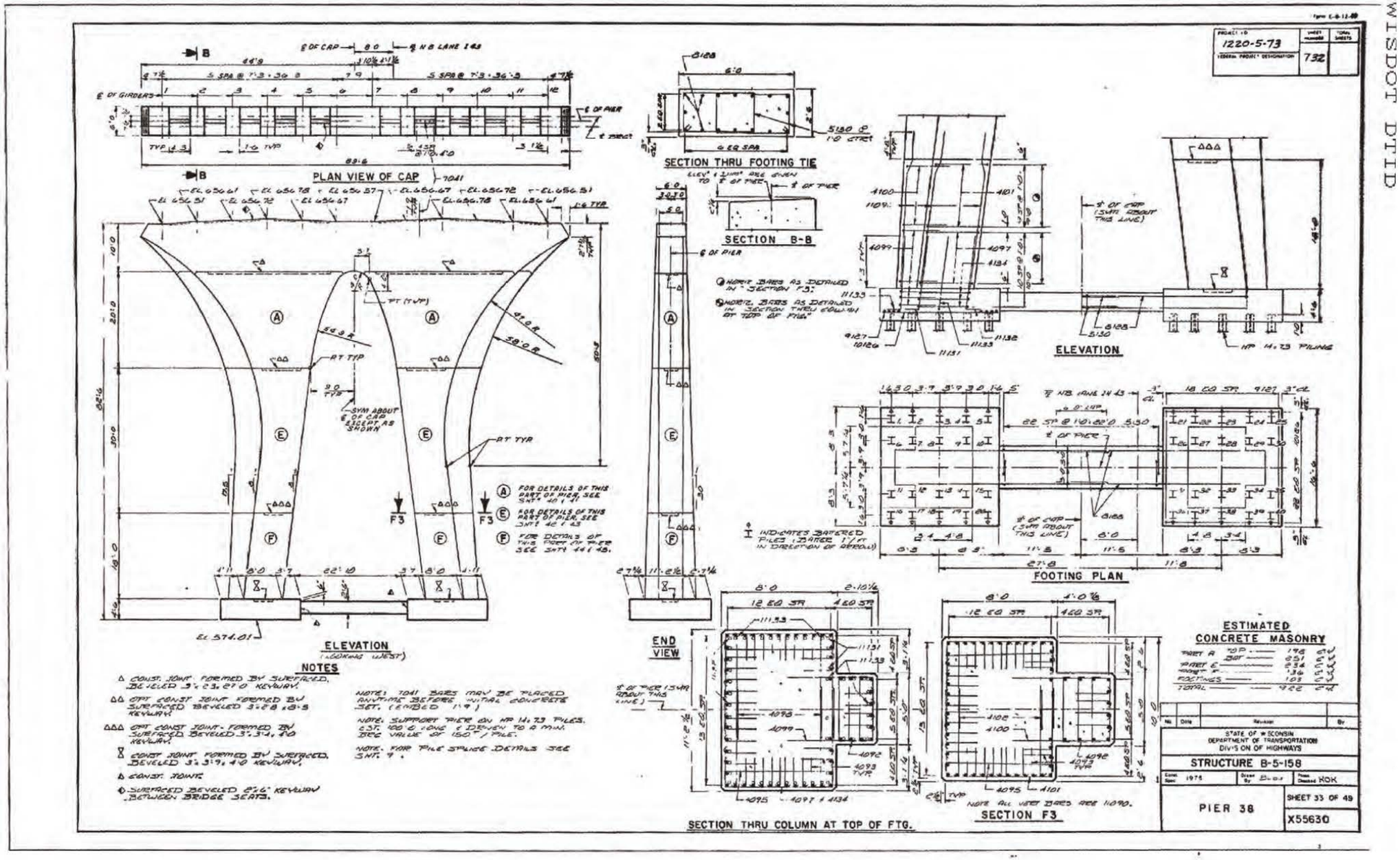
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER 37

SHEET 32 OF 46

X55629


PROJECT I.D. 1220-5-73
SHEET NUMBER 732
PLAN VIEW OF CAP
ELEVATION
NOTES
SECTION THRU FOOTING TIE
SECTION B-B
ELEVATION
SECTION F3
FOOTING PLAN
END VIEW
SECTION THRU COLUMN AT TOP OF FTG.
ESTIMATED CONCRETE MASONRY
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIV'S ON OF HIGHWAYS
STRUCTURE B-5-158
PIER 38
SHEET 33 OF 49
X55630

WISDOT DTID

PROJECT I.D. 1220-5-78 — SHEET NUMBER 733 — TOTAL SHEETS

PLAN VIEW OF CAP

ELEVATION (LOOKING WEST)

SECTION THRU FOOTING TIE

SECTION B-B

ELEVATION

FOOTING PLAN

END VIEW

SECTION THRU COLUMN AT TOP OF FTG.

SECTION F3

NOTES

△ CONST. JOINT FORMED BY SURFACED, BEVELED 3:4 x 3.67.0 KEYWAY.

△△ OPT. CONST. JOINT FORMED BY SURFACER BEVELED 3:4 x 6.0.5 KEYWAY.

△△△ OPT. CONST. JOINT FORMED BY SURFACED BEVELED 3:4 x 4.0 KEYWAY.

⧖ CONST. JOINT FORMED BY SURFACED, BEVELED 3:4 x 3.6.40 KEYWAY.

▲ CONST. JOINT.

◐ SURFACED BEVELED 2:6" KEYWAY BETWEEN BRIDGE SEATS.

NOTE: 7041 BARS MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET. (EMBED 1'-9")

NOTE: SUPPORT PIER ON 12" H. 73 PILES. EST. 100'-0 LONG & DRIVEN TO A MIN. BRG VALUE OF 130 T / PILE.

NOTE: FOR PILE SPLICE DETAILS SEE SHT. 9.

ESTIMATED CONCRETE MASONRY

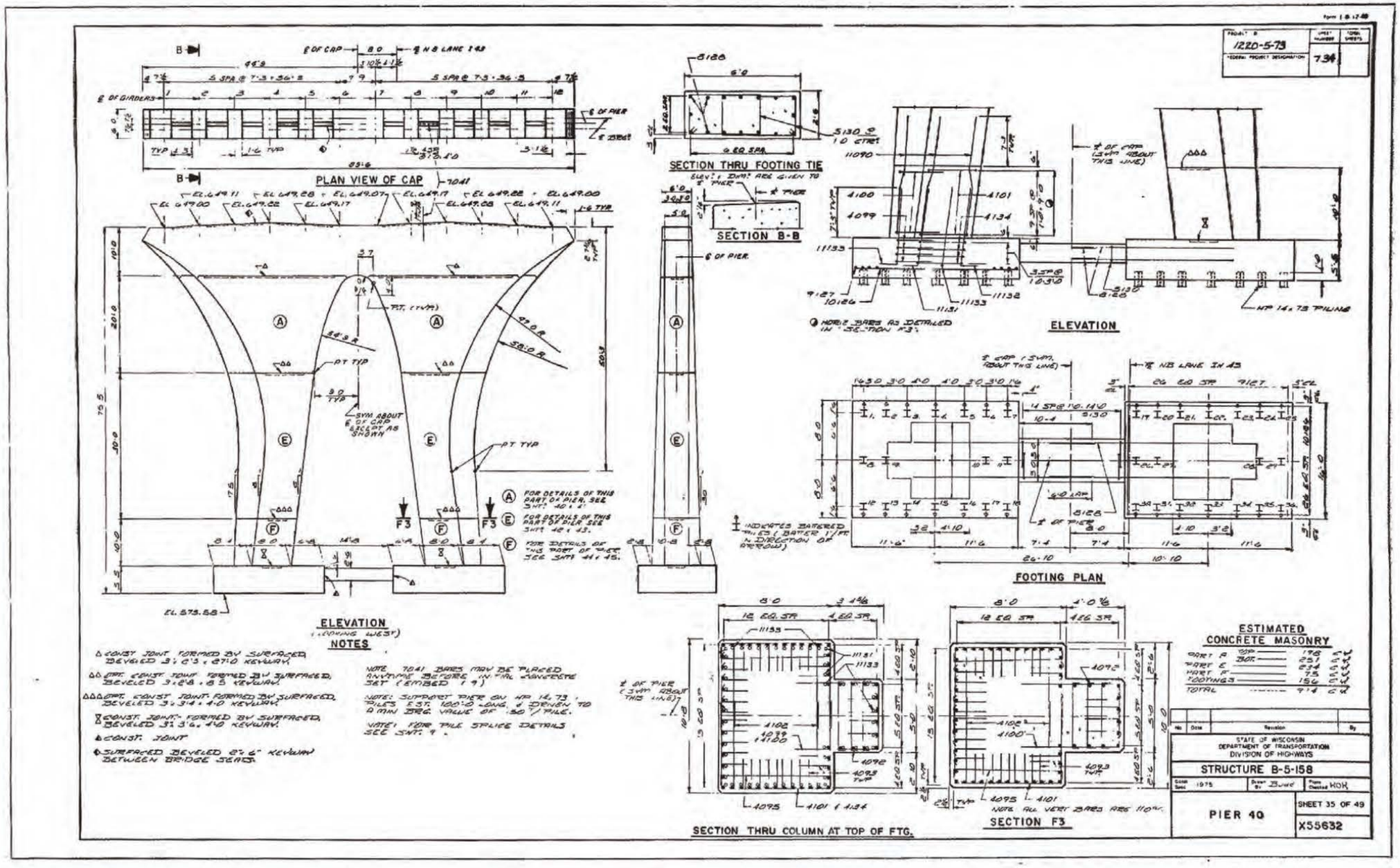
PART A	TOP	148 C.Y.
	BOT.	251 C.Y.
PART C		234 C.Y.
PART F		106 C.Y.
FOOTINGS		118 C.Y.
TOTAL		707 C.Y.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Start 1975 — Drawn By B. ado — Work Unit No. KOK

PIER 39 — SHEET 34 OF 49 — X55631


PLAN VIEW OF CAP
ELEVATION
(LOOKING WEST)
NOTES
SECTION THRU FOOTING TIE
SECTION B-B
ELEVATION
FOOTING PLAN
SECTION THRU COLUMN AT TOP OF FTG.
SECTION F3
ESTIMATED CONCRETE MASONRY
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 40
SHEET 35 OF 49
X55632
1220-5-73
734
WISDOT DTID

WISDOT DTID

PROJECT ID 1220-5-73 | SHEET NUMBER 7.35

PLAN VIEW OF CAP

SECTION THRU FOOTING TIE

ELEVATION

ELEVATION (LOOKING WEST)

END VIEW

SECTION THRU COLUMN AT TOP OF FTG.

FOOTING PLAN

SECTION F3

NOTES

A CONST JOINT: FORMED BY SURFACED BEVELED 3 x 2-3 x 270 KEYWAY.

AA OPT CONST JOINT: FORMED BY SURFACED BEVELED 3 x 2.0 x 0'-5 KEYWAY.

AAA OPT CONST JOINT: FORMED BY SURFACED BEVELED 3'-3 x 1.40 KEYWAY.

E CONST JOINT: FORMED BY SURFACED BEVELED 3'-3 x 1.40 KEYWAY.

F CONST. JOINT.

NOTE: SUPPORT PIER ON HP 14 x 73 PILES, LET 10010 LONG & DRIVEN TO A MIN. BRG VALUE OF 150 T/PILE.

NOTE: FOR PILE SPLICE DETAILS SEE SHT. 9.

ESTIMATED CONCRETE MASONRY

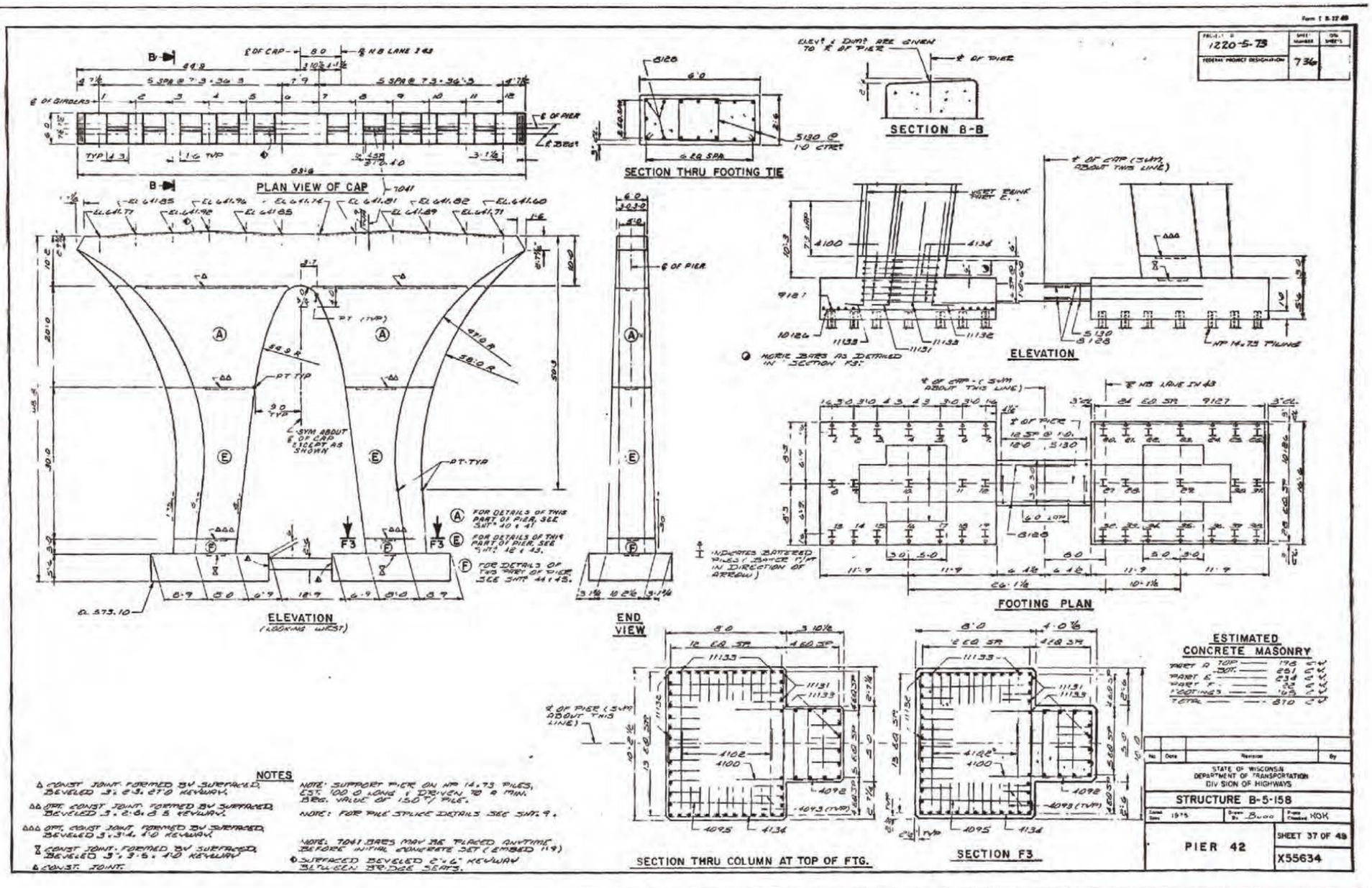
PIER A	TOP	48 CY
	BOT.	251 CY
PIER E		234 CY
PIER F		47 CY
FOOTINGS		90 CY
TOTAL		882 CY

STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

STRUCTURE B-5-156

Const. Spec. 1975 | Drawn By JS wide | Plans Checked HOK

PIER 41 | SHEET 36 OF 49 | X55633


PLAN VIEW OF CAP
ELEVATION
(LOOKING WEST)
SECTION THRU FOOTING TIE
SECTION B-B
ELEVATION
END VIEW
SECTION THRU COLUMN AT TOP OF FTG.
SECTION F3
FOOTING PLAN
NOTES
ESTIMATED CONCRETE MASONRY
PIER 42
STRUCTURE B-5-158
SHEET 37 OF 49
X55634
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

WISDOT BTID

PROJECT I.D. 1220-5-73 | SHEET NUMBER 7.37 | TOTAL SHEETS

PLAN VIEW OF CAP

ELEVATION (LOOKING WEST)

SECTION THRU FOOTING TIE

SECTION B-B

ELEVATION

END VIEW

SECTION T (SHOWING ADDITIONAL TOP REINF. ONLY)

FOOTING PLAN

SECTION THRU COLUMN AT TOP OF FTG.

SECTION E

NOTES

△ CONST. JOINT - FORMED BY SURFACED BEVELED 3"x2"x 27-0 KEYWAY.

△△ OFF CONST JOINT - FORMED BY SURFACED BEVELED 3"x2"x 8-5 KEYWAY.

⧖ CONST. JOINT - FORMED BY SURFACED BEVELED 3"x3"x 4-0

▲ CONST JOINT

◐ SURFACED BEVELED 2"x6" KEYWAY BETWEEN BRIDGE SEATS.

NOTE: TOAL BARS MAY BE PLACED ANYTIME BEFORE INITIAL CONCRETE SET (EMBED 1'-9)

NOTE: SUPPORT PIER ON HP 14x73 PILES, EST. 1000 LONG, F DRIVEN TO A MIN. BEG. VALUE OF 150 T/PILE.

NOTE: FOR PILE SPLICE DETAILS SEE SHT. 9 -

ESTIMATED CONCRETE MASONRY

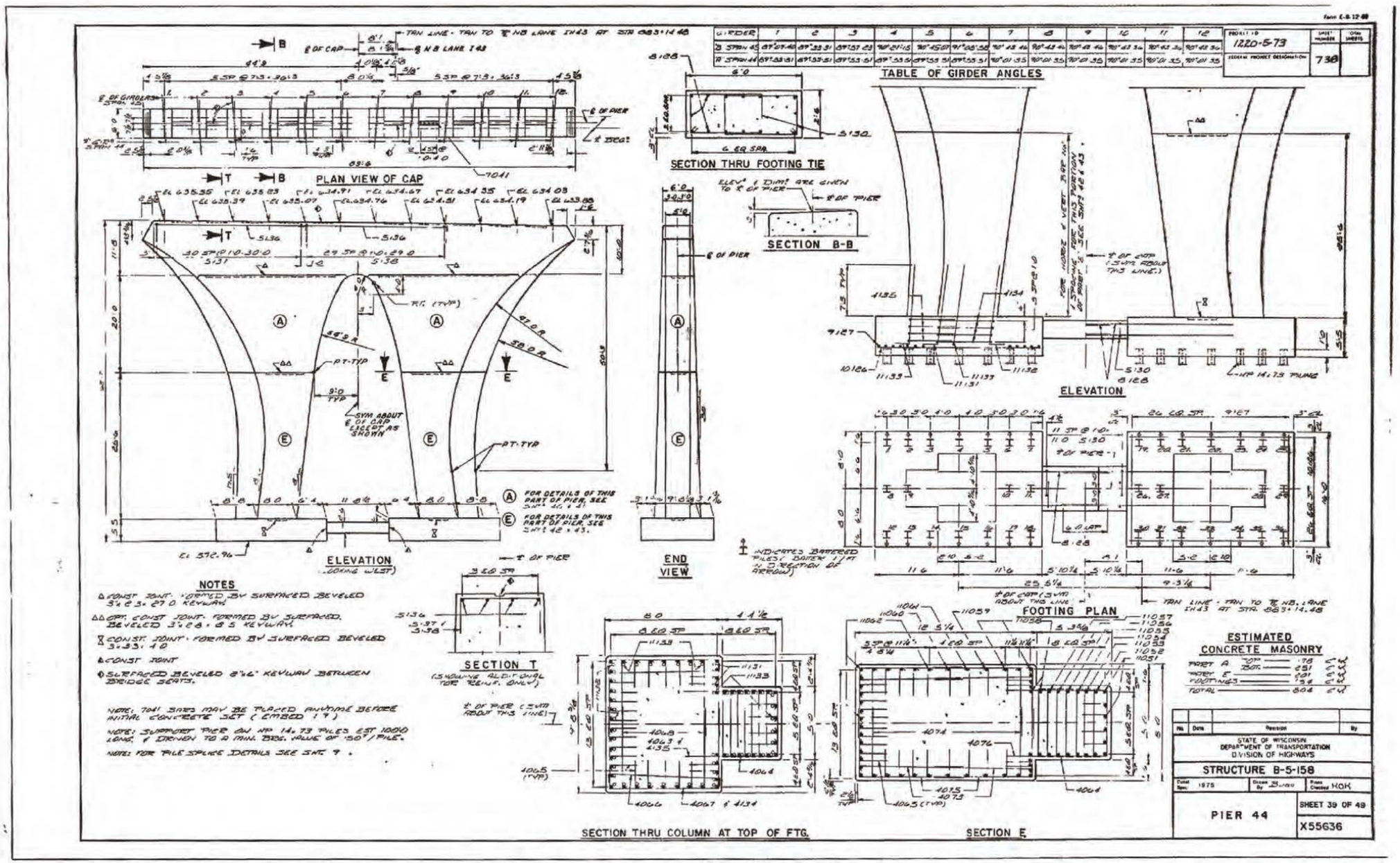
PART A	TOT.	178
	EXIST.	0
PART E		534
FOOTINGS		91
TOTAL		774 C.Y.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1975 | Drawn By | Plans Checked HOK

PIER 43 | SHEET 38 OF 49 | X55635


PLAN VIEW OF CAP
ELEVATION (LOOKING WEST)
END VIEW
SECTION THRU FOOTING TIE
SECTION B-B
ELEVATION
TABLE OF GIRDER ANGLES
SECTION T
SECTION THRU COLUMN AT TOP OF FTG.
SECTION E
FOOTING PLAN
NOTES
ESTIMATED CONCRETE MASONRY
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS
STRUCTURE B-5-158
PIER 44
SHEET 39 OF 49
X55636
WISDOT DTID

WISDOT DTID

10001 THRU 10004, 9018 THRU 9029 PIERS 37 THRU 44
11001 THRU 11004, 10018 THRU 10029 PIERS 26 AND 29 THRU 36

1220-5-75 | 739

CAP PLAN

ELEVATION

SECTION A1

SECTION A2

SECTION THRU CAP BETWEEN GIRDERS
PIERS 38, 39, 40, 42, 43 & 44 ONLY.
NOTE FOR ANCHOR BOLT LOCATION LAYOUT FOR PIERS 26 & 29 THRU 37 AND 41 SEE SHT 9 - SPACE STIRRUPS TO MISS ANCHOR BOLTS.

SECTION A3

BUNDLED BARS LAYOUT

SECTION A4

SECTION A5

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Date 1975 | Drawn By NJA | Plans Checked HOK

PIER DETAILS
PART A

SHEET 40 OF 49

X55637

WISDOT DTID

NOTE THE FIRST DIGIT OF A FOUR DIGIT MARK AND THE FIRST TWO DIGITS OF A FIVE DIGIT MARK SIGNIFIES THE BAR SIZE

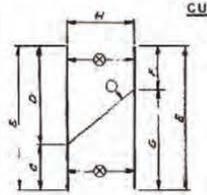
ALL BAR DIMENSIONS ARE OUT TO OUT

① PIERS 31 THRU 44.
② PIERS 26 AND 29 THRU 36
③ PIERS 26 AND 29 THRU 44
④ PIERS 38, 39, 40, 42 43 & 44 ONLY.

PROJECT ID 1220-5-78 | SHEET NUMBER 740 | TOTAL SHEETS

FEDERAL PROJECT DESIGNATION

CUTTING DIAGRAM



○ MARK AND CUT ALL BARS ALONG THIS LINE MAKE ALL CUTS NORMAL TO BAR AXIS

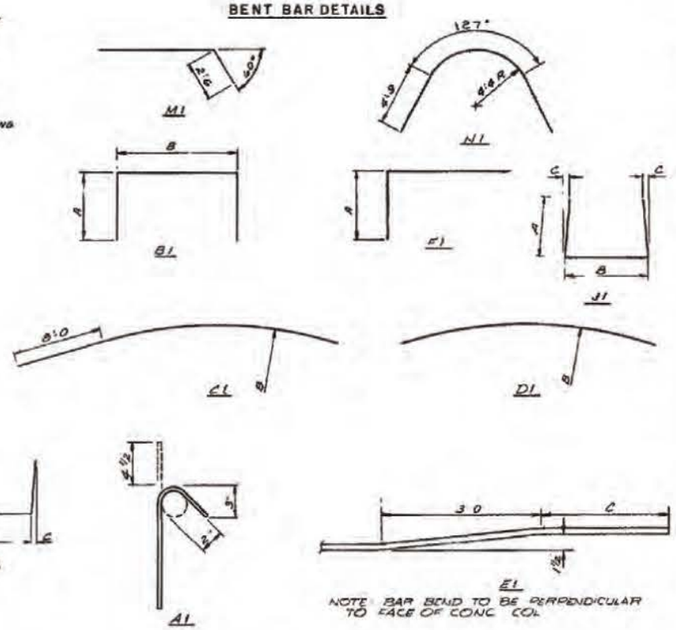
⊗ BUNDLE AND MARK CUT BARS WITH BAR AND SET NUMBER

"H" IS THE NUMBER OF BARS IN A CUTTING DIAGRAM BEFORE CUTTING

BENT BARS SHALL BE BENT AFTER CUTTING

MARK	SET NO	C	D	E	F	G	H	SETS REQD
1001	1	4'8	32'0	47'0	16'6	32'4	9	C
5011	2	7'7	13'5	21'0	7'7	13'5	2	A
5013	3	9'1	11'9	18'4	6'7	11'9	6	A
4030	11	10'1	60'7	137'2	16'1	20'7	7	B
4031	5	13'7	16'3	29'10	13'7	16'3	4	B
4032	6	10	34	25'8	11'10	34	6	B
4034	7	23'5	30'3	53'8	23'5	30'3	7	A
4038	8	17'5	22'5	39'10	17'9	22'5	7	A
4036	9	8'0	16'9	30'9	14'0	16'9	6	A

BENT BAR DETAILS



BILL OF BARS

NOTE MARK ('H' PART) AS INDICATED IS FOR ONE PIER PART A.

MARK	NO REQD.	LENGTH	CUT	BUND	BEND TYPE	BEND DIMENSIONS A	B	C	LOCATION
1000 1	4	60 0		x	M1				CAP TOP
1000 2	12	31 9		x	M1				" "
1000 3	12	60 0		x					" "
1000 4	12	32 9		x					" "
1001	16	60 0		x	M1				CAP TOP
1002	12	39 1		x	M1				" "
1003	12	60 0		x					" "
1004	12	34 3		x					" "
1000 5	22	60 0							CAP SIDES
1000 6	2	34 0							" "
1000 7	3	47 0	x						" "
1000 8	3	23 0							" BOTTOM
1009	7	9 6			N1				" SHAFT
5010	64	3 9			G1	2 0	5 8	1"	" TOP
5011	18	21 0	x		H1	ddg			" ENDS
5012	18	9 5			B1	2'6	4 8		" "
5013	2	9 5	x		F1	3 7			" "
5014	12	13 0			F1	3 7			" "
5015	92	9 2							" VERT
5016	23	19 7			G1	7 1	5 8	3"	" STIRRUPS
5017	23	14 1			J1	3 0	6 4	2"	"
9018	10	25 8			E1 C1		55 0	4 8	SHAFT VERT
9019	20	25 4			E1	**		4 8	" "
9020	36	22 11			E1	**		4 8	" "
9021	8	23 11			E1	**		4 8	" "
9022	8	26 7			E1	**		4 8	" "
9023	8	27 4			E1	**		4 8	" "
9024	4	16 3			E1			4 8	" "
9025	8	35 7			E1 D1		47 3	4 8	" "
9026	4	21 9			D1		50 0		" "
9027	4	28 5			D1		52 9		" "
9028	4	28 8			D1		53 0		" "
9029	10	32 1			E1 D1		58 3	4 8	" "
9030	2	29 8			C1 E1	**	55 0	4 8	" "
9031	2	29 8			C1 E1	**	55 0	4 8	" "
1003 8	10	27 0			E1 C1		55 0	6 0	SHAFT VERT
1003 9	20	26 8			E1	**		6 0	" "
1003 10	36	24 3			E1	**		6 0	" "
1003 11	8	27 3			C1	**		6 0	" "
1003 12	8	27 11			E1	**		6 0	" "
1003 13	8	28 8			E1	**		6 0	" "
1003 14	4	17 9			E1			6 0	" "
1003 15	8	36 11			E1 D1		47 3	6 0	" "
1003 16	4	29 1			D1		50 0		" "
1003 17	4	29 9			D1		52 9		" "
1003 18	4	30 0			D1		53 6		" "
1003 19	10	33 5			E1 D1		58 3	6 0	" "
1003 20	2	29 C			C1 E1	**	55 0	6 0	" "
1003 21	2	27 0			C1 E1	**	55 0	6 0	" "

** BEND BOTH ENDS AS SHOWN IN BEND TYPE E1.

MARK	NO REQD	LENGTH	CUT	BUND	BEND TYPE	BEND DIMENSIONS A	B	C	LOCATION
4030	28	31 2	x		F1	4 4			SHAFT HORIZ
4031	28	29 10	x		F1	4 7			" "
1034	24	25 2	x		F1	4 9			" "
4033	40	16 6			B1	6 0	4 4		" "
4034	18	53 8	x		A1				" "
1035	14	33 10	x		A1				" "
1036	12	30 9	x		A1				" "
4037	80	5 1			A1				" "
4038	10	5 10			B1	8"	4 8		" "
1039	80	3 0			A1				" "
4040	1872	2 7			A1				" "
9041	50	3 6							DOWELS VERT

NOTE: LABEL BILL OF BARS FOR EACH PIER WITH BAR NO AND PIER NO.

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Comp Spec 1.07.5 | Drawn By BJA | Plans Checked MOK

BILL OF BARS
PART A

SHEET 41 OF 49

X55638

‡ INDICATES DIRECTION OF E1 BENDS ON VERT BARS.

PART SECTION AT A4 AND A5

WISDOT DTID

SECTION E3

SECTION E2

SECTION E1

ELEVATION
(LOOKING WEST)

END VIEW

ELEVATION PART E

PART SECTION AT E3

- 9051 THRU 9062 BARS AT PIERS 37, 38, 39 AND 41.
  10051 THRU 10062 BARS AT PIERS 29 THRU 36.
  11051 THRU 11062 BARS AT PIERS 40 AND 42.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

PIER DETAILS
PART E

SHEET 42 OF 49

X55639

WISDOT DTID

BILL OF BARS

NOTE FOR PIERS 26 AND 29 THRU 42
NOTE- BILL OF BARS AS INDICATED IS FOR ONE PIER, PART E.

MARK	NO REQD	LENGTH	BEND TYPE	BEND DIMENSION A	B	C	LOCATION SHAFT	VERT
9051	12	36-1	C1		58 3		"	"
9052	4	36-1	C1		56-10½		"	"
9053	4	36-1	C1		55 6		"	"
9054	4	36-1	C1		54-1½		"	"
9055	4	36-1	C1		52 9		"	"
9056	4	36-1	C1		51-4½		"	"
9057	4	36-1	C1		50-0		"	"
4058	32	36-1	C1		47 0		"	"
9059	4	18-6	D1		47-0		"	"
9060	4	13-1					"	"
9061	4	14-3					"	"
9062	48	36-1					"	"
10051	12	36-1	C1		58 3		"	"
10052	4	36-1	C1		56-10½		"	"
10053	4	36 1	C1		55 6		"	"
10054	4	36-1	C1		54 1½		"	"
10055	4	36-1	C1		52 9		"	"
10056	4	36-1	C1		51 4½		"	"
10057	4	36-1	C1		50 0		"	"
10058	32	36-1	C1		47 0		"	"
10059	4	18-6	D1		47-0		"	"
10060	4	13-1					"	"
10061	4	14 3					"	"
10062	48	36 1					"	"
11051	12	36-1	C1		58 3		"	"
11052	4	36-1	C1		56 10½		"	"
11053	4	36-1	C1		55 6		"	"
11054	4	36-1	C1		54 1½		"	"
11055	4	36-1	C1		52 9		"	"
11056	4	36-1	C1		51 4½		"	"
11057	4	36-1	C1		50 0		"	"
11058	32	36-1	C1		47 0		"	"
11059	4	18 6	D1		47-0		"	"
11060	4	13-1					"	"
11061	4	14-3					"	"
11062	48	36 1					"	"
4063	20	18 0	B1	4 8	6 9		"	HORIZ.
4064	420	5 10	B1	4-8	8"		"	"
4065	1820	2 4	A1				"	"
4066	40	8 10	B1	7-8	8"		"	"
4067	40	19 2	B1	7 8	5-10		"	"
4068	80	6 3	A1				"	"
4069	80	11 0	F1	5-8			"	"
4070	80	5 11	A1				"	"
4071	80	5 8	A1				"	"
4072	20	19 2	B1	4-8	7-4		"	"
4073	80	7-4	A1				"	"
4074	80	5 7	A1				"	"
4075	80	12 2	F1	7 0			"	"
4076	20	18 10	B1	4-8	7-2		"	"

BILL OF BARS ◑

NOTE FOR PIER 43 ONLY

MARK	NO REQD	LENGTH	BEND TYPE	BEND DIMENSION A	B	C	LOCATION SHAFT	VERT
9051	12	36-1	C1		58 3		"	"
9052	4	36-1	C1		56-10½		"	"
9053	4	36-1	C1		55-6		"	"
9054	4	36-1	C1		54-1½		"	"
9055	4	36-1	C1		52-9		"	"
9056	4	36-1	C1		51-4½		"	"
9057	4	36-1	C1		50-0		"	"
9058	32	36-1	C1		47-0		"	"
9059	4	18-6	D1		47 0		"	"
9060	4	13-1					"	"
9061	4	14-3					"	"
9062	48	36-1					"	"
4063	20	18-0	B1	4-8	6-9		"	HORIZ.
4064	420	5-10	B1	4-8	8"		"	"
4065	1820	2-4	A1				"	"
4066	40	8-10	B1	7-8	8"		"	"
4067	40	19-2	B1	7-8	5-10		"	"
4068	80	6-3	A1				"	"
4069	80	11-0	F1	5-8			"	"
4070	80	5-11	A1				"	"
4071	80	5-8	A1				"	"
4072	20	19-2	B1	4-8	7-4		"	"
4073	80	7-4	A1				"	"
4074	80	5-7	A1				"	"
4075	80	12-2	F1	7-0			"	"
4076	20	18-10	B1	4-8	7-2		"	"
0126	40	18-6					FOOTING	
0127	48	14-6					"	
8128 ◑	32	24-2					"	TIE
5130 ◑	40	12-11	K1	4-0	2-1		"	TIE
9131	16	9-5	G1	1-7			"	DOWELS
9132	28	9 5	H1	1-7			"	"
9133	72	9-5	F1	1 7			"	"
4134	12	18-11	B1	7-5	5-10		"	STIRRUPS
4135	6	16-6	B1	4-8	6-0		"	"
5136	4	40-0					PIER CAP (TOP) HORIZ	
9137	40	9-4	J1	2-0	5-1	1"	" " VERT	

◑ COATED HIGH STRENGTH BAR STEEL REINFORCEMENT

BILL OF BARS ◑

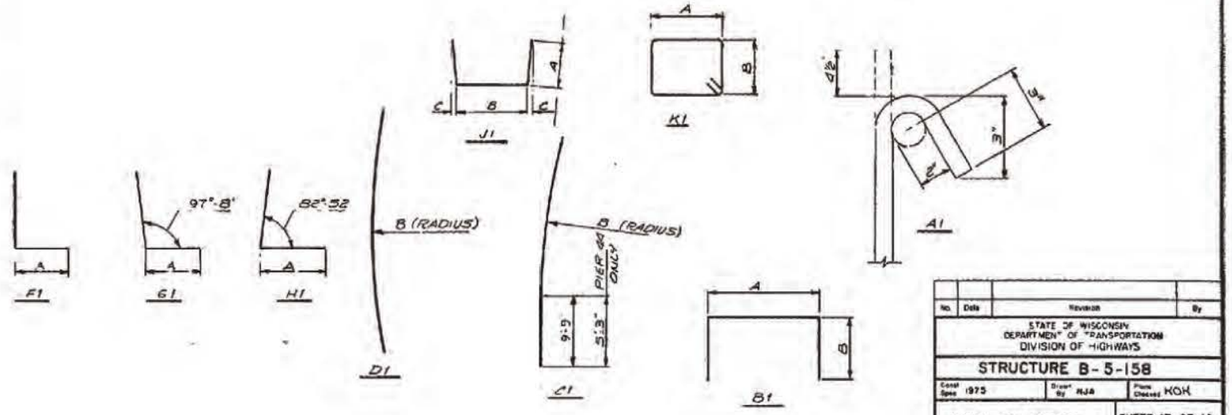
NOTE- FOR PIER 44 ONLY

MARK	NO REQD	LENGTH	BEND TYPE	BEND DIMENSION A	B	C	LOCATION SHAFT	VERT
1051	12	31 8	C1		58 3		"	"
1052	4	31-8	C1		56-C½		"	"
11053	4	31 8	C1		55 6		"	"
11054	4	31 8	C1		54 1½		"	"
1055	4	31 8	C1		52 9		"	"
11056	4	31-8	C1		51 4½		"	"
11057	4	31 8	C1		50 0		"	"
11058	32	31-8	C1		47-0		"	"
1059	4	18 6	D1		47 0		"	"
11060	4	13-1					"	"
11061	4	14 3					"	"
11062	48	31-8					"	"
4063	12	18-0	B1	4-8	6-9		"	HORIZ
4064	344	5-10	B1	4 8	8"		"	"
4065	1596	2-4	A1				"	"
4066	24	8-10	B1	7 8	8"		"	"
4067	24	19-2	B1	7 8	5-10		"	"
4068	48	6-3	A1				"	"
4069	80	11 0	F1	5-8			"	"
4070	80	5-11	A1				"	"
4071	80	5-8	A1				"	"
4072	20	19-2	B1	4-8	7-4		"	"
4073	80	7-4	A1				"	"
4074	80	5-7	A1				"	"
4075	80	12-2	F1	7-0			"	"
4076	20	18-10	B1	4-8	7-2		"	"
10126	50	22 6					FOOTING	
9127	50	15-6					"	
8128 ◑	32	23 3					"	TIE
5130 ◑	28	12-11	K1	4 0	2-1		"	TIE
11131	16	13 2	G1	2 0			"	DOWEL
11132	28	13-2	H1	2 0			"	"
11133	72	13-2	F1	2 0			"	"
4134	16	18-10	B1	7-4	5 10		"	STIRRUPS
4135	8	18-0	B1	4-8	6 9		"	"
5136	8	30 9					PIER CAP (TOP) HORIZ	
5137	31	11-2	J1	2-11	5-7	1"	" " VERT.	
5138	30	9-10	J1	2 3	5-7	1"	" " " "	

① PIERS 37 38 39 41
② PIERS 26 AND 29 THRU 36
③ PIERS 40, 42
④ PIERS 26 AND 29 THRU 42

NOTE: THE FIRST DIGIT OF A FOUR DIGIT BAR MARK AND THE FIRST TWO DIGITS OF A FIVE DIGIT MARK SIGNIFIES THE BAR SIZE.
NOTE DIMS IN BENDING DETAILS ARE OUT TO OUT OF BAR.
NOTE: LABEL BILL OF BARS FOR EACH PIER WITH BAR NO. AND PIER NO.

◑ BILL OF BARS PARTIAL PART E PLUS FOOTING REINF.



PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-73	742	
FEDERAL PROJECT DESIGNATION		

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const Spec 1975 | Drawn By HJA | Plans Checked KOK

BILL OF BARS PART 'E' | SHEET 43 OF 49 | X55640

WISDOT DTID

PROJECT I.D. 1220-5-78 | SHEET NUMBER 7.43 | TOTAL SHEETS

FEDERAL PROJECT DESIGNATION

8'-0" 4101 4102 4095 4100 4092 4093 13 EQ SPA. 12 EQ SPA. 4 EQ SPA. 5 EQ SPA. 5'-0" ℄ SYM. ABOUT ℄ OF PIER

SECTION F3

NOTE: ALL VERT. REINF. IN SECTION ARE 11090.

8'-0" 4097 4095 4098 4099 4092 4093 13 EQ SPA. 12 EQ SPA. 4 EQ SPA. 5 EQ SPA. 5'-0" ℄ SYM. ABOUT ℄ OF PIER

NOTE ALL VERT BARS IN SECTION ARE 11090.

SECTION F2

8'-0" 4095 4094 4096 4091 4092 13 EQ SPA. 12 EQ SPA. 4 EQ SPA. 5 EQ SPA. 5'-0" ℄ SYM. ABOUT ℄ OF PIER 4093

NOTE ALL VERT BARS IN SECTION ARE 11090.

SECTION F1

℄ OF PIER

SYM ABOUT ℄ OF CAP

TOP OF FTG PIER 37 ONLY 38 39 40 41 42

30'-0" PART 'F' 21'-0" 18'-0" 14'-0" 10'-0" 9'-3" 3'-0"

F3 F2 F1

8'-0" 40° 6 SPA @ 10'-0" = 60'-0" 10'-0" 8'-0" 2'-0"

ELEVATION (LOOKING WEST)

△ OFT KEYED CONST JT

26 30 2'-6"

4100 4101 4099 4097 4091 4096

END VIEW

7'-3" 4100 4101 4097 11090 4096 4099 11090 4091 9 SPACES @ 10'-0" = 90'-0" 30'-0"

ELEVATION PART F

VERT REINF PART 'E' (TYP AT JOINT)

JOINT BETW. PARTS 'E' AND 'F'

BAR BEND- FOR DETAILS SEE SHEET 48 (TYP ALL VERT BARS)

VERT REINF PART 'F' (TYP AT JOINT)

HORIZ REINF

PART SECTION AT F3

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1973	Drawing No. M.24	Plate Criterion HOK

PIER DETAILS PART F

SHEET 44 OF 49

X55641

NOTE BILL OF BARS AS INDICATED IS FOR ONE PIER PART F.

BILL OF BARS PIERS 26, 29, 31

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
11580	116	37'-6	E1	7'-3		SHAFT VERT
4091	20	16'-2	B1	4'-8	4'-10	SEC E1 HORIZ
4092	180	5'-10	B1	4'-8	8"	SHAFT "
4093	2160	2'-4	A1			" "
4094	80	1'-2	A1			SEC E1 "
4095	120	8'-10	B1	7'-8	8"	SHAFT "
4096	40	21'-0	B1	7'-8	6'-9	SEC E1 "
4097	40	20'-4	B1	7'-8	6'-5	" F2 "
4098	80	6'-10	A1			" F2 "
4099	40	15'-6	B1	4'-8	5'-6	" F2 "
4100	20	16'-6	B1	4'-8	6'-0	" F3 "
4101	40	19'-8	B1	7'-8	6'-1	" F3 "
4102	80	6'-6	A1			" F3 "

BILL OF BARS PIER 36

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
1090	116	30'-6	E1	7'-3		SHAFT VERT
4091	10	14'-2	B1	4'-8	4'-10	FOOTING HORIZ
4092	138	5'-10	B1	4'-8	8"	SHAFT "
4093	1656	2'-4	A1			" "
4095	92	8'-10	B1	7'-8	8"	" "
4097	52	20'-8	B1	7'-8	6'-7	** "
4098	104	1'-0	A1			** "
4099	26	15'-6	B1	4'-8	5'-6	** "
4100	20	16'-6	B1	4'-8	6'-0	SEC F3 "
4101	40	19'-8	B1	7'-8	6'-1	" F3 "
4102	80	6'-6	A1			" F3 "
11126	54	24'-6				FOOTING
8127	50	15'-0				"
8128	32	26'-7				" TIE
5130	32	12'-11	K1	4'-0	2'-1	" TIE
11131	16	12'-7	G1	2'-0		" DOWEL
11132	28	12'-7	H1	2'-0		" "
11133	72	12'-7	F1	2'-0		" "
4134	20	20'-4	B1	7'-4	6'-7	" STIRRUP

BILL OF BARS PIER 37

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
9090	116	25'-10	E1	4'-8		SHAFT VERT
4092	126	5'-10	B1	4'-8	8"	SEC F3 HORIZ
4093	1512	2'-4	A1			" F3 "
4095	84	8'-10	B1	7'-8	8"	" F3 "
4097	44	20'-4	B1	7'-8	6'-5	** "
4098	88	6'-10	A1			** "
4099	28	15'-6	B1	4'-8	5'-6	** & FTG "
4100	20	16'-6	B1	4'-8	6'-0	SEC F3 "
4101	40	19'-8	B1	7'-8	6'-1	" F3 "
4102	80	6'-6	A1			" F3 "
10126	40	15'-0				FOOTING
9127	44	16'-6				"
8128	32	26'-5				" TIE
5130	48	12'-11	K1	4'-0	2'-1	" "
9131	16	9'-4	G1	1'-7		" DOWELS
9132	28	9'-4	H1	1'-7		" "
9133	72	9'-4	F1	1'-7		" "
4134	12	20'-3	B1	7'-5	6'-6	" STIRRUPS

BILL OF BARS PIER 38

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
11090	116	22'-10	E1	4'-8		SHAFT VERT
4092	108	5'-10	B1	4'-8	8"	SEC F3 HORIZ
4093	1296	2'-4	A1			" F3 "
4095	72	8'-10	B1	7'-8	8"	" F3 "
4097	32	20'-4	B1	7'-8	6'-5	** "
4098	64	6'-10	A1			** "
4099	22	15'-6	B1	4'-8	5'-6	** & FTG "
4100	20	16'-6	B1	4'-8	6'-0	SEC F3 "
4101	20	19'-8	B1	7'-8	6'-1	" F3 "
4102	80	6'-6	A1			" F3 "
10126	46	16'-0				FOOTING
9127	38	16'-0				"
8128	32	26'-0				" TIE
5130	46	12'-11	K1	4'-0	2'-1	" "
11131	16	12'-4	G1	2'-0		" DOWEL
11132	28	12'-4	H1	2'-0		" "
11133	72	12'-4	F1	2'-0		" "
4134	12	20'-2	B1	7'-4	6'-5	" STIRRUP

BILL OF BARS PIER 39

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
9090	116	18'-10	E1	4'-8		SHAFT VERT
4092	80	5'-10	B1	4'-8	8"	SEC F3 HORIZ
4093	1008	2'-4	A1			" F3 "
4095	56	8'-10	B1	7'-8	8"	" F3 "
4097	16	20'-4	B1	7'-8	6'-5	** "
4098	32	6'-10	A1			** "
4099	16	15'-6	B1	4'-8	5'-6	** & FTG "
4100	20	16'-6	B1	4'-8	6'-0	SEC F3 "
4101	40	19'-8	B1	7'-8	6'-1	" F3 "
4102	80	6'-6	A1			" F3 "
10126	50	19'-0				FOOTING
9127	28	12'-6				"
8128	32	22'-6				" TIE
5130	38	12'-11	K1	4'-0	2'-1	" "
9131	10	10'-8	G1	1'-7		" DOWEL
9132	28	10'-8	H1	1'-7		" "
9133	72	10'-8	F1	1'-7		" "
4134	16	19'-9	B1	7'-5	6'-3	" STIRRUP

BILL OF BARS PIER 40

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
11090	116	17'-4	E1	7'-3		SHAFT VERT
4092	60	5'-10	B1	4'-8	8"	SEC F3 HORIZ
4093	720	2'-4	A1			" F3 "
4095	40	8'-10	B1	7'-8	8"	" F3 "
4099	8	15'-6	B1	4'-8	5'-6	FOOTING "
4100	20	16'-6	B1	4'-8	6'-0	SEC F3 "
4101	40	19'-8	B1	7'-8	6'-1	" F3 "
4102	80	6'-6	A1			" F3 "
10126	54	22'-6				FOOTING
9127	54	15'-6				"
8128	32	25'-0				" TIE
5130	30	12'-11	K1	4'-0	2'-1	" "
11131	16	13'-3	G1	2'-0		" DOWEL
11132	28	13'-3	H1	2'-0		" "
11133	72	13'-3	F1	2'-0		" "
4134	16	19'-6	B1	7'-4	6'-2	" STIRRUP

BILL OF BARS PIER 41

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
9090	116	12'-0				SHAFT VERT
4092	36	5'-10	B1	4'-8	8"	SEC F3 HORIZ
4093	432	2'-4	A1			" F3 "
4095	24	8'-10	B1	7'-8	8"	" F3 "
4100	18	16'-6	B1	4'-8	6'-0	" F3 & FTG "
4102	48	6'-6	A1			" F3 "
10126	40	15'-6				FOOTING
9127	44	16'-6				"
8128	32	26'-6				" TIE
5130	42	12'-11	K1	4'-0	2'-1	" "
9131	16	9'-5	G1	1'-7		" DOWEL
9132	28	9'-5	H1	1'-7		" "
9133	72	9'-5	F1	1'-7		" "
4134	36	19'-2	B1	7'-8	5'-10	" & PART F STIRRUP

BILL OF BARS PIER 42

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
4092	18	5'-10	B1	4'-8	8"	SEC F3 HORIZ
4093	216	2'-4	A1			" F3 "
4095	12	8'-10	B1	7'-8	8"	" F3 "
4100	14	16'-6	B1	4'-8	6'-0	" F3 & FTG "
4102	24	6'-6	A1			" F3 "
10126	58	23'-0				FOOTING
9127	50	16'-0				"
8128	32	24'-0				" TIE
5130	26	12'-11	K1	4'-0	2'-1	" "
11131	16	16'-4	G1	2'-0		" DOWEL
11132	28	16'-4	H1	2'-0		" "
11133	72	16'-4	F1	2'-0		" "
4134	28	18'-10	B1	7'-4	5'-10	" & PART F STIRRUP

FHWA	STATE	FEDERAL PROJECT DESIGNATION	SHEET NUMBER	TOTAL SHEETS
	1220-5-73		744	

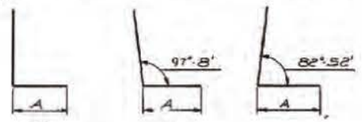
NOTE: LABEL BILL OF BARS FOR EACH PIER WITH BAR NO. AND PIER NO.

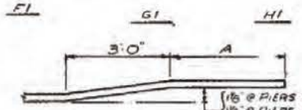
● COATED HIGH STRENGTH BAR STEEL REINFORCEMENT

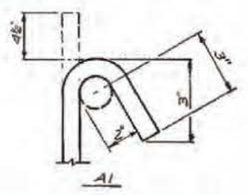
◑ BILL OF BARS - PARTIAL PART F PLUS FOOTING REINFORCEMENT.

** SECTION THRU COLUMN AT TOP OF FOOTING.

NOTE THE FIRST DIGIT OF A FOUR DIGIT BAR MARK AND THE FIRST TWO OF A FIVE DIGIT BAR MARK SIGNIFIES THE BAR SIZE.
NOTE: DIMS IN BENDING DETAILS ARE OUT TO OUT OF BAR.







No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Date	Designed By	Plans Checked
1975	NJA	KOK

BILL OF BARS PART F

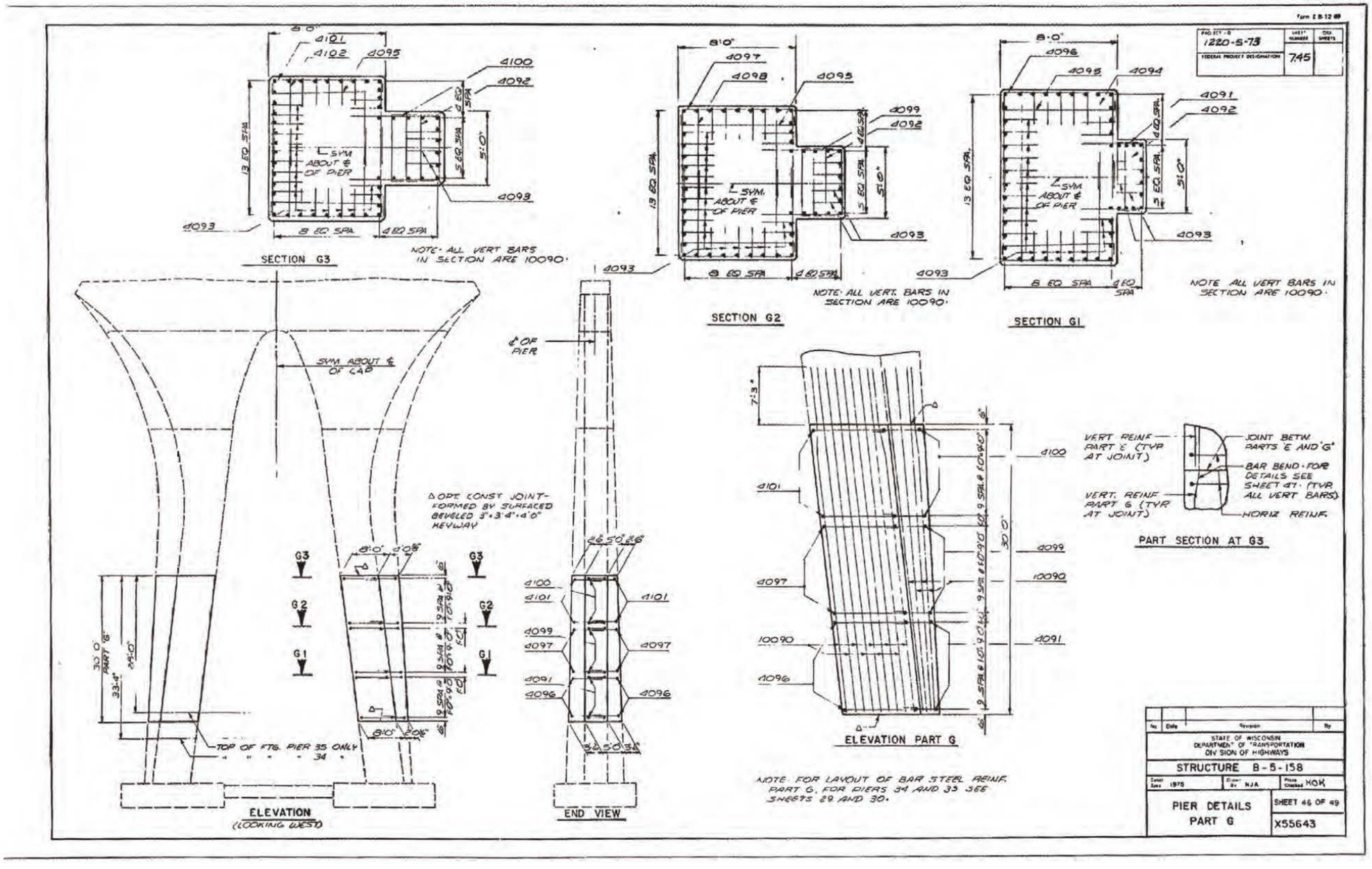
SHEET 45 OF 49

X55642

WISDOT DTID

WISDOT DTID

PROJECT ID	SHEET NUMBER	TOTAL SHEETS
1220-5-73	745	
FEDERAL PROJECT DESIGNATION		



STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Date	Drawn By	Plans Checked
1975	NJA	KOK

PIER DETAILS PART G

SHEET 46 OF 49

X55643

WISDOT DTID

Form C-B 12-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-73	746	
FEDERAL PROJECT DESIGNATION		

BILL OF BARS PIERS 30 & 32

NOTE BILL OF BARS AS INDICATED IS FOR ONE PIER, PART G.

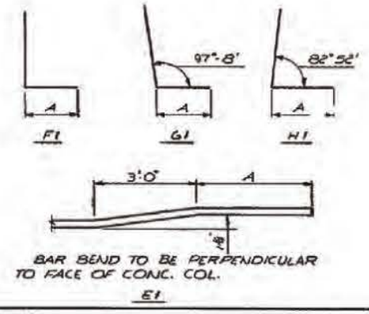
MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION	
4090	100	37-3	E1	7-3		SHAFT	VERT
4091	20	19-2	B1	4-8	4-10	SEC G1	HORIZ
4092	180	5-10	B1	4-8	8"	SHAFT	"
4093	1680	2-4	A1			"	"
4094	80	7-2	A1			SEC G1	"
4095	120	8-10	B1	7-8	8"	SHAFT	"
4096	40	21-0	B1	7-8	6-9	SEC G1	"
4097	40	20-4	B1	7-8	6-5	" G2	"
4098	80	6-10	A1			" G2	"
4099	60	15-6	B1	4-8	5-6	" G2	"
4100	80	16-6	B1	4-8	6-0	" G3	"
4101	40	19-8	B1	7-8	6-1	" G3	"
4102	80	6-6	A1			" G3	"

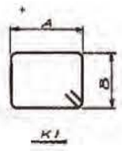
BILL OF BARS PIER 34◑

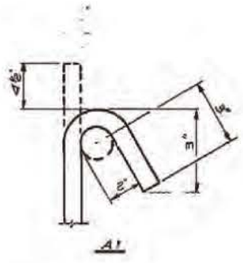
MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION	
11090	100	40 11	E1	7-3		SHAFT	VERT
4091	66	14-2	B1	4-8	4-10	**	HORIZ
4092	198	5-10	B1	4-8	8"	SHAFT	"
4093	1848	2-4	A1			"	"
4094	104	7-4	A1			**	"
4095	132	8-10	B1	7-8	8"	SHAFT	"
4096	52	21-4	B1	7-8	6-11	**	"
4097	40	20-4	B1	7-8	6-5	SEC G2	"
4098	80	6-10	A1			" G2	"
4099	20	15-6	B1	4-8	5-6	" G2	"
4100	20	16-6	B1	4-8	6-0	" G3	"
4101	40	19-8	B1	7-8	6-1	" G3	"
4102	80	6-6	A1			" G3	"
11126	60	24 0				FOOTING	
8127	48	14-6				"	
8128▼	32	27 11				" TIE	
5130▼	34	12 11	K1	4-0	2-1	"	"
11131	16	15 7	G1	2-0		" DOWEL	
11132	28	15-7	H1	2-0		"	"
11133	56	15-7	F1	2-0		"	"
4134	24	20-8	B1	7-4	6-9	" STIRRUP	
4135	12	12-6	B1	4-8	4-0	"	"

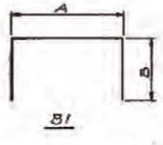
BILL OF BARS PIER 35◑

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION	
11090	100	35-6	E1	7-3		SHAFT	VERT
4091	16	14-2	B1	4-8	4-10	**	HORIZ
4092	1648	5-10	B1	4-8	8"	SHAFT	"
4093	1568	2-4	A1			"	"
4094	64	7-2	A1			**	"
4095	112	8-10	B1	7-8	8"	SHAFT	"
4096	32	21-0	B1	7-8	6-9	**	"
4097	40	20-4	B1	7-8	6-5	SEC G2	"
4098	80	6-10	A1			" G2	"
4099	20	15-6	B1	4-8	5-6	" G2	"
4100	20	16-6	B1	4-8	6-0	" G3	"
4101	40	19-8	B1	7-8	6-1	" G3	"
4102	80	6-6	A1			" G3	"
11126	60	24-0				FOOTING	
8127	48	14-6				"	
8128▼	32	27-3				" TIE	
5130▼	34	12-11	K1	4-0	2-1	"	"
11131	16	15-7	G1	2-0		" DOWEL	
11132	28	15-7	H1	2-0		"	"
11133	56	15-7	F1	2-0		"	"
4134	24	20-8	B1	7-4	6-9	" STIRRUP	
4135	12	12-8	B1	4-8	4-1	"	"









** SECTION THRU COLUMN AT TOP OF FOOTING

NOTE: THE FIRST DIGIT OF A FOUR DIGIT MARK AND THE FIRST TWO OF A FIVE DIGIT MARK SIGNIFIES THE BAR SIZE.

NOTE DIMS IN BENDING DETAILS ARE OUT TO OUT OF BAR.

◑ BILL OF BARS PARTIAL PART G PLUS FOOTING REINFORCEMENT.

NOTE LABEL BILL OF BARS FOR EACH PIER WITH BAR NO AND PIER NO.

▼ COATED HIGH STRENGTH BAR STEEL REINFORCEMENT

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

Const. Spec. 1975	Drawn By NJA	Plans Checked KOK

BILL OF BARS
PART G

SHEET 47 OF 49

X55644

WISDOT DTID

Form 1-8-12-69

PROJECT I.D.	SHEET NUMBER	TOTAL SHEETS
1220-5-73	7.47	
FEDERAL PROJECT DESIGNATION		

BILL OF BARS PIER 29 ◑

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
1111	152	37-5	E1	7-3		SEC C1 f** VERT.
4112	30	11-6	B1	4-8	3-6	" C1 HORIZ
4113	30	5-10	B1	4-8	8"	" C1 "
4114	3180	2-4	A1			" C1 f** "
4115	160	8-10	B1	7-8	8"	" C1 f** "
4116	60	22-2	B1	7-8	7-4	" C1 "
4117	160	7-9	A1			" C1 "
4118	40	23-0	B1	7-8	7-9	** "
4119	120	8-1	A1			** "
4120	50	9-6	B1	4-8	2-6	** "
1112	80	29-0				FOOTING
8127	50	21-0				"
8128▼	32	31-3				" TIE
5130▼	88	12-11	K1	4-0	2-1	" TIE
1131	24	14-0	G1	2-0		" DOWEL
1132	42	14-0	H1	2-0		" "
1133	84	14-0	F1	2-0		" "
4134	16	22-11	B1	7-5	7-10	" STIRRUP

BILL OF BARS PIER 30 ◑

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
1111	112	30-4	E1	7-3		SEC. C1 f** VERT.
4112	30	11-6	B1	4-8	3-6	" C1 HORIZ
4113	30	5-10	B1	4-8	8"	" C1 "
4114	1748	2-4	A1			" C1 f** "
4115	92	8-10	B1	7-8	8"	" C1 f** "
4116	60	22-2	B1	7-8	7-4	" C1 "
4117	120	7-9	A1			" C1 "
4118	32	23-0	B1	7-8	7-9	** "
4119	64	8-1	A1			** "
4120	16	9-6	B1	4-8	2-6	** "
1112	56	18-6				FOOTING
8127	40	15-6				"
8128▼	32	30-5				" TIE
5130▼	56	12-11	K1	4-0	2-1	" TIE
1131	24	13-3	G1	2-0		" DOWEL
1132	38	13-3	H1	2-0		" "
1133	50	13-3	F1	2-0		" "
4134	12	22-5	B1	7-5	7-7	" STIRRUP
4135	6	8-3	B1	4-5	2-0	" "

BILL OF BARS PIER 31 ◑

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
1111	152	26-5	E1	7-3		SEC C1 f** VERT.
4112	22	11-6	B1	4-8	3-6	" C1 HORIZ
4113	22	5-10	B1	4-8	8"	" C1 "
4114	2204	2-4	A1			" C1 f** "
4115	76	8-10	B1	7-8	8"	" C1 f** "
4116	44	22-2	B1	7-8	7-4	" C1 "
4117	88	7-9	A1			" C1 "
4118	32	22-8	B1	7-8	7-7	** "
4119	64	7-11	A1			** "
4120	16	9-6	B1	4-8	2-6	** "
1112	76	23-0				FOOTING
8127	48	19-6				"
8128▼	32	29-11				" TIE
5130▼	44	12-11	K1	4-0	2-1	" TIE
1131	24	17-0	G1	2-0		" DOWEL
1132	42	17-0	H1	2-0		" "
1133	84	17-0	F1	2-0		" "
4134	20	22-5	B1	7-5	7-7	" STIRRUP
4135	10	8-9	B1	4-5	2-3	" "

BILL OF BARS PIER 33 ◗

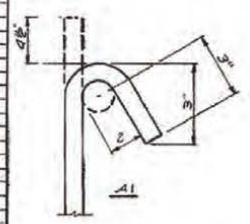
MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
1111	4	15-11	E1	7-3		SEC C1 f** VERT
4112	30	15-10	B1	4-8	5-8	" C1 HORIZ
4113	234	5-10	B1	4-8	8"	" C1 f** "
4114	2808	2-4	A1			" C1 f** "
4115	156	8-10	B1	7-8	8"	" C1 f** "
4116	80	20-6	B1	7-8	6-6	" C1 "
4117	160	6-10	A1			" C1 "
4118	76	21-10	B1	7-8	7-2	** "
4119	152	7-6	A1			** "
4120	38	11-8	B1	4-8	3-7	** "
11121	36	16-7				** VERT.
1126	66	21-6				FOOTING
8127	48	18-6				"
8128▼	32	28-7				" TIE
5130▼	42	12-11	K1	4-0	2-1	" TIE
1131	18	14-6	G1	2-0		" DOWEL
1132	28	14-6	H1	2-0		" "
1133	108	14-6	F1	2-0		" "
4134	20	21-7	B1	7-5	7-2	" STIRRUPS
4135	10	10-9	B1	4-5	3-3	" "

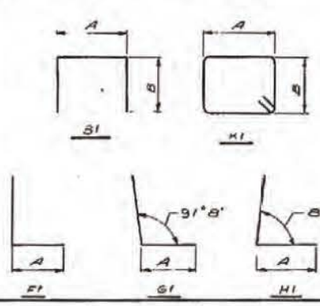
BILL OF BARS PIER 32 ◑

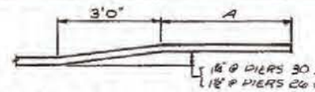
MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
1111	112	21-4	E1	7-3		SEC C1 f** VERT
4112	14	11-6	B1	4-8	3-6	" C1 HORIZ
4113	28	5-10	B1	4-8	8"	" C1 f** "
4114	1064	2-4	A1			" C1 f** "
4115	56	8-10	B1	7-8	8"	" C1 f** "
4116	28	22-2	B1	7-8	7-4	" C1 "
4117	56	7-9	A1			" C1 "
4118	28	22-2	B1	7-8	7-4	** "
4119	56	7-8	A1			** "
4120	14	10-6	B1	4-8	3-0	** "
1126	36	18-6				FOOTING
8127	40	15-6				"
8128▼	32	29-3				" TIE
5130▼	52	12-11	K1	4-0	2-1	" TIE
1131	24	13-3	G1	2-0		" DOWEL
1132	38	13-3	H1	2-0		" "
1133	50	13-3	F1	2-0		" "
4134	12	21-9	B1	7-5	3-3	" STIRRUPS
4135	6	10-5	B1	4-5	3-1	" "

BILL OF BARS PIER 26 ◑

MARK	NO REQ'D	LENGTH	BEND TYPE	BEND DIMENSION A	BEND DIMENSION B	LOCATION
1111	152	32-8	E1	7-3		SEC C1 f** VERT
4112	30	11-6	B1	4-8	3-6	" C1 HORIZ
4113	30	5-10	B1	4-8	8"	" C1 "
4114	2900	2-4	A1			" C1 f** "
4115	100	8-10	B1	7-8	8"	" C1 f** "
4116	60	22-0	B1	7-8	7-4	" C1 "
4117	120	7-9	A1			" C1 "
4118	40	22-8	B1	7-8	7-7	**
4119	80	7-11	A1			**
4120	20	9-6	B1	4-8	2-6	**
1126	80	29-0				FOOTING
8127	50	21-0				"
8128▼	32	30-8				" TIE
5130▼	46	12-11	K1	4-0	2-1	" TIE
1131	24	14-0	G1	2-0		" DOWEL
1132	42	14-0	H1	2-0		" "
1133	84	14-0	F1	2-0		" "
4134	16	22-11	B1	7-5	7-10	" STIRRUP







NOTE: BAR BEND TO BE PERPENDICULAR TO FACE OF CONC. COL.

E1

NOTE THE FIRST DIGIT OF A FOUR DIGIT BAR MARK AND THE FIRST TWO OF A FIVE DIGIT BAR MARK SIGNIFIES THE BAR SIZE.

NOTE: DIMS IN BENDING DETAILS ARE OUT TO OUT OF BAR.

NOTE LABEL BILL OF BARS FOR EACH PIER WITH BAR NO. AND PIER NO.

▼ COATED HIGH STRENGTH BAR STEEL REINFORCEMENT.

◑ BILL OF BARS PARTIAL PART H PLUS FOOTING REINFORCEMENT.

** SECTION THRU COLUMN AT TOP OF FOOTING.

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

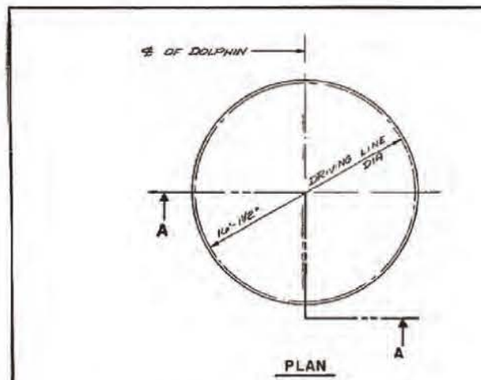
Const. Spec. 1975	Drawn By WJA	Plans Checked KOK

BILL OF BARS PART H

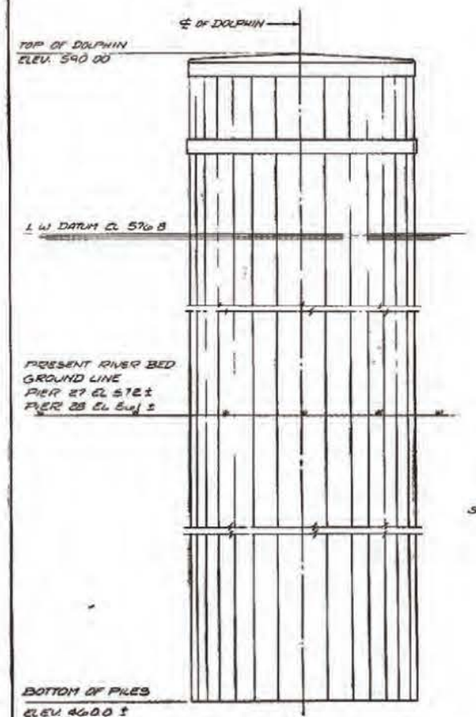
SHEET 48 OF 49

X55645

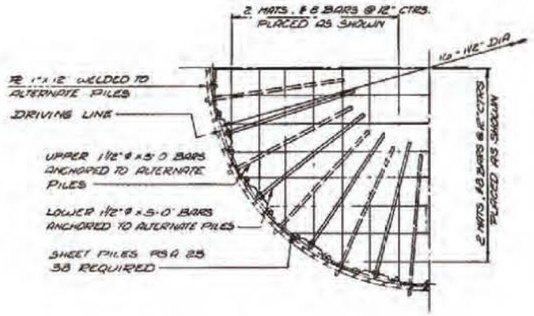
WISDOT DTID



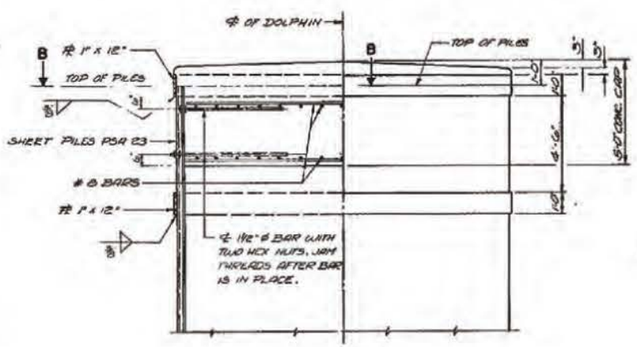
PLAN



ELEVATION

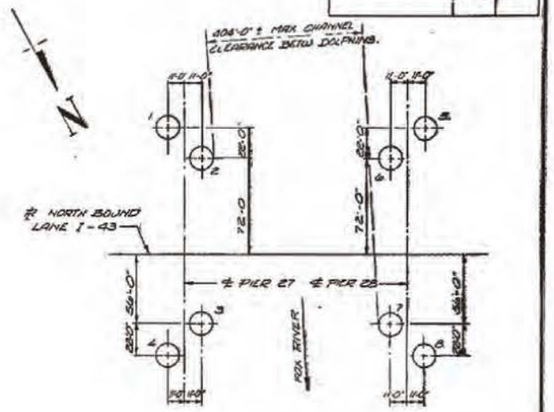


SECTION B-B



SECTION A-A

NOTE:
SOFT MATERIAL TO BE EXCAVATED FROM INSIDE OF DOLPHINS AND REPLACED WITH GRAVEL TO BOTTOM OF CONCRETE CAP OF DOLPHINS. BASED ON AVAILABLE BORING INFORMATION THE BOTTOM OF SOFT MATERIAL IS AS FOLLOWS:
DOLPHINS 1 THRU 4 EL ± 505.
DOLPHINS 5 THRU 8 EL. ± 490.



LOCATION PLAN

No.	Date	Revision	By

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-5-158

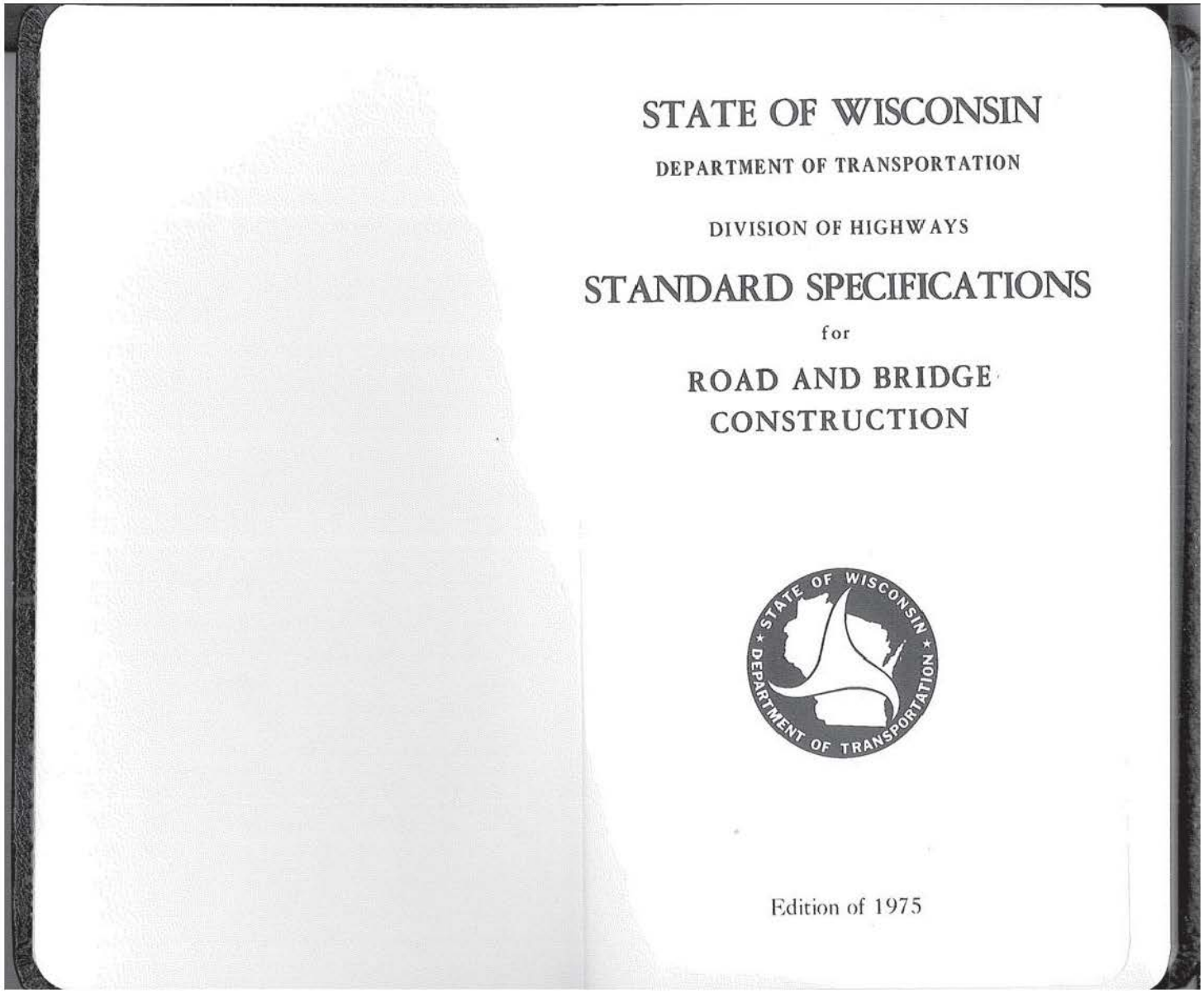
Const. Type: 1975	Drawn By: A.G.	Plans Checked: R.L.P.

PIER PROTECTION SYSTEM

SHEET 49 OF 49

X55646

Appendix C
1975 WisDOT Standard Specifications Related to Piling



STATE OF WISCONSIN

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

STANDARD SPECIFICATIONS

for

ROAD AND BRIDGE CONSTRUCTION

Edition of 1975

Strength Bar Steel Reinforcement, Culverts; or High-Strength Bar Steel Reinforcement, Retaining Walls; as the case may be, which price shall be full compensation for furnishing, transporting and placing all materials and for all labor, tools, equipment and incidentals necessary to complete the installation of the required reinforcement in the work.

SECTION 506. STEEL BRIDGES

506.1 Description. This work shall consist of fabricating, furnishing, casting, machining or otherwise preparing, delivering, erecting and painting all the steel and miscellaneous metals required for steel bridges, or metal parts of other bridges, all in accordance with the requirements of the plans and specifications.

Steel bridges, and such parts of other bridges as are of metal, shall be built in reasonably close conformity with the lines, grades, dimensions, details and design indicated therefor on the plans, and in accordance with the pertinent requirements of the specifications for all work necessary to complete the bridges (or parts thereof) designated in the contract.

506.2 Materials.

506.2.1 General. All materials used in the work shall conform to the requirements set forth in the specifications for the several parts of the completed structure.

506.2.2 Structural Steel.

506.2.2.1 General. Structural steel furnished for highway bridges and other structural purposes shall be in accordance with the following:

Structural steel furnished for highway structures shall conform to the requirements of the ASTM Specifications as indicated on the plans. For material where the plans do not indicate the specifications, structural carbon steel conforming to the requirments of ASTM Designation: A 36 as modified in Subsection 506.2.2.4 shall be furnished.

When due to size and shape, structural carbon steel conforming to the requirements of ASTM Designation: A 36, for use for secondary members in structures, cannot be obtained in bar quality in the quantity for the contract, the following grades of steel may be used as alternates under the conditions specified:

Steel bar which conforms to the requirements of ASTM Designation: A 306, Grade 60 with modifications that no Bessemer steel shall be allowed, or merchant bar quality or better in AISI Compositions of C-1018 through C-1025. If steel of AISI Compositions of C-1018 through C-1025 is furnished, its physical properties as shown by Certified Report of Test or Analysis shall conform to those of ASTM Designation: A 306, Grade 60 steel.

506.2.2.2 Structural Carbon Steel. Structural carbon steels shall conform to the requirements of the Specification for Structural Steel, ASTM Designation: A 36 as modified in Subsection 506.2.2.4.

506.2.2.3 Structural Low Alloy Steel. Structural low alloy steels shall conform to the requirements of the ASTM Specifications designated below and as modified in Subsection 506.2.2.4.

506.2.2.3.1 High-Strength Low-Alloy Structural Steel ---------- ASTM A 242

506.2.2.3.2 High-Strength Low-Alloy Structural Manganese Vanadium Steel---------- ASTM A 441

506.2.2.3.3 High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality---------- ASTM A 572

506.2.2.3.4 High-Strength Low-Alloy Structural Steel with 50,000 PSI. Minimum Yield Point to 4 In. Thick ---------- ASTM A 588, except that Grade G steel used in main or stress carrying members shall have the following chemical composition:

Carbon	0.17 max.
Manganese	1.25 max.
Phosphorus	0.04 max.
Sulfur	0.05 max.
Silicon	0.15-0.50
Nickel	0.80 max.
Chromium	0.40-0.75
Molybedenum	———
Copper	0.30-0.50
Titanium	———
Columbium	0.06 max.

ASTM A 242 steel may be furnished in lieu of ASTM A 588 steel for secondary members, except when impact tests are required, if the weldability of the steel is established in accordance with Paragraph 9.2.2 of AWS D 1.1-72 (Revised 1-73) as amended by AASHO, dated 1974. Charpy impact tests shall not be required for ASTM A 242 steel.

506.2.2.4 Charpy V-Notch Requirements. All girder flange plates, flange splice plates, hanger bars, links, rolled beams and flange cover plates shall meet the following longitudinal Charpy V-notch tests:

ASTM A 36 steel	15 Ft. Lbs. @ 40 F
ASTM A 441 steel	15 Ft. Lbs. @ 40 F
*ASTM A 572 steel	15 Ft. Lbs. @ 40 F
*ASTM A 588 steel less than 2 inches thick	15 Ft. Lbs. @ 40 F
*ASTM A 588 steel over 2 inches thick	20 Ft. Lbs. @ 40 F

Sampling and testing procedures shall be in accordance with ASTM Designation: A 673. The (H) frequency of testing shall be used.

*If the yield point of the material exceeds 65,000 pounds per square inch the temperature for the Charpy V-notch value for acceptability shall be reduced by 15 F for each increment of 10,000 pounds per square inch above 65,000 pounds per square inch.

506.2.2.5 Steel Structural Rivets. Steel structural rivets shall conform to the requirements of the Specification for Steel Structural Rivets, ASTM Designation: A 502, Grade 1, unless otherwise specified.

506.2.3 Miscellaneous Metals.

506.2.3.1 Steel Castings. Carbon steel castings, for bridges and general use, shall conform to the requirements for Class 70, 90 or 120 of the Specification for Steel Castings for Highway Bridges, AASHO Designation: M 192, supplemented by the following requirements:

The specific class of steel castings to be furnished shall be as indicated on the plans or in the contract.

Steel castings shall be true to pattern in form and dimensions without sharp, unfilleted angles or corners and shall be free from pouring faults, sponginess, cracks, blow holes and other defects in positions affecting strength and value for the service intended.

Defects which do not impair the strength may, with prior approval of the engineer, be welded by an approved process. The defects shall be removed to solid metal by chipping, drilling or other satisfactory methods and then welded. Whenever possible, such welding shall be done before annealing the casting. Any casting welded after annealing shall be reannealed if required by the engineer.

If required by the engineer, castings shall be suspended and hammered all over to determine if cracks, flaws or other defects are present.

The thickness of metal remaining after machining is completed shall be not less than the thickness shown on the plans.

The ends of the tensile test specimens shall be threaded for at least 3/4 of an inch with 3/4-inch American N. C. threads.

506.2.3.2 (Blank)

506.2.3.3 (Blank)

506.2.3.4 Bronze Castings. Bronze castings, for bearings, trunnions, journals of bridges and expansion plates shall conform to the requirements of Alloy No. 911 metal of the Specification for Bronze Castings for Bridges and Turntables, ASTM Designation: B 22.

506.2.3.5 Cold-Finished Carbon Steel Shafting. Cold-finished carbon steel shafting shall conform to the requirements of the Specification for Cold-Finished Carbon Steel Bars and Shafting, AASHO Designation: M 169, Grade 1016 through 1030.

506.2.3.6 Lubricated Bronze Plates. Lubricated bronze plates shall be fabricated in accordance with the plan details and these specifications, and with materials which conform to the requirements of ASTM Designation: B 100, Copper Alloy No. 510; ASTM Designation: B 22, Alloy No. 911, ASTM Designation: B 148, Copper Alloy No. 954 or 955 or to ASTM Designation: B 169, Alloy 614, Soft Temper.

The contractor shall furnish to the engineer, in triplicate, a Certified Report of Test or Analysis indicating the results of tests made by the manufacturer of the lubricated bronze plates on their chemical and physical properties, including the coefficient of friction of the material used.

The surface of the lubricated bronze plate shall be bored or cast in a geometric pattern of recesses which shall be filled with a lubricating compound, consisting of graphites and metallic substances with a lubricating binder, which is capable of withstanding the atmospheric elements; and the compound shall be hydraulically pressed into the recesses so as to form dense, non-plastic lubricating inserts. The lubricated area shall be within a range of from 25 to 33 percent, inclusive, of the bearing face with a coefficient of friction not to exceed one-tenth. Unless otherwise directed on the plans or in the contract, the top face of the bronze plate is the only surface that is to be lubricated.

506.2.3.7 Steel Forgings. Steel forgings, for pins, rollers, trunnions and other forged parts as may be called for on the plans, shall conform to the requirements for Class E forgings of the Specification for Carbon Steel Forgings for General Industrial Use, ASTM Designation: A 235, supplemented by the following requirements.

The ends of the tensile test specimens shall be threaded for at least 3/4 of an inch with 3/4-inch American N. C. threads.

Forgings shall be thoroughly annealed before they are machined.

506.2.3.8 (Blank)

506.2.3.9 Welded and Seamless Steel Pipe. Welded and seamless steel pipe, for railings and general use, shall conform to the requirements of the Specification for Welded and Seamless Steel Pipe, ASTM Designation: A 53. Unless otherwise specified, the pipe shall be black standard weight pipe.

506.2.3.10 Pipe Fittings. Pipe fittings, for railings and other required uses, shall be malleable cast iron or pressed steel. When galvanized fittings are required, the galvanizing shall conform to the requirements of ASTM Designation: A 123.

506.2.3.11 Nickel-Copper Steel Pipe. This pipe, intended for use where corrosion is expected, shall conform to the pertinent requirements of the Specification for Welded and Seamless Steel Pipe, ASTM Designation: A 53, except as hereinafter otherwise required for chemical composition.

The pipe and fittings shall be manufactured from steel having the following chemical composition:

Carbon, maximum percent	0.20
Manganese, maximum percent	1.00
Sulphur, maximum percent	0.05
Phosphorous, maximum percent	0.08

Copper, percent	0.75-1.25
Nickel, percent	1.60-2.20

Unless otherwise specified, the pipe shall be black standard weight pipe.

506.2.3.12 Sheet Lead. Lead, in the form of sheets, shall conform to the requirements of the Specification for Pig Lead, ASTM Designation: B 29.

The lead sheet shall be of uniform thickness throughout. It shall be free from cracks, seams, slivers, scale and other surface defects.

Unless otherwise specified on the plans, sheet lead shall be 1/8 inch in thickness with a permissible tolerance of plus or minus 1/32 inch. The length and width shall be within 1/8 inch of the dimensions called for on the plans.

506.2.3.13 Sheet Copper. Copper in the form of sheets or strips shall conform to the requirements of the Specification for Copper Sheet, Strip, Plate and Rolled Bar, ASTM Designation: B 152. Any type and temper therein described and suitable for the purpose intended may be used. Unless otherwise specified, sheet copper shall have a minimum thickness of 0.02 inch.

506.2.3.14 Sheet Zinc. Zinc in the form of sheets or plates shall conform to the requirements for Selected Grade of the Specification for Zinc Metal (Slab Zinc) ASTM Designation: B 6.

Zinc sheets and plates shall be of uniform thickness and shall be free from cracks, seams, slivers, scale, surface corrosion, adhering matter and other surface defects.

Zinc sheets and plates shall be of the zinc gage called for on the plans with a permissible tolerance in thickness of plus or minus six percent. The length and width of sheets shall be within 1/8 inch of the dimensions called for on the plans.

506.2.3.15 Welding Materials. All welding materials shall conform to the Structural Welding Code of the American Welding Society, Edition of 1972 as revised in 1973 and amended by the AASHO Standard Specifications for Welding of Structural Steel Highway Bridges, dated 1974.

506.2.4 Name Plates.

506.2.4.1 General. Name plates to be installed on bridges and culverts shall conform to the requirements herein designated.

506.2.4.2 Composition. Name plates shall be made of metal with the following composition by weight:

Copper	84 to 86 percent
Lead	4 to 6 percent
Zinc	4 to 6 percent

Tin	4 to 6 percent
Impurities	Not over 1 percent

The chemical determination shall be made in accordance with pertinent ASTM standard procedures.

506.2.4.3 Casting. The plate shall be cast to conform to dimensions and details shown on the plans. Each plate shall bear the notations STATE OF WISCONSIN, DEPARTMENT OF TRANSPORTATION and DIVISION OF HIGHWAYS placed as shown on the plans. The fourth line shall have a letter B or C designating a bridge or culvert respectively or the letters RW designating a retaining wall, then figures designating the county, the number of the bridge, culvert or retaining wall and lastly, figures which are the last two numerals of the year of substantial completion of construction. Except for plates on retaining walls, the last or fifth line shall have letters and figures showing the unit number, when required, and the design loading of the structure indicated on the plans.

The border boss, the boss for anchors and lugs, and all lettering and numerals shall be raised 1/8 inch above the face of the plate. If the plate is attached by bolts, the boss for anchor bolts shall be cast solid and then drilled, but if the plate is attached by lugs, the boss shall be cast and left undrilled. The top surface of the border boss, the boss for anchors and lugs, and all lettering and numerals shall be polished. All lettering shall be Gothic or block and shall be square cut on top with only sufficient taper to provide the necessary draft to permit removal from the mold.

When the plate is attached to metal, it shall be rigidly attached to the structure by means of two bolts. Such bolts shall be 1/4 inch in diameter with countersunk heads, and they shall be of metal with the composition specified above for name plates.

When the plate is attached to concrete, it shall be rigidly attached to the structure by means of two lugs at least three inches long and cast integral with the name plate.

506.2.5 High-Strength Bolts.

506.2.5.1 General Requirements. High-Strength bolts, nuts and washers, for use in the fabrication of structural steel rigid joints, shall conform to the Specification for High-Strength Bolts for Structural Steel Joints, Including Suitable Nuts and Plain Hardened Washers, ASTM Designation: A 325, supplemented with the provisions hereinafter delineated.

High-Strength bolts, nuts and washers, for use in the fabrication of rigid joints of unpainted high-strength low-alloy structural steel conforming to ASTM Designation: A 588 shall be Type 3.

506.2.5.2 Bolt and Nut Dimensions. High-Strength bolts and nuts shall conform to the dimensions set forth in the following table:

BOLT AND NUT DIMENSIONS (Inches)

Nominal Bolt Size	Bolts		Nuts	
	Width Across Flats	Height Head	Width Across Flats	Height Nut
1/2	7/8	5/16	7/8	31/64
5/8	1- 1/16	25/64	1- 1/16	39/64
3/4	1- 1/4	15/32	1- 1/4	47/64
7/8	1- 7/16	35/64	1- 7/16	55/64
1	1- 5/8	39/64	1- 5/8	63/64
1-1/8	1-13/16	11/16	1-13/16	1- 7/64
1-1/4	2	25/32	2	1- 7/32
1-3/8	2- 3/16	27/32	2- 3/16	1-11/32
1-1/2	2- 3/8	15/16	2- 3/8	1-15/32

506.2.5.3 Washer Dimensions. Circular washers shall be flat, smooth, hardened and conform to dimensions given in the following table.

Bolts shall be installed with a hardened washer under the nut or bolt head, whichever is the element turned in tightening. Where bearing faces of the bolted parts have a slope of more than 1:20 with respect to a plane normal to the bolt axis, smooth beveled washers shall be used to compensate for lack of parallelism. All washers shall be hardened.

WASHER DIMENSIONS (Inches)

Bolt Size	Circular Washers				Square or Rectangular Beveled Washers for American Standard Beams and Channels		
	Nominal Outside Diameter*	Nominal Diameter of Hole	Thickness		Minimum Side Dimension	Mean Thickness	Slope or Taper in Thickness
			Min.	Max.			
1/2	1- 1/16	17/32	.097	.177	1-3/4	5/16	1:6
5/8	1- 5/16	21/32	.122	.177	1-3/4	5/16	1:6
3/4	1-15/32	13/16	.122	.177	1-3/4	5/16	1:6
7/8	1- 3/4	15/16	.136	.177	1-3/4	5/16	1:6
1	2	1- 1/16	.136	.177	1-3/4	5/16	1:6
1-1/8	2- 1/4	1- 1/4	.136	.177	2-1/4	5/16	1:6
1-1/4	2- 1/2	1- 3/8	.136	.177	2-1/4	5/16	1:6
1-3/8	2- 3/4	1- 1/2	.136	.177	2-1/4	5/16	1:6
1-1/2	3	1- 5/8	.136	.177	2-1/4	5/16	1:6

*May be exceeded by ¼ inch

Where clearance is necessary, washers may be clipped on one side to a point not closer than 7/8 of the bolt diameter from center of washer.

506.2.5.4 Bolt Lengths. The length of bolts shall be determined by adding to the grip (total thickness of the connected material) the values given below.

Bolt Diameter (Inches)	Add to Grip (Inches)
1/2	13/16
5/8	1 1/16
3/4	1 3/16
7/8	1 5/16
1	1 9/16
1 1/8	1 13/16
1 1/4	1 13/16
1 3/8	2 1/16
1 1/2	2 1/16

The above values are generalized, with due allowance for manufacturing tolerances, to provide for the inclusion of a washer and the use of a heavy nut, with adequate stick-through at the end of the bolt. For each required beveled washer, add an additional 1/8 inch. The length determined by the use of the above table should be adjusted to the next 1/4-inch length increment for bolts up to 5-inch length and to the next 1/2-inch length increment for lengths over five inches.

For bolt lengths determined, as provided above, the full thread may extend into the grip not to exceed 3/8 inch for lengths of five inches or less and not to exceed 5/8 inch for lengths over five inches.

506.2.5.5 Identification. High-Strength bolts, nuts and washers shall bear the identification marks specified in ASTM Designation: A 325 for the type furnished.

506.2.5.6 High-Strength Pin Bolts. The shank and head of the high-strength steel pin bolt and the collar fasteners shall meet the chemical composition and mechanical property requirements of ASTM Designation: A 325. Each pin bolt or fastener shall provide a solid shank body of sufficient diameter to provide tensile and shear strength equivalent to or greater than the bolt specified, having a cold forged head on one end, of the type and dimensions approved by the engineer, a shank length suitable for the material thickness fastened, locking grooves, breakneck groove and pull grooves, all annular, on the opposite end. Each fastener shall provide a steel locking collar of proper size for shank diameter used, which by means of suitable installation tools is cold swaged into the locking grooves, forming a head for the grooved

end of the fastener after the pull groove section has been removed. The steel locking collar shall be a standard product of an established manufacturer of pin bolt and collar fasteners, as approved by the engineer.

Washers need not be used except when beveled washers are required as specified in Subsection 506.2.5.3.

506.2.6 Bearing Pads. Bearing pads, intended for use on bridge seats, shall consist of sheet lead or preformed fabric pads or when so designated, elastomeric bearing pads.

Bearing pads shall be furnished conforming to the thickness and size shown on the plans.

Under the item Bearing Pads, when the specific type of bearing pad is not designated, the contractor may elect to furnish either sheet lead or Class A preformed fabric pads. Only one type of bearing pad shall be used throughout any one structure, unless otherwise provided on the plans or in the contract.

506.2.6.1 Sheet Lead. Sheet lead for bearing pads shall conform to the requirements specified in Subsection 506.2.3.12.

506.2.6.2 Preformed Fabric, Class A. This material shall consist of preformed fabric pads composed of multiple layers of 8-ounce cotton duck impregnated and bound with high-quality natural rubber or of equivalent and equally suitable materials compressed into resilient pads of uniform thickness. The number of plies shall be such as to produce the specified thickness, after compression and vulcanizing. The finished pads shall withstand compression loads perpendicular to the plane of the laminations of not less than 10,000 pounds per square inch without detrimental extrusion or reduction in thickness.

The contractor shall furnish three copies of a Certificate of Compliance, however the right is reserved to obtain test specimens.

506.2.6.3 Elastomeric. Elastomeric bearing pads shall be preformed pads, formed by casting or extruding natural rubber or neoprene under pressure and heat. The pads shall be cast or extruded in a single, integral layer to the required thickness, unless pads with nonelastic laminations are called for on the plans. All components of a laminated bearing shall be molded together into an integral unit and all edges of the laminates shall be covered by a minimum of 1/8 inch of elastomer except at laminate restraining devices and around holes that will be entirely closed on the finished structure. Laminates shall be of the material and thickness called for on the plans.

The pads shall conform to the following physical properties:

	Natural Rubber	Neoprene
Grade (Durometer)	60	60
Physical Properties		
Hardness, (ASTM D 2240)	60±5	60±5
Tensile Strength, min. psi, (ASTM D 412)	2500	2500
Ultimate elongation, min. percent	400	350
Heat Resistance, 70 hrs. at 158 F (ASTM D 573)		
Hardness, max. points change	+10	+15
Tensile strength, max. percent change	−25	−15
Ultimate elongation, max. percent change	−25	−40
Compression Set (ASTM D 395, Method B)		
22 hrs. at 158 F, max. percent	25	—
22 hrs. at 212 F, max. percent	—	35
Ozone (ASTM D 1149), 20 percent strain 100± 2 F, mounting procedure D 518, Procedure A.		
25 pphm ozone in air by volume, 48 hours	No Cracks	—
100 pphm ozone in air by volume, 100 hours	—	No Cracks
Adhesion (ASTM D 429, Method B)		
Bond made during vulcanization, pounds per inch	40	40

The material furnished will be evaluated for acceptance on the basis of the manufacturer's Certified Report of Test or Analysis indicating compliance with these special properties, but the right is reserved to obtain test specimens on request. Three copies of the manufacturer's Certified Report of Test or Analysis shall be furnished to the engineer by the contractor before use of the material in the work.

Test specimens, when required, shall be in accordance with ASTM Designation: D 15, Part B.

506.2.7 Welded Stud Shear Connectors. Shear connector studs shall conform to the requirements of the Specification for Cold-Finished Carbon Steel Bars and Shafting, ASTM Designation: A 108, cold-drawn bars, grades 1015 or 1020, either semi- or fully-killed. If flux retaining caps are used, the steel for the caps shall be of low carbon grade suitable for welding and shall comply with the Specification for Cold-Rolled Carbon Steel Strip, ASTM Designation: A 109.

Tensile properties as determined by tests of bar stock after drawing or of finished studs shall conform to requirements as follows:

Tensile Strength (min.)	60,000
Yield Strength* (min.)	50,000

Elongation (min.)	20 percent in 2 inches
Reduction of area (min.)	50 percent

*As determined by the 0.2 percent offset method.

Tensile properties shall be determined in accordance with the applicable sections of ASTM Designation: A 370, Mechanical Testing of Steel Products. Tensile tests of finished studs shall be made on studs welded to test plates in accordance with the AASHO Standard Specifications for Highway Bridges. If fracture occurs outside of the middle half of the gage length, the test shall be repeated.

Finished studs shall be of uniform quality and condition, free from injurious laps, fins, seams, cracks, twists, bends or other injurious defects. Finish shall be as produced by cold drawing, cold rolling or machining.

The contractor shall furnish a Certificate of Compliance verifying that the studs as delivered are in accordance with the requirements of this Subsection.

506.3 Construction Methods.

506.3.1 General Requirements. It is understood that the work to be done under these items includes everything which might reasonably be considered necessary for a complete and workmanlike job in accordance with the plans and contract.

Workmanship and finish shall be equal to the best general practice in modern bridge shops. Portions of the work exposed to view shall be finished neatly. Shearing, flame cutting and chipping shall be done carefully and accurately.

506.3.2 Shop Drawings. Shop drawings shall conform to the contract plans and shall consist of shop detail, erection and other working plans showing dimensions, sizes of material, including the dimensional properties of all rolled shapes, details and other information necessary for the complete fabrication and erection of the metal work. Each sheet of the shop drawings shall carry the project and the structure numbers.

The contractor shall submit to the engineer for approval two sets of checked shop drawings. The engineer reserves the right to refuse prints of shop drawings which are not clear and legible. Upon approval, the contractor shall furnish the engineer with as many copies of approved shop drawings as may be required. The contract price shall include the cost of furnishing all shop drawings and the contractor will be allowed no extra compensation for such drawings.

The shop drawings as approved by the engineer shall become a part of the contract, provided however, that any substitution of sections contemplated by the shop drawings different from sections shown on the plans shall be made only when approved by the engineer and in such

case additional costs resulting from such substitution shall be borne by the contractor.

Approval of shop drawings shall be secured before fabrication is commenced. After approval there shall be no deviation from the shop drawings or changes made thereon without the prior approval of the engineer.

It is expressly understood that the engineer's approval of shop drawings means only an acceptance of the character and sufficiency of the details and does not relieve the contractor from responsibility in regard to errors or omissions on said drawings.

The fabricator shall, upon completion of contracts involving structures supporting railroads, deliver to the railroad company one set of shop drawings of such structures on linen or other approved material.

506.3.3 Identification of Structural Steel. In addition to the ordinary mill identification thereof, all structural steel, except steel conforming to the requirements of ASTM Designation: A 36, shall be painted on each end of each piece with the appropriate color paint before shipment from the mill. The color system shall conform to ASTM Designation: A 6. Before any piece is worked in the shop, the identifying paint marks shall be extended back along the piece sufficiently to insure the identity of the piece during the process of fabrication. Angles shall be marked on the inside of a leg. Beams and channels shall be marked on the inside of a flange. The ends of pieces shall be painted when assembly will destroy or make identification by the above methods impossible. Failure to exercise the above precautions shall be cause for rejection.

506.3.4 Rolled Material.

506.3.4.1 Straightening. Rolled material, before being laid off or worked, must be straight. If straightening is necessary, it shall be done by methods that will not injure the metal. Sharp kinks and bends shall be cause for rejection of the material.

506.3.4.2 Camber. Where specified on the plans, rolled beams shall be cambered. The camber shall conform to a uniform, approximately circular, curve for the entire length of the beam or between designated points. The designated camber shall be within the tolerance specified in the American Institute of Steel Construction manual. Camber may be produced either in the rolling mill, or in the fabricating shop by gaging, or it may be produced or corrected by local heating. If the plans specify camber less than the minimum camber likely to remain permanent as tabulated in the American Institute of Steel Construction manual, the camber shall be produced by the application of heat.

In cambering beams or correcting camber by local heating, care shall be taken not to overheat the metal. Heating above 1200 F will not be permitted. The areas to be heated shall be so selected that distortion other than the required camber will not occur. A procedure shall be

followed that precludes warpage of the beam flanges. When such procedure entails heating along the fillets as well as along the center portion of the outer face of the flange, the heat shall be applied to the fillets from each side simultaneously. Cambering by heating vertical sections of the web will not be permitted. Not less than three sections located approximately at the quarter points and at the centerline of the beam shall be heated. The length of each section shall be equal to approximately one and one-half times the depth of the beam and the heat shall be applied uniformly throughout the length of the section. The heated metal shall be air-cooled slowly away from wind or drafts. Improper heating or cooling which might affect the strength or ductility of the metal shall be cause for rejection.

506.3.5 Rivet and Bolt Holes. All holes for rivets or bolts shall be either punched or drilled. Material forming parts of a member composed of not more than five thicknesses of metal may be punched 1/16 inch larger than the nominal diameter of the rivets or bolts whenever the thickness of the metal is not greater than 3/4 inch for structural steel or 5/8 inch for high-strength steel. When there are more than five thicknesses or when any of the main material is thicker than 3/4 inch for carbon steel, or 5/8 inch for high-strength steel, or when required elsewhere in this section, all holes shall be subpunched or subdrilled 3/16 inch smaller and, after assembling, reamed 1/16 inch larger or drilled from the solid to 1/16 inch larger, than the nominal diameter of the rivets or bolts.

The diameter of the die shall not exceed the diameter of the punch by more than 1/16 inch. If any holes must be enlarged to admit the rivets or bolts, such holes shall be reamed. Holes must be clean cut without torn or ragged edges. Poor matching of holes will be cause for rejection.

Reamed or drilled holes shall be cylindrical, perpendicular to the member and not more than 1/16 inch larger than the nominal diameter of the rivet or bolts. Where practicable, reamers shall be directed by mechanical means. Burrs on the outside surfaces shall be removed. Poor matching of holes will be cause for rejection. Reaming and drilling shall be done with twist drills. If required by the engineer, assembled parts shall be taken apart for removal of burrs caused by drilling. Connecting parts requiring reamed or drilled holes shall be assembled and securely held while being reamed or drilled.

506.3.6 Accuracy of Holes.

506.3.6.1 Punched and Drilled Holes. All holes punched full size, subpunched or subdrilled shall be so accurately punched that after assembling (before any reaming is done) a cylindrical pin 1/8 inch smaller in diameter than the nominal size of the punched hole may be entered perpendicular to the face of the member, without drifting, in at least 75 percent of the contiguous holes in the same plane. If the requirement is not fulfilled, the badly punched pieces will be rejected. If

any hole will not pass a pin 3/16 inch smaller in diameter than the nominal size of the punched hole, this will be cause for rejection.

506.3.6.2 Reamed and Drilled Holes. When holes are reamed or drilled, 85 percent of the holes in any contiguous group shall, after reaming or drilling, show no offset greater than 1/32 inch between adjacent thickness of metal.

All steel templates shall have hardened steel bushings in holes accurately dimensioned from the center lines of the connection as inscribed on the template. The center lines shall be used in accurately locating the template from the milled or scribed ends of the members.

506.3.7 Shop Assembling.

506.3.7.1 General. Unless otherwise specified, rivet and bolt holes in connections and splices (shop and field) of main truss or arch members, continuous beams, continuous plate girders and rigid frames shall be either subpunched (or subdrilled) and reamed while shop assembled or drilled full size from the solid while assembled at the shop.

Unless otherwise authorized by the engineer, each individual (full length) truss, arch, continuous beam or girder shall be assembled at the shop before reaming or drilling is commenced. Approval of other than full length assembly shall be obtained before the shop drawings are submitted for approval and the approved alternate assembly procedure shall be shown on the shop drawings. During shop assembly, all members shall be supported at such intervals and in such manner as is necessary to avoid undesirable deflections. The assembly, including camber, alignment, accuracy of holes and milled joints, shall be approved by the inspector before drilling or reaming is commenced.

Floor beam connections for plate girders and trusses shall be subpunched (or subdrilled) and reamed to a steel template.

The component parts of a built-up member shall be straight and close fitting. All members and parts of built-up members shall be matchmarked before being disassembled.

506.3.7.2 Fitting for Riveting and Bolting. Surfaces of metal in contact shall be cleaned before assembling. The parts of a member shall be assembled, well pinned and firmly drawn together with bolts before drilling, reaming or riveting is commenced. Assembled pieces shall be taken apart, if necessary, for the removal of burrs and shavings produced by the operation. The member shall be free from twists, bends and other deformation.

The drifting done during assembling shall be only such as to bring the parts into position and not sufficient to enlarge the holes or distort the metal.

The rivet holes, if necessary, shall be spear-reamed for the admission of the rivets. The reamed holes shall not be more than 1/16 inch larger than the nominal diameter of the rivets.

End connection angles, stiffener angles and similar parts shall be carefully adjusted to correct positions and bolted, clamped or otherwise firmly held in place until riveted.

Parts not completely riveted in the shop shall be secured by bolts, insofar as practicable, to prevent damage in shipment and handling.

506.3.8 Flame Cutting. Structural steel permitted by these specifications may be flame cut, provided a smooth surface free from cracks and notches is secured and provided that an accurate profile is secured by the use of a mechanical guide. Hand cutting shall be done only where approved by the engineer.

Plates to be flame cut shall be cut in a direction which will permit the stress in the plate when assembled in the work to be parallel with the direction in which the plate was rolled.

In all flame cutting, the cutting flame shall be so adjusted and manipulated as to avoid cutting beyond (inside) the prescribed lines. Flame cut surfaces shall meet the ANSI surface roughness value of 1000 for material up to four inches thick and 1600 for material four inches to eight inches thick, except that the ends of members not subject to calculated stress at the ends shall meet the surface roughness value of 2000. Flame cut surfaces of members carrying calculated stress shall have their corners rounded to approximately a 1/16-inch radius by grinding after flame cutting.

Re-entrant cuts shall be filleted to a radius of not less than 3/4 inch.

Surface roughness, exceeding the above values, and occasional gouges not more than 3/16 inch deep on otherwise satisfactory flame cut surfaces, shall be removed by machining or grinding. Corrections of the defects must be faired with the surface of the cut on a bevel of 1 to 10 or less. Occasional gouges of flame cut edges more than 3/16 inch deep but not more than 7/16 inch deep may be repaired by welding, when approved by the engineer, with low-hydrogen electrodes not exceeding 5/32 inch in diameter and with a preheat of 250 F. The completed weld shall be ground smooth and flush with the adjacent surface.

Flame cut edges of ASTM Designation: A 440 steel 1/2 inch or greater in thickness* shall be removed to a depth of at least 1/8 inch by machining or grinding except that machine flame cut edges may be used without such removal if the edges are softened after cutting; (a) by heating the cut edge uniformly and progressively to a red heat, visible in ordinary shop light (1150 to 1250 F) to a depth of at least 1/16 inch; or (b) by means of a post heating torch attached to and following the cutting torch with the tips, gas pressure, speed of travel and the distance of the post heating torch from the kerf regulated to the thickness of the

*ASTM Designation: A 242 steel not approved for welded construction requires this treatment of flame-cut edges in all thicknesses and with bend tests conforming to ASTM Designation: A 242.

steel. Bend test specimens 1-1/2 inches wide and of the full thickness of the material or with thickness reduced to 3/4 inch in accordance with ASTM Designation: A 6 and having edges flame cut and flame softened in accordance with this article shall meet the bend test requirements specified in ASTM Designation: A 440 for the thickness of material under consideration.

506.3.9 Edge Planing. Sheared edge of plates more than 5/8 inch in thickness and carrying calculated stress shall be planed to a depth of 1/4 inch. Re-entrant cuts shall be filleted before cutting.

506.3.10 Connections. Unless otherwise specified, all connections shall be made with 3/4-inch high-strength bolts or pin bolts.

506.3.11 Rivets and Riveting. When specified on the plans, connections shall be riveted. The size of rivets called for on the plans shall be the size before heating.

Rivet heads shall be of standard shape, unless otherwise specified, and of uniform size for the same diameter of rivet. They shall be full, neatly made and concentric with the shank.

Rivets shall be heated uniformly to a light cherry-red color and shall be driven while hot. The point of a rivet shall not be heated more than the remainder of the rivet. When a rivet is ready for driving, it shall be free from slag, scale and other adhering matter. Burned, burred or otherwise defective rivets shall not be driven.

When driven, rivets shall completely fill the holes, and both heads shall be in full contact with the material being riveted. Rivet heads shall be full and symmetrical and concentric with the shank. Countersunk rivets to finish flush shall be ground flush.

All rivets that are loose, burned, badly deformed or otherwise defective shall be removed and replaced with satisfactory rivets. Any rivets whose head is defective in size or whose head is driven off center will be considered defective and shall be removed. Rivets loosened by driving of adjacent rivets shall be removed and replaced with satisfactory rivets. Caulking, recupping or double gunning of rivet heads will not be permitted. Defective rivets shall be removed in a manner satisfactory to the engineer and in such manner that the surrounding metal shall not be injured.

Shop rivets shall be driven by direct-acting rivet machines when practicable. Shop rivets not driven with a direct-acting rivet machine shall be driven with a pneumatic hammer. Beveled rivet sets shall be used with direct-acting rivet machines for forming rivet heads on sloping surfaces.

Pneumatic bucking tools, for rivets driven with pneumatic hammers, will be required when, in the opinion of the engineer, the size and length of the rivets warrant their use.

506.3.12 Bolts and Bolted Connections.

506.3.12.1 General. The contractor shall furnish sufficient bolts of each type, size and length required to bolt the connections with an ample surplus to replace those lost or rejected. Connections may be made with either high-strength bolts or high-strength pin bolts, except that the same type of fastener shall be used throughout the structure, unless otherwise permitted by the engineer.

Shop assembly and match-marking of parts to be connected by high-strength bolts or pin bolts shall be as required elsewhere in this section.

When assembled, all joint surfaces, including those adjacent to washers, shall be free of scale except tight mill scale and shall be free of dirt, oil, burrs, pits and other defects that would prevent solid seating of the parts. Contact surfaces of beam splices, girder splices and main truss connections shall be free of paint or lacquer.

506.3.12.2 Unfinished Bolts. Unfinished bolts, for temporary connections and other specifically permitted uses, shall be standard bolts with hexagon heads and nuts. The diameter of the bolt hole shall be 1/16 inch greater than the diameter of the bolt.

Bolts transmitting shear shall be threaded to such a length that not more than one thread will be within the grip of the metal. Lock washers shall be used under the nuts of unfinished bolts which are used in permanent connections.

506.3.12.3 High-Strength Bolts. When connections are assembled, bolts shall be installed with a hardened washer under the nut or bolt head, whichever is the element turned in tightening.

A flat washer may be used when the abutting surface adjacent to the bolt head or nut does not have a slope of more than 1:20 with respect to a plane normal to the bolt axis. For slopes greater than 1:20, smooth beveled washers shall be used to produce parallelism.

The bolted parts shall be brought together into solid contact bearing before final tightening. Not less than 25 percent of the total number of bolts in a joint shall serve as fitting up bolts for this purpose.

Each fastener shall be tightened to provide, when all fasteners in the joint are tight, at least the minimum bolt tension shown in Table 1-Bolt Tension, for the size of fastener used.

TABLE 1 – BOLT TENSION

Bolt Size Inches	Required Minimum Bolt Tension* Pounds
1/2	12,050
5/8	19,200
3/4	28,400
7/8	36,050
1	47,250
1-1/8	56,450
1-1/4	71,700
1-3/8	85,450
1-1/2	104,000

*Equal to the proof load of bolt given in ASTM Designation: A 325

Threaded bolts shall be tightened with properly calibrated manual wrenches or by the turn-of-nut method, except that the turn-of-nut method may not be used for bolts requiring a beveled washer. If required because of bolt entering and wrench operation clearances, tightening by either procedure may be done by turning the bolt while the nut is prevented from rotating.

506.3.12.3.1 Calibrated Wrenches. When calibrated wrenches are used to provide the bolt tension specified in Table 1 - Bolt Tension, their setting shall be such as to induce a bolt tension slightly in excess of this value. These wrenches shall be calibrated by tightening, in a device capable of indicating actual bolt tension, not less than three typical bolts from the lot to be installed. The torque indication corresponding to the calibrating tension shall be noted and used in the installation of all bolts of the tested lot. Nuts shall be in tightening motion when torque is measured. When using calibrated wrenches to install several bolts in a single joint, the wrench shall be returned to retighten bolts previously tightened, which may have been loosened by the tightening of the subsequent bolts, until all are tightened to the prescribed amount.

506.3.12.3.2 Turn-of-Nut Method. When the turn-of-nut method is used to provide the bolt tension specified in Table 1 - Bolt Tension, there shall first be enough bolts brought to a "snug tight" condition to insure that the parts of the joint are brought into full contact with each other. Snug tight is defined as the tightness attained by a few impacts of

an impact wrench or the full effort of a man using an ordinary spud wrench. Following this initial operation, bolts shall be placed in any remaining holes in the connection and brought to snug tightness. All bolts in the joint shall then be tightened additionally by the applicable amount of nut rotation specified in Table 2 - Nut Rotation From Snug Tight Condition, with tightening progressing systematically from the most rigid part of the joint to its free edges. During this operation there shall be no rotation of the part not turned by the wrench.

TABLE 2 – NUT ROTATION FROM SNUG TIGHT CONDITION*

Disposition of Outer Faces of Bolted Parts		
Both faces normal to bolt axis, or one face normal to axis and other face sloped** (bevel washer not used)		Both faces sloped** from normal to bolt axis (bevel washers not used)
Bolt length not exceeding 8 diameters or 8''***	Bolt length exceeding 8 diameters or 8''***	For all lengths of bolts
1/2 turn	2/3 turn	3/4 turn

* For coarse thread heavy hexagon structural bolts of all sizes and lengths and heavy hexagon semi-finished nuts. Nut rotation is rotation relative to bolt regardless of the element (nut or bolt) being turned. Tolerance on rotation: 1/6 turn (60 degrees) over and nothing under.
** Slope 1:20 maximum.
*** Bolt length is measured from underside of head to extreme end of point.

506.3.12.3.3 Inspection. All requirements of this specification for bolt connections shall be performed to the satisfaction of the engineer.

The procedure for calibration of wrenches and installation of bolts shall meet with the approval of the engineer.

The following inspection shall be used unless a more extensive or different inspection procedure is specified.

Either the engineer or the contractor in the presence of the engineer, at the engineer's option, shall use a manual torque inspection wrench that can be accurately calibrated in accordance with the requirements of Subsection 506.3.12.3.1.

Three bolts of the same grade, size, length and condition as those under inspection shall be placed individually in a calibration device (furnished by the contractor) capable of indicating bolt tension. There shall be a washer under the part turned in tightening each bolt.

Each bolt specified in the paragraph above shall be tightened in the calibration device by any convenient means to the minimum tension specified for its size in Subsection 506.3.12.3. The inspecting wrench then shall be applied to the tightened bolt and the torque necessary to

turn the nut or head five degrees (approximately one inch at 12-inch radius) in the tightening direction shall be determined. The average torque measured in the tests of three bolts shall be taken as the job inspecting torque to be used in the manner specified in the last paragraph of this Subsection.

Bolts represented by the sample prescribed in the second paragraph above which have been tightened in the structure shall be inspected by applying, in the tightening direction, the inspecting wrench and its job inspecting torque to ten percent of the bolts, but not less than two bolts, selected at random in each connection. If no nut or bolt head is turned by this application of the job inspecting torque, the connection shall be accepted as properly tightened. If any nut or bolt head is turned by the application of the job inspecting torque, this torque shall be applied to all bolts in the connection, and all bolts whose nut or head is turned by the job inspecting torque shall be tightened and re-inspected, or alternatively, the fabricator or erector, at his option, may re-tighten all of the bolts in the connection and then re-submit the connection for the specified inspection.

506.3.12.4 High-Strength Pin Bolts. The driving of pin bolts shall be done by the use of a special driving tool capable of partial swaging of the collars to allow for some adjustment during erection when the pinning and bolting work is performed. The tool shall be capable of producing the required tension in the bolt, and shall be capable of swaging the collar into the annular locking grooves, forming the collar into the proper size and shape as recommended by the manufacturer, before the pin tail breaks.

The required minimum bolt tension shall be as indicated in Subsection 506.3.12.3 - Table 1.

At least 50 percent of the pin bolts in the joint shall be partially tensioned to insure that all parts of the joint are tightly fitted before final swaging and pin bolt fracture.

The pin bolts will be tested prior to use in a device (furnished by the contractor) capable of indicating actual bolt tension. Not less than three typical bolts of each size and length shall be furnished for tests from the supply of bolts which will subsequently be used in the work. Other bolts may be tested during the bolting operation as directed by the engineer. The same installation tool that will subsequently be used for tightening and swaging the bolts for the field connections shall also be used for applying tension in the bolts during the testing procedure.

For slopes greater than 1:20, smooth beveled washers shall be used to produce parallelism.

The expendable pin tails shall be recovered from the driving tool as it breaks from the bolt and shall not be permitted to drop in such a manner as to create a hazard.

The procedure for testing and the installation of pin bolts shall meet with the approval of the engineer.

506.3.13 Abutting Joints. Abutting joints in compression members of trusses and in columns shall be milled or saw cut to give a true and square cut.

Openings at abutting joints in tension members, in continuous I-beams and plate girders shall not exceed 3/8 inch.

506.3.14 Facing of Bearing Surfaces. The top and bottom surfaces of steel slabs and the base plate and cap plates of columns and pedestals shall be straight, smooth and free from warp and must bear evenly throughout.

The bases of welded steel bearings shall be planed, if necessary, after welding to secure an even bearing.

The bases of cast steel bearings shall be planed after annealing to secure an even bearing.

Sole plates of beams and girders shall have full contact with the flanges and the bearing surface shall be smooth and true and shall be perpendicular to the web of the member. Curved sole plates shall make full line bearing with masonry or bearing plates, which line shall be at right angles to the axis of the member and perpendicular to the web of the member, unless otherwise shown on the plans.

The excess metal of countersunk rivet heads shall be ground flush with the surrounding metal.

In planing the curved surfaces of expansion bearings the cut of the tool shall preferably be in the direction of the expansion. If the cut of the tool is at right angles, the finished surface must be the true arc of a circle, smooth and free from ridges.

Contact steel surfaces subject to sliding motion shall be finished in the direction of motion as specified in ANSI No. 125.

Surfaces specified on the plans to receive a surface finish shall be machine finished.

Surfaces of bronze bearing plates intended for sliding contact shall be polish-finished.

When lubricated bronze plates are used, the finished surface of the expansion plate assembly in contact with the lubricated bronze plate shall be covered with a plastic or other approved coating upon completion of machining. Prior to erection of the girder, this coating shall be removed and the surface coated with graphite.

506.3.15 Web and Flange Plates. In girders having no cover plates and not to be encased in concrete, the top edge of the web plate shall not extend above the backs of the flange angles and shall be not more than 1/8 inch below at any point. Any portion of the plate projecting beyond the angles shall be clipped flush with the backs of the angles. Web plates of girders having cover plates may be 1/2 inch less in width than the distance back to back of flange angles.

Splices in webs of girders without cover plates shall be sealed on the top by welding.

At web splices, the clearance between the ends of the web plates shall not exceed 3/8 inch.

When camber is specified on the plans for welded girders, the camber shall be produced by machine flame cutting the web plate. All cambers shall be cut on a continuous smooth curve.

Welded girders when detailed to a horizontal curve shall have the flange plates cut to a continuous smooth curve by machine flame cutting or the girder shall be curved by heat curving methods approved by the engineer, unless otherwise specified on the plans.

Web and flange plates shall be assembled in the work so that the direction of stress in the plate, as assembled, will be parallel with the direction in which the plate was rolled.

506.3.16 Fit of Stiffeners. End stiffeners of girders and stiffeners intended as supports for concentrated loads shall have full bearing on the flanges to which they transmit load or from which they receive load. The full bearing shall be obtained by milling, grinding, or in the case of weldable steel in compression areas, by welding as shown on the plans or specified.

Stiffeners not intended to support concentrated loads shall, unless shown or specified otherwise, fit sufficiently tight to exclude water after being painted.

506.3.17 Pin and Roller Details.

506.3.17.1 Pins and Rollers. Pins and rollers shall be accurately turned to the dimensions shown on the drawings and shall be straight, smooth and free from flaws.

Pins and rollers more than nine inches in diameter shall be forged and annealed. Pins and rollers nine inches or less in diameter may be either forged and annealed or cold-finished carbon-steel shafting.

In pins larger than nine inches in diameter, a hole not less than two inches in diameter shall be bored full length along the axis after the forging has been allowed to cool to a temperature below the critical range under suitable conditions to prevent injury by too rapid cooling and before being annealed.

Nuts used in connection with pins shall be standard recessed pin nuts.

506.3.17.2 Pin Holes. Pin holes shall be bored true to the specified diameter, smooth and straight, at right angles with the axis of the member and parallel with each other unless otherwise required. The final surface shall be produced by a finishing cut.

The diameter of the pin hole shall not exceed that of the pin by more than 1/50 inch for pins five inches or less in diameter, or 1/32 inch for larger pins.

506.3.17.3 Threads for Bolts and Pins. Threads for all bolts and pins for structural steel construction shall conform to the Unified

Standard Series UNC– ANSI B1.1 1972, Class 2A for external threads and Class 2B for internal threads, except that pin ends having a diameter of 1-3/8 inches or more shall be threaded six threads to the inch.

506.3.18 Finished Members. Finished members shall be true to line and free from twists, bends and open joints.

506.3.19 Welding.

506.3.19.1 General. Welding of steel structures shall conform to the requirements of these specifications, the Structural Welding Code of the American Welding Society, D 1.1-72 (Revised 1-73) as modified and amended by the AASHO Standard Specifications for Welding of Structural Steel Highway Bridges, dated 1974. Whenever the term AWS D 1.1 is used or referenced it shall mean the foregoing revised and amended Structural Welding Code.

All welding shall be performed by welders who are currently certified by the Wisconsin Department of Industry, Labor and Human Relations or other approved agency.

506.3.19.2 Welding Procedures, Procedure Qualifications and Inspection.

506.3.19.2.1 Procedures. Complete welding procedures proposed for use shall be submitted to the engineer in triplicate for approval prior to fabrication of the structural steel.

The welding procedures shall include, but not be limited to the following items: General instructions for fit-up, techniques and welding sequences: types of steel, joint description, joint preparation, pre-heat or post-heat, welding position; current polarity, amperage, voltage and linear welding speed; electrode size and type for manual welding; electrode size and type, type of flux and type and make of welding machine for automatic welding; number of passes, maximum width and thickness of weld layers, and any procedure change between passes in the same weld; interpass temperatures, either maximum or minimum; and any other data necessary to describe the welding procedure fully.

A submerged arc weld shall be used on welded girders at the junction of flange plate and web. Submerged arc, electroslag or electrogas weld shall be used on shop butt splices.

The preheat shall be in accordance with AWS D 1.1.

The requirements for electroslag and electrogas welding shall be in accordance with AWS D 1.1.

506.3.19.2.2 Procedure Qualifications. Procedure qualifications shall be in accordance with Section 5 of AWS D 1.1.

Qualification tests of the welding procedures shall be completed by the contractor and accepted by the engineer prior to the start of the

fabrication of the steel. Any revision in the welding procedure specifications shall be submitted to the engineer for approval and shall be qualified in the presence of the State's inspector before acceptance.

Prior to the start of qualifying welding procedures, the contractor and the State's inspector shall have a conference to insure that agreement has been reached regarding the details of the procedures, the sequence of welding to be followed, the handling of materials to be inspected, the status of qualifications for welders and welding inspectors and the approval of electrodes, wire, flux and other welding materials and equipment.

Each welder or welding operator shall be assigned an identification mark which shall be stamped on the pieces he has welded. Such identification mark shall be used by the welder or welding operator for the duration of the contract.

506.3.19.2.3 Inspection. Inspection of welding shall be in accordance with AWS D 1.1.

Compensation for furnishing radiographic films to the engineer for inspection shall be considered as included in the bid price for structural steel and no additional or extra compensation will be allowed.

506.3.20 Stud Shear Connectors. Studs shall be used for shear connectors when designated on the plans. Welding shall be in accordance with Subsection 506.3.19 and the following requirements. In the event of conflict, the following requirements shall govern.

They shall be end welded to steel beams, girders or plates with automatically timed stud welding equipment connected to a suitable power source. The type, size or diameter and length of stud shall be as indicated on the plans. Fillet welds varying in size from 3/16 inch to 5/16 inch are satisfactory provided the studs pass all other tests required. Adequate provision shall be made in the fabrication of structural members to compensate for loss of camber due to welding of the shear connectors.

If two or more stud welding guns are to be operated from the same power source, they shall be interlocked so that only one gun can operate at a time and so that the power source has fully recovered from making one weld before another weld is started. The power source shall be adequate for the size of stud being welded.

Studs shall not be painted or galvanized. The studs shall be free from rust, scale, rust pits and oil at the time of welding and immediately before the concrete is placed. The beam surface to which the studs are welded shall be free from excessive mill scale, rust, dirt, paint, grease or any other material which might impair the quality of the weld. When necessary to obtain satisfactory welds, the areas on the beam, girder or plate to which the studs are to be welded shall be wire-brushed, peened, prickpunched or ground free of scale or rust.

Welding shall not be done when the surface is wet or exposed to rain or snow.

When the temperature of the base metal is below 0 F, preheating will be required in accordance with the AWS Code and two studs in each 100 studs welded shall be bent 45 degrees in addition to the first two bent as specified elsewhere in these specifications. Preheating must be to 70 F and temperature of the preheated base metal shall be maintained between 32 F and 70 F during the welding operation.

While in operation the welding gun shall be held in position without movement until the weld metal has solidified.

An arc shield (ferrule) of heat-resistant ceramic or other material shall be furnished with each stud. The material shall not be detrimental to the welds or cause excessive slag and shall have sufficient strength so as not to crumble or break due to thermal or structural shock before the weld is completed.

Flux for welding shall be furnished with each stud, either attached to the end of the stud or combined with the arc shield for automatic application in the welding operation.

Only qualified studs shall be used. A stud to be qualified shall have passed the tests prescribed in the AASHO Standard Specifications for Highway Bridges. The arc shield used in production shall be the same as used in the qualification tests. Qualification of the studs, prior to use under the contract, shall be at the expense of the manufacturer.

The contractor shall submit to the engineer for approval, before installation, information on the studs to be furnished as follows:

The name of the manufacturer.

A detailed description of the stud and arc shield.

A certification from the manufacturer that the stud is qualified as specified in the paragraph above.

Longitudinal and lateral spacings of studs with respect to each other and to edges of beam or girder flanges shall not vary more than one-half inch from the dimensions shown on the plans except that a variation of one inch will be permitted where required to avoid obstruction with other attachments on the beam or where a new stud is being welded to replace a defective one. The minimum distance from the edge of a stud shank to the edge of a beam or plate shall be one inch, but preferably not less than one and one-half inches.

The first two studs welded on each beam or girder, after being allowed to cool, shall be bent 45 degrees by striking the stud with a hammer. If failure occurs in the weld of either stud, the procedure shall be corrected and two successive studs successfully welded and tested before any more studs are welded to the beam or girder. The engineer shall be promptly informed of any changes in the welding procedure at any time during construction.

Studs on which a full 360 degree weld is not obtained may, at the option of the contractor, be repaired by adding a 3/16-inch fillet weld in place of the lack of weld, using the shielded metal-arc process with low-hydrogen welding electrodes.

If the reduction in the height of studs as they are welded becomes less than normal, welding shall be stopped immediately and not resumed until the cause has been corrected.

Before welding a new stud where a defective one has been removed, the area shall be ground smooth and flush, or in the case of a pullout of metal, the pocket shall be filled with weld metal using the shielded metal-arc process with low-hydrogen welding electrodes and then ground flush. In compression areas of flanges, a new stud may be welded adjacent to the defective area in lieu of repair and replacement on existing weld area, providing the foregoing requirements for spacing and variation of studs is complied with. In the case of a pullout of metal, the pocket shall be filled with weld metal, but need not be ground flush.

After the studs have been welded to the beams a visual inspection shall be made and each stud shall be given a light blow with a hammer. Any stud which does not have a complete end weld, any stud which does not emit a ringing sound when given a light blow with a hammer, any stud that has been repaired by welding or any stud which has less than normal reduction in height due to welding, shall be struck with a hammer and bent 15 degrees from the correct axis of installation, and in the case of a defective or repaired weld the stud shall be bent 15 degrees in the direction that will place the defective portion of the weld in the greatest tension. Studs that crack either in the weld or in the shank shall be replaced.

The engineer, at his option, may select additional studs to be subjected to the bend test specified above.

The studs tested that show no sign of failure shall be left in the bent position.

If during the progress of the work, inspection and testing indicate in the judgment of the engineer that the shear connectors being obtained are not satisfactory, the contractor will be required at his expense to make such changes in welding procedure, welding equipment and type of shear connector as necessary to secure satisfactory results.

506.3.21 Mill Inspection and Tests. Unless otherwise directed, the fabricator of structural steel shall furnish the engineer with three certified copies of mill inspection and test reports showing both physical and chemical tests of each heat from which material is to be used. These inspection and test reports shall be submitted to the engineer for examination before request for shop inspection of fabrication is made.

506.3.22 Shop Inspection. All structural steel and miscellaneous metals furnished for the work shall be subject to shop inspection by the engineer.

The contractor shall give the engineer ample notice of the beginning of the work in the shop.

Prior to requesting the services of an inspector, the fabricator shall submit a list of main stress carrying members and the heat number of

the material from which the member was fabricated. The heat number, as marked by the rolling mill, shall be preserved for identification by the inspector. If, by fabrication, such original number or marking is hidden, cut off or otherwise obliterated, the fabricator shall paint the number on the material at a conspicuous location.

The contractor shall furnish facilities for the inspection of material and workmanship in the shop and the inspectors shall be allowed free access to the necessary parts of the works.

The inspector shall have the authority to reject any material or workmanship which does not meet the requirements of the specifications.

The acceptance of any material or finished members by the inspector shall not be a bar to their subsequent rejection if found defective.

Inspection at the shop is intended as a means of facilitating the work and avoiding error so far as possible, but it is expressly understood that it will not relieve the contractor from responsibility in regard to imperfect material or workmanship or the necessity for replacing the same.

506.3.23 Marking and Shipping. Each member shall be painted or marked with an erection mark for identification and an erection diagram shall be furnished with erection marks shown thereon. Members weighing more than three tons shall have the weights marked thereon. Structural members shall be loaded on trucks or cars in such a manner that they may be transported and unloaded at their destination without being excessively stressed, deformed or otherwise damaged. All girders, except for haunched sections thereof, and rolled beams must be shipped in a standing position, which position shall be maintained in subsequent operations. Haunched sections of built-up girders may be shipped in an inverted position.

Bolts of one length and diameter and loose nuts or washers of each size shall be packed separately. Pins, small parts and packages of bolts, washers and nuts shall be shipped in boxes, crates, kegs or barrels, but the gross weight of any package shall not exceed 300 pounds. A list and description of the contained material shall be plainly marked on the outside of each shipping container.

506.3.24 Handling and Storing. Material to be stored shall be placed on skids above the ground. It shall be kept clean and properly drained. Girders and beams shall be placed upright and shored. Long members, such as columns and chords, shall be supported on skids placed near enough together to prevent injury from deflection. The contractor shall be responsible for the loss of any material while in his care, or for any damage caused to it after being received by him.

506.3.25 Field Inspection. All work of erection shall be subject to inspection and the contractor shall furnish facilities for such inspection of material and workmanship. Material and workmanship not

previously inspected will be inspected after its delivery to the site of the work.

506.3.26 Falsework. Materials used in falsework need not be new, unused material. The falsework shall be properly designed and substantially constructed and maintained for the loads which will come upon it. Falsework shall provide the required construction camber.

Detailed plans for falsework shall be submitted to the engineer when so requested. The engineer's approval of such plans or acquiescence in work constructed according to them shall not relieve the contractor of responsibility for successful erection or satisfactory results.

When falsework is built over a stream or lake subject to boating use, it shall be constructed so as to provide horizontal and vertical clearance adequate for passage of rowboats and small power boats. When falsework is built over a highway or street used by traffic the minimum clearance to be provided, unless otherwise required by the plans or special provisions, shall be 22 feet horizontal and 13 feet-six inches vertical.

Upon completion of the work, falsework piles shall be removed down to at least two feet below streambed or finished ground line. Temporary bents, mud sills and footings shall be entirely removed.

Overhang bracket form supports shall not be attached to the girder web.

506.3.27 Erection. No part of the load of the steel superstructure shall be applied to any concrete substructure unit until after the expiration of the curing and protection period for said unit. Loads shall not be applied to beams of open-type structure units until the end of the required period for support of these beams by falsework.

Unless otherwise specified the minimum number of pickup points for handling girders shall be as follows:

Girder Length	Minimum No. of Pickups
0-50	1
50 and over	2 or more

No bent or twisted member shall be put in place until its defects are corrected and members seriously damaged in handling or transporting will be rejected.

506.3.28 Straightening Bent Material. The straightening of plates and angles or other shapes shall be done by methods not likely to produce fracture or other injury. The metal shall not be heated unless permitted by the engineer, in which case the heating shall be to a temperature not higher than 1200 F (a dull red) as controlled by temperature indicating crayons, liquids or bimetal thermometers.

Parts to be heat straightened shall be substantially free of stress and from external forces, except stresses resulting from mechanical means

used in conjunction with the application of heat. After heating, the metal shall be cooled as slowly as possible away from drafts. Water shall not be used for cooling.

Following the straightening of a bend or buckle, the surface of the metal shall be carefully inspected for evidence of fracture.

506.3.29 Field Assembling and Bolting. Field assembling shall conform to the foregoing requirements for shop assembling. Field connections shall, unless otherwise specified, be made with high-strength bolts or pin bolts in accordance with Subsection 506.3.12.

A burning torch shall not be used to make adjustments or cuts as an aid to field assembling except by express permission of the engineer.

Before beginning the field bolting on a continuous span, the span and the immediately adjacent continuous spans shall be adjusted to the correct grade (including construction camber) and alignment.

Field bolting (except for compression joints in trusses, connections for laterals and railings and connections for those nominal members specifically designated on the plans or in the contract) shall be completed before any part of the span is released and swung free from its supporting falsework.

Connections for laterals shall not be made until after the span is swung free from all falsework.

After the concrete floor (and sidewalks, if any) on all spans of the structure have been poured and cured, the connections for those nominal members specifically designated on the plans or in the contract shall be made and the railings shall be erected, aligned and fastened in place.

Splices and field connections using high-strength bolts or pin bolts shall have at least 25 percent of the holes filled with cylindrical erection pins before placing the permanent high-strength bolts or pin bolts. At least 25 percent of the holes must be filled with erection bolts for temporary connections. All bolts must be in place before proceeding with final tightening as specified in Subsection 506.3.12.

Erection bolts shall be of the same nominal diameter as the high-strength bolts or pin bolts and cylindrical erection pins shall be 1/32 inch larger.

Girders or portions of girders or other units may be assembled on blocking to the required camber prior to erection or placement in the structure, when approved by the engineer, however the contractor shall be responsible for and shall make any adjustments in the joints or splices of such assembled units after erection or placement as may be necessary.

506.3.30 Bearings and Anchorage. Masonry bearing plates shall not be placed upon bridge seat bearing areas which are improperly finished, deformed or irregular.

Bearing plates shall be set level in exact position and shall have a full and even bearing upon the masonry. Unless otherwise required, they

shall be placed on bearing pads conforming to the requirements of Subsection 506.2.6.

After the steel in the superstructure has been properly aligned and finally connected, the contractor shall drill the holes in the concrete masonry and set the anchor bolts except where the bolts are built into the masonry.

Anchor bolts shall be set in portland cement grout except during freezing weather, or in melted lead. Portland cement grout shall be an expansive mortar and consist of two parts of sand for mortar and one part of portland cement. Unpolished aluminum powder at the rate of four grams per sack of cement shall be thoroughly dry mixed with the cement before incorporation with other ingredients. The grout shall be as dry as practicable and the hole filled before ramming the bolt in place. The hole shall be over filled with grout or lead just enough to produce a watertight fit when the bearing plate is installed. Excess grout or lead shall be removed from the bolt and bearing area.

506.3.31 Cleaning of Surfaces.

506.3.31.1 General. Surfaces of metal to be painted, and surfaces to be in contact because of bolting or riveting, shall be thoroughly cleaned, removing rust, mill scale, dirt, oil or grease and other foreign substances. Unless cleaning is to be done by blast cleaning, all weld areas, before cleaning is begun, shall be neutralized with a proper chemical, after which they shall be thoroughly rinsed with water.

All nonmachined surfaces of a casting shall be blast cleaned before the casting is machined.

All structural steel except steel encased in concrete shall be cleaned by blast cleaning, unless otherwise specified. Structural steel encased in concrete shall be either blast cleaned or hand cleaned.

506.3.31.2 Hand Cleaning. Where hand cleaning is permitted, the removal of rust, scale and dirt shall be done by the use of metal brushes, scrapers, chisels, hammers or other effective means. Oil and grease shall be removed by the use of suitable solvents. All dust or other loose material shall be completely removed by brushing or by other satisfactory methods.

506.3.31.3 Blast Cleaning. The blast cleaning shall remove mill scale, rust, old paint and other substances from the surface of the metal until a finish is obtained as described for No. 6 Commercial Blast Cleaning by the Steel Structures Painting Council's Specifications. Special attention shall be given to cleaning of corners and re-entrant angles. Before painting, sand, grit or shot adhering to the steel in corners and elsewhere shall be removed. The cleaning shall be approved by the engineer prior to any painting. The material shall be painted before rust forms. Blast cleaning shall be performed with sand, metal grit or metallic shot as described for No. 6 Commercial Blast Cleaning.

506.3.31.4 Unpainted Weathering Steel. Blast cleaning or neutralizing of completed welds will not be required. Slag shall be removed from all welds by hand cleaning.

Before steel is shipped to the field, all surfaces shall be free of oil, dirt, grease and other foreign substances.

The following markings will remain on material shipped to the field:

Color code when required.

Heat numbers for main stress carrying members.

Weight of members weighing three tons or more.

Piece marks.

Match marks when required.

Codings and markings shall be placed on interior surfaces of exterior girders and on interior girders in locations that will be inconspicuous upon erection and need not be removed except when directed by the engineer.

All steel in the completed structure shall be free of oil, dirt, grease and other foreign substances.

The following surfaces or members shall be blast cleaned, but if blast cleaned prior to erection, spot blast cleaning shall be performed as required after the concrete or steel deck has been completed:

Outside surfaces of fascia girders.

Walkways on railroad structures when located on the outside (exposed surface) of fascia girders, including all items in the sidewalk, railing, brackets, supporting members, but excluding the grating or other tread material required. The grating or tread material will not be erected until after all blast cleaning required has been performed.

506.3.32 Painting Metal. Unless other wise provided in the contract, all structural steel and miscellaneous metals shall receive one shop or prime coat of paint and three field coats of paint. The contractor at his option, unless otherwise required by the contract, may furnish and apply paints conforming to the requirements of either System I or System II, Structural Steel Paint, provided however, that the same system shall be used throughout the work. The requirements for Structural Steel Paint are set forth in Section 517.

The application of the coat of shop paint shall be made after the metal has been accepted by the engineer. Surfaces which will be in contact with concrete shall not be painted; except that tops of steel beams for eight feet from a pier or abutment, when they are to be erected for extended periods prior to placing of floors, may be painted to prevent or minimize rusting where the rusting of such areas would cause staining of pier, abutment or other concrete surfaces.

Shop contact surfaces shall not be painted. Except as noted under Subsection 506.3.12.1 for field connections with high-strength bolts or pin bolts, field contact surfaces shall receive a coat of shop paint. Surfaces of bearing devices, expansion joint assemblies and other surfaces not in contact but inaccessible after assembly or erection shall be painted with three coats of paint. The first and second coats shall

conform to the requirements for shop or prime coat and the third coat shall conform to the requirements for aluminum third field coat of System I or System II, Structural Steel Paint, whichever system is used throughout the work. The second and third coats shall not be applied until the previous paint coat has dried throughout the full thickness of the paint film provided, however, that not less than two days shall have elapsed before applying the succeeding coat.

Structural steel which is to be welded shall not be painted before welding is complete. If it is to be welded only in the fabricating shop and subsequently erected by bolting, it shall receive one coat of paint after shop welding is finished. Steel surfaces which are to be field welded shall be given one coat of boiled linseed oil or other approved protective coating after shop welding and shop fabrication is completed.

Surfaces of iron and steel castings, either milled or finished, shall be given one coat of paint.

Upon fabrication and acceptance, pins and pin holes shall be coated with a plastic or other approved coating before removal from the shop.

No markings other than erection marks for the field identification of members and weight marks as otherwise required shall be painted upon surface areas previously painted with the shop coat. Material shall not be loaded for shipment until it is thoroughly dry.

The painting of structural steel and miscellaneous metals will not be paid for directly but shall be considered incidental to the work of furnishing and erecting the structural steel and miscellaneous metals, unless otherwise specifically provided for in the contract.

506.3.33 Name Plates. The contractor shall furnish and install name plates conforming to the requirements of Subsection 506.2.4.

One name plate shall be furnished and placed on each structure at the location indicated on the plans.

Each plate when attached to the structure steel, shall be rigidly attached by means of two bolts meeting the requirements of Subsection 506.2.4. In the event the plate is required to be attached to concrete, it shall be attached as specified in Subsection 502.3.12.

No permanent plates or markers other than the name plate hereinbefore designated, unless otherwise approved by the engineer, will be permitted on any structure.

Compensation for furnishing and placing of name plates shall be included in the contract price for other items and no additional compensation therefor will be allowed.

506.4 Method of Measurement. Structural carbon steel, structural low-alloy steel, steel castings, carbon steel forgings, lubricated bronze plates, bronze castings, sheet copper and sheet zinc shall be measured by the pound. The quantities measured for payment shall be those shown on the approved bridge plans, except as hereinafter provided. Only accepted work will be measured for payment. Preformed pads and sheet lead shall be measured in square feet and the quantity measured for

payment shall be the total number of square feet of the material incorporated in the work in accordance with the plan details.

The following unit weights shall be used in computing the weight of metals:

Steel (structural carbon, structural low-alloy, castings or forgings)	490	lbs. per cu. ft.
Bronze Plate and Castings	535	lbs. per cu. ft.
Sheet Copper (0.02 inch thick)	.93	lbs. per sq. ft.
Sheet Zinc (No. 12 zinc gage, 0.028 inch)	1.05	lbs. per sq. ft.
Sheet Zinc (No. 18 zinc gage, 0.055 inch)	2.06	lbs. per sq. ft.
Sheet Zinc (No. 20 zinc gage, 0.070 inch)	2.62	lbs. per sq. ft.

The weights of all rolled shapes shall be computed on the basis of their nominal weights and dimensions. The weights of all plates, including those of zinc and copper, shall be computed on the basis of their nominal weights and dimensions and full deduction shall be made for all cuts, except interior cuts, beveled cuts on edges for butt welding and cuts made by machining to provide other than plane surfaces.

The weight of paint or weld metal will not be included in the computed weight.

The weight of all shop rivet heads shall be included in the computed weight and the computations thereof shall be based on the following assumed weights:

Diameter of Rivet Inches	Weight per 100 Heads, Pounds
1/2	4.0
5/8	7.0
3/4	12.0
7/8	18.0
1	26.0

The weight of heads, nuts, single washers and threaded stick-through of all high tensile strength bolts and of heads, collars and stick-through of all high tensile strength pin bolts shall be included on the basis of the following weights:

Diameter of Bolt Inches	Weight per 100 Bolts, Pounds
1/2	19.7
5/8	31.7
3/4	52.4
7/8	80.4
1	116.7
1 1/8	165.1
1 1/4	212.0

The weight of castings shall be computed from their dimensions with an addition of three percent for fillets and overruns, provided however,

that if the scale weight of any casting is less than the computed weight, the weight of that casting to be paid for shall be the scale weight thereof. If the scale weight of any casting is less than 97 percent of the computed weight, the casting may be rejected.

Should the weights of metals as may be computed from the approved shop drawings vary more than one percent from those shown on the approved bridge plans for an individual structure, the quantities for that structure measured for payment shall be based on those computed from the approved shop drawings, except that if the contractor elects (with the engineer's permission) to use equivalent sections of greater weight than those shown on the approved bridge plans, he shall bear all additional costs thereof.

All work included within the scope of the contract but not listed as bid items in the proposal shall be considered as work incidental and subsidiary to the several bid items and will not be measured for payment.

506.5 Basis of Payment. Structural steel and miscellaneous metals, measured as provided above, will be paid for at the contract unit price per pound for Structural Carbon Steel, Structural Low-Alloy Steel, Steel Castings, Carbon Steel Forgings, Lubricated Bronze Plate, Bronze Castings, Sheet Copper or Sheet Zinc, as the case may be, and that contract unit price shall be payment in full for furnishing, fabricating, casting, machining or otherwise preparing, transporting, erecting and painting all materials and for furnishing all equipment, tools, labor and incidentals necessary to complete the work in accordance with the contract.

Bearing Pads or Bearing Pads, Elastomeric, as the case may be, will be paid for at the contract unit price per square foot.

Miscellaneous work, shown or billed on plans or otherwise specified and included within the scope of the contract but not listed as bid items, shall be performed by the contractor as a part of and included in the contract price for other items.

SECTION 507. TIMBER STRUCTURES

507.1 Description. This work shall consist of furnishing, framing, treating, if required, delivering, erecting and painting, if required, all untreated or treated lumber and timber, as the case may be, required for timber bridges and other timber structures, or lumber and timber parts of other bridges or structures, all in accordance with the requirements of the plans and the specifications.

This work shall include only such lumber and timber as is a part of the completed work. It shall not include falsework, forms, bracing, sheeting or other lumber and timber used for erection purposes.

This work shall include all hardware (machine bolts, carriage bolts, drift bolts, connectors, lag screws, dowels, rods, nails, spikes, washers,

Painting of lumber and timber will not be paid for directly but shall be considered incidental to the work of furnishing and erecting the lumber and timber.

507.4 Method of Measurement. Untreated and treated lumber and timber shall be measured by the thousand feet board measure (M.B.M.), and the quantity to be paid for shall be the number of thousand feet board measure incorporated in the finished structure in accordance with the contract. Only accepted work will be measured for payment, and the quantities thereof will be computed from the nominal sizes and from the lengths as framed and erected. No allowance will be made for waste.

507.5 Basis of Payment. Untreated and treated lumber and timber, measured as provided above, will be paid for at the contract unit price per thousand feet board measure (M.B.M.) for Untreated Lumber and Timber or for Treated Lumber and Timber (as the case may be), and that contract unit price shall be payment in full for furnishing, framing, treating, if required, placing and painting, if required; for all material, including hardware and for furnishing all equipment, tools, labor and incidentals necessary to complete the work in accordance with the contract.

SECTION 508. TIMBER PILING

508.1 Description. This work shall consist of furnishing, treating, if required, driving, including preboring, if required, and cutting off untreated timber test piling, treated timber test piling, untreated timber foundation piling, treated timber foundation piling, untreated timber trestle piling or treated timber trestle piling, as the case may be, all in accordance with the requirements of the plans and the specifications.

508.2 Materials.

508.2.1 General. Materials used in this work shall meet the requirements for the class of material named and as provided in the specifications.

Specific reference is made to the following:

Structural Steel	Subsection 506.2
Miscellaneous Metals	Subsection 506.2
Creosote Oil	Subsection 507.2.3
Coal-Tar Pitch, Type A	Subsection 507.2.4

508.2.2 Timber Piling.

508.2.2.1 General. Timber piling furnished and used shall be treated or untreated as designated in the contract.

Except as otherwise provided, Class A piles shall be furnished.

Class B piles shall include all piles incorporated in a trestle, temporary or permanent, supporting railroad traffic.

Class C piles shall be used only in falsework for structures supporting highway traffic and for temporary structures supporting highway traffic.

508.2.2.2 Species. Untreated timber piling may be any species of wood which will withstand driving without showing excessive brooming or splitting.

Treated timber piling shall be from one of the following species:

Pacific Coast Douglas Fir	White Pine
Southern Yellow Pine	Jack Pine
Red (Norway) Pine	Western Larch
	Oak

508.2.2.3 Quality Requirements. Class A and Class B timber piles shall conform to the following quality requirements:

508.2.2.3.1 Soundness. Piles shall be of sound wood, free from decay, red heart or insect attack. The butt end of cedar piles may have a pipe or stump rot hole not more than 1-1/2 inches in diameter. Southern pine piles may have unsound knots not exceeding half the permitted size of a sound knot, provided that the unsoundness extends to not more than 1-1/2 inch depth and that the adjacent areas of the trunk are not affected. Piles having sound turpentine scars undamaged by insects may be accepted.

508.2.2.3.2 Knots. Sound knots in piles 50 feet or less in length, and in three quarters of the length from the butt of piles longer than 50 feet, shall be no larger than 4 inches, or one-third the diameter of the pile at the point where they occur, whichever is the smaller. Sound knots in the remaining one quarter of the length of piles longer than 50 feet shall be no larger than five inches, or one-half the diameter of the pile at the point where they occur, whichever is the smaller. The size of a knot shall be its diameter measured at right angles to the length of the pile. Unsound knots shall not be permitted except in Southern Pine piles as specified above. The sum of sizes of all knots in any foot of length of the pile shall not exceed twice the size of the largest permitted single knot. Cluster knots are prohibited. A cluster knot is two or more knots grouped together, the fibers of the wood being deflected around the entire unit. A group of single knots with fibers deflected around each knot separately is not a cluster, even though the knots may be in close proximity.

508.2.2.3.3 Holes. Holes less than one-half inch in average diameter may be permitted provided the sum of the average diameters of all holes in any square foot of pile surface does not exceed 1-1/2 inches.

508.2.2.3.4 Splits and Shakes. Splits shall not be longer than the butt diameter of the pile. The length of any shake or combination of shakes in the outer half of the radius of the butt of the pile, when measured along the curve of the annual ring, shall not exceed one-third the circumference of the butt of the pile.

508.2.2.3.5 Treated Piles, Sapwood. Piles for preservative treatment shall have not less than one inch of sapwood at the butt end.

508.2.2.3.6 Heartwood and Density. In untreated piling for use in exposed work the diameter of the heartwood at the butt shall be not less than eight-tenths of the diameter of the pile at the butt. If high heartwood content is required for untreated foundation piles, the ratio of heartwood to total diameter shall be specified. If high structural strength is required, a limitation on the minimum number of annual rings per inch of radius shall be shown on the plans or in the special provisions.

508.2.2.3.7 Peeling. Piles shall be peeled by removing all of the outer bark and at least 80 percent of the inner bark, well distributed over the surface of the pile. When piles are to receive preservative treatment, no strip of inner bark wider than one-half inch shall remain.

508.2.2.3.8 Cutting and Trimming. Butts and tips shall be sawed square with the axis of the pile. All knots and limbs shall be trimmed or smoothly cut flush with the surface of the pile except that knots may be hand-trimmed flush with the surface of the swell surrounding the knot.

508.2.2.3.9 Straightness. A straight line from the center of the butt to the center of the tip shall lie entirely within the body of the pile.

508.2.2.3.10 Taper. Piles shall be cut above the butt swell and shall have a continuous taper from the point of butt measurement to the tip.

508.2.2.3.11 Twist of Grain. Twist of grain in any 20 feet of length shall not exceed one-half of the circumference at the midpoint of length measured.

508.2.2.4 Dimensions. Class A or Class B timber piles, measured peeled or under the bark, shall conform to the minimum and maximum dimensional values given in the table, Dimensions of Timber Piles; except that for Class A piles, ten percent of the piles in any lot may have circumferences two inches less than the tabulated minimum values; and for Class B piles, ten percent of the piles in any lot may have diameters 1/2-inch less than the tabulated minimum values.

The ratio of the maximum to the minimum diameter of the butt of any pile shall not exceed one to two.

For Class B piles, the measured diameter of a pile at a specified location, where the pile is not exactly round, shall be determined either as the average of the minimum and maximum measured diameters or by dividing the measured circumference by 3.14.

DIMENSIONS OF TIMBER PILES

Length, Feet	Class A Piles				Class B Piles			
	At 3 feet from butt		At tip		At 3 feet from butt		At tip	
	Circumference, Inches		Diameter (Approx.), Inches		Diameter, Inches		Diameter (Approx.), Inches	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Douglas Fir, Hemlock, Larch, Pine, Spruce or Tamarack								
Under 20	32	63	10	20	25	8		
Under 40	38	63	12	20	25	8	14	20	10
40 to 50 Incl.	38	63	12	20	22	7	14	20	9
51 to 70 Incl.	41	63	13	20	22	7	14	20	8
71 to 90 Incl.	41	63	13	20	19	6	14	20	7
Over 90*								
Oak and Other Hardwoods								
Under 30	38	57	12	18	25	8	14	18	10
30 to 40 Incl.	41	63	13	20	22	7	14	20	9
Over 40	41	63	13	20	19	6	14	20	8
Cedar								
Under 30	38	69	12	22	25	8	14	22	10
30 to 40 Incl.	41	69	13	22	25	8	14	22	9
Over 40	41	69	13	22	22	7	14	22	8

*Dimensions of all timber piles over 90 feet in length shall be given on the plans or in the special provisions.

508.2.2.5 Class C Piles. Class C piles shall be of adequate strength and shall be of the shape and dimensions suitable for the purpose intended. Such piling shall be of sound wood, free of defects which might impair its strength and shall be in good condition. Such piling shall be reasonably straight and shall be capable of withstanding driving.

Class C piles need not be peeled but shall have all limbs and knots trimmed flush with the surface.

508.2.2.6 Treated Piling. Treated timber piling shall have a preservative treatment of creosote oil by the pressure process in accordance with the requirements of the Specification for Preservatives and Pressure Treatment Process for Timber AASHO Designation: M 133. Unless otherwise directed by the engineer, the material shall be inspected prior to treatment. Material shall be accepted after treatment on the basis of its condition prior to treatment, on the basis of inspection of the treatment procedure substantiated by plant records, on the condition of the material after treatment and on absorption, penetration borings and visual inspection.

The Division reserves the right to reinspect material after delivery and to reject any and all material which does not comply with the requirements of the specifications.

Whenever it is practicable, during treatment, the piles shall be sorted into groups of each species and into pieces having approximately equal moisture and sapwood content, and so separated as to insure contact of the treating medium with all surfaces.

The net retention of any charge shall be not less than 90 percent of the quantity of preservative that may be specified; but the average retention by the material treated under any contract or order and the average retention of any five consecutive charges shall be at least 100 percent of the quantity specified. Unless otherwise specified on the plans or in the proposal, the minimum quantity of preservative retained shall be as follows:

Species	Min. Net Retention* of Preservative per Cu. Ft. of Wood, Pounds	Minimum Penetration
Pacific Coast Douglas Fir	17	3/4" and 85% of Sapwood up to a Max. of 1-5/8"
Western Larch	10	1/2" and 85% of Sapwood
Southern Yellow Pine	12	3-1/2" or 90% of Sapwood
Red (Norway) Pine	12	2-1/2" or 85% of Sapwood
White Pine	12	1-1/2" and 85% of Sapwood
Jack Pine	12	1-1/2" or 85% of Sapwood
Oak	10	100% of Sapwood

*The minimum net retention shall be determined in accordance with procedures specified in American Wood-Preservers' Association Standard M 2.

508.3 Construction Methods.

508.3.1 Ordering Piling. When timber test piling is a bid item, the contractor shall not order the foundation or trestle piling until he has driven the timber test piling as hereinafter set forth and the engineer has determined, from the data thereby obtained, the lengths of piling to be ordered by the contractor.

If the contractor furnishes foundation or trestle piling in lengths other than those thus determined by the engineer subsequent to the driving of the test piling, all unsatisfactory, unsuitable, or excess lengths of piling so furnished will not be measured for payment. The contractor shall not plead misunderstanding of this requirement because the lengths thus determined by the engineer differ from those shown on the plans.

508.3.2 Test Piling. At least one treated or untreated test pile, as specified, meeting the requirements for Class A piling and of the length shown on the plans shall be driven for each substructure unit specified.

In lieu of an untreated timber test pile, the contractor may, with the approval of the engineer, furnish a treated test pile. Any additional costs for such treated pile shall be borne by the contractor.

The location of each test pile for each specified substructure unit shall be determined by the engineer. Unless otherwise specified, the test piles shall be driven at such locations as will permit their use in the finished structure.

Test piling shall be driven under conditions similar to those prevailing for the foundation or trestle piling. The contractor shall excavate the site of each test pile to the elevation of the bottom of the footing before driving test piles, and in case of trestle bents the site of each of the several test piles shall be thus excavated to the elevation of the finished ground line.

Test piling shall be driven to the bearing and penetration determined by the engineer.

Except when incorporated in the structure as foundation or trestle piling, test piling shall be removed down to at least two feet below stream bed or finished ground line.

The cutoff of a timber test pile shall be considered the property of the Division until all timber piling under the contract have been driven.

508.3.3 Equipment for Driving.

508.3.3.1 General. Equipment used in driving test piling, foundation piling, or trestle piling shall be in accordance with the requirements hereinafter set forth. Gravity hammers shall be used only when permitted by the engineer.

For driving piling which are required to be driven to refusal, the size or energy rating of the hammer shall conform to the requirements for driving piling to bearing values equivalent to the design bearing values shown on the plans.

508.3.3.2 Gravity Hammers. The contractor shall furnish, at the request of the engineer, a certified scale weight of the gravity hammer he proposes to use.

A gravity hammer shall weigh not less than 3000 pounds for driving piles to required bearing values up to 35 tons per pile, not less than 4000 for required bearing values up to 50 tons per pile, and not less than 5000 pounds for required bearing values over 50 tons per pile.

The fall of a gravity hammer shall be so regulated as to avoid injury to the pile, preferably not to exceed ten feet, and in no case shall it exceed 15 feet.

The load line shall be mounted on a free drum.

508.3.3.3 Air, Steam or Diesel Hammers. The contractor shall furnish, when requested by the engineer, the following authentic data for the hammer he proposes to use:

For air or steam hammers, the weight of the ram, the stroke of the ram, the rated energy of the hammer in foot-pounds per blow, and the number of blows per minute at the rated energy.

For diesel hammers, the weight of the ram, the maximum rated energy of the hammer in foot-pounds per blow, and the normal number of operating blows per minute.

The hammer used on the work shall have an energy rating in foot-pounds per blow of not less than the value of E in the following formula, except that in no case shall the rated energy be less than 7200 foot-pounds per blow:

$$E = 0.15\ P$$

In which:

P = Required bearing of pile in pounds.

The maximum energy rating furnished by the manufacturer for diesel hammers shall be reduced by 25 percent for the purpose of complying with the foregoing formula.

The hammer, when driving to required bearing, shall operate at the rate of blows per minute, or within the range of the rate, as recommended by the manufacturer.

508.3.3.4 Leads. Leads shall be required for all types of hammers. In general, pile driver leads shall be constructed in such a manner as to afford freedom of movement to the hammer, and they shall be held in position by guys or stiff braces to insure support to the pile during driving.

Swinging leads shall be so rigged that the travel of the hammer is maintained in line with the axis of the pile and that they afford adequate support to drive the pile within the tolerance of accuracy set forth elsewhere in the specifications.

Piles driven that are not within the specified tolerance of accuracy shall be subject to removal and replacement by the contractor at his own expense.

Inclined leads shall be used in driving batter piles.

Except where piles are driven through water, the leads shall be of sufficient length so that a follower will not be required.

508.3.3.5 Followers. The driving of piles with followers shall be limited to driving through water and shall be done only with the permission of the engineer. When followers are used, one pile from each group of ten shall be a pile of sufficient length to be driven without a follower and shall be used to determine the average bearing capacity of the group. The extra length of this pile over the normal ordered length shall be furnished by the contractor at his own expense. At the option of the contractor, in lieu of furnishing extra length piling, piles may be driven through water with approved under water driving hammers.

508.3.3.6 Water Jets. When water jets are used, the number of jets and the volume and pressure of water at the jet nozzle shall be sufficient to freely erode the material adjacent to the pile. The plant shall have sufficient capacity to deliver at all times at least 100 pounds per square inch pressure at each of two 3/4-inch jet nozzles while both are in operation. Before the desired penetration is reached, the jets shall be withdrawn and the piles shall be driven with the hammer to secure the final penetration and bearing.

Water jets shall not be used while driving piling through roadway embankments.

508.3.3.7 Caps. The heads of all piles shall be protected by a cap of approved design which fits into a casting which in turn supports a timber shock block. Such a cap shall have an area not less than that of the head of the pile and shall be so constructed as to distribute the blow of the hammer throughout the cross section of the pile and thus avoid, as far as possible, the tendency to split or shatter the pile.

508.3.3.8 Collars. Collars or bands to protect piles against splitting or brooming shall be provided where necessary.

508.3.4 Storing and Handling. The method of storing and handling shall be such as to avoid injury to the piles. Special care shall be taken to avoid breaking the surface of treated piles. Chains, cant hooks, dogs, pike poles or other pointed tools shall not be used. Cuts or breaks in the surface of treated piling shall be carefully trimmed and then covered with three applications of hot creosote oil followed by one application of a cold mixture of 80 percent creosote oil and 20 percent coal-tar pitch, Type A. The creosote oil and coal-tar referred to above shall meet the requirements of Subsection 507.2.3. All bolt holes shall be filled with hot creosote oil, under pressure by means of an approved pressure bolt hole treater.

508.3.5 Driving.

508.3.5.1 General. Except as otherwise specified, piling shall be driven with a gravity hammer, when permitted, single-acting hammer (air or steam), double-acting hammer (air or steam), differential-acting hammer (air or steam), diesel hammer, or with the combination of water jet and hammer.

The contractor shall coordinate his pile driving and concrete placement operations in such a manner that no damage or displacement will occur to concrete masonry in any substructure unit as a result of pile driving operations in any other unit.

Foundation or trestle piles shall not be driven for a given substructure unit until the excavation therefor or thereat is complete. Any material forced up within the limits of the footing shall be removed to correct elevation before placing masonry in that footing and the

contractor shall receive no compensation for the removal of such material.

Piles shall be driven with a variation of not more than 1/4-inch per foot from the vertical or from the batter shown on the plans, except that piles for trestle bents shall be so driven that the cap may be placed in its proper location without inducing excessive stresses in the piles, and foundation piles shall not be out of the position shown on the plans more than six inches after driving.

Pile tips shall be tapered to a point not less than four inches square.

Piles shall be driven so that the cutoff is not less than eight inches.

Followers shall not be used to drive piling except as provided for piling driven through water.

Foundation and trestle piling shall not be spliced.

All foundation or trestle piles raised by the driving of adjacent piles shall be driven down again when so required by the engineer.

All damaged or misplaced piles shall be corrected at the contractor's expense by either removing and replacing the pile or by driving a second pile adjacent to the damaged or misplaced pile, as approved by the engineer.

508.3.5.2 Bearing Value. Piles shall be driven to a bearing value not less than that shown on the plans.

Theoretical bearing values shall be computed according to the following formulae:

$$P = \frac{2WH}{S + 0.5} \quad \text{for gravity hammers}$$

$$P = \frac{2E}{S + 0.2} \quad \text{for air, steam or diesel hammers}$$

In which:

P = Safe bearing value in pounds.

W = Weight of ram or striking parts of hammer in pounds.

H = Height of fall of ram or striking parts of hammer in feet.

S = The average penetration in inches per blow for the last five to ten blows for gravity hammers and the last ten to 20 blows for air, steam or diesel hammers.

E = Energy in foot-pounds per blow.

Wherein:

For single-acting air or steam hammers, E = H W.

For double-acting or differential-acting air or steam hammers, E shall equal the manufacturer's rated energy per blow of the hammer operating at the designated number of blows per minute.

For diesel hammers with unrestricted rebound of the ram, E = H W. Such hammers shall have an attached gage for measuring H.

For diesel hammers which have the ram enclosed, E shall be the average equivalent energy in foot-pounds as determined by a gage attached to the hammer and recorded during the period when the average penetration per blow is recorded. Hammers of this type shall be provided with a gage and applicable charts which will evaluate the equivalent energy being produced under any driving condition.

The above formulae are applicable only when:

The gravity hammer has a free fall.

The head of the pile is not broomed or crushed.

The penetration is reasonably quick and uniform.

No follower is used.

There is no noticeable bounce after the blow. When there is a noticeable bounce, twice the height of the bounce shall be deducted from H to determine its value in the above formulae.

The bearing values of piles as determined by the foregoing formulae shall be considered effective only when they are less than the crushing strengths of the piles. The character of the soil penetrated, conditions of driving, the distribution, sizes and lengths of the piles involved, and the computed load per pile shall be given due consideration in determining the reliability of driven piles.

In case water jets are used in connection with the driving, the bearing value shall be determined by the above formulae from the results of driving after the jets have been withdrawn.

508.3.5.3 Penetration. Piles shall be driven to not less than ten feet below the elevation of the stream bed or original ground in the case of pile bents or below the elevation of the bottom of footings or original ground, whichever is lower, in the case of foundation piling, unless otherwise specified on the plans or specifically permitted by the engineer in writing. Preboring required to achieve minimum penetration shall be measured and paid for as provided for the item of Preboring, Timber Piling.

508.3.5.4 Cutting Off Piles. After the driving of foundation or trestle piling for a given substructure unit is completed, the tops of all piling therein shall be sawed true to the plane shown therefor on the plans.

The sawed surface which results from making a preliminary cutoff on a treated pile in advance of the final cutoff thereof shall be treated with at least one application of hot creosote oil which meets the requirements of Subsection 507.2.3.

The sawed surface which results from making final cutoff on a treated pile shall receive the treatment set forth in Subsection 508.3.4 for cuts in treated piling, except that treated piles to be encased in concrete shall be treated with two applications of hot creosote oil and

the application of a cold mixture of creosote oil and coal-tar may be omitted.

All pile cutoffs except excess lengths ordered by the contractor to facilitate the work and extra lengths as required when followers are used, are the property of the Division. They shall remain the property of the Division until all timber piling under the contract have been driven.

508.3.5.5 Prebored Holes. When prebored holes are required by the plans or contract special provisions, the length or depth of holes shall be as shown on the plans. Unless otherwise directed, the diameter of the hole shall be approximately the same as the diameter of the pile. Bored holes, through roadway embankments, which exceed the diameter of the piling, shall be backfilled with sand after the piling has been driven.

508.3.6 Piling for Trestle Bents. In addition to the general requirements for timber piling, piling for trestle bents shall be subject to the following requirements:

The piles for any one bent shall be carefully selected as to size so that any undue bending or distortion of the sway bracing will be thereby avoided without cutting the piles.

The piles shall be driven as accurately as possible in the correct location and to the vertical lines or batter indicated on the plans. In case a pile is driven out of line, it shall be straightened without injury before it is cut off or braced. All piles damaged in straightening shall be removed and replaced at the contractor's expense. Tops of piles shall not be shimmed.

Suitable clamps shall be used on treated piles for the support of staging or other construction facilities, and under no circumstances shall such construction facilities be bolted, spiked, or nailed to treated piling.

A piece of sheet zinc of the dimensions and thickness indicated on the plans shall be placed on the top of each pile which is to receive a cap. Before placing the zinc, the top of the piling shall be treated with creosote as prescribed for treatment of cut surfaces in Subsection 508.3.4.

The tops of treated piling in wings shall be covered with alternate layers of hot coal-tar pitch, Type A, AASHO Designation: M 118, and coal-tar treated fabric conforming to Subsection 516.2.6, using four applications of pitch and three layers of fabric. The fabric cover shall measure at least six inches more in dimension than the diameter of the pile and shall be neatly folded down over the pile and secured in place with galvanized wire and large headed galvanized nails. At least seven wrappings of wire shall be placed around the piling, over the fabric. The wire shall be drawn tight and secured with galvanized nails or staples. The edges of fabric shall be neatly trimmed to line below the wire. The pitch shall be applied to the piling beneath the turned down wrapping as well as to the top, and the entire fabric completely mopped.

Holes bored in treated piling subsequent to preservative treatment shall be poured full (under pressure) of hot creosote oil.

A tight-fitting treated plug shall be inserted in all holes not used for bolts, rods, etc.

508.3.7 Salvaged Pile Cutoffs. During the progress of construction and prior to the ordering of the piling for a unit, the engineer may order the contractor to furnish any or all piling for the unit by driving suitable salvaged cutoffs that have accumulated under the contract. No compensation will be allowed for furnishing piling from salvaged cutoffs, except the compensation provided in Subsection 508.5.4 for preparing and pointing the pile for driving.

Upon completion of the driving of the timber piling under the contract, all cutoffs not salvaged and used in the work shall become the property of the contractor for his disposal.

508.4 Method of Measurement.

508.4.1 Untreated Timber Test Piling. The item Untreated Timber Test Piling shall be measured as a unit complete in place in accordance with the contract, and each unit measured for payment shall consist of the number and length of untreated timber test piling designated on the plans, and required to be furnished for the structure.

508.4.2 Treated Timber Test Piling. The item Treated Timber Test Piling shall be measured as a unit complete in place in accordance with the contract, and each unit measured for payment shall consist of the number and length of treated timber test piling designated on the plans, and required to be furnished for the structure.

508.4.3 Timber Piling, Delivered. Treated and untreated timber piling, delivered will be measured by length in linear feet. The quantity to be paid for shall be the summation of the nominal lengths of piling ordered by the engineer on the basis of test piling driven. In no case will additional lengths, ordered by the contractor to facilitate the work, be measured for payment. Test piles which are incorporated in the finished work as foundation or trestle piling will not be measured as a part of nor included in the item of Timber Piling, Delivered or Timber Piling, Driven.

Where piling are driven through water and one pile in each group of ten is required to be extra long to determine bearing capacity of the group, the extra length of this pile over the nominal ordered length for the group shall not be measured for payment.

508.4.4 Timber Piling, Driven. Treated and untreated timber piling, driven, accepted and incorporated in the work in accordance with the contract, will be measured by length in linear feet.

In the case of foundation or bearing piling the quantity measured for payment shall be the summation of the lengths left in place below cutoff.

In the case of piling for trestle bents, shear booms and pile clusters, the quantity measured for payment shall be the summation of the

lengths left in place below the ground surface as it existed before driving started. For timber abutments, the ground surface shall be construed to be the bottom of excavation for timber backing. For trestle bents, the ground surface shall be construed to be the existing or constructed stream bed.

508.4.5 Preboring, Timber Piling. Holes designated on the plans or specified in the special provisions to be prebored, except holes for test piling, shall be measured separately by the linear foot of the length or depth of the hole, completed and accepted.

508.5 Basis of Payment.

508.5.1 Untreated Timber Test Piling. This item, measured as provided above, will be paid for at the contract lump sum price for Untreated Timber Test Piling, which price shall be payment in full for all excavation necessary to drive such test piling which is not included within the limits of Excavation for Structures, for preboring (when specified), for furnishing and driving the test piling, for removing as above described the test piling which is not incorporated in the structure as foundation or trestle piling, for cutting off the test piling which is so incorporated, for disposal regardless of the length thereof of the removed piles or pile cutoffs, as the case may be, which are not salvaged and used in the work and for furnishing all equipment, tools, labor and incidentals necessary to complete the work in accordance with the contract.

508.5.2 Treated Timber Test Piling. This item measured as provided above, will be paid for at the contract lump sum price for Treated Timber Test Piling, which price shall be payment in full for all excavation necessary to drive such test piling which is not included within the limits of Excavation for Structures; for preboring (when specified), for furnishing, driving and cutting off the test piling; for removal of any test piling not incorporated in the finished structure; for disposal regardless of the length thereof of the removed piles or pile cutoffs, as the case may be, which are not salvaged and used in the work; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work in accordance with the contract.

508.5.3 Timber Piling General. The following provisions covering basis of payment provide for all adjustments in compensation in the items of Timber Piling, Delivered and Timber Piling, Driven, Treated or Untreated, as the case may be, and the items shall not be subject to adjustment in compensation elsewhere specified for increased or decreased quantities.

508.5.4 Timber Piling, Delivered. The quantity, measured as provided above, shall be paid for at the contract unit price per linear foot for Timber Piling, Delivered, Treated or Untreated, as the case may be, adjusted in accordance with the following schedule based on

the relationship between the length of piles as indicated on the plans (Plan Length) and the length as ordered by the engineer after driving the test piling (Ordered Length). The adjusted contract unit price shall be full compensation for furnishing, treating if required and delivering, ready for driving, acceptable piling for the work.

Plan Length	Ordered Length	Basis of Payment
Less than 25'	Less than 25'	Contract Unit Price
Less than 25'	25' to 50'	90% of Contract Unit Price
Less than 25'	More than 50'	105% of Contract Unit Price
25' to 50'	Less than 25'	110% of Contract Unit Price
25' to 50'	25' to 50'	Contract Unit Price
25' to 50'	More than 50'	115% of Contract Unit Price
More than 50'	Less than 25'	95% of Contract Unit Price
More than 50'	25' to 50'	85% of Contract Unit Price
More than 50'	More than 50'	Contract Unit Price

The preparing and pointing of salvaged pile cutoffs, designated by the engineer to be used for piling, will be paid for at a price per piling so prepared, arrived at by multiplying the contract unit price for Timber Piling, Delivered, Treated or Untreated, as the case may be, by five, which price shall be payment in full for furnishing all labor, tools, equipment and incidentals necessary to prepare the salvaged pile cutoff for driving.

508.5.5 Timber Piling, Driven. The quantity, measured as provided above, shall be paid for at the contract unit price per linear foot for Timber Piling, Driven, Treated or Untreated, as the case may be, which price shall be full compensation for preparing, framing, driving and cutting off piling; for disposing of pile cutoffs not salvaged and used in the work; for treating cuts and abrasions; for removing and disposing of upheaved material; and for furnishing all equipment, tools, labor and incidentals necessary to complete the work.

508.5.6 Preboring, Timber Piling. The quantity, measured as provided above, shall be paid for at the contract unit price per linear foot which price shall be full compensation for boring, for furnishing and placing necessary backfill material, for disposal of all material excavated by boring, and for furnishing all labor, tools, equipment and incidentals necessary to complete this item of work.

When the item of Preboring, Timber Piling is not an item in the contract, but is subsequently found necessary and required by the engineer, then all work connected with performing such required preboring shall be considered and paid for as Extra Work.

This item shall not be subject to adjustment in compensation as elsewhere set forth in the specifications for increased or decreased quantities.

SECTION 509. (Blank)

SECTION 510. CAST-IN-PLACE CONCRETE PILING

510.1 Description. This work shall consist of furnishing, driving, including preboring if required, splicing if necessary, cutting off and painting if necessary, metal piling shells; of furnishing, placing, curing and protecting the concrete cores within the shells; and placing the bar steel reinforcement in the top of the cast-in-place concrete trestle piling or cast-in-place concrete foundation piling, as the case may be, all in accordance with the requirements of the plans, specifications and the contract.

510.2 Materials.

510.2.1 General. Materials used in the work shall conform to the requirements specified for the class of material named.

Specific reference is made to the following:

Concrete Masonry ---------- Section 501
Steel Reinforcement ---------- Section 505
Paint ---------- Section 517

The concrete cores shall be constructed with Grade A concrete.

510.2.2 Steel Pile Shells.

510.2.2.1 General Requirements. The steel pile shells shall have the outside diameter at the butt called for on the plans, and shall be either cylindrical or tapered, and be of spiral welded, straight-seam welded or seamless tube type having a minimum nominal shell thickness of 0.188 inch, or be fluted steel shells having a minimum shell thickness of not less than 0.1793 inch, unless otherwise specified on the plans or in the contract special provisions.

All pile shells shall have sufficient strength and rigidity to withstand driving to the required penetration and bearing and be substantially watertight. Unless otherwise specified on the plans or in the contract, all pile shells shall be equipped with approved conical driving points or attached plate ends.

Only one type and manufacturer's brand of pile shell shall be permitted throughout a structure unless otherwise permitted by the engineer.

The portion of the outside of steel pile shells which will be exposed in the completed work shall have a shop or prime coat of paint applied according to and meeting the requirements of Subsection 510.3.6.

Steel pile shells which will not be exposed in the finished work need not be painted.

510.2.2.2 Material Requirements.

510.2.2.2.1 Cylindrical Type. The pile shells shall be made from steel conforming to the requirements of the Specification for Welded and Seamless Steel Pipe Piles, ASTM Designation: A 252, Grade 2, or an approved alternate.

510.2.2.2.2 Tapered, Fluted Type. The material in the pile shell shall comply with S.A.E. Steel Specifications having the following chemical ranges and limits:

	Percent
Carbon	0.08-0.13
Manganese	0.30-0.60
Sulphur, Maximum	0.05
Phosphorous, Maximum	0.04

The minimum tensile yield strength of the steel in the fabricated pile shall be 50,000 pounds per square inch.

510.2.2.3 Sampling and Testing. Unless otherwise required in the contract, the contractor shall submit to the engineer at the time of delivery of the pile shells a manufacturer's Certified Report of Test or Analysis showing that the pile shells conform to the above requirements. The delivered shells shall bear markings identifying them with the applicable test report or, in the absence of such identification, the contractor shall certify that the delivered shells are from the same lot as represented by the test report.

510.3 Construction Methods.

510.3.1 Ordering Pile Shells. Estimated lengths of piling shown on the plans shall be considered as approximate only and as having been determined for design and estimating purposes from a few soil soundings taken at the site. The contractor shall be entirely responsible for furnishing cast-in-place piles of sufficient lengths to obtain the required penetration and specified bearing for each pile.

510.3.2 Shell Lengths and Splices. Unless otherwise required in the contract, and except for piling made from cutoffs by permission of the engineer, all steel shells for cast-in-place concrete piling up to 50 feet in length shall be furnished with not more than three shop or field welded splices, and pile shells over 50 feet in length shall be furnished with not more than four shop or field welded splices.

Splices in piles shown on the plans as subject to bending moment shall be welded in accordance with the requirements of the American Welding Society's Structural Welding Code, D 1.1-72 (Revised-73), as amended by the AASHO Standard Specifications for Welding of Structural Steel Highway Bridges, dated 1974, by welders currently certified by the Wisconsin Department of Industry, Labor and Human Relations or other approved agency.

Splices in other piles shall be welded in accordance with the requirements of the American Welding Society's Structural Welding Code, D 1.1-72 (Revised-73) as amended by the 1974 AASHO amendments, except that qualification of welders according to Paragraph 5.3 is not required nor is certification by the Wisconsin Department of Industry, Labor and Human Relations or other approved agency required. In lieu of such qualification and certification, the engineer shall determine that a welder has the ability to produce satisfactory work using the electrode, joint configuration and position of welding prescribed.

The welding of the joint shall be such as to form an integral pile shell adequate in strength to withstand driving, that is watertight and that meets the approval of the engineer.

510.3.3 Equipment for Driving. The equipment used in driving metal shells for trestle piling or foundation piling shall meet the requirements set forth in Section 508.

510.3.4 Driving.

510.3.4.1 General. The pile shells shall be driven with a variation of not more than 1/4-inch per foot from the vertical or from the batter indicated on the plans, except that piles for trestle bents shall be so driven that the cap may be placed in its proper location without inducing excessive stress in the piles and that the piles in each row appear substantially in alignment. Foundation piles shall not be more than six inches out of the position shown on the plans after driving.

The metal pile shells shall not be driven for a given substructure unit until the excavation therefor is complete.

The contractor shall coordinate his pile driving and concrete placement operations in such a manner that no damage or displacement will occur to concrete masonry in any substructure unit as a result of pile driving operations in any other unit.

The top of the metal pile shell when being driven shall be protected from damage by means of a suitable driving head.

After driving, the shells shall remain substantially watertight until placement of concrete therein. All shells which suffer breaks, bends or kinks which are the result of handling or driving or which are damaged by reason of internal defects and which in the opinion of the engineer are unsuitable for use shall be removed, at the contractor's expense, and replaced. In lieu of removing and replacing, at the engineer's option, a

second pile may be driven adjacent to the damaged pile, if this can be done without detriment to the structure.

The contractor shall have available at all times before the shells are filled with concrete a suitable light for inspecting the entire length inside the driven shell.

Insofar as practicable all pile shells required for a given substructure unit shall be driven prior to placing concrete cores in any of the shells in said unit. Driving of pile shells will not be permitted within a radius of 15 feet of any concrete filled pile shell until the concrete has cured for at least seven days, or three days, if using High-Early-Strength Concrete.

Driving of any pile shell will not be permitted after the shell has been filled with concrete.

510.3.4.2 Bearing Value. The shells for cast-in-place concrete piling shall be driven to a bearing value of not less than that shown on the plans.

Unless otherwise provided in the contract, the bearing value of each individual pile shell shall be determined as set forth in Section 508 for timber piling.

510.3.4.3 Penetration. The shells for cast-in-place concrete piling shall be driven to the minimum penetration set forth in Section 508 for timber piling. Preboring required to achieve minimum penetration shall be measured and paid for as provided for the item of Preboring, Cast-in-Place Concrete Piling.

510.3.4.4 Cutting Off Shells. Upon completion of the driving of the metal shell and prior to the placing of the concrete core therein, the shell shall be cut off at the elevation called for on the plans by means of a saw or cutting torch.

Delivered or driven lengths of steel pile shells may, when necessary, be spliced and extended with suitable cutoffs. No separate or additional compensation will be allowed for splicing.

The engineer may permit the contractor to produce pile lengths by splicing together suitable cutoffs, except that cutoffs less than five feet in length shall not be used to fabricate such piling. No separate or additional compensation will be allowed for furnishing a pile shell fabricated from cutoffs, or for furnishing and attaching of the conical point or end plate.

All pile shell cutoffs are the property of the contractor and any cutoffs not used in the work shall be disposed of by the contractor.

510.3.4.5 Prebored Holes. When prebored holes are required by the plans or contract special provisions, the length or depth of holes shall be as shown on the plans. Unless otherwise directed, the diameter of the hole shall be approximately the same as the diameter of the pile. Bored holes, through roadway embankments, which exceed the diameter of the piling, shall be backfilled with sand after the piling has been driven.

510.3.5 Concrete Cores. Except as provided herein, the placing, protection and curing of the concrete cores shall conform to the requirements set forth in Section 501.

Any accumulated water or other foreign material shall be removed from inside the shell before placing the concrete therein.

After the pile shells have been inspected and approved by the engineer, the concrete shall be deposited in each shell in one continuous operation in a manner and at such moderate rate as to avoid formation of air pockets. The use of a tremie or downspout within the shell will not be required. The concrete shall completely fill the shell and shall be satisfactorily compacted by a mechanical vibrator or by other methods satisfactory to the engineer for as great a depth below the top as is practicable.

Steel reinforcement shall be placed in the concrete core as called for on the plans and shall be in place when the level of concrete placement reaches the elevation of the lower limits of the reinforcement.

The concrete shall not be placed in shells within a radius of 15 feet of driving operations of other shells. In the event it is necessary to place concrete within the above limits, the driving operations shall cease and shall not be resumed until such concrete has cured for at least seven days or three days when High-Early-Strength Concrete is used.

510.3.6 Painting. Portions of the completed trestle or other exposed piling above finished ground or water line shall be given one shop or prime coat and three field coats of paint, however, the shop or prime coat shall extend from the top of the driven pile to a point not less than four feet below the finished ground line or stream bed. The shop or prime coat may be applied in the field, but must be applied before driving.

The paint and painting shall conform to the requirements of either System I or System II paints as set forth in Subsection 517.2.4, Structural Steel Paint. The system used shall be the system specified or selected for the remainder of the steel, if any, in the structure, except that when the shop or prime coat is applied on rusty metal or in the field, only Type I or Type II red lead paint of System I can be used, but subsequent coats shall conform to the appropriate system.

Before painting, the surface of the metal shall first be thoroughly cleaned of rust or scale by wire brushing, and any oil or other substances which might inhibit adhesion of the paint film shall be removed.

510.4 Method of Measurement.

510.4.1 Cast-in-Place Concrete Piling, Delivered and Driven. The item Cast-in-Place Concrete Piling, Delivered and Driven, (Size), shall be measured by the linear foot, and the quantity to be paid for shall be the summation of the lengths of piling, delivered, accepted and incorporated in the work in accordance with the contract.

The quantity measured for payment shall be the summation of the lengths left in place below cutoff.

Steel reinforcement incorporated in the concrete core will be measured for payment according to the requirements of Subsection 505.4.

510.4.2 Preboring, Cast-in-Place Concrete Piling. Holes designated on the plans or specified in the special provisions to be prebored shall be measured separately by the linear foot of the length or depth of the hole, completed or accepted.

510.5 Basis of Payment.

510.5.1 Cast-in-Place Concrete Piling, Delivered and Driven. The item Cast-in-Place Concrete Piling, Delivered and Driven, (Size), measured as provided above shall be paid for at the contract unit price per linear foot, which price shall be payment in full for fabricating, furnishing, and delivering acceptable pile shells; for preparing, driving, splicing and cutting off metal shells; for disposal of cutoffs not used; for field painting, when required; for furnishing, placing, curing and protecting the concrete cores; and for furnishing all labor, equipment, tools and incidentals necessary to complete the work in accordance with the contract.

Steel reinforcement incorporated in the concrete core shall be paid for as provided in Subsection 505.5.

This item shall not be subject to adjustment in compensation as elsewhere set forth in the specifications for increased or decreased quantities.

510.5.2 Preboring, Cast-in-Place Concrete Piling. The quantity measured as provided above, shall be paid for at the contract unit price per linear foot which price shall be full compensation for boring, for furnishing and placing necessary backfill material, for disposal of all material excavated by boring, and for furnishing all labor, tools, equipment and incidentals necessary to complete this item of work.

When the item of Preboring, Cast-in-Place Concrete Piling is not an item in the contract, but is subsequently found necessary and required by the engineer, then all work connected with performing such required preboring shall be considered and paid for as Extra Work.

This item shall not be subject to adjustment in compensation as elsewhere set forth in the specifications for increased or decreased quantities.

SECTION 511. STEEL PILING

511.1 Description. This work shall consist of furnishing, driving, cutting off, splicing if necessary, and painting if required, steel

foundation piling or steel trestle piling, as the case may be, all in accordance with the requirements of the plans and the specifications.

511.2 Materials. Materials used in this work shall meet the requirements for the class of material named and as provided in the specifications.

Specific reference is made to the following:

Structural Carbon Steel ---------- Subsection 506.2
Paint ---------- Section 517

Unless otherwise directed by the engineer, the contractor shall submit at the time of delivery of the steel piling the mill inspection and test reports as specified for structural steel under Subsection 506.3.21.

511.3 Construction Methods.

511.3.1 Ordering Piling. Estimated lengths of piling shown on the plans shall be considered as approximate only and as having been determined for design and estimating purposes from a few soil soundings taken at the site. The contractor shall be entirely responsible for furnishing steel piles of sufficient lengths to obtain the required penetration and specified bearing for each pile.

511.3.2 Fabrication and Delivery. All steel foundation or trestle piling shall consist of the structural steel shapes shown on the plans and shall be fabricated and delivered in accordance with the requirements of Section 506, except as hereinafter provided. Required mill inspection and test reports shall be submitted to the engineer prior to driving the piling.

The portion of the steel piling which will be exposed in the completed work shall have a shop or prime coat of paint applied according to and meeting the requirements of Subsection 510.3.6.

Steel piling not exposed in the finished work need not be painted.

Except for piling made from cutoffs by permission of the engineer, lengths of steel piling up to and including 20 feet in length shall be furnished in one unwelded piece. Piling from 20 to 50 feet in length may have two field or shop splices and piling over 50 feet in length may be furnished with four splices, unless otherwise provided in the contract.

511.3.3 Equipment for Driving. Equipment for driving steel piling shall conform to the requirements set forth in Subsection 508.3.3 for equipment for driving timber piling. The head of the pile shall be cut squarely and a driving cap shall be provided to hold the axis of the pile in line with the axis of the hammer.

511.3.4 Driving.

511.3.4.1 General. Steel piling shall be driven as set forth in Subsection 508.3.5 for timber piling except as hereinafter provided.

511.3.4.2 Bearing Value. Piles shall be driven to a bearing value not less than that shown on the plans.

The bearing value for each individual pile shall be determined as set forth in Section 508 for timber piling.

511.3.4.3 Penetration. Steel piles shall be driven to the minimum penetration set forth in Section 508 for timber piling.

511.3.4.4 Splicing of Piles. Pile splices shall be made in accordance with the pertinent requirements set forth in Subsection 510.3.2.

The splice shall develop the full strength of the pile. In the event details for splices are incorporated in the plans, the splicing shall conform thereto.

No separate or additional compensation will be allowed for splicing.

511.3.4.5 Cutting Off Piles. After all piles in a unit have been driven, the top of the piles shall be cut off at the elevation and in accordance with the detail therefore shown on the plans.

511.3.4.6 Pile Cutoffs. Delivered or driven lengths of steel piling may, when necessary, be spliced and extended with suitable cutoffs.

The engineer may permit the contractor to produce pile lengths by splicing together suitable cutoffs, except that cutoffs less than five feet in length shall not be used to fabricate such piling. No separate or additional compensation will be allowed for furnishing a piling fabricated from cutoffs.

All pile cutoffs are the property of the contractor and any cutoffs not used in the work shall be disposed of by the contractor.

511.3.5 Painting. Portions of the completed trestle or other exposed piling above the finished ground or water line shall be given three field coats of paint applied according to and meeting the requirements of Subsection 510.3.6.

511.4 Method of Measurement. The item, Steel Piling, Delivered and Driven (HP Size Weight) shall be measured by the linear foot and, the quantity to be paid for shall be the summation of the lengths of piling delivered, accepted and incorporated in the work in accordance with the contract.

The quantity measured for payment shall be the summation of the lengths left in place below cutoff.

511.5 Basis of Payment. The item Steel Piling, Delivered and Driven (HP Size Weight), measured as provided above, shall be paid for at the contract unit price per linear foot, which price shall be payment in full for fabricating, furnishing and delivering acceptable piling; for preparing and driving; for splicing, cutting off and painting, when required, the steel piling; for removing upheaved material; for disposing of piling cutoffs not used in the work; and for furnishing all equipment,

tools, labor and incidentals necessary to complete the work in accordance with the contract.

This item shall not be subject to adjustment in compensation as elsewhere set forth in the specifications for increased or decreased quantities.

SECTION 512. STEEL SHEET PILING

512.1 Description. This work shall consist of furnishing, driving, cutting off and painting, if required, steel sheet piling which is designated by the plans or the contract as sheet piling to be left in place as a part of the completed work, all in accordance with the requirements of the plans and the specifications.

512.2 Materials. Materials used in this work shall meet the requirements for the class of material named and as provided in the specifications.

Specific reference is made to the following:

Paint ---------- Section 517

Steel sheet piling shall conform to the requirements of ASTM Designation: A 328 and shall have the section modulus designated on the plans or in the special provisions.

Unless otherwise provided, all sheet piling included in the item of Steel Sheet Piling shall be new material and shall not be used for any purpose, temporary or otherwise, prior to being driven in the location shown on the plans for such item.

Unless otherwise directed by the engineer, the contractor shall submit at the time of delivery of steel sheet piling the mill inspection and test reports as specified for structural steel under Subsection 506.3.21.

512.3 Construction Methods.

512.3.1 Driving and Cutting Off. Insofar as practicable, steel sheet piling shall be driven and cut off as provided for steel piling in Section 511.

512.3.2 Wales. Sheet piling shall be braced with waling strips as shown on the plans. Wales shall preferably be in one length between corners and shall be bolted to the piles.

512.3.3 Painting. Steel sheet piling shall be painted as specified for cast-in-place concrete piling in Subsection 510.3.6.

512.4 Method of Measurement.

512.4.1 Steel Sheet Piling, Delivered. The item Steel Sheet Piling, Delivered, shall be measured by the square foot, and the quantity to be

Two-ply work shall be started by mopping with hot bitumen a section of the surface at least two inches wider than half the width of the treated fabric. On this hot mopping a half width of fabric shall be laid. The top surface of the placed fabric and an adjacent section of the concrete surface at least two inches wider than half the width of the fabric shall then be mopped. On this mopping shall be laid a full width of fabric, completely covering the first strip. Thereafter, full widths of fabric shall be laid in hot mopping in such a manner that each strip will lap the second preceding strip by two inches. Each strip of fabric shall be stretched and pressed into the hot moppings to avoid creases and air bubbles and to bond the membrane to the concrete surface. Before completion of the day's work, the entire surface of the fabric placed shall be mopped with a final coat of hot bitumen. Each mopping of bitumen shall be so applied that it will completely cover and seal the fabric. The amount of bitumen used for each mopping shall be not less than 4-1/2 gallons for each 100 square feet of surface.

Three-ply membrane waterproofing shall be applied the same as two-ply, except that the first strip of fabric shall be a 1/3 width; the second a 2/3 width; and the third and succeeding strips full widths. The second full strip shall lap the first, or 1/3 width strip, at least two inches. Each succeeding strip shall lap the third preceding strip at least two inches.

Membrane waterproofing consisting of more than three plies shall be built up in shingle fashion similar to three-ply work by addition of as many layers of fabric and moppings of bitumen as required.

When so required in the contract, dampproofing and waterproofing shall be constructed with materials and by construction methods specified in the contract.

516.3.4 Asphalt Plank. Asphalt plank shall be handled and stored in such a manner as to avoid breakage or deformation. Any plank which becomes deformed or damaged shall not be laid.

Asphalt plank shall be laid in a mopping of hot asphalt (Subsection 516.2.2) spread at the rate of not less than 50 pounds per 100 square feet of area. The surface to be covered with plank shall, at the time of applying the asphalt, be free from dirt or other foreign material. The plank as laid shall have the edges coated with asphalt and shall be laid tight against each other. After all plank have been laid, any joints not completely filled shall be filled with hot asphalt.

If the air temperature at the time of laying the plank is less than 45 F, the engineer may require that the planks be heated prior to laying by placing them in a room maintained at a temperature of at least 70 F.

516.4 Method of Measurement. Dampproofing, membrane waterproofing and asphalt plank, each, will be measured by the square yard complete in place and the quantity measured for payment shall be the summation of square yards of dampproofing, membrane

waterproofing or asphalt plank, as the case may be, completed and accepted in accordance with the contract.

516.5 Basis of Payment. These items, measured as provided above, will be paid for at the contract unit price per square yard for Dampproofing, Membrane Waterproofing, (Plies) or Asphalt Plank, as the case may be, which price shall be payment in full for furnishing all materials; for all transporting, handling and heating of materials; for placing treated fabric or asphalt plank, including the application of prime coats and moppings of hot bitumen; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

SECTION 517. PAINT AND PAINTING

517.1 Description. This work shall consist of furnishing paint materials and the application of paint to steel or timber structures, including structural steel, miscellaneous metal or lumber or timber parts of other structures. It shall include, unless otherwise provided in the contract, the preparation of the surfaces to be painted, the application, protection and drying of the paint coatings, the protection of traffic and property upon and in the vicinity of the structure, the protection of all portions of the structure against disfigurement by paint or paint materials and the supplying of all equipment, tools, tackle, scaffolding, labor, materials and incidentals necessary to complete the work in accordance with the requirements of the specifications and the contract.

These specifications also include the requirements for Structure Maintenance Painting.

517.2 Materials.

517.2.1 General Requirements. All paints used in the work shall conform to the requirements specified for the type of paint named.

Paint furnished shall be factory mixed, except aluminum paint used in System I.

Paints shall be well ground, shall not settle badly or cake in the container, and shall be readily broken up with a paddle to a smooth, uniform paint of good brushing consistency which shall dry without streaking, wrinkling, running or sagging when painted on smooth vertical surfaces. Prime and undercoats shall dry to a dull gloss and finish coats to a full gloss. If required, colors and hiding powers shall be equal to those of samples furnished by the Division. The proportions specified in the formulae are by weight, unless otherwise indicated in the requirements for specific paint.

517.2.2 Containers. Generally, paint shall be packaged in strong, tight, standard commercial, metal containers of five US standard gallons capacity, except for the fractional parts of five-gallon units. Such fractional parts shall be one US standard gallon capacity metal

containers. Where mechanical means for mixing and stirring are provided at the job-site, paint may be furnished in 30-gallon metal containers.

Each container shall be plainly marked with the name and address of the manufacturer, the type of paint contained and the date of manufacture. Containers shall have tight fitting covers so arranged that the inspector may attach wire-lead seals.

Except as hereinbefore provided for mixing of paint by mechanical means, the mixing of paint on the job shall be in containers having a capacity of not more than 15 gallons.

517.2.3 Inspection, Sampling and Testing. Paints used on construction projects will normally be sampled in the field, although the Division reserves the right to inspect and sample the ingredients or finished product at the point of manufacture. Paints purchased directly by the State will be sampled for approval either at their destination or at the point of manufacture as indicated either at the time that contracts are awarded or in the invitation for bids.

If paints under these specifications are required to be inspected at the point of manufacture, the manufacturer shall furnish, when requested, any formulae required to ascertain the ingredients before the paints are made. The inspector shall be afforded an opportunity to check the make-up and grinding of paint batches and shall be permitted to sample for test any or all batches. The manufacturer shall also furnish, when requested, any formulae required to ascertain specification conformance.

Representative samples of all ready-mixed paints shall be taken after the paints have been thoroughly mixed. For aluminum paint used in System I, separate samples of the pigment (1/4 pint) and of the vehicle (one pint) shall be taken. One container chosen at random from each lot or batch for each coat, or if a batch or lot exceeds 500 gallons, one container for each 500 gallon increment or fraction thereof, shall be considered representative. A one-pint sample shall be taken from such container in the presence of the inspector. The contractor or manufacturer shall be responsible for the thorough mixing of the paint in such container to insure the procurement of a sample representative of the paint contained therein. Field samples shall be taken only from paint that is on the job. Samples taken in fabricating shops shall be from containers of paint proposed for the specific item of work.

Tests shall be made in accordance with applicable standard methods of ASTM, AASHO or Federal Standard No. 141.

The sampling and testing requirements may be waived for quantities of five gallons or less of paint of any single formulation required for each project provided that the paint purchased is from stock which has demonstrated a satisfactory service record.

517.2.4 Structural Steel Paint. Unless otherwise required in the contract, the contractor, at his option, may furnish and apply paints

conforming to the requirements of either System I or System II, as hereinafter set forth, provided however, that the same System shall be used throughout the work.

517.2.4.1 System I.

517.2.4.1.1 General. System I shall consist of a prime or shop coat and a field coat of red lead paint and two field coats of aluminum paint.

517.2.4.1.2. Red Lead Paint.

517.2.4.1.2.1 General. Paint intended for use as a prime or shop coat and the first field coat on metals shall be red lead paint.

The field coat of red lead paint shall be tinted by the addition of 0.2 percent by weight of lampblack (paste in oil ASTM Designation: D 209) to the pigment content of the paint. This amount of lampblack is equivalent to approximately one-half ounce per gallon of paint.

Unless otherwise provided in the contract, it will be optional for the contractor to furnish and use one or another of the following types of paint provided, however, that the same type of paint is used for any one coat throughout the work.

517.2.4.1.2.2 Ready-Mixed Paint. Ready-mixed red lead paint shall conform to the requirements of the Specification for Red Lead Ready-Mixed Paint, AASHO Designation: M 72, for Types I, II or IV, unless otherwise provided.

517.2.4.1.3 Aluminum Paint. Aluminum paint intended for use for second and third field coats on metals, shall be made with aluminum pigment paste and varnish vehicle conforming to the requirements of the Specification for Aluminum Paint, AASHO Designation: M 69, Type I, except that the pigment paste for the second field coat (first aluminum) shall be non-leafing. The pigment and the vehicle shall be furnished separately. The paint made therefrom shall be mixed the same day it is to be used, in the proportion of two pounds of pigment paste to one gallon of vehicle.

The second field coat (first aluminum) shall be tinted by the addition of Paste in Oil, as contained in the Specification for Iron Blue, ASTM Designation: D 261, in the proportion of three ounces to the gallon of vehicle.

517.2.4.2 System II.

517.2.4.2.1 General. System II shall consist of a prime or shop coat and a field coat of basic lead silico chromate paint; a second field coat of aluminum basic lead silico chromate paint and a third field coat of aluminum paint.

517.2.4.2.2 Shop or Prime Coat.

517.2.4.2.2.1 General. Paint intended for use as a prime or shop coat on metals shall be basic lead silico chromate meeting the requirements of the Standard Specification for Basic Lead Silico Chromate, Ready-Mixed Primer, AASHO Designation: M 229, Type II.

517.2.4.2.3 First Field Coat-Maroon.

517.2.4.2.3.1 General. Paint intended for use as a first field coat shall be basic lead silico chromate paint.

517.2.4.2.3.2 Composition and Properties.

Pigment	Min.	Max.
Basic lead silico chromate (ASTM Designation: D 1648) % by weight	64.0	
Siliceous red iron oxide (85% min. Fe_2O_3)*. % by weight	—	35.5
Organo Montmorillonite, % by weight	0.5	0.7

*No calcium sulfate permitted.

Liquid. The liquid shall consist of not less than 72 percent nonvolatile vehicle, the balance to be combined drier and mineral spirits. The nonvolatile vehicle shall be composed of raw linseed oil (ASTM Designation: D 234) and alkyd resin combined in the approximate proportions of 2:1 respectively by weight and shall contain a minimum of 7.6 percent phthalic anhydride. The alkyd resin, furnished as a solution, shall meet the requirements of Federal Specification TT-R-266, Type I, Class A or B. Small quantities of grinding and wetting aids may be used if desired.

Finished Paint	Min.	Max.
Pigment, % by weight	62.0	–
Vehicle, % by weight	–	38.0
Weight per gallon, lbs.	14.8	–
Water, % by weight	–	0.5
Coarse particles and skins (total residue retained on No. 325 sieve based on paint), % by wt.	–	1.0
Fineness of grind (North Standard)	4	–
Consistency (Stormer): Krebs units	74	84
Grams	160	215
Drying time: Set to touch, hours	–	6
Dry through, hours	–	24

517.2.4.2.4 Second Field Coat—Ready-Mixed Non-Leafing Aluminum.

517.2.4.2.4.1 General. Paint intended for use as a second field coat shall be basic lead silico chromate aluminum for use under an aluminum finish coat.

517.2.4.2.4.2 Composition and Properties. Pigment. The pigment shall be composed of:

	Min.	Max.
Basic lead silico chromate (ASTM Designation: D 1648), % by weight	43.0	–
Non-leafing aluminum flake, supplied in paste form (AASHO Designation: M 69, except for leafing), % by weight	–	56.0
Organo Montmorillonite, % by weight	0.8	1.0

Liquid. The liquid shall consist of not less than 45.0 percent nonvolatile vehicle, the balance to be combined drier and mineral spirits including that carried by the non-leafing aluminum paste. The nonvolatile vehicle shall be an alkyd resin, furnished as a solution, meeting the requirements of Federal Specification TT-R-266, Type I, Class A or B.

Finished Paint	Min.	Max.
Pigment, % by weight	21.0	–
Vehicle, % by weight	–	79.0
Weight per gallon, lbs.	8.8	–
Water, % by weight	–	0.1
Coarse particles and skins (total residue retained on No. 325 sieve based on paint), % by weight	–	0.2
Viscosity (No. 4 Ford Cup), seconds	–	60
Drying time: Set to touch, hours	–	4
Dry hard, hours	–	24
Fineness of grind of basic lead silico chromate dispersion	4	–

The paint in a tightly sealed, full container shall show no gas pressure after 30 days storage at 75 F plus or minus 5.

The paint shall be prepared by dispersing the basic lead silico chromate and suspending agent in the vehicle before mixing in the aluminum paste.

The general composition of the formula shall be on the following basis:

One pound basic lead silico chromate.

Two pounds non-leafing aluminum paste (65 percent pigment).

One gallon alkyd resin solution and additional mineral spirits.

The second field coat (first aluminum) shall be tinted by the addition of Paste in Oil, as contained in the Specification for Iron Blue, ASTM Designation: D 261, in the proportion of three ounces to the gallon of paint.

517.2.4.2.5 Third Field Coat - Ready-Mixed Leafing Aluminum.

517.2.4.2.5.1 Composition and Properties.

Pigment. The pigment shall be entirely leafing aluminum flake in paste form (65 percent pigment), meeting all requirements for coarse particles and leafing of Federal Specification TT-P-320a, Type II, Class B, latest revision.

Liquid. The liquid shall consist of an alkyd resin solution meeting all requirements of Federal Specification TT-R-266, Type I, Class A, along with mineral spirits and drier. The liquid shall consist of not less than 44.0 percent nonvolatile vehicle, the balance shall be thinner and drier including that carried by the leafing aluminum paste.

The vehicle shall be formulated as follows:

Alkyd resin solution (TT-R-266, Type I, Class A)-------- 100 lbs.
Mineral spirits (ASTM Designation: D 235)---------- 40 lbs.

After accurately determining the acid number of the vehicle and before adding driers, four ounces of Alcoa stabilizer No. 5 (Aluminum Company of America) per acid number per 100 pounds of vehicle solids shall be added.

In lieu of Alcoa No. 5, Raybo 41-Spangle (Raybo Chemical Co., Huntington, West Va.) or an approved equal may be added in accordance with the manufacturers' instructions.

The vehicle, with stabilizer added, shall stand for at least 18 hours before mixing with the aluminum paste pigment. Driers shall not be added until after mixing the stabilized vehicle with the aluminum paste pigment.

The finished vehicle shall meet the following requirements:

	Min.	Max.
Viscosity, poises	0.85	1.25
Nonvolatile, % by weight	48.0	–
Water, % by weight	–	0.1

Preparation. The paint shall be made on the following basis:
two pounds of leafing aluminum paste (65 percent pigment) one gallon vehicle.

Finished Paint	Min.	Max.
Pigment, % by weight	13.0	–
Vehicle, % by weight	–	87.0
Weight per gallon, lbs.	8.0	–
Water, % by weight	–	0.1
Viscosity (No. 4 Ford Cup), seconds	40	55
Drying time: Set to touch, hours	1	4
Dry hard, hours	–	24

Working Properties. The resulting paint shall be smooth and uniform in appearance, free from skins or coarse particles and suitable for application by brush or spray.

Leafing. The paint, when flowed on a clean glass panel, supported at an angle of 45°, and then allowed to dry, protected from all drafts, for 24 hours at 75 F plus or minus 5, shall produce a film comparable in smoothness, color, luster and opacity to that of a similar film applied at the same time and in the same manner, using a standard comparison paint. The comparison standard shall be prepared by freshly mixing four ounces of aluminum paste meeting Federal Specification TT-P-320a, Type II, Class B, with one pint of long oil-alkyd varnish, conforming to Federal Specification TT-R-266a, Type I and having satisfactory leafing characteristics.

The paint in a tightly sealed, full container shall show no gas pressure after 30 days storage at 75 F plus or minus 5.

517.2.5 (Blank).

517.2.6 White Paint for Wood (Prime Coat).

517.2.6.1 Scope. This specification covers a ready-mixed, ready-to-apply paint intended for use as a primer in a two-coat system on highway signs and posts.

517.2.6.2 General Requirements. The paint shall not skin, liver, curdle or thicken materially in the container. It shall brush easily at package consistency and shall permit lapping without difficulty.

517.2.6.3 Composition and Properties.

Pigment		
% by volume in total nonvolatile portion of the paint		38-42
White lead, basic lead carbonate (ASTM D 81), basic lead sulphate (ASTM D 82) or mixture thereof, % by weight, min.	50	
Titanium dioxide (ASTM D 476), % min.	10	
Magnesium silicate, fibrous type, (ASTM D 605), % max.	40	
Matter soluble in water, % max.	1	
Vehicle		
Nonvolatile, % min.		58
Linseed oil, heat bodied (Fed. Spec. TT-L-201, Type II) (Gardner-Holdt viscosity, Z 4, min.), % min.	45	
Linseed oil, raw, (ASTM D 234) % max.	45	
Coumarone resin, *%	5-7	
Volatile, % max.		42
Drier and thinner (thinner shall be mineral spirits, turpentine, or a mixture thereof) (Thinner ASTM D 13 or D 235, Drier ASTM D 600, Class B).		
Karui reduction, % min.	275	
Finished Paint		
Water, % max.	1	
Viscosity, Krebs units, 77 F	90-100	
Drying Time		
Set to touch, hours, max.	6	
Ready for recoating, hours, max.	48	
Adhesion. After the paint has dried for 48 hours, press firmly over the surface several linear inches of scotch tape (one inch width) and then pull. The tape shall not pick up any of the primer.		

Bending. Brush one coat over a thoroughly cleaned steel panel (3" x 5") weighing 0.39 to 0.51 pounds per square foot. Allow paint to dry for 18 hours. Bake the panel for five hours (105-110 C) in a horizontal position in properly ventilated oven. Cool to 25 C plus or minus 2 for 15 minutes and bend over a 1/8-inch mandrel with the paint on the upper side. The paint film shall show no cracking or flaking when viewed with a magnification of 7.5x.

*A satisfactory synthetic resin chosen on the basis of the similarity of its properties to the properties of the Coumarone resin may be submitted if Coumarone resin cannot be furnished.

Absorption, inches, max.		0.5

Fill a one-half pint friction top can plug (diameter 5-1/2 cm.) level full with a portion of the thoroughly mixed sample and then place a 12.5 cm. No. 2 Whatman filter paper flat on the paint surface with its center over the center of the paint. Allow to remain at room temperature (70-90 F) for three hours. Then measure average radial distance on the filter paper from the edge of the area originally wetted by the paint to the farthest extent of the absorption of the vehicle.

517.2.7 White Paint for Wood (Final or Finish Coat).

517.2.7.1 Scope. This specification covers a ready-mixed, ready-to-apply, white paint for outdoor exposure, used for final coat of a three-coat system on marker posts, guard rails or similar wooden structures on construction projects, for finish coat in a two-coat system on traffic signs and posts and for finish coat in the maintenance painting of wooden structures.

517.2.7.2 Composition and Properties. The paint, except as otherwise permitted below for quantities of less than five gallons, shall conform to the following composition and properties:

Pigment, % min.		60
Titanium dioxide (ASTM D 476, Type I), % min.	40	
Zinc Oxide, (ASTM D 79), % min.	35	
Calcium Carbonate (ASTM D 1199, Type PC) % min.	15	
Magnesium silicate, fibrous type, (ASTM D 605), % min.	10	
Vehicle, % max.		40
Raw linseed oil, (ASTM D 234), % min.	59	
Bodied linseed oil, (Federal Specification TT-L-201, Type II), % min.	14	
Thinner (ASTM D 13 or ASTM D 235) and drier (ASTM D 600, Class B), % max.	27	
Finished Paint		
Water, % max.		1.0
Coarse particles, skins and other foreign matter (residue retained on a No. 325 sieve based on pigment), % max.		2.0
Weight per gallon, pounds, min.		13.5
Viscosity, Krebs units, 77 F		85-95
Drying time, hours, max.		18

517.2.7.2.1 Small Quantities. On construction projects requiring less than five gallons of paint for a three-coat application, the detailed

requirements of this specification may be modified as indicated below to facilitate local procurement:

The pigment portion may consist of opaque pigments of white lead or combinations of white lead, zinc oxide and titanium pigments, not less than 78 percent; and filler or extender pigments such as barytes (barium sulphate), asbestine or similar silicates, silica, carbonates, calcium sulphate, etc., not more than 22 percent. The vehicle portion may contain oils consisting of raw, boiled or bodied linseed oil, bodied tung oil or combination thereof and may include a maximum of 15 percent processed or chemically modified soya oil. Drying time shall be not more than 24 hours.

517.2.7.3 Preparation of Paint. This paint when applied as a prime (first) coat or second coat on wood may be prepared as follows:

First or Prime Coat. (Construction Projects). Paint, for the prime or first coat on new wood or on old paint in poor condition, may be prepared by the addition of boiled linseed oil and turpentine in the following quantities to the final or finish coat paint specified above:

For soft or weathered lumber: One gallon of boiled linseed oil and one pint of turpentine to each gallon of paint.

For resinous or dense surfaces: One-half gallon of boiled linseed oil and one quart of turpentine to each gallon of paint.

These represent the approximate ranges of additions. The actual proportions to be used shall be determined from the general characteristics of the wood upon which it is to be used, to yield a paint having the desired properties of penetration and coverage without running or dripping upon application.

Second Coat (Construction Projects). Paint for the second coat may be prepared by the addition of not more than one quart of boiled linseed oil and one pint of turpentine to the final or finish coat paint specified above.

Note: If raw linseed oil is used instead of boiled linseed oil in preparing paint for the prime coat or second coat, add 3/4 pint of drier to each gallon of raw linseed oil before using.

517.2.8 Yellow Paint for Wood (Prime Coat).

517.2.8.1 Scope. This specification covers a ready-mixed, ready-to-apply paint intended for use as a primer in a two-coat system on highway signs and posts.

517.2.8.2 General Requirements. The paint shall not skin, liver, curdle or thicken materially in the container. It shall brush easily at package consistency and shall permit lapping without difficulty.

517.2.8.3 Composition and Properties.

Pigment, % by volume in total nonvolatile portion of the paint		38-42
White lead, basic carbonate (ASTM D 81), basic lead sulphate (ASTM D 82) or mixture thereof, % by weight, min.	37.5	
Chrome yellow and/or chrome orange (ASTM D 211), % min.	12.5	
Titanium dioxide (ASTM D 476), % min.	10.0	
Magnesium silicate, fibrous type (ASTM D 605), % max.	40.0	
Matter soluble in water, % max.	0.5	
Vehicle		
Nonvolatile, % min.		58
Linseed oil, heat bodied (Fed. Specs. TT-L-201 Type II) (Gardner-Holdt viscosity, Z 4 min.), % min.	45	
Linseed oil, raw, (ASTM D 234), % max.	45	
Coumarone resin*, %	5-7	
Volatile, % max.		42
Drier and thinner (thinner shall be mineral spirits, turpentine or a mixture thereof) (thinner ASTM D 13 or D 235, Drier ASTM D 600, Class B).		
Kauri reduction, % min.		275
Finished Paint		
Water, % max.		1
Viscosity, Krebs units, 77 F		90-100
Drying time		
Set to touch, hours, max.		6
Ready for recoating, hours, max.		48

Adhesion. After the paint has dried for 48 hours, press firmly over the surface several linear inches of scotch tape (one inch width) and then pull. The tape shall not pick up any of the primer.

*A satisfactory synthetic resin chosen on the basis of the similarity of its properties to the properties of the Coumarone resin may be submitted if Coumarone resin cannot be furnished.

Bending. Brush one coat over a thoroughly cleaned steel panel (3" X 5") weighing 0.39 to 0.51 pounds per square foot. Allow paint to dry for 18 hours. Bake the panel for 5 hours (105-110 C) in a horizontal position in a properly ventilated oven. Cool to 25 plus or minus 2 C for 15 minutes and bend over a 1/8-inch mandrel with the paint on the upper side. The paint film shall show no cracking or flaking when viewed with a magnification of 7.5x.

Absorption, inches, max. ---------- 0.5

Fill a one-half pint friction top can plug (diameter 5-1/2 cm.) level full with a portion of the thoroughly mixed sample and then place a 12.5 cm. No. 2 Whatman filter paper flat on the paint surface with its center over the center of the paint. Allow to remain at room temperature (70-90 F) for three hours. Then measure average radial distance on the filter paper from the edge of the area originally wetted by the paint to the farthest extent of the absorption of the vehicle.

Color shall be Federal Highway Administration's highway yellow, PR color No. 1, Standard to Red Tolerance. A wet color standard will be furnished by the Division upon request.

517.2.9 Yellow Paint for Wood (Final or Finish Coat).

517.2.9.1 Scope. This specification covers a ready-mixed ready-to-apply yellow paint for outdoor exposure, used for final coat of a three-coat system on marker posts on construction projects, for finish coat in a two-coat system on traffic signs, and for finish coat in maintenance painting.

517.2.9.2 Requirements. The paint shall conform to the following requirements:

Pigment, % min.		34
Lead chromate (ASTM D 211), % min.	80	
Magnesium silicate (ASTM D 605), % max.	20	
Sulfides, sulfur and organic color	None	
Vehicle, % max.		66
Long oil soya alkyd resin solution (Federal TT-R-266, Type I, Class A) % min.	65	
Q bodied linseed oil (Fed. Spec. TT-L-201, Type II)	12-15	
Thinner (ASTM D 235), drier (ASTM D 600) and anti-skinning agents, % max.	20	
Nonvolatile content, % min.	60	
Finished Paint		
Coarse particles and skins (retained on No. 325 sieve) % max.	2	
Water, % max.	1	
Fineness of grind (North Standard) min.	5	

Viscosity, Krebs units, 77 F	77-90
Drying Time	
Set to touch, hours	1-4
Dry hard, hours, max.	18

Color shall be Federal Highway Administration's highway yellow, PR color No. 1, Standard to Red Tolerance. A wet color standard will be furnished by the Division upon request.

517.2.9.3 Second or Intermediate Coat (Construction Projects). Paints for the second or intermediate coat required on right-of-way markers may be prepared by the addition of not more than one-half pint of thinner per gallon of final or finish coat paint specified above.

517.2.10 Black Paint for Wood (Final or Finish Coat).

517.2.10.1 Scope. This specification covers a ready-mixed paint intended for use as a final or finish coat for outdoor exposure.

517.2.10.2 Requirements. The paint shall conform to the following requirements:

Pigment, % min. ---------- 30

Carbon, lead oxide, insoluble siliceous material and, at the option of the manufacturer, oxide of iron. Upon analysis the pigment shall show not less than 20 percent carbon, not less than five percent Pb_3O_4 and the total of lead oxide, iron oxide, insoluble siliceous material and loss on ignition shall be not less than 90 percent.

Vehicle, % max. ---------- 70

The vehicle shall contain not less than 80 percent linseed oil, the remainder to be combined drier and thinner. The linseed oil may be any mixture of raw (ASTM D 234), boiled (ASTM D 260), or bodied (Federal Specification TT-L-201, Type II). The thinner shall be turpentine (ASTM D 13), mineral spirits (ASTM D 235) or any mixture thereof. The drier shall meet ASTM D 600.

Finished Paint

Viscosity, Krebs units, 77 F	70-80
If required, color and hiding power shall be equal to that of sample furnished by the Division.	
Drying time, hours, maximum	24

517.2.10.3 Small Quantities. On construction projects requiring less than five gallons of paint, the detailed requirements of this specification may be waived and a paint designated commercially as Trim, Sash or Shutter Black, procured from known reliable sources, will be acceptable.

517.2.11 Brown Stain for Wood.

517.2.11.1 Scope. This specification covers a brown stain for use on rustic wood fences and other similar rustic materials.

517.2.11.2 Requirements.

Pigment, %		12-14
Black synthetic iron oxide (ASTM D 769), %	70-80	
Dark brown iron oxide (ASTM D 84, Class I), %	20-30	
Vehicle		86-88
Linseed oil, raw (ASTM D 234), % min.	50	
Pentachlorophenol (ASTM D 1272), % min.	5	
Paraffin wax (household), %	0.5-1.0	
Thinners and driers (ASTM D 13 or D 235, and D 600), % max.	44	

Finished Stain

Drying time, hours, max.	48

When the stain is applied to a wood surface it shall match in color a similar application of standard stain to be furnished by the Division.

517.2.12 Green Paint for Wood.

517.2.12.1 Scope. This specification covers a quick drying foliage green paint for use on wayside benches, tables and other equipment.

517.2.12.2 Requirements.

Pigment, % min.		25
Pure chrome green (ASTM D 212) and pure chrome yellow (ASTM D 211) proportioned to produce desired color, % min.	55	
Extender, % max.	45	
Vehicle, % max.		75
Linseed oil, raw (ASTM D 234), % min.	15	
Alkyd resin solids, % min.	35	
Thinners and driers (ASTM D 235 or D 13 and D 600), % max.		50
Finished Paint		
Water, % max.		1.0
Coarse particles, skins and other foreign matter (retained on a No. 325 sieve based on pigment ASTM D 185), % max.		2.0
Viscosity, Krebs units, 77 F		70-80
Drying time, hours, max.		8

Color and hiding power shall be equal to that of samples furnished by the Division.

517.3 Construction Methods.

517.3.1 Painting Metal.

517.3.1.1 General. The surfaces of metal parts to be painted shall first be properly cleaned and prepared.

All structural steel and miscellaneous metals, unless otherwise provided, shall receive one shop or prime coat of paint and three field coats of paint. The contractor, at his option, unless otherwise required by the contract, may furnish and apply paints conforming to the requirements of either System I or System II, Structural Steel Paints as set forth in Subsection 517.2.4, provided however, that the same system is used throughout the work.

Other paints are to be used only when specified in the contract. Colors of the several coats shall be in accordance with standard color samples furnished by the Division.

Unless otherwise provided, structural steel and miscellaneous metals which are to be incased in concrete masonry and contact surfaces of beam splices, girder splices and main truss connections which are assembled with high-strength bolts or pin-bolts shall not be painted.

517.3.1.2 Weather Conditions. Paint shall not be applied when the air temperature is below 40 F, when the air is misty or when conditions are otherwise unsatisfactory for the work. It shall not be applied upon damp or frosted surfaces.

Material painted under cover in damp or cold weather shall remain under cover until dry or until weather conditions permit its exposure in the open. Painting shall not be done when the metal is hot enough to cause the paint to blister and produce a porous paint film.

Painted surfaces shall not be exposed to temperatures below 35 F until completion of the drying period.

517.3.1.3 Cleaning of Surfaces.

517.3.1.3.1 General. Surfaces of metal to be painted and surfaces to be in contact because of bolting or riveting, shall be thoroughly cleaned, removing rust, mill scale, dirt, oil or grease and other foreign substances. Unless cleaning is to be done by blast cleaning, all weld areas, before cleaning is begun, shall be neutralized with a proper chemical, after which they shall be thoroughly rinsed with water.

All nonmachined surfaces of a casting shall be blast cleaned before the casting is machined.

All structural steel except steel encased in concrete shall be blast cleaned, unless otherwise specified. Structural steel encased in concrete shall be either blast cleaned or hand cleaned.

517.3.1.3.2 Hand Cleaning. Where hand cleaning is permitted, the removal of rust, scale and dirt shall be done by the use of metal brushes, scrapers, chisels, hammers or other effective means. Oil and grease shall be removed by the use of suitable solvents. All dust or other loose

material shall be completely removed by brushing or by other satisfactory methods.

517.3.1.3.3 Blast Cleaning. The blast cleaning shall remove mill scale, rust, dirt and other substances from the surface of the metal until a finish is obtained as described for No. 6 Commercial Blast Cleaning by the Steel Structures Painting Council's Specifications. Special attention shall be given to cleaning of corners and re-entrant angles. Before painting, sand, grit or shot adhering to the steel in corners and elsewhere shall be removed. The cleaning shall be approved by the engineer prior to any painting. The material shall be painted before rust forms. Blast cleaning shall be performed with sand, metal grit or metallic shot as described for No. 6 Commercial Blast Cleaning.

517.3.1.3.4 Unpainted Weathering Steel. Cleaning and surface preparation of unpainted weathering steel shall conform to the requirements of Subsection 506.3.31.4.

517.3.1.4. Mixing of Paint. Except as otherwise provided in Subsection 517.2, paint shall be premixed at the factory. Paint shall also be thoroughly field mixed by hand or mechanically before applying and shall be stirred sufficiently while being used to keep the pigments in uniform suspension. Paint delivered in 30 gallon containers shall be field mixed by mechanical equipment. Air container paint pots shall be equipped with agitators.

Mixing of pigment and vehicle for aluminum paint used in System I shall be done the same day the paint is to be used.

517.3.1.5 Application. Painting shall be done in a neat and workmanlike manner. Paint may be applied by brushing or spraying, except that spraying shall not be used for field painting of structures over live streams, rivers, lakes or other bodies of water. The coating of paint applied shall be smoothly and uniformly spread so that no excess paint will collect at any point. The finished surface shall be free of streaks, pitting, wrinkling or other irregularities.

When brushes are used, the brushes preferably shall be round or oval in shape, but if flat brushes are used, they shall not exceed four inches in width. The paint shall be so manipulated under the brush as to produce a smooth, uniform, even coating in close contact with the metal or with previously applied paint and shall be well worked into all corners, crevices and around rivet heads and bolts.

Power spraying equipment shall apply the paint in a fine, even spray without the addition of any thinner. Paint when applied with spray equipment shall be immediately smoothed by brushing, when necessary, to secure uniform coverage and to eliminate wrinkling, blistering and air holes.

In lieu of applying paint by brushing or spraying, the paint may be applied on flat surfaces by the use of approved rollers, immediately followed by brushing.

On all surfaces which are inaccessible for paint brushes, the paint shall be applied by spraying, when permitted, or with paint daubers to insure thorough covering.

In cool weather, paint to be applied by brushing or spraying may be warmed to reduce the viscosity. Such warming shall be accomplished by heating the paint containers in water or by placing them on steam radiators.

517.3.1.6 Removal of Paint. Painting which does not conform to the requirements of the specifications or which is unsatisfactory to the engineer, shall be removed and the metal thoroughly cleaned and repainted at the expense of the contractor.

517.3.1.7 Shop Painting. Unless otherwise specified, metal shall be given one coat of shop paint after it has been accepted by the inspector. The minimum wet film thickness of the coat of paint applied in the shop shall be three mils measured immediately after it is applied to the surface. Surfaces which will be in contact with concrete shall not be painted, unless otherwise specified.

Shop contact surfaces shall not be painted. Except as noted under Subsection 506.3.12 for field connections with high-strength bolts or pin-bolts, field contact surfaces shall receive a coat of shop paint. Surfaces of bearing devices, expansion joint assemblies and other surfaces not in contact but inaccessible after assembly or erection shall be painted with three coats of paint. The first and second coats shall conform to the requirements for shop or prime coat and the third coat shall conform to the requirements for aluminum third field coat of System I or System II, Structural Steel Paint, whichever system is used throughout the work. The second and third coats shall not be applied until the previous paint coat has dried throughout the full thickness of the paint film, provided however, that not less than two days shall have elapsed before applying the succeeding coat.

Structural steel which is to be welded shall not be painted before welding is complete. If it is to be welded only in the fabricating shop and subsequently erected by bolting, it shall receive one coat of paint after shop welding is finished. Steel surfaces which are to be field welded shall be given one coat of boiled linseed oil or other approved protective coating after shop welding and shop fabrication is completed.

Surfaces of iron and steel castings, either milled or finished, shall be given one coat of paint.

Upon fabrication and acceptance, pins and pin holes shall be coated with a plastic or other approved coating before removal from the shop.

No markings other than erection marks for the field identification of members and weight marks as otherwise required shall be painted upon surface areas previously painted with the shop coat. Material shall not be loaded for shipment until it is thoroughly dry.

517.3.1.8 Field Painting. When the erection work is complete, including all bolting, welding and straightening of bent metal, all

adhering rust, scale, dirt, grease or other foreign material shall be removed as specified under Subsection 517.3.1.3, Cleaning of Surfaces.

As soon as the inspector has examined and approved the field bolting, such field bolts and field welds, all abrasions of the shop coat and all shipping or erection marks shall be thoroughly covered with one coat of shop paint. All small cracks and cavities which have not been sealed in a watertight manner by the shop or retouching coat shall be filled with a mixture of red lead or basic lead silico paste and linseed oil before the first coat is applied.

Surfaces to be bolted in contact and surfaces which will be in contact with concrete shall not be painted. Surfaces which will be inaccessible after erection shall be painted with such field coats as are called for on plans or authorized. When the paint applied for retouching the shop coat has thoroughly dried and the field cleaning has been satisfactorily completed, the field coats as called for shall be applied.

In no case shall a succeeding paint coat be applied until the previous paint coat has dried throughout the full thickness of the paint film, provided however, that not less than four days shall elapse before painting a surface previously painted with red lead or basic lead silico chromate paint and that not less than two days shall elapse before painting a surface previously painted with basic lead silico chromate aluminum paint as described in Subsection 517.2.4.2.4 or aluminum paint as described in Subsection 517.2.4.1.3.

The following provision shall apply to the application of the three field coats. To secure a maximum coating on edges of plates or shapes, rivet heads and other parts subjected to special wear and attack, the edges shall first be striped with a longitudinal motion and the rivet heads with a rotary motion of the brush, followed immediately by the general painting of the whole surface, including the edges and rivet heads.

If, in the opinion of the engineer, traffic produces an objectionable amount of dust, the contractor shall, at his own expense allay the dust for the necessary distance on each side of the site and take any other precautions necessary to prevent dust and dirt from coming in contact with freshly painted surfaces or with surfaces before the paint is applied.

The application of the third field coat shall be deferred until adjoining concrete work has been placed and finished. If concreting operations have damaged the paint, the surface shall be recleaned and repainted.

When paint is applied by spraying, and the precautions necessary to protect the work as required in Subsection 517.3.3 are inadequate or the atmospheric conditions are such that paint drift becomes a problem, the engineer may require that spraying be discontinued until adequate precautions are taken or until the atmospheric conditions become favorable for spraying or the engineer may require that the paint be applied by brushing.

517.3.2 Painting Lumber and Timber.

517.3.2.1 General. The painting of lumber and timber shall include, unless otherwise provided in the contract, the preparation of the surface, the application, protection and drying of the paint coatings, the protection of traffic and property upon and in the vicinity of the structure, the protection of all portions of the structure against disfigurement by paint or paint materials and the supplying of all equipment, tools, tackle, scaffolding, labor, materials and incidentals to complete the work.

The surfaces to be painted shall be clean and free from dust, dirt or other loose or adhering foreign material.

Unless otherwise provided on the plans, in the specifications or in the contract, all surfaces required to be painted shall be given three coats of paint, consisting of a prime, second and finish coat, with paint which meets the requirements of Subsection 517.2 for paint for wood surfaces. Each coat shall be with the type of paint designated on the plans, in the specifications, in the contract or ordered by the engineer.

517.3.2.2 Weather Conditions. The provisions of Subsection 517.3.1.2 shall apply to painting of wood surfaces.

517.3.2.3 Mixing of Paint. Mixing of paint shall be in accordance with the provisions of Subsection 517.3.1.4.

517.3.2.4 Application. Paint may be applied with hand brushes or by spraying, except as restricted in Subsection 517.3.1.5. By either method, the coating of paint applied shall be smoothly and uniformly spread so that no excess paint will collect at any point. The finished surface shall be free from streaks, pitting, wrinkling or other irregularities.

When brushes are used, the paint shall be so manipulated under the brush as to produce a smooth, uniform, even coating in close contact with the wood or with previously applied paint and shall be worked into all corners and crevices.

Power spraying equipment shall apply the paint in a fine, even spray without the addition of any thinner. Paint when applied with spray equipment shall be immediately smoothed by brushing, when necessary, to secure uniform coverage and to eliminate wrinkling, blistering and air holes.

In cool weather, the paint may be warmed to reduce the viscosity for use suitable for brushing or spraying. Such warming shall be accomplished by heating the paint containers in water or by placing them on steam radiators.

On all surfaces which are inaccessible for paint brushes, the paint shall be applied by spraying, when permitted, or with paint daubers to insure thorough covering.

In no case shall a succeeding coat be applied until the previous coat has dried throughout the full thickness of the paint film, provided however, that no less than three days shall elapse before any succeeding coat of paint is applied.

All surfaces coated with paint which does not conform to the requirements of the specifications shall be thoroughly cleaned and repainted to the satisfaction of the engineer, at the cost and expense of the contractor.

517.3.3 Protection. The contractor, during all painting operations, shall be responsible and shall take precautions necessary for the full protection of traffic, parked vehicles and property upon and in the vicinity of the structure against damage by paint drift, drops or spatters, the protection of all portions of the structure against disfigurement by paint or equipment and the protection of the coatings of paint during the life of the contract.

517.4 Structure Maintenance Painting.

517.4.1 Description.

517.4.1.1 General. This work shall consist of cleaning and repainting existing structures or parts thereof as designated in the contract, all in accordance with the requirements of the specifications.

The work of cleaning and repainting existing structures or parts thereof will be classified as hereinafter set forth and the class of painting for each structure will be designated in the contract.

Unless otherwise required in the contract, the contractor at his option, may furnish and apply paints conforming to the requirements of either System I or System II, Structural Steel Paint, provided however, that the same System shall be used throughout the work.

517.4.1.2 Class A Structure Maintenance Painting. Under this classification, the surfaces to be painted shall be thoroughly cleaned as provided in Subsection 517.3.1.3.3 for No. 6 Commercial Blast Cleaning, except that all traces of rust shall be removed.

The repainting shall consist of three coats of paint. When System I is used the first coat shall be a coat of red lead paint shop or prime coat and the other two coats shall be aluminum, second and third field coats. When System II is used, the first coat shall be basic lead silico chromate paint shop or prime coat, the second coat shall be basic lead silico chromate aluminum paint and the third coat shall be aluminum paint.

517.4.1.3 Class B Structure Maintenance Painting. Under this classification, the surfaces to be painted shall be thoroughly cleaned by removing dirt, dust and foreign matter except that all paint including the prime coat shall be removed from those areas where there is evidence that rust, loose paint, scale or foreign matter has penetrated to the prime coat or to the metal.

The repainting shall consist of three coats of paint as provided in Subsection 517.4.1.2.

517.4.2 Materials. Paint material used in this work shall meet the requirements specified under Subsection 517.2 for the material named.

517.4.3 Construction Methods.

517.4.3.1 General. The requirements for painting as specified for structural steel and miscellaneous metals in Subsection 517.3 shall apply to the work except as modified and supplemented herein. In the event of conflict between the provisions herein specified and those specified under Subsection 517.3, the engineer shall be the sole judge of the matter at issue and his decision shall be final.

517.4.3.2 Cleaning. All surfaces to be painted shall be blast cleaned unless otherwise provided in the special provisions.

517.4.3.3 Painting. Cleaned surfaces which become oxidized or dirty from any cause whatever shall be again cleaned before the paint is applied.

Paint shall be applied only by brushing unless otherwise specified in the special provisions.

In the event of poor workmanship or the use of material which does not meet the specifications, the right is reserved to reject any portion or all of the work, as the case may be. The contractor shall remove such defective work and repaint in accordance with the contract, at his own cost and expense.

517.4.3.4 Protection. Under all methods of cleaning and repainting, it is the responsibility of the contractor to fully protect traffic and property upon and in the vicinity of the structure and protect all portions of the structure, superstructure and substructure, against disfigurement from equipment or materials during cleaning and repainting operations. No structure shall be closed to traffic unless specifically provided in the special provisions.

517.5 Method of Measurement.

517.5.1 Steel and Timber Structures. Painting of steel and timber structures, including lumber, timber, structural steel and miscellaneous metals, furnished and erected under the contract, will not be measured for payment, unless the contract contains a specific pay item for painting structures.

When provided for in the contract, the item Painting Structure will be measured for payment as a single unit of work complete for each structure.

517.5.2 Structure Maintenance Painting. The classes of structure maintenance painting will each be measured by the unit (one structure cleaned and painted as designated). Only accepted work will be measured for payment.

517.6 Basis of Payment.

517.6.1 Steel and Timber Structures. Unless the contract contains a specific pay item for painting structures, no direct payment will be made for the painting of steel or timber structures, including structural steel, miscellaneous metals, lumber or timber. Payment for such painting, including the furnishing and applying of paint materials, cleaning and preparing surfaces and the protection of traffic and property, will be considered as included in the contract unit price for furnishing and erecting the various items of structural steel and miscellaneous metals or lumber and timber, as the case may be.

When specifically provided for in the contract, painting of structures, measured as provided above, will be paid for at the contract lump sum price for Painting Structure, which price will be payment in full for furnishing paint materials; for preparing and cleaning surfaces, including furnishing of cleaning materials and equipment; for applying paint coatings; for protecting traffic and property; and for furnishing all labor, tools, equipment and incidentals necessary to complete this item of work.

517.6.2 Structure Maintenance Painting. The structure maintenance painting items, measured as provided above, will be paid for at the contract lump sum price for Structure Maintenance Painting, Class A or Structure Maintenance Painting, Class B, as the case may be, and the respective contract lump sum price shall be payment in full for preparing and cleaning the designated surfaces; for furnishing and applying the paint coatings; for protecting traffic; and for furnishing all equipment, tools, labor and incidentals necessary to complete the work in accordance with the contract.

SECTION 518. MORTAR RUBBLE MASONRY

518.1 Description. Mortar rubble masonry shall include the classes commonly known as coursed, random and random range work and shall consist of roughly squared and dressed stone laid in cement mortar.

518.2 Materials.

518.2.1 General. All materials used in the work shall meet the requirements specified for the class of material named.

Specific reference is made to the following:

Portland Cement	Subsection 501.3
Water	Subsection 501.3

Unless otherwise directed, portland cement may be either Type I or Type IA.

Masonry cement shall conform to the requirements for Masonry Cement, AASHO Designation: M 150.

Hydrated lime shall conform to the requirements of Type N, Normal Finishing Hydrated Lime, ASTM Designation: C 6.

518.2.2 Sand for Mortar.

518.2.2.1 General Requirements. Sand furnished for mortar shall conform to the pertinent requirements of Subsection 501.3.6. It shall meet the requirements for quality, physical characteristics and properties, deleterious substances, and organic impurities specified for fine aggregate in Subsection 501.3.6.3, except mortar strength and size requirements.

518.2.2.2 Mortar Strength. Sand for mortar, when subjected to the mortar strength test, shall have a tensile or compressive strength, at the ages of three days and seven days, of not less than 85 percent of that developed by mortar of the same proportions and consistency, made of the same cement and standard Ottawa sand.

518.2.2.3 Size Requirements. Sand shall be uniformly graded from coarse to fine and shall conform to the following gradation requirements:

	Percent
Passing a No. 8 sieve	95-100
Passing a No. 100 sieve	25 max.
Passing a No. 200 sieve	10 max.

518.2.3 Mortar. Unless otherwise provided, mortar for laying the stone and pointing shall be composed of three parts of sand for mortar and one part of any one of the following materials, by volume: portland cement, masonry cement or a mixture of 90 percent portland cement and ten percent hydrated lime.

The mortar shall be machine mixed unless otherwise permitted by the engineer. Machine-mixed mortar shall be prepared in an approved mixer and shall be mixed not less than 1-1/2 minutes. In the preparation of hand-mixed mortar, the sand and cement shall be thoroughly mixed together in a clean, tight mortar box until the mixture is of uniform color, after which clean water shall be added in such quantity as to form a stiff paste. Mortar shall be used within 45 minutes after mixing. Retempering of mortar will not be permitted.

518.2.4 Rubble Stone.

518.2.4.1 General Requirements. Stone for rubble masonry shall be of approved quality, sound and durable and free from segregations, seams, cracks and other structural defects or imperfections tending to destroy its resistance to the weather. It shall be free from rounded, worn or weathered surfaces. Selected stones with flat faces as nearly parallel as practical shall be used.

518.2.4.2 Size Requirements. Individual stones shall have a thickness of not less than six inches and a width not less than 1-1/2 times the thickness. No stones, except headers, shall have a length less than 1-1/2

Appendix D
Site Investigation Report, Pile Driving Record and Test Pile Data

Appendix D – Site Investigation Report, Pile Driving Record and Test Pile Data

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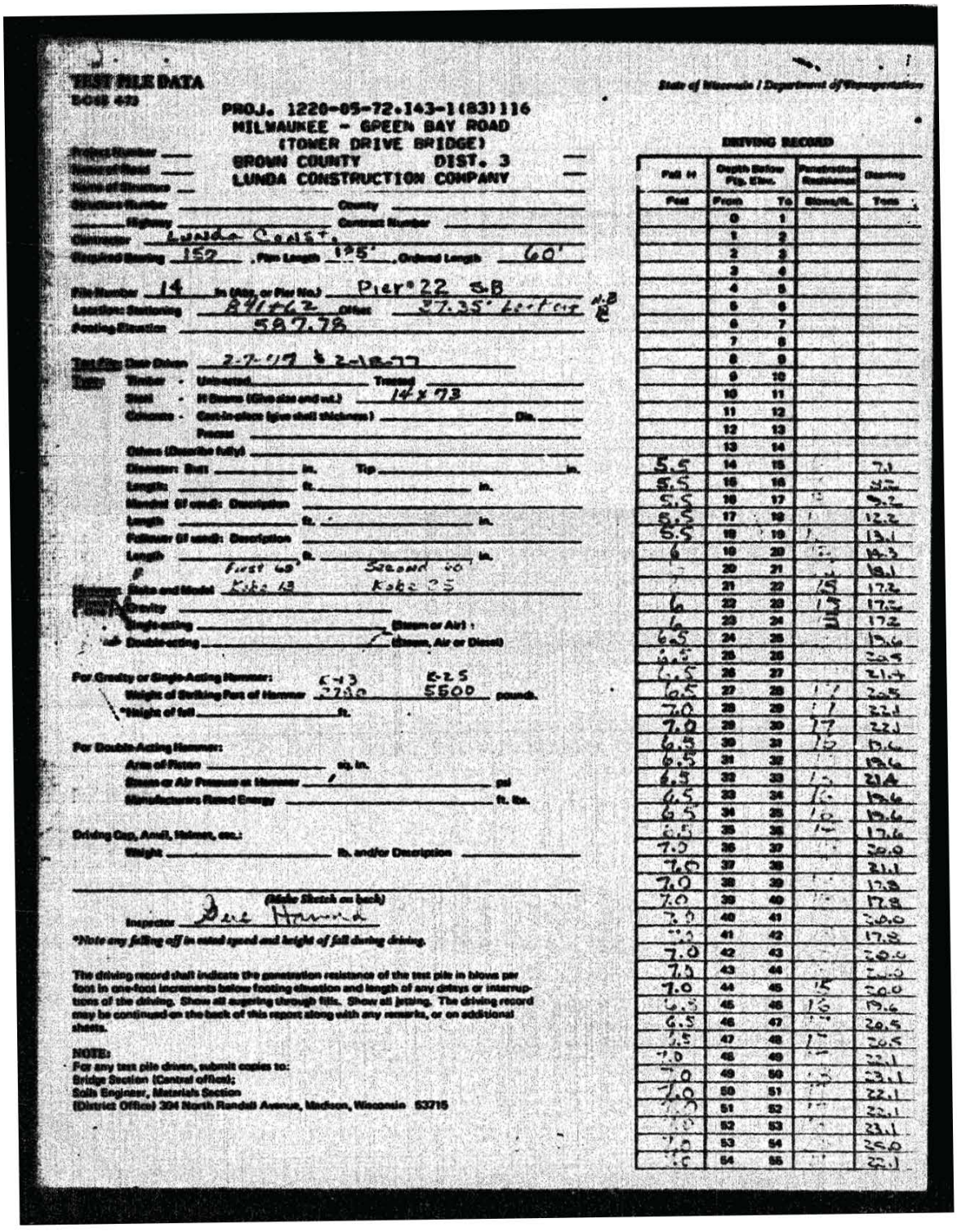
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Test Pile Data



TEST PILE DATA

PROJ. 1220-05-72.143-1(83)116
MILWAUKEE - GREEN BAY ROAD
(TOWER DRIVE BRIDGE)
BROWN COUNTY DIST. 3
LUNDA CONSTRUCTION COMPANY

Contractor Lunda Const.
Required Bearing 152 . Pipe Length 125' . Ordered Length 60'

Pile Number 14 In (Abt. or Plat No.) Pier 22 S.B
Location: Stationing 8+46.2 Offset 27.35' Left
Footing Elevation 587.78

Test Pile: Date Driven 2-7-77 & 2-18-77
Type: Timber - Untreated Treated
Steel - H Beams (Give size and wt.) 14 x 73
Concrete - Cast-in-place (give shell thickness) Dia.
Precast
Other (Describe fully)
Diameter: Butt in. Tip in.
Length: ft. in.
Number (if weld): Description
Length ft. in.
Follower (if used): Description
Length ft. in.
Hammer: Make and Model First 40' Kobe 13 Second 60' Kobe 25
Capacity
Single-acting (Steam or Air):
Double-acting (Steam, Air or Diesel)

For Gravity or Single-Acting Hammer: K-13 K-25
Weight of Striking Part of Hammer 2750 5500 pounds.
*Height of fall ft.

For Double-Acting Hammer:
Area of Piston sq. in.
Steam or Air Pressure at Hammer psi
Manufacturer's Rated Energy ft. lbs.

Driving Cap, Anvil, Helmet, etc.:
Weight lb. and/or Description

(Make Sketch on back)
Inspector Dale Hanna

*Note any falling off in rated speed and height of fall during driving.

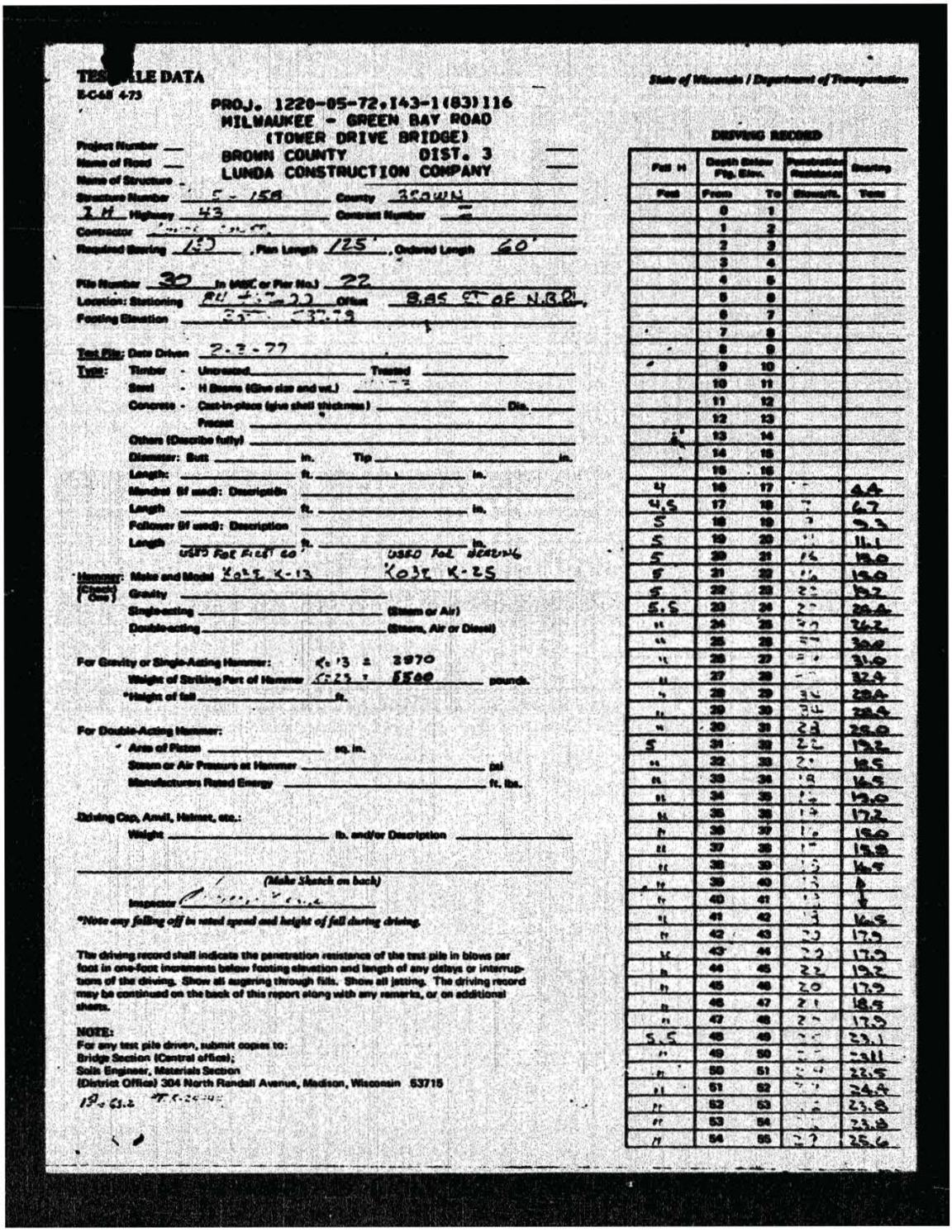
The driving record shall indicate the penetration resistance of the test pile in blows per foot in one-foot increments below footing elevation and length of any delays or interruptions of the driving. Show all augering through fills. Show all jetting. The driving record may be continued on the back of this report along with any remarks, or on additional sheets.

NOTE:
For any test pile driven, submit copies to:
Bridge Section (Central office);
Soils Engineer, Materials Section
(District Office) 304 North Randall Avenue, Madison, Wisconsin 53715

State of Wisconsin / Department of Transportation

DRIVING RECORD

Pull in Feet	Depth Below Fin. Elev. From	To	Penetration Resistance Blows/ft.	Blows Total
	0	1		
	1	2		
	2	3		
	3	4		
	4	5		
	5	6		
	6	7		
	7	8		
	8	9		
	9	10		
	10	11		
	11	12		
	12	13		
	13	14		
5.5	14	15		7.1
5.5	15	16		9.2
5.5	16	17		9.2
5.5	17	18		12.2
5.5	18	19		13.1
6	19	20		16.3
	20	21		18.1
	21	22	15	17.2
6	22	23	13	17.5
6	23	24	11	17.2
6.5	24	25		15.6
6.5	25	26		20.5
6.5	26	27		21.7
6.5	27	28	17	20.5
7.0	28	29	17	22.1
7.0	29	30	17	22.1
6.5	30	31	15	19.6
6.5	31	32		19.6
6.5	32	33	15	21.4
6.5	33	34	15	19.6
6.5	34	35	15	19.6
6.5	35	36	15	17.6
7.0	36	37		20.0
7.0	37	38		21.1
7.0	38	39		17.8
7.0	39	40		17.8
7.0	40	41		20.0
7.0	41	42		17.8
7.0	42	43		20.0
7.0	43	44		20.0
7.0	44	45	15	20.0
6.5	45	46	15	19.6
6.5	46	47	15	20.5
7.5	47	48	17	20.5
7.0	48	49		22.1
7.0	49	50		23.1
7.0	50	51		22.1
7.0	51	52		22.1
7.0	52	53		23.1
7.0	53	54		25.0
7.0	54	55		22.1



TEST PILE DATA

BC48 4-73

State of Wisconsin / Department of Transportation

PROJ. 1220-05-72.143-1(83)116
MILWAUKEE - GREEN BAY ROAD
(TOWER DRIVE BRIDGE)
BROWN COUNTY DIST. 3
LUNDA CONSTRUCTION COMPANY

Project Number
Name of Road
Name of Structure
Structure Number 5-158 County BROWN
I.H. Highway 43 Contract Number
Contractor
Required Bearing 180 , Plan Length 125' , Ordered Length 60'

Pile Number 30 In (NSE or Pier No.) 22
Location: Stationing RU 4+72.22 Offset 8.85 ℄ OF N.B.R.
Footing Elevation 577.79

Test Pile: Date Driven 2-2-77
Type: Timber - Untreated Treated
Steel - H Beams (Give size and wt.)
Concrete - Cast-in-place (give shell thickness) Dia.
Precast
Others (Describe fully)
Diameter: Butt in. Tip in.
Length: ft. in.
Mandrel (If used): Description
Length ft. in.
Follower (If used): Description
Length ft. in.
USED FOR FIRST 60' USED FOR BEARING

Hammer: Make and Model KOBE K-13 KOBE K-25
(Check One) Gravity
Single-acting (Steam or Air)
Double-acting (Steam, Air or Diesel)

For Gravity or Single-Acting Hammer: K-13 = 2970
Weight of Striking Part of Hammer K-25 = 5500 pounds.
*Height of fall ft.

For Double-Acting Hammer:
Area of Piston sq. in.
Steam or Air Pressure at Hammer psi
Manufacturers Rated Energy ft. lbs.

Driving Cap, Anvil, Helmet, etc.:
Weight lb. and/or Description

(Make Sketch on back)

Inspector

*Note any falling off in rated speed and height of fall during driving.

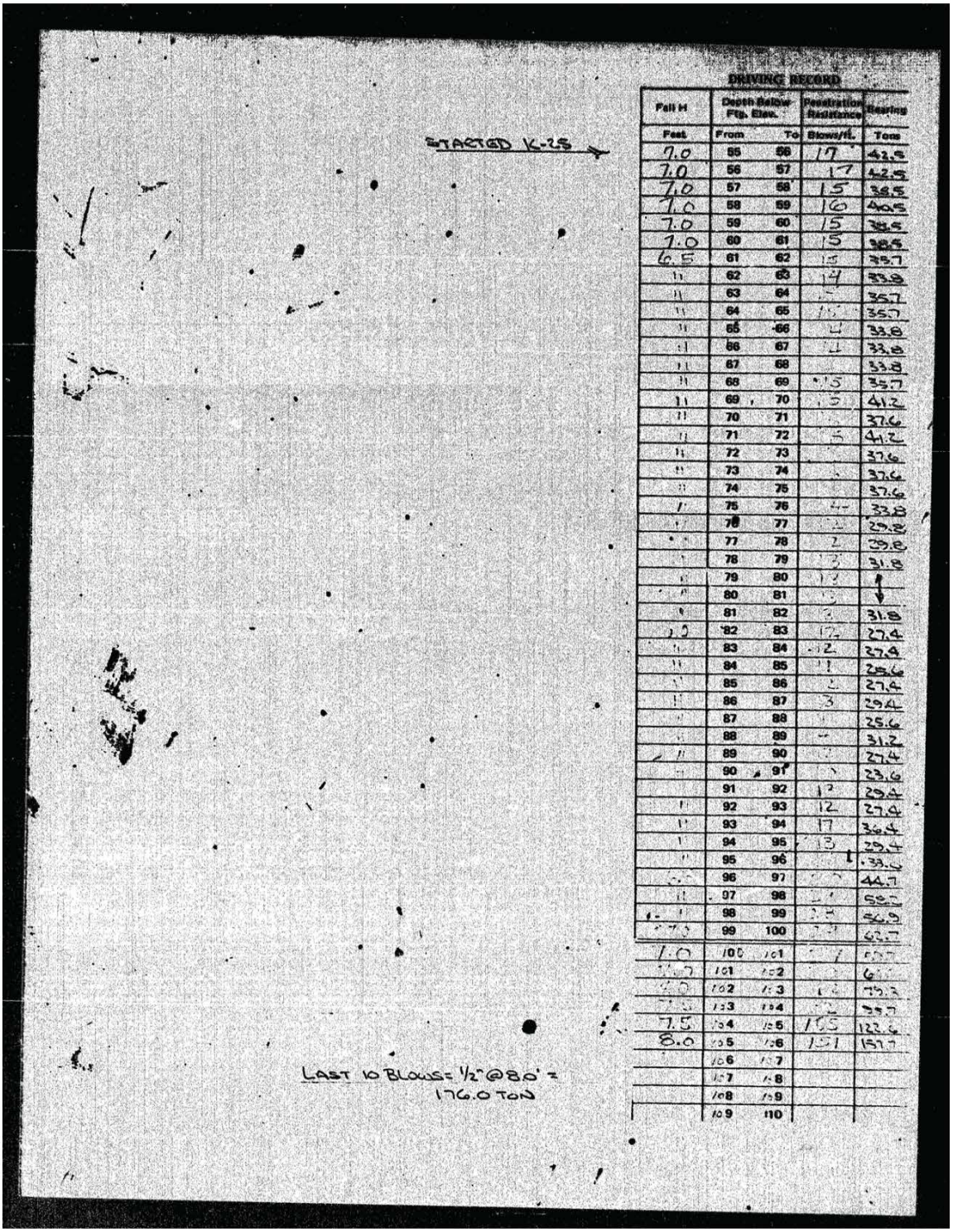
The driving record shall indicate the penetration resistance of the test pile in blows per foot in one-foot increments below footing elevation and length of any delays or interruptions of the driving. Show all augering through fills. Show all jetting. The driving record may be continued on the back of this report along with any remarks, or on additional sheets.

NOTE:
For any test pile driven, submit copies to:
Bridge Section (Central office);
Soils Engineer, Materials Section
(District Office) 304 North Randall Avenue, Madison, Wisconsin 53715

19.63.2 K-25-40

DRIVING RECORD

Pile #	Depth Below Pkg. Elev. From	To	Penetration Resistance Blows/ft.	Bearing Tons
	0	1		
	1	2		
	2	3		
	3	4		
	4	5		
	5	6		
	6	7		
	7	8		
	8	9		
	9	10		
	10	11		
	11	12		
	12	13		
	13	14		
	14	15		
	15	16		
4	16	17		44
4.5	17	18		67
5	18	19		93
5	19	20		111
5	20	21	16	130
5	21	22	16	130
5	22	23	22	152
5.5	23	24	27	208
"	24	25	29	242
"	25	26	57	304
"	26	27	21	310
"	27	28	17	324
"	28	29	36	284
"	29	30	36	284
"	30	31	23	280
5	31	32	22	172
"	32	33	21	165
"	33	34	18	145
"	34	35	16	130
"	35	36	17	172
"	36	37	16	130
"	37	38	17	139
"	38	39	13	104
"	39	40	13	"
"	40	41	13	"
"	41	42	13	165
"	42	43	20	175
"	43	44	22	175
"	44	45	23	192
"	45	46	20	175
"	46	47	21	184
"	47	48	20	175
5.5	48	49	26	231
"	49	50	32	311
"	50	51	24	225
"	51	52	27	244
"	52	53	26	238
"	53	54	26	238
"	54	55	29	256

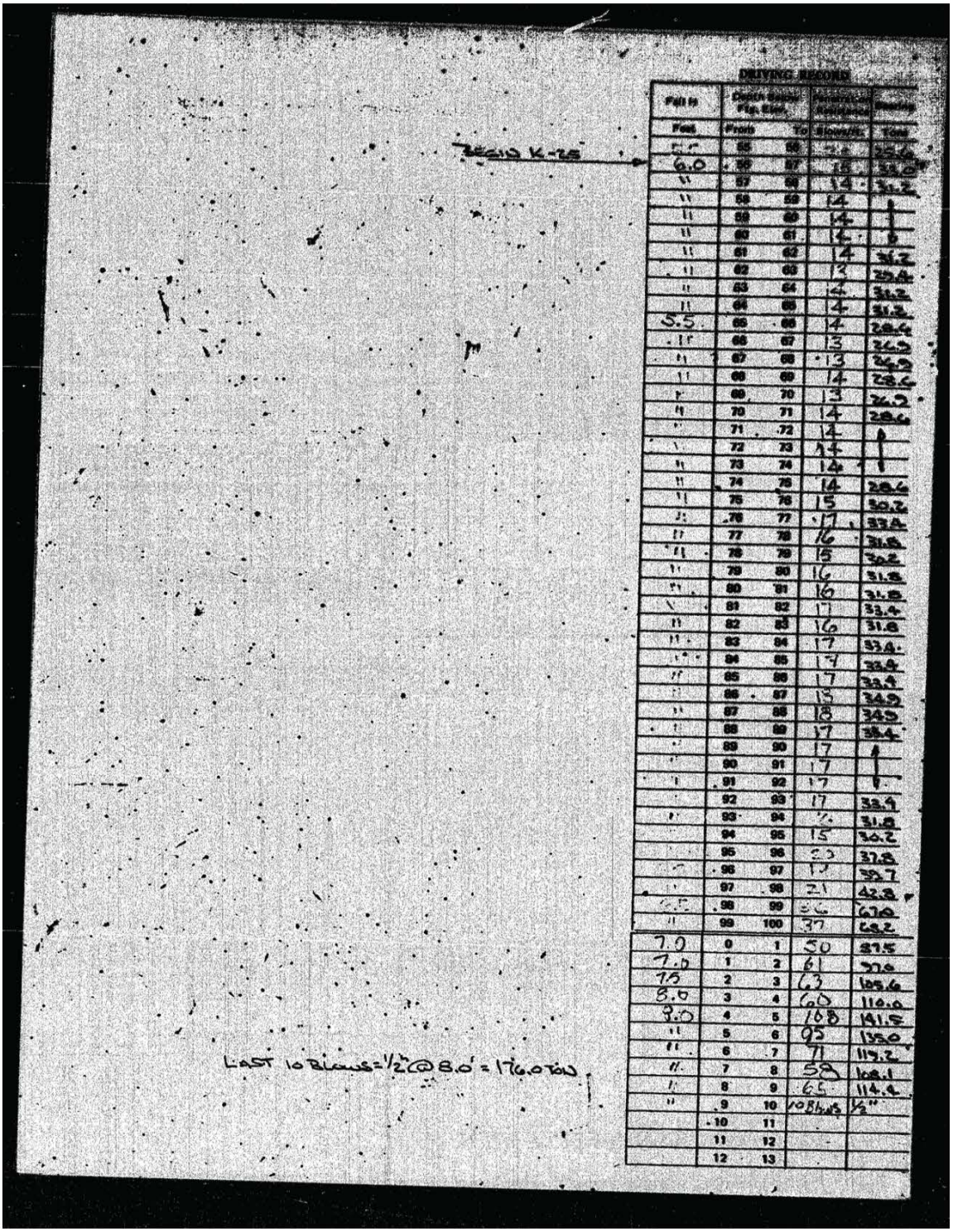


STARTED K-25

LAST 10 BLOWS = ½" @ 80' = 176.0 TON

DRIVING RECORD

Pell H	Depth Below Ftg. Elev.		Penetration Resistance	Bearing
Feet	From	To	Blows/ft.	Tons
7.0	55	56	17	42.5
7.0	56	57	17	42.5
7.0	57	58	15	38.5
7.0	58	59	16	40.5
7.0	59	60	15	38.5
7.0	60	61	15	38.5
6.5	61	62	15	35.7
"	62	63	14	33.8
"	63	64	15	35.7
"	64	65	15	35.7
"	65	66	14	33.8
"	66	67	14	33.8
"	67	68	14	33.8
"	68	69	15	35.7
"	69	70	15	41.2
"	70	71	11	37.6
"	71	72	15	41.2
"	72	73	11	37.6
"	73	74	11	37.6
"	74	75	11	37.6
"	75	76	14	33.8
"	76	77	12	29.8
"	77	78	12	29.8
"	78	79	13	31.8
"	79	80	13	"
"	80	81	13	"
"	81	82	13	31.8
"	82	83	11	27.4
"	83	84	11	27.4
"	84	85	11	25.6
"	85	86	11	27.4
"	86	87	12	29.4
"	87	88	11	25.6
"	88	89	13	31.2
"	89	90	11	27.4
"	90	91	10	23.6
"	91	92	12	29.4
"	92	93	12	27.4
"	93	94	17	36.4
"	94	95	13	29.4
"	95	96	15	33.4
"	96	97	19	44.7
"	97	98	24	58.5
"	98	99	24	56.9
"	99	100	29	69.7
7.0	100	101	27	65.7
7.0	101	102	25	60.9
7.0	102	103	32	77.3
7.0	103	104	24	58.7
7.5	104	105	105	122.6
8.0	105	106	131	157.7
	106	107		
	107	108		
	108	109		
	109	110		

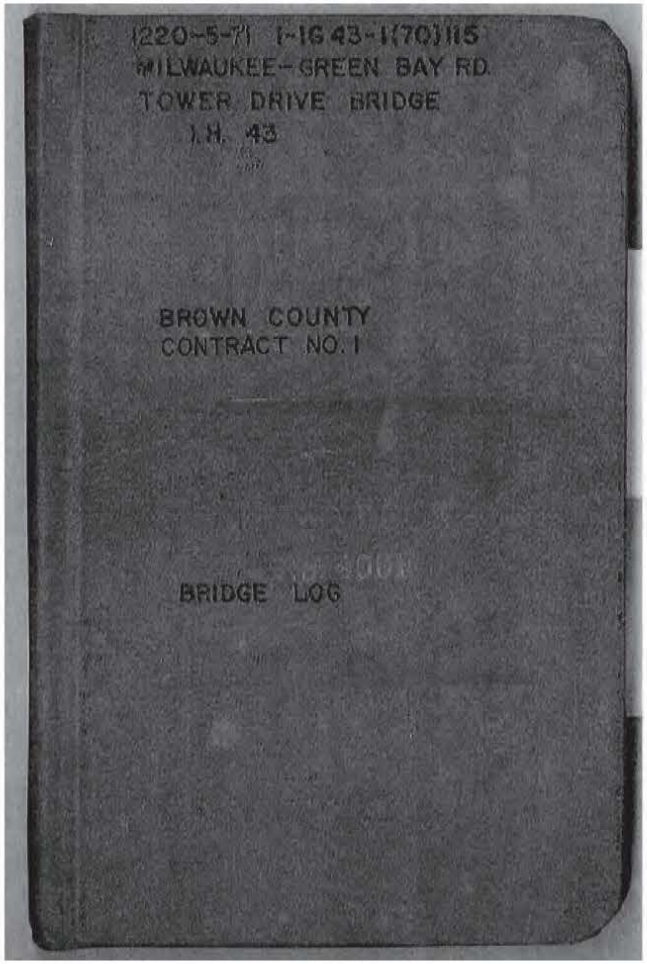


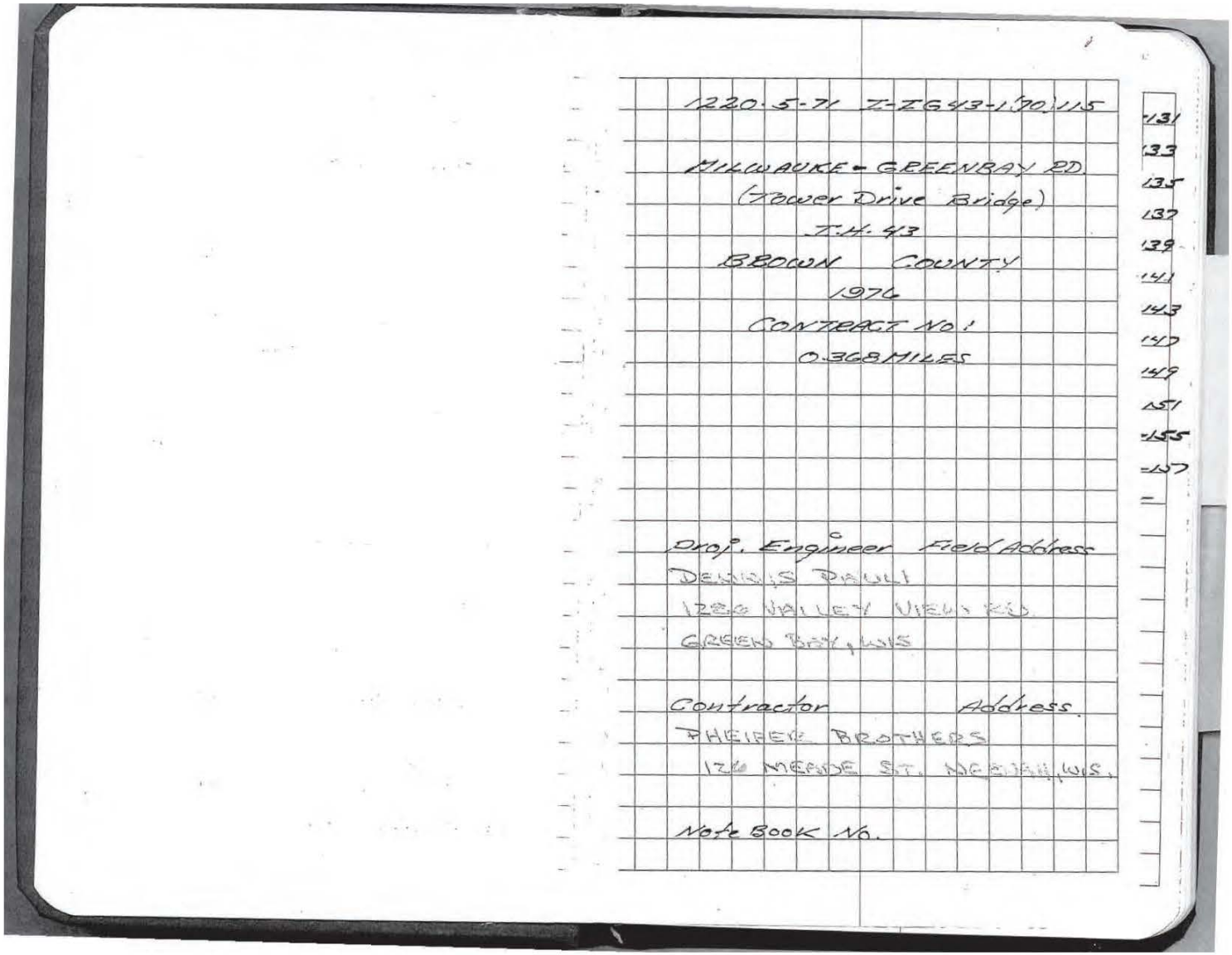
DRIVING RECORD

Feet	From	To	Blows/ft.	Tons
5.5	55	56	12	25.6
6.0	56	57	13	31.0
"	57	58	14	33.2
"	58	59	14	"
"	59	60	14	"
"	60	61	14	"
"	61	62	14	33.2
"	62	63	13	29.4
"	63	64	14	31.2
"	64	65	14	31.2
5.5	65	66	14	28.4
"	66	67	13	26.5
"	67	68	13	26.5
"	68	69	14	28.4
"	69	70	13	26.5
"	70	71	14	28.4
"	71	72	14	"
"	72	73	14	"
"	73	74	14	"
"	74	75	14	28.4
"	75	76	15	30.2
"	76	77	17	33.4
"	77	78	16	31.8
"	78	79	15	30.2
"	79	80	16	31.8
"	80	81	16	31.8
"	81	82	17	33.4
"	82	83	16	31.8
"	83	84	17	33.4
"	84	85	17	33.4
"	85	86	17	33.4
"	86	87	15	34.9
"	87	88	18	34.5
"	88	89	17	33.4
"	89	90	17	"
"	90	91	17	"
"	91	92	17	"
"	92	93	17	33.4
"	93	94	[illegible]	31.8
"	94	95	15	30.2
"	95	96	[illegible]	37.8
"	96	97	[illegible]	39.7
"	97	98	21	42.8
"	98	99	[illegible]	67.0
"	99	100	37	68.2
7.0	0	1	50	87.5
7.0	1	2	61	97.0
7.5	2	3	63	105.6
8.0	3	4	60	110.0
8.0	4	5	108	191.5
"	5	6	93	135.0
"	6	7	71	119.2
"	7	8	58	108.1
"	8	9	65	114.4
"	9	10	10 Blows	1/2"
	10	11		
	11	12		
	12	13		

LAST 10 Blows = 1/2" @ 8.0' = 176.0 Ton

Substructure Project 1220-5-71
East Abutment thru Pier 8
and
Pier 45 thru West Abutment


1220-5-71 I-IG 43-1(70)115
MILWAUKEE-GREEN BAY RD.
TOWER DRIVE BRIDGE
I.H. 43
BROWN COUNTY
CONTRACT NO. I
BRIDGE LOG



1220-5-71 I-ZG43-1.70,115

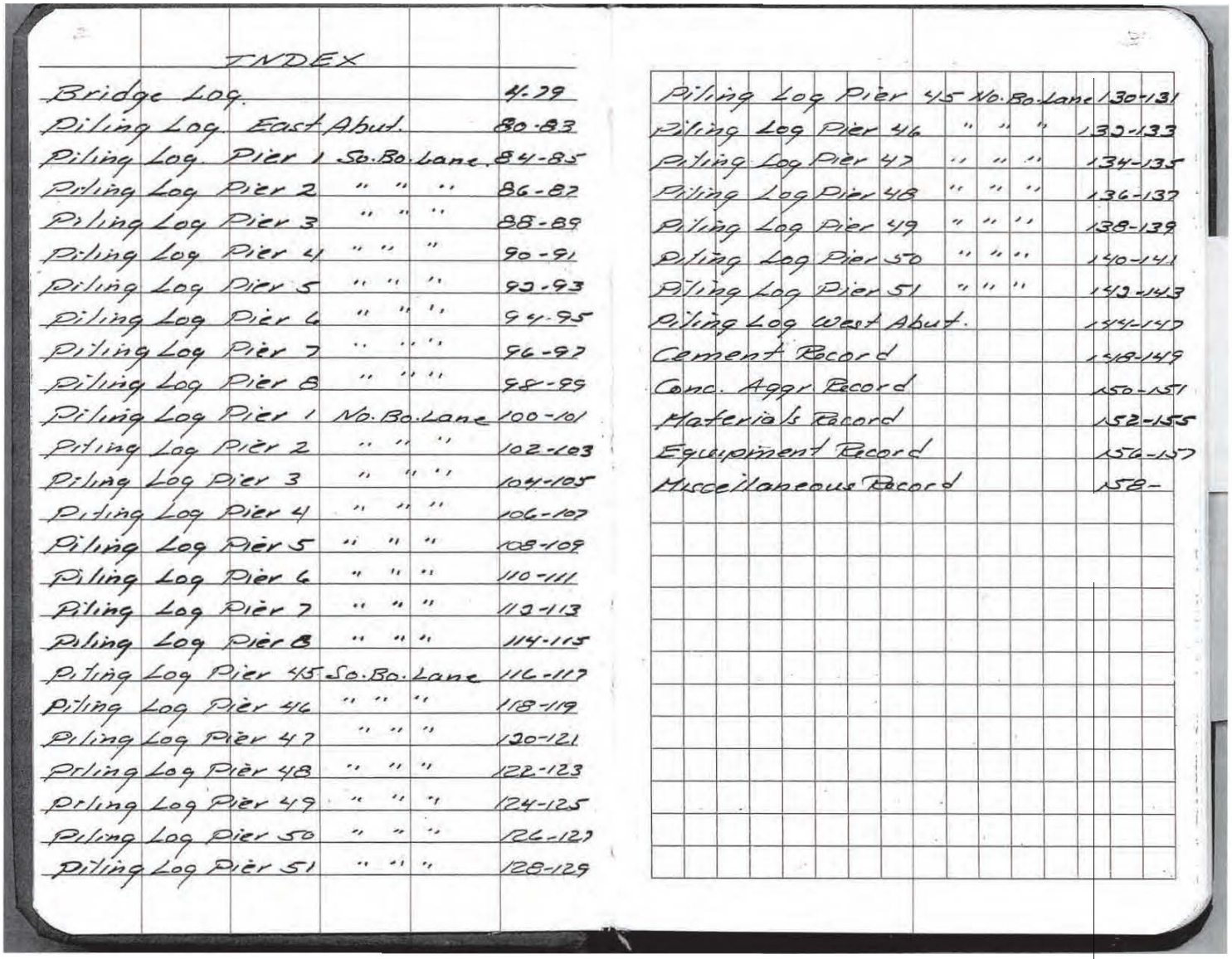
MILWAUKEE - GREENBAY ED.
(Tower Drive Bridge)
I.H. 43
BROWN COUNTY
1970
CONTRACT NO:
0.368 MILES

Proj. Engineer Field Address
DENNIS PAULI
1220 VALLEY VIEW RD.
GREEN BAY, WIS

Contractor Address.
THEIFER BROTHERS
124 MEADE ST. APPLETON, WIS.

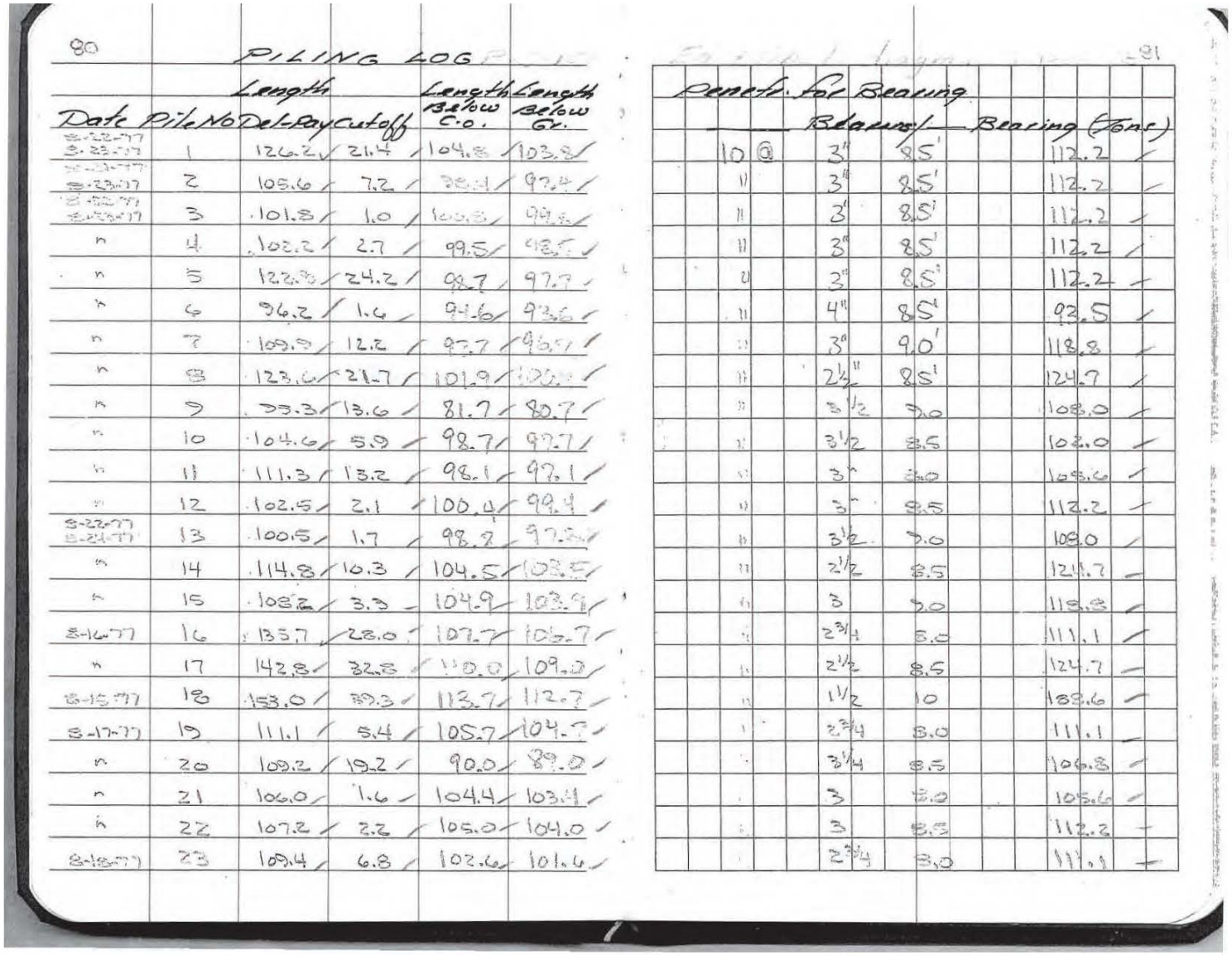
Note Book No.

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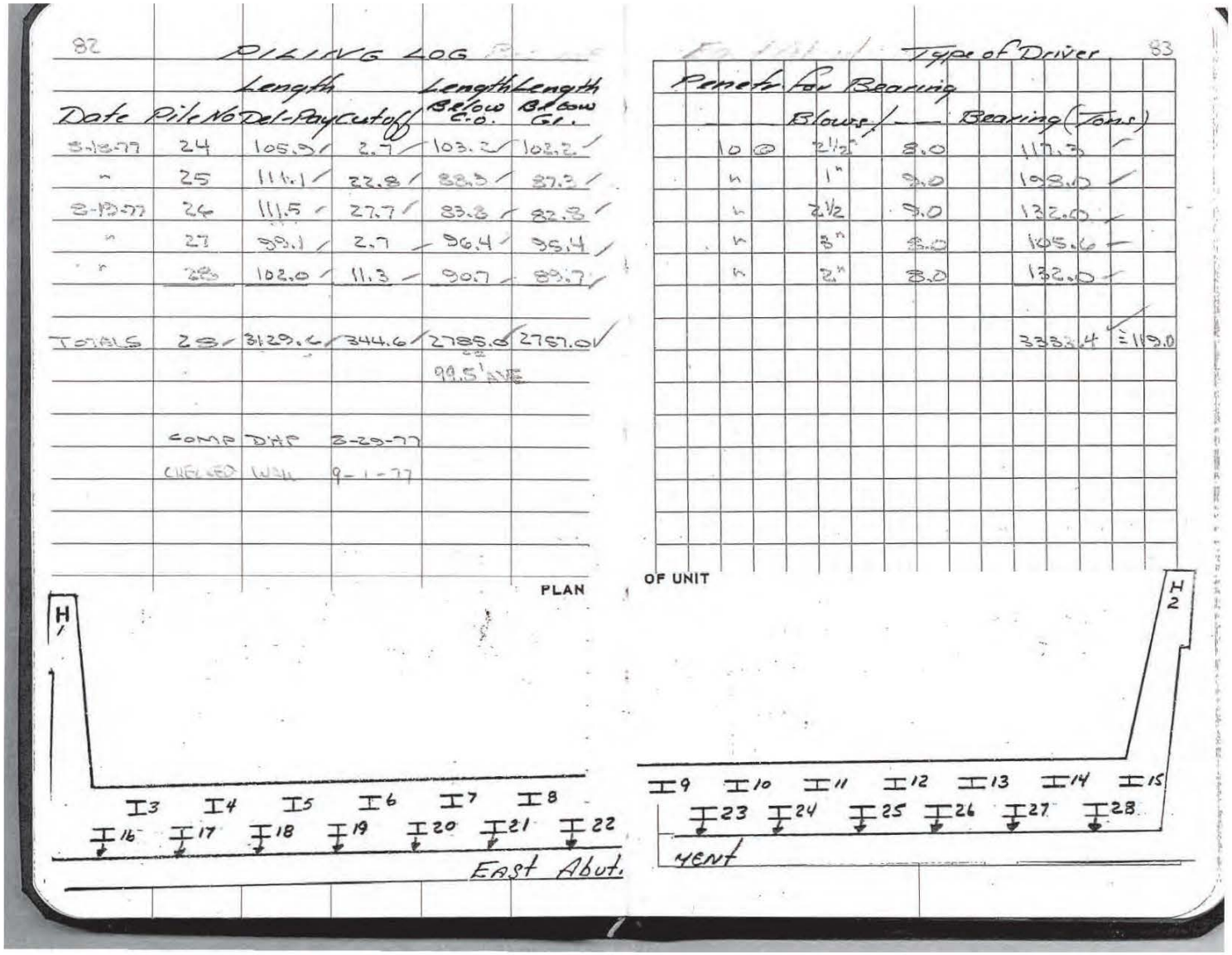


80 PILING LOG

Date	Pile No	Length Del.	Length Cutoff	Length Below C.O.	Length Below Gr.
8-22-77 8-23-77	1	126.2	21.4	104.8	103.8
8-23-77	2	105.6	7.2	98.4	97.4
8-23-77	3	101.8	1.0	100.8	99.8
"	4	102.2	2.7	99.5	98.5
"	5	122.8	24.2	98.7	97.7
"	6	96.2	1.6	94.6	93.6
"	7	109.9	12.2	97.7	96.7
"	8	123.6	21.7	101.9	100.9
"	9	93.3	13.6	81.7	80.7
"	10	104.6	5.9	98.7	97.7
"	11	111.3	13.2	98.1	97.1
"	12	102.5	2.1	100.4	99.4
8-23-77 8-24-77	13	100.5	1.7	98.8	97.8
"	14	114.8	10.3	104.5	103.5
"	15	108.2	3.3	104.9	103.9
8-16-77	16	135.7	28.0	107.7	106.7
"	17	142.8	32.8	110.0	109.0
8-15-77	18	153.0	39.3	113.7	112.7
8-17-77	19	111.1	5.4	105.7	104.7
"	20	109.2	19.2	90.0	89.0
"	21	106.0	1.6	104.4	103.4
"	22	107.2	2.2	105.0	104.0
8-18-77	23	109.4	6.8	102.6	101.6

81

Length for Bearing		Bearing	Bearing (Tons)	
10 @	3"	85'	112.2	✓
"	3"	85'	112.2	✓
"	3"	85'	112.2	✓
"	3"	85'	112.2	✓
"	3"	85'	112.2	✓
"	4"	85'	93.5	✓
"	3"	90'	118.8	✓
"	2½"	85'	124.7	✓
"	3½	90	108.0	✓
"	3½	85	102.0	✓
"	3"	90	108.6	✓
"	3"	85	112.2	✓
"	3½	90	108.0	✓
"	2½	85	124.7	✓
"	3	90	118.8	✓
"	2¾	85	111.1	✓
"	2½	85	124.7	✓
"	1½	10	138.6	✓
"	2¾	80	111.1	✓
"	3¼	85	106.8	✓
"	3	90	105.6	✓
"	3	85	112.2	✓
"	2¾	80	111.1	✓



82

PILING LOG

Date	Pile No	Length Del.	Length Cut-off	Length Below C.O.	Length Below G.L.
3-18-77	24	105.9	2.7	103.2	102.2
"	25	111.1	22.8	88.3	87.3
3-19-77	26	111.5	27.7	83.8	82.8
"	27	99.1	2.7	96.4	95.4
"	28	102.0	11.3	90.7	89.7
TOTALS	28	3129.6	344.6	2785.0	2767.0

99.5' AVE

COMP DRIVE 3-29-77

CHECKED WITH 9-1-77

Type of Driver

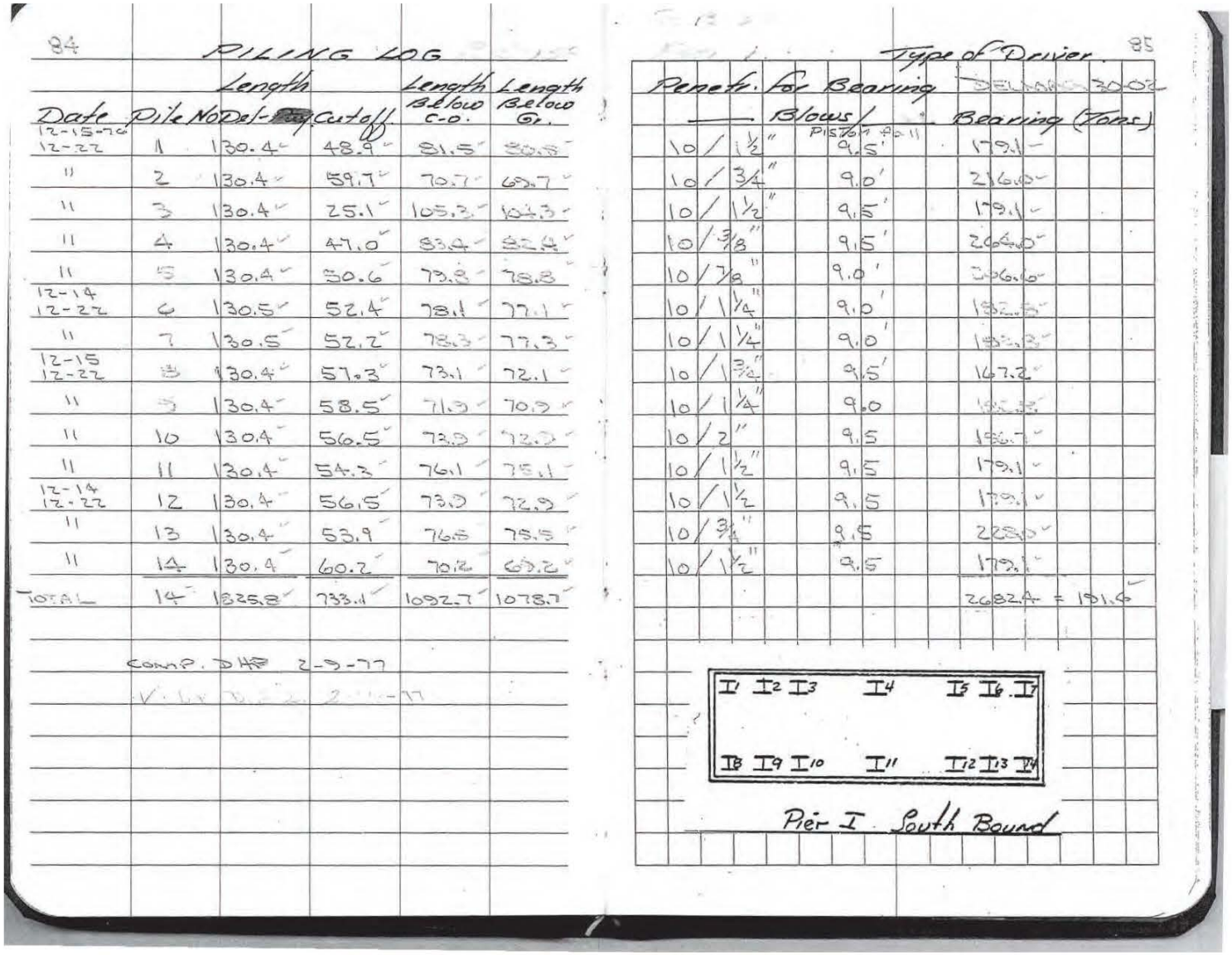
83

Penetr for Bearing

		Blows/	Bearing (Tons)
10 @	2½"	8.0	117.3
"	1"	8.0	198.0
"	½"	8.0	132.0
"	3"	8.0	105.6
"	2"	8.0	132.0
			3383.4 ÷ 119.0

PLAN

OF UNIT



84

PILING LOG

Date	Pile No.	Length Del.	Length Cutoff	Length Below C-O.	Length Below Gr.
12-15-76 12-22	1	130.4'	48.9'	81.5'	80.5'
"	2	130.4'	59.7'	70.7'	69.7'
"	3	130.4'	25.1'	105.3'	104.3'
"	4	130.4'	47.0'	83.4'	82.4'
"	5	130.4'	50.6'	79.8'	78.8'
12-14 12-22	6	130.5'	52.4'	78.1'	77.1'
"	7	130.5'	52.2'	78.3'	77.3'
12-15 12-22	8	130.4'	57.3'	73.1'	72.1'
"	9	130.4'	58.5'	71.9'	70.9'
"	10	130.4'	56.5'	73.9'	72.9'
"	11	130.4'	54.3'	76.1'	75.1'
12-14 12-22	12	130.4'	56.5'	73.9'	72.9'
"	13	130.4'	53.9'	76.5'	75.5'
"	14	130.4'	60.2'	70.2'	69.2'
TOTAL	14	1825.8'	733.1'	1092.7'	1078.7'

COMP. DATE 2-9-77

85

Type of Driver DELMAG D30-02

Penetr. for Bearing

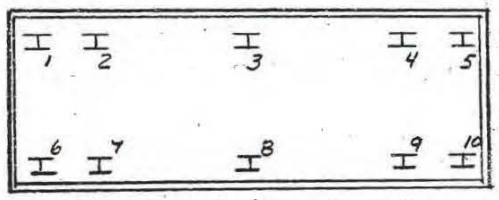
Blows /	Bearing (Tons)
10 / 1½"	9.5' 179.1
10 / ¾"	9.0' 216.0
10 / 1½"	9.5' 179.1
10 / ⅜"	9.5' 204.0
10 / ⅞"	9.0' 206.6
10 / 1¼"	9.0' 192.8
10 / 1¼"	9.0' 192.8
10 / 1¾"	9.5' 167.2
10 / 1¼"	9.0 192.8
10 / 2"	9.5 156.7
10 / 1½"	9.5 179.1
10 / 1½	9.5 179.1
10 / ¾"	9.5 228.0
10 / 1½"	9.5 179.1
	2682.4 ÷ 191.6

Pier I South Bound

86

PILING LOG

Date	Pile No	Del-[illegible] Length	Cutoff Length	Length Below C.O.	Length Below Gr.
12-17 12-28	1 *	130.5'	58.5'	71.7'	
12-17 12-28	2 *	130.4'	54.0'	76.4'	
12-17 12-28	3	130.4'	51.2'	79.2'	78.2'
12-17 12-28	4	130.4'	55.3'	75.1'	74.1'
12-16 12-28	5	130.4'	48.9'	81.5'	80.5'
12-17 12-27	6 *	130.4'	55.4'	75.0'	
12-17 12-27	7 *	130.4'	58.5'	71.9'	
12-17 12-27	8	130.5'	55.0'	75.5'	74.5'
12-17 12-27	9	130.4'	49.5'	80.9'	79.9'
12-17 12-27	10	130.4'	55.0	75.4'	74.4'
1-14 1-24	11	114.1'	38.3	75.8	74.8
1-14 1-24	12	107.4	19.3	87.5	86.5
1-14 1-24	13	103.0	23.3	85.1	84.1
1-14 1-24	14	106.0	27.5	78.5	77.5
TOTAL	14	1740.7'	651.2	1089.5	783.5



Pier 2 South Bound Lane

2

Type of Driver

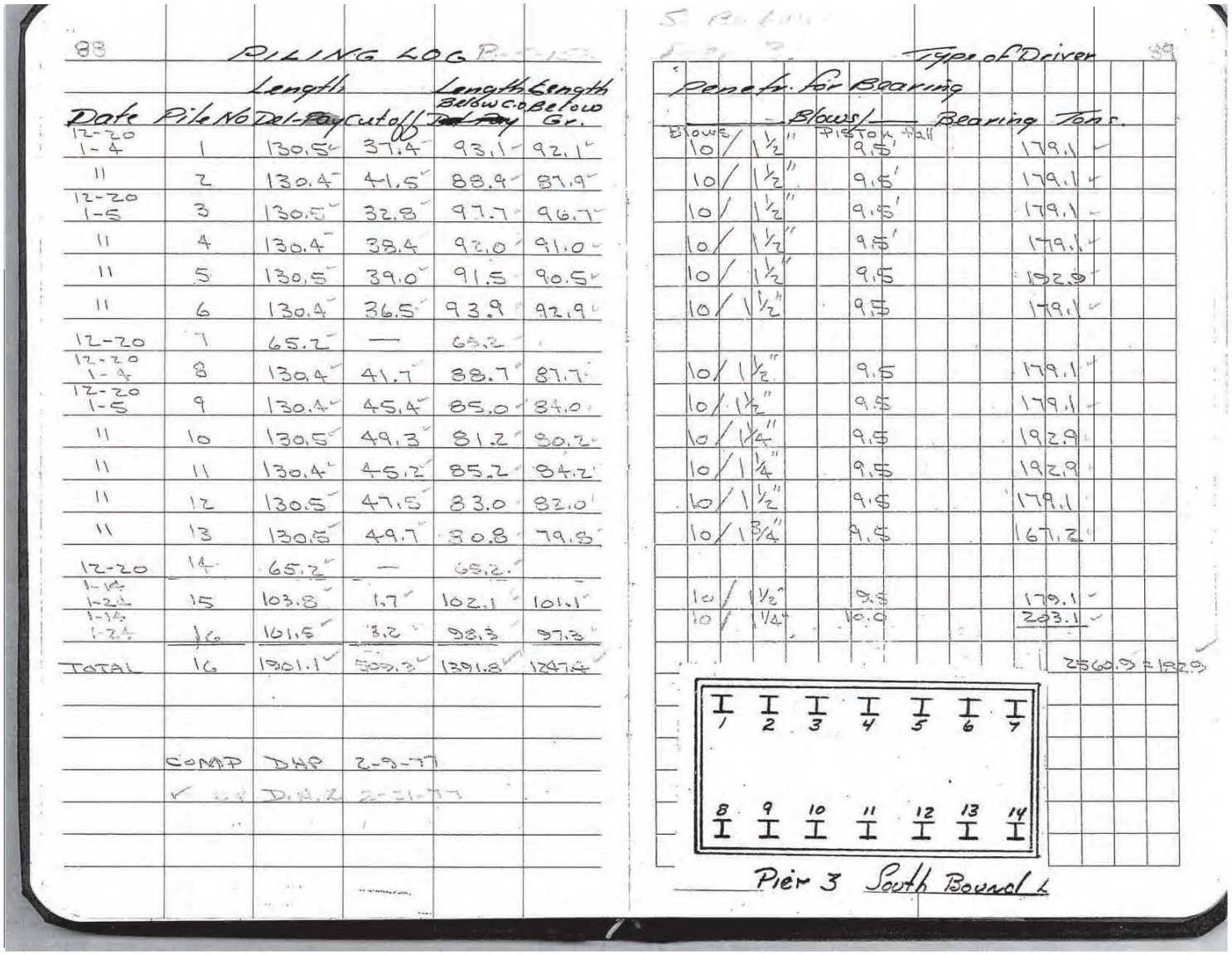
87

Penetr. for Bearing

Blows/	Piston Ra'	Bearing (Tons)
10 / 1½"	9.5'	
10 / 1¼"	9.5'	
10 / 1¼"	9.5'	179.1'
10 / 1¼"	9.5'	192.9'
10 / 1½"	9.5'	179.1'
10 / 1"	9.0'	
10 / ¾"	9.5'	
10 / 1½"	9.5'	179.1'
10 / 1¼"	9.5'	192.9'
10 / 1¼"	9.5'	192.9'
10 / 1"	10.0	220.0'
10 / 1½"	10.0	138.6'
10 / 1½"	10.0	138.6"
10 / 1½"	10.0	138.6'
		1901.3 = 190.2

* NOTE: THESE PILE DRIVEN OUTSIDE THE FOOTING

COMP. DNP 2-9-77



88

PILING LOG

Date	Pile No	Length Del.	Length Cutoff	Length Below C.O.	Length Below Gr.
12-20 1-4	1	130.5	37.4	93.1	92.1
11	2	130.4	41.5	88.9	87.9
12-20 1-5	3	130.5	32.8	97.7	96.7
11	4	130.4	38.4	92.0	91.0
11	5	130.5	39.0	91.5	90.5
11	6	130.4	36.5	93.9	92.9
12-20	7	65.2	—	65.2	
12-20 1-4	8	130.4	41.7	88.7	87.7
12-20 1-5	9	130.4	45.4	85.0	84.0
11	10	130.5	49.3	81.2	80.2
11	11	130.4	45.2	85.2	84.2
11	12	130.5	47.5	83.0	82.0
11	13	130.5	49.7	80.8	79.8
12-20	14	65.2	—	65.2	
1-14 1-21	15	103.8	1.7	102.1	101.1
1-14 1-21	16	101.5	3.2	98.3	97.3
TOTAL	16	1901.1	509.3	1391.8	1247.8
	COMP	DHP	2-9-77		
		D.H.P.	2-21-77		

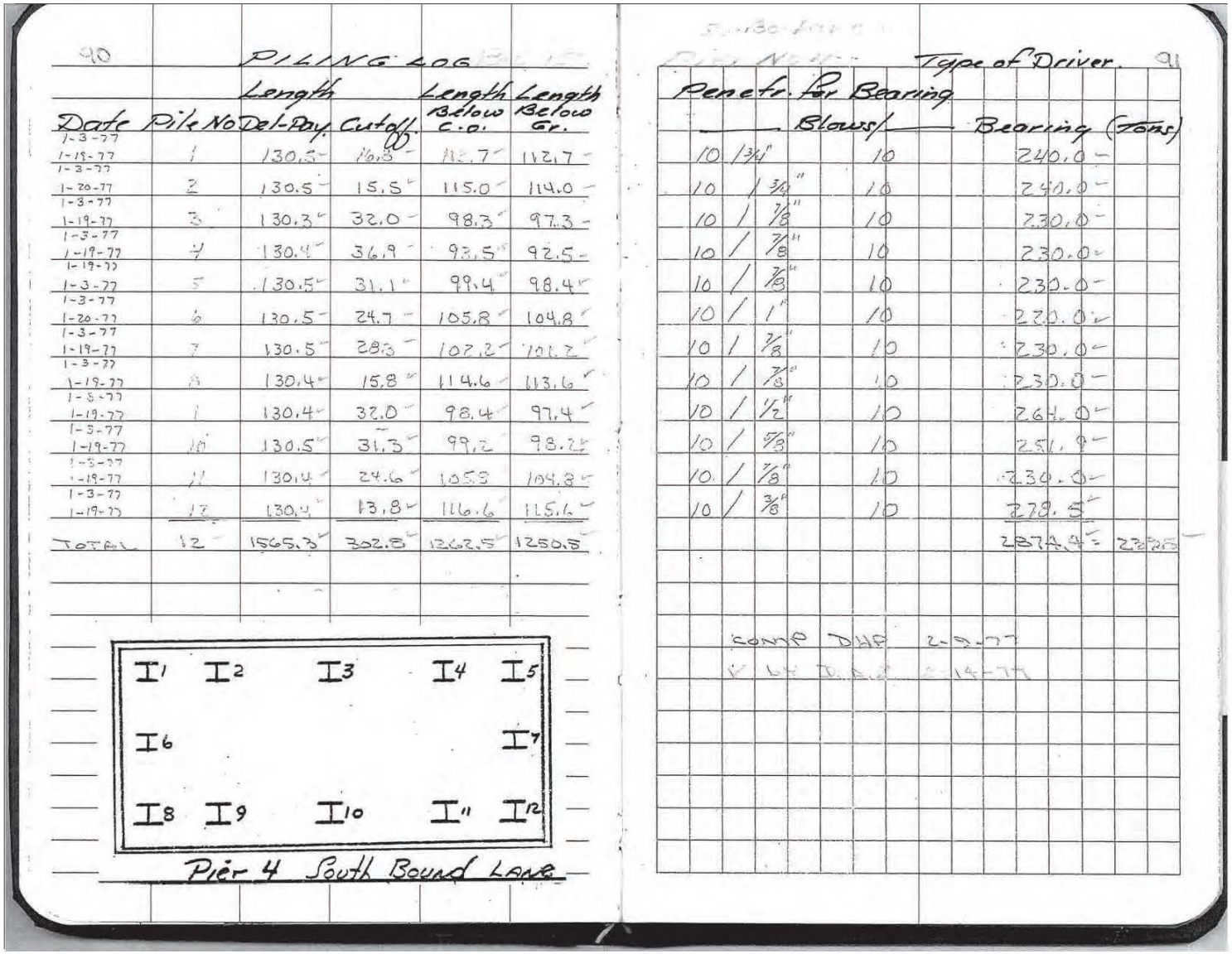
Types of Driver

Penetr. for Bearing

Blows	/		Pistons Fall	Bearing Tons.
10	/	1½"	9.5'	179.1
10	/	1½"	9.5'	179.1
10	/	1½"	9.5'	179.1
10	/	1½"	9.5'	179.1
10	/	1½"	9.5	192.9
10	/	1½"	9.5	179.1
10	/	1½"	9.5	179.1
10	/	1½"	9.5	179.1
10	/	1¼"	9.5	192.9
10	/	1¼"	9.5	192.9
10	/	1½"	9.5	179.1
10	/	1¾"	9.5	167.2
10	/	1½"	9.5	179.1
10	/	1¼"	10.0	203.1

2560.9 ÷ 182.9

Pier 3 South Bound



90

PILING LOG

Date	Pile No	Length Del-Day	Length Cutoff	Length Below C.O.	Length Below Gr.
1-3-77 / 1-19-77	1	130.5	16.8	113.7	112.7
1-3-77 / 1-20-77	2	130.5	15.5	115.0	114.0
1-3-77 / 1-19-77	3	130.3	32.0	98.3	97.3
1-3-77 / 1-19-77	4	130.4	36.9	93.5	92.5
1-19-77 / 1-3-77	5	130.5	31.1	99.4	98.4
1-3-77 / 1-20-77	6	130.5	24.7	105.8	104.8
1-3-77 / 1-19-77	7	130.5	28.3	102.2	101.2
1-3-77 / 1-19-77	8	130.4	15.8	114.6	113.6
1-3-77 / 1-19-77	9	130.4	32.0	98.4	97.4
1-3-77 / 1-19-77	10	130.5	31.3	99.2	98.2
1-3-77 / 1-19-77	11	130.4	24.6	105.8	104.8
1-3-77 / 1-19-77	12	130.4	13.8	116.6	115.6
TOTAL	12	1565.3	302.8	1262.5	1250.5

Pier 4 South Bound Lane

91

Type of Driver

Penetr. for Bearing Blows/			Bearing (Tons)
10	1 3/4"	10	240.0
10	1 3/4"	10	240.0
10	1 7/8"	10	230.0
10	1 7/8"	10	230.0
10	1 7/8"	10	230.0
10	1 1"	10	220.0
10	1 7/8"	10	230.0
10	1 7/8"	10	230.0
10	1 1/2"	10	264.0
10	1 7/8"	10	251.9
10	1 7/8"	10	230.0
10	1 7/8"	10	278.5
			2874.4 = 2872.5

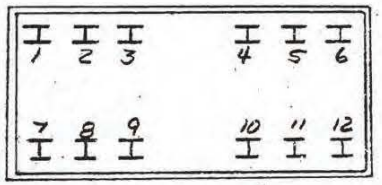
COMP DHP 2-9-77

V L4 D.S.2 2-14-77

92

PILING LOG

Date	Pile No	Length Del-Ray Cutoff.	Length Below C.O.	Length Below Gr.
1-26-77 2-3&3-77	1	261.0	200.4	199.4
1-26-77 2-3-77	2	130.5	14.0	116.5	115.5
1-26-77 2-2-77	3	130.5	15.5	115.0	114.0
1-26-77 2-1-77	4	130.4	16.8	114.6	113.6
1-26-77 2-1&3-77	5	213.7	15.4	198.3	197.3
1-26-77 2-1-77	6	130.5	27.1	103.4	102.4
1-25-77 2-2-77	7	130.5	16.2	114.3	113.2
1-26-77 2-2-77	8	130.4	27.2	103.2	102.2
1-26-77 2-2-77	9	130.4	19.7	110.7	109.7
1-26-77 2-2-77	10	130.4	17.2	113.2	112.2
1-26-77 2-2-77	11	130.4	26.7	103.7	102.7
1-26-77 2-2-77	12	130.4	25.2	105.2	104.2
Total	12	1,779.1	280.6	1,498.5	1,486.5



Pier 5 South Bound

93

Type of Driver

Penetr. for Bearing

Blows/		Bearing (Tons)
10 / 1½"	9.5	179.1
10 / 3/4"	10.0	240.0
10 / 3/4"	10.0	240.0
10 / 1/2"	10.0	264.0
10 / 3/4"	9.5	228.0
10 / 1"	10.0	220.0
10 / 1"	9.5	209.0
10 / 1"	9.5	209.0
10 / 1"	10.0	220.0
10 / 1"	10.0	209.0
10 / 1"	9.5	209.0
10 / 7/8"	10.0	230.0
		221.4

COMP DHP 2-10-77

94

PILING LOG

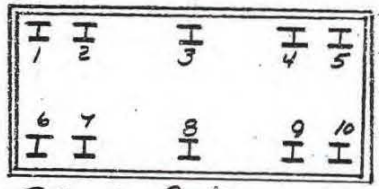
Date	Pile No.	Length Del.	Length Pay	Cutoff	Length Below Gd.	Length Below Gr.
1-21-77 2-4-77	1	130.5		7.3	123.2	122.2
1-21-77 2-4-77	2	130.5		7.7	122.8	121.8
1-21-77 2-4-77	3	130.5		8.6	121.9	120.9
1-21-77 2-4-77	4	130.6		9.2	121.4	120.4
1-21-77 2-4-77	5	130.6		7.6	123.0	122.0
1-24-77 2-2-77	6	130.6		7.4	123.2	122.2
1-24-77 2-2-77	7	130.4		6.5	123.9	122.9
1-25-77 2-3-77	8	130.4		7.2	123.2	122.2
1-25-77 2-3-77	9	130.6		8.5	122.1	121.1
1-25-77 2-4-77	10	130.6		9.2	121.4	120.4
Total	10	1,305.3		79.2	1,226.1	1216.1

COMP DIFF 2-10-77

95

Type of Driver

Penetr. for Bearing Blows/		Bearing (Tons)
10 / 1"	9.5	209.0
10 / 1 1/8"	9.5'	200.6
10 / 1"	9.5'	209.0
10 / 1 1/8	9.5'	200.6
10 / 1"	9.5'	209.0
10 / 1"	9.5'	209.0
10 / 1"	9.5'	209.0
10 / 1"	9.5'	209.0
10 / 1 1/4"	9.5'	182.9
10 / 1"	9.0'	183.0
		204.6



Pier 6 South Bound L.

PILING LOG

Date	Pile No.	Length Del-Pay	Length Cutoff	Length Below C.G.	Length Below Gr.
2-10-77 2-11-77	1	130.5	18.3	112.2	111.2
〃	2	130.4	20.8	109.6	108.6
〃	3	130.4	19.1	111.3	110.3
〃	4	130.5	19.4	111.1	110.1
2-9-77 2-11-77	5	130.4	12.8	117.6	116.6
2-10-77 2-11-77	6	130.4	19.5	110.9	109.9
2-9-77 2-11-77	7	130.5	16.7	113.8	112.8
〃	8	130.5	11.4	119.1	118.1
〃	9	130.4	16.0	114.4	113.4
〃	10	130.4	16.1	114.3	113.3
〃	11	130.5	19.4	111.1	110.1
2-10-77 2-11-77	12	130.6	9.9	120.7	119.7
TOTAL	12	1565.5	199.4	1366.1	1354.1

Comp. Bk. 44. 2-10-77

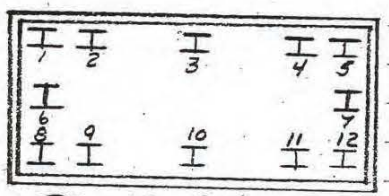
Pier 7 Bk. 2-3 = 2-11-77

Pier 7 Type of Driver 97

Penetr. for Bearing

Blows/		Bearing (Tons)
10/ 1½"	9.5	179.1
10/ 1"	9.5	209.0
10/ 1¼"	9.0	182.8
10/ 1½"	9.0	169.7
10/ 1½"	9.5	179.1
10/ 1½"	9.5	179.1
10/ 1½"	9.5	179.1
10/ 1"	9.5	209.0
10/ 1½"	9.5	179.1
10/ 1½"	9.5	179.1
10/ 1"	9.5	209.0
10/ 1½"	9.5	179.1
		2233.2

AVG. TONS BEARING 12 = 186.1



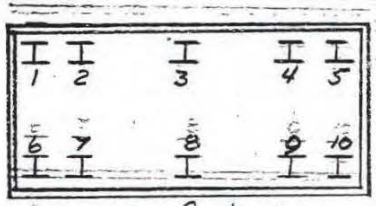
Pier 7 South Bound

98 PILING LOG

Date	Pile No.	Length Del-Pay	Cutoff	Length Below C-O.	Length Below Gr.
2-15-77 2-16-77	1	130.4	10.8	119.6	118.6
2-15-77 2-16-77	2	130.4	11.0	119.4	118.4
2-15-77 2-16-77	3	130.5	9.1	121.4	120.4
2-14-77 2-16-77	4	130.4	18.1	112.3	111.3
2-14-77 2-16-77	5	130.5	8.0	122.5	121.5
2-14-77 2-16-77	6	130.4	13.6	116.8	115.8
2-12-77 2-16-77	7	130.4	11.8	118.6	117.6
2-12-77 2-16-77	8	130.5	9.4	121.1	120.1
2-14-77 2-16-77	9	130.5	13.1	117.4	116.4
2-14-77 2-16-77	10	130.4	13.0	117.4	116.4
TOTAL		1304.4	117.9	1186.5	1176.5

CONTD ON [illegible] 2-18-77

V 6 TO 4.2. 2-21-77



Pier 8 South Bound

99 Type of Driver

Penetr. for Last	Bearing Blows/	Bearing Tons.
10 / 1¼"	9.8'	192.9
10 / 1"	9.0'	198.0
10 / ½"	9.5'	250.8
10 / 1⅛"	9.5'	200.6
10 / 1¼"	9.5'	192.9
10 / 1"	9.5'	209.0
10 / 1¼"	9.5'	192.9
10 / 1"	9.5'	209.0
10 / 1"	9.5'	209.0
10 / 1¼"	9.5'	192.9
		2043.5 = 204.3

100

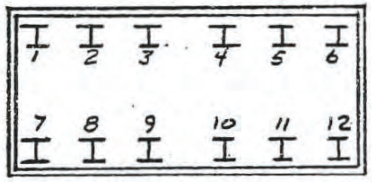
PILING LOG

Type of Driver

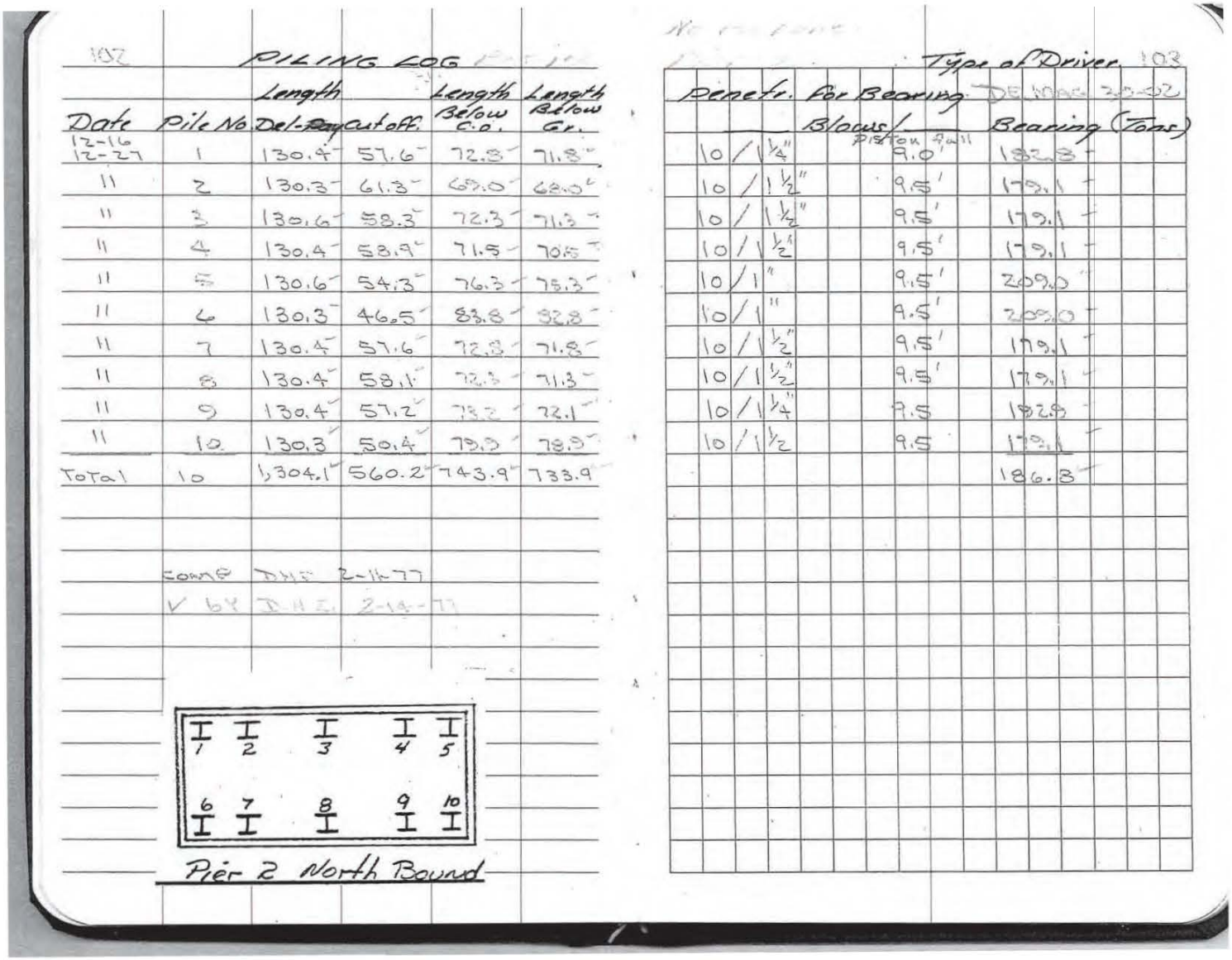
Date	Pile No.	Length Del.	Length Cutoff.	Length Below C.O.	Length Below Gr.	Penetr. for Last Blows /	Bearing Distance	Bearing (Tons)
12-15 12-22	1	130.4	50.7	79.7	78.7	10 / 1¼"	9.5	179.1
11	2	130.4	57.5	72.9	71.9	10 / 1½"	9.5	179.1
11	3	130.2	57.5	72.7	71.7	10 / 1½"	9.5	179.1
12-16 12-22	4	130.4	50.8	79.6	78.6	10 / 1¾"	9.5	167.2
11	5	130.4	51.5	78.9	77.9	10 / 1¾"	9.5	167.2
11	6	130.3	51.0	79.3	78.3	10 / 1¾"	9.5	167.2
12-15 12-27	7	130.5	50.1	80.4	79.4	10 / 1¼"	9.5	192.9
11	8	130.3	49.3	81.0	80.0	10 / 1½	9.5	179.1
11	9	130.3	47.9	82.4	81.4	10 / 1½"	9.5	179.1
12-16 12-27	10	130.4	53.9	76.5	75.5	10 / 1"	9.5	203.0
11	11	130.5	53.2	77.3	76.3	10 / 1½"	9.0	169.7
11	12	130.2	52.9	77.3	76.3	10 / 1½	9.5	179.1
Total	12	1,564.3	626.3	938.0	926.0			179.0

Comp Date 2-11-77

Insp. 2-14-77



Pier 1 North Bound Lane



PILING LOG

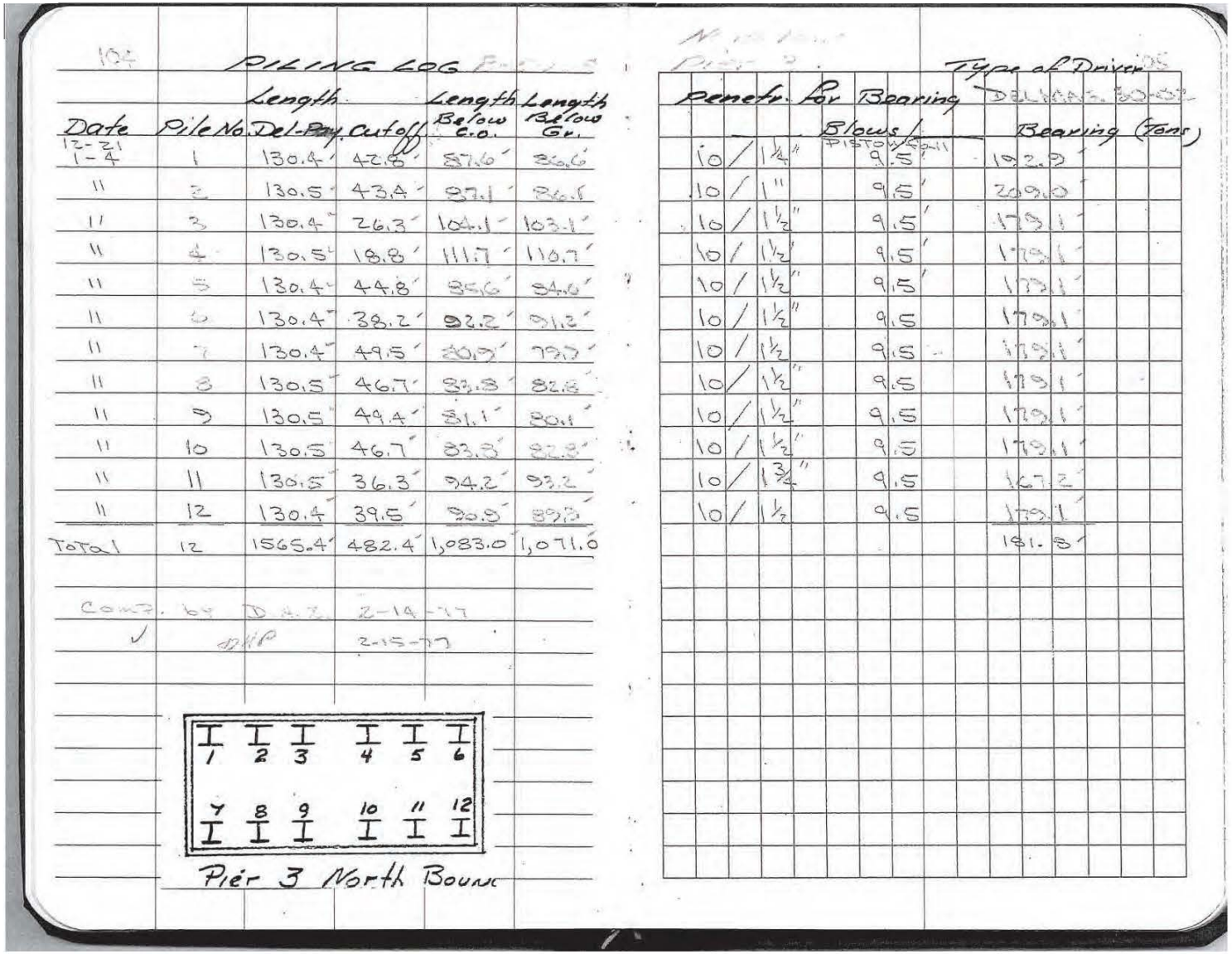
Type of Driver

Date	Pile No	Length Del.	Length cut off	Length Below C.O.	Length Below Gr.	Penetr. For Bearing Blows/	Bearing (Tons)
12-16 12-27	1	130.4'	57.6'	72.8'	71.8'	10 / 1 1/4"	182.3
11	2	130.3'	61.3'	69.0'	68.0'	10 / 1 1/2"	179.1
11	3	130.6'	58.3'	72.3'	71.3'	10 / 1 1/2"	179.1
11	4	130.4'	58.9'	71.5'	70.5'	10 / 1 1/2"	179.1
11	5	130.6'	54.3'	76.3'	75.3'	10 / 1"	209.0
11	6	130.3'	46.5'	83.8'	82.8'	10 / 1"	209.0
11	7	130.4'	57.6'	72.8'	71.8'	10 / 1 1/2"	179.1
11	8	130.4'	58.1'	72.3'	71.3'	10 / 1 1/2"	179.1
11	9	130.4'	57.2'	73.2'	72.1'	10 / 1 1/4"	182.9
11	10	130.3'	50.4'	79.9'	78.9'	10 / 1 1/2	179.1
Total	10	1304.1'	560.2'	743.9'	733.9'		186.8

Complete DHE 2-14-77

Verified by DHE 2-14-77

Pier 2 North Bound



PILING LOG

Type of Driving: DELMAG D-30-02

Date	Pile No.	Length Del.	Pay Length Cutoff	Length Below C.O.	Length Below Gr.	Penetr. For Bearing Blows /	Bearing (Tons)
12-21 1-4	1	130.4'	42.6'	87.6'	86.6'	10 / 1¼" PISTON 9.5'	209.9'
"	2	130.5'	43.4'	87.1'	86.5'	10 / 1" 9.5'	209.0'
"	3	130.4'	26.3'	104.1'	103.1'	10 / 1½" 9.5'	179.1'
"	4	130.5'	18.8'	111.7'	110.7'	10 / 1½" 9.5'	179.1'
"	5	130.4'	44.8'	85.6'	84.6'	10 / 1½" 9.5'	179.1'
"	6	130.4'	38.2'	92.2'	91.2'	10 / 1½" 9.5	179.1'
"	7	130.4'	49.5'	80.9'	79.9'	10 / 1½" 9.5	179.1'
"	8	130.5'	46.7'	83.8'	82.8'	10 / 1½" 9.5	179.1'
"	9	130.5'	49.4'	81.1'	80.1'	10 / 1½" 9.5	179.1'
"	10	130.5'	46.7'	83.8'	82.8'	10 / 1½" 9.5	179.1'
"	11	130.5'	36.3'	94.2'	93.2'	10 / 1¾" 9.5	167.2'
"	12	130.4'	39.5'	90.9'	89.9'	10 / 1½" 9.5	179.1'
Total	12	1565.4'	482.4'	1,083.0'	1,071.0'		181.3'

Cont. by D.A.Z. 2-14-77

✓ MHP 2-15-77

Pier 3 North Bound

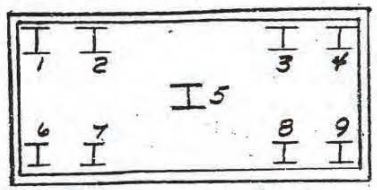
106

PILING LOG

Date	Pile No.	Length Del.	Length Pay	Length Cutoff.	Length Below C-O.	Length Below Gr.
12-08-77						
1-14-77	1	130.5'		32.5'	98.0'	97.0'
"	2	130.6'		32.7'	97.9'	96.9'
"	3	130.5'		28.1'	102.4'	101.4'
"	4	130.4'		30.8'	99.6'	98.6'
"	5	130.4'		31.3'	99.1'	98.1'
"	6	130.6'		32.0'	98.6'	97.6'
"	7	130.5'		30.3'	100.2'	99.2'
"	8	130.5'		25.9'	104.6'	103.6'
"	9	130.5'		33.1'	97.4'	96.4'
Total	9	1174.5'		276.7'	897.8'	888.3'

Comp. by D.A.Z. 2-14-77

✓ D&P 2-15-77



Pier 4 North Bound

Type of Driver

Penetr. for Bearing			Blows/	Bearing (Tons)
10	/	1½"	9.5	179.1'
10	/	1½"	9.5	179.1'
10	/	1½"	9.5	179.1'
10	/	1"	9.0	168.0'
10	/	1½"	9.5	179.1'
10	/	1½"	9.0	169.7'
10	/	1½"	9.0	169.7'
10	/	1½"	9.5	179.1'
10	/	1½"	9.5	179.1'
				179.1'

108

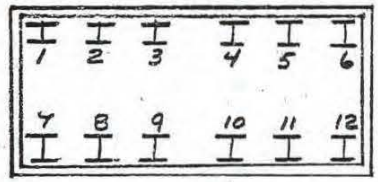
PILING LOG

Type of Driver 109

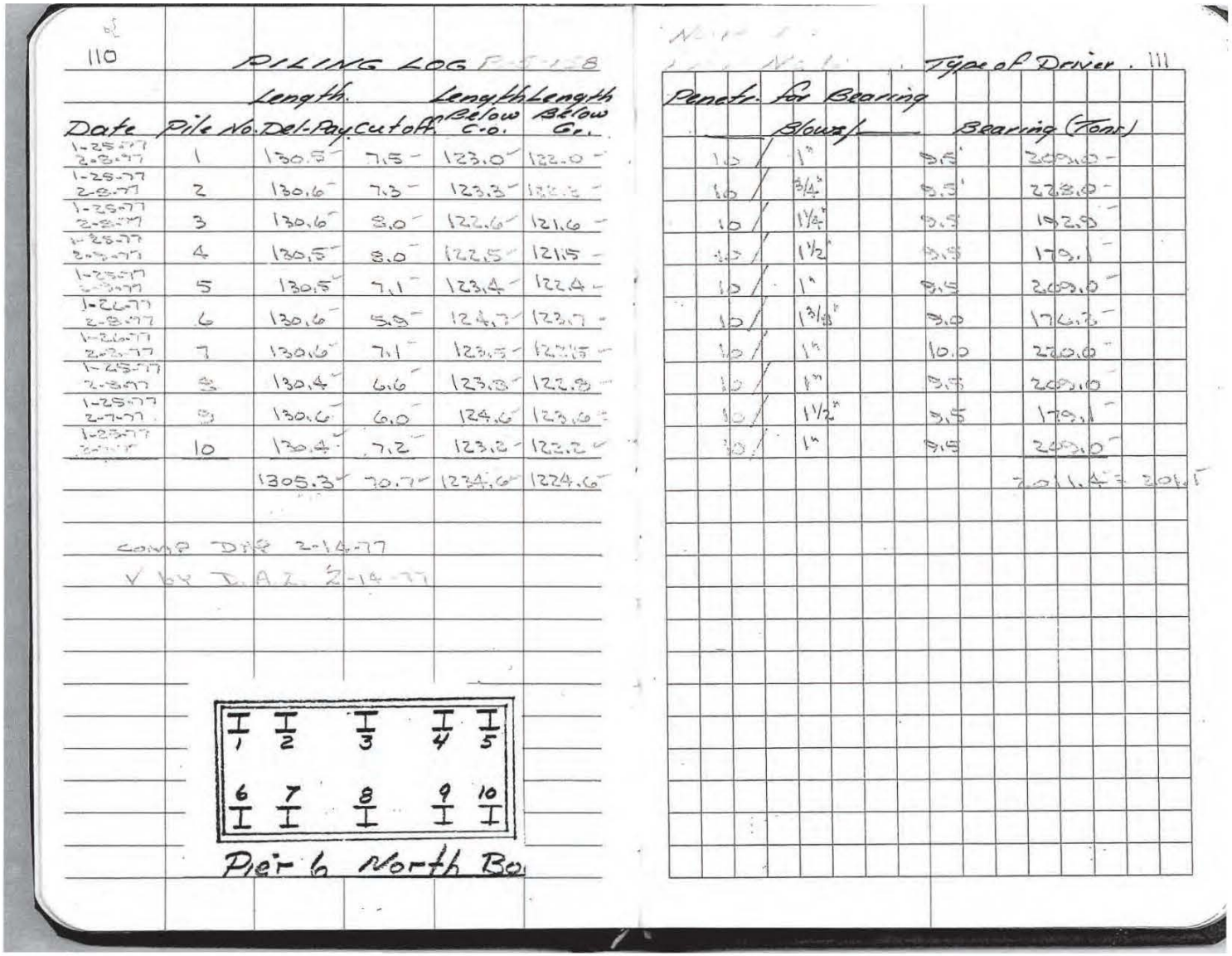
Date	Pile No.	Length Del.	Pay Cutoff	Length Below C.O.	Length Below Gr.
1-21-77 1-26-77	1	130.6'	17.2'	113.4'	112.4'
1-21-77 1-26-77	2	130.6'	29.6'	101.0'	100.0'
1-21-77 1-26-77	3	130.5'	28.7'	101.8'	100.8'
1-21-77 1-26-77	4	130.5'	17.5'	113.0'	112.0'
1-21-77 1-26-77	5	130.5'	26.6'	103.9'	102.9'
1-21-77 1-24-77	6	130.6'	14.4'	116.2'	115.2'
1-21-77 2-1-77	7	130.5'	20.2'	110.3'	109.3'
1-20-77 2-1-77	8	130.5'	26.8'	103.7'	102.7'
1-20-77 2-1-77	9	130.6'	21.0'	109.6'	108.6'
1-20,26-77 2-1,3-77	10	223.8'	26.5'	197.3'	196.3'
1-20-77 1-26-77	11	130.5'	9.0'	121.5'	120.5'
1-20-77 1-26-77	12	130.5'	15.8'	114.7'	113.7'
Total	12	1,659.7'	253.3'	1,406.4'	1394.4'

Penetr. for Bearing

Blows /			Bearing (Tons)
10 /	7/8"	10.0	230.0
10 /	1"	10.0	220.0
10 /	1"	10.0	220.0
10 /	1/2"	10.0	264.0
10 /	1/2"	10.0	264.0
10 /	1/2"	10.0	264.0
10 /	1"	10.0	220.0
10 /	1"	10.0	220.0
10 /	1"	9.5	209.0
10 /	1 1/4"	9.5	199.5
10 /	1"	10.0	220.0
10 /	1"	10.0	220.0
			228.6



Pier 5 North Bound



110

PILING LOG

Date	Pile No.	Length Del.	Length Pay Cutoff	Length Below C.O.	Length Below G.L.
1-25-77 2-8-77	1	130.5'	7.5'	123.0'	122.0'
1-25-77 2-8-77	2	130.6'	7.3'	123.3'	122.3'
1-25-77 2-8-77	3	130.6'	8.0'	122.6'	121.6'
1-25-77 2-8-77	4	130.5'	8.0'	122.5'	121.5'
1-25-77 2-8-77	5	130.5'	7.1'	123.4'	122.4'
1-26-77 2-8-77	6	130.6'	5.9'	124.7'	123.7'
1-26-77 2-8-77	7	130.6'	7.1'	123.5'	122.5'
1-25-77 2-8-77	8	130.4'	6.6'	123.8'	122.8'
1-25-77 2-7-77	9	130.6'	6.0'	124.6'	123.6'
1-25-77 2-8-77	10	130.4'	7.2'	123.2'	122.2'
		1305.3'	70.7'	1234.6'	1224.6'

COMP DR 2-14-77

V by T.A.Z. 2-14-77

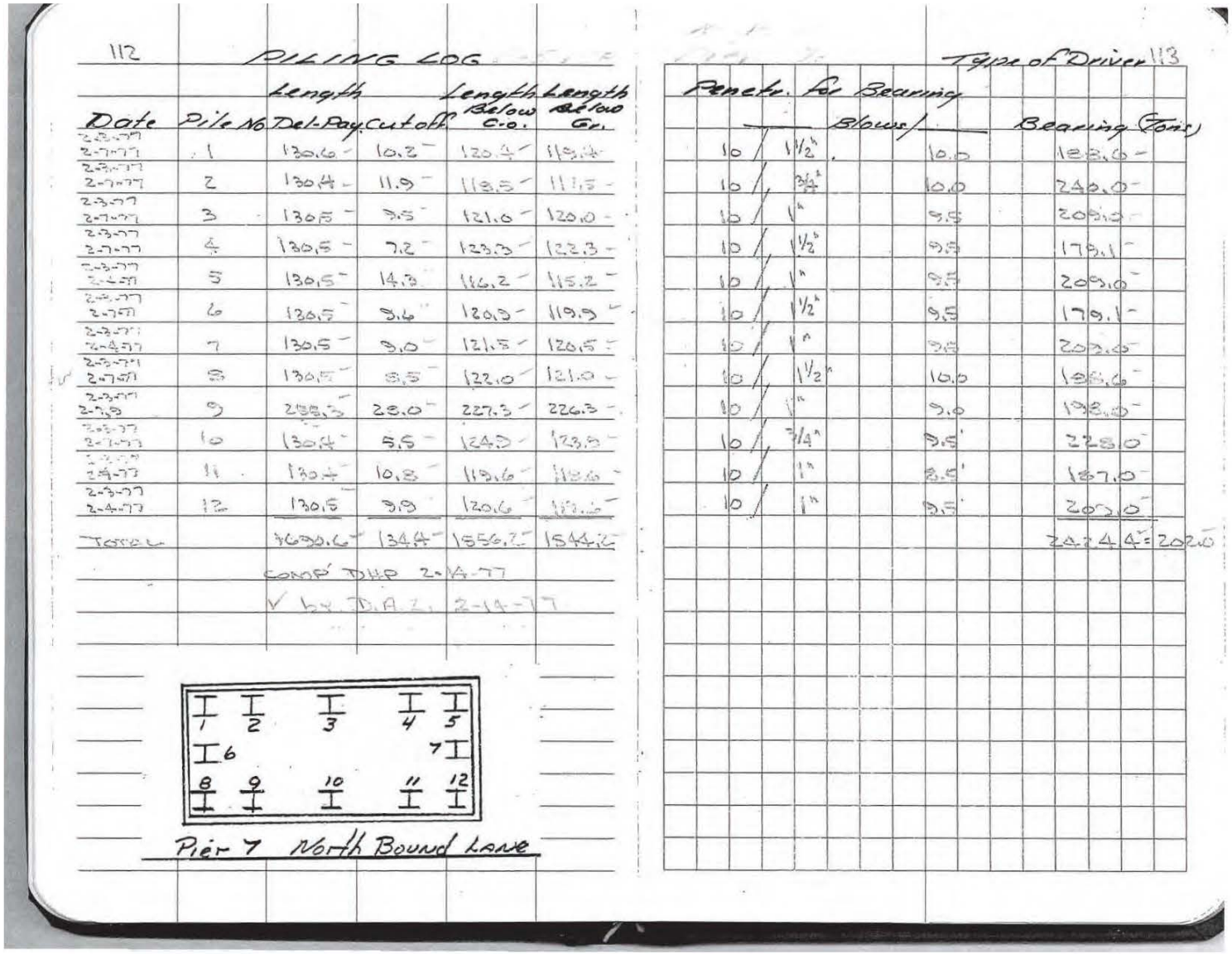
Pier 6 North Ba

Type of Driver . III

Penetr. for Bearing

Blows/		Bearing (Tons)
10 /	1"	209.0
10 /	3/4"	228.0
10 /	1 1/4"	192.0
10 /	1 1/2"	179.1
10 /	1"	209.0
10 /	1 3/8"	176.3
10 /	1"	220.0
10 /	1"	209.0
10 /	1 1/2"	179.1
10 /	1"	209.0

7011.4 = 201.1



112

PILING LOG

Date	Pile No	Length Del-Pay	Length Cutoff	Length Below C.O.	Length Below Gr.
2-3-77 2-7-77	1	130.6'	10.2'	120.4'	119.4'
2-3-77 2-7-77	2	130.4'	11.9'	118.5'	117.5'
2-3-77 2-7-77	3	130.5'	9.5'	121.0'	120.0'
2-3-77 2-7-77	4	130.5'	7.2'	123.3'	122.3'
2-3-77 2-7-77	5	130.5'	14.3'	116.2'	115.2'
2-3-77 2-7-77	6	130.5'	9.6'	120.9'	119.9'
2-3-77 2-4-77	7	130.5'	9.0'	121.5'	120.5'
2-3-77 2-7-77	8	130.5'	8.5'	122.0'	121.0'
2-3-77 2-7-77	9	238.3'	28.0'	227.3'	226.3'
2-3-77 2-7-77	10	130.4'	5.5'	124.9'	123.9'
2-3-77 2-4-77	11	130.4'	10.8'	119.6'	118.6'
2-3-77 2-4-77	12	130.5'	9.9'	120.6'	119.6'
TOTAL		1630.6'	134.4'	1556.7'	1544.2'

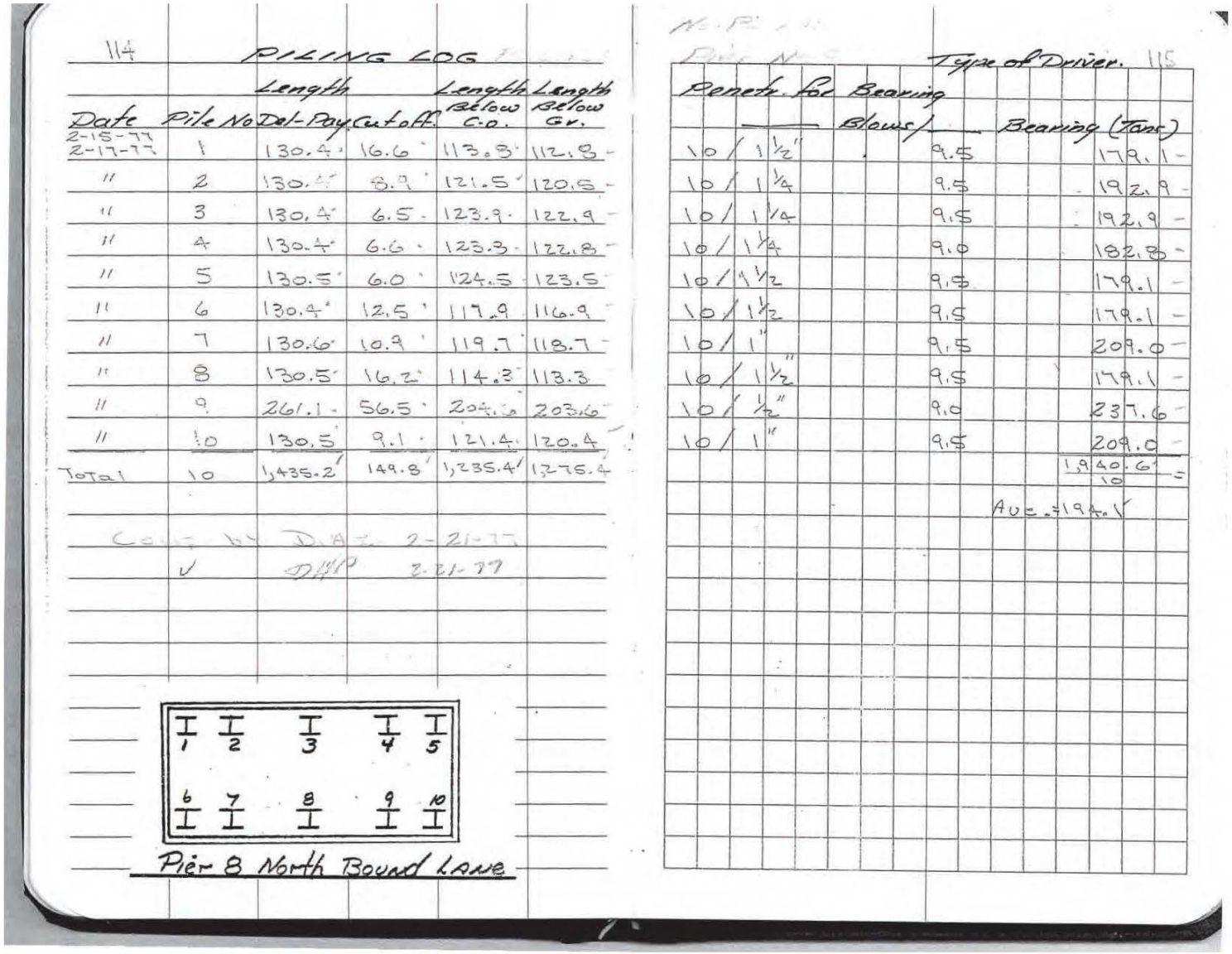
COMP' DTHD 2-14-77

V by DIA 2. 2-14-77

Pier 7 North Bound Lane

Type of Driver 113

Penetr. for Bearing Blows/		Bearing (Tons)
10 / 1½"	10.0	188.0
10 / 3/4"	10.0	240.0
10 / 1"	9.5	209.0
10 / 1½"	9.5	179.1
10 / 1"	9.5	209.0
10 / 1½"	9.5	179.1
10 / 1"	9.5	209.0
10 / 1½"	10.0	188.0
10 / 1"	9.0	198.0
10 / 3/4"	9.5	228.0
10 / 1"	8.5	187.0
10 / 1"	9.5	209.0
		2474 = 2020



114

PILING LOG

Date	Pile No	Length Del-Pay	Length Cutoff	Length Below C.O.	Length Below Gr.
2-15-77 2-17-77	1	130.4'	16.6'	113.8'	112.8'
"	2	130.4'	8.9'	121.5'	120.5'
"	3	130.4'	6.5'	123.9'	122.9'
"	4	130.4'	6.6'	123.3'	122.8'
"	5	130.5'	6.0'	124.5'	123.5'
"	6	130.4'	12.5'	117.9'	116.9'
"	7	130.6'	10.9'	119.7'	118.7'
"	8	130.5'	16.2'	114.3'	113.3'
"	9	261.1'	56.5'	204.6'	203.6'
"	10	130.5'	9.1'	121.4'	120.4'
Total	10	1,435.2'	149.8'	1,235.4'	1,226.4'

Calc. by D.A.T. 2-21-77

✓ DHP 2-21-77

Pier 8 North Bound Lane

115

Type of Driver.

Penetr. for Last	Blows/	Bearing (Tons)
10 / 1½"	9.5	179.1
10 / 1¼	9.5	192.9
10 / 1¼	9.5	192.9
10 / 1¼	9.0	182.8
10 / 1½	9.5	179.1
10 / 1½	9.5	179.1
10 / 1"	9.5	209.0
10 / 1½"	9.5	179.1
10 / ½"	9.0	237.6
10 / 1"	9.5	209.0
		1940.6 / 10 =

Ave. = 194.1 ✓

116 PILING LOG

Date	Pile No	Length Del-Pay	Length cutoff	Length Below C.O.	Length Below Gr.
3-15-77 3-16-77	1	100.3'	13.7'	86.6'	85.6'
"	2	100.4'	13.1'	87.3'	86.3'
3-14-77 3-15-77	3	100.3'	12.6'	87.7'	86.7'
"	4	100.3'	5.7'	94.6'	93.6'
3-11-77 3-15-77	5	100.4'	30.2'	70.2'	69.2'
"	6	100.3'	13.9'	86.4'	85.4'
3-16-77 3-16-77	7	100.4'	5.5'	94.9'	93.9'
"	8	100.4'	5.3'	95.1'	94.1'
3-10-77 3-15-77	9	100.4'	23.5	76.9'	75.9'
"	10	100.5'	14.3'	86.2'	85.2'
"	11	100.3'	13.6'	86.7'	85.7'
3-11-77 3-15-77	12	100.4'	6.1'	94.3'	93.3'
TOTAL	12	1204.8'	156.5'	1047.9' ±	1035.9'

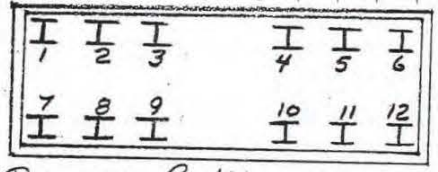
CONC. DAY 3-16-77

PILE # 1 3-16-77

Type of Driver 117

Penetr. for Bearing

	Blows/	Bearing (Tons)
10 @	1 1/4"	203.0
"	1 1/2"	188.6
"	1 1/2"	188.6
"	1 1/4"	172.6
"	1/2"	237.6
"	1 1/4"	203.0
"	1"	220.0
"	1"	220.0
"	1"	220.0
"	1 1/4"	203.0
"	1 1/4"	203.0
"	1"	220.0
		2479.4' ± 206.6'



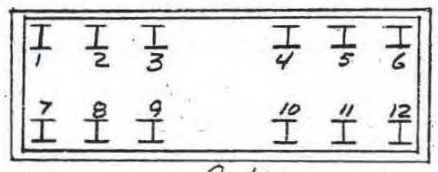
Pier 45 Southbound LANE

118

PILING LOG

Date	Pile No.	Length Del-Pay	Length Cutoff	Length Below C.O.	Length Below Gr.
3-7-77 3-10-77 3-11-77	1	100.4 ✓	22.3 ✓	78.1 ✓	77.1 ✓
3-10-77 3-15-77 3-16-77	2	150.5 ✓	33.0 ✓	117.5 ✓	116.5 ✓
3-7-77 3-11-77 3-15-77	3	100.4 ✓	9.2 ✓	91.2 ✓	90.2 ✓
3-10-77 3-11-77 3-16-77	4	150.3 ✓	50.0 ✓	100.3 ✓	99.3 ✓
3-8-77 3-11-77	5	100.2 ✓	11.9 ✓	88.3 ✓	87.3 ✓
3-10-77 3-11-77 3-14-77	6	127.6 ✓	46.4 ✓	81.2 ✓	80.2
3-8-77 3-11-77	7	100.4 ✓	36.3 ✓	64.1 ✓	63.1 ✓
"	8	100.3 ✓	29.4 ✓	70.9 ✓	69.9 ✓
"	9	100.4 ✓	26.2 ✓	74.2 ✓	73.2 ✓
3-8-77 3-14-77	10	100.2 ✓	27.9 ✓	72.3 ✓	71.3 ✓
"	11	100.3 ✓	35.8 ✓	64.5 ✓	63.5 ✓
"	12	100.3 ✓	27.5 ✓	72.8 ✓	71.8 ✓
Total	12	1331.3 ✓	358.9 ✓	975.4 ✓	963.4 ✓

COMP BY DHS 3-16-77
" T.G 3-18-77



Pier 46 Southbound Lane

119

Type of Driver

Blows/	Penetr. for Bearing	Bearing (Tons)
10 @ 1¼"	9.5	192.9 ✓
" 1¼"	8.5	172.6 ✓
" 1"	9.5	209.0 ✓
" 1¼"	9.5	192.9 ✓
" 1½"	10.0	188.6 ✓
" 1¼"	8.5	172.6 ✓
" 1½"	9.0	169.7 ✓
" 1½"	9.0	169.7 ✓
" 1¼"	9.5	192.9 ✓
" 1¼"	9.5	192.9 ✓
" 1"	9.5	209.0 ✓
" 1½"	8.5	160.3 ✓
		2223.1 ✓ = 185.3 ✓

120 PILING LOG P-5 NB

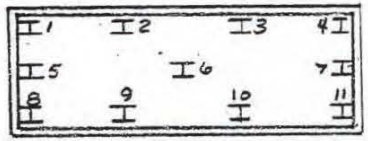
Date	Pile No.	Length Del-Pay.	Length Cut-off	Length Below C.O.	Length Below Gr.
3-2-77 3-9-77	1	100.2	11.0	89.2	89.2
3-3-77 3-9-77	2	100.4	9.9	90.5	89.5
"	3	100.4	8.6	91.8	90.8
"	4	100.3	2.4	97.9	96.9
3-2-77 3-9-77	5	100.2	10.0	90.2	89.2
3-3-77 3-9-77	6	100.3	8.9	91.4	90.4
"	7	127.7	27.3	100.4	99.4
3-2-77 3-9-77	8	100.3	11.3	89.0	88.0
"	9	100.3	9.9	90.4	89.4
3-3-77 3-9-77	10	100.3	10.9	89.4	88.4
"	11	100.3	27.4	72.9	71.9
TOTAL	11	1130.7	137.6	993.1	982.1

COMP BY SHD 3-10-77
✓ [illegible] 3-15-77

121 Type of Driver.

Penetr. for Bearing — Blows/		Bearing Tons
10 /	1 1/2"	10.0 / 188.6 ✓
" /	"	9.5 / 179.1 ✓
" /	"	10.0 / 188.6 ✓
" /	1/2"	8.5 / 224.4 ✓
" /	1 1/4"	10.0 / 203.0 ✓
" /	1 1/4"	10.0 / 203.0 ✓
" /	1"	9.5 / 209.0 ✓
" /	1 1/4"	10.0 / 203.0 ✓
" /	1 1/4"	10.0 / 203.0 ✓
" /	1"	10.0 / 220.0 ✓
" /	3/8"	9.5 / 264.6 ✓

2296.3 = 207.0



Pier 47 Southbound Lane

122

PILING LOG

Date	Pile No.	Length Del-Pay	Length Cutoff.	Length Below C.O.	Length Below Gr.
3-1-77 3-7-77	1	100.2'	26.4'	73.8'	72.8'
"	2	100.3'	18.5'	81.8'	80.3'
"	3	100.2'	23.6'	76.6'	75.6'
3-1-77 3-3-77	4	100.3	22.6	77.7	76.7
2-[illegible] 3-7-77	5	100.4'	28.4'	72.0'	71.0'
11	6	100.3'	24.6'	75.7'	74.7'
3-1-77 [illegible]	7	100.2'	29.2'	71.0'	70.0
"	8	100.3'	26.8'	73.5'	72.5
"	9	100.2'	26.9	73.3	72.3
"	10	100.5'	22.3'	78.2'	77.2'
"	11	100.3'	23.2'	77.1'	76.1'
"	12	100.4'	23.5'	76.9'	75.9'
TOTAL	12	1203.6'	296.0'	907.6'	895.6'

COMP BY DHG 3-18-77

[illegible] 3-18-77

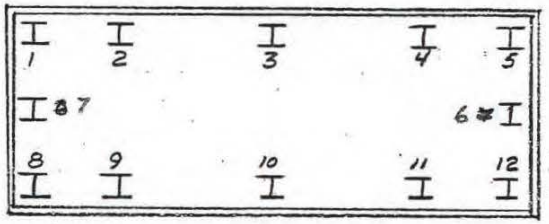
So. Bound Pier 48

123

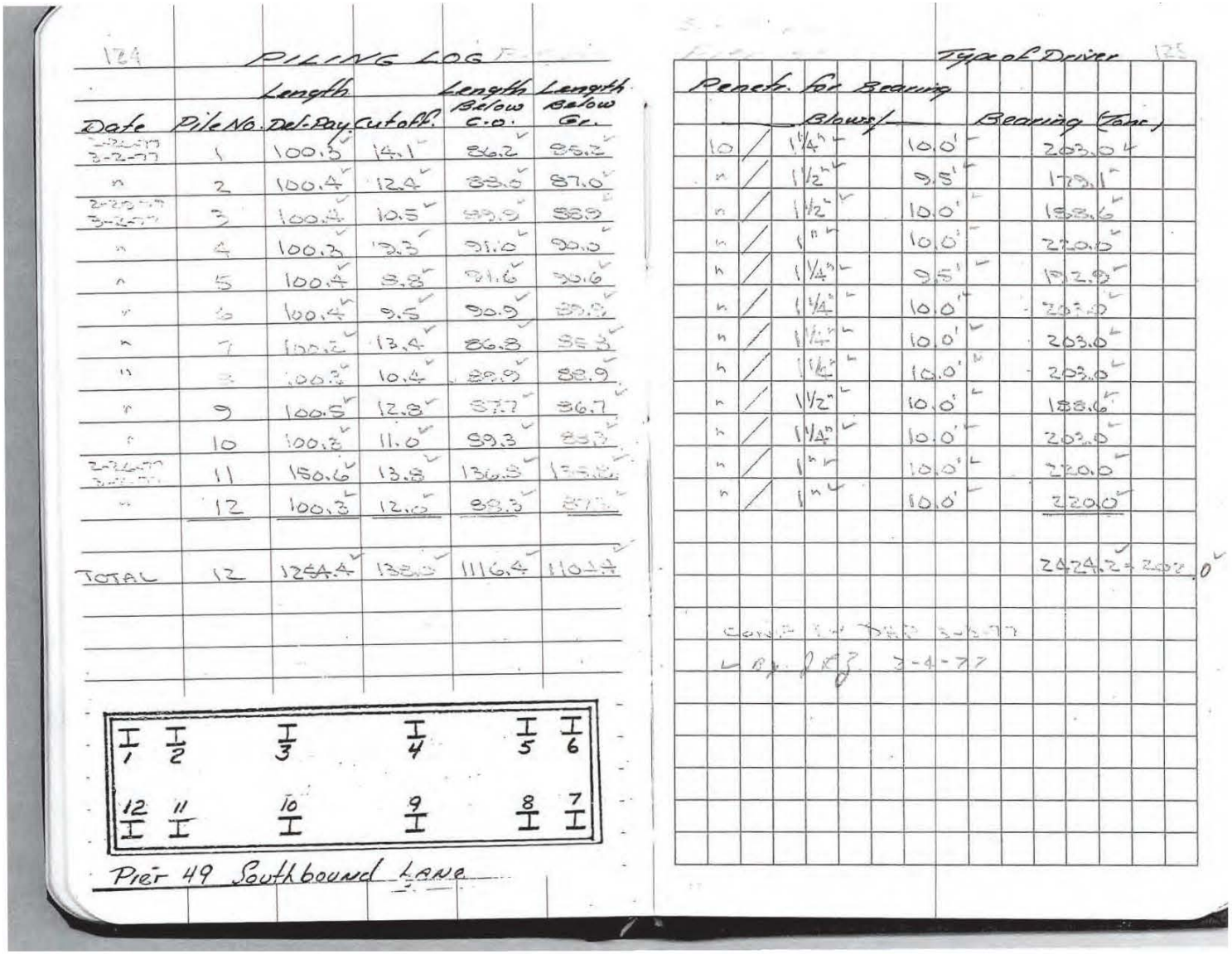
Type of Driver

		Penetr. for Bearing Blows/		Bearing (Tons)
10	/	1½"	10.0'	188.6'
"	/	1½"	"	188.6'
"	/	1¼"	"	203.0'
"	/	1"	"	220.0'
"	/	1"	"	220.0'
"	/	1½"	"	188.6'
"	/	1¼"	"	203.0'
"	/	1½"	"	188.6'
"	/	1½"	"	188.6'
"	/	1½"	"	188.6'
"	/	1¼"	"	203.0'
"	/	1½"	"	188.6'

2369.2' = 197.4'



Pier 48 Southbound Lane



124 PILING LOG

Date	Pile No.	Length Del. Bay	Length Cutoff	Length Below C.G.	Length Below Gr.
3-2-77	1	100.5	14.1	86.2	85.2
"	2	100.4	12.4	88.0	87.0
3-2-77	3	100.4	10.5	89.9	88.9
"	4	100.3	9.3	91.0	90.0
"	5	100.4	8.8	91.6	90.6
"	6	100.4	9.5	90.9	89.9
"	7	100.2	13.4	86.8	85.8
"	8	100.3	10.4	89.9	88.9
"	9	100.5	12.8	87.7	86.7
"	10	100.3	11.0	89.3	88.3
3-24-77	11	150.6	13.8	136.8	135.8
"	12	100.3	12.0	88.3	87.3
TOTAL	12	1254.4	138.3	1116.4	1104.4

Pier 49 Southbound Lane

125 Type of Driver

Penetr. for Bearing

		Blows/		Bearing (Tons)
10	/	1¼"	10.0'	203.0
"	/	1½"	9.5'	179.1
"	/	1½"	10.0'	188.6
"	/	1"	10.0'	220.0
"	/	1¼"	9.5'	192.9
"	/	1¼"	10.0'	203.0
"	/	1¼"	10.0'	203.0
"	/	1¼"	10.0'	203.0
"	/	1½"	10.0'	188.6
"	/	1¼"	10.0'	203.0
"	/	1"	10.0'	220.0
"	/	1"	10.0'	220.0
				2424.2 ÷ 203.0

Cont. 3-4-77

Ck. RKB 3-4-77

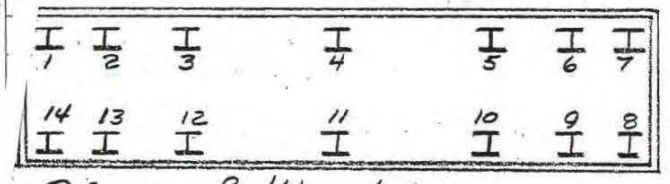
126 PILING LOG

Date	Pile No.	Del. Length	Day cutoff.	Length Below C.O.	Length Below Gr.
2-22-77 2-25-77 3-1-77	1	237.9'	30.5'	207.4'	206.4'
2-22-77 2-25-77	2	100.3'	16.9'	83.4'	82.4'
"	3	168.4'	2.2'	166.2'	165.2'
2-22-77 2-24-77	4	100.3'	14.6'	85.7'	84.7'
2-22-77 2-25-77	5	100.1'	19.3'	80.8'	79.8'
"	6	100.3'	17.8'	82.5'	81.5'
"	7	100.3'	21.3'	79.0'	78.0'
"	8	100.3'	20.8'	79.5'	78.5'
"	9	100.4'	18.7'	81.7'	80.7'
2-25-77 2-28-77	10	100.2'	19.8'	81.4'	80.4'
2-22-77 2-26-77	11	100.3'	22.8'	77.5'	76.5'
2-22-77 2-28-77	12	100.4'	15.7'	84.7'	83.7'
"	13	150.4'	37.5'	112.9'	111.9'
"	14	100.3'	21.1'	79.2'	78.2'
TOTAL	14	1659.9'	273.0	1386.9'	1367.3'

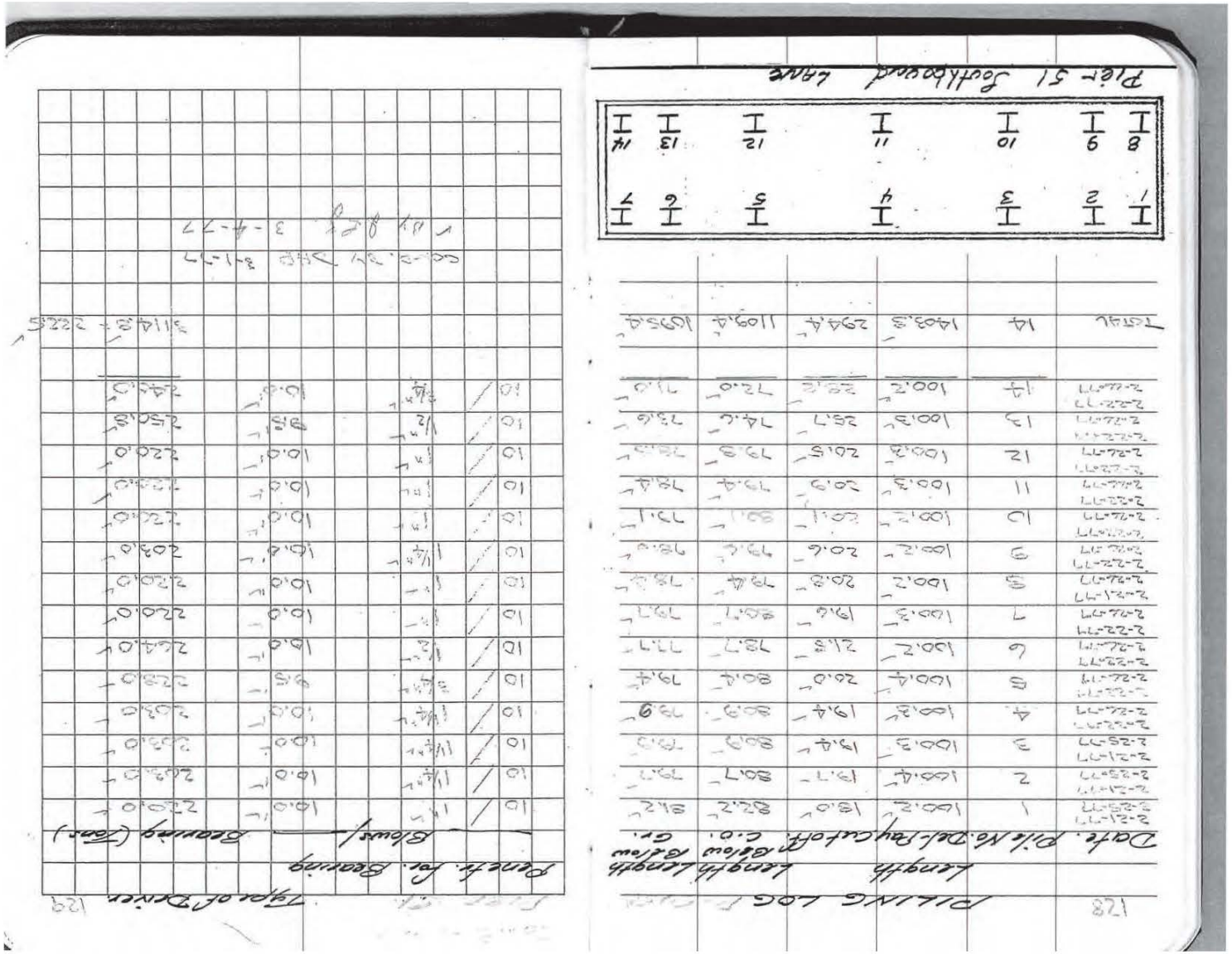
COMP 24 DRIVEN 5-2-77
BY D.F.J. 3-4-77

Type of Driver

Penetr. for Bearing Blows/			Bearing (Tons)
10	/	1"	198.0'
"	/	1"	220.0'
"	/	1"	198.0'
"	/	1"	220.0'
"	/	1 1/4"	192.5'
"	/	1 1/4"	203.0'
"	/	1 1/4"	203.0'
"	/	1"	220.0'
"	/	1 1/4"	203.0'
"	/	1 1/4"	203.0'
"	/	1"	220.0'
"	/	1 1/2"	264.0'
			2943.7' = 210.3'



Pier 50 Southbound Lane



120

PILING LOG

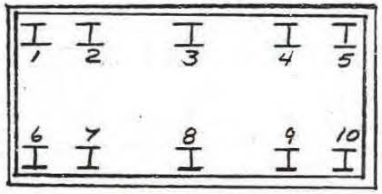
Date	Pile No.	Length Del.	Length Pay	Length Cutoff.	Length Below C.O.	Length Below Gr.
3-29-77 4-1-77	1	101.3'		38.6'	62.7'	61.7'
3-29-77 4-1-77	2	102.1'		39.5'	62.6'	61.6'
3-29-77 4-1-77	3	99.6'		27.0'	72.6'	71.6'
3-29-77 4-1-77	4	100.1'		17.3'	82.8'	81.8'
3-29-77 4-1-77	5	102.0'		7.4'	94.6'	93.6'
3-25-77 4-1-77	6	100.4'		17.6'	82.8'	81.8'
3-25-77 4-1-77	7	100.4'		34.5'	65.9'	64.9'
3-25-77 4-1-77	8	100.3'		9.2'	91.1'	90.1'
3-25-77 4-1-77	9	100.4'		14.9'	85.5'	84.5'
3-25-77 4-1-77	10	100.4'		13.7'	86.7'	85.7'
TOTAL	10'	1007.0'		219.7'	787.3'	777.3'

Comp By KED 4-4-77

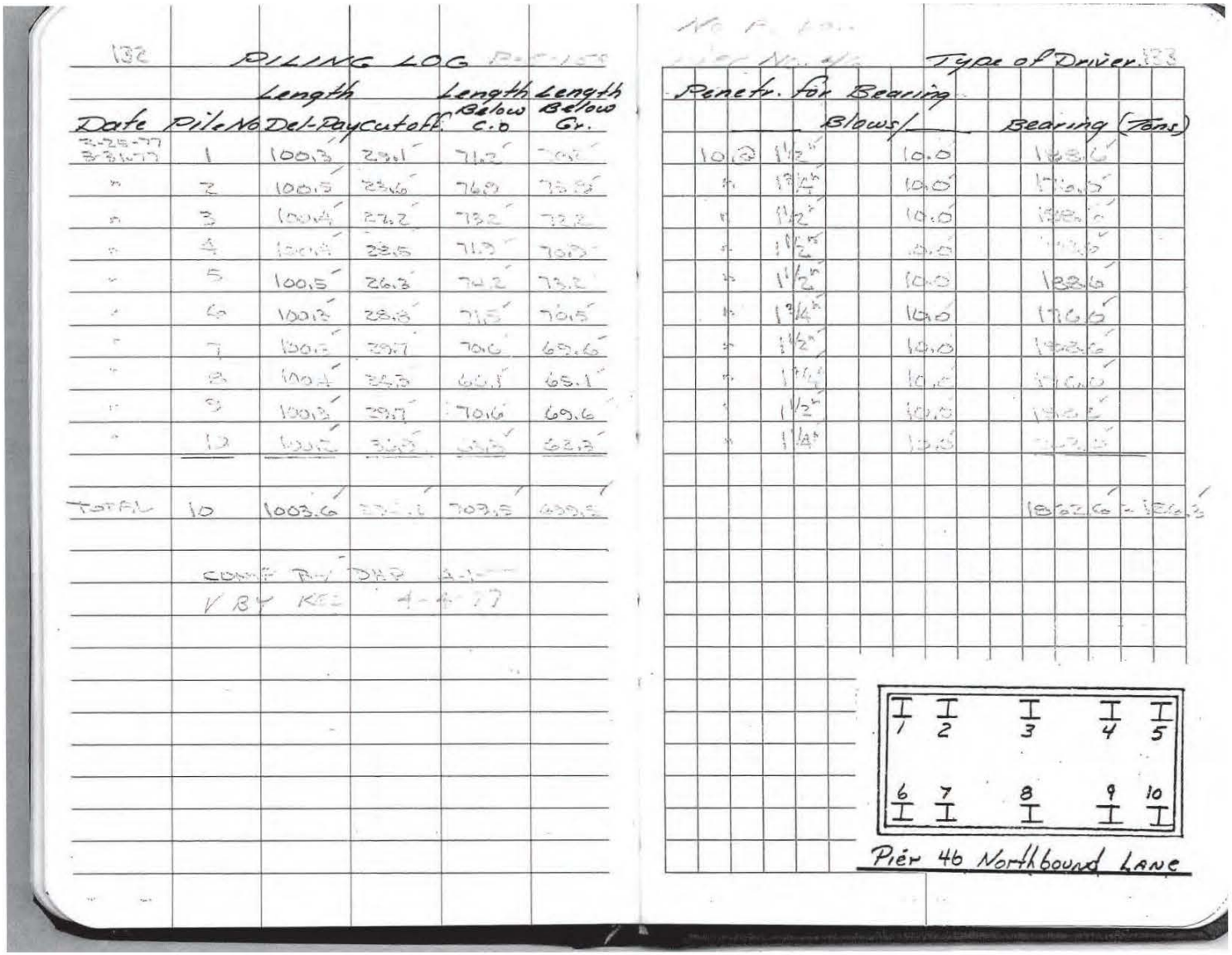
✓ KJ DWH 4-5-77

Type of Driver

Benefit for Bearing			Bearing (Tons)
	Blows/		
10 @	1/4"	10.0	293.3
"	1/4"	10.0	293.3
"	1 3/4"	10.0	176.0
"	1 1/2"	10.0	183.6
"	5/8"	10.0	251.9
"	1 1/2"	9.5	177.1
"	1 1/4"	9.8	182.8
"	1"	10.0	220.0
"	1 1/4"	10.0	203.1
"	1 3/4"	10.0	176.0
			2164.1 = 216.4



Pier 45 Northbound Lane



132 PILING LOG

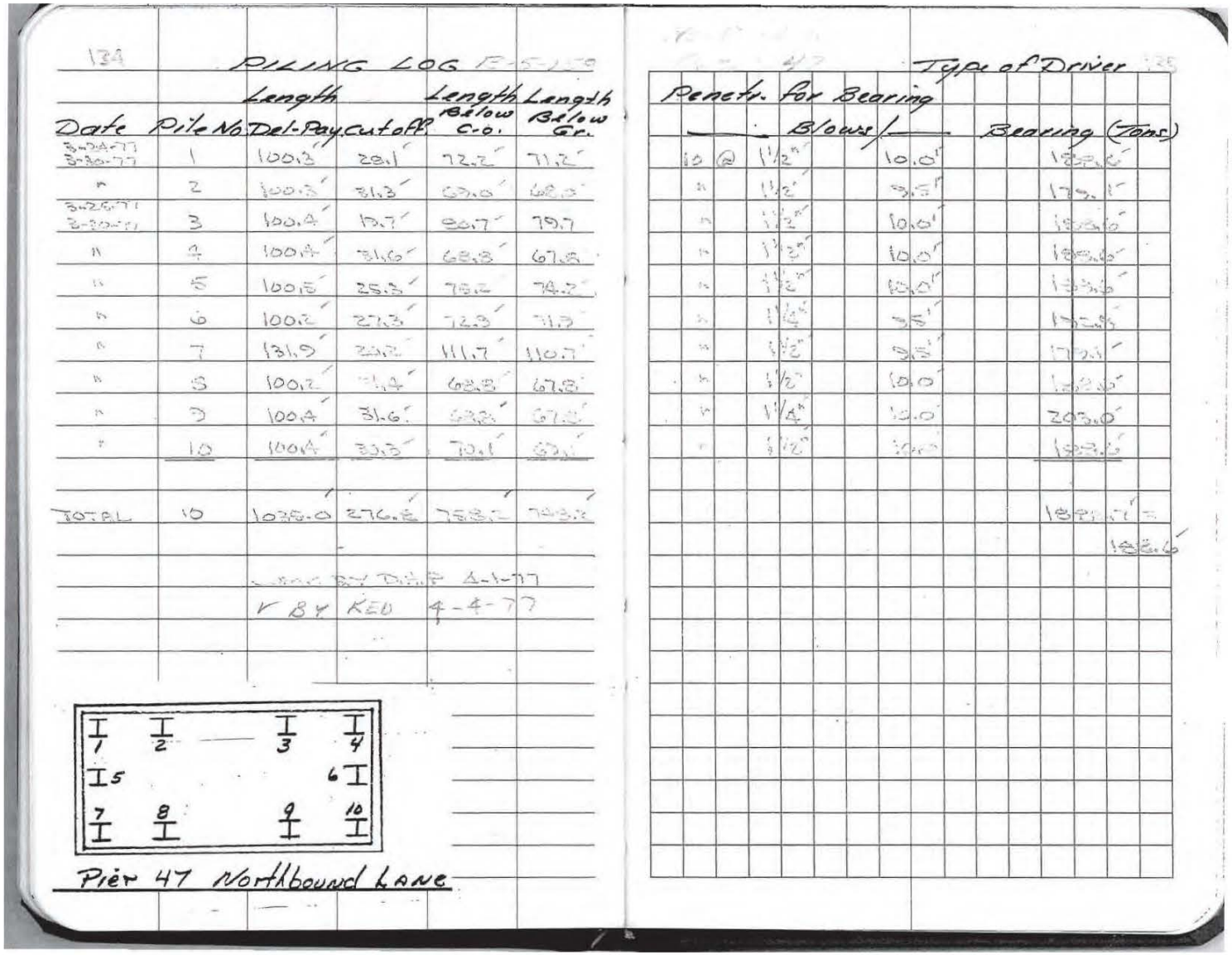
Date	Pile No	Del-Pay	Length Cutoff	Length Below C.O	Length Below Gr.
3-25-77 3-31-77	1	100.3	23.1	76.2	70.2
"	2	100.5	23.6	76.9	73.9
"	3	100.4	27.2	73.2	73.2
"	4	100.4	28.5	71.9	70.9
"	5	100.5	26.3	74.2	73.2
"	6	100.3	28.8	71.5	70.5
"	7	100.3	29.7	70.6	69.6
"	8	100.4	35.3	65.1	65.1
"	9	100.3	29.7	70.6	69.6
"	10	100.2	37.9	62.3	62.3
TOTAL	10	1003.6	[illegible]	709.5	[illegible]

COMP BY DHP 3-1-77
VBY KEC 4-4-77

Type of Driver. [illegible]

Penetr. for Bearing	Blows/		Bearing (Tons)
10.0	1½"	10.0	[illegible]
"	1¾"	10.0	[illegible]
"	1½"	10.0	[illegible]
"	1½"	10.0	[illegible]
"	1½"	10.0	[illegible]
"	1¾"	10.0	[illegible]
"	1½"	10.0	[illegible]
"	1¾"	10.0	[illegible]
"	1½"	10.0	[illegible]
"	1¼"	10.0	[illegible]

Pier 46 Northbound Lane



134

PILING LOG

Type of Driver

Date	Pile No.	Length Del.	Length Pay.	Length Cutoff	Length Below C.O.	Length Below Gr.	Penetr. for Bearing ___ Blows/___	Bearing (Tons)
3-24-77 3-30-77	1	100.3'	28.1'	72.2'	71.2'	10 @ 1½"	10.0'	
"	2	100.3'	31.3'	69.0'	68.0'	" 1½"	9.5'	
3-25-77 3-30-77	3	100.4'	30.7'	69.7'	70.7'	" 1½"	10.0'	
"	4	100.4'	31.6'	68.8'	67.8'	" 1½"	10.0'	
"	5	100.5'	25.3'	75.2'	74.2'	" 1½"	10.0'	
"	6	100.2'	27.3'	72.9'	71.9'	" 1¼"	9.5'	
"	7	131.9'	20.2'	111.7'	110.7'	" 1½"	9.5'	
"	8	100.2'	31.4'	68.8'	67.8'	" 1½"	10.0'	
"	9	100.4'	31.6'	68.8'	67.8'	" 1¼"	10.0'	203.0'
"	10	100.4'	30.3'	70.1'	69.1'	" 1½"	10.0'	189.6'
TOTAL	10	1035.0'	276.8'	758.2'	748.2'			1891.6' = 189.6

[illegible] By Date 4-1-77

V BY KED 4-4-77

Pier 47 Northbound Lane

136

PILING LOG

Type of Driver. 137

Date	Pile No.	Length Del.	Pay Length Cut off	Length Below C.O.	Length Below Gr.
3-22-77 3-24-77	1	100.3	24.6	75.7	74.7
"	2	100.3	21.9	78.4	77.4
"	3	100.2	23.8	76.4	75.4
3-22-77	4	100.2	29.4	70.8	69.8
"	5	100.2	28.1	72.1	71.1
"	6	100.2	26.4	73.8	72.8
"	7	100.3	22.4	77.9	76.9
"	8	100.3	25.5	74.8	73.8
"	9	100.4	24.2	76.2	75.2
"	10	100.3	29.2	71.1	70.1
Total	10	1002.7	255.5	747.2	737.2

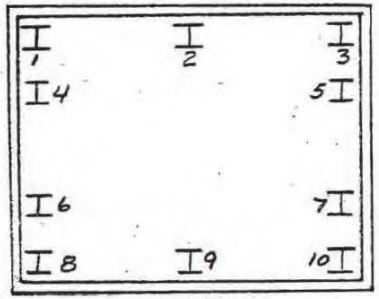
Comp. by DHP 3-28-77

✓ by D.A.Z 3-25-77

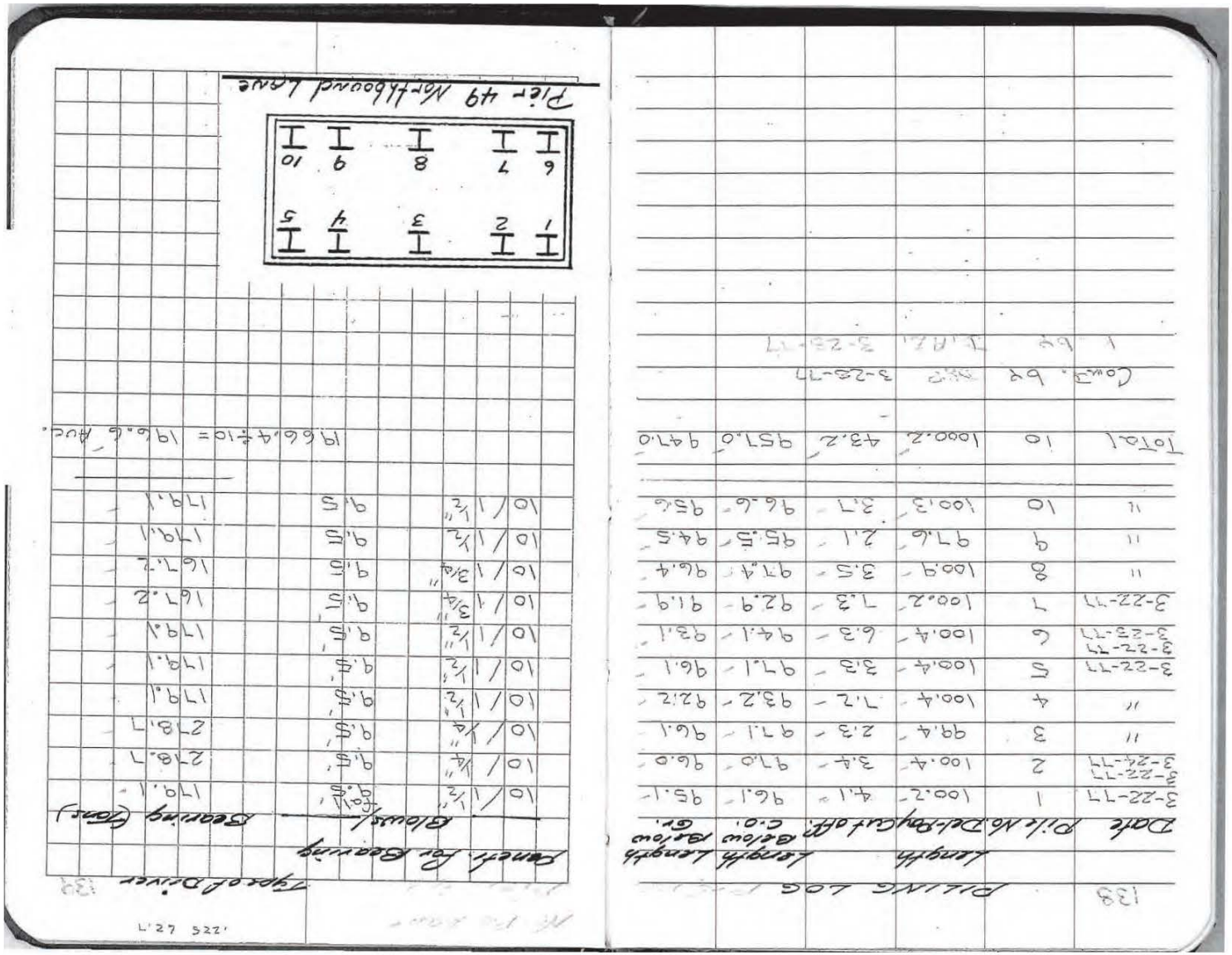
Penetr. for Bearing

Blows	Blows/	Fall	Bearing (Tons)
10	1½"	9.5'	179.1
10	1½"	10'	188.6
10	1½"	9.5'	179.1
10	1½"	10'	188.6
10	1½"	9.5'	179.1
10	1¼"	10'	203.0
10	1¼"	10'	203.0
10	¾"	10'	176.0
10	1½"	10'	188.6
10	1½"	10'	188.6

1873.7 ÷ 10 = 187.4 Ton Ave.



Pier 48 Northbound Lane



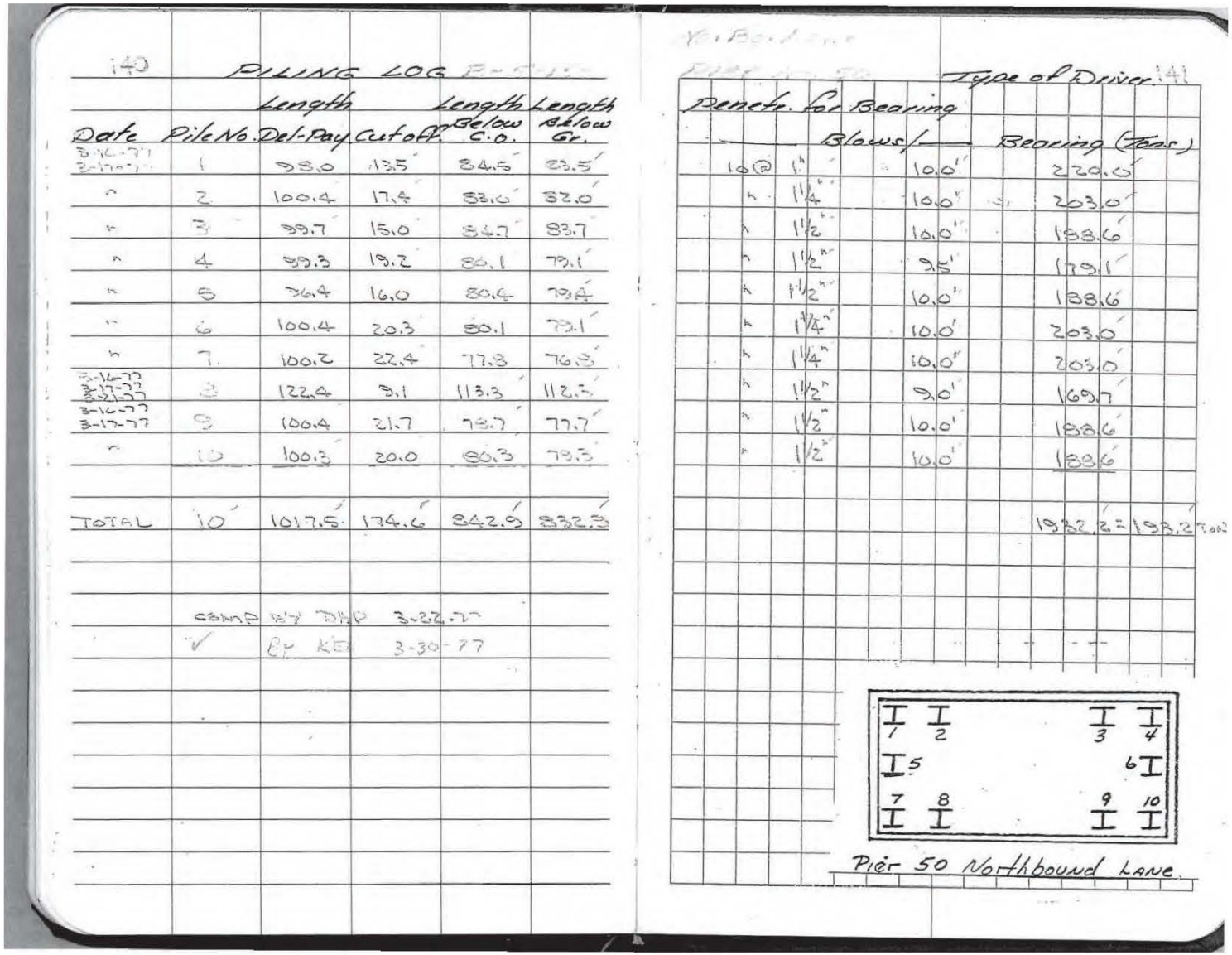
Pier #9 Northbound Lane

	1	2	3	4	5
6					
7					
8					
9					
10					

Type of Driver — Blows/ — Bearing (Tons)

Remarks For Bearing

| | | | | |



140

PILING LOG

Date	Pile No.	Length Del-Pay	Length Cut-off	Length Below C.O.	Length Below Gr.
3-16-77 3-17-77	1	98.0	13.5	84.5	83.5
"	2	100.4	17.4	83.0	82.0
"	3	99.7	15.0	84.7	83.7
"	4	99.3	18.2	81.1	79.1
"	5	96.4	16.0	80.4	79.4
"	6	100.4	20.3	80.1	79.1
"	7	100.2	22.4	77.8	76.8
3-16-77 3-17-77 3-17-77	8	122.4	9.1	113.3	112.3
3-16-77 3-17-77	9	100.4	21.7	78.7	77.7
"	10	100.3	20.0	80.3	79.3
TOTAL	10	1017.5	174.6	842.9	832.3

COMP BY DHP 3-22-77

✓ BY KEH 3-30-77

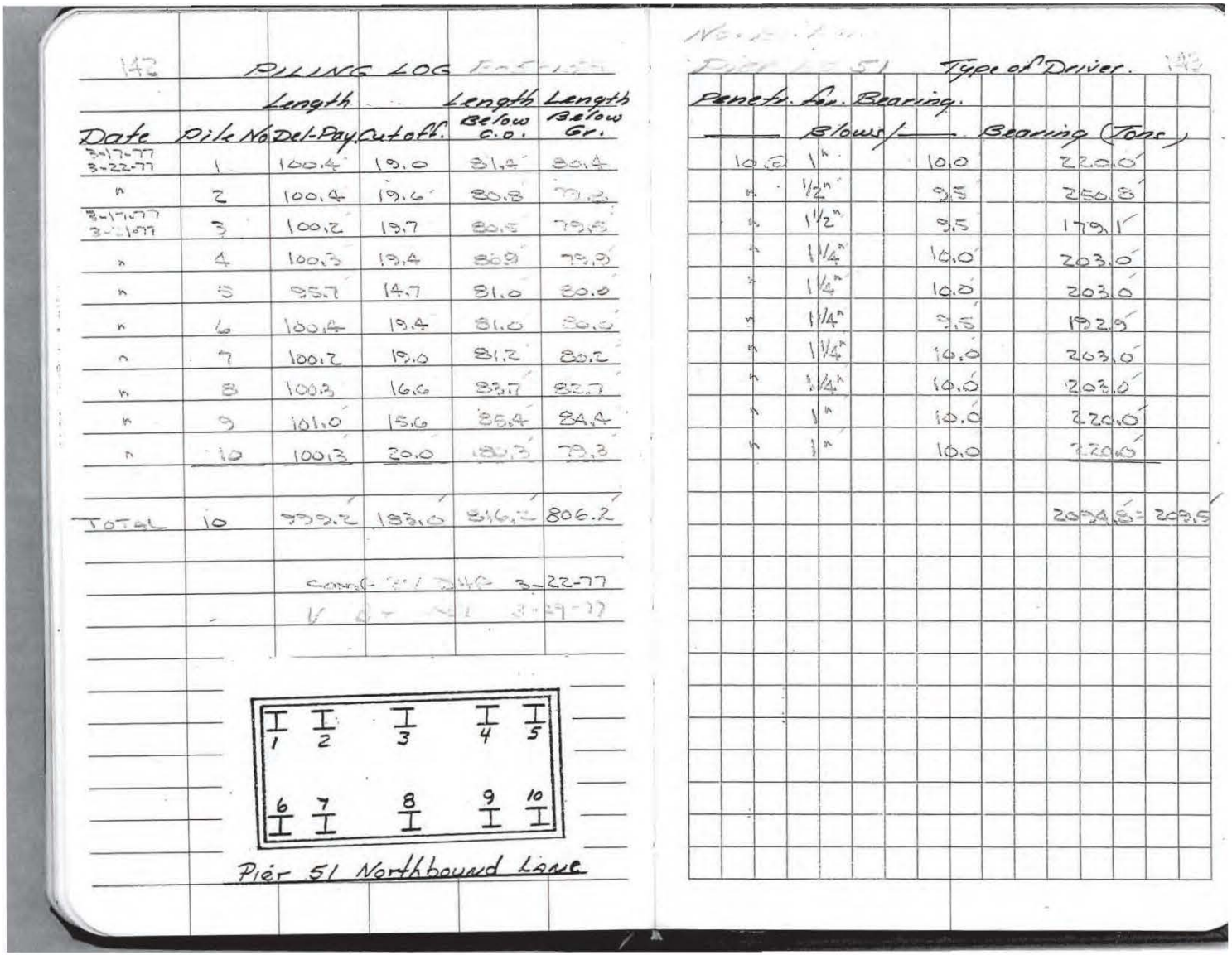
Type of Driver 141

Penetr. for Bearing

	Blows/		Bearing (Tons)
10 @	1"	10.0'	220.0
"	1 1/4"	10.0'	203.0
"	1 1/2"	10.0'	188.6
"	1 1/2"	9.5'	179.1
"	1 1/2"	10.0'	188.6
"	1 1/4"	10.0'	203.0
"	1 1/4"	10.0'	203.0
"	1 1/2"	9.0'	169.7
"	1 1/2"	10.0'	188.6
"	1 1/2"	10.0'	188.6

1932.2 = 193.2 Tons

Pier 50 Northbound Lane



PILING LOG

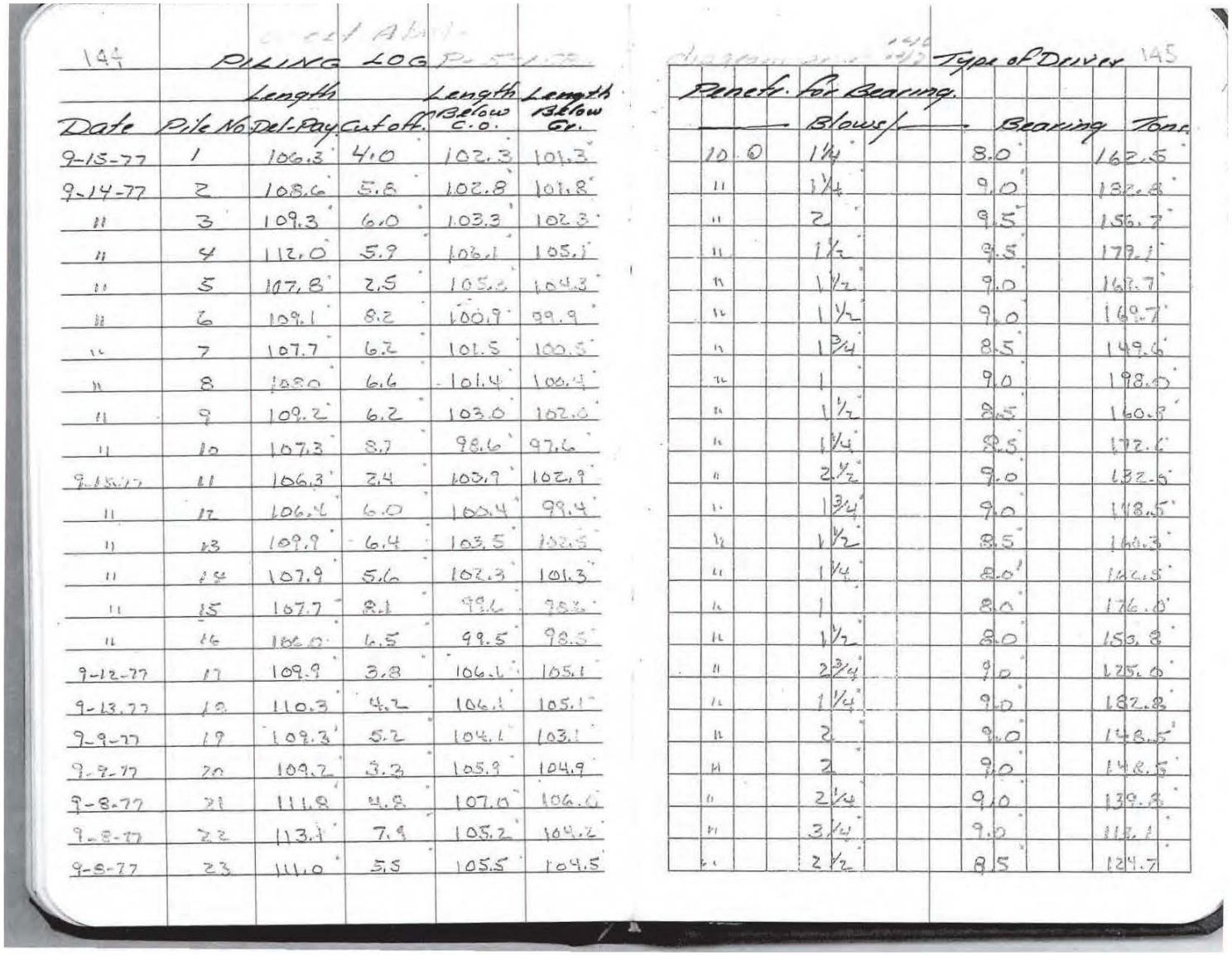
Date	Pile No	Length Del-Pay	Length Cutoff.	Length Below O.O.	Length Below Gr.
3-17-77 3-22-77	1	100.4	19.0	81.4	80.4
"	2	100.4	19.6	80.8	79.8
3-17-77 3-21-77	3	100.2	19.7	80.5	79.5
"	4	100.3	19.4	80.9	79.9
"	5	95.7	14.7	81.0	80.0
"	6	100.4	19.4	81.0	80.0
"	7	100.2	19.0	81.2	80.2
"	8	100.3	16.6	83.7	82.7
"	9	101.0	15.6	85.4	84.4
"	10	100.3	20.0	80.3	79.3
TOTAL	10	999.2	183.0	816.2	806.2

Comp. 3-22-77

Pier 51 Northbound Leave

Type of Driver.

Penetr. for.	Blows/	Bearing (Tons)
10	1"	220.0
"	1/2"	250.8
"	1 1/2"	179.1
"	1 1/4"	203.0
"	1 1/4"	203.0
"	1 1/4"	192.9
"	1 1/4"	203.0
"	1 1/4"	203.0
"	1"	220.0
"	1"	220.0
		2004.8 = 200.5



144

PILING LOG

Date	Pile No.	Length Del-Pay	Length Cut off.	Length Below C.O.	Length Below Gr.
9-15-77	1	106.3	4.0	102.3	101.3
9-14-77	2	108.6	5.8	102.8	101.8
"	3	109.3	6.0	103.3	102.3
"	4	112.0	5.9	106.1	105.1
"	5	107.8	2.5	105.3	104.3
"	6	109.1	8.2	100.9	99.9
"	7	107.7	6.2	101.5	100.5
"	8	108.0	6.6	101.4	100.4
"	9	109.2	6.2	103.0	102.0
"	10	107.3	8.7	98.6	97.6
9-15-77	11	106.3	2.4	103.9	102.9
"	12	106.4	6.0	100.4	99.4
"	13	109.9	6.4	103.5	102.5
"	14	107.9	5.6	102.3	101.3
"	15	107.7	8.1	99.6	98.6
"	16	106.0	6.5	99.5	98.5
9-12-77	17	109.9	3.8	106.1	105.1
9-13-77	18	110.3	4.2	106.1	105.1
9-9-77	19	109.3	5.2	104.1	103.1
9-9-77	20	109.7	3.3	105.9	104.9
9-8-77	21	111.8	4.8	107.0	106.0
9-8-77	22	113.1	7.9	105.2	104.2
9-8-77	23	111.0	5.5	105.5	104.5

145

Type of Driver

Penetr. for Last Blows/	Bearing	Tons
10.0	1¼	8.0	162.5
11	1¼	9.0	182.8
"	2	9.5	156.7
"	1½	9.5	179.1
"	1½	9.0	168.7
"	1½	9.0	168.7
"	1¾	8.5	149.6
"	1	9.0	198.0
"	1½	8.5	160.8
"	1¼	8.5	172.2
"	2½	9.0	182.5
"	1¾	9.0	178.5
"	1½	8.5	160.3
"	1¼	8.0	162.5
"	1	8.0	176.0
"	1½	8.0	153.8
"	2¾	9.0	125.0
"	1¼	9.0	182.8
"	2	9.0	148.5
"	2	9.0	148.5
"	2¼	9.0	139.8
"	3¼	9.0	113.1
"	2½	8.5	124.7

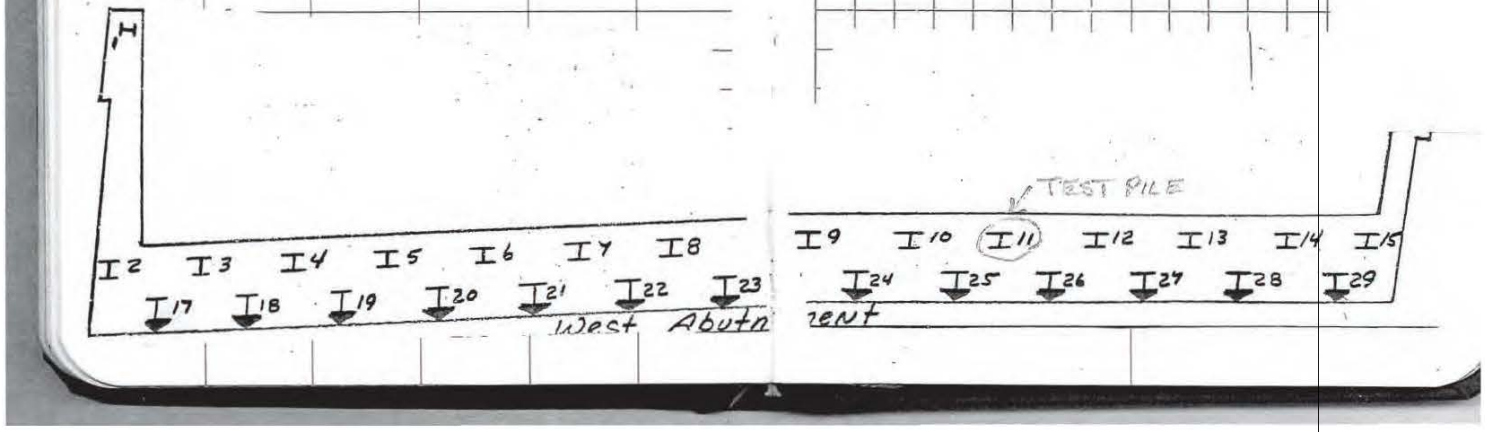
PILING LOG

Date	Pile No.	Length Del.	Length Pay Cutoff	Length Below C.O.	Length Below Gr.
9-8-77	24	108.0	3.7	104.3	103.3
9-8-77	25	110.3	5.7	104.6	103.6
9-8-77	26	108.5	4.9	103.6	102.6
9-7-77	27	112.9	7.9	105.0	104.0
9-7-77	28	111.5	8.8	102.7	101.7
9-7-77	29	157.9	50.6	107.3	106.3
TOTALS		3213.2	211.4	3001.8	2972.8
				103.5	102.5

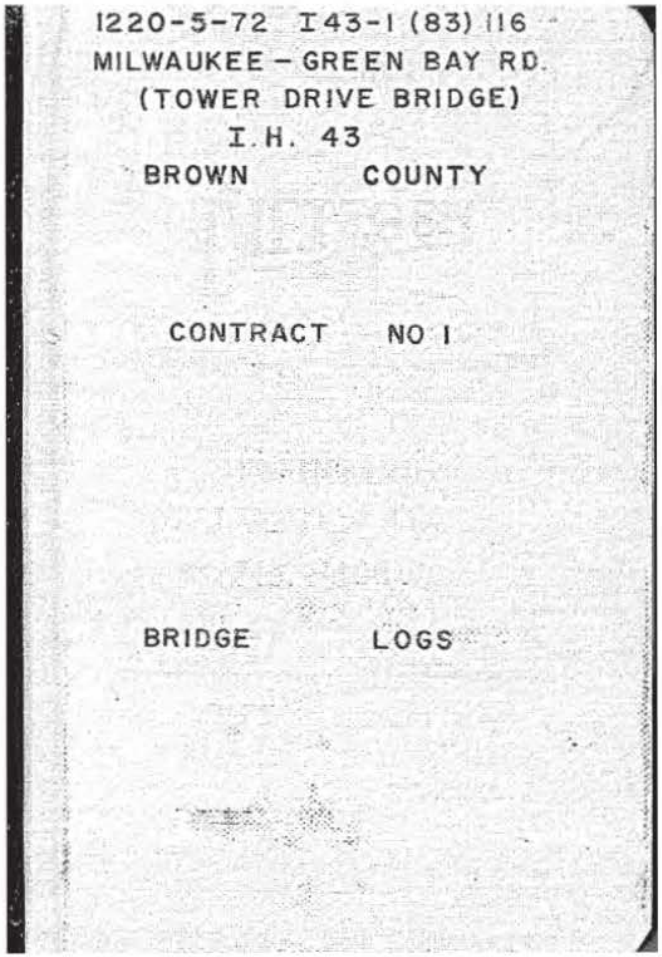
COMP - H K 9-16-77

9-20-77

Benefit for Bearing	Blows/	Bearing (Tons)
10	2	8.5 / 140.7
11	2 1/2	8.5 / 124.7
12	3	8.5 / 112.2
11	3	9.0 / 118.8
12	2	8.5 / 140.7
14	2 3/4	8.5 / 118.1
		4367.7
		150.6



Substructure Project 1220-5-72
Piers 9 thru 25

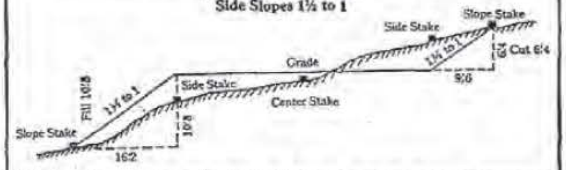

1220-5-72 I43-1 (83) 116
MILWAUKEE – GREEN BAY RD.
(TOWER DRIVE BRIDGE)
I.H. 43
BROWN COUNTY

CONTRACT NO 1

BRIDGE LOGS

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width
Side Slopes 1½ to 1



In the figure above: Opposite 6 under "Cut or Fill" and under .4 read 9/6 the distance from the side stake to the slope stake at right. Opposite 10 under "Cut or Fill" and under .8 read 16/2, the distance from the side stake to the slope stake at the left.

Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

12527

Property of _____

_____

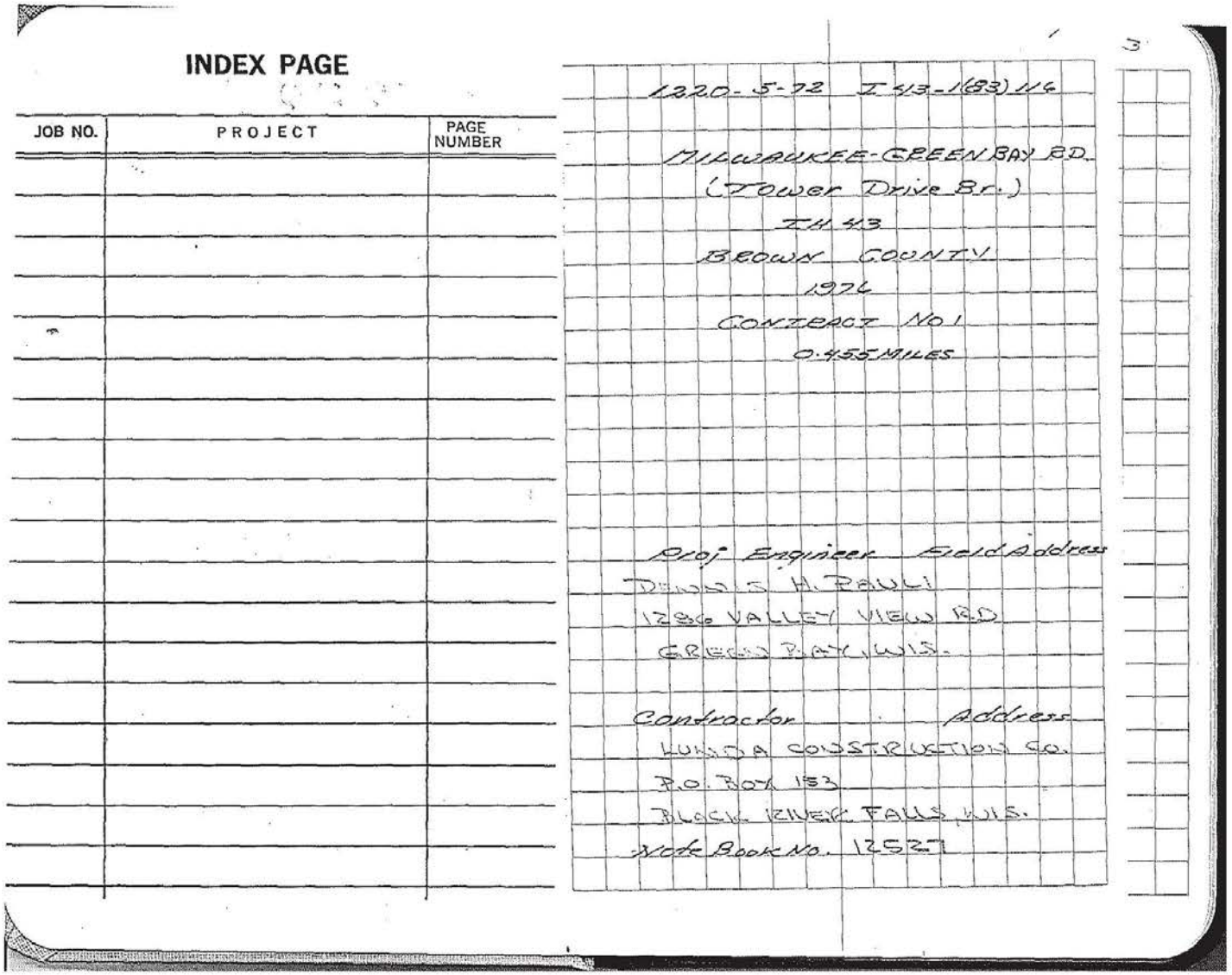
Address _____

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Phone _____

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Made in U. S. A.



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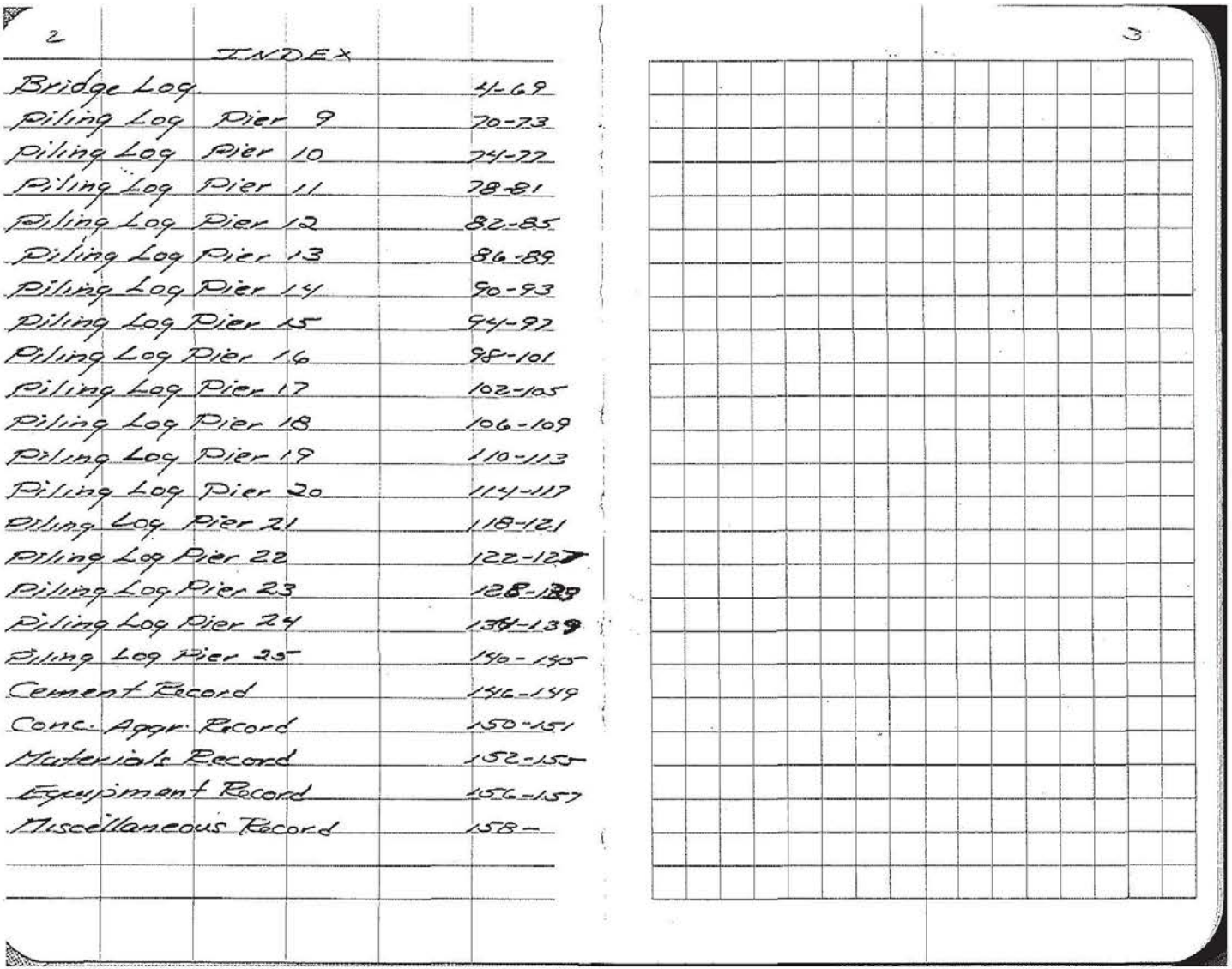
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1220-5-72 I-43-1(83)WG

MILWAUKEE-GREEN BAY RD.
(Tower Drive Br.)
IH 43
BROWN COUNTY
1972
CONTRACT NO 1
0.455 MILES

Proj Engineer Field Address
DENNIS H. PAULI
1280 VALLEY VIEW RD
GREEN BAY, WIS.

Contractor Address
KUNDA CONSTRUCTION CO.
P.O. BOX 153
BLACK RIVER FALLS, WIS.
Work Book No. 12527



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BRIDGE LOG.

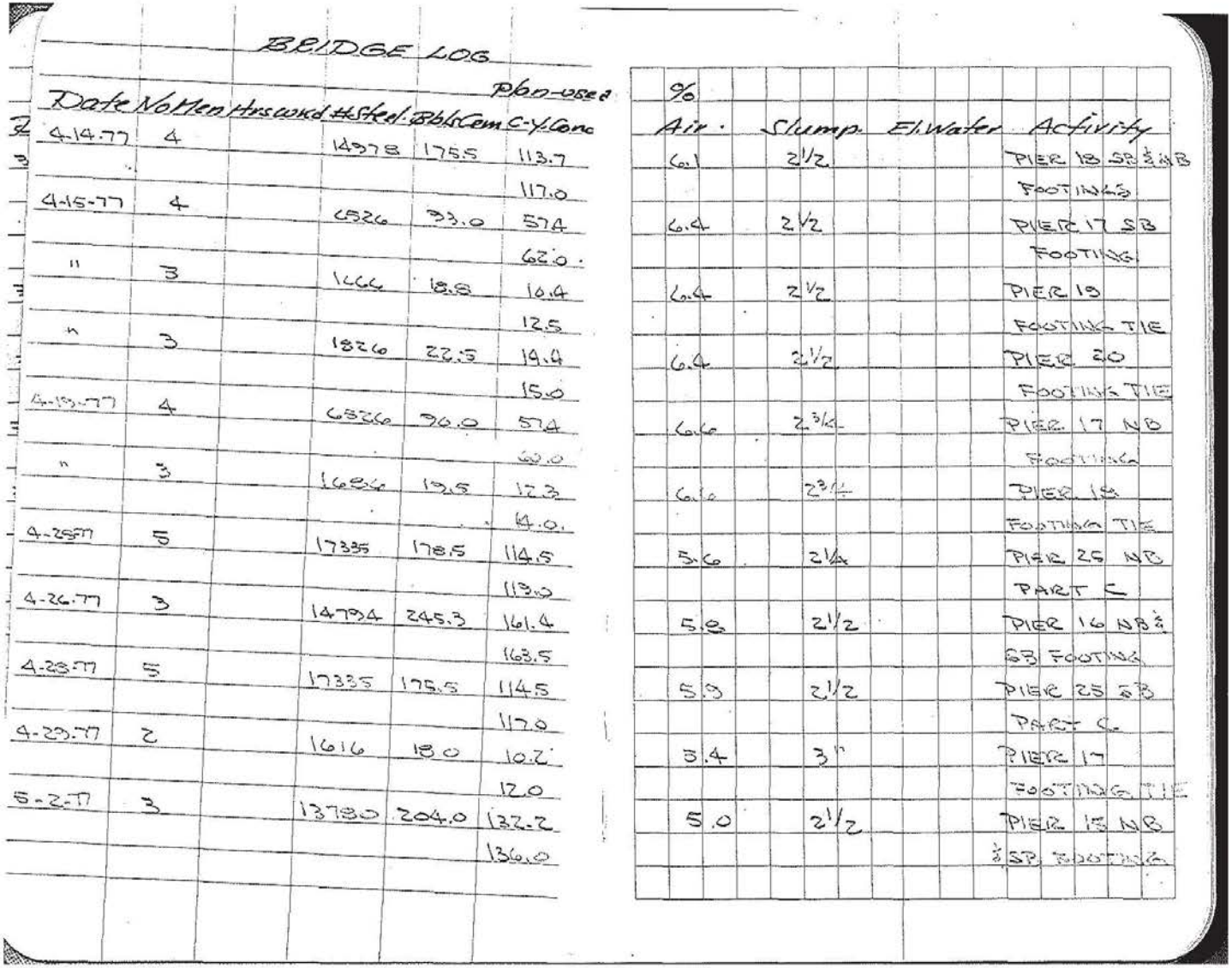
Date	No Men	Hrs Wkd	# Sked.	Bbls Cem	Proposed C.Y. Conc.
3-8-77	5	3.0	3790	126.4	82.6
					84.3
3-9-77	5	4.0	3790	126.2	82.6
					85.5
3-10-77	5	4.0	10487	136.0	90.0
					92.0
3-14-77	5	4.0	10487	136.5	90.0
					91.0
"	5	4.0	10799	114.0	72.3
					76.0
"	4	1.0	1916	22.5	12.8
					15.0
3-15-77	5	4.0	10799	111.5	72.3
					74.5
3-16-77	4	2.0	1916	25.5	13.0
					17.0
3-17-77	4	5.0	18085	234.0	152.8
					156
"	3	1.0	1916	19.5	12.4
					13.0
3-22-77	4	2.5	8173	85.5	54.8
					57.0

5

% Air	Slump.	El. Water.	Activity
6.7	2 1/2		PIER 25 N.B. FOOTING.
5.1	2 1/2		PIER 25 S.B. FOOTING.
5.1	2 1/2		PIER 24 N.B. FOOTING.
5.5	2 1/2		PIER 24 S.B. FOOTING.
5.2	2 3/4		PIER 23 N.B. FOOTING
5.2	2 3/4		PIER 25 FOOTING TIE
5.7	2 1/4		PIER 23 S.B. FOOTING
5.5	2 1/2		PIER 24 FOOTING TIE
5.4	2 1/2		PIER 22, 23 1/2 N.B. FOOTING.
			PIER 23 FOOTING TIE
5.1	2 1/2		PIER 21 N.B. FOOTING

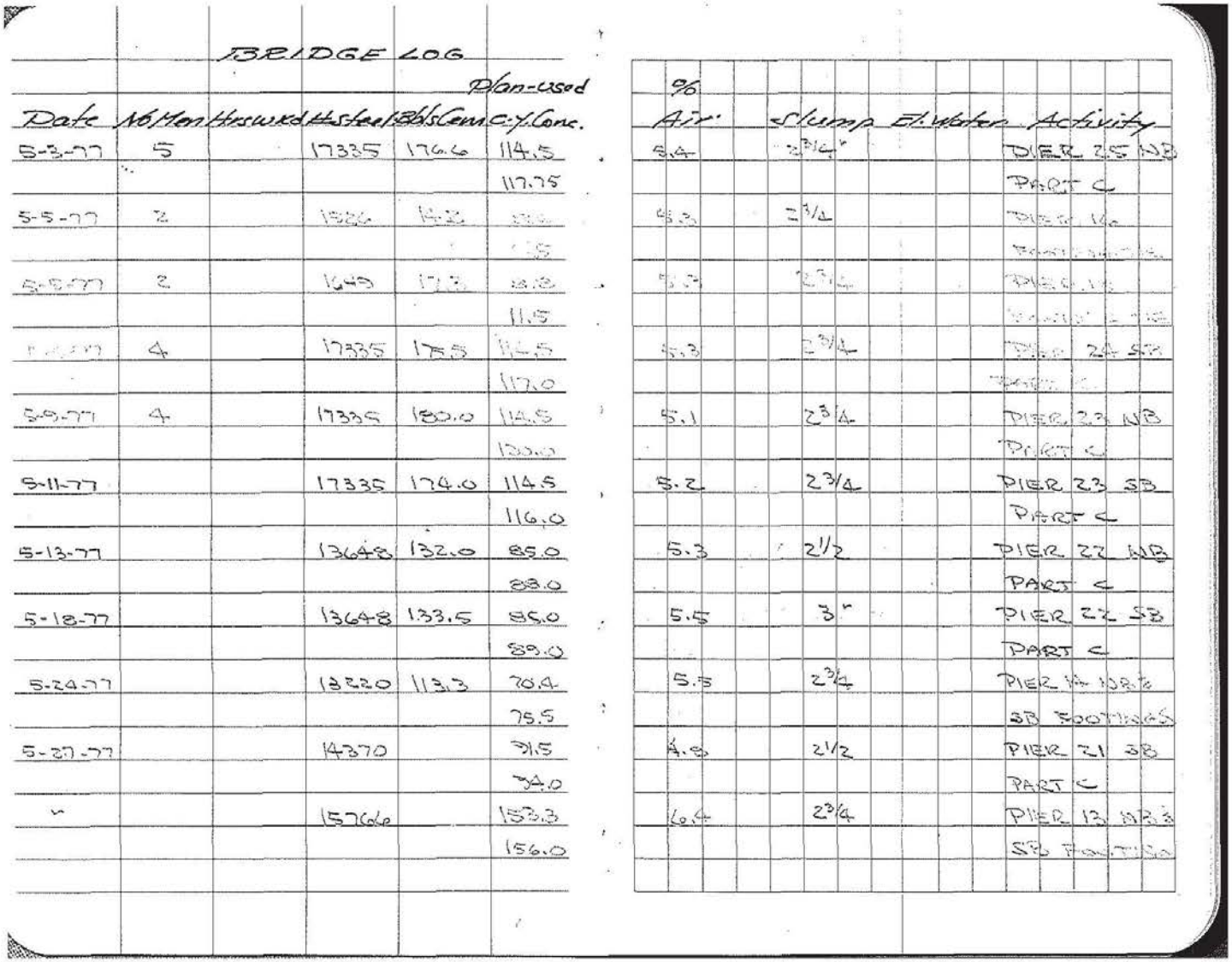
BRIDGE LOG

Date	No Men	Hrs Worked	# Steel	# Bolts	Cem. C.Y.	Conc. plan used	% Air	Slump	Ft. Water	Activity
3-23-77	4	2 1/2	9173	89.5	54.0		5.7	2 1/4		PIER 21
					57.0					S.B. FOOTING
"	4	3 1/2	8685	77.3	49.0		5.2	2 1/4		PIER 25
					51.2					S.B. PART D
3-24-77	2	1.0	1859	16.5	10.2		5.3	2 1/2		PIER 22
					11.0					FOOTING TIE
3-25-77	4	4.0	8689	76.5	49.0		5.7	2"		PIER 25
					51.0					N.B. PART D
3-28-77	4		11845	113.3	70.6		6.6	2 3/4		PIER 20 N.B.
					75.5					S.B. FOOTINGS
3-29-77	4		8770	77.6	50.0		5.8	3		PIER 20 S.B.
					51.75					PART A
4-1-77	4		17181	217.5	138.0		4.2	2 1/2		PIER 19 S.B.
					145.0					N.B. FOOTING
4-1-77	4		8770	78.0	50.0		5.7	3		PIER 24 N.B.
					52.0					PART D
4-11-77	4		2854	18.4	10.4		6.0	2 3/4		PIER 21
					12.2					FOOTING TIE
4-12-77	4		3538	35.2	22.5		6.0	2 1/4		PIER 23 N.B.
					23.5					PART D
4-13-77	4		3538	35.2	22.5		6.6	2 1/2		PIER 23 S.B.
					23.5					PART D



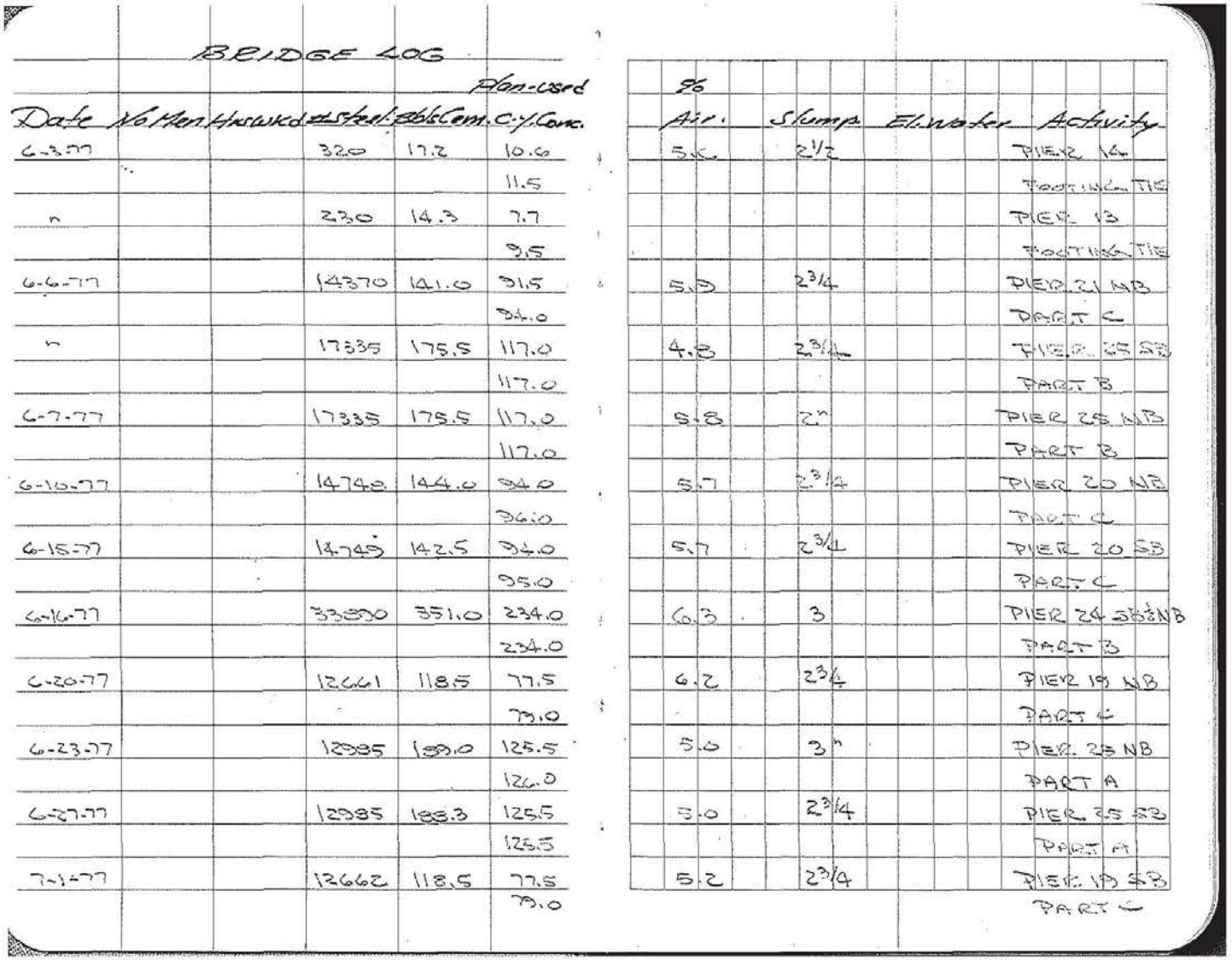
BRIDGE LOG

Date	No Men	Hrs worked	# Sked. Bbls Cem	C-Y Conc	Plan used	% Air	Slump	El. Water	Activity
4-14-77	4		14978	175.5	113.7	6.1	2 1/2		PIER 18 SB & NB
					117.0				FOOTINGS
4-15-77	4		6526	93.0	57.4	6.4	2 1/2		PIER 17 SB
					62.0				FOOTING
"	3		1466	18.8	10.4	6.4	2 1/2		PIER 19
					12.5				FOOTING TIE
"	3		1826	22.5	19.4	6.4	2 1/2		PIER 20
					15.0				FOOTING TIE
4-19-77	4		6526	96.0	57.4	6.6	2 3/4		PIER 17 NB
					60.0				FOOTING
"	3		1686	19.5	12.3	6.6	2 3/4		PIER 19
					14.0				FOOTING TIE
4-25-77	5		17335	178.5	114.5	5.6	2 1/4		PIER 25 NB
					119.0				PART C
4-26-77	3		14794	245.3	161.4	5.8	2 1/2		PIER 16 NB &
					163.5				SB FOOTING
4-28-77	5		17335	175.5	114.5	5.9	2 1/2		PIER 25 SB
					117.0				PART C
4-29-77	2		1616	18.0	10.2	5.4	3"		PIER 17
					12.0				FOOTING TIE
5-2-77	3		13780	204.0	132.2	5.0	2 1/2		PIER 15 NB
					136.0				& SB FOOTINGS



BRIDGE LOG

Date	No. Men	Hrs. Wkd.	# Steel	# Bbls Cem.	C.Y. Conc. Plan-used	% Air	Slump	El. Worker	Activity
5-3-77	5		17335	176.6	114.5	5.4	2 3/4"		PIER 25 NB
					117.75				PART C
5-5-77	2		1586	14.2	[illegible]	4.3	2 3/4		PIER 24
					[illegible]				[illegible]
5-6-77	2		1649	17.2	13.0	5.3	2 3/4		PIER 24
					11.5				[illegible]
5-7-77	4		17335	175.5	114.5	5.3	2 3/4		PIER 24 SB
					117.0				PART C
5-9-77	4		17335	180.0	114.5	5.1	2 3/4		PIER 23 NB
					120.0				PART C
5-11-77			17335	174.0	114.5	5.2	2 3/4		PIER 23 SB
					116.0				PART C
5-13-77			13648	132.0	85.0	5.3	2 1/2		PIER 22 NB
					88.0				PART C
5-18-77			13648	133.5	85.0	5.5	3"		PIER 22 SB
					89.0				PART C
5-24-77			13220	113.3	70.4	5.5	2 3/4		PIER 14 NB &
					75.5				SB FOOTINGS
5-27-77			14370		91.5	4.8	2 1/2		PIER 21 SB
					94.0				PART C
"			15766		153.3	6.4	2 3/4		PIER 13 NB &
					156.0				SB FOOTING



BRIDGE 40G

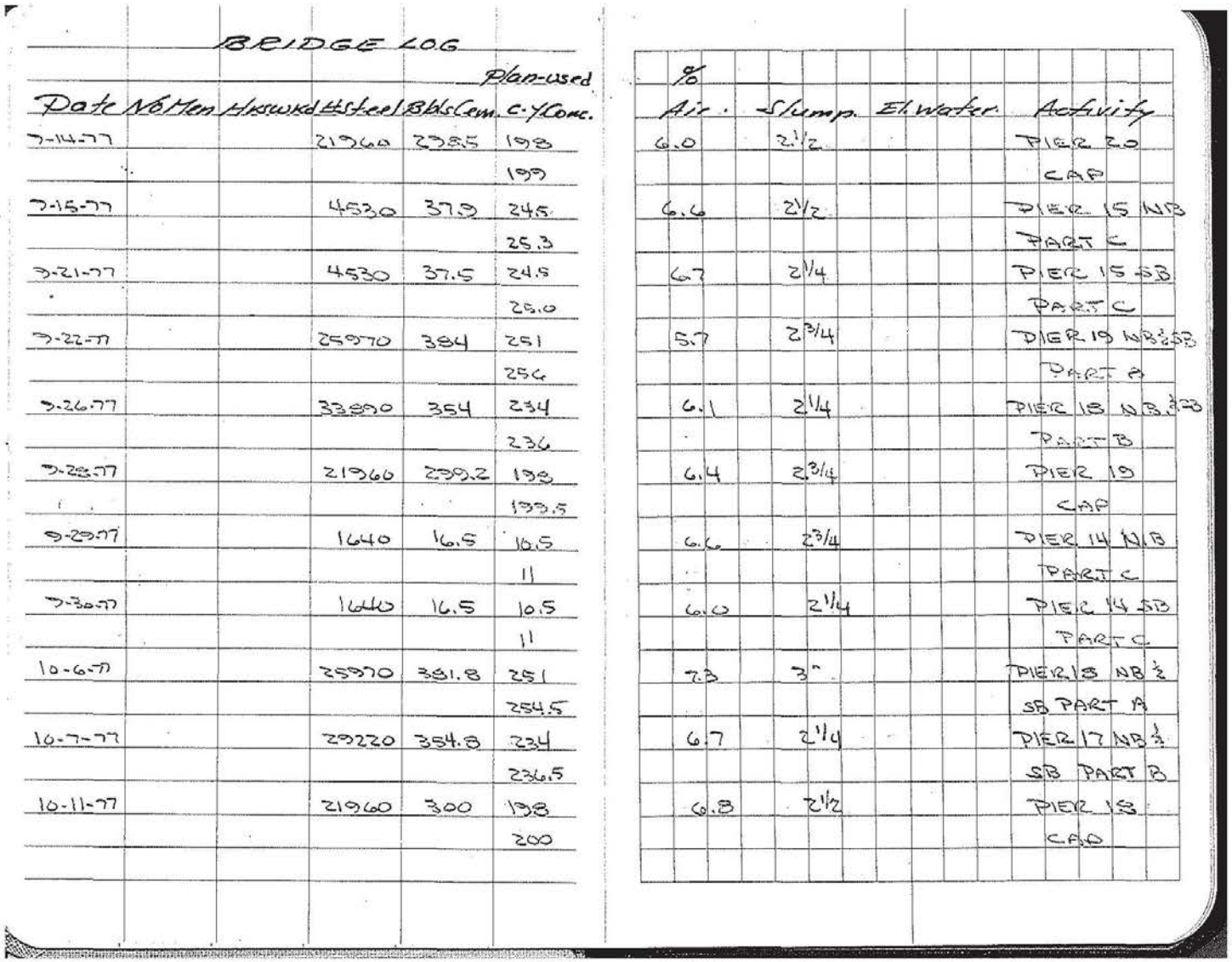
Date	No Men	Hrs Worked	# Steel	# Bolts	Com. C.Y. Conc.	Non-used	% Air	Slump	El. Water	Activity
6-3-77			320	17.2	10.0		5.4	2 1/2		PIER 14
					11.5					FOOTING TIE
"			230	14.3	7.7					PIER 13
					9.5					FOOTING TIE
6-6-77			14370	141.0	91.5		5.9	2 3/4		PIER 21 NB
					94.0					PART C
"			17335	175.5	117.0		4.8	2 3/4		PIER 25 SB
					117.0					PART B
6-7-77			17335	175.5	117.0		5.8	2"		PIER 25 NB
					117.0					PART B
6-10-77			14740	144.0	94.0		5.7	2 3/4		PIER 20 NB
					96.0					PART C
6-15-77			14745	142.5	94.0		5.7	2 3/4		PIER 20 SB
					95.0					PART C
6-16-77			33350	351.0	234.0		6.3	3		PIER 24 SB & NB
					234.0					PART B
6-20-77			12661	118.5	77.5		6.2	2 3/4		PIER 19 NB
					79.0					PART C
6-23-77			12985	190.0	125.5		5.0	3"		PIER 23 NB
					126.0					PART A
6-27-77			12985	188.3	125.5		5.0	2 3/4		PIER 23 SB
					125.5					PART A
7-1-77			12662	118.5	77.5		5.2	2 3/4		PIER 19 SB
					79.0					PART C

BRIDGE LOG

Date	Men	Hours	# Steel	Bbls Cem	Plan used C.Y. Conc.	% Air -	Slump	Ft. Water	Activity
7-5-77			21960	299.3	198.0	5.9	3"		PIER 25
					199.5				CAP
7-7-77			10948	97.5	65.0	4.8	2 3/4		PIER 18 NB
					65.0				PART C
7-15-77			25970	387	251.0	5.0	2 3/4		PIER 24 NB
					258.0				SB PART A
7-20-77			33890	354.8	234.0	5.0	3		PIER 23 NB
					234.5				SB PART B
7-21-77			21960	298.9	198.0	5.2	2 3/4		PIER 24
					199.2				CAP
7-25-77			25970	387	251.0	5.6	2 1/2		PIER 23 NB
					258.0				SB PART A
8-1-77			33890	354	234.0	5.5	2 1/4		PIER 22 NB
					236.0				SB PART B
8-2-77			10948	99.4	65.0	5.8	2 3/4		PIER 18 NB
					66.25				PART C
8-3-77			21960	297	198.0	6.4	2 3/4		PIER 23
					198.0				CAP
8-5-77			11752	82.1	53	5.2	2 1/2		PIER 17 NB
					54.8				PART C
8-12-77			25970	384	251.0	5.4	2 3/4		PIER 22 NB
					256.0				SB PART A

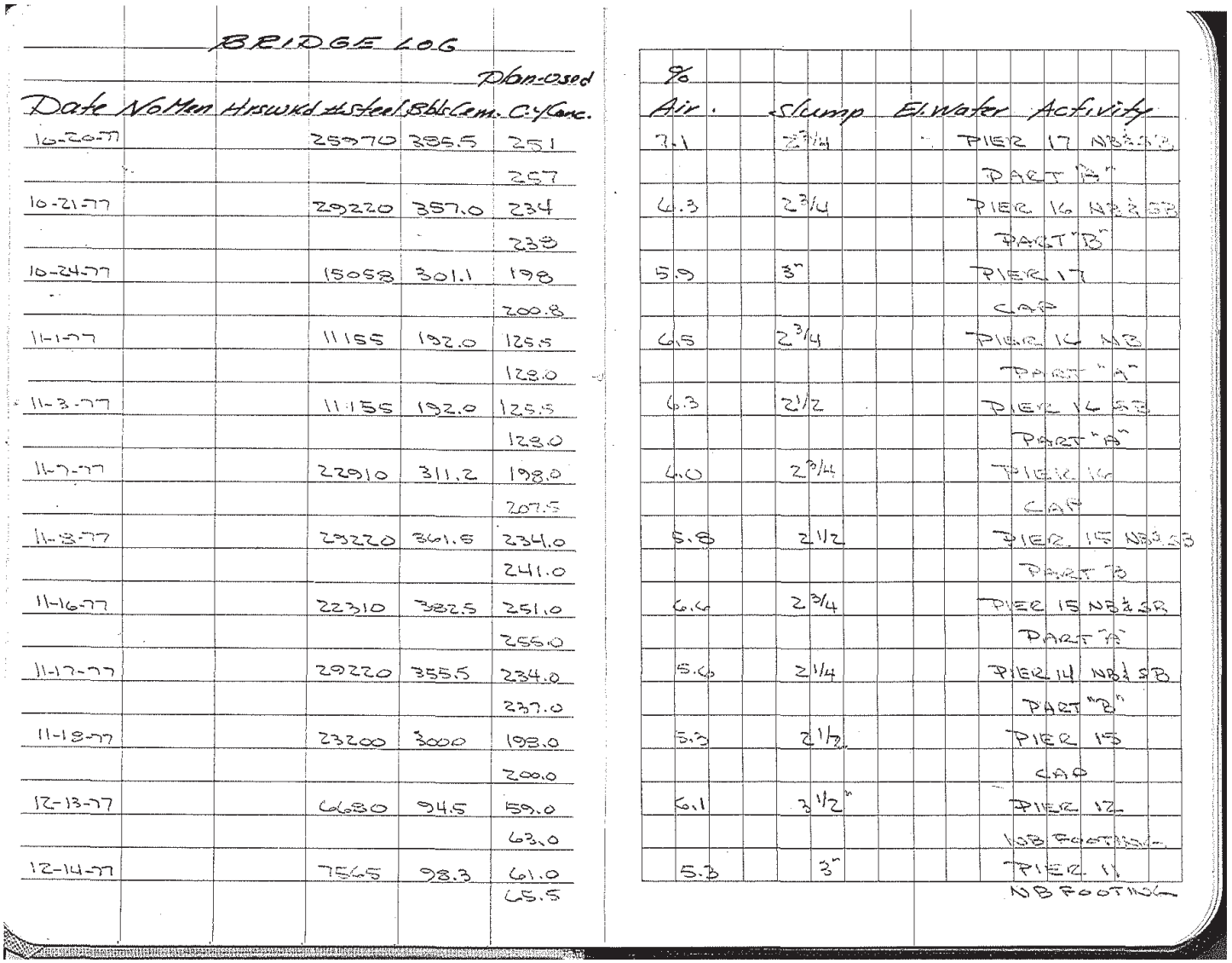
BRIDGE LOG

Date	No Men	Hrs Work'd	#Steel	Bbls Cem	Plan-used C.Y. Conc.	% Air	Slump	El. Water	Activity
8-15-77		23,850	354.6		234	5.7	2 1/4		PIER 21 NB
					236.5				SB PART B
8-17-77		21960	239.6		139.5	5.5	2 1/4		PIER 22
					139.5				CAP
8-18-77		11752	81		53.0	5.4	2 3/4		PIER 17
					54.0				SB PART C
8-19-77		5950	58.1		37.5	5.6	3		PIER 16
					39.0				NB PART C
8-25-77		12985	192.6		125.5	6.0	2 1/2		PIER 21
					128.0				NB PART A
8-26-77		12985	193.5		125.5	5.5	2 3/4		PIER 21
					129.0				SB PART A
8-29-77		33890	355.5		234.0	5.6	2 1/4		PIER 20 NB
					237.0				SB PART B
8-31-77		21360	303.0		198.0	4.8	2 1/4		PIER 21
					202.0				CAP
9-2-77		5950	58.5		37.5	5.4	2 1/2		PIER 16 SB PART C
					39.0				
9-9-77		25970	382.1		251.0	5.0	2 1/2		PIER 20 NB
					254.0				SB PART A
9-12-77		33890	354.7		234.0	6.6	2 3/4		PIER 19 NB
					236.5				SB PART B



BRIDGE LOG

Date	# Men	# Rebar	# Steel	# Bbls Cem.	C.Y. Conc. Plan-used	% Air	Slump	El. Water	Activity
7-14-77		21960	238.5	198		6.0	2 1/2		PIER 20
				199					CAP
7-15-77		4530	37.9	24.5		6.6	2 1/2		PIER 15 NB
				25.3					PART C
7-21-77		4530	37.5	24.5		6.7	2 1/4		PIER 15 SB
				25.0					PART C
7-22-77		25970	384	251		5.7	2 3/4		PIER 19 NB & SB
				256					PART A
7-26-77		33890	354	234		6.1	2 1/4		PIER 18 NB & SB
				236					PART B
7-28-77		21960	299.2	198		6.4	2 3/4		PIER 19
				199.5					CAP
9-29-77		1640	16.5	10.5		6.6	2 3/4		PIER 14 NB
				11					PART C
7-30-77		1640	16.5	10.5		6.0	2 1/4		PIER 14 SB
				11					PART C
10-6-77		25970	381.8	251		7.3	3"		PIER 18 NB & SB PART A
				254.5					
10-7-77		29220	354.8	234		6.7	2 1/4		PIER 17 NB & SB PART B
				236.5					
10-11-77		21960	300	198		6.8	2 1/2		PIER 18
				200					CAP

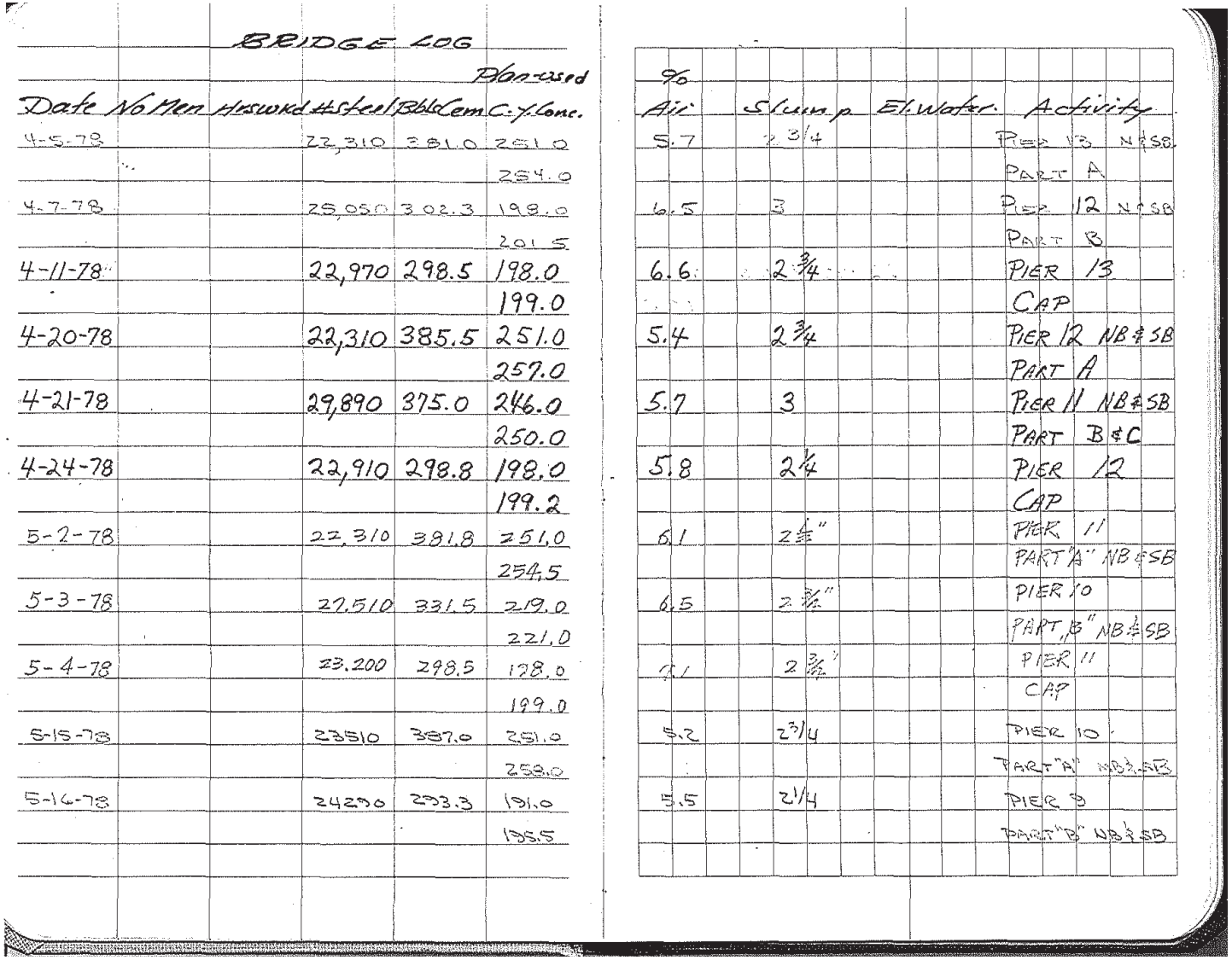


BRIDGE LOG

Date	No Men	H.S.W.R.D.	#Steel	#Bbl. Cem.	C.Y. Conc.	Pbm-osed	% Air	Slump	El. Water	Activity
10-20-77		25970	385.5		251		7.1	2 3/4		PIER 17 NB & SB
					257					PART "B"
10-21-77		29220	357.0		234		4.3	2 3/4		PIER 16 NB & SB
					238					PART "B"
10-24-77		15058	301.1		198		5.9	3"		PIER 17
					200.8					CAP
11-1-77		11155	192.0		125.5		6.5	2 3/4		PIER 16 NB
					128.0					PART "A"
11-3-77		11155	192.0		125.5		6.3	2 1/2		PIER 16 SB
					128.0					PART "A"
11-7-77		22910	311.2		198.0		4.0	2 3/4		PIER 16
					207.5					CAP
11-8-77		29220	361.5		234.0		5.8	2 1/2		PIER 15 NB & SB
					241.0					PART "B"
11-16-77		22310	382.5		251.0		6.6	2 3/4		PIER 15 NB & SB
					255.0					PART "A"
11-17-77		29220	355.5		234.0		5.6	2 1/4		PIER 14 NB & SB
					237.0					PART "B"
11-18-77		23200	3000		198.0		5.3	2 1/2		PIER 15
					200.0					CAP
12-13-77		6680	94.5		59.0		6.1	3 1/2"		PIER 12
					63.0					NB FOOTING
12-14-77		7565	98.3		61.0		5.3	3"		PIER 11
					65.5					NB FOOTING

BRIDGE LOG

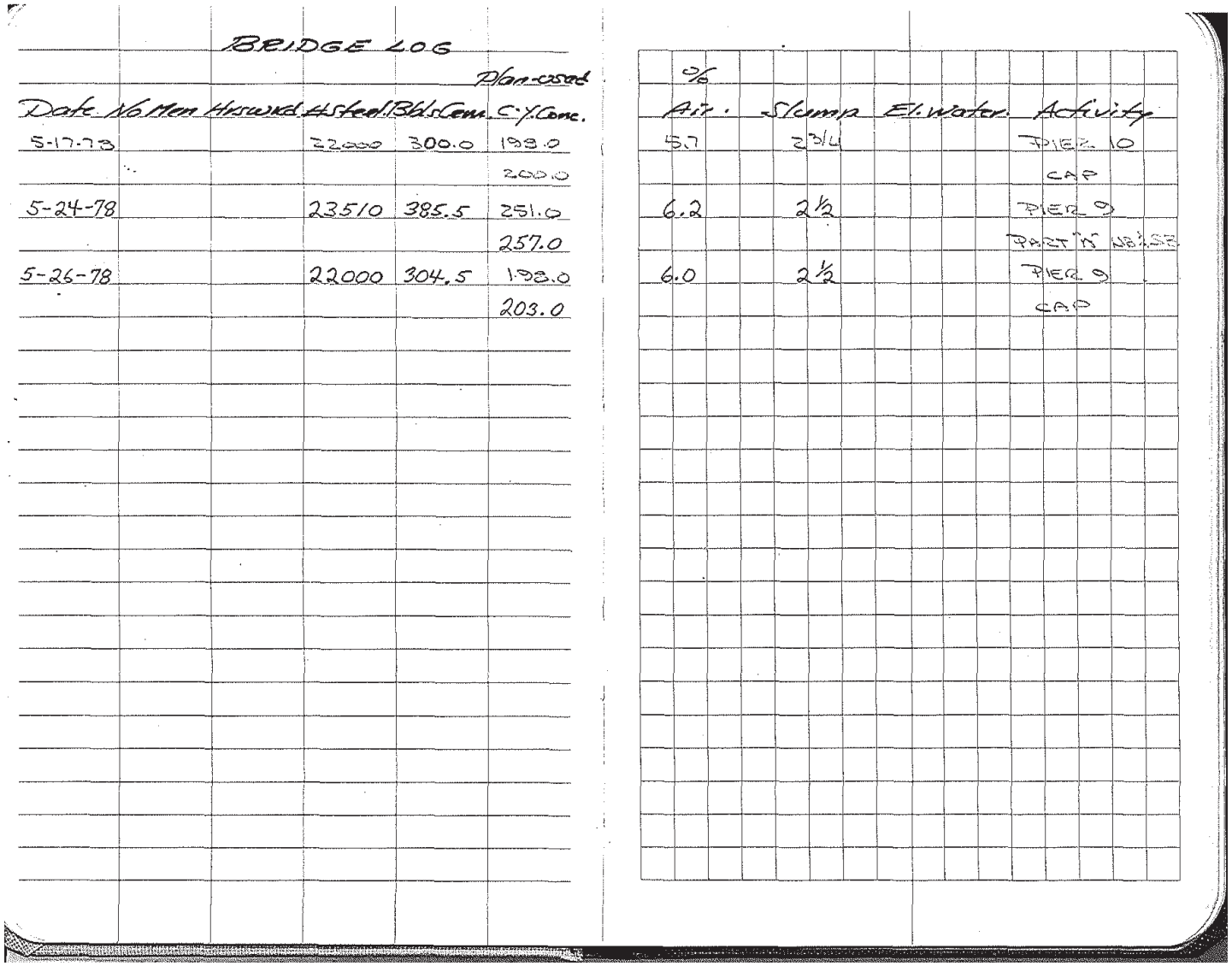
Date	No Men	Hrs Work'd	# Steel	B66 Com.	Plan-ased C.Y. Conc.	% Air	Slump	El. Water	Activity
12-15-77			7565	99.4	61.0	5.5	3"		PIER 11
					64.3				SB FOOTING
12-16-77			560	13.9	9.0	5.5	3"		PIER 11
					9.3				FOOTING TIE
12-19-77			6680	93.0	59.0	4.6	2 1/2"		PIER 12
					62.0				SB FOOTING
12-22-77			11970	135.0	85.0	4.6	2 3/4"		PIER 10
					90.0				SB & NB FOOTING
12-23-77			760	15.75	9.0	4.5	3"		PIER 12
					10.5				FOOTING TIE
1-4-78			560	17.25	10.0	5.6	3 1/4		PIER 10
					11.5				FOOTING TIE
1-16-78			14770	210	137.0	5.8	2 1/2		PIER 9 NB & SB
					140.0				FOOTINGS
1-23-78			940	11.6	7.0	4.5	3		PIER 9
					7.7				FOOTING TIE
3-21-78			22310	378.8	251.0	6.6	3		PIER 14 NB & SB.
					252.3				PART A
3-22-78			28694	343.5	227.0	6.1	2 3/4		PIER 13 NB & SB.
					229.0				PART B
3-24-78			20,900	297.0	198.0	6.4	2 3/4		PART 14
					198.0				PIER C.F.



BRIDGE LOG

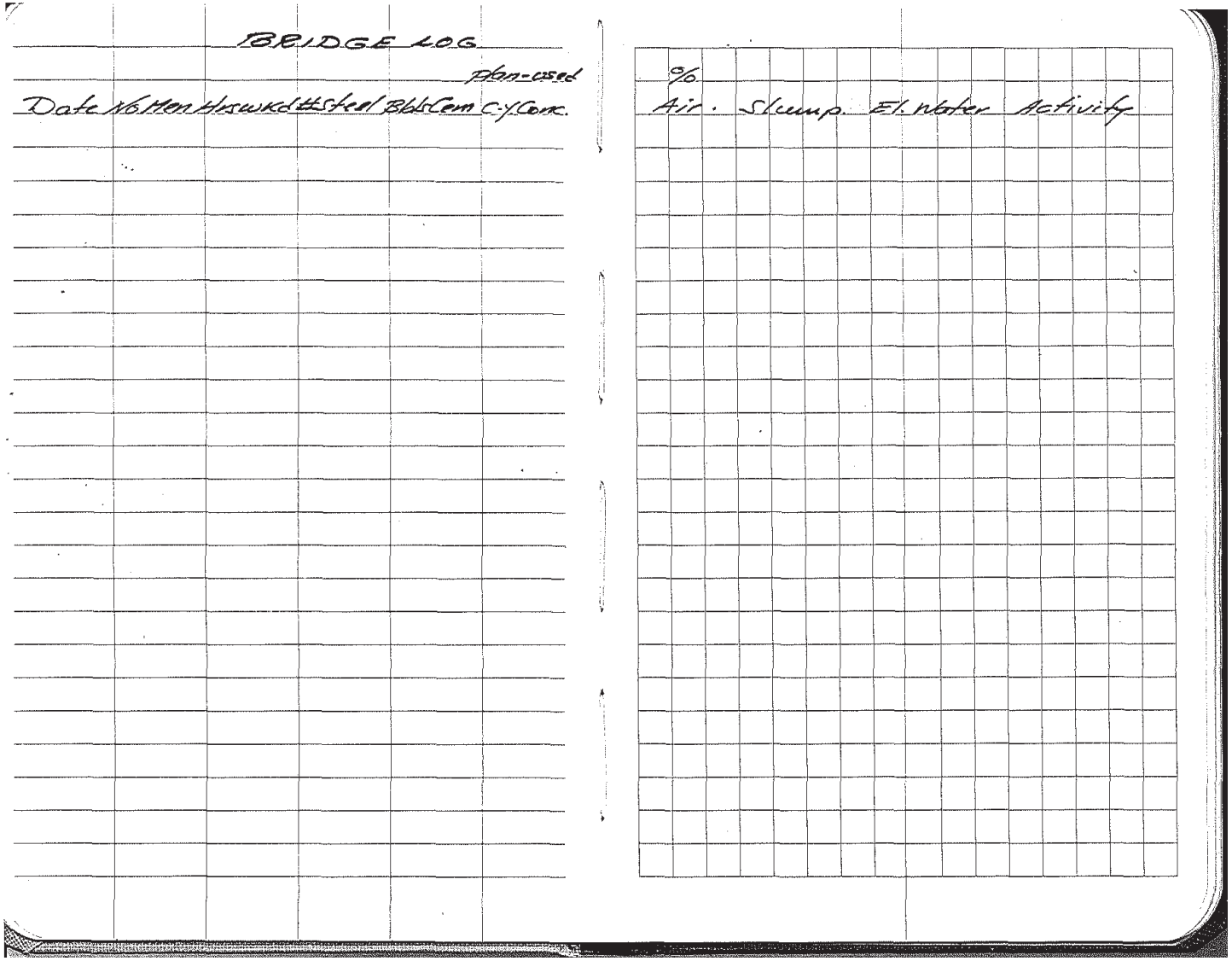
Date	No Men	Hrs Work'd	# Steel	Bbls Cem	C.Y. Conc. Planned
4-5-78		22,310	381.0	251.0	
				254.0	
4-7-78		25,050	302.3	198.0	
				201.5	
4-11-78		22,970	298.5	198.0	
				199.0	
4-20-78		22,310	385.5	251.0	
				257.0	
4-21-78		29,890	375.0	246.0	
				250.0	
4-24-78		22,910	298.8	198.0	
				199.2	
5-2-78		22,310	381.8	251.0	
				254.5	
5-3-78		22,510	331.5	219.0	
				221.0	
5-4-78		23,200	298.5	198.0	
				199.0	
5-15-78		23510	387.0	251.0	
				258.0	
5-16-78		24290	293.3	191.0	
				195.5	

% Air	Slump	Ft. Water	Activity
5.7	3 3/4		Pier 13 N & SB
			Part A
6.5	3		Pier 12 N & SB
			Part B
6.6	2 3/4		Pier 13
			Cap
5.4	2 3/4		Pier 12 NB & SB
			Part A
5.7	3		Pier 11 NB & SB
			Part B & C
5.8	2 1/4		Pier 12
			Cap
6.1	2 1/4"		Pier 11
			Part "A" NB & SB
6.5	2 3/4"		Pier 10
			Part "B" NB & SB
6.1	2 3/4"		Pier 11
			Cap
5.2	2 3/4		Pier 10
			Part "A" NB & SB
5.5	2 1/4		Pier 9
			Part "B" NB & SB



BRIDGE LOG

Date	No Men	Hrs. Work'd.	Lbs. Steel	Bbls. Cem.	Planned C.Y. Conc.	% Air.	Slump	El. Water.	Activity
5-17-78			22000	300.0	198.0	5.7	2 3/4		PIER 10
					200.0				CAP
5-24-78			23510	385.5	251.0	6.2	2 1/2		PIER 9
					257.0				PART 'A' NB & SB
5-26-78			22000	304.5	198.0	6.0	2 1/2		PIER 9
					203.0				CAP



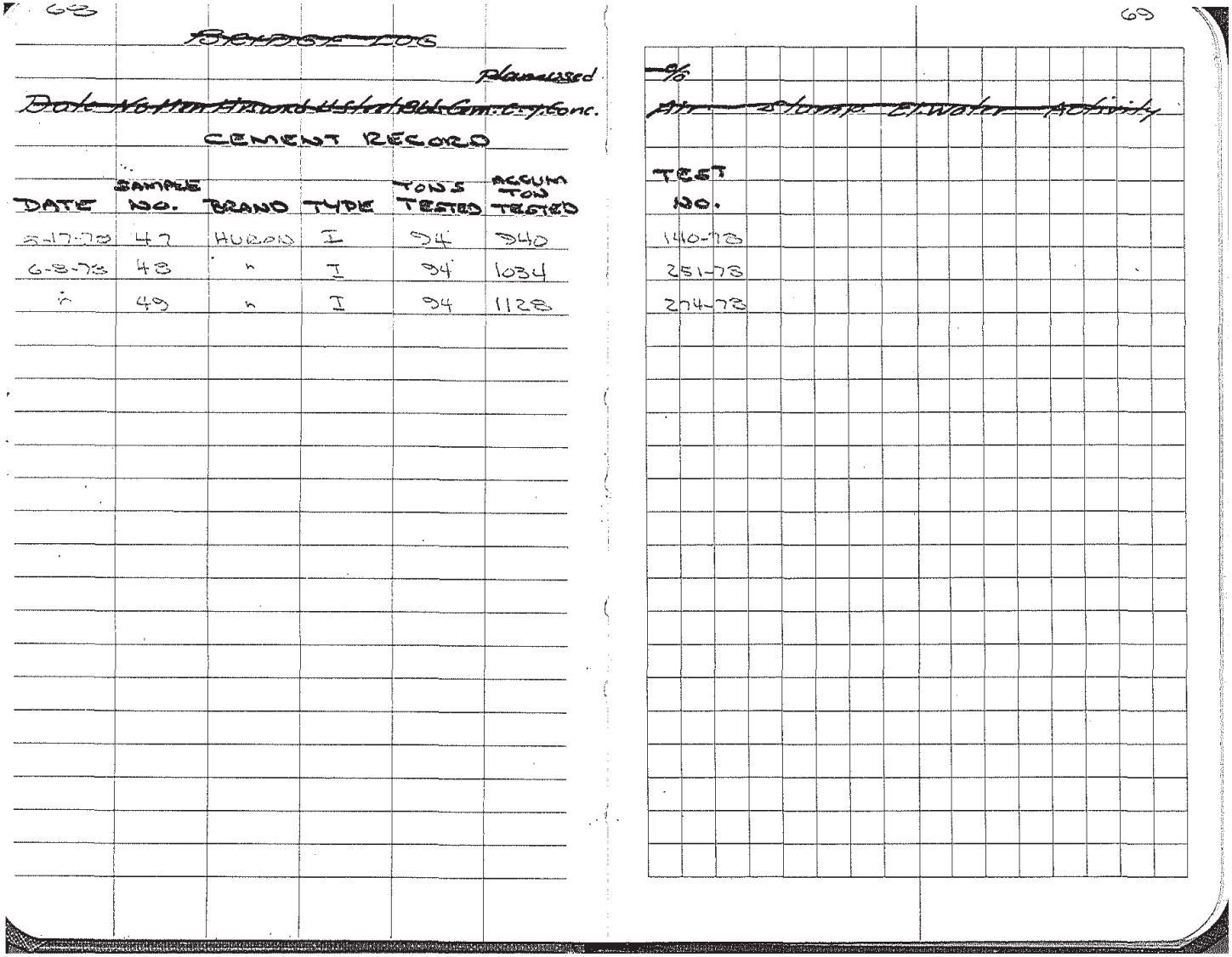
BRIDGE LOG

Plan-used

Date No. Men Hrs. Wkd. Lbs. Steel Bbls. Cem. C.Y. Conc.

%

Air. Slump. Ft. Water Activity



68

BRIDGE LOG

Planussed

Date Notation Record Weather Gen. Cryp. Conc.

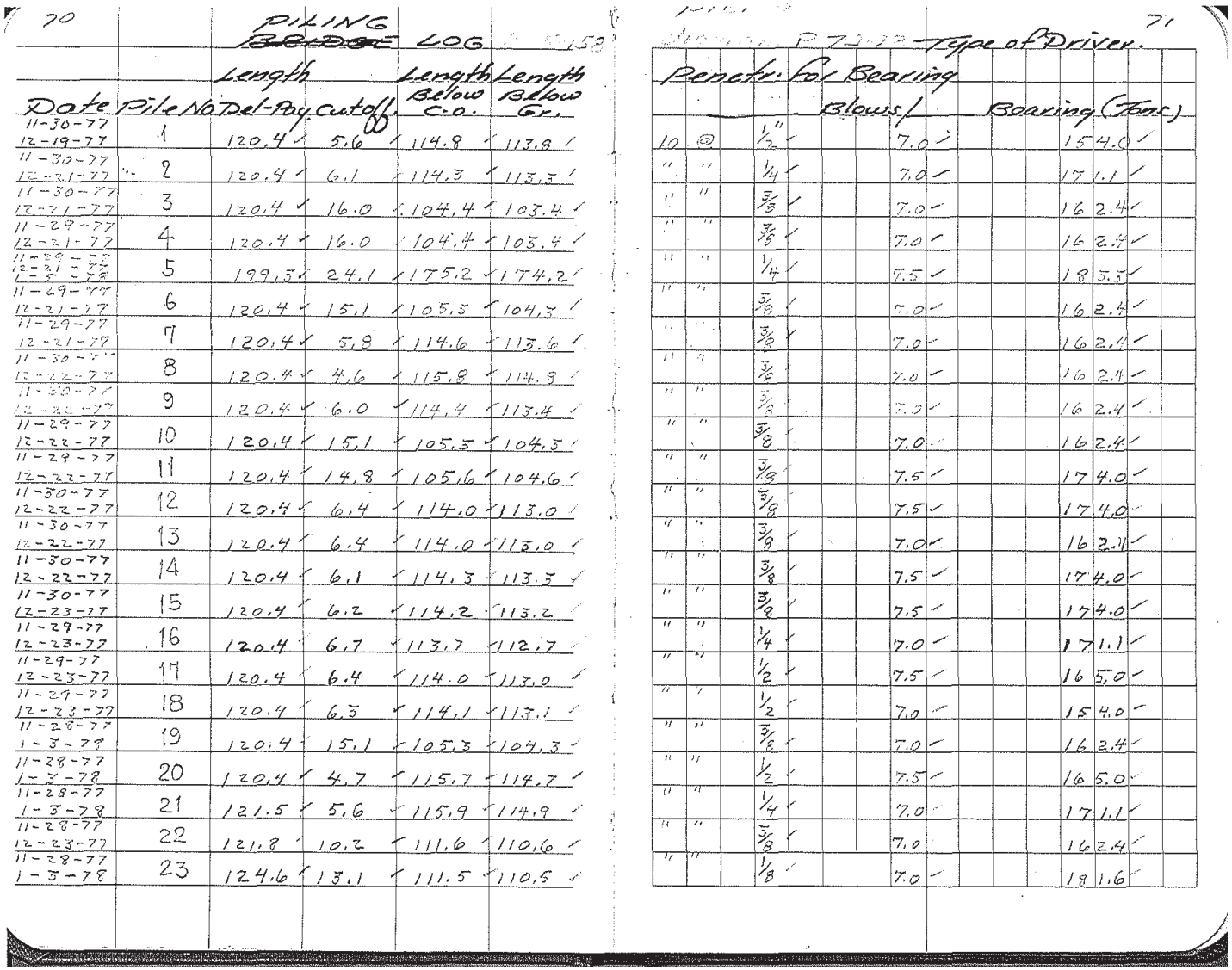
CEMENT RECORD

DATE	SAMPLE NO.	BRAND	TYPE	TONS TESTED	ACCUM TON TESTED
5-17-73	47	HURON	I	94	940
6-8-73	48	"	I	94	1034
"	49	"	I	94	1128

69

% Air — Slump — Entrain — Activity

TEST NO.
140-73
251-73
274-73



70

PILING ~~BRIDGE~~ LOG

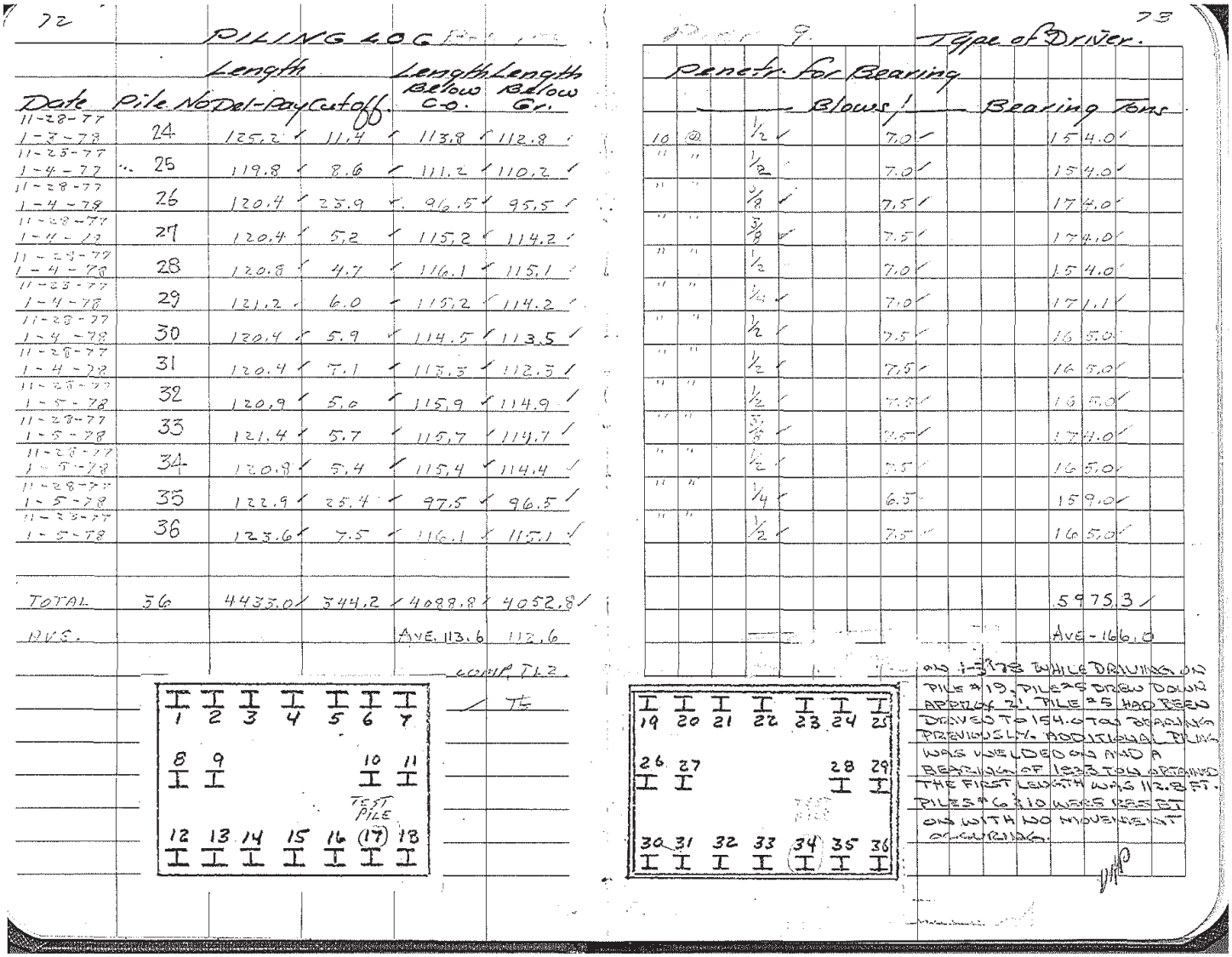
Date	Pile No	Length Del-Pay cutoff	Length Below C.O.	Length Below Gr.
11-30-77 / 12-19-77	1	120.4 ✓ 5.6 ✓	114.8 ✓	113.8 ✓
11-30-77 / 12-21-77	2	120.4 ✓ 6.1 ✓	114.3 ✓	113.3 ✓
11-30-77 / 12-21-77	3	120.4 ✓ 16.0 ✓	104.4 ✓	103.4 ✓
11-29-77 / 12-21-77	4	120.4 ✓ 16.0 ✓	104.4 ✓	103.4 ✓
11-29-77 / 12-21-77 / 1-5-78	5	199.5 ✓ 24.1 ✓	175.2 ✓	174.2 ✓
11-29-77 / 12-21-77	6	120.4 ✓ 15.1 ✓	105.3 ✓	104.3 ✓
11-29-77 / 12-21-77	7	120.4 ✓ 5.8 ✓	114.6 ✓	113.6 ✓
11-30-77 / 12-22-77	8	120.4 ✓ 4.6 ✓	115.8 ✓	114.8 ✓
11-30-77 / 12-22-77	9	120.4 ✓ 6.0 ✓	114.4 ✓	113.4 ✓
11-29-77 / 12-22-77	10	120.4 ✓ 15.1 ✓	105.3 ✓	104.3 ✓
11-29-77 / 12-22-77	11	120.4 ✓ 14.8 ✓	105.6 ✓	104.6 ✓
11-30-77 / 12-22-77	12	120.4 ✓ 6.4 ✓	114.0 ✓	113.0 ✓
11-30-77 / 12-22-77	13	120.4 ✓ 6.4 ✓	114.0 ✓	113.0 ✓
11-30-77 / 12-22-77	14	120.4 ✓ 6.1 ✓	114.3 ✓	113.3 ✓
11-30-77 / 12-23-77	15	120.4 ✓ 6.2 ✓	114.2 ✓	113.2 ✓
11-29-77 / 12-23-77	16	120.4 ✓ 6.7 ✓	113.7 ✓	112.7 ✓
11-29-77 / 12-23-77	17	120.4 ✓ 6.4 ✓	114.0 ✓	113.0 ✓
11-29-77 / 12-23-77	18	120.4 ✓ 6.3 ✓	114.1 ✓	113.1 ✓
11-28-77 / 1-3-78	19	120.4 ✓ 15.1 ✓	105.3 ✓	104.3 ✓
11-28-77 / 1-3-78	20	120.4 ✓ 4.7 ✓	115.7 ✓	114.7 ✓
11-28-77 / 1-3-78	21	121.5 ✓ 5.6 ✓	115.9 ✓	114.9 ✓
11-28-77 / 12-23-77	22	121.8 ✓ 10.2 ✓	111.6 ✓	110.6 ✓
11-28-77 / 1-3-78	23	124.6 ✓ 13.1 ✓	111.5 ✓	110.5 ✓

71

PZ-22 Type of Driver.

Remarks: For Bearing

Blows/			Bearing (Tons)	
10 @	1/2" ✓	7.0 ✓	15	4.0 ✓
" "	1/4 ✓	7.0 ✓	17	1.1 ✓
" "	3/8 ✓	7.0 ✓	16	2.4 ✓
" "	3/8 ✓	7.0 ✓	16	2.4 ✓
" "	1/4 ✓	7.5 ✓	18	5.5 ✓
" "	3/8 ✓	7.0 ✓	16	2.4 ✓
" "	3/8 ✓	7.0 ✓	16	2.4 ✓
" "	3/8 ✓	7.0 ✓	16	2.4 ✓
" "	3/8 ✓	7.0 ✓	16	2.4 ✓
" "	3/8 ✓	7.0 ✓	16	2.4 ✓
" "	3/8 ✓	7.5 ✓	17	4.0 ✓
" "	3/8 ✓	7.5 ✓	17	4.0 ✓
" "	3/8 ✓	7.0 ✓	16	2.4 ✓
" "	3/8 ✓	7.5 ✓	17	4.0 ✓
" "	3/8 ✓	7.5 ✓	17	4.0 ✓
" "	1/4 ✓	7.0 ✓	17	1.1 ✓
" "	1/2 ✓	7.5 ✓	16	5.0 ✓
" "	1/2 ✓	7.0 ✓	15	4.0 ✓
" "	3/8 ✓	7.0 ✓	16	2.4 ✓
" "	1/2 ✓	7.5 ✓	16	5.0 ✓
" "	1/4 ✓	7.0 ✓	17	1.1 ✓
" "	3/8 ✓	7.0	16	2.4 ✓
" "	1/8 ✓	7.0 ✓	18	1.6 ✓



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PILING LOG

Date	Pile No	Length Del-Pay	Length Cutoff	Length Below C-O.	Length Below Gr.
11-28-77 1-3-78	24	125.2	11.4	113.8	112.8
11-25-77 1-4-78	25	119.8	8.6	111.2	110.2
11-28-77 1-4-78	26	120.4	25.9	96.5	95.5
11-28-77 1-4-78	27	120.4	5.2	115.2	114.2
11-28-77 1-4-78	28	120.8	4.7	116.1	115.1
11-25-77 1-4-78	29	121.2	6.0	115.2	114.2
11-28-77 1-4-78	30	120.4	5.9	114.5	113.5
11-28-77 1-4-78	31	120.4	7.1	113.3	112.3
11-25-77 1-5-78	32	120.9	5.0	115.9	114.9
11-28-77 1-5-78	33	121.4	5.7	115.7	114.7
11-28-77 1-5-78	34	120.8	5.4	115.4	114.4
11-28-77 1-5-78	35	122.9	25.4	97.5	96.5
11-25-77 1-5-78	36	123.6	7.5	116.1	115.1
TOTAL	36	4433.0	344.2	4088.8	4052.8
AVG.				AVE. 113.6	112.6

COMP. T.2

T2

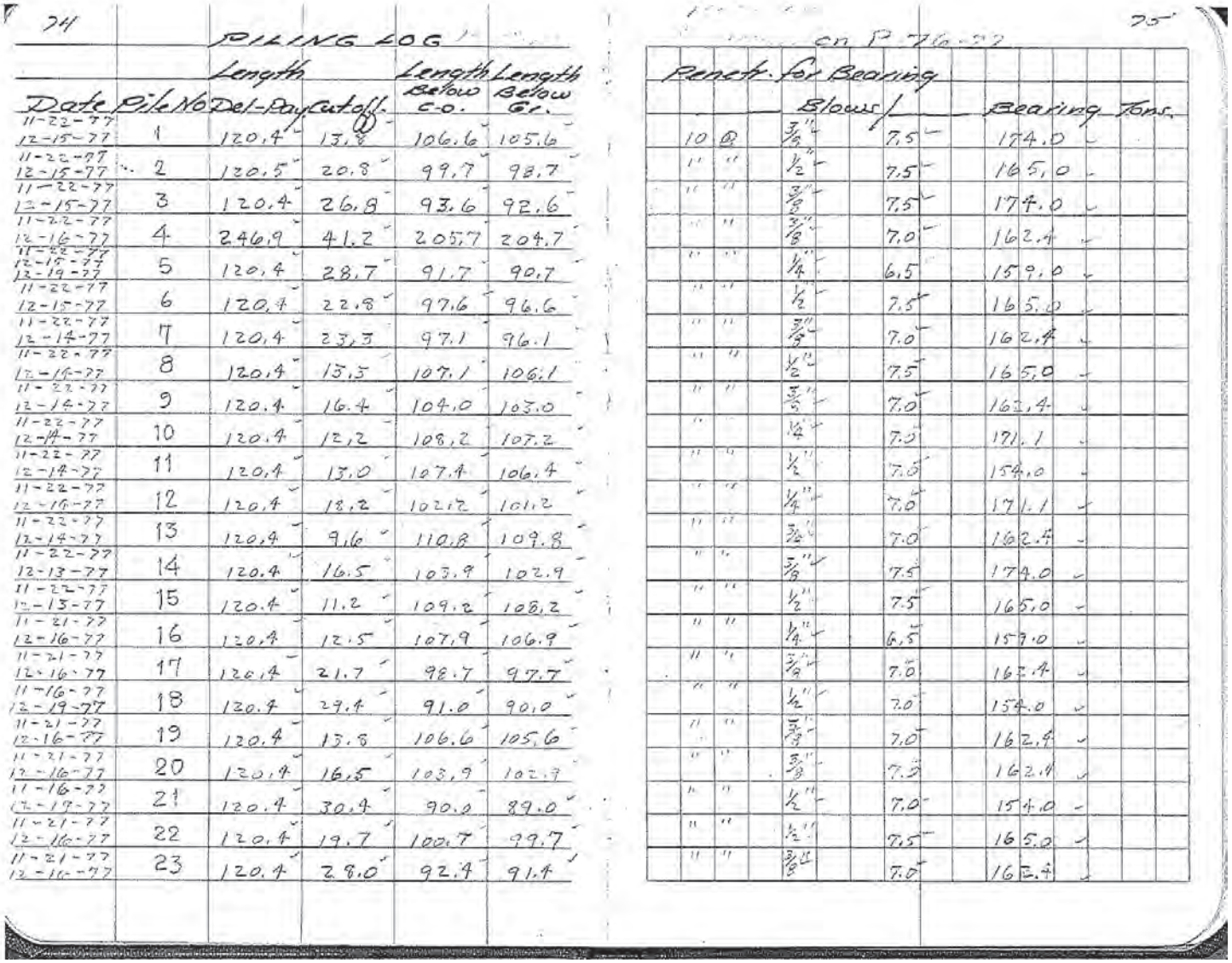
9

Type of Driver.

Penetr. for Bearing

Blows/	Bearing Tons
10 @ ½	7.0 / 154.0
" " ½	7.0 / 154.0
" " ⅞	7.5 / 174.0
" " ⅞	7.5 / 174.0
" " ½	7.0 / 154.0
" " ¾	7.0 / 171.1
" " ½	7.5 / 165.0
" " ½	7.5 / 165.0
" " ½	7.5 / 165.0
" " ⅞	7.5 / 174.0
" " ½	7.5 / 165.0
" " ¼	6.5 / 159.0
" " ½	7.5 / 165.0
	5975.3
	AVE - 166.0

ON 1-3-78 WHILE DRIVING OUT PILE #19, PILE #9 DREW DOWN APPROX 2'. PILE #5 HAD BEEN DRIVEN TO 154.0 TON BEARING PREVIOUSLY. ADDITIONAL BLOWS WAS WELDED AND A BEARING OF 165 TONS OBTAINED THE FIRST LENGTH WAS 112.8 FT. PILES #6 & 10 WERE RESET ON 1-4-78 WITH 120 BLOWS/FT OF DRIVING.



34

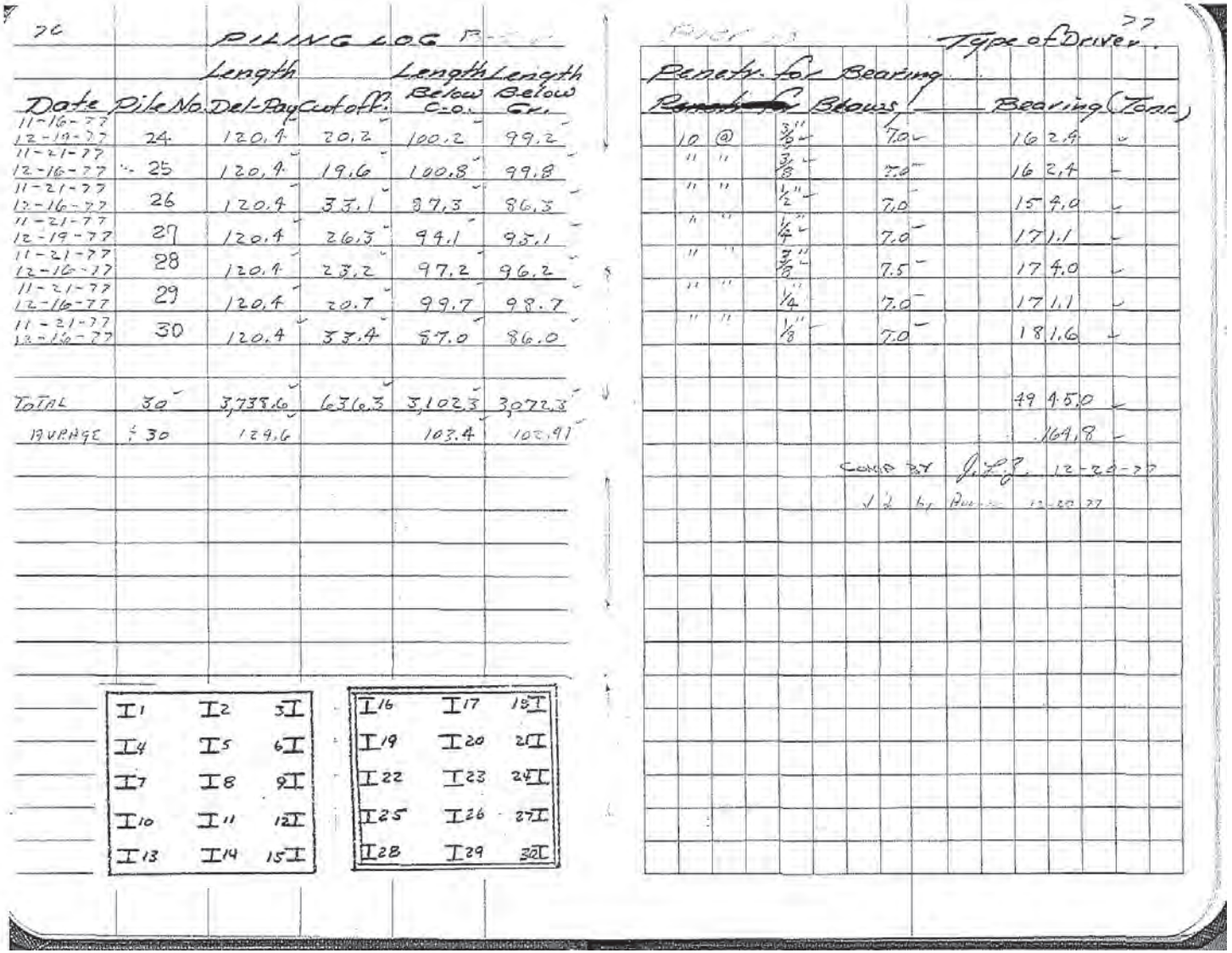
PILING LOG

Date	Pile No	Length Del-Day	Length Cutoff	Length Below C.O.	Length Below Gr.
11-22-77 / 12-15-77	1	120.4	13.8	106.6	105.6
11-22-77 / 12-15-77	2	120.5	20.8	99.7	98.7
11-22-77 / 12-15-77	3	120.4	26.8	93.6	92.6
11-22-77 / 12-16-77	4	246.9	41.2	205.7	204.7
11-22-77 / 12-15-77 / 12-19-77	5	120.4	28.7	91.7	90.7
11-22-77 / 12-15-77	6	120.4	22.8	97.6	96.6
11-22-77 / 12-14-77	7	120.4	23.3	97.1	96.1
11-22-77 / 12-14-77	8	120.4	13.3	107.1	106.1
11-22-77 / 12-14-77	9	120.4	16.4	104.0	103.0
11-22-77 / 12-14-77	10	120.4	12.2	108.2	107.2
11-22-77 / 12-14-77	11	120.4	13.0	107.4	106.4
11-22-77 / 12-16-77	12	120.4	18.2	102.2	101.2
11-22-77 / 12-14-77	13	120.4	9.6	110.8	109.8
11-22-77 / 12-13-77	14	120.4	16.5	103.9	102.9
11-22-77 / 12-13-77	15	120.4	11.2	109.2	108.2
11-21-77 / 12-16-77	16	120.4	12.5	107.9	106.9
11-21-77 / 12-16-77	17	120.4	21.7	98.7	97.7
11-16-77 / 12-19-77	18	120.4	29.4	91.0	90.0
11-21-77 / 12-16-77	19	120.4	13.8	106.6	105.6
11-21-77 / 12-16-77	20	120.4	16.5	103.9	102.9
11-16-77 / 12-19-77	21	120.4	30.4	90.0	89.0
11-21-77 / 12-16-77	22	120.4	19.7	100.7	99.7
11-21-77 / 12-16-77	23	120.4	28.0	92.4	91.4

on P 776-22

75

Reach. for Bearing Blows /				Bearing Tons.
10	@	3/8"	7.5	174.0
"	"	1/2"	7.5	165.0
"	"	3/8"	7.5	174.0
"	"	3/8"	7.0	162.4
"	"	1/4"	6.5	159.0
"	"	1/2"	7.5	165.0
"	"	3/8"	7.0	162.4
"	"	1/2"	7.5	165.0
"	"	3/8"	7.0	162.4
"	"	1/4"	7.0	171.1
"	"	1/2"	7.5	154.0
"	"	1/4"	7.0	171.1
"	"	3/8"	7.0	162.4
"	"	3/8"	7.5	174.0
"	"	1/2"	7.5	165.0
"	"	1/4"	6.5	159.0
"	"	3/8"	7.0	162.4
"	"	1/2"	7.0	154.0
"	"	3/8"	7.0	162.4
"	"	3/8"	7.5	162.4
"	"	1/2"	7.0	154.0
"	"	1/2"	7.5	165.0
"	"	3/8"	7.0	162.4



PILING LOG

Date	Pile No.	Length Del.	Pay	Cut off ft.	Length Below C.O.	Length Below Gr.
11-16-77 12-19-77	24	120.4	20.2	100.2	99.2
11-21-77 12-16-77	25	120.4	19.6	100.8	99.8
11-21-77 12-16-77	26	120.4	33.1	87.3	86.3
11-21-77 12-19-77	27	120.4	26.3	94.1	93.1
11-21-77 12-16-77	28	120.4	23.2	97.2	96.2
11-21-77 12-16-77	29	120.4	20.7	99.7	98.7
11-21-77 12-16-77	30	120.4	33.4	87.0	86.0
TOTAL	30	3,735.6	636.3	3,102.3	3,072.3
AVERAGE	÷ 30	124.6		103.4	102.41

Type of Driver

Remarks for Bearing		Blows		Bearing (Tons)	
10	@	3/8"	7.0	162.9	
"	"	3/8	7.0	162.4	
"	"	1/2"	7.0	154.0	
"	"	1/4"	7.0	171.1	
"	"	3/8"	7.5	174.0	
"	"	1/4"	7.0	171.1	
"	"	1/8"	7.0	181.6	
				49	945.0
					169.8

Cond by J.F.G. 12-20-77

√2 by Pile 12-20-77

I1	I2	3 I
I4	I5	6 I
I7	I8	9 I
I10	I11	12 I
I13	I14	15 I

I16	I17	18 I
I19	I20	21 I
I22	I23	24 I
I25	I26	27 I
I28	I29	30 I

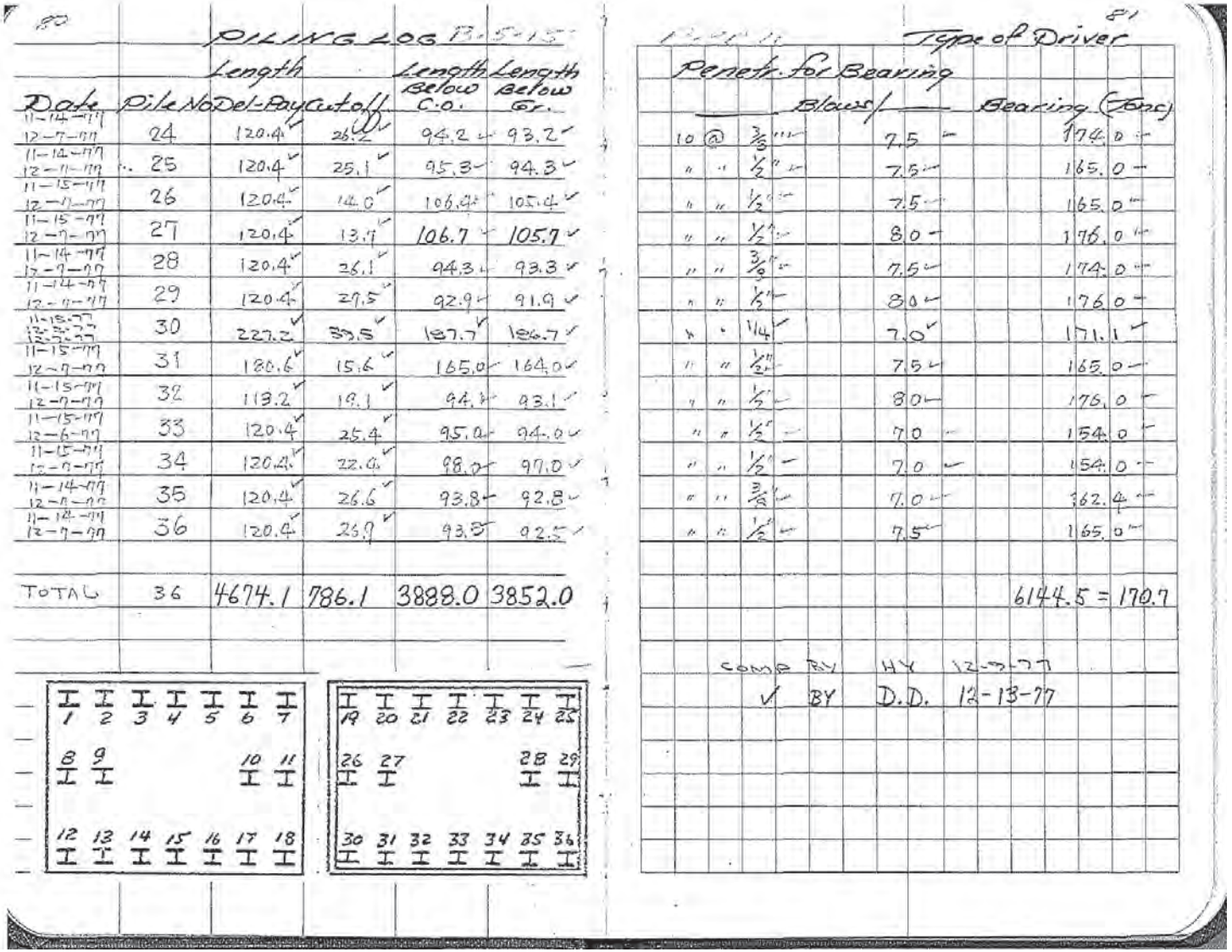
78

PILING LOG

Date	Pile No.	Length Del-Pay	Length cut off	Length Below Co.	Length Below Gr.
11-16-77 12-13-77	1	240.8	48.0	192.8	191.8
"	2	120.4	12.3	108.1	107.1
"	3	120.4	13.3	107.1	106.1
11-16-77 12-7-77	4	120.4	14.5	105.9	104.9
11-16-77 12-7-77	5	120.4	13.0	107.4	106.4
11-16-77 12-7-77	6	120.4	13.0	107.4	106.4
11-16-77 12-6-77	7	120.4	13.7	106.7	105.7
11-16-77 12-7-77	8	120.3	14.7	105.6	104.6
11-16-77 12-7-77	9	120.3	16.1	104.2	103.2
11-16-77 12-7-77	10	120.4	21.3	99.1	98.1
11-16-77 12-7-77	11	120.3	14.3	106.0	105.0
11-16-77 12-7-77	12	120.4	23.2	97.2	96.2
11-16-77 12-6-77	13	120.4	17.1	103.3	102.3
11-16-77 12-6-77	14	120.4	29.0	91.4	90.4
11-16-77 12-7-77	15	120.3	29.9	92.4	91.4
11-15-77 12-7-77	16	120.4	29.2	91.2	90.2
11-15-77 12-7-77	17	120.4	29.4	91.0	90.0
11-15-77 12-7-77	18	120.3	16.5	103.8	102.8
11-15-77 12-7-77	19	120.4	13.6	106.8	105.8
11-15-77 12-7-77	20	120.3	21.9	98.4	97.4
11-15-77 12-6-77	21	120.4	12.8	107.6	106.6
11-15-77 12-6-77	22	120.4	26.7	93.7	92.7
11-15-77 12-7-77	23	180.5	36.5	144.0	143.0

79

Penetr. for Bearing Blows/				Bearing (Tons)
10 @	3/8"		6.5	150.5
10 @	3/8"		7.0	162.4
10 @	3/8"		7.0	162.4
10 @	1/2"		8.0	176.0
"	"	3/8"	8.0	185.6
"	"	1/2"	7.5	165.0
"	"	1/2"	8.5	187.0
"	"	1/4"	7.5	183.3
"	"	1/2"	7.5	165.0
"	"	1/2"	7.5	165.0
"	"	1/2"	8.0	176.0
"	"	1/2"	7.5	165.0
"	"	1/2"	7.0	154.0
"	"	3/8"	8.0	185.6
"	"	1/4"	7.0	171.1
"	"	3/8"	8.5	197.2
"	"	1/4"	7.5	183.3
"	"	1/4"	6.5	159.0
"	"	3/8"	7.5	174.0
"	"	1/4"	8.0	176.6
"	"	1/2"	7.5	165.0
"	"	1/2"	7.5	165.0
"	"	3/8"	7.5	174.0



PILING LOG B-5-15

Date	Pile No	Length Del-Pay	Length cut-off	Length Below C.O.	Length Below Gr.
11-14-77 / 12-7-77	24	120.4	26.2	94.2	93.2
11-14-77 / 12-11-77	25	120.4	25.1	95.3	94.3
11-15-77 / 12-7-77	26	120.4	14.0	106.4	105.4
11-15-77 / 12-7-77	27	120.4	13.7	106.7	105.7
11-14-77 / 12-7-77	28	120.4	26.1	94.3	93.3
11-14-77 / 12-7-77	29	120.4	27.5	92.9	91.9
11-15-77 / 12-5-77 / 12-7-77	30	227.2	39.5	187.7	186.7
11-15-77 / 12-7-77	31	180.6	15.6	165.0	164.0
11-15-77 / 12-7-77	32	113.2	19.1	94.1	93.1
11-15-77 / 12-6-77	33	120.4	25.4	95.0	94.0
11-15-77 / 12-7-77	34	120.4	22.4	98.0	97.0
11-14-77 / 12-7-77	35	120.4	26.6	93.8	92.8
11-12-77 / 12-7-77	36	120.4	28.9	93.5	92.5
TOTAL	36	4674.1	786.1	3888.0	3852.0

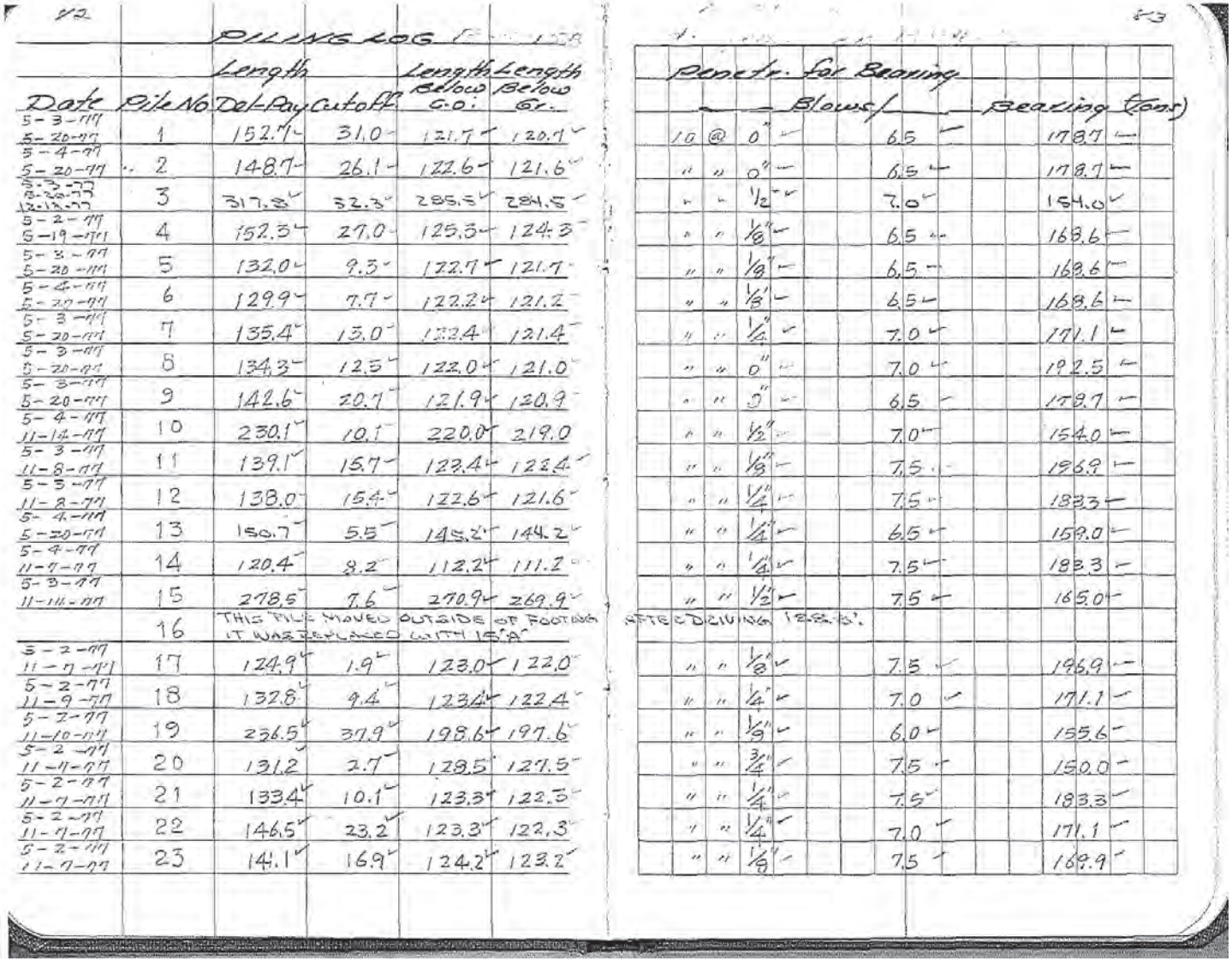
Type of Driver

Penetr. for Bearing

			Blows/	Bearing (Tons)
10 @	3/3		7.5	174.0
" "	1/2		7.5	165.0
" "	1/2		7.5	165.0
" "	1/2		8.0	176.0
" "	3/3		7.5	174.0
" "	1/2		8.0	176.0
" "	1/4		7.0	171.1
" "	1/2		7.5	165.0
" "	1/2		8.0	176.0
" "	1/2		7.0	154.0
" "	1/2		7.0	154.0
" "	3/3		7.0	162.4
" "	1/2		7.5	165.0
			6144.5 =	170.7

COMP BY HY 12-7-77

✓ BY D.D. 12-13-77

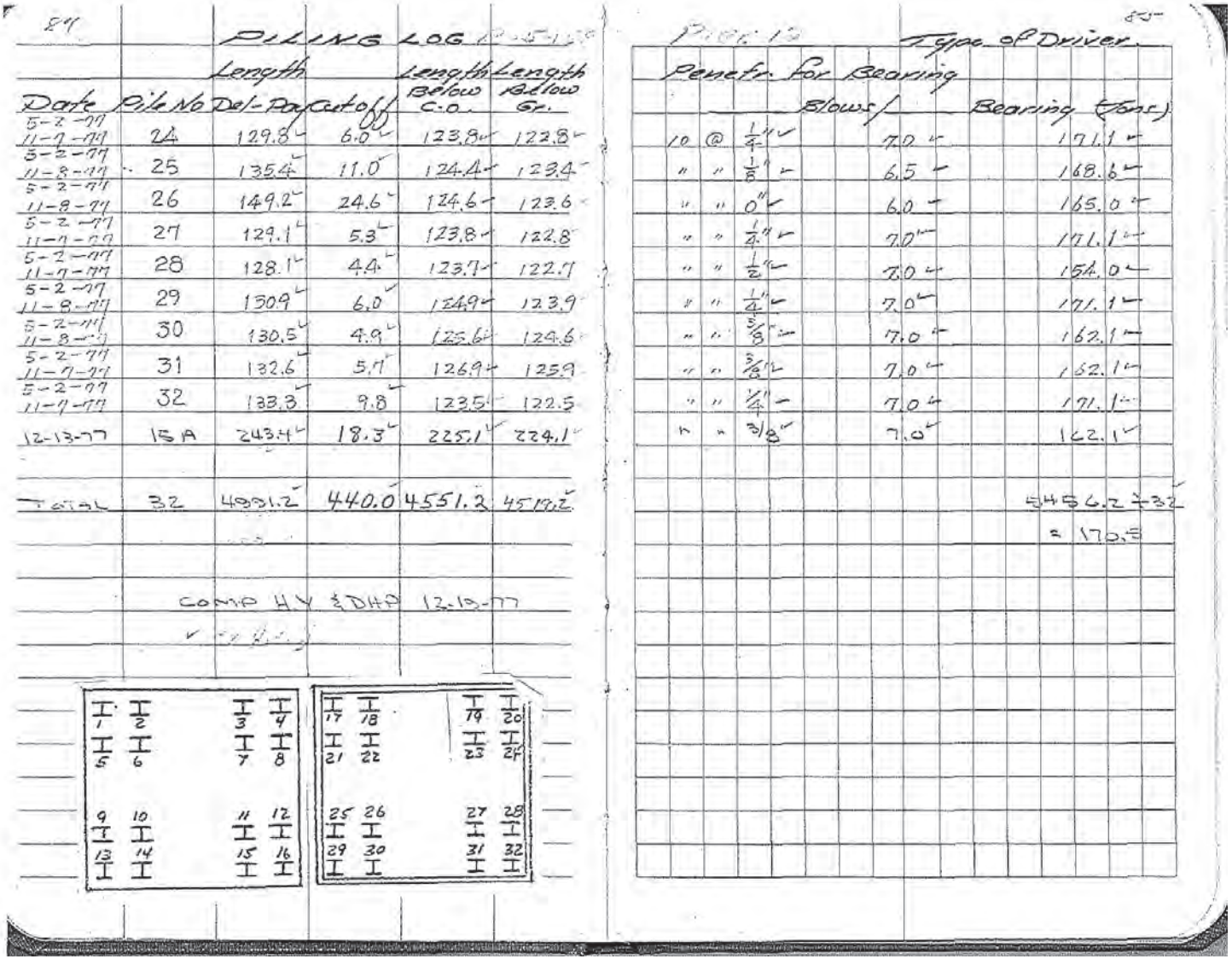


PILING LOG

Date	Pile No	Length Del-Pay	Length Cutoff	Length Below C.O.	Length Below Gr.
5-3-77 5-20-77	1	152.7	31.0	121.7	120.7
5-4-77 5-20-77	2	148.7	26.1	122.6	121.6
5-3-77 8-20-77 12:13:77	3	317.8	32.3	285.5	284.5
5-2-77 5-19-77	4	152.3	27.0	125.3	124.3
5-3-77 5-20-77	5	132.0	9.3	122.7	121.7
5-4-77 5-20-77	6	129.9	7.7	122.2	121.2
5-3-77 5-20-77	7	135.4	13.0	122.4	121.4
5-3-77 5-20-77	8	134.3	12.5	122.0	121.0
5-3-77 5-20-77	9	142.6	20.7	121.9	120.9
5-4-77 11-14-77	10	230.1	10.1	220.0	219.0
5-3-77 11-8-77	11	139.1	15.7	123.4	122.4
5-3-77 11-8-77	12	138.0	15.4	122.6	121.6
5-4-77 5-20-77	13	150.7	5.5	145.2	144.2
5-4-77 11-7-77	14	120.4	8.2	112.2	111.2
5-3-77 11-14-77	15	278.5	7.6	270.9	269.9
	16	THIS PILE MOVED OUTSIDE OF FOOTING IT WAS REPLACED WITH 15 "A"			
5-2-77 11-7-77	17	124.9	1.9	123.0	122.0
5-2-77 11-9-77	18	132.8	9.4	123.4	122.4
5-2-77 11-10-77	19	236.5	37.9	198.6	197.6
5-2-77 11-7-77	20	131.2	2.7	128.5	127.5
5-2-77 11-7-77	21	133.4	10.1	123.3	122.3
5-2-77 11-7-77	22	146.5	23.2	123.3	122.3
5-2-77 11-7-77	23	141.1	16.9	124.2	123.2

Penetr. for Bearing

Blows/			Bearing (tons)
10 @	0"	6.5	178.7
" "	0"	6.5	178.7
" "	1/2"	7.0	164.0
" "	1/8"	6.5	168.6
" "	1/8"	6.5	168.6
" "	1/8"	6.5	168.6
" "	1/4"	7.0	171.1
" "	0"	7.0	192.5
" "	0"	6.5	178.7
" "	1/2"	7.0	154.0
" "	1/8"	7.5	196.9
" "	1/4"	7.5	183.3
" "	1/4"	6.5	159.0
" "	1/4"	7.5	183.3
" "	1/2"	7.5	165.0
AFTER DRIVING 18 BLS.			
" "	1/8"	7.5	196.9
" "	1/4"	7.0	171.1
" "	1/8"	6.0	155.6
" "	3/4"	7.5	150.0
" "	1/4"	7.5	183.3
" "	1/4"	7.0	171.1
" "	1/8"	7.5	169.9



PILING LOG

Date	Pile No	Length Del.	Length Cutoff	Length Below C.O.	Length Below Gr.
5-2-77 / 11-7-77	24	129.8	6.0	123.8	122.8
5-2-77 / 11-8-77	25	135.4	11.0	124.4	123.4
5-2-77 / 11-8-77	26	149.2	24.6	124.6	123.6
5-2-77 / 11-7-77	27	129.1	5.3	123.8	122.8
5-2-77 / 11-7-77	28	128.1	4.4	123.7	122.7
5-2-77 / 11-8-77	29	130.9	6.0	124.9	123.9
5-2-77 / 11-8-77	30	130.5	4.9	125.6	124.6
5-2-77 / 11-7-77	31	132.6	5.7	126.9	125.9
5-2-77 / 11-7-77	32	133.3	9.8	123.5	122.5
12-13-77	15A	243.4	18.3	225.1	224.1
Total	32	4991.2	440.0	4551.2	4519.2

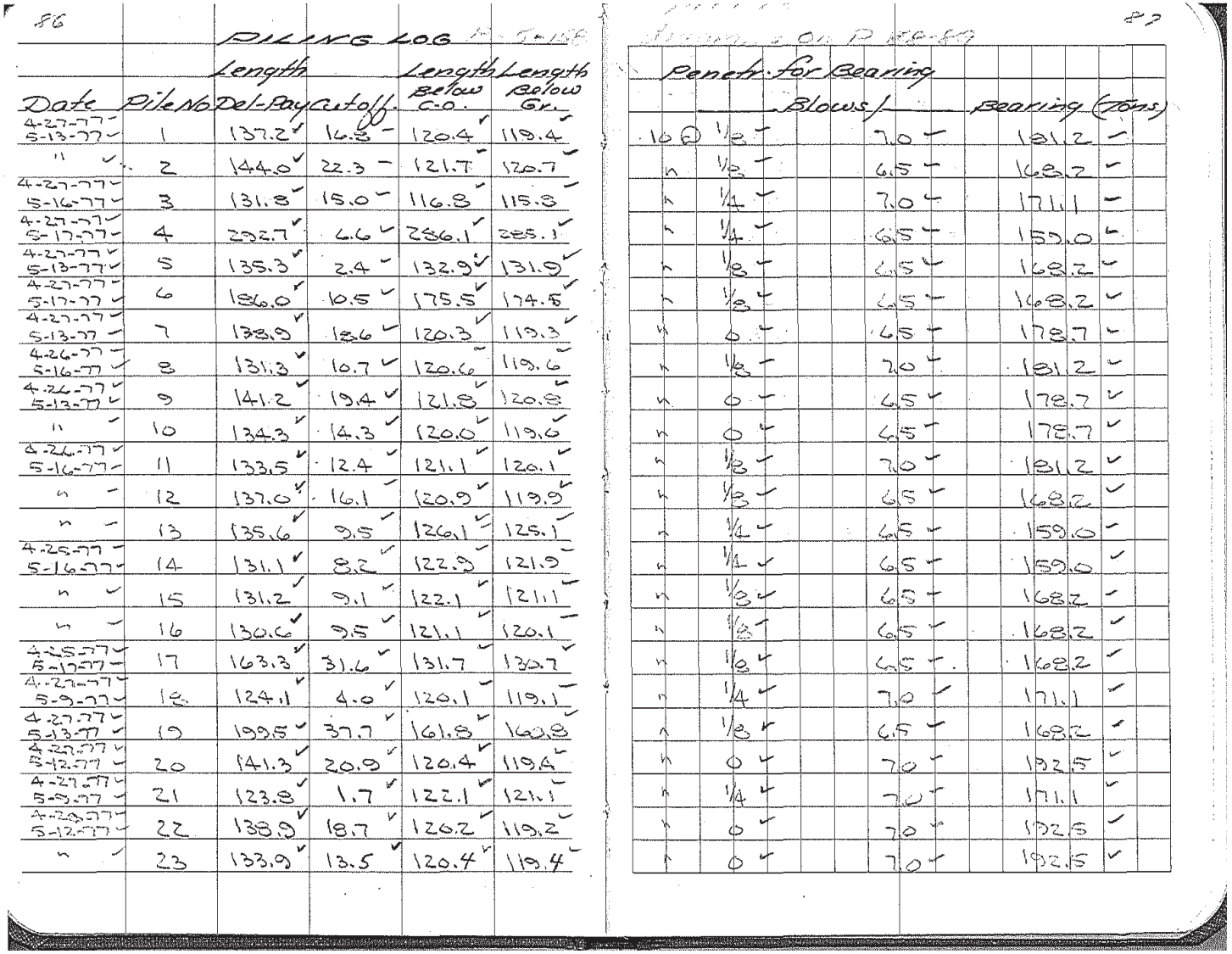
COMP HV & DHP 12-13-77

12-8-77 Type of Driver

Penetr. for Bearing

Blows/	Bearing (Tons)
10 @ 1/4"	171.1
" " 1/8"	168.6
" " 0"	165.0
" " 1/4"	171.1
" " 1/2"	154.0
" " 1/4"	171.1
" " 3/8"	162.1
" " 3/8"	162.1
" " 1/4"	171.1
" " 3/8"	162.1

5456.2 ÷ 32 = 170.5



86

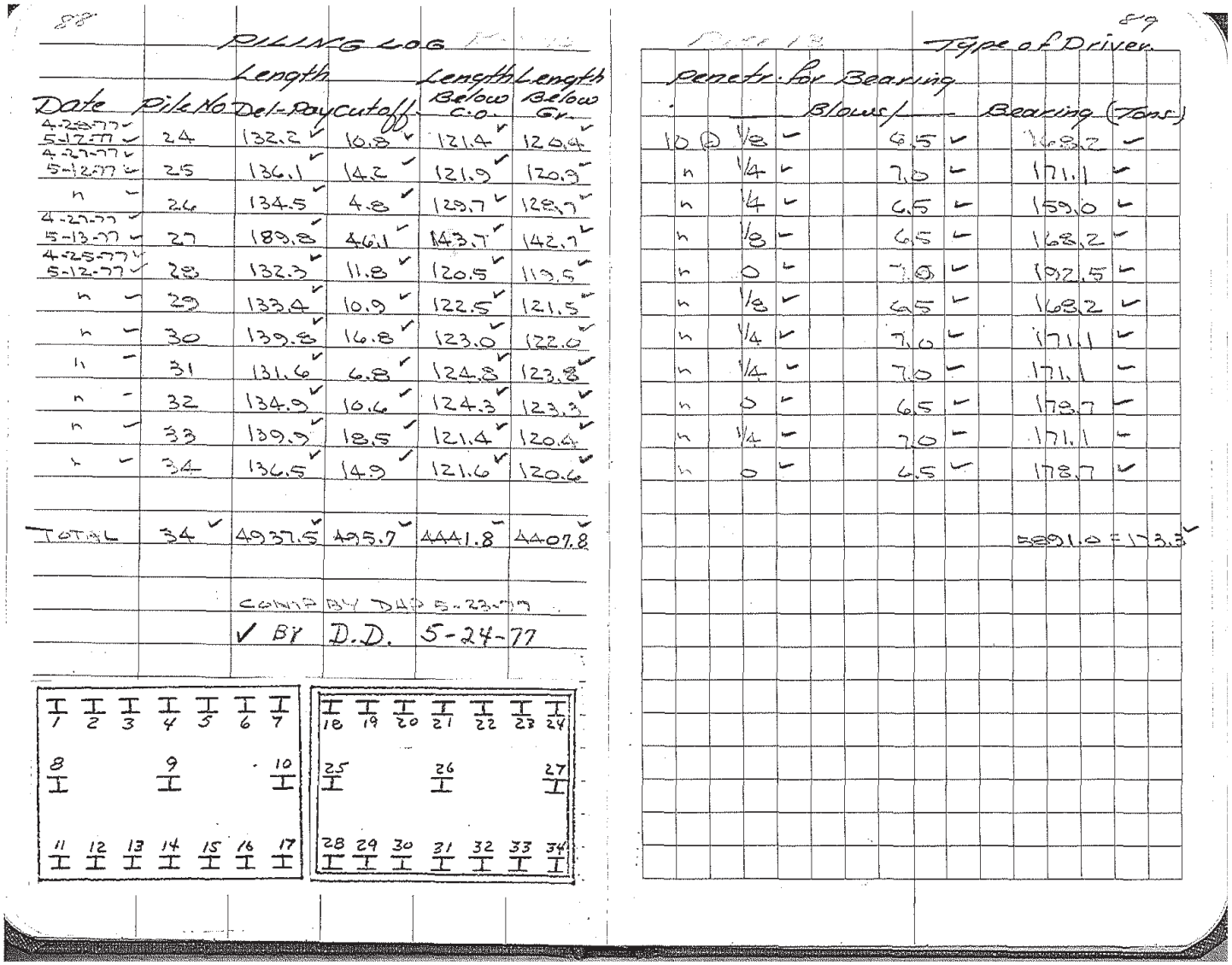
PILING LOG

Date	Pile No	Length Del-Pay	Length cutoff	Length Below C.O.	Length Below Gr.
4-27-77 5-13-77	1	137.2	16.8	120.4	119.4
"	2	144.0	22.3	121.7	120.7
4-27-77 5-16-77	3	131.8	15.0	116.8	115.8
4-27-77 5-17-77	4	292.7	6.6	286.1	285.1
4-27-77 5-13-77	5	135.3	2.4	132.9	131.9
4-27-77 5-17-77	6	186.0	10.5	175.5	174.5
4-27-77 5-13-77	7	138.9	18.6	120.3	119.3
4-26-77 5-16-77	8	131.3	10.7	120.6	119.6
4-26-77 5-13-77	9	141.2	19.4	121.8	120.8
"	10	134.3	14.3	120.0	119.0
4-26-77 5-16-77	11	133.5	12.4	121.1	120.1
"	12	137.0	16.1	120.9	119.9
"	13	135.6	9.5	126.1	125.1
4-25-77 5-16-77	14	131.1	8.2	122.9	121.9
"	15	131.2	9.1	122.1	121.1
"	16	130.6	9.5	121.1	120.1
4-25-77 5-17-77	17	163.3	31.6	131.7	130.7
4-27-77 5-9-77	18	124.1	4.0	120.1	119.1
4-27-77 5-13-77	19	199.5	37.7	161.8	160.8
4-27-77 5-12-77	20	141.3	20.9	120.4	119.4
4-27-77 5-9-77	21	123.8	1.7	122.1	121.1
4-26-77 5-12-77	22	138.9	18.7	120.2	119.2
"	23	133.9	13.5	120.4	119.4

87

Penetr. for Bearing

		Blows/	Bearing (Tons)
160	1/8	7.0	181.2
"	1/8	6.5	168.2
"	1/4	7.0	171.1
"	1/4	6.5	159.0
"	1/8	6.5	168.2
"	1/8	6.5	168.2
"	0	6.5	178.7
"	1/8	7.0	181.2
"	0	6.5	178.7
"	0	6.5	178.7
"	1/8	7.0	181.2
"	1/8	6.5	168.2
"	1/4	6.5	159.0
"	1/4	6.5	159.0
"	1/8	6.5	168.2
"	1/8	6.5	168.2
"	1/8	6.5	168.2
"	1/4	7.0	171.1
"	1/8	6.5	168.2
"	0	7.0	192.5
"	1/4	7.0	171.1
"	0	7.0	192.5
"	0	7.0	192.5



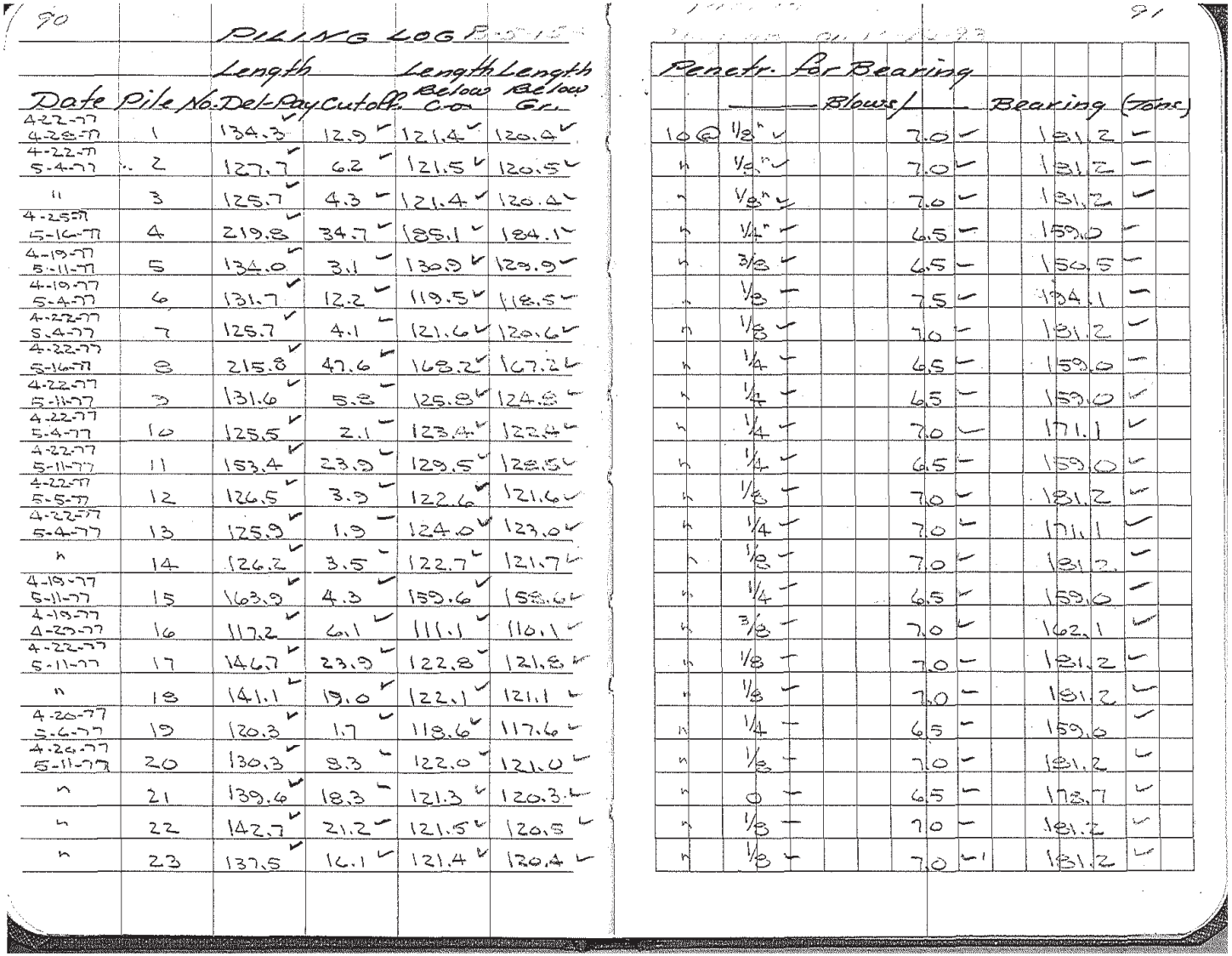
PILING LOG

Date	Pile No	Length Del-Pay	Cutoff	Length Below C.O.	Length Below Gr.
4-26-77 / 5-12-77	24	132.2	10.8	121.4	120.4
4-27-77 / 5-12-77	25	136.1	14.2	121.9	120.9
"	26	134.5	4.8	129.7	128.7
4-27-77 / 5-13-77	27	189.8	46.1	143.7	142.7
4-25-77 / 5-12-77	28	132.3	11.8	120.5	119.5
"	29	133.4	10.9	122.5	121.5
"	30	139.8	16.8	123.0	122.0
"	31	131.6	6.8	124.8	123.8
"	32	134.9	10.6	124.3	123.3
"	33	139.9	18.5	121.4	120.4
"	34	136.5	14.9	121.6	120.6
TOTAL	34	4937.5	495.7	4441.8	4407.8

Comp by DJD 5-23-77

✓ By D.D. 5-24-77

Type of Driver	Penetr. for Bearing Blows/	Bearing (Tons)
10 D	1/8	6.5	168.2
"	1/4	7.0	171.1
"	1/4	6.5	159.0
"	1/8	6.5	168.2
"	0	7.0	192.5
"	1/8	6.5	168.2
"	1/4	7.0	171.1
"	1/4	7.0	171.1
"	0	6.5	178.7
"	1/4	7.0	171.1
"	0	6.5	178.7
		5891.0 ÷ 17 = 173.3



PILING LOG

Date	Pile No.	Length Del.	Pay Cutoff	Length Below C.O.	Length Below Gr.
4-22-77 4-25-77	1	134.3	12.9	121.4	120.4
4-22-77 5-4-77	2	127.7	6.2	121.5	120.5
"	3	125.7	4.3	121.4	120.4
4-25-77 5-16-77	4	219.8	34.7	185.1	184.1
4-19-77 5-11-77	5	134.0	3.1	130.9	129.9
4-19-77 5-4-77	6	131.7	12.2	119.5	118.5
4-22-77 5-4-77	7	125.7	4.1	121.6	120.6
4-22-77 5-16-77	8	215.8	47.6	168.2	167.2
4-22-77 5-11-77	9	131.6	5.8	125.8	124.8
4-22-77 5-4-77	10	125.5	2.1	123.4	122.4
4-22-77 5-11-77	11	153.4	23.9	129.5	128.5
4-22-77 5-5-77	12	126.5	3.9	122.6	121.6
4-22-77 5-4-77	13	125.9	1.9	124.0	123.0
"	14	126.2	3.5	122.7	121.7
4-19-77 5-11-77	15	163.9	4.3	159.6	158.6
4-19-77 4-25-77	16	117.2	6.1	111.1	110.1
4-22-77 5-11-77	17	146.7	23.9	122.8	121.8
"	18	141.1	19.0	122.1	121.1
4-20-77 5-6-77	19	120.3	1.7	118.6	117.6
4-26-77 5-11-77	20	130.3	8.3	122.0	121.0
"	21	139.6	18.3	121.3	120.3
"	22	142.7	21.2	121.5	120.5
"	23	137.5	16.1	121.4	120.4

Penetr. for Bearing

	Blows/		Bearing (Tons)
10 @	1/8"	7.0	181.2
"	1/8"	7.0	181.2
"	1/8"	7.0	181.2
"	1/4"	6.5	159.0
"	3/8	6.5	150.5
"	1/8	7.5	194.1
"	1/8	7.0	181.2
"	1/4	6.5	159.0
"	1/4	6.5	159.0
"	1/4	7.0	171.1
"	1/4	6.5	159.0
"	1/8	7.0	181.2
"	1/4	7.0	171.1
"	1/8	7.0	181.2
"	1/4	6.5	159.0
"	3/8	7.0	162.1
"	1/8	7.0	181.2
"	1/8	7.0	181.2
"	1/4	6.5	159.0
"	1/8	7.0	181.2
"	0	6.5	173.7
"	1/8	7.0	181.2
"	1/8	7.0	181.2

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PILING LOG

Date	Pile No	Length Del.	Pay Length Cutoff	Length Below C.O.	Length Below Gr.
4-20-77 5-11-77	24	134.3	10.8	123.5	122.5
4-19-77 5-11-77	25	141.4	18.5	122.9	121.9
4-20-77 5-17-77	26	255.1	35.0	220.1	219.1
4-20-77 5-11-77	27	140.5	7.5	133.0	132.0
4-20-77 5-16-77	28	207.6	7.0	200.6	199.6
4-19-77 5-11-77	29	136.1	14.7	121.4	120.4
"	30	133.9	4.8	129.1	128.1
"	31	140.0	20.8	119.2	118.2
4-19-77 5-12-77	32	136.0	14.8	121.2	120.2
TOTAL	32	4648.0	419.0	4249.0	4217.0

Comp. by DHP 5-23-77

✓ BY D.D. 5-24-77

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

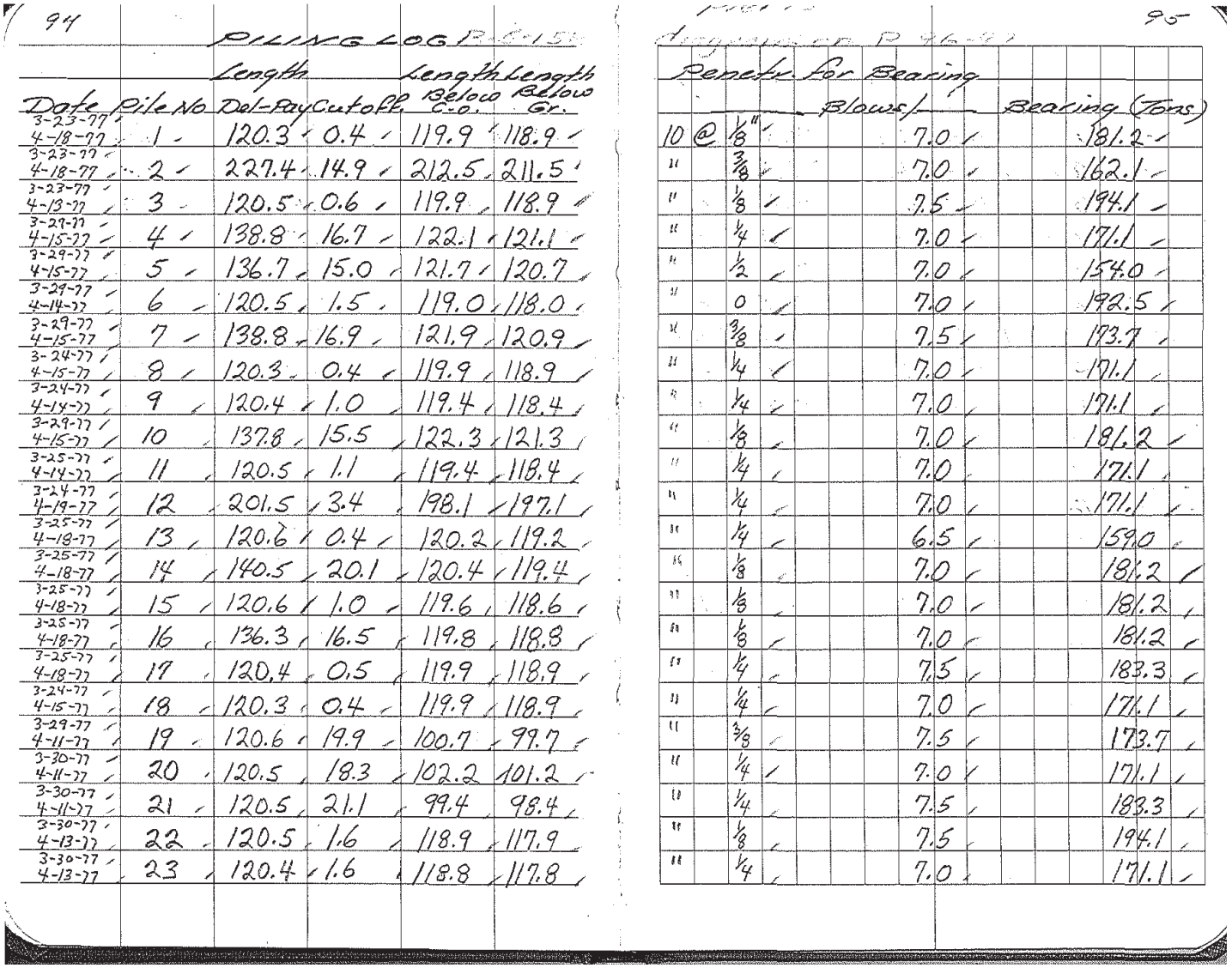
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32

93

Type of Driver

Penetr. for Last		Blows	Bearing (Tons)
10 @	1/4	6.5	159.0
"	1/8	6.5	168.2
"	3/8	6.5	150.5
"	1/4	6.5	159.0
"	1/8	6.5	168.2
"	1/8	7.0	193.2
"	1/4	7.0	171.1
"	1/4	6.5	159.0
"	1/4	7.0	171.1

5462.1 = 170.7



94

PILING LOG

Date	Pile No	Length Del-Ray	Length Cutoff	Length Below C.O.	Length Below Gr.
3-23-77 4-18-77	1	120.3	0.4	119.9	118.9
3-23-77 4-18-77	2	227.4	14.9	212.5	211.5
3-23-77 4-13-77	3	120.5	0.6	119.9	118.9
3-29-77 4-15-77	4	138.8	16.7	122.1	121.1
3-29-77 4-15-77	5	136.7	15.0	121.7	120.7
3-29-77 4-14-77	6	120.5	1.5	119.0	118.0
3-29-77 4-15-77	7	138.8	16.9	121.9	120.9
3-24-77 4-15-77	8	120.3	0.4	119.9	118.9
3-24-77 4-14-77	9	120.4	1.0	119.4	118.4
3-29-77 4-15-77	10	137.8	15.5	122.3	121.3
3-25-77 4-14-77	11	120.5	1.1	119.4	118.4
3-24-77 4-19-77	12	201.5	3.4	198.1	197.1
3-25-77 4-18-77	13	120.6	0.4	120.2	119.2
3-25-77 4-18-77	14	140.5	20.1	120.4	119.4
3-25-77 4-18-77	15	120.6	1.0	119.6	118.6
3-25-77 4-18-77	16	136.3	16.5	119.8	118.8
3-25-77 4-18-77	17	120.4	0.5	119.9	118.9
3-24-77 4-15-77	18	120.3	0.4	119.9	118.9
3-29-77 4-11-77	19	120.6	19.9	100.7	99.7
3-30-77 4-11-77	20	120.5	18.3	102.2	101.2
3-30-77 4-11-77	21	120.5	21.1	99.4	98.4
3-30-77 4-13-77	22	120.5	1.6	118.9	117.9
3-30-77 4-13-77	23	120.4	1.6	118.8	117.8

95

Remarks for Bearing		Blows/	Bearing (Tons)
10 @	1/8"	7.0	181.2
"	3/8	7.0	162.1
"	1/8	7.5	194.1
"	1/4	7.0	171.1
"	1/2	7.0	154.0
"	0	7.0	192.5
"	3/8	7.5	173.7
"	1/4	7.0	171.1
"	1/4	7.0	171.1
"	1/8	7.0	181.2
"	1/4	7.0	171.1
"	1/4	7.0	171.1
"	1/4	6.5	159.0
"	1/8	7.0	181.2
"	1/8	7.0	181.2
"	1/8	7.0	181.2
"	1/4	7.5	183.3
"	1/4	7.0	171.1
"	3/8	7.5	173.7
"	1/4	7.0	171.1
"	1/4	7.5	183.3
"	1/8	7.5	194.1
"	1/4	7.0	171.1

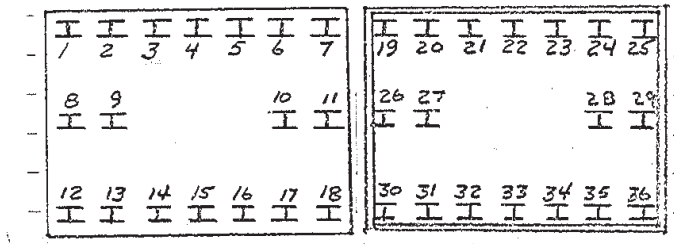
96

PILING LOG

Date	Pile No	Length Del-Bay	Length Cutoff	Length Below C.O.	Length Below Gr.
3-30-77 4-12-77	24	120.4	0.1	120.3	119.3
3-30-77 4-13-77	25	120.5	1.1	119.4	118.4
3-30-77 4-12-77	26	120.4	17.4	103.0	102.0
3-30-77 4-12-77	27	120.5	18.3	102.2	101.2
3-30-77 4-14-77	28	128.3	0	128.3	127.3
3-30-77 4-12-77	29	120.3	0.3	120.0	119.0
3-30-77 4-13-77	30	120.5	0.2	120.3	119.3
3-31-77 4-13-77	31	120.4	0.4	120.0	119.0
3-31-77 4-13-77	32	120.5	16.3	104.2	103.2
3-31-77 4-13-77	33	120.4	15.8	104.6	103.6
3-31-77 4-13-77	34	120.5	1.2	119.3	118.3
3-31-77 4-13-77	35	120.5	1.1	119.4	118.4
3-31-77 4-13-77	36	120.5	25.5	95.0	94.0
TOTAL	36	4638.4	286.5	4351.9	4315.9

Comp By D.D. 4-20-77

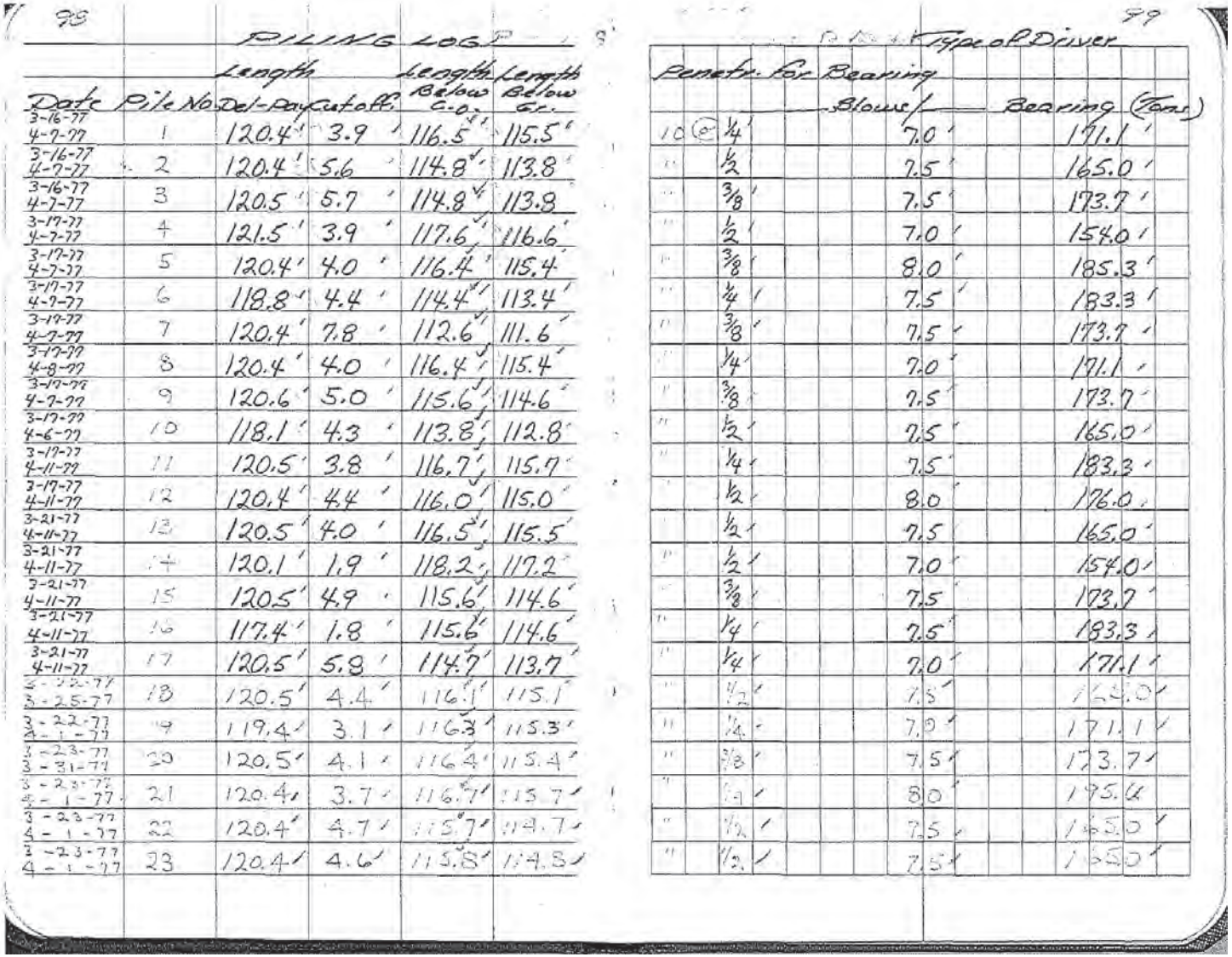
Check By H.T.T 4-21-77



97

Type of Driver

Penetr. for Bearing	Blows/	Bearing (Tons)
10 @ 1/4"	7.0	171.1
" 3/8	7.5	173.7
" 1/2	7.0	154.0
" 1/4	7.0	171.1
" 3/8	6.5	150.5
" 1/8	7.0	181.2
" 1/4	7.5	183.3
" 1/8	7.0	181.2
" 1/4	7.0	171.1
" 1/2	7.0	154.0
" 1/4	7.0	171.1
" 1/4	7.0	171.1
" 0	7.0	192.5
		6270.5 = 174.2



95

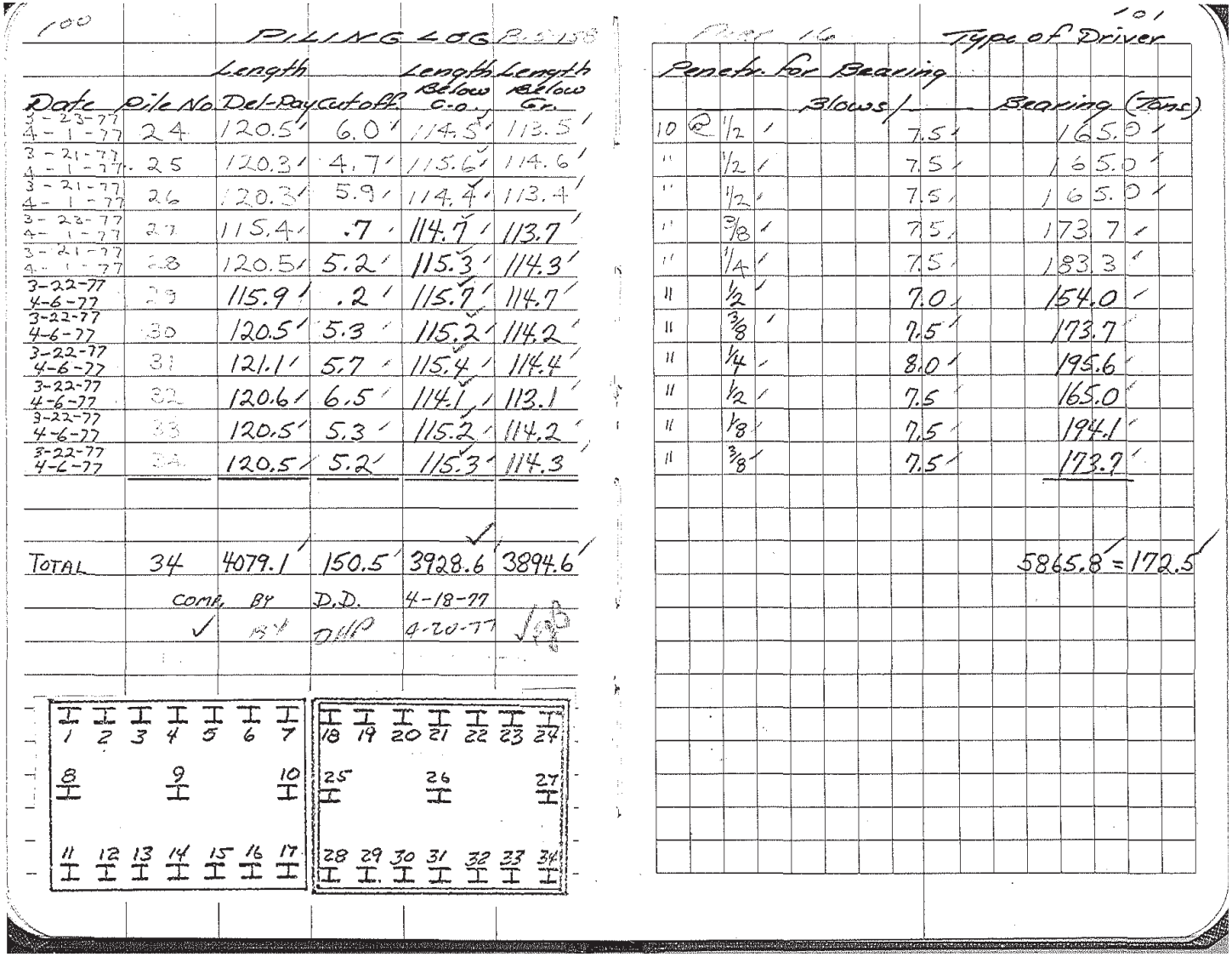
PILING LOG

Date	Pile No.	Length Del-Pay cutoff	Length Below C.O.	Length Below Gr.
3-16-77 4-7-77	1	120.4'	3.9'	116.5'	115.5'
3-16-77 4-7-77	2	120.4'	5.6'	114.8'	113.8'
3-16-77 4-7-77	3	120.5'	5.7'	114.8'	113.8
3-17-77 4-7-77	4	121.5'	3.9'	117.6'	116.6'
3-17-77 4-7-77	5	120.4'	4.0'	116.4'	115.4
3-17-77 4-7-77	6	118.8'	4.4'	114.4'	113.4'
3-17-77 4-7-77	7	120.4'	7.8'	112.6'	111.6'
3-17-77 4-8-77	8	120.4'	4.0'	116.4'	115.4'
3-17-77 4-7-77	9	120.6'	5.0'	115.6'	114.6'
3-17-77 4-6-77	10	118.1'	4.3'	113.8'	112.8'
3-17-77 4-11-77	11	120.5'	3.8'	116.7'	115.7'
3-17-77 4-11-77	12	120.4'	4.4'	116.0'	115.0'
3-21-77 4-11-77	13	120.5'	4.0'	116.5'	115.5'
3-21-77 4-11-77	14	120.1'	1.9'	118.2'	117.2'
3-21-77 4-11-77	15	120.5'	4.9'	115.6'	114.6'
3-21-77 4-11-77	16	117.4'	1.8'	115.6'	114.6'
3-21-77 4-11-77	17	120.5'	5.8'	114.7'	113.7'
3-22-77 3-25-77	18	120.5'	4.4'	116.1'	115.1'
3-22-77 4-1-77	19	119.4'	3.1'	116.3'	115.3'
3-23-77 3-31-77	20	120.5'	4.1'	116.4'	115.4'
3-23-77 4-1-77	21	120.4'	3.7'	116.7'	115.7'
3-23-77 4-1-77	22	120.4'	4.7'	115.7'	114.7'
3-23-77 4-1-77	23	120.4'	4.6'	115.8'	114.8'

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Typical Driver

Penetr. for Bearing Blows/		Bearing (Tons)
10 @	1/4'	7.0'	171.1'
"	1/2'	7.5'	165.0'
"	3/8'	7.5'	173.7'
"	1/2'	7.0'	154.0'
"	3/8'	8.0'	185.3'
"	1/4'	7.5'	183.3'
"	3/8'	7.5'	173.7'
"	1/4'	7.0'	171.1'
"	3/8'	7.5'	173.7'
"	1/2'	7.5'	165.0'
"	1/4'	7.5'	183.3'
"	1/2'	8.0'	176.0'
"	1/2'	7.5'	165.0'
"	1/2'	7.0'	154.0'
"	3/8'	7.5'	173.7'
"	1/4'	7.5'	183.3'
"	1/4'	7.0'	171.1'
"	1/2'	7.5'	165.0'
"	1/4'	7.0'	171.1'
"	3/8'	7.5'	173.7'
"	1/4'	8.0'	195.4
"	1/2'	7.5'	165.0'
"	1/2'	7.5'	165.0'



100

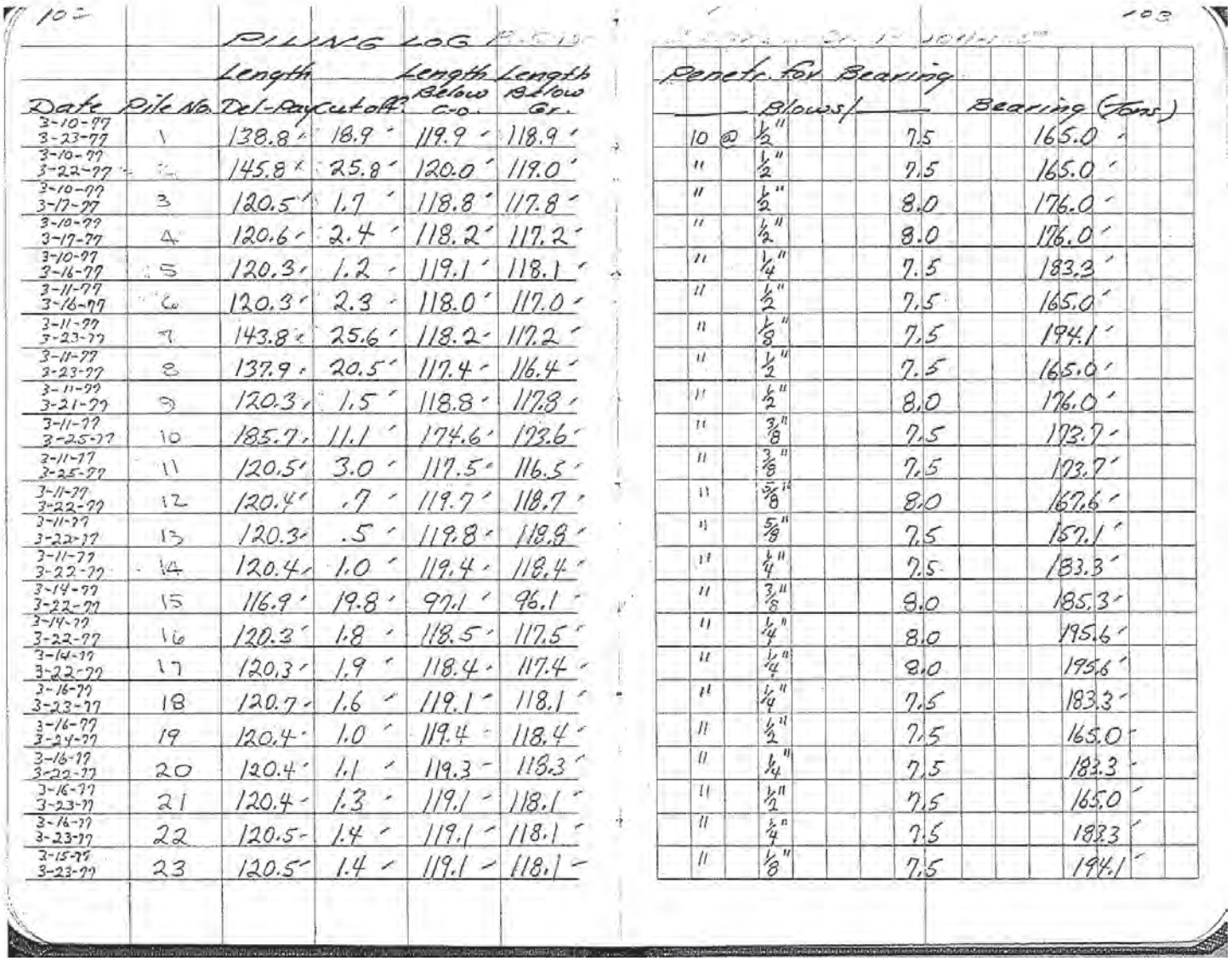
PILING LOG Bents

Date	Pile No	Length Del-Pay	Length cutoff	Length Below C.O.	Length Below Gr.
3-23-77 4-1-77	24	120.5'	6.0'	114.5'	113.5'
3-21-77 4-1-77	25	120.3'	4.7'	115.6'	114.6'
3-21-77 4-1-77	26	120.3'	5.9'	114.4'	113.4'
3-23-77 4-1-77	27	115.4'	.7'	114.7'	113.7'
3-21-77 4-1-77	28	120.5'	5.2'	115.3'	114.3'
3-22-77 4-6-77	29	115.9'	.2'	115.7'	114.7'
3-22-77 4-6-77	30	120.5'	5.3'	115.2'	114.2'
3-22-77 4-6-77	31	121.1'	5.7'	115.4'	114.4'
3-22-77 4-6-77	32	120.6'	6.5'	114.1'	113.1'
3-22-77 4-6-77	33	120.5'	5.3'	115.2'	114.2'
3-22-77 4-6-77	34	120.5'	5.2'	115.3'	114.3'
TOTAL	34	4079.1'	150.5'	3928.6'	3894.6'
	COMP. BY	D.D.	4-18-77		
	✓	BY	DHP	4-20-77	✓

Page 16

Type of Driver 101

Penetr. for Bearing		Blows/	Bearing (Tons)
10	1/2'	7.5'	165.0'
"	1/2'	7.5'	165.0'
"	1/2'	7.5'	165.0'
"	3/8'	7.5'	173.7'
"	1/4'	7.5'	183.3'
"	1/2'	7.0'	154.0'
"	3/8'	7.5'	173.7'
"	1/4'	8.0'	195.6'
"	1/2'	7.5'	165.0'
"	1/8'	7.5'	194.1'
"	3/8'	7.5'	173.7'
			5865.8 = 172.5



10-

PILING LOG

Date	Pile No.	Length Del-Pay cut off	Length Below C.O.	Length Below Gr.
3-10-77 3-23-77	1	138.8'	18.9'	119.9'	118.9'
3-10-77 3-22-77	2	145.8'	25.8'	120.0'	119.0'
3-10-77 3-17-77	3	120.5'	1.7'	118.8'	117.8'
3-10-77 3-17-77	4	120.6'	2.4'	118.2'	117.2'
3-10-77 3-16-77	5	120.3'	1.2'	119.1'	118.1'
3-11-77 3-16-77	6	120.3'	2.3'	118.0'	117.0'
3-11-77 3-23-77	7	143.8'	25.6'	118.2'	117.2'
3-11-77 3-23-77	8	137.9'	20.5'	117.4'	116.4'
3-11-77 3-21-77	9	120.3'	1.5'	118.8'	117.8'
3-11-77 3-25-77	10	185.7'	11.1'	174.6'	173.6'
3-11-77 3-25-77	11	120.5'	3.0'	117.5'	116.5'
3-11-77 3-22-77	12	120.4'	.7'	119.7'	118.7'
3-11-77 3-22-77	13	120.3'	.5'	119.8'	118.8'
3-11-77 3-22-77	14	120.4'	1.0'	119.4'	118.4'
3-14-77 3-22-77	15	116.9'	19.8'	97.1'	96.1'
3-14-77 3-22-77	16	120.3'	1.8'	118.5'	117.5'
3-14-77 3-22-77	17	120.3'	1.9'	118.4'	117.4'
3-16-77 3-23-77	18	120.7'	1.6'	119.1'	118.1'
3-16-77 3-24-77	19	120.4'	1.0'	119.4'	118.4'
3-16-77 3-22-77	20	120.4'	1.1'	119.3'	118.3'
3-16-77 3-23-77	21	120.4'	1.3'	119.1'	118.1'
3-14-77 3-23-77	22	120.5'	1.4'	119.1'	118.1'
3-15-77 3-23-77	23	120.5'	1.4'	119.1'	118.1'

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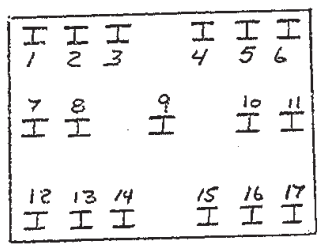
Penetr. for Bearing Blows/		Bearing (Tons)
10 @	½"	7.5	165.0'
"	½"	7.5	165.0'
"	½"	8.0	176.0'
"	½"	8.0	176.0'
"	¼"	7.5	183.3'
"	½"	7.5	165.0'
"	⅛"	7.5	194.1'
"	½"	7.5	165.0'
"	½"	8.0	176.0'
"	⅜"	7.5	173.7'
"	⅜"	7.5	173.7'
"	⅝"	8.0	167.6'
"	⅝"	7.5	167.1'
"	¼"	7.5	183.3'
"	⅜"	8.0	185.3'
"	¼"	8.0	195.6'
"	¼"	8.0	195.6'
"	¼"	7.5	183.3'
"	½"	7.5	165.0'
"	¼"	7.5	183.3'
"	½"	7.5	165.0'
"	¼"	7.5	183.3'
"	⅛"	7.5	194.1'

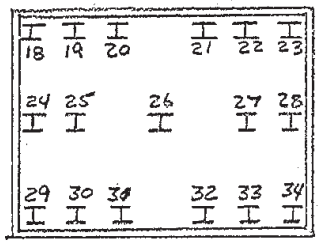
PILING LOG

Date	Pile No	Length Del-Pay	Length Cutoff	Length Below C.O.	Length Below Gr.
3-15-77 3-24-77	24	120.5'	2.2'	118.3'	117.3'
3-16-77 3-25-77	25	140.7'	19.3'	121.4'	120.4'
3-16-77 3-25-77	26	144.0'	16.9'	127.1'	126.1'
3-15-77 3-24-77	27	120.5'	1.0'	119.5'	118.5'
3-15-77 3-24-77	28	120.6'	2.0'	118.6'	117.6'
3-14-77 3-24-77	29	120.2'	2.0'	118.2'	117.2'
3-15-77 3-24-77	30	120.4'	2.3'	118.1'	117.1'
3-15-77 3-25-77	31	120.6'	3.0'	117.6'	116.6'
3-15-77 3-24-77	32	120.5'	2.4'	118.1'	117.1'
3-15-77 3-25-77	33	120.5'	1.1'	119.4'	118.4'
3-15-77 3-25-77	34	120.3'	.4'	119.9'	118.9'
TOTAL	34	4284.8'	200.1'	4084.7'	4050.7'

COMP. BY D.D. 3-29-77

✓ BY DHP 3-29-77





Type of Driver

Penetr. for Bearing Blows/			Bearing (Tons)
10 @	¼"	7.0	171.1'
11	⅛"	7.0	181.2'
11	½"	7.5	165.0'
11	½"	7.5	165.0'
11	½"	8.0	176.0'
11	¼"	8.0	195.6'
11	¼"	7.5	183.3'
11	¼"	7.0	171.1'
11	¼"	8.0	195.6'
11	⅝"	7.5	157.1'
11	¾"	8.0	160.0'

5992.3 ÷ 176.2

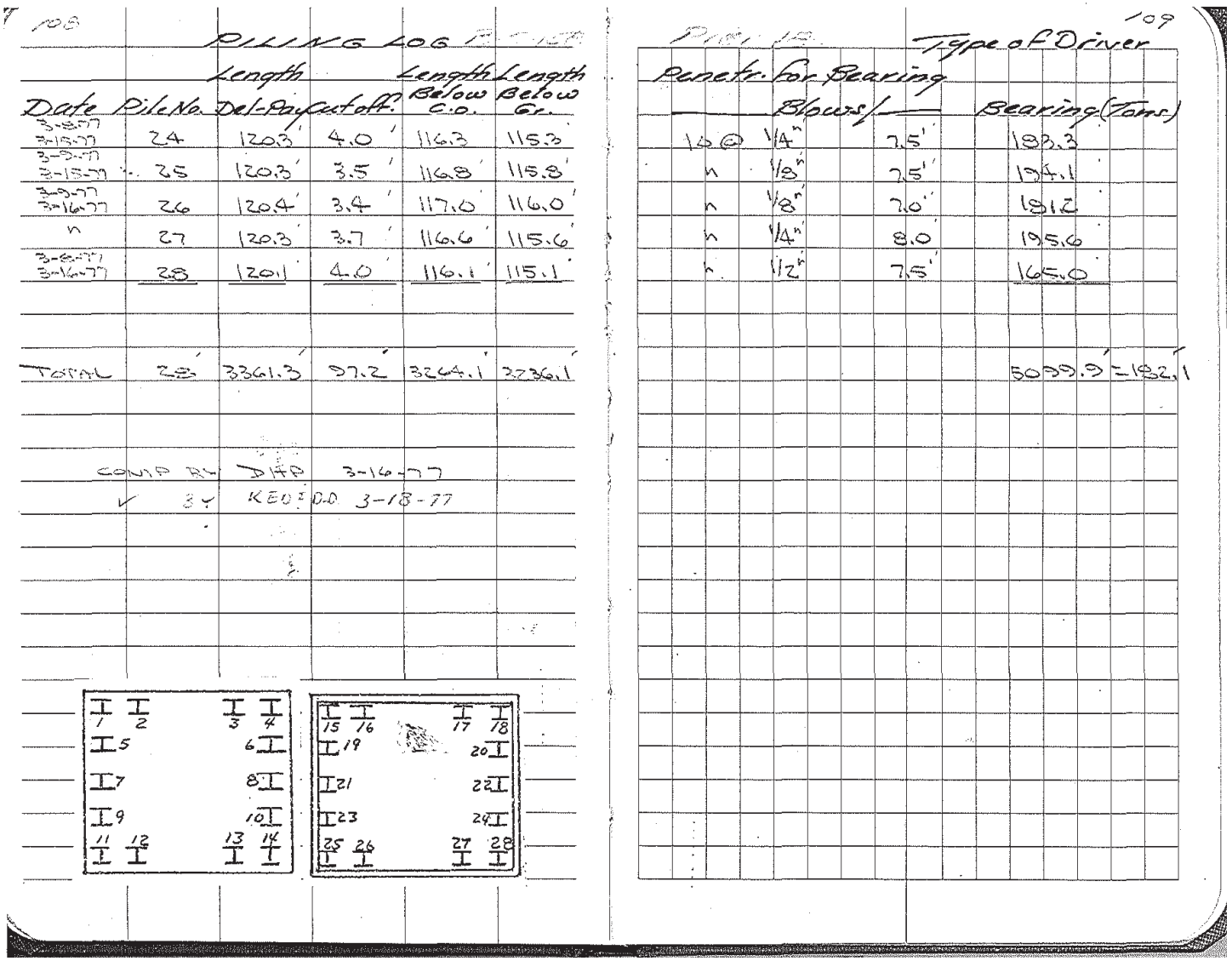
106

PILING LOG

Date	Pile No.	Length Del.	Pay cut off	Length Below C.O.	Length Below Gr.
3-2-77 3-11-77	1	120.3	3.4	116.9	115.9
"	2	116.7	—	116.7	115.7
3-3-77 3-14-77	3	120.0	3.9	116.1	115.1
3-3-77 3-11-77	4	120.1	3.8	116.3	115.3
3-2-77 3-11-77	5	116.7	0.2	116.5	115.5
3-3-77 3-11-77	6	120.4	4.4	116.0	115.0
3-4-77 3-14-77	7	120.4	4.0	116.4	115.4
3-3-77 3-11-77	8	120.3	4.1	116.2	115.2
3-7-77 3-14-77	9	120.4	3.9	116.5	115.5
3-3-77 3-14-77	10	120.3	3.5	116.8	115.8
3-7-77 3-14-77	11	120.4	3.2	117.2	116.2
"	12	120.3	3.4	116.9	115.9
"	13	120.4	3.6	116.8	115.8
"	14	120.4	3.7	116.7	115.7
3-8-77 3-14-77	15	120.3	3.6	116.7	115.7
3-8-77 3-15-77	16	120.5	3.6	116.9	115.9
3-7-77 3-15-77	17	120.3	3.9	116.4	115.4
"	18	120.2	3.5	116.7	115.7
3-9-77 3-15-77	19	120.1	3.4	116.7	115.7
3-8-77 3-15-77	20	120.5	3.9	116.6	115.6
3-7-77 3-15-77	21	120.3	3.8	116.5	115.5
3-8-77 3-15-77	22	120.3	4.2	116.1	115.1
3-7-77 3-15-77	23	120.3	3.6	116.7	115.7

107

Penetr. for Bearing Blows/		Bearing (Tons)
10 @	1/4"	7.5	183.3
"	1/2"	7.0	154.0
"	1/8"	6.5	168.2
"	1/2"	7.5	165.0
"	1/2"	7.5	165.0
"	1/8"	7.5	194.1
"	1/4"	7.0	171.1
"	3/8"	7.5	173.7
"	1/4"	7.5	183.3
"	1/8"	7.5	194.1
"	1/8"	7.5	194.1
"	1/4"	7.5	183.3
"	1/8"	7.5	194.1
"	1/8"	7.5	194.1
"	1/4"	8.0	195.6
"	1/4"	7.5	183.3
"	3/8"	7.5	173.7
"	1/8"	7.5	194.1
"	1/4"	7.5	183.3
"	1/4"	8.0	195.6
"	1/4"	7.5	183.3
"	1/4"	7.0	171.1
"	1/4"	7.5	183.3



108

PILING LOG

Date	Pile No.	Length Del.	Pay cutoff.	Length Below C.O.	Length Below Gr.
3-8-77 3-15-77	24	120.3'	4.0'	116.3'	115.3'
3-9-77 3-15-77	25	120.3'	3.5'	116.8'	115.8'
3-9-77 3-16-77	26	120.4'	3.4'	117.0'	116.0'
"	27	120.3'	3.7'	116.6'	115.6'
3-8-77 3-16-77	28	120.1'	4.0'	116.1'	115.1'
TOTAL	28	3361.3'	97.2'	3264.1'	3236.1'

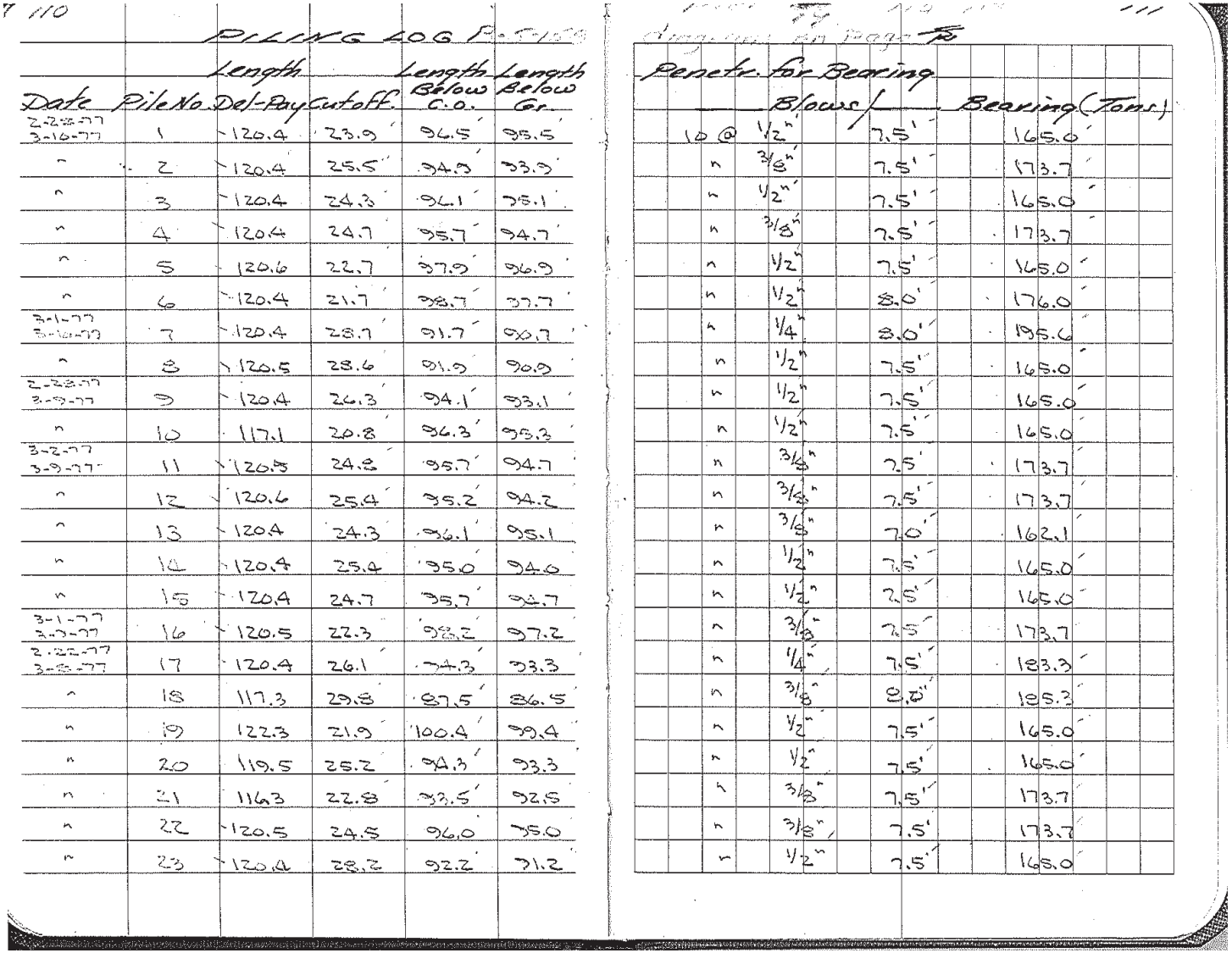
CONTD BY D&P 3-16-77

✓ 34 KEO'S D.O. 3-18-77

109

Type of Driver

Penetr. for Bearing Blows/		Bearing (Tons)
10 @ 1/4"	7.5'	183.3
" 1/8"	7.5'	194.1
" 1/8"	7.0'	181.2
" 1/4"	8.0'	195.6
" 1/2"	7.5'	165.0
		5099.9 ÷ 182.1



PILING LOG

Date	Pile No.	Length Def-Pay	Length Cutoff.	Length Below C.O.	Length Below Gr.
2-28-77 3-16-77	1	120.4	23.9	96.5	95.5
"	2	120.4	25.5	94.9	93.9
"	3	120.4	24.3	96.1	95.1
"	4	120.4	24.7	95.7	94.7
"	5	120.6	22.7	97.9	96.9
"	6	120.4	21.7	98.7	97.7
3-1-77 3-10-77	7	120.4	28.7	91.7	90.7
"	8	120.5	28.6	91.9	90.9
2-28-77 3-9-77	9	120.4	26.3	94.1	93.1
"	10	117.1	20.8	96.3	95.3
3-2-77 3-9-77	11	120.5	24.8	95.7	94.7
"	12	120.6	25.4	95.2	94.2
"	13	120.4	24.3	96.1	95.1
"	14	120.4	25.4	95.0	94.0
"	15	120.4	24.7	95.7	94.7
3-1-77 3-7-77	16	120.5	22.3	98.2	97.2
2-22-77 3-8-77	17	120.4	26.1	94.3	93.3
"	18	117.3	29.8	87.5	86.5
"	19	122.3	21.9	100.4	99.4
"	20	119.5	25.2	94.3	93.3
"	21	1163	22.8	93.5	92.5
"	22	120.5	24.5	96.0	95.0
"	23	120.4	28.2	92.2	91.2

Penetr. for Bearing

Blows /		Bearing (Tons)
10 @ 1/2"	7.5'	165.0
" 3/8"	7.5'	173.7
" 1/2"	7.5'	165.0
" 3/8"	7.5'	173.7
" 1/2"	7.5'	165.0
" 1/2"	8.0'	176.0
" 1/4"	8.0'	195.6
" 1/2"	7.5'	165.0
" 1/2"	7.5'	165.0
" 1/2"	7.5'	165.0
" 3/8"	7.5'	173.7
" 3/8"	7.5'	173.7
" 3/8"	7.0'	162.1
" 1/2"	7.5'	165.0
" 1/2"	7.5'	165.0
" 3/8"	7.5'	173.7
" 1/4"	7.5'	183.3
" 3/8"	8.0'	185.2
" 1/2"	7.5'	165.0
" 1/2"	7.5'	165.0
" 3/8"	7.5'	173.7
" 3/8"	7.5'	173.7
" 1/2"	7.5'	165.0

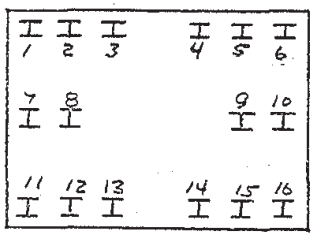
112

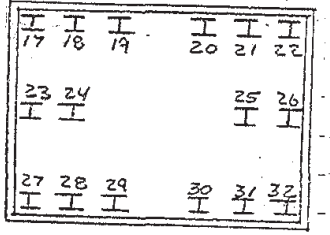
PILING LOG

Date	Pile No.	Length Del-Ray	Length Cutoff	Length Below C.O.	Length Below Gr.
2-25-77 3-7-77	24	120.5	25.1	95.4	94.4
2-25-77 3-7-77	25	120.4	25.4	95.0	94.0
"	26	120.4	22.8	97.6	96.6
"	27	120.4	25.6	94.8	93.8
"	28	120.4	23.0	97.4	96.4
"	29	120.4	23.4	97.0	96.0
"	30	120.5	22.6	97.9	96.9
"	31	120.5	25.1	95.4	94.4
"	32	120.4	21.7	98.7	97.7
TOTAL	32	3844.4	787.3	3057.1	3025.1

COMP BY DHP 3-11-77

✓ BY KED 3-15-77





113

Pier 6P Type of Driver

Penetr. for Bearing	Blows /		Bearing (Tons)
16 @	3/8"	7.5'	173.7
"	1/2"	7.5'	165.0
"	1/2"	8.0'	176.0
"	1/2"	8.0'	176.0
"	1/4"	7.5'	183.3
"	1/2"	8.5'	187.0
"	3/8"	7.5'	173.7
"	1/2"	7.5'	165.0
"	3/8"	7.5'	173.7
			5506.6 = 172.1

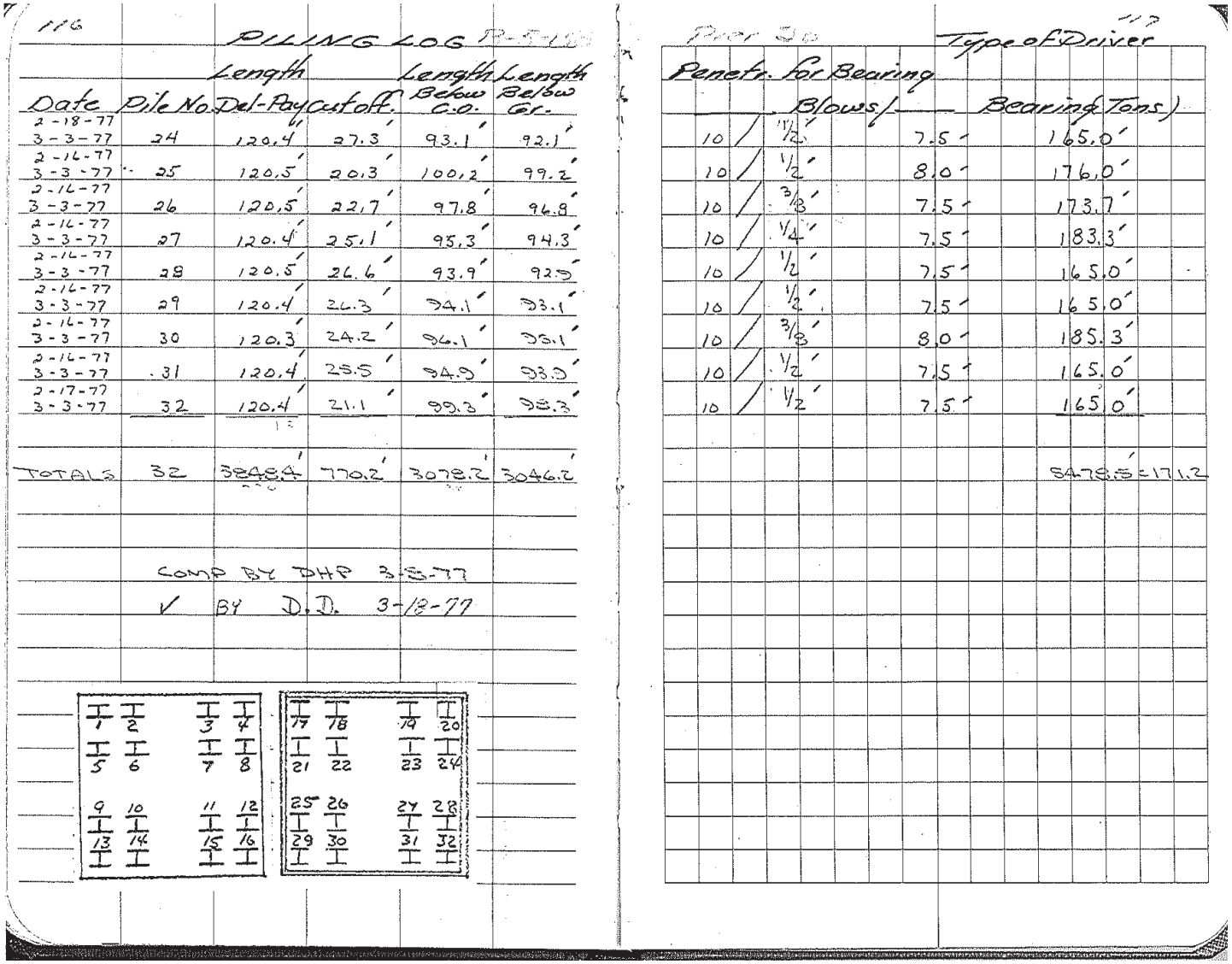
114

PILING LOG

Date	Pile No.	Length Del.	Pay cutoff	Length Below C.O.	Length Below Gr.
2-21-77 / 2-28-77	1	120.4'	22.8'	97.6'	96.6'
2-21-77 / 2-28-77	2	117.8'	19.5'	98.3'	97.3'
2-21-77 / 3-1-77	3	120.5'	24.2'	96.3'	95.3'
2-22-77 / 3-1-77	4	120.4'	21.4'	99.0'	98.0'
2-21-77 / 3-1-77	5	116.7'	15.9'	100.8'	99.8'
2-21-77 / 3-1-77	6	120.4'	24.9'	95.5'	94.5'
2-21-77 / 3-1-77	7	120.6'	27.2'	93.4'	92.4'
2-21-77 / 3-1-77	8	121.7'	23.3'	98.4'	97.4'
2-21-77	9	120.3'	24.7'	95.6'	94.6'
2-21-77 / 3-1-77	10	120.4'	23.4'	97.0'	96.0'
2-18-77 / 3-1-77	11	120.3'	23.2'	97.1'	96.1'
2-18-77 / 3-1-77	12	120.4'	23.9'	96.5'	95.5'
2-18-77 / 3-2-77	13	120.5'	20.8'	99.7'	98.7'
2-18-77 / 3-2-77	14	120.4'	23.6'	96.8'	95.8'
2-18-77 / 3-2-77	15	120.4'	22.5'	97.9'	96.9'
2-18-77 / 3-2-77	16	120.4'	24.4'	96.0'	95.0'
2-17-77 / 3-2-77	17	120.4'	25.1'	95.3'	94.3'
2-17-77 / 3-2-77	18	120.4'	25.2'	95.2'	94.2'
2-7-77 / 3-2-77	19	120.4'	25.4'	95.0'	94.0'
2-17-77 / 3-2-77	20	120.4'	28.0'	92.4'	91.4'
2-17-77 / 3-2-77	21	120.6'	27.2'	93.4'	92.4'
2-17-77 / 3-2-77	22	120.4'	28.0'	92.4'	91.4'
2-18-77 / 3-3-77	23	120.4'	26.5'	93.9'	92.9'

Type of Driver

Penetr. for Bearing	Blows /		Bearing (Tons)
10	1/2"	7.5'	165.0'
10	3/8"	7.5'	173.7'
10	3/8"	8.0'	185.3'
10	3/8"	8.0'	185.3'
10	3/4"	8.5'	170.0'
10	1/2"	7.5'	165.0'
10	1/2"	7.5'	165.0'
10	1/2"	7.5'	165.0'
10	1/2"	7.5'	165.0'
10	1/2"	7.5'	165.0'
10	3/8"	7.0'	162.1'
10	1/2"	7.5'	165.0'
10	5/8"	8.0'	167.6'
10	5/8"	8.0'	167.6'
10	5/8"	8.0'	167.6'
10	1/2"	8.0'	176.0'
10	3/8"	7.5'	173.7'
10	1/4"	8.0'	195.6'
10	1/2"	8.0'	176.0'
10	1/2"	8.0'	176.0'
10	1/2"	7.5'	165.0'
10	3/8"	7.5'	173.7'
10	1/2"	7.5'	165.0'



116

PILING LOG P-5-18

Date	Pile No.	Length Del.	Pay cutoff.	Length Below C.O.	Length Below Gr.
2-18-77 3-3-77	24	120.4'	27.3'	93.1'	92.1'
2-16-77 3-3-77	25	120.5'	20.3'	100.2'	99.2'
2-16-77 3-3-77	26	120.5'	22.7'	97.8'	96.8'
2-16-77 3-3-77	27	120.4'	25.1'	95.3'	94.3'
2-16-77 3-3-77	28	120.5'	26.6'	93.9'	92.9'
2-16-77 3-3-77	29	120.4'	26.3'	94.1'	93.1'
2-16-77 3-3-77	30	120.3'	24.2'	96.1'	95.1'
2-16-77 3-3-77	31	120.4'	25.5'	94.9'	93.9'
2-17-77 3-3-77	32	120.4'	21.1'	99.3'	98.3'
TOTALS	32	3848.4'	770.2'	3078.2'	3046.2'

COMP BY DHP 3-8-77

V BY D.D. 3-18-77

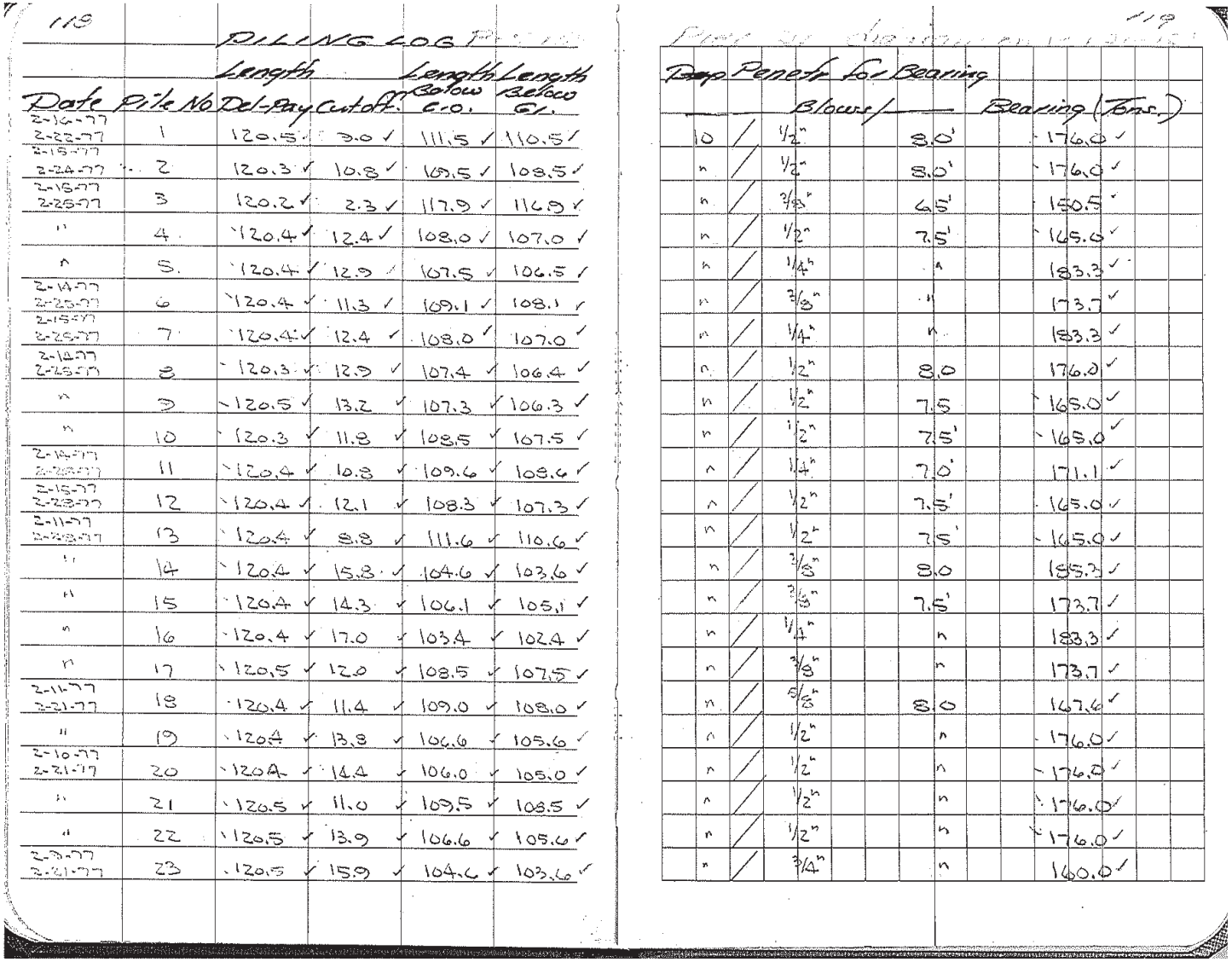
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32

Pier 3a

Type of Driver 117

Penetr. for Bearing Blows/		Bearing Tons)
10 / 1/2"	7.5	165.0'
10 / 1/2"	8.0	176.0'
10 / 3/8"	7.5	173.7'
10 / 1/4"	7.5	183.3'
10 / 1/2"	7.5	165.0'
10 / 1/2"	7.5	165.0'
10 / 3/8"	8.0	185.3'
10 / 1/2"	7.5	165.0'
10 / 1/2"	7.5	165.0'
		8478.5 ÷ 171.2



PILING LOG

Date	Pile No	Length Delivered	Length Cutoff	Length Below C.O.	Length Below El.
2-16-77 2-22-77	1	120.5 ✓	3.0 ✓	111.5 ✓	110.5 ✓
2-15-77 2-24-77	2	120.3 ✓	10.8 ✓	109.5 ✓	108.5 ✓
2-15-77 2-25-77	3	120.2 ✓	2.3 ✓	117.9 ✓	116.9 ✓
"	4	120.4 ✓	12.4 ✓	108.0 ✓	107.0 ✓
"	5	120.4 ✓	12.9 ✓	107.5 ✓	106.5 ✓
2-14-77 2-25-77	6	120.4 ✓	11.3 ✓	109.1 ✓	108.1 ✓
2-15-77 2-25-77	7	120.4 ✓	12.4 ✓	108.0 ✓	107.0 ✓
2-14-77 2-25-77	8	120.3 ✓	12.9 ✓	107.4 ✓	106.4 ✓
"	9	120.5 ✓	13.2 ✓	107.3 ✓	106.3 ✓
"	10	120.3 ✓	11.8 ✓	108.5 ✓	107.5 ✓
2-14-77 2-28-77	11	120.4 ✓	10.8 ✓	109.6 ✓	108.6 ✓
2-15-77 2-28-77	12	120.4 ✓	12.1 ✓	108.3 ✓	107.3 ✓
2-11-77 2-28-77	13	120.4 ✓	8.8 ✓	111.6 ✓	110.6 ✓
"	14	120.4 ✓	15.8 ✓	104.6 ✓	103.6 ✓
"	15	120.4 ✓	14.3 ✓	106.1 ✓	105.1 ✓
"	16	120.4 ✓	17.0 ✓	103.4 ✓	102.4 ✓
"	17	120.5 ✓	12.0 ✓	108.5 ✓	107.5 ✓
2-11-77 3-21-77	18	120.4 ✓	11.4 ✓	109.0 ✓	108.0 ✓
"	19	120.4 ✓	13.8 ✓	106.6 ✓	105.6 ✓
2-10-77 2-21-77	20	120.4 ✓	14.4 ✓	106.0 ✓	105.0 ✓
"	21	120.5 ✓	11.0 ✓	109.5 ✓	108.5 ✓
"	22	120.5 ✓	13.9 ✓	106.6 ✓	105.6 ✓
2-9-77 2-21-77	23	120.5 ✓	15.9 ✓	104.6 ✓	103.6 ✓

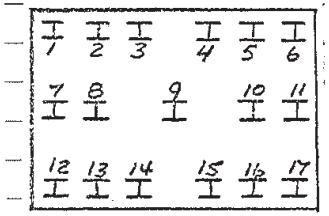
Driving Penetration for Bearing

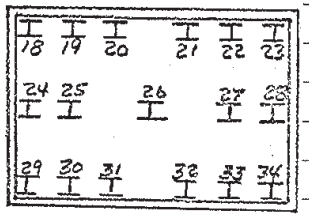
		Blows/		Bearing (Tons)
10	/	1/2"	8.0'	176.0 ✓
"	/	1/2"	8.0'	176.0 ✓
"	/	3/8"	6.5'	150.5 ✓
"	/	1/2"	7.5'	165.0 ✓
"	/	1/4"	"	183.3 ✓
"	/	3/8"	"	173.7 ✓
"	/	1/4"	"	183.3 ✓
"	/	1/2"	8.0	176.0 ✓
"	/	1/2"	7.5	165.0 ✓
"	/	1/2"	7.5'	165.0 ✓
"	/	1/4"	7.0'	171.1 ✓
"	/	1/2"	7.5'	165.0 ✓
"	/	1/2"	7.5'	165.0 ✓
"	/	3/8"	8.0	195.3 ✓
"	/	3/8"	7.5'	173.7 ✓
"	/	1/4"	"	183.3 ✓
"	/	3/8"	"	173.7 ✓
"	/	5/8"	8.0	167.6 ✓
"	/	1/2"	"	176.0 ✓
"	/	1/2"	"	176.0 ✓
"	/	1/2"	"	176.0 ✓
"	/	1/2"	"	176.0 ✓
"	/	3/4"	"	160.0 ✓

120

PILING LOG

Date	Pile No	Length Pile	Length Cutoff	Length Below C.O.	Length Below Gr.
2-10-77 2-21-77	24	120.4 ✓	13.6 ✓	106.8 ✓	105.8 ✓
2-10-77 2-22-77	25	120.4 ✓	12.2 ✓	108.2 ✓	107.2 ✓
〃	26	120.5 ✓	10.6 ✓	109.9 ✓	108.9 ✓
2-9-77 2-22-77	27	120.5 ✓	11.8 ✓	108.7 ✓	107.7 ✓
〃	28	120.4 ✓	13.5 ✓	106.9 ✓	105.9 ✓
2-10-77 2-22-77	29	120.4 ✓	12.3 ✓	108.1 ✓	107.1 ✓
2-16-77 2-22-77	30	120.4 ✓	12.2 ✓	108.2 ✓	107.2 ✓
2-9-77 2-22-77	31	120.5 ✓	12.6 ✓	107.9 ✓	106.9 ✓
〃	32	120.4 ✓	17.5 ✓	102.9 ✓	101.9 ✓
〃	33	120.5 ✓	17.5 ✓	103.0	102.0 ✓
〃	34	120.4 ✓	14.4 ✓	106.0 ✓	105.0 ✓
TOTAL	34	4094.1 ✓	428.4 ✓	3666.7 ✓	3631.7 ✓





121

Pile 34 Type of Driver.

Penetr. for Bearing

Blows			Bearing (Tons)
10	1/2"	8.0	176.0 ✓
〃	1/2"	7.5'	165.0 ✓
〃	1/2"	8.0	176.0 ✓
〃	1/2"	8.0	176.0 ✓
〃	3/8"	8.0	185.3 ✓
〃	1/2"	8.0	176.0 ✓
〃	1/2"	8.0	176.0 ✓
〃	5/8"	7.5'	157.1 ✓
〃	3/8"	7.5'	173.7 ✓
〃	1/2"	7.5'	165.0 ✓
〃	1/2"	7.5'	165.0 ✓

5853.6 ✓ = 172.2 ✓

comp DHP 3-1-77

✓ T.G. & K.D - 3-4-77

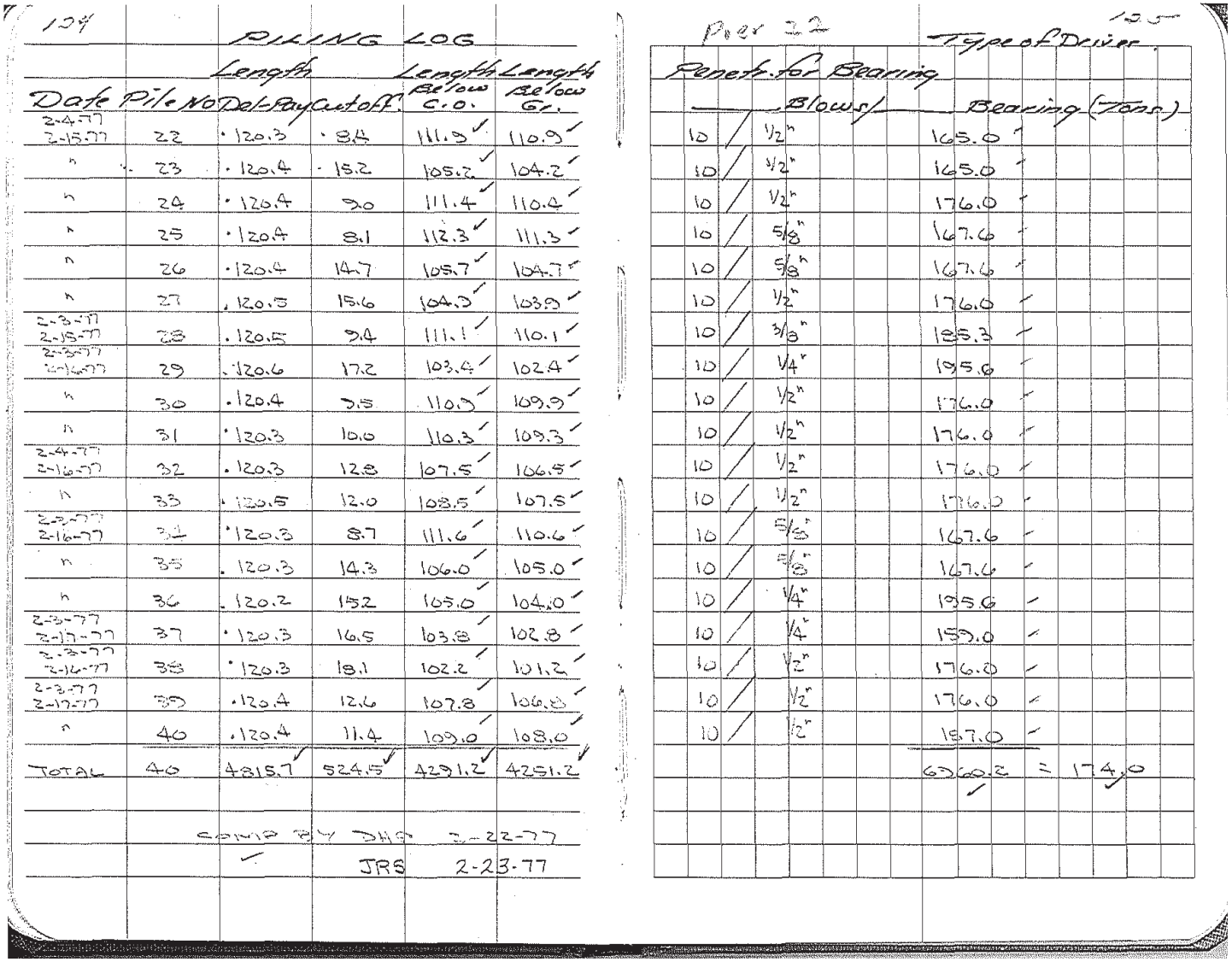
122

PILING LOG

Date	Pile No	Length Del.	Pay	Cutoff.	Length Below C.O.	Length Below Gr.
2-2-77 2-18-77	1	-120.3		4.0	116.3 ✓	115.3 ✓
"	2	-120.4		8.5	111.9 ✓	110.9 ✓
"	3	-120.4		11.7	108.7 ✓	107.7 ✓
"	4	-120.5		14.4	106.1 ✓	105.1 ✓
"	5	-120.4		14.0	106.4 ✓	105.4 ✓
"	6	-120.4		12.3	108.1 ✓	107.1 ✓
"	7	-120.5		13.0	107.5 ✓	106.5 ✓
"	8	-120.4		11.3	109.1 ✓	108.1 ✓
"	9	-120.4		14.0	106.4 ✓	105.4 ✓
"	10	-120.4		13.3	107.1 ✓	106.1 ✓
"	11	-120.4		16.9	103.5 ✓	102.5 ✓
"	12	-120.3		17.1	103.2 ✓	102.2 ✓
2-7-77 2-18-77	13	-120.3		12.3	108.0 ✓	107.0 ✓
"	14	-120.4		12.9	107.5 ✓	106.5 ✓
"	15	-120.4		20.4	100.0 ✓	99.0 ✓
"	16	-120.5		15.8	104.7 ✓	103.7 ✓
2-4-77 2-18-77	17	-120.5		15.0	105.5 ✓	104.5 ✓
"	18	-120.4		14.0	106.4 ✓	105.4 ✓
2-4-77 2-21-77	19	-120.4		15.7	104.7 ✓	103.7 ✓
2-4-77 2-21-77	20	-120.4		14.6	105.8 ✓	104.8 ✓
2-4-77 2-18-77	21	-120.4		14.6	105.8 ✓	104.8 ✓

123

Penetr. for Bearing Blows/			Bearing (Tons)	
10	1/2"	8.5'	187.0	✓
10	3/4"	8.5'	170.0	✓
10	1/2"	8.5'	187.0	✓
10	1/2"	7.5'	165.0	✓
10	1/2"	8.0'	176.0	✓
10	1/2"	7.5'	165.0	✓
10	1/2"	7.5'	165.0	✓
10	1/2"	7.5'	165.0	✓
10	1/2"	8.0'	176.0	✓
10	1/2"	8.0'	176.0	✓
10	1/2"	8.0'	176.0	✓
10	1/2"	7.5'	165.0	✓
10	1/2"	8.0'	176.0	✓
10	1/2"	8.0'	176.0	✓
10	1/4"	7.5'	183.3	✓
10	3/8"	7.5'	173.7	✓
10	1/2"	7.5'	165.0	✓
10	1/2"	8.0'	176.0	✓
10	3/8"	7.5'	173.7	✓
10	5/8"	8.0'	167.6	✓
10	1/2"	7.5'	165.0	✓



104

PILING LOG

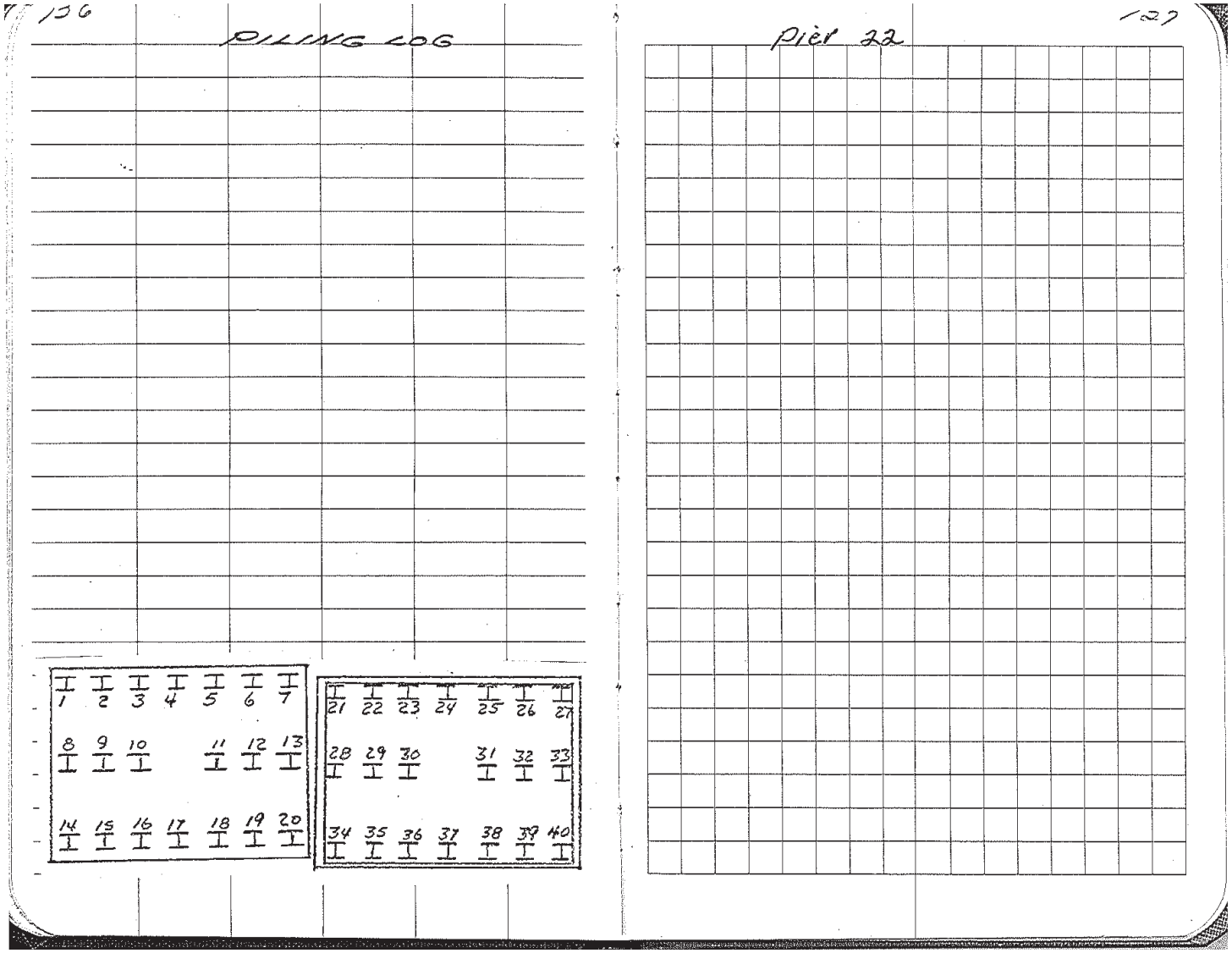
Per 22

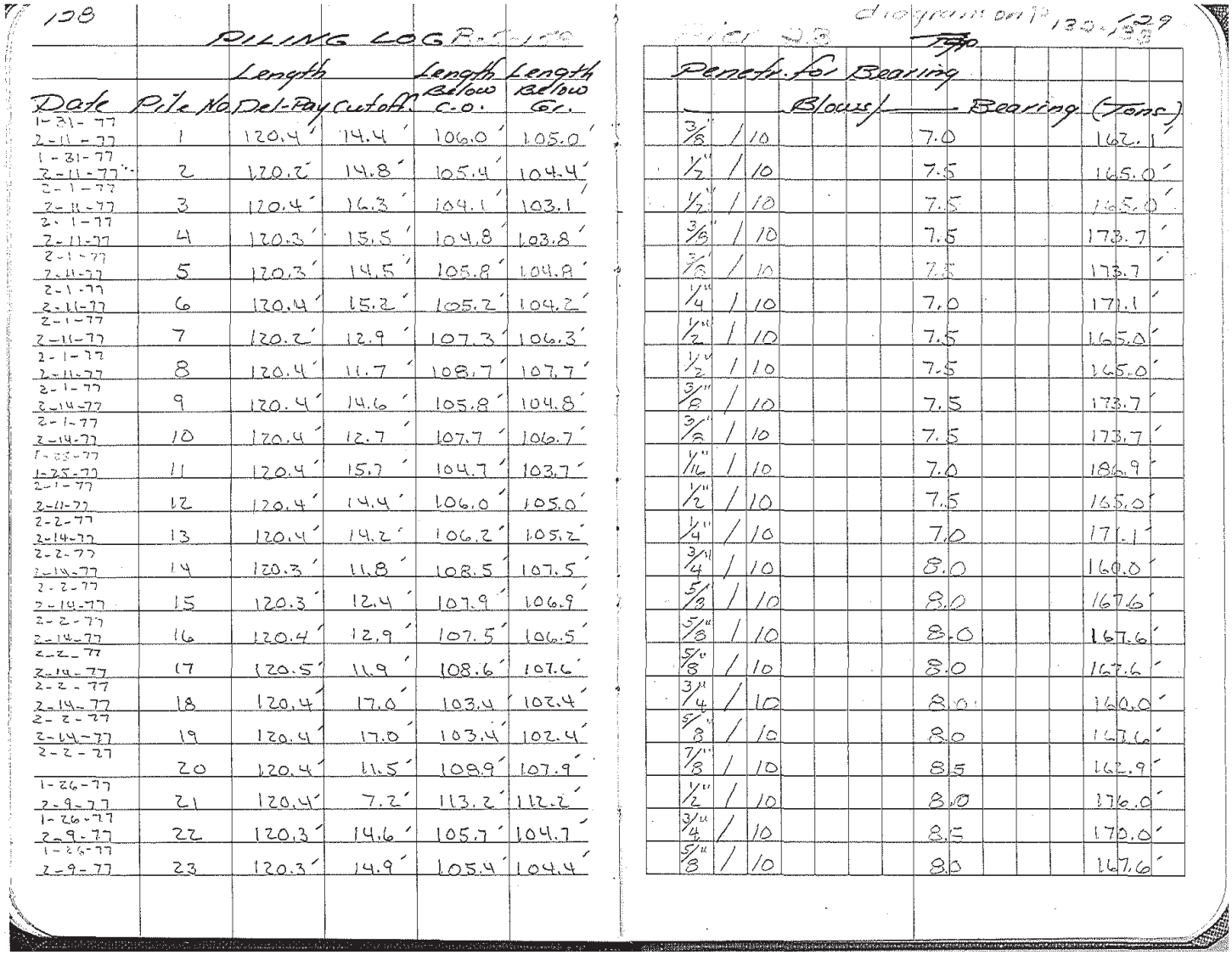
Type of Driver 105

Date	Pile No	Length Del.	Pay Cutoff	Length Below C.O.	Length Below Gr.	Reach for Bearing Blows/			Bearing (Tons)
2-4-77 2-15-77	22	120.3	8.4	111.9	110.9	10	/	1/2"	165.0
"	23	120.4	15.2	105.2	104.2	10	/	1/2"	165.0
"	24	120.4	9.0	111.4	110.4	10	/	1/2"	176.0
"	25	120.4	8.1	112.3	111.3	10	/	5/8"	167.6
"	26	120.4	14.7	105.7	104.7	10	/	5/8"	167.6
"	27	120.5	15.6	104.9	103.9	10	/	1/2"	176.0
2-3-77 2-15-77	28	120.5	9.4	111.1	110.1	10	/	3/8"	185.3
2-3-77 2-16-77	29	120.6	17.2	103.4	102.4	10	/	1/4"	195.6
"	30	120.4	9.5	110.9	109.9	10	/	1/2"	176.0
"	31	120.3	10.0	110.3	109.3	10	/	1/2"	176.0
2-4-77 2-16-77	32	120.3	12.8	107.5	106.5	10	/	1/2"	176.0
"	33	120.5	12.0	108.5	107.5	10	/	1/2"	176.0
2-3-77 2-16-77	34	120.3	8.7	111.6	110.6	10	/	5/8"	167.6
"	35	120.3	14.3	106.0	105.0	10	/	5/8"	167.6
"	36	120.2	15.2	105.0	104.0	10	/	1/4"	195.6
2-3-77 2-17-77	37	120.3	16.5	103.8	102.8	10	/	1/4"	159.0
2-3-77 2-16-77	38	120.3	18.1	102.2	101.2	10	/	1/2"	176.0
2-3-77 2-17-77	39	120.4	12.6	107.8	106.8	10	/	1/2"	176.0
"	40	120.4	11.4	109.0	108.0	10	/	1/2"	159.0
TOTAL	40	4815.7	524.5	4291.2	4251.2				6760.2 = 174.0

COMP'D BY DHS 2-22-77

JRS 2-23-77


126
PILING LOG
1 2 3 4 5 6 7
8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30 31 32 33
34 35 36 37 38 39 40
127
Pier 22



108

PILING LOG Pier 2

Date	Pile No.	Length Del-Pay	Length Cutoff	Length Below C.O.	Length Below Gr.
1-31-77 2-11-77	1	120.4'	14.4'	106.0'	105.0'
1-31-77 2-11-77	2	120.2'	14.8'	105.4'	104.4'
2-1-77 2-11-77	3	120.4'	16.3'	104.1'	103.1'
2-1-77 2-11-77	4	120.3'	15.5'	104.8'	103.8'
2-1-77 2-11-77	5	120.3'	14.5'	105.8'	104.8'
2-1-77 2-11-77	6	120.4'	15.2'	105.2'	104.2'
2-1-77 2-11-77	7	120.2'	12.9'	107.3'	106.3'
2-1-77 2-11-77	8	120.4'	11.7'	108.7'	107.7'
2-1-77 2-14-77	9	120.4'	14.6'	105.8'	104.8'
2-1-77 2-14-77	10	120.4'	12.7'	107.7'	106.7'
1-25-77 1-25-77	11	120.4'	15.7'	104.7'	103.7'
2-1-77 2-11-77	12	120.4'	14.4'	106.0'	105.0'
2-2-77 2-14-77	13	120.4'	14.2'	106.2'	105.2'
2-2-77 2-14-77	14	120.3'	11.8'	108.5'	107.5'
2-2-77 2-14-77	15	120.3'	12.4'	107.9'	106.9'
2-2-77 2-14-77	16	120.4'	12.9'	107.5'	106.5'
2-2-77 2-14-77	17	120.5'	11.9'	108.6'	107.6'
2-2-77 2-14-77	18	120.4'	17.0'	103.4'	102.4'
2-2-77 2-14-77	19	120.4'	17.0'	103.4'	102.4'
2-2-77	20	120.4'	11.5'	108.9'	107.9'
1-26-77 2-9-77	21	120.4'	7.2'	113.2'	112.2'
1-26-77 2-9-77	22	120.3'	14.6'	105.7'	104.7'
1-26-77 2-9-77	23	120.3'	14.9'	105.4'	104.4'

Pier 2B — diagram on p. 130-129

Penetr. for Bearing

Blows /	Bearing (Tons)
3/8" / 10	7.0 — 162.1'
1/2" / 10	7.5 — 165.0'
1/2" / 10	7.5 — 165.0'
3/8" / 10	7.5 — 173.7'
3/8" / 10	7.5 — 173.7'
1/4" / 10	7.0 — 171.1'
1/2" / 10	7.5 — 165.0'
1/2" / 10	7.5 — 165.0'
3/8" / 10	7.5 — 173.7'
3/8" / 10	7.5 — 173.7'
1/16" / 10	7.0 — 186.9'
1/2" / 10	7.5 — 165.0'
1/4" / 10	7.0 — 171.1'
3/4" / 10	8.0 — 160.0'
5/8" / 10	8.0 — 167.6'
5/8" / 10	8.0 — 167.6'
5/8" / 10	8.0 — 167.6'
3/4" / 10	8.0 — 160.0'
5/8" / 10	8.0 — 167.6'
7/8" / 10	8.5 — 162.9'
1/2" / 10	8.0 — 176.0'
3/4" / 10	8.5 — 170.0'
5/8" / 10	8.0 — 167.6'

130

PILING LOG

Date	Pile No	Length Del-Ray	Length Cutoff	Length Below C.O.	Length Below Gr.
1-26-77 2-9-77	24	120.4'	17.9'	102.5'	101.5'
1-26-77 2-9-77	25	120.4'	11.7'	108.7'	107.7'
1-31-77 2-9-77	26	120.3'	14.5'	105.8'	104.8'
1-31-77 2-10-77	27	120.4'	8.4'	112.0'	111.0'
1-25-77 2-10-77	28	120.4'	13.3'	107.1'	106.1'
1-25-77 2-10-77	29	120.4'	16.0'	104.4'	103.4'
1-25-77 2-10-77	30	120.3'	13.0'	107.3'	106.3'
1-24-77 1-24-77	31	120.5'	13.9'	106.6'	105.6'
1-25-77 2-10-77	32	120.4'	12.2'	108.2'	107.2'
1-26-77 2-10-77	33	120.4'	14.5'	105.9'	104.9'
1-25-77 2-10-77	34	120.5'	12.2'	108.3'	107.3'
1-25-77 2-10-77	35	120.3'	15.8'	104.5'	103.5'
1-25-77 2-10-77	36	120.4'	16.0'	104.4'	103.4'
1-25-77 2-10-77	37	120.4'	15.7'	104.7'	103.7'
1-25-77 2-11-77	38	120.6'	14.3'	106.3'	105.3'
1-25-77 2-11-77	39	120.3'	17.4'	102.9'	101.9'
1-25-77 2-11-77	40	120.3'	16.5'	103.8'	102.8'
TOTALS	40'	4815.0'	561.4'	4253.6'	4213.6'

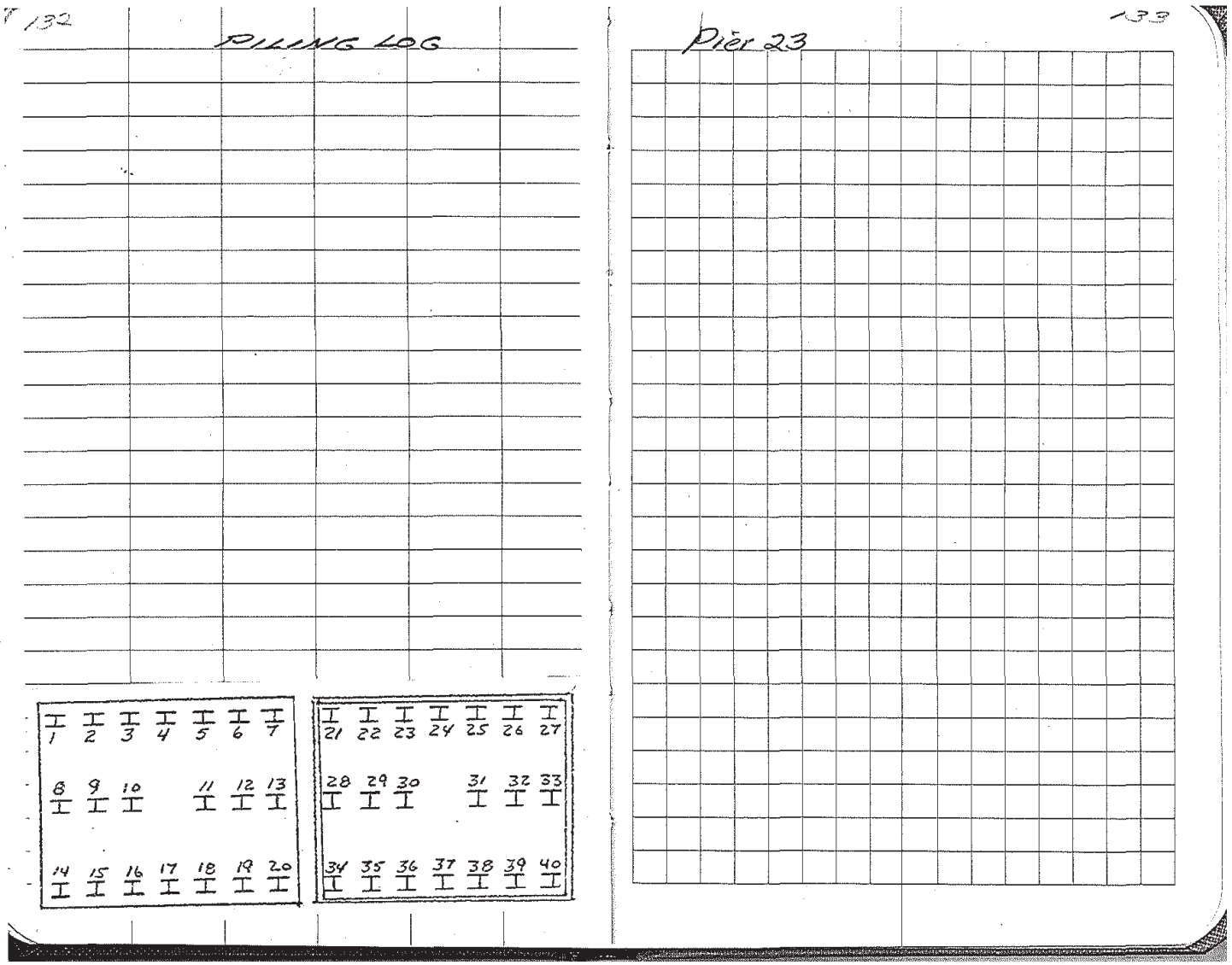
COMP. BY H.K. 2-15-77

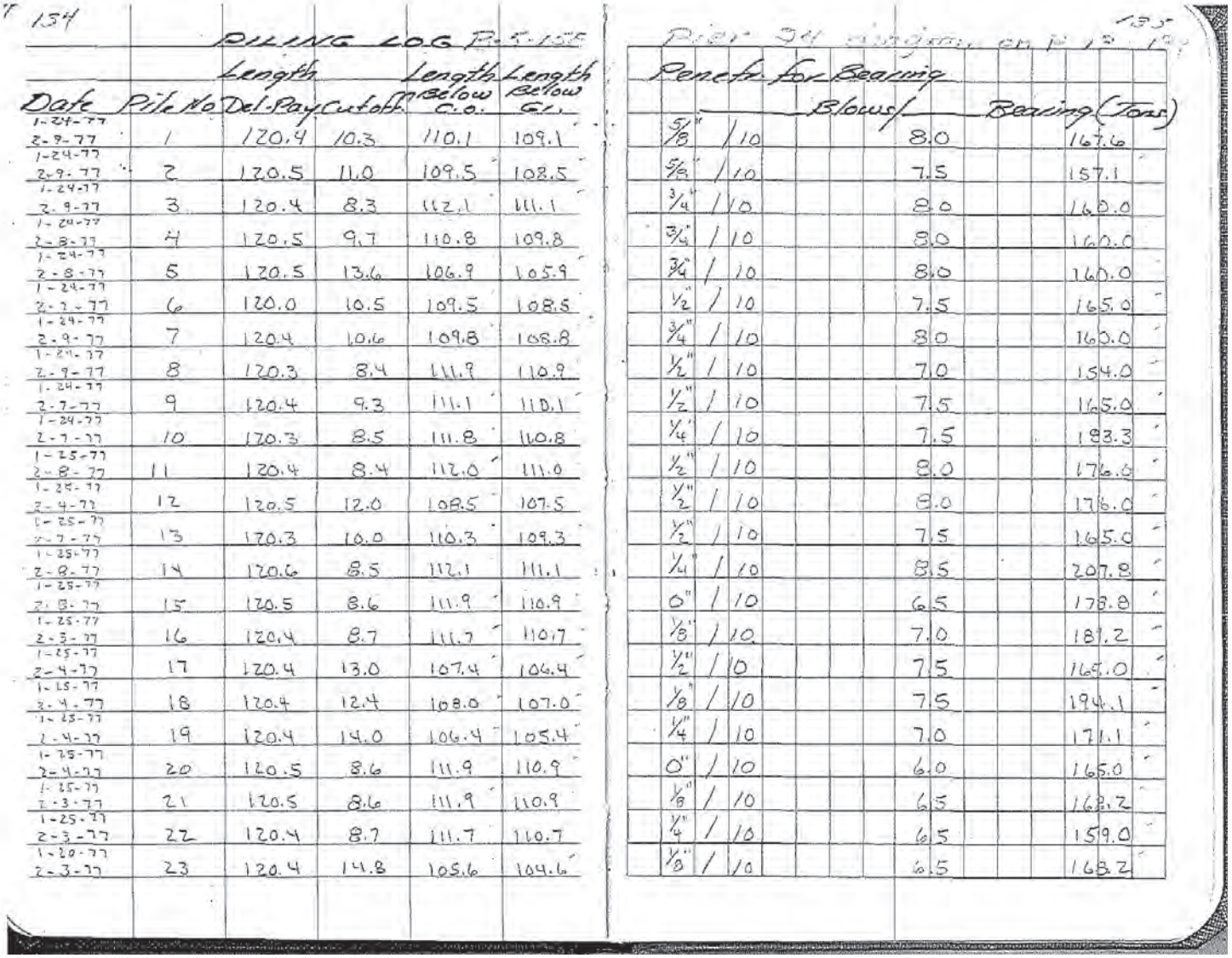
✓ DHP 2-16-77

131

Type of Driver

Penetr. for Bearing Blows/			Bearing (Tons)
1/2"	/	10	176.0'
3/4"	/	10	160.0'
1/2"	/	10	176.0'
3/4"	/	10	160.0'
1/2"	/	10	165.0'
1/2"	/	10	176.0'
1/2"	/	10	176.0'
1/8"	/	10	148.2'
1/2"	/	10	165.0'
1/2"	/	10	176.0'
3/4"	/	10	160.0'
5/8"	/	10	167.6'
1/2"	/	10	165.0'
1/2"	/	10	165.0'
3/4"	/	10	160.0'
5/8"	/	10	167.6'
1/4"	/	10	148.2'
			6744.6'
AVG. TONS			40 = 168.6'


132
PILING LOG
1 2 3 4 5 6 7
8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30 31 32 33
34 35 36 37 38 39 40
133
Pier 23



T 134

PILING LOG P. 5-155

Date	Pile No	Length Del. Pay	Length Cutoff	Length Below C.O.	Length Below G.L.
1-24-77 / 2-8-77	1	120.4	10.3	110.1	109.1
1-24-77 / 2-9-77	2	120.5	11.0	109.5	108.5
1-24-77 / 2-9-77	3	120.4	8.3	112.1	111.1
1-24-77 / 2-8-77	4	120.5	9.7	110.8	109.8
1-24-77 / 2-8-77	5	120.5	13.6	106.9	105.9
1-24-77 / 2-7-77	6	120.0	10.5	109.5	108.5
1-24-77 / 2-9-77	7	120.4	10.6	109.8	108.8
1-24-77 / 2-9-77	8	120.3	8.4	111.9	110.9
1-24-77 / 2-7-77	9	120.4	9.3	111.1	110.1
1-24-77 / 2-7-77	10	120.3	8.5	111.8	110.8
1-25-77 / 2-8-77	11	120.4	8.4	112.0	111.0
1-25-77 / 2-4-77	12	120.5	12.0	108.5	107.5
1-25-77 / 2-7-77	13	120.3	10.0	110.3	109.3
1-25-77 / 2-8-77	14	120.6	8.5	112.1	111.1
1-25-77 / 2-8-77	15	120.5	8.6	111.9	110.9
1-25-77 / 2-3-77	16	120.4	8.7	111.7	110.7
1-25-77 / 2-4-77	17	120.4	13.0	107.4	106.4
1-25-77 / 2-4-77	18	120.4	12.4	108.0	107.0
1-25-77 / 2-4-77	19	120.4	14.0	106.4	105.4
1-25-77 / 2-4-77	20	120.5	8.6	111.9	110.9
1-25-77 / 2-3-77	21	120.5	8.6	111.9	110.9
1-25-77 / 2-3-77	22	120.4	8.7	111.7	110.7
1-20-77 / 2-3-77	23	120.4	14.8	105.6	104.6

Pile 24 diagram on p. 135

Penetr. for Bearing		Blows/	Bearing (Tons)
5/8"	/ 10	8.0	167.6
5/8"	/ 10	7.5	157.1
3/4"	/ 10	8.0	160.0
3/4"	/ 10	8.0	160.0
3/4"	/ 10	8.0	160.0
1/2"	/ 10	7.5	165.0
3/4"	/ 10	8.0	160.0
1/2"	/ 10	7.0	154.0
1/2"	/ 10	7.5	165.0
1/4"	/ 10	7.5	193.3
1/2"	/ 10	8.0	176.0
1/2"	/ 10	8.0	176.0
1/2"	/ 10	7.5	165.0
1/4"	/ 10	8.5	207.8
0"	/ 10	6.5	178.8
1/8"	/ 10	7.0	181.2
1/2"	/ 10	7.5	165.0
1/8"	/ 10	7.5	194.1
1/4"	/ 10	7.0	171.1
0"	/ 10	6.0	165.0
1/8"	/ 10	6.5	168.2
1/4"	/ 10	6.5	159.0
1/8"	/ 10	6.5	168.2

136

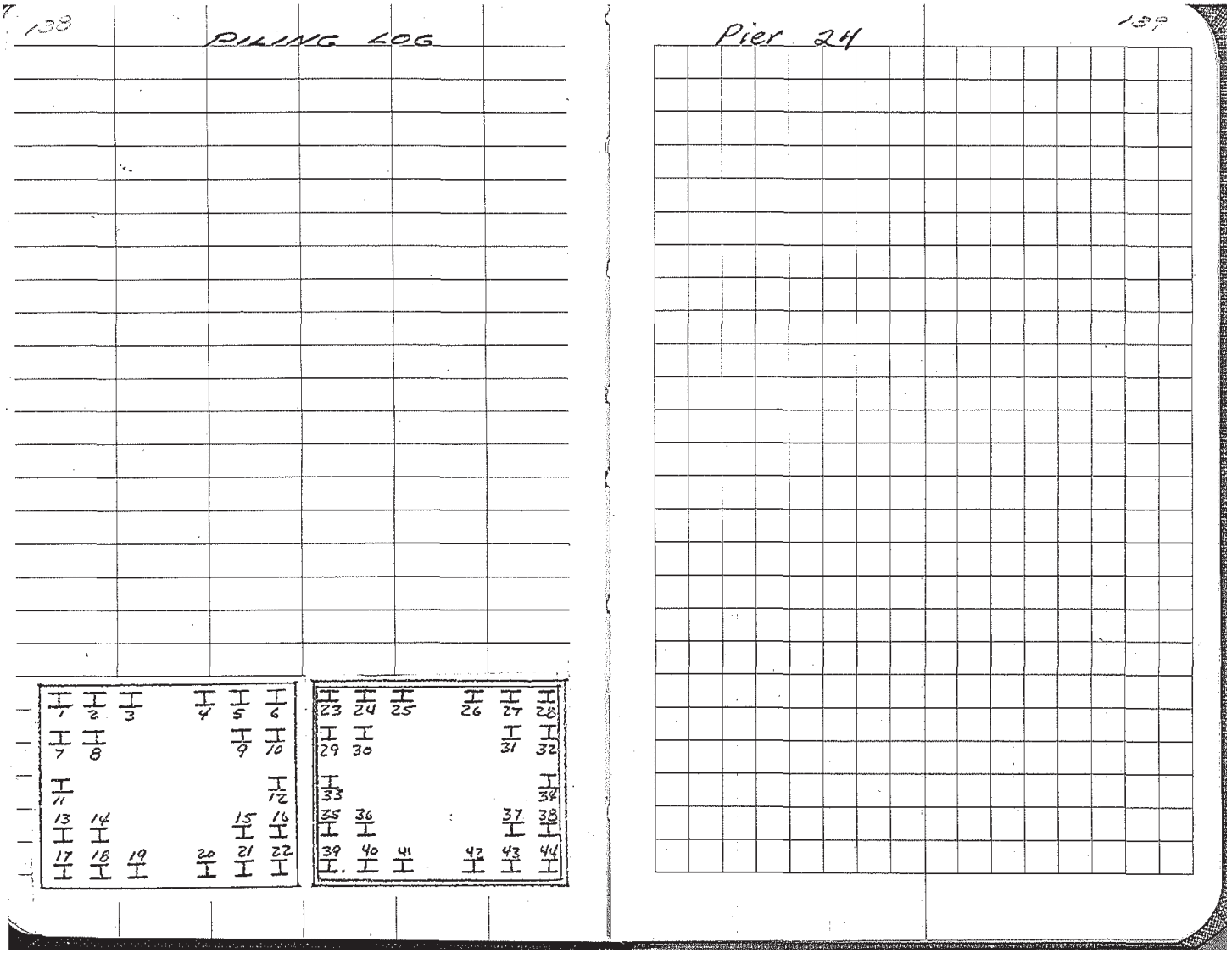
PILING LOG PIER 24

Date	Pile No	Length Del-Pay	Length Cutoff.	Length Below C.O.	Length Below Gr.
1-19-77	24	120.0	14.0	106.0	105.0
2-2-77	25	120.4	14.0	106.4	105.4
2-2-77 / 2-3-77	26	120.3	14.5	105.8	104.8
2-3-77	27	120.4	14.6	105.8	104.8
2-3-77	28	120.4	10.3	110.1	109.1
1-21-77 / 2-2-77	29	120.0	12.8	107.2	106.2
1-20.77 / 2-2-77	30	120.2	10.5	109.7	108.7
2-2-77 / 2-2-77	31	120.5	10.9	109.6	108.6
2-2-77	32	120.4	8.7	111.7	110.7
1-21-77 / 2-2-77	33	120.4	9.1	111.3	110.3
1-20-77 / 2-2-77	34	119.7	8.0	111.7	110.7
1-21-77 / 2-1-77	35	120.4	13.8	106.6	105.6
1-21-77 / 2-1-77	36	120.4	13.8	106.6	105.6
1-20-77 / 2-1-77	37	120.5	8.3	112.2	111.2
1-20-77 / 2-1-77	38	120.4	10.7	109.7	108.7
1-21-77 / 2-1-77	39	120.4	8.5	111.9	110.9
1-21-77 / 2-1-77	40	120.3	8.8	111.5	110.5
1-21-77 / 2-1-77	41	120.4	9.0	111.4	110.4
1-21-77 / 1-26-77	42	120.5	8.2	112.3	111.3
1-20-77 / 1-26-77	43	120.5	9.6	110.9	109.9
1-20-77 / 1-26-77	44	119.9	8.4	111.5	110.5
TOTALS	44	5295.8	463.0	4832.8	4788.8

Type of Driver. 52

Penetr. for Bearing ____ Blows/____	Bearing (Tons)
1/4" / 10	171.1
1/4" / 10	171.1
1/4" / 10	159.0
1/4" / 10	159.0
1/4" / 10	159.0
1/4" / 10	159.0
1/4" / 10	157.0
1/4" / 10	171.1
1/8" / 10	181.2
1/4" / 10	171.1
1/8" / 10	181.2
1/4" / 10	171.1
1/4" / 10	159.0
1/4" / 10	159.0
1/4" / 10	171.1
1/4" / 10	159.0
1/4" / 10	159.0
1/4" / 10	195.6
1/8" / 10	181.2
0" / 10	165.0
1/8" / 10	181.2
AVG. TONS	7450.4 / 44 = 169.3

COMP BY H.K.
✓ BY [illegible]


138
PILING LOG
Pier 24
139

140

PILING LOG

Date	Pile No.	Length Del. Bar	Cutoff	Length Blows C.O.	Length Blows Gr.
12-21-76	1	60.2			
1-3-77		60.2	1.5	118.9	117.9
12-22-76	2	60.2			
1-3-77		60.2	6.3	114.1	113.1
12-22-76	3	60.1			
1-3-77		60.2	6.3	114.0	113.0
12-27-76	4	60.2			
12-28-76		60.2	3.5	116.9	115.9
12-27-76	5	59.7			
12-28-76		60.1	3.2	116.6	115.6
12-27-76	6	60.1			
12-28-76		60.1	7.5	112.7	111.7
12-22-76	7	60.3			
1-3-77		60.3	1.6	119.0	118.0
12-22-76	8	60.2			
1-3-77		60.2	6.8	113.6	112.6
12-27-76	9	60.2			
1-3-77		60.2	5.4	115.0	114.0
12-27-76	10	60.3			
1-3-77		60.1	1.8	118.6	117.6
12-27-76	11	60.1			
1-3-77		60.2	2.0	118.3	117.3
12-27-76	12	60.1			
1-3-77		60.2	1.6	118.7	117.7

Penetr. Br. Bearing Blows/Pitch	Ft.	Bearing (Tons)
1/4" /10	7.0'	171.1
3/4" /10	8.0'	160.0
1/2" /10	7.0'	154.0
1/2" /10	7.0'	154.0
1/2" /10	7.0'	154.0
1/4" /10	6.5'	159.0
1/4" /10	7.0'	171.1
1/2" /10	7.0'	154.0
1/2" /10	7.5'	165.0
1/2" /10	7.0'	154.0
1/2" /10	7.0	154.0
1/2" /10	7.5'	165.0

142

PILING LOG B-5-158

Date	Pile No	Length Del-Pay	Cutoff	Length Below C.O.	Length Below G.L.
12-22-76	13	60.1			
1-3-77		60.3	2.2	118.2	117.2
12-22-76	14	60.1			
1-3-77		60.2	6.6	113.7	112.7
12-27-76	15	60.4			
1-3-77		60.2	7.4	113.2	112.2
12-27-76	16	60.2			
1-3-77		60.2	3.6	116.8	115.8
12-22-76	17	60.2			
1-3-77		60.2	1.8	118.6	117.6
12-22-76	18	60.2			
1-3-77		60.2	2.2	118.2	117.2
12-22-76	19	60.3			
1-3-77		60.2	1.6	118.9	117.9
12-27-76	20	60.3			
1-3-77		60.2	1.6	118.9	117.9
12-27-76	21	60.4			
1-3-77		60.2	7.3	113.3	112.3
12-27-76	22	60.1			
1-21-77		60.2	3.4	116.9	115.9
12-28-76	23	60.1			
1-21-77		60.2	2.2	118.1	117.1
12-28-76	24	60.1			
1-21-77		60.2	3.0	117.3	116.3

143

Pier 25 Type of Driver

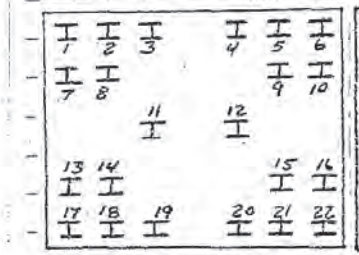
Penetr. for Bearing — Kobe 25

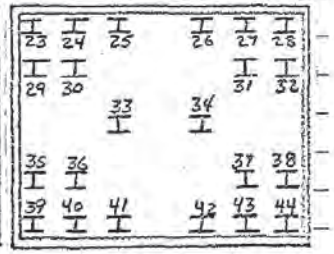
Blows/	Piston Fall	Bearing (Tons)
1/4" /10	7.0'	171.1
1/4" /10	7.0'	171.1
1/4" /10	7.0'	171.1
1/4" /10	6.5'	159.0
1/2" /10	7.0'	154.0
1/4" /10	7.0'	171.1
1/2" /10	6.5'	159.0
1/4/10	6.5'	159.0
0"/10	6.5'	178.8
1/2"/10	6.5'	159.0
1/4"/10	6.5'	159.0
1/8"/10	6.5'	167.8

1977

PILING LOG

Date	Pile No.	Length Below Pad	Cutoff	Length Below T.O.	Length Below G.L.
1-21-77	25	120.4	1.3	119.3	118.3
1-21-77	26	120.6	6.5	114.1	113.1
1-21-77	27	120.4	10.3	110.1	109.1
1-21-77	28	120.4	8.0	112.4	111.4
1-21-77	29	120.3	5.2	115.1	114.1
1-21-77	30	120.4	2.6	117.8	116.8
1-21-77	31	120.5	8.5	112.0	111.0
1-21-77	32	120.4	1.3	119.1	118.1
1-5-77	33	120.4	1.8	118.6	117.6
1-5-77	34	120.4	4.0	116.4	115.4
1-5-77	35	120.4	1.0	119.4	118.4
1-5-77	36	120.4	.4	120.0	119.0
1-5-77	37	120.4	3.6	116.8	115.8
1-5-77	38	120.4	7.8	112.6	111.6
1-5-77	39	120.4	4.8	115.6	114.6
1-5-77	40	120.6	1.2	119.4	118.4
1-5-77	41	120.4	2.7	117.7	116.7
1-4-77	42	120.4	2.6	117.8	116.8
1-4-77	43	120.4	3.9	116.5	115.5
1-4-77	44	120.4	5.8	114.6	113.6
Totals	44	5297.3	173.7	5,123.6	5,079.6



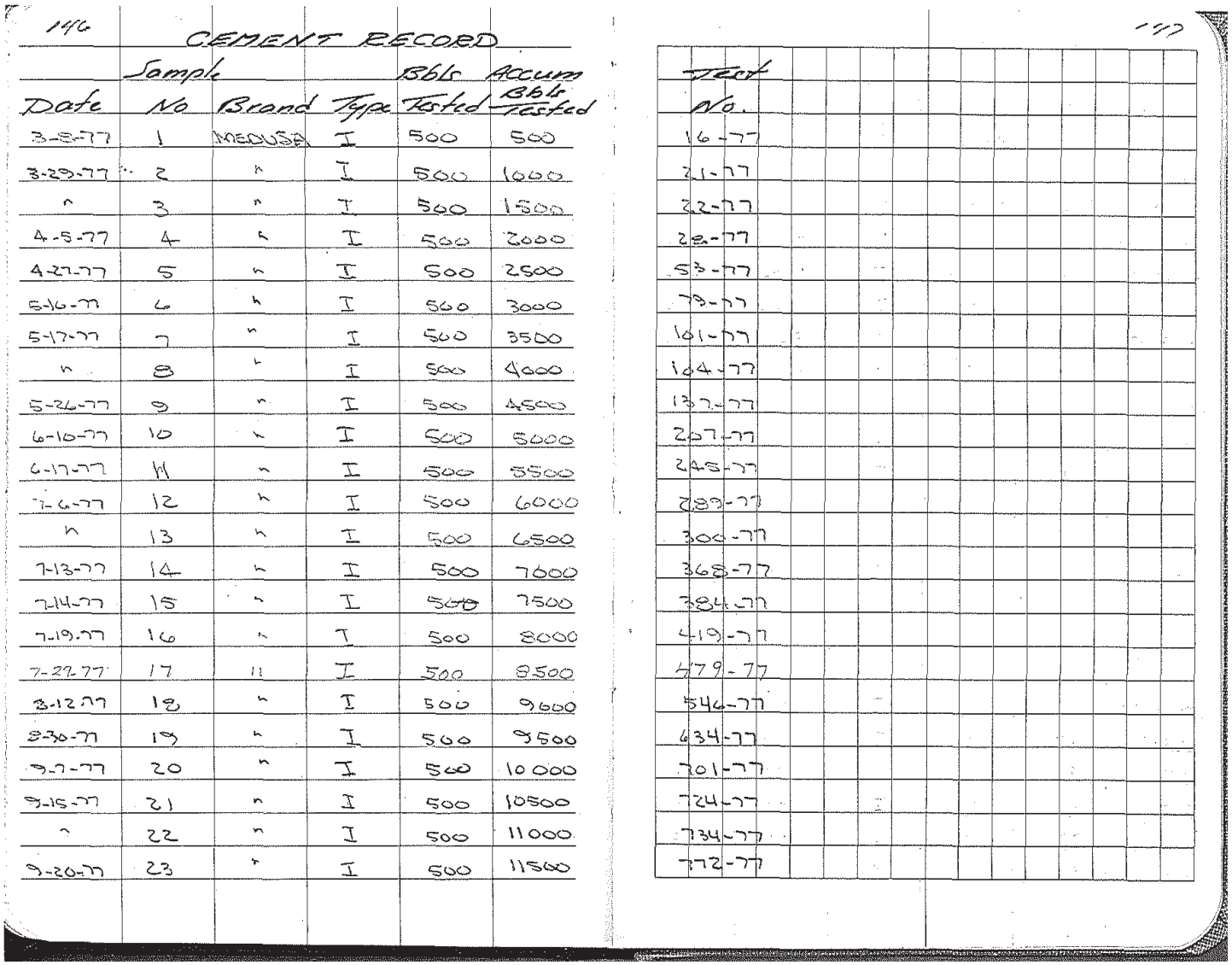


Pier 25

Penetration	10 Blows	Ft. of Piling	Bearing
1/4"/10		6.5'	159.0
1/8"/10		7.0'	180.8
1/4"/10		7.0'	171.1
1/8"/10		7.0'	180.8
1/4"/10		6.5'	159.0
1/8"/10		6.5'	167.8
1/4"/10		6.5'	159.0
1/16"/10		6.5'	173.8
1/4"/10		7.0'	171.1
1/4"/10		7.0'	171.1
1/4"/10		7.0'	171.1
0"/10		7.0'	193.0
1/4"/10		6.5'	159.0
1/4"/10		6.5'	159.0
1/4"/10		6.5'	159.0
1/8"/10		6.5'	167.8
1/4"/10		6.5'	159.0
1/4"/10		6.5'	159.0
1/4"/10		7.0'	171.1
1/2"/10		7.0	154.0

AVG TONS 164.5

COMP. BY



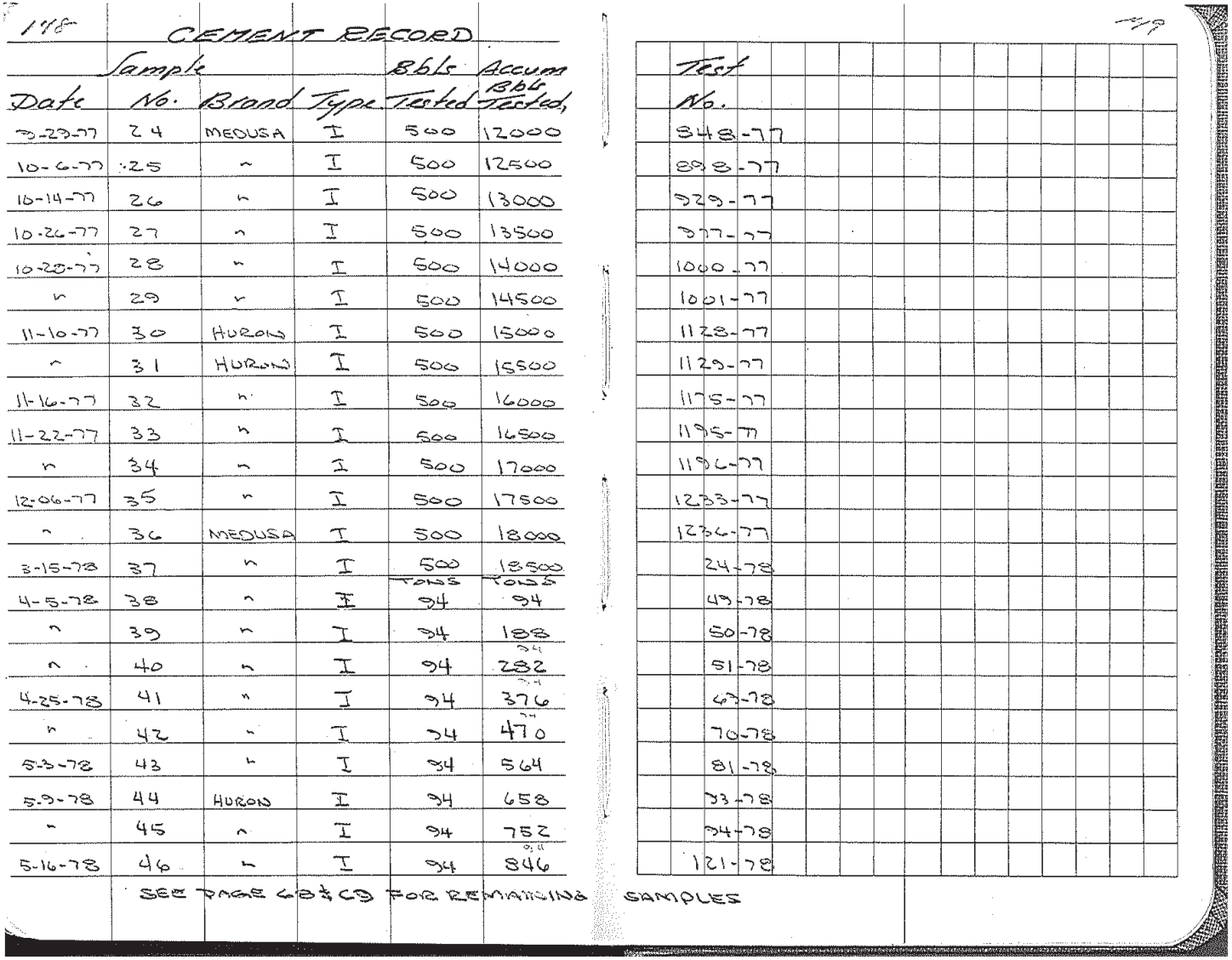
146

CEMENT RECORD

Date	Sample No	Brand	Type	Bbls Tested	Accum Bbls Tested
3-8-77	1	MEDUSA	I	500	500
3-29-77	2	"	I	500	1000
"	3	"	I	500	1500
4-5-77	4	"	I	500	2000
4-27-77	5	"	I	500	2500
5-16-77	6	"	I	500	3000
5-17-77	7	"	I	500	3500
"	8	"	I	500	4000
5-26-77	9	"	I	500	4500
6-10-77	10	"	I	500	5000
6-17-77	11	"	I	500	5500
7-6-77	12	"	I	500	6000
"	13	"	I	500	6500
7-13-77	14	"	I	500	7000
7-14-77	15	"	I	500	7500
7-19-77	16	"	I	500	8000
7-22-77	17	"	I	500	8500
8-12-77	18	"	I	500	9000
8-30-77	19	"	I	500	9500
9-7-77	20	"	I	500	10000
9-15-77	21	"	I	500	10500
"	22	"	I	500	11000
9-20-77	23	"	I	500	11500

147

Test No.
16-77
21-77
22-77
28-77
53-77
79-77
101-77
104-77
137-77
207-77
245-77
289-77
300-77
368-77
384-77
419-77
479-77
546-77
634-77
701-77
724-77
734-77
772-77

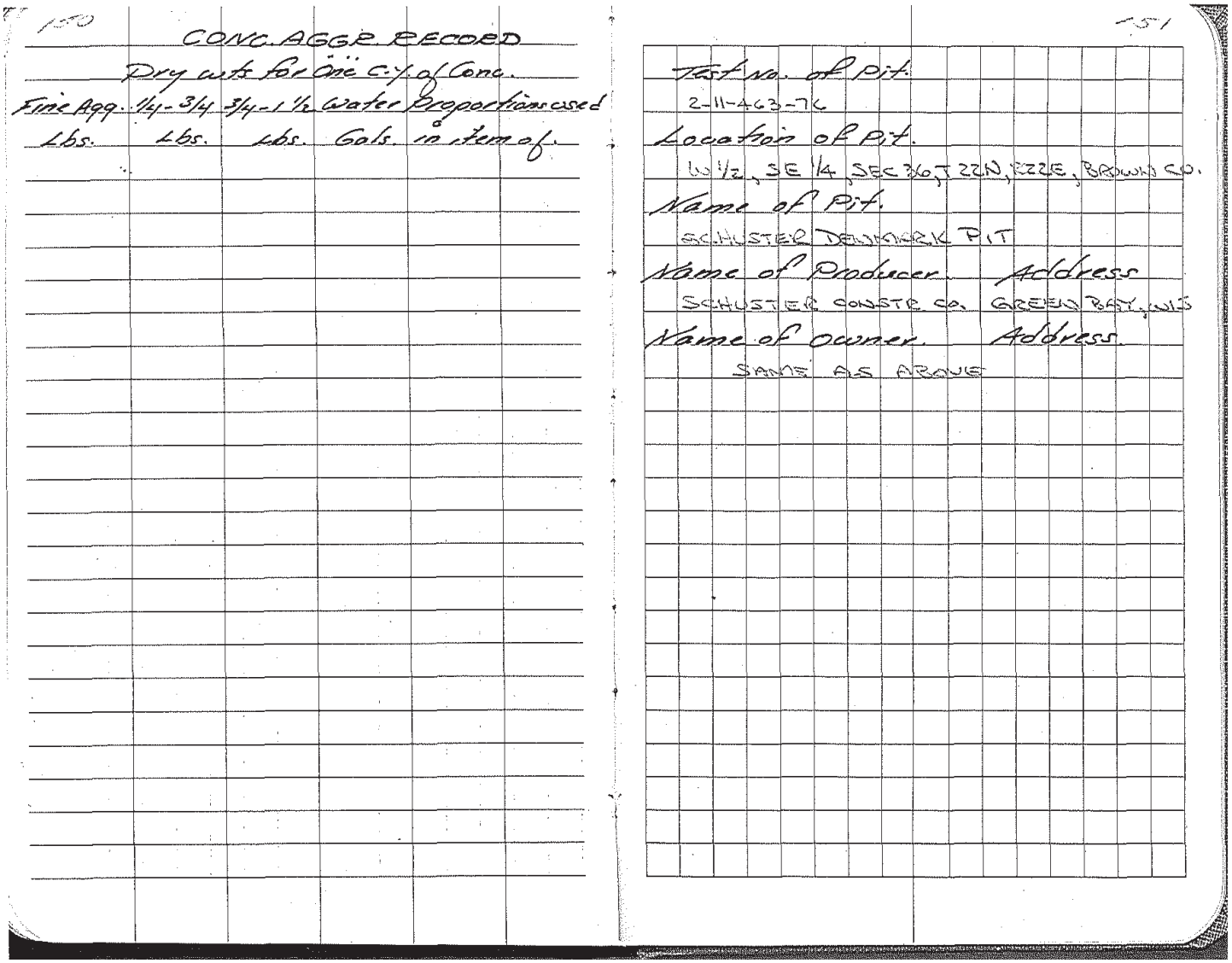


CEMENT RECORD

Date	Sample No.	Brand	Type	BBLS Tested	Accum BBLS Tested
9-23-77	24	MEDUSA	I	500	12000
10-6-77	25	"	I	500	12500
10-14-77	26	"	I	500	13000
10-26-77	27	"	I	500	13500
10-28-77	28	"	I	500	14000
"	29	"	I	500	14500
11-10-77	30	HURON	I	500	15000
"	31	HURON	I	500	15500
11-16-77	32	"	I	500	16000
11-22-77	33	"	I	500	16500
"	34	"	I	500	17000
12-06-77	35	"	I	500	17500
"	36	MEDUSA	I	500	18000
3-15-78	37	"	I	500	18500
4-5-78	38	"	I	94 Tons	94 Tons
"	39	"	I	94	188
"	40	"	I	94	282
4-25-78	41	"	I	94	376
"	42	"	I	94	470
5-3-78	43	"	I	94	564
5-9-78	44	HURON	I	94	658
"	45	"	I	94	752
5-16-78	46	"	I	94	846

SEE PAGE 68 & 69 FOR REMAINING SAMPLES

Test No.
348-77
898-77
929-77
977-77
1000-77
1001-77
1128-77
1129-77
1175-77
1195-77
1196-77
1233-77
1236-77
24-78
49-78
50-78
51-78
67-78
70-78
81-78
93-78
94-78
121-78



150

CONC. AGGR. RECORD

Dry wts for one C.Y. of Conc.

Fine Agg.	1/4-3/4	3/4-1 1/2	Water	Proportions used
Lbs.	Lbs.	Lbs.	Gals.	in item of.

151

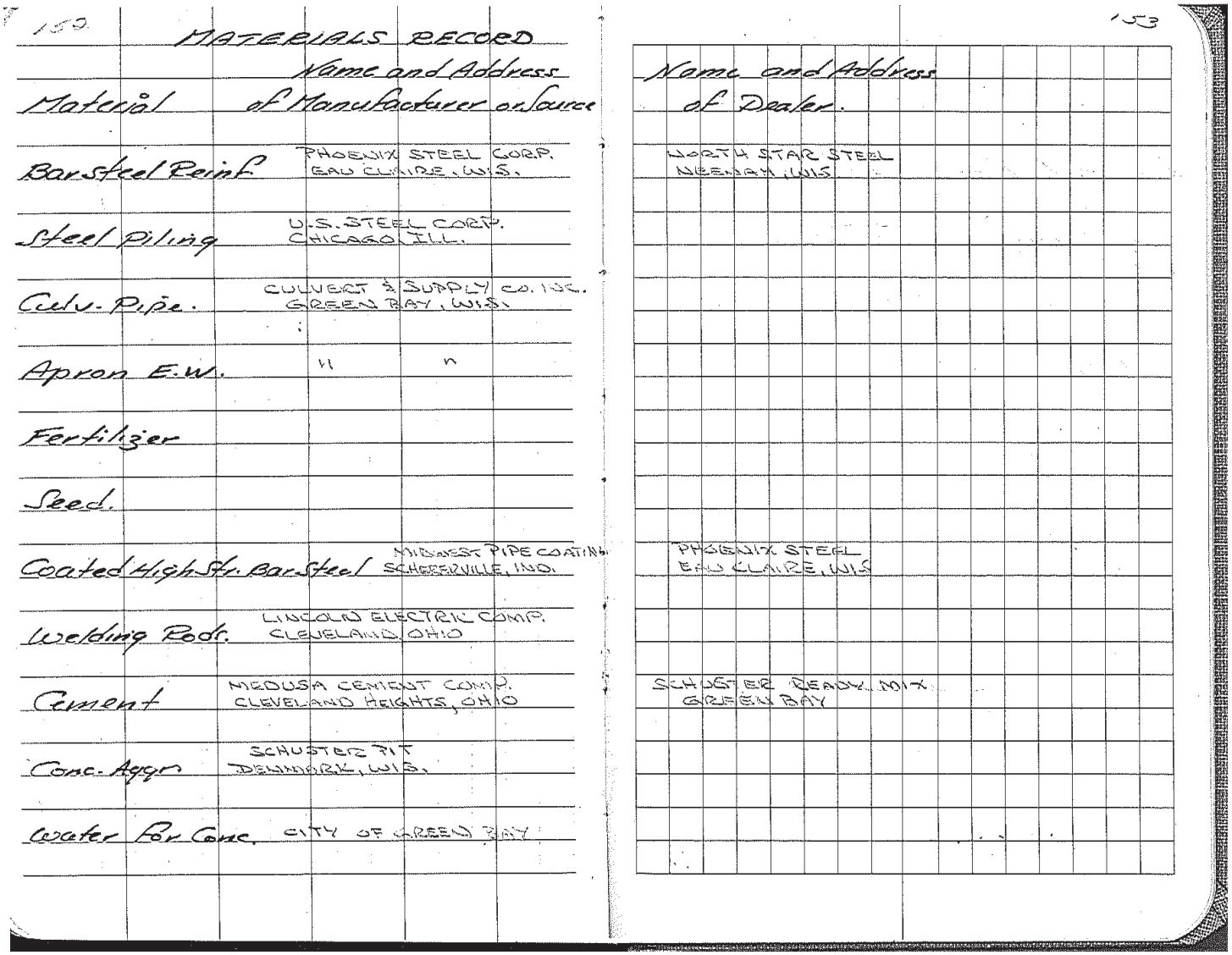
Test No. of Pit.
2-11-463-7K

Location of Pit.
W 1/2, SE 1/4, SEC 36, T 22N, R22E, BROWN CO.

Name of Pit.
SCHUSTER DENMARK PIT

Name of Producer. Address
SCHUSTER CONSTR CO. GREEN BAY, WIS

Name of owner. Address.
SAME AS ABOVE

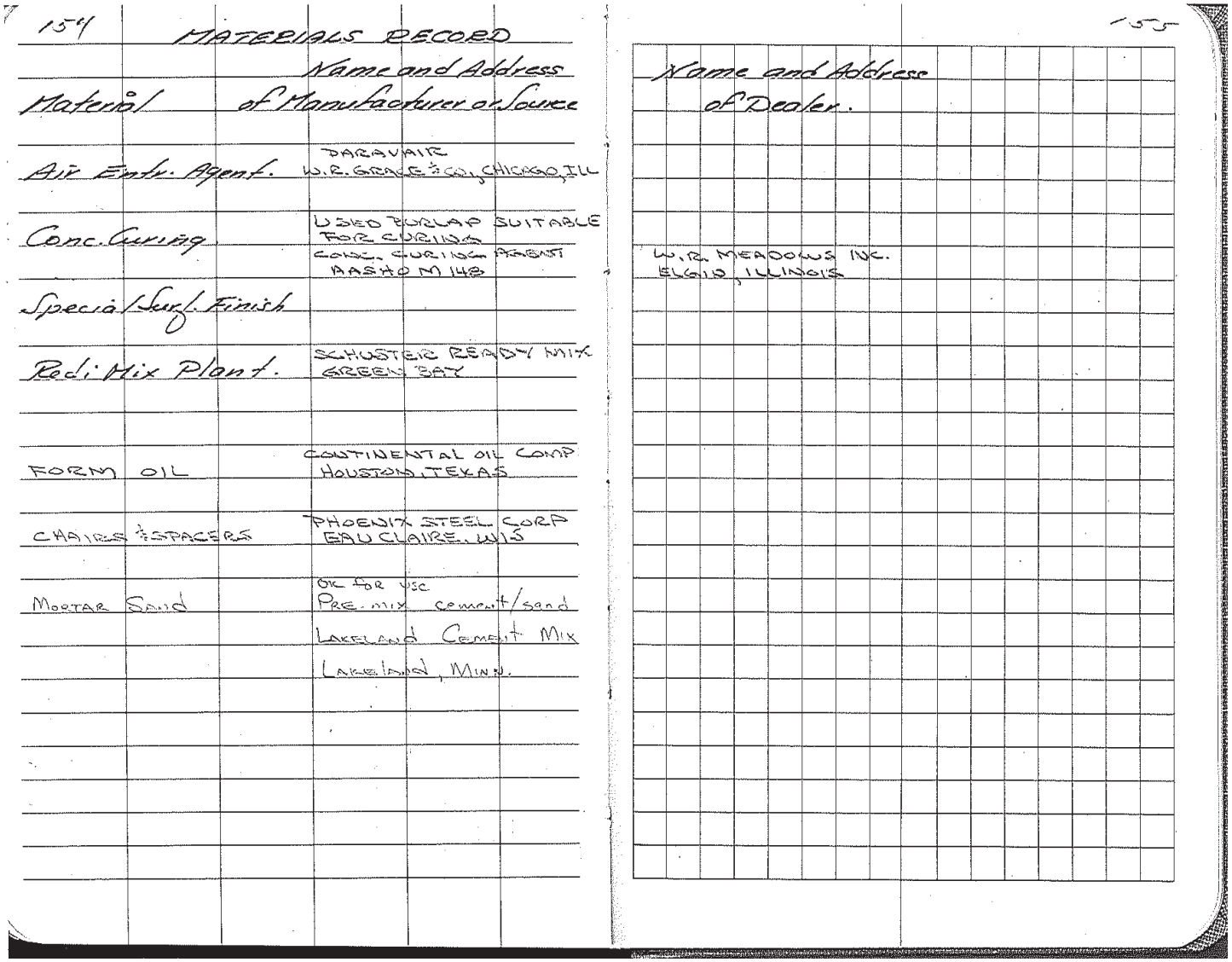


150

MATERIALS RECORD

Material	Name and Address of Manufacturer or Source	Name and Address of Dealer.
Bar Steel Reinf.	PHOENIX STEEL CORP. EAU CLAIRE, WIS.	NORTH STAR STEEL NEENAH, WIS
Steel Piling	U.S. STEEL CORP. CHICAGO, ILL.	
Culv. Pipe.	CULVERT & SUPPLY CO. INC. GREEN BAY, WIS.	
Apron E.W.	" "	
Fertilizer		
Seed.		
Coated High Str. Bar Steel	MIDWEST PIPE COATING SCHERERVILLE, IND.	PHOENIX STEEL EAU CLAIRE, WIS
Welding Rods.	LINCOLN ELECTRIC COMP. CLEVELAND, OHIO	
Cement	MEDUSA CEMENT COMP. CLEVELAND HEIGHTS, OHIO	SCHUSTER READY MIX GREEN BAY
Conc. Aggr.	SCHUSTER PIT DENMARK, WIS.	
Water For Conc.	CITY OF GREEN BAY	

153

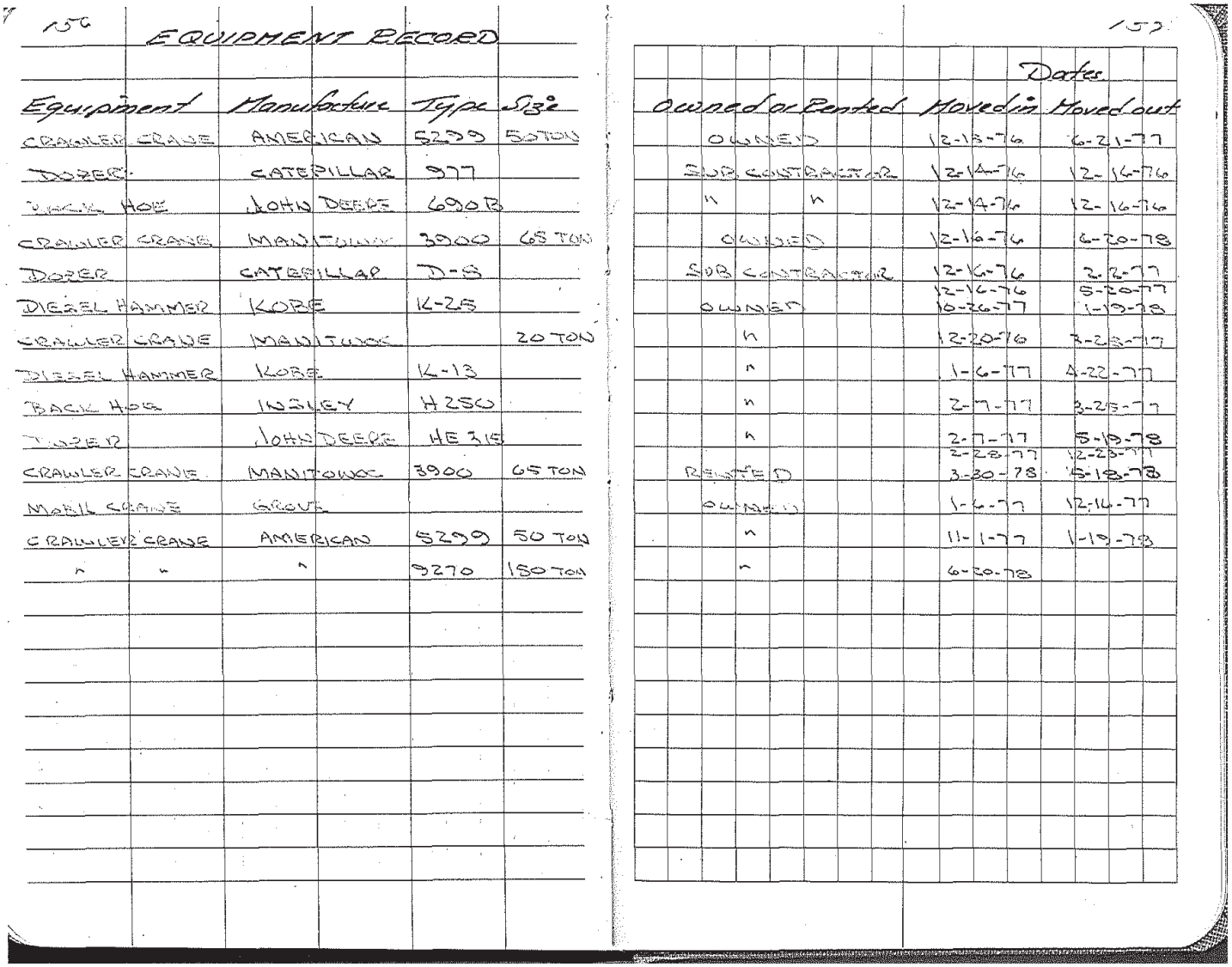


154

MATERIALS RECORD

Material	Name and Address of Manufacturer or Source	Name and Address of Dealer.
Air Entr. Agent.	DARAVAIR W.R. GRACE & CO, CHICAGO, ILL	
Conc. Curing	USED BURLAP SUITABLE FOR CURING CONC. CURING AGENT AASHO M 148	W.R. MEADOWS INC. ELGIN, ILLINOIS
Special Surf. Finish		
Redi Mix Plant.	SCHUSTER READY MIX GREEN BAY	
FORM OIL	CONTINENTAL OIL CORP HOUSTON, TEXAS	
CHAIRS & SPACERS	PHOENIX STEEL CORP EAU CLAIRE, WIS	
MORTAR SAND	OK FOR USE PRE-MIX cement/sand LAKELAND CEMENT MIX LAKELAND, MINN.	

155



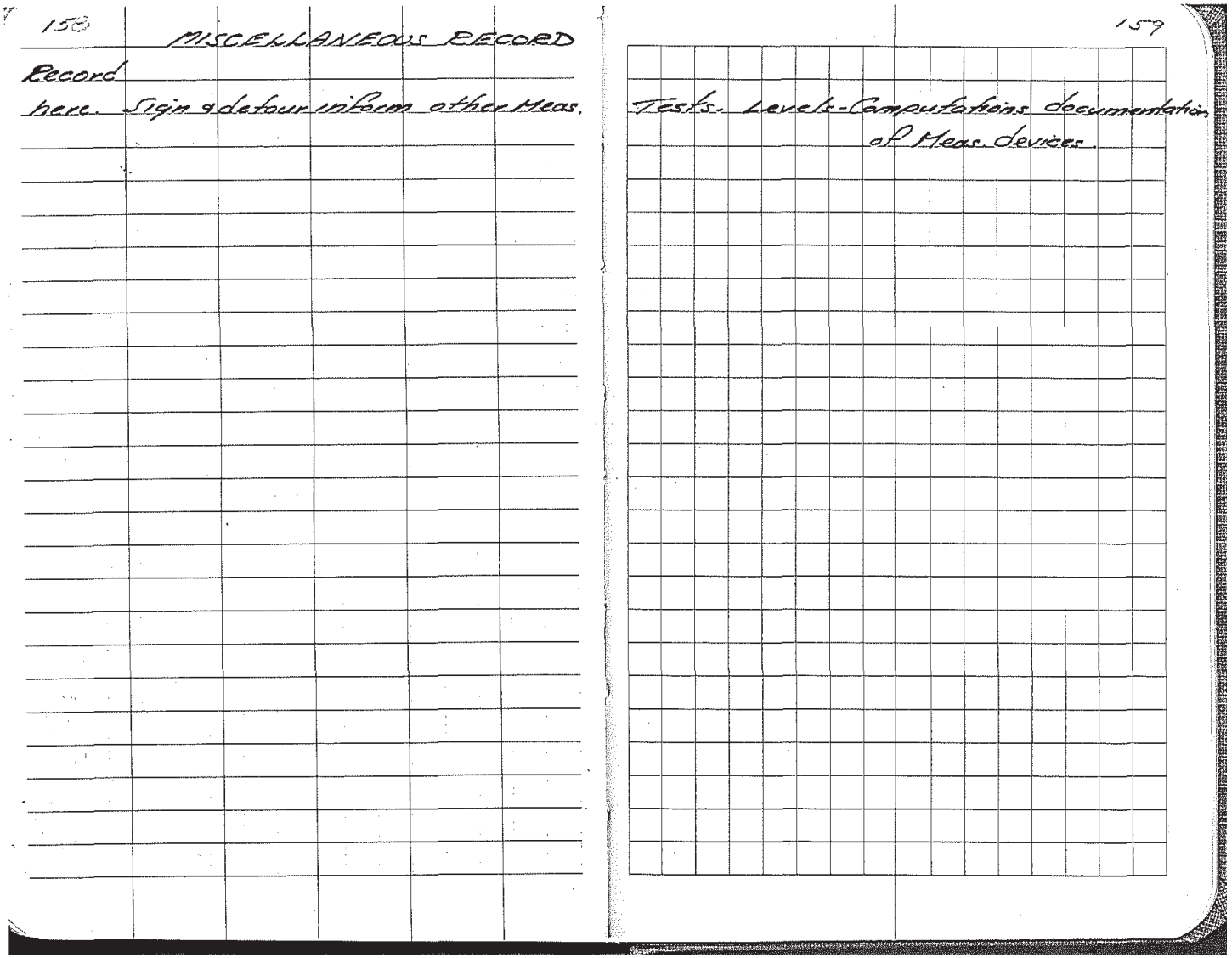
156

EQUIPMENT RECORD

Equipment	Manufacturer	Type	Size
CRAWLER CRANE	AMERICAN	5299	50 TON
DOZER	CATERPILLAR	977	
BACK HOE	JOHN DEERE	690B	
CRAWLER CRANE	MANITOWOC	3900	65 TON
DOZER	CATERPILLAR	D-8	
DIESEL HAMMER	KOBE	K-25	
CRAWLER CRANE	MANITOWOC		20 TON
DIESEL HAMMER	KOBE	K-13	
BACK HOE	INSLEY	H250	
DOZER	JOHN DEERE	HE 315	
CRAWLER CRANE	MANITOWOC	3900	65 TON
MOBIL CRANE	GROVE		
CRAWLER CRANE	AMERICAN	5299	50 TON
" "	"	9270	150 TON

157

Owned or Rented	Dates Moved in	Moved out
OWNED	12-13-76	6-21-77
SUB CONTRACTOR	12-14-76	12-16-76
" "	12-14-76	12-16-76
OWNED	12-16-76	6-20-78
SUB CONTRACTOR	12-16-76	2-2-77
OWNED	12-16-76 10-26-77	5-20-77 1-19-78
"	12-20-76	3-23-77
"	1-6-77	4-22-77
"	2-7-77	3-23-77
"	2-7-77	5-19-78
RENTED	2-28-77 3-30-78	12-23-77 5-19-78
OWNED	1-6-77	12-16-77
"	11-1-77	1-19-78
"	6-20-78	



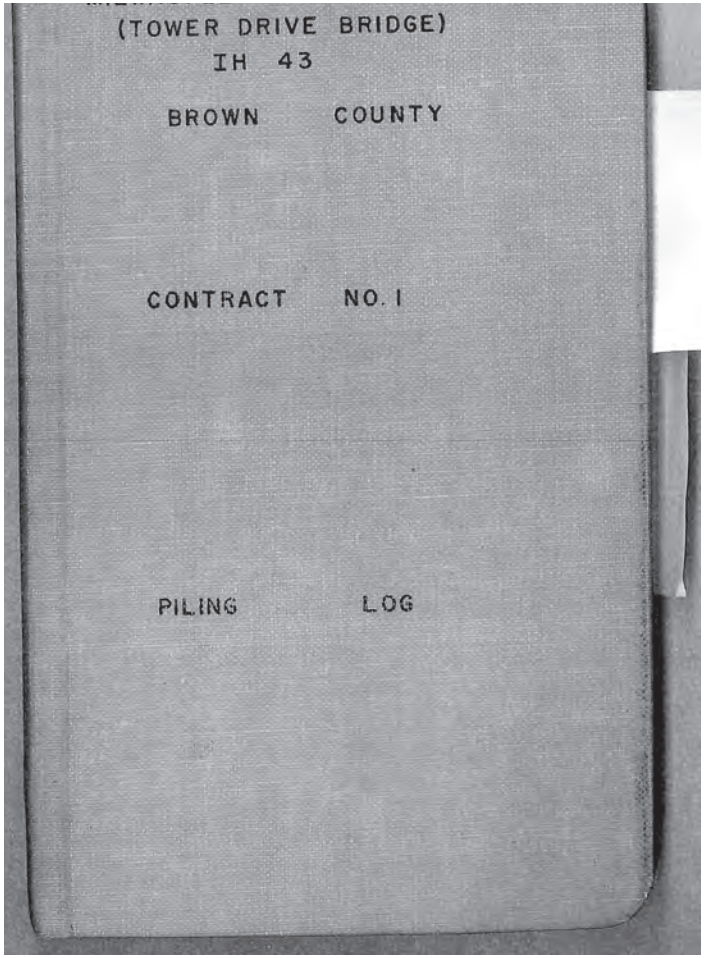
158 MISCELLANEOUS RECORD

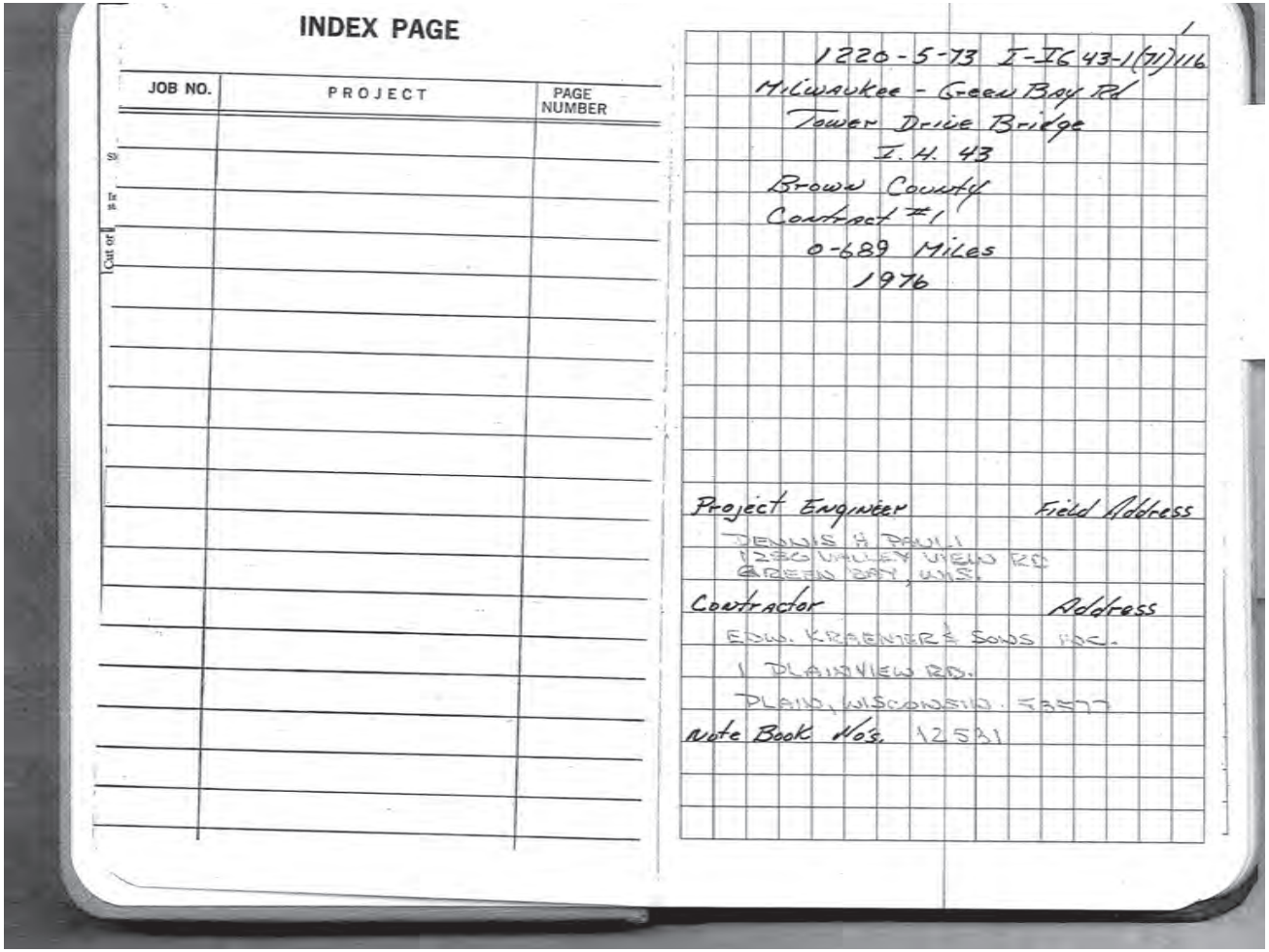
Record here. Sign & detour inform other Meas.

159

Tests. Levels-Computations documentation of Meas. Devices.

Substructure Project 1220-5-73
Piers 26 thru 44


(TOWER DRIVE BRIDGE)
IH 43
BROWN COUNTY
CONTRACT NO. I
PILING LOG



INDEX PAGE

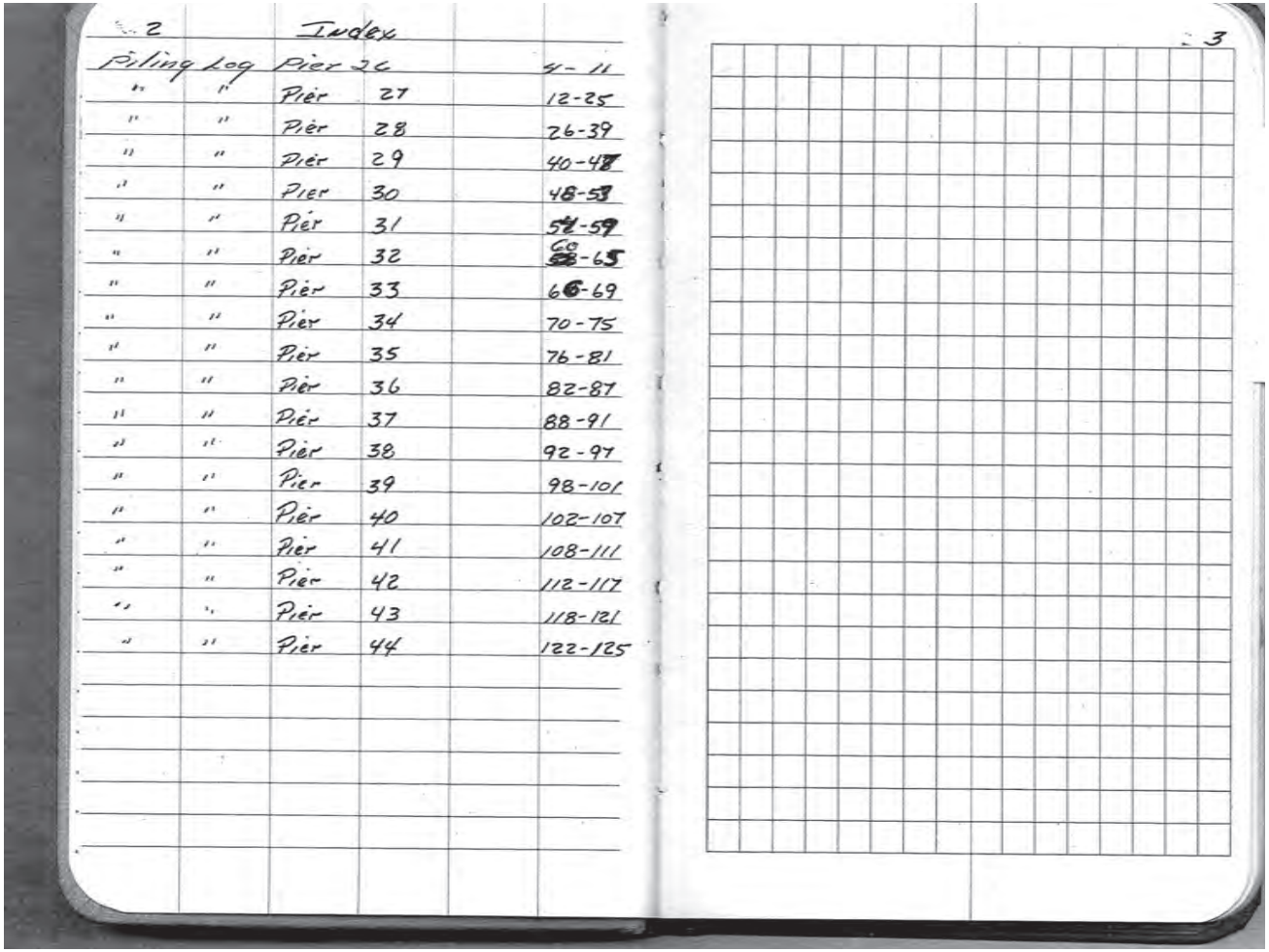
JOB NO.	PROJECT	PAGE NUMBER

1220-5-73 I-IC 43-1(71)116
Milwaukee - Green Bay Rd
Tower Drive Bridge
I.H. 43
Brown County
Contract #1
0-689 Miles
1976

Project Engineer — Field Address
DENNIS A PAUL
1230 VALLEY VIEW RD
GREEN BAY, WIS.

Contractor — Address
EDW. K. BUENTER & SONS INC.
1 PLAINVIEW RD.
PLAIN, WISCONSIN 53577

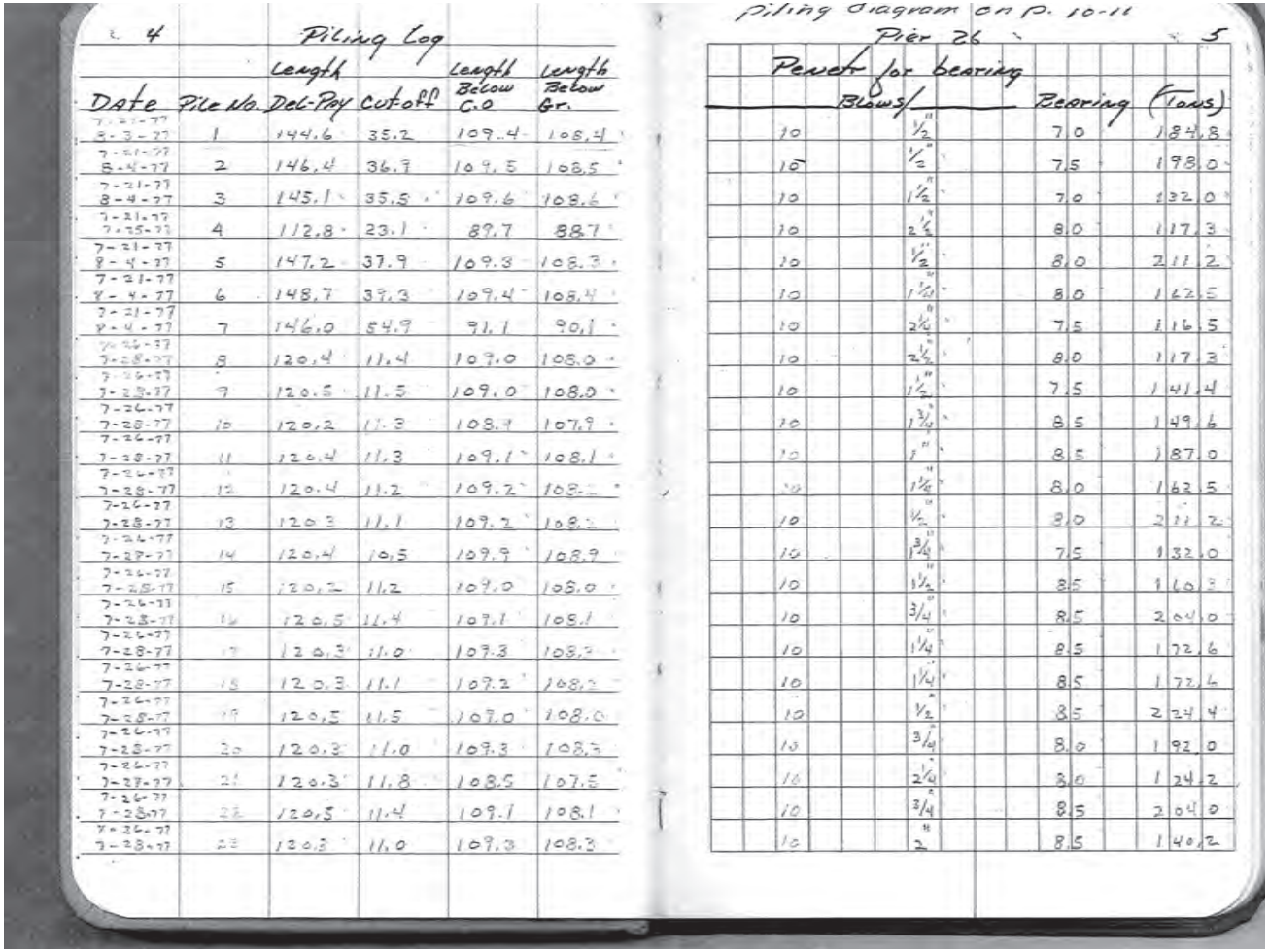
Note Book Nos. 12531



2 Index

Piling Log	Pier	26	4-11
"	"	Pier	27	12-25
"	"	Pier	28	26-39
"	"	Pier	29	40-47
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"	"	Pier	33	66-69
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"	"	Pier	40	102-107
"	"	Pier	41	108-111
"	"	Pier	42	112-117
"	"	Pier	43	118-121
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3



4 Piling Log

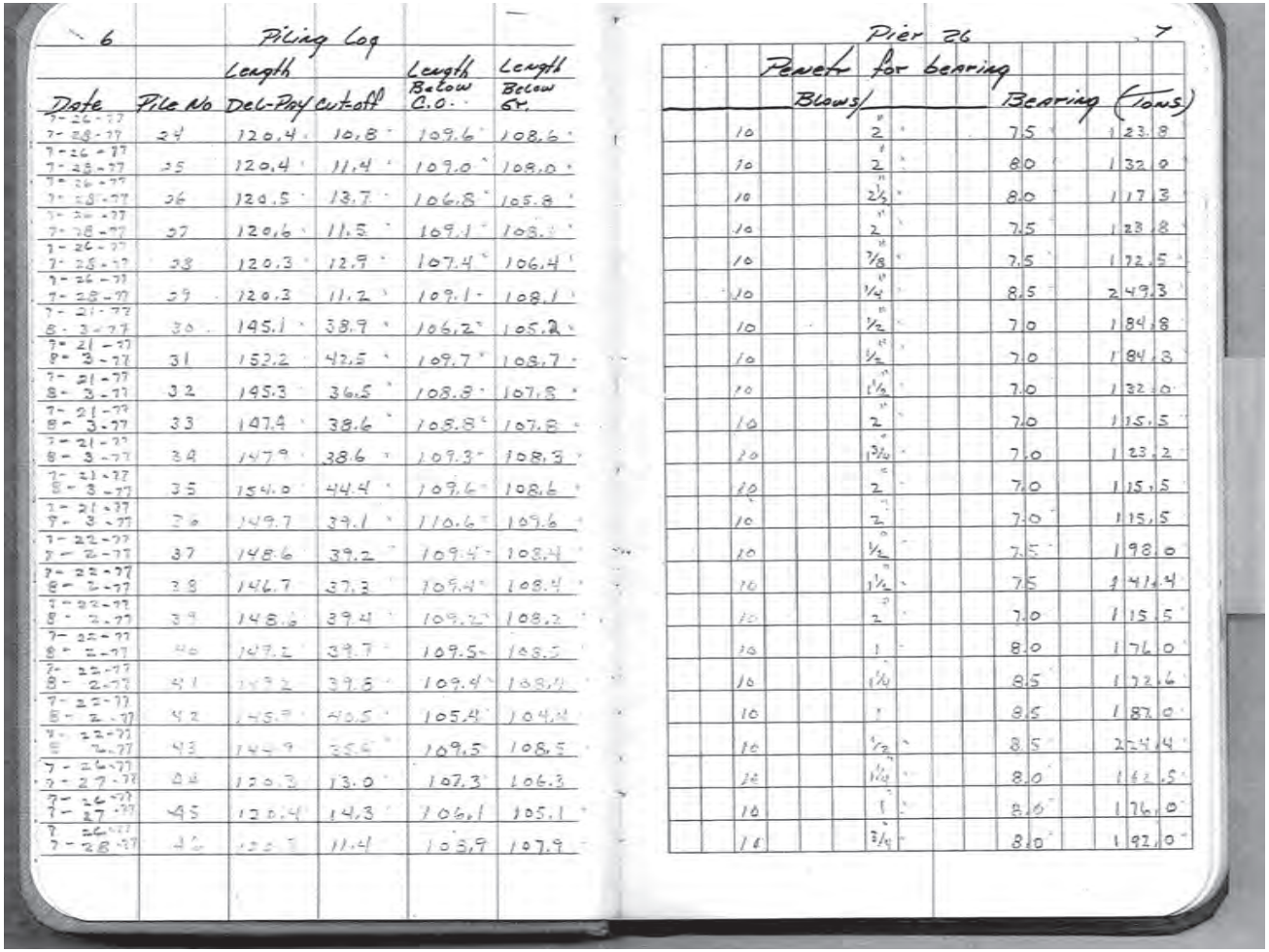
Date	Pile No.	Length Del-Pay	Cut-off	Length Below C.O	Length Below Gr.
7-21-77 8-3-77	1	144.6	35.2	109.4	108.4
7-21-77 8-4-77	2	146.4	36.9	109.5	108.5
7-21-77 8-4-77	3	145.1	35.5	109.6	108.6
7-21-77 7-25-77	4	112.8	23.1	89.7	88.7
7-21-77 8-4-77	5	147.2	37.9	109.3	108.3
7-21-77 8-4-77	6	148.7	39.3	109.4	108.4
7-21-77 8-4-77	7	146.0	54.9	91.1	90.1
7-26-77 7-28-77	8	120.4	11.4	109.0	108.0
7-26-77 7-28-77	9	120.5	11.5	109.0	108.0
7-26-77 7-28-77	10	120.2	11.3	108.9	107.9
7-26-77 7-28-77	11	120.4	11.3	109.1	108.1
7-26-77 7-28-77	12	120.4	11.2	109.2	108.2
7-26-77 7-28-77	13	120.3	11.1	109.2	108.2
7-26-77 7-27-77	14	120.4	10.5	109.9	108.9
7-26-77 7-28-77	15	120.2	11.2	109.0	108.0
7-26-77 7-28-77	16	120.5	11.4	109.1	108.1
7-26-77 7-28-77	17	120.3	11.0	109.3	108.3
7-26-77 7-28-77	18	120.3	11.1	109.2	108.2
7-26-77 7-28-77	19	120.5	11.5	109.0	108.0
7-26-77 7-28-77	20	120.3	11.0	109.3	108.3
7-26-77 7-27-77	21	120.3	11.8	108.5	107.5
7-26-77 7-28-77	22	120.5	11.4	109.1	108.1
7-26-77 7-28-77	23	120.3	11.0	109.3	108.3

Piling diagram on p. 10-11

Pier 26

5

Power for bearing Blows/		Bearing	(Tons)
10	1/2"	7.0	184.8
10	1/2"	7.5	198.0
10	1 1/2"	7.0	132.0
10	2 1/2"	8.0	117.3
10	1/2"	8.0	211.2
10	1 1/2"	8.0	162.5
10	2 1/4"	7.5	116.5
10	2 1/2"	8.0	117.3
10	1 1/2"	7.5	141.4
10	1 3/4"	8.5	149.6
10	1"	8.5	187.0
10	1 1/4"	8.0	162.5
10	1/2"	8.0	211.2
10	1 3/4"	7.5	132.0
10	1 1/2"	8.5	160.3
10	3/4"	8.5	204.0
10	1 1/4"	8.5	172.6
10	1 1/4"	8.5	172.4
10	1/2"	8.5	224.4
10	3/4"	8.0	192.0
10	2 1/4"	8.0	124.2
10	3/4"	8.5	204.0
10	2"	8.5	140.2



6

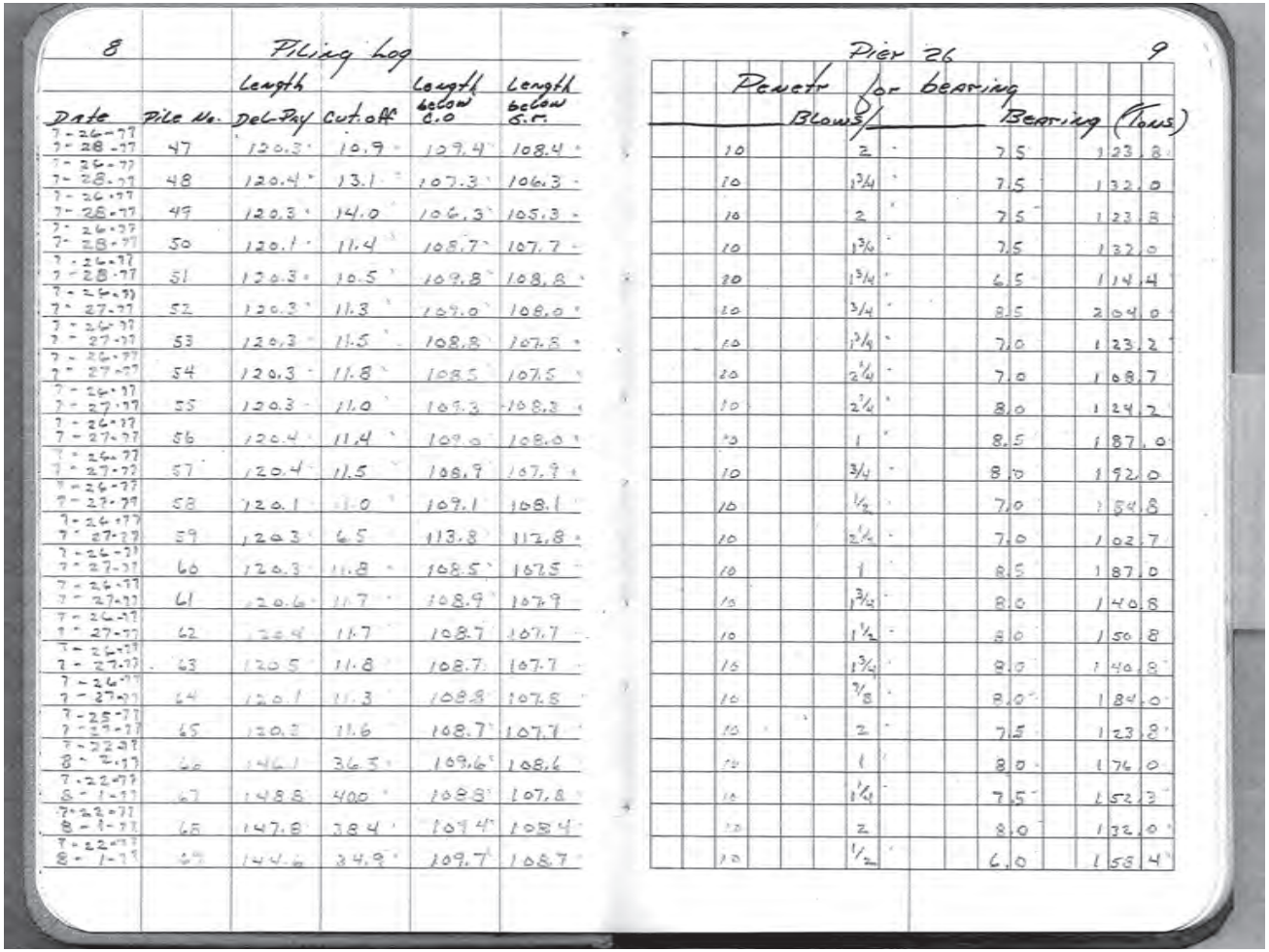
Piling Log

Date	Pile No	Length Del-Pkg	Length Cut-off	Length Below C.O.	Length Below Gr.
7-26-77 7-28-77	24	120.4	10.8	109.6	108.6
7-26-77 7-28-77	25	120.4	11.4	109.0	108.0
7-26-77 7-28-77	26	120.5	13.7	106.8	105.8
7-26-77 7-28-77	27	120.6	11.5	109.1	108.1
7-26-77 7-28-77	28	120.3	12.9	107.4	106.4
7-26-77 7-28-77	29	120.3	11.2	109.1	108.1
7-21-77 8-3-77	30	145.1	38.9	106.2	105.2
7-21-77 8-3-77	31	152.2	42.5	109.7	108.7
7-21-77 8-3-77	32	145.3	36.5	108.8	107.8
7-21-77 8-3-77	33	147.4	38.6	108.8	107.8
7-21-77 8-3-77	34	147.9	38.6	109.3	108.3
7-21-77 8-3-77	35	154.0	44.4	109.6	108.6
7-21-77 8-3-77	36	149.7	39.1	110.6	109.6
7-22-77 8-2-77	37	148.6	39.2	109.4	108.4
7-22-77 8-2-77	38	146.7	37.3	109.4	108.4
7-22-77 8-2-77	39	148.6	39.4	109.2	108.2
7-22-77 8-2-77	40	147.2	39.7	109.5	108.5
7-22-77 8-2-77	41	148.2	39.8	109.4	108.4
7-22-77 8-2-77	42	145.9	40.5	105.4	104.4
7-22-77 8-2-77	43	144.9	35.6	109.5	108.5
7-26-77 7-27-77	44	120.3	13.0	107.3	106.3
7-26-77 7-27-77	45	120.4	14.3	106.1	105.1
7-26-77 7-28-77	46	120.3	11.4	108.9	107.9

Pier 26

7

Blows/	Penetration for bearing	Bearing (Tons)
10	2"	123.8
10	2"	132.0
10	2½"	117.3
10	2"	123.8
10	⅞"	172.5
10	¼"	249.3
10	½"	184.8
10	½"	184.8
10	1⅛"	132.0
10	2"	115.5
10	1⅜"	123.2
10	2"	115.5
10	2"	115.5
10	¼"	198.0
10	1½"	141.4
10	2"	115.5
10	1"	176.0
10	1¼"	172.6
10	1"	187.0
10	½"	254.4
10	1¼"	162.5
10	1"	176.0
10	⅜"	192.0

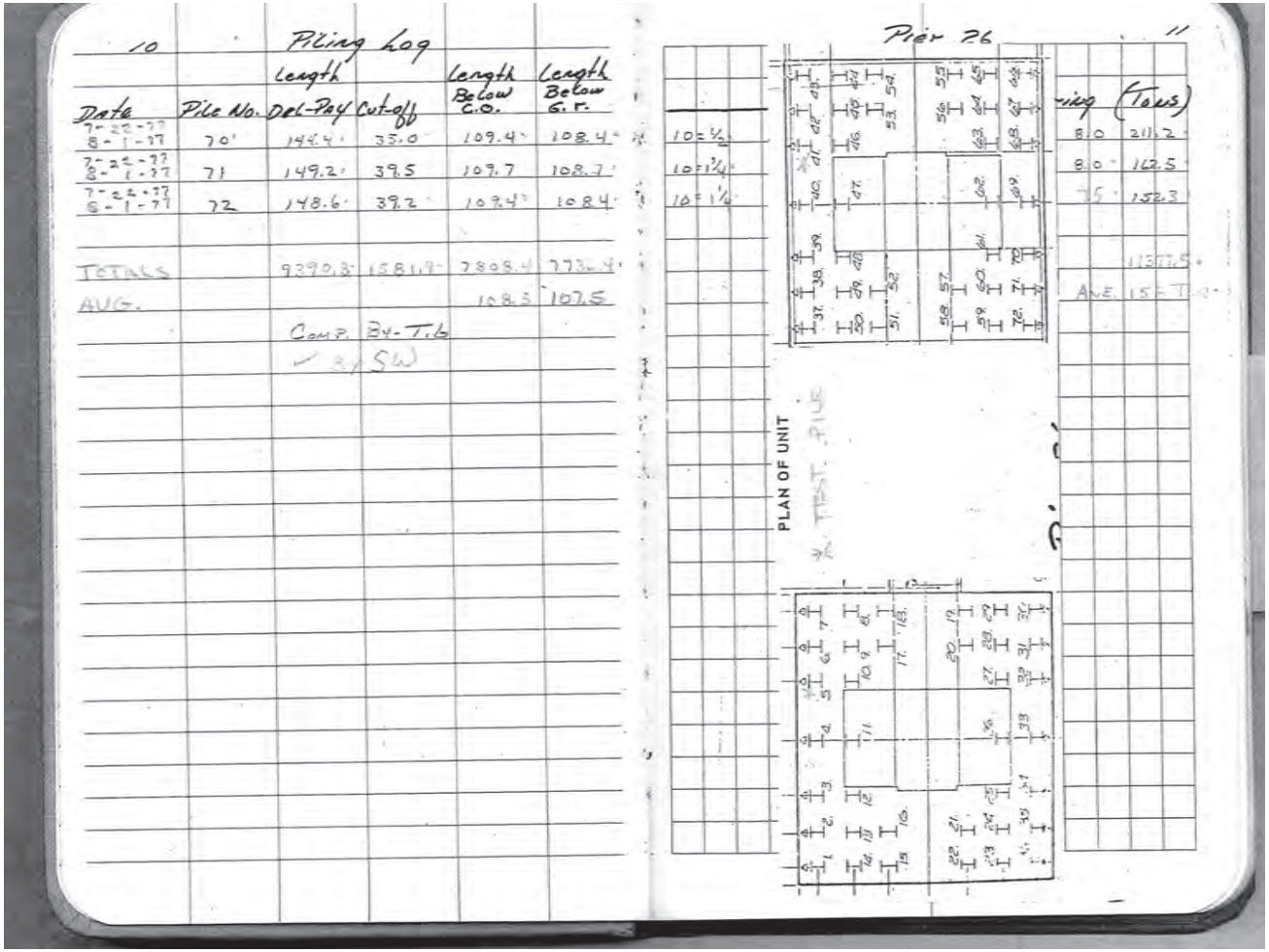


8 Piling Log

Date	Pile No.	Length Del. Pay	Length Cut off	Length below C.O	Length below S.C.
7-26-77 7-28-77	47	120.3	10.9	109.4	108.4
7-26-77 7-28-77	48	120.4	13.1	107.3	106.3
7-26-77 7-28-77	49	120.3	14.0	106.3	105.3
7-26-77 7-28-77	50	120.1	11.4	108.7	107.7
7-26-77 7-28-77	51	120.3	10.5	109.8	108.8
7-26-77 7-27-77	52	120.3	11.3	109.0	108.0
7-26-77 7-27-77	53	120.3	11.5	108.8	107.8
7-26-77 7-27-77	54	120.3	11.8	108.5	107.5
7-26-77 7-27-77	55	120.3	11.0	109.3	108.3
7-26-77 7-27-77	56	120.4	11.4	109.0	108.0
7-26-77 7-27-77	57	120.4	11.5	108.9	107.9
7-26-77 7-27-77	58	120.1	11.0	109.1	108.1
7-26-77 7-27-77	59	120.3	6.5	113.8	112.8
7-26-77 7-27-77	60	120.3	11.8	108.5	107.5
7-26-77 7-27-77	61	120.6	11.7	108.9	107.9
7-26-77 7-27-77	62	120.4	11.7	108.7	107.7
7-26-77 7-27-77	63	120.5	11.8	108.7	107.7
7-26-77 7-27-77	64	120.1	11.3	108.8	107.8
7-25-77 7-29-77	65	120.2	11.6	108.7	107.7
7-22-77 8-2-77	66	146.1	36.5	109.6	108.6
7-22-77 8-1-77	67	148.8	40.0	108.8	107.8
7-22-77 8-1-77	68	147.8	38.4	109.4	108.4
7-22-77 8-1-77	69	144.6	34.9	109.7	108.7

Pier 26 9

Penetr for bearing Blows/	Bearing (Tons)
10 2	75 123.8
10 1 3/4	75 132.0
10 2	75 123.8
10 1 3/4	75 132.0
20 1 3/4	65 114.4
20 3/4	85 204.0
10 1 3/4	70 123.2
20 2 1/4	70 108.7
10 2 1/4	80 124.2
10 1	85 187.0
10 3/4	80 192.0
10 1/2	70 154.8
10 2 1/4	70 102.7
10 1	85 187.0
10 1 3/4	80 140.8
10 1 1/2	80 150.8
10 1 3/4	80 140.8
10 7/8	80 184.0
10 2	75 123.8
10 1	80 174.0
10 1 1/4	75 152.3
10 2	80 132.0
10 1/2	60 158.4



10

Piling Log

Date	Pile No.	Length Del-Pay	Length Cut-off	Length Below C.O.	Length Below G.L.
7-22-77 8-1-77	70'	144.4'	35.0'	109.4'	108.4'
7-22-77 8-1-77	71	149.2'	39.5	109.7	108.7'
7-22-77 8-1-77	72	148.6'	39.2	109.4'	108.4'
TOTALS		9390.8'	1581.9'	7808.4'	7736.4'
AVG.				108.5'	107.5

Comp. By-T.B.
✓ B/SW

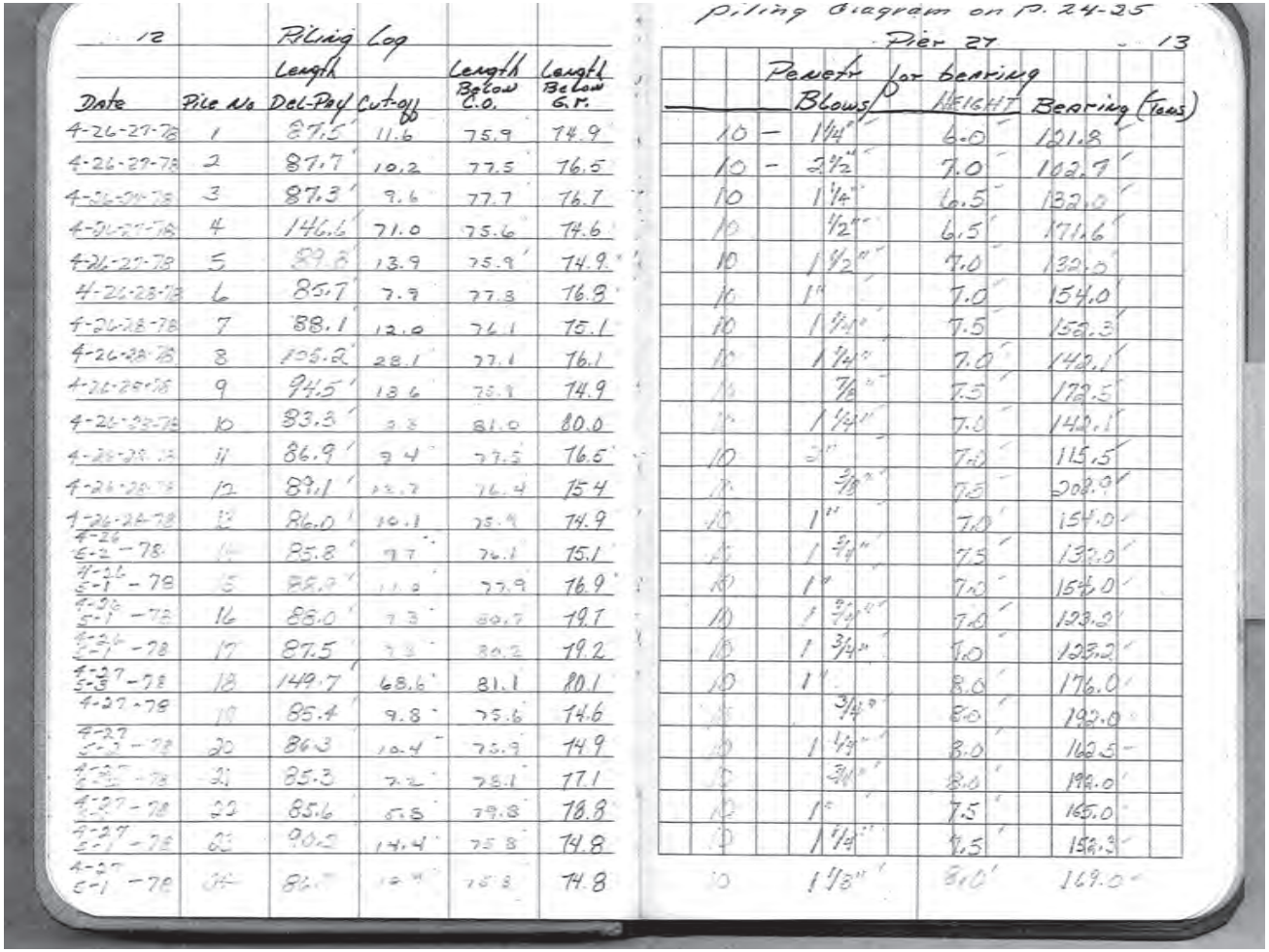
Pier 26

11

PLAN OF UNIT

* TEST PILE

(Tons)



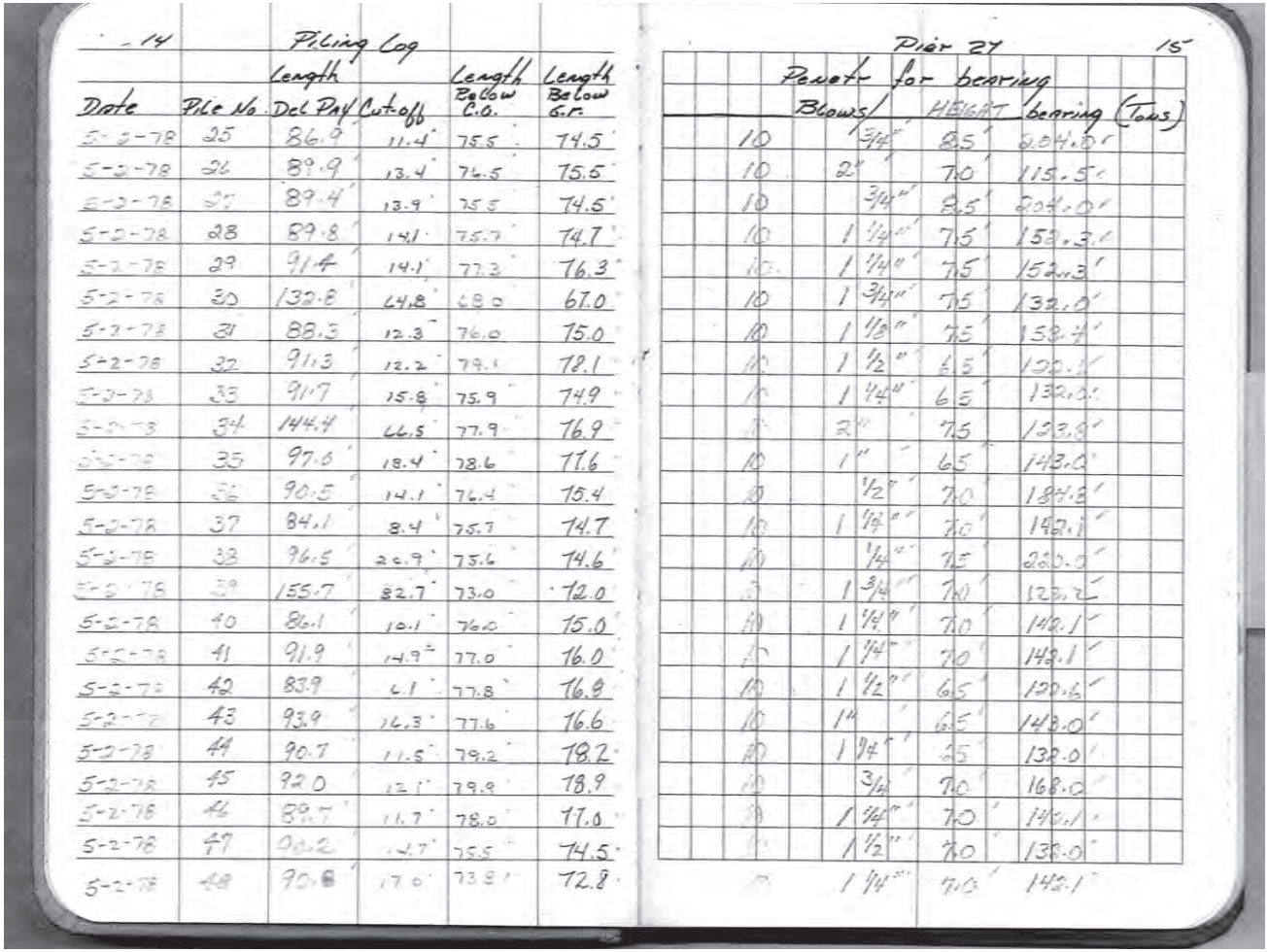
12 — Piling Log

Date	Pile No	Del-Pay Length	Cut-off	Length Below C.O.	Length Below G.T.
4-26-27-78	1	87.5'	11.6	75.9	74.9
4-26-29-78	2	87.7'	10.2	77.5	76.5
4-26-28-78	3	87.3'	9.6	77.7	76.7
4-26-27-78	4	146.6'	71.0	75.6	74.6
4-26-27-78	5	89.8'	13.9	75.9	74.9
4-26-28-78	6	85.1'	7.9	77.3	76.3
4-26-28-78	7	88.1'	12.0	76.1	75.1
4-26-28-78	8	105.2'	28.1	77.1	76.1
4-26-28-78	9	94.5'	13.6	75.9	74.9
4-26-28-78	10	83.3'	2.3	81.0	80.0
4-26-28-78	11	86.9'	9.4	77.5	76.5
4-26-28-78	12	89.1'	12.7	76.4	75.4
4-26-28-78	13	86.0'	10.1	75.9	74.9
4-26 E-2 -78	14	85.8'	9.7	76.1	75.1
4-26 E-1 -78	15	88.7'	11.8	76.9	75.9
4-26 E-1 -78	16	88.0'	7.3	80.7	79.7
4-26 E-1 -78	17	87.5'	7.3	80.2	79.2
4-27 E-3 -78	18	149.7'	68.6'	81.1	80.1
4-27-78	19	85.4'	9.8'	75.6	74.6
4-27 E-3 -78	20	86.3'	10.4'	75.9	74.9
4-27 E-3 -78	21	85.3'	7.2'	78.1	77.1
4-27 E-3 -78	22	85.6'	5.8'	79.8	78.8
4-27 E-1 -78	23	90.2'	14.4'	75.8	74.8
4-27 E-1 -78	24	86.1'	10.4'	75.8	74.8

Piling diagram on P. 24-25

Pier 27 — 13

Penetr for last	Blows/	HEIGHT	Bearing (Tons)
10 –	1¼"	6.0'	121.8'
10 –	2½"	7.0'	102.7'
10	1¼"	6.5'	132.0'
10	½"	6.5'	171.6'
10	1½"	7.0'	132.0'
10	1"	7.0'	154.0'
10	1¼"	7.5'	158.3'
10	1¼"	7.0'	142.1'
10	⅞"	7.5'	172.5'
10	1¼"	7.0'	142.1'
10	3"	7.0'	115.5'
10	⅜"	7.5'	208.9'
10	1"	7.0'	154.0'
10	1⅜"	7.5'	132.0'
10	1"	7.0'	154.0'
10	1¾"	7.0'	123.2'
10	1 ¾"	7.0'	123.2'
10	1"	8.0'	176.0'
10	¾"	8.0'	192.0'
10	1 ⅛"	8.0'	160.5'
10	¾"	8.0'	192.0'
10	1"	7.5'	165.0'
10	1⅛"	7.5'	158.3'
10	1⅛"	8.0'	169.0'

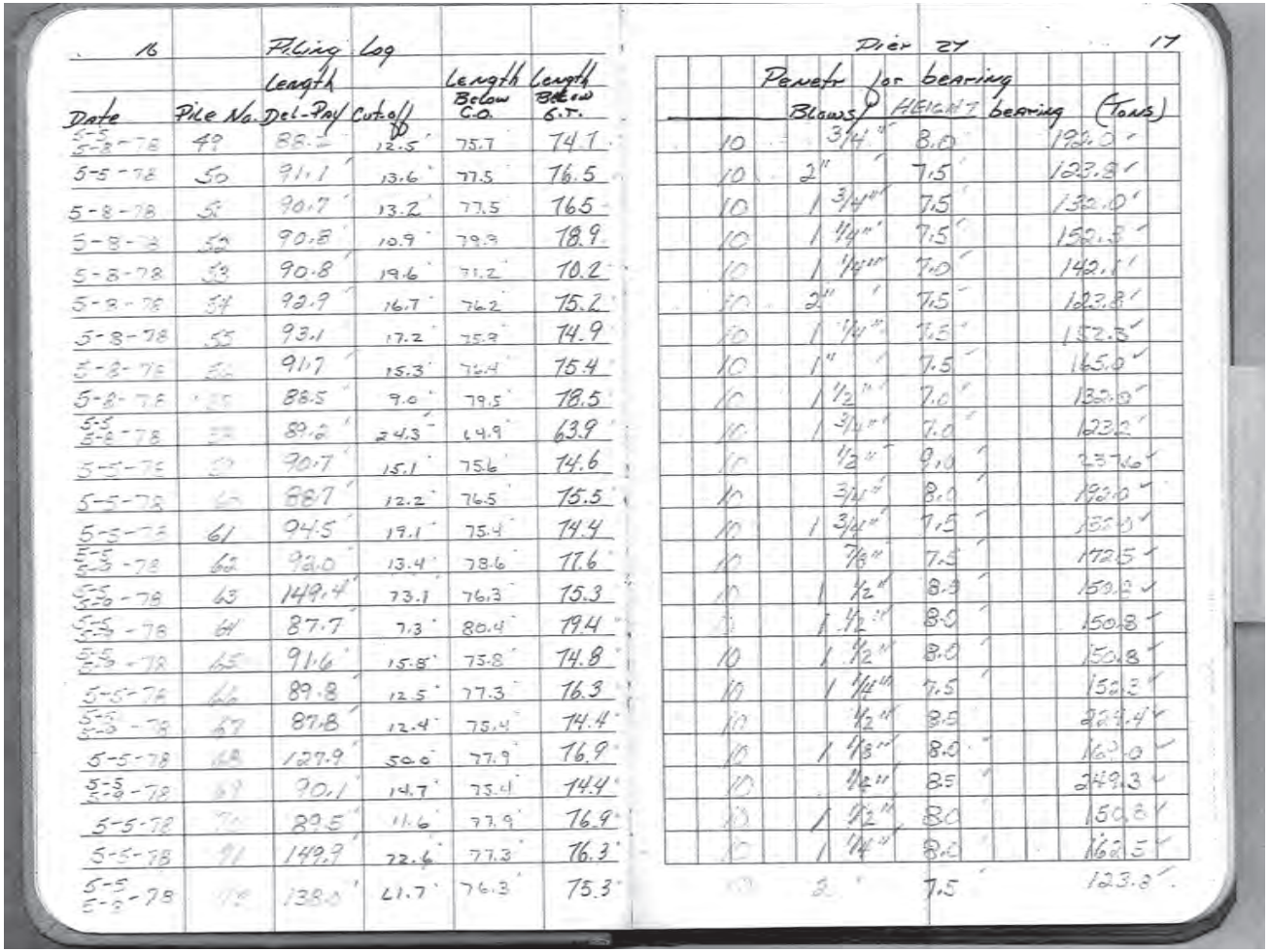


- 14 — Piling Log

Date	Pile No.	Length Del Pay	Length Cut-off	Length Below C.O.	Length Below G.L.
5-2-78	25	86.9	11.4	75.5	74.5
5-2-78	26	89.9	13.4	76.5	75.5
5-2-78	27	89.4	13.9	75.5	74.5
5-2-78	28	89.8	14.1	75.7	74.7
5-2-78	29	91.4	14.1	77.3	76.3
5-2-78	30	132.8	64.8	68.0	67.0
5-2-78	31	88.3	12.3	76.0	75.0
5-2-78	32	91.3	12.2	79.1	78.1
5-2-78	33	91.7	15.8	75.9	74.9
5-2-78	34	144.4	66.5	77.9	76.9
5-2-78	35	97.6	18.4	78.6	77.6
5-2-78	36	90.5	14.1	76.4	75.4
5-2-78	37	84.1	8.4	75.7	74.7
5-2-78	38	96.5	20.9	75.6	74.6
5-2-78	39	155.7	82.7	73.0	72.0
5-2-78	40	86.1	10.1	76.0	75.0
5-2-78	41	91.9	14.9	77.0	76.0
5-2-78	42	83.9	4.1	77.8	76.8
5-2-78	43	93.9	16.3	77.6	76.6
5-2-78	44	90.7	11.5	79.2	78.2
5-2-78	45	92.0	12.1	79.9	78.9
5-2-78	46	89.7	11.7	78.0	77.0
5-2-78	47	90.2	14.7	75.5	74.5
5-2-78	48	90.8	17.0	73.8	72.8

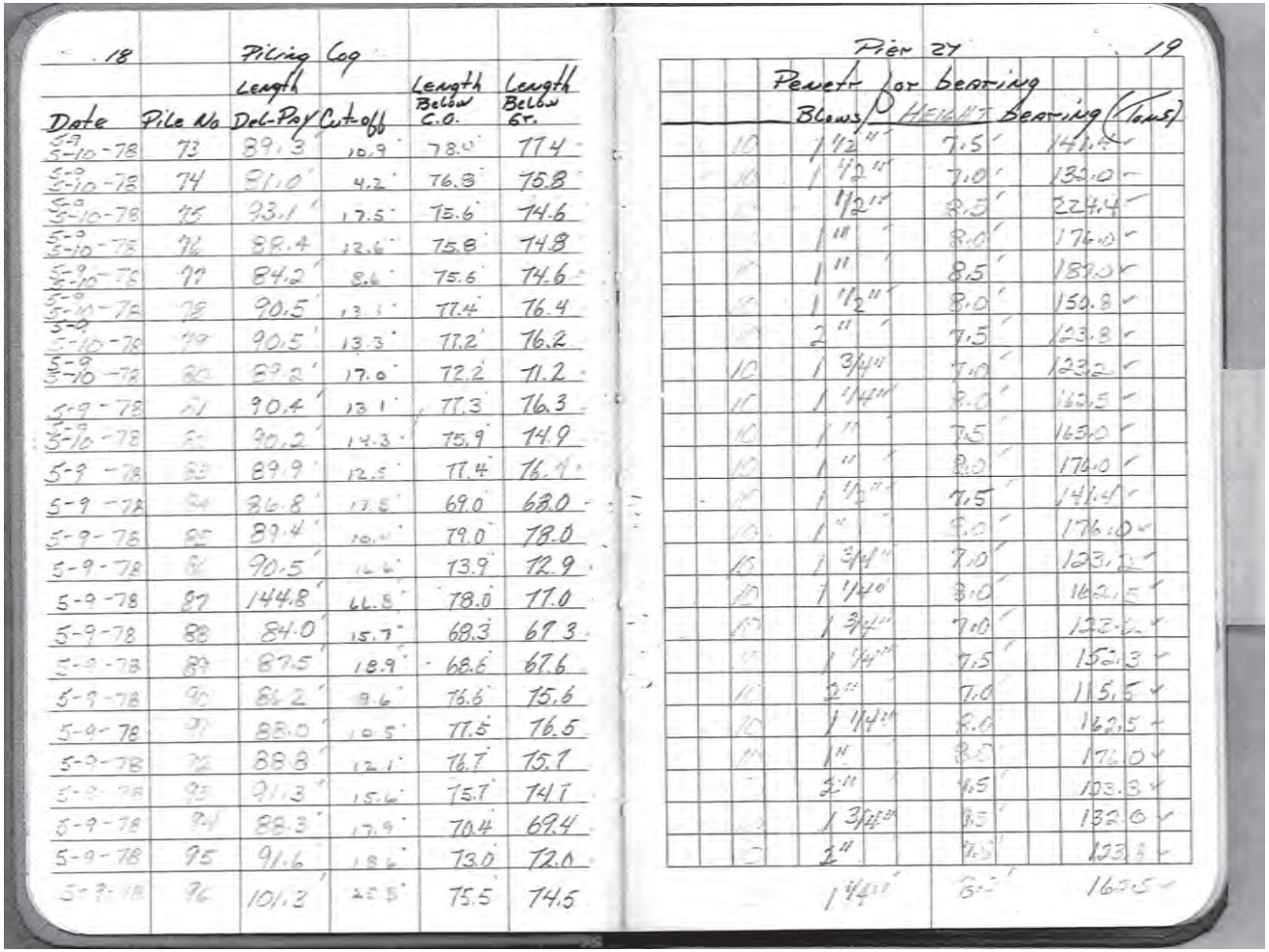
Pier 27 — 15

Blows/	Report for bearing HEIGHT	bearing (Tons)
10	3/4" 8.5'	204.0
10	2" 7.0'	115.5
10	3/4" 8.5'	204.0
10	1 1/4" 7.5'	153.3
10	1 1/4" 7.5'	153.3
10	1 3/4" 7.5'	132.0
10	1 1/8" 7.5'	158.4
10	1 1/2" 6.5'	132.3
10	1 1/4" 6.5'	132.3
10	2" 7.5'	123.8
10	1" 6.5'	143.0
10	1/2" 7.0'	184.8
10	1 1/8" 7.0'	142.1
10	1/4" 7.5'	220.0
10	1 3/4" 7.0'	123.2
10	1 1/4" 7.0'	142.1
10	1 1/4" 7.0'	142.1
10	1 1/2" 6.5'	130.6
10	1" 6.5'	143.0
10	1 1/4" 7.5'	132.0
10	3/4" 7.0'	168.0
10	1 1/4" 7.0'	142.1
10	1 1/2" 7.0'	138.0
10	1 1/4" 7.0'	142.1



16 — Piling Log — Pier 27 — 17

Date	Pile No.	Del-Pay Length	Cut-off	Length Below C.O.	Length Below S.T.	Penetration for bearing: Blows	Height	bearing (Tons)
5-5 5-8-78	49	88.=	12.5	75.7	74.1	10 3/4"	8.0	120.0
5-5-78	50	91.1	13.6	77.5	76.5	10 2"	7.5	123.8
5-8-78	51	90.7	13.2	77.5	76.5	10 1 3/4"	7.5	132.0
5-8-78	52	90.8	10.9	79.9	78.9	10 1 1/4"	7.5	150.3
5-8-78	53	90.8	19.6	71.2	70.2	10 1 1/4"	7.0	142.1
5-8-78	54	92.9	16.7	76.2	75.2	10 2"	7.5	123.8
5-8-78	55	93.1	17.2	75.9	74.9	10 1 1/4"	7.5	132.3
5-8-78	56	91.7	15.3	76.4	75.4	10 1"	7.5	165.0
5-8-78	57	88.5	9.0	79.5	78.5	10 1 1/2"	7.0	130.0
5-5 5-8-78	58	89.2	24.3	64.9	63.9	10 1 3/4"	7.0	123.2
5-5-78	59	90.7	15.1	75.6	74.6	10 1 1/2"	9.0	237.6
5-5-78	60	88.7	12.2	76.5	75.5	10 3/4"	8.0	120.0
5-5-78	61	94.5	19.1	75.4	74.4	10 1 3/4"	7.5	132.0
5-5 5-8-78	62	92.0	13.4	78.6	77.6	10 7/8"	7.5	172.5
5-5 5-8-78	63	149.4	73.1	76.3	75.3	10 1 1/2"	8.0	150.8
5-5 5-8-78	64	87.7	7.3	80.4	79.4	10 1 1/2"	8.0	150.8
5-5 5-8-78	65	91.6	15.8	75.8	74.8	10 1 1/2"	8.0	150.8
5-5-78	66	89.8	12.5	77.3	76.3	10 1 1/4"	7.5	150.3
5-5 5-8-78	67	87.8	12.4	75.4	74.4	10 1 1/2"	8.5	223.4
5-5-78	68	127.9	50.0	77.9	76.9	10 1 1/8"	8.0	162.0
5-5 5-8-78	69	90.1	14.7	75.4	74.4	10 1 1/2"	8.5	249.3
5-5-78	70	89.5	11.6	77.9	76.9	10 1 1/2"	8.0	150.8
5-5-78	71	149.9	72.6	77.3	76.3	10 1 1/4"	8.0	162.5
5-5 5-8-78	72	138.0	61.7	76.3	75.3	10 2"	7.5	123.8

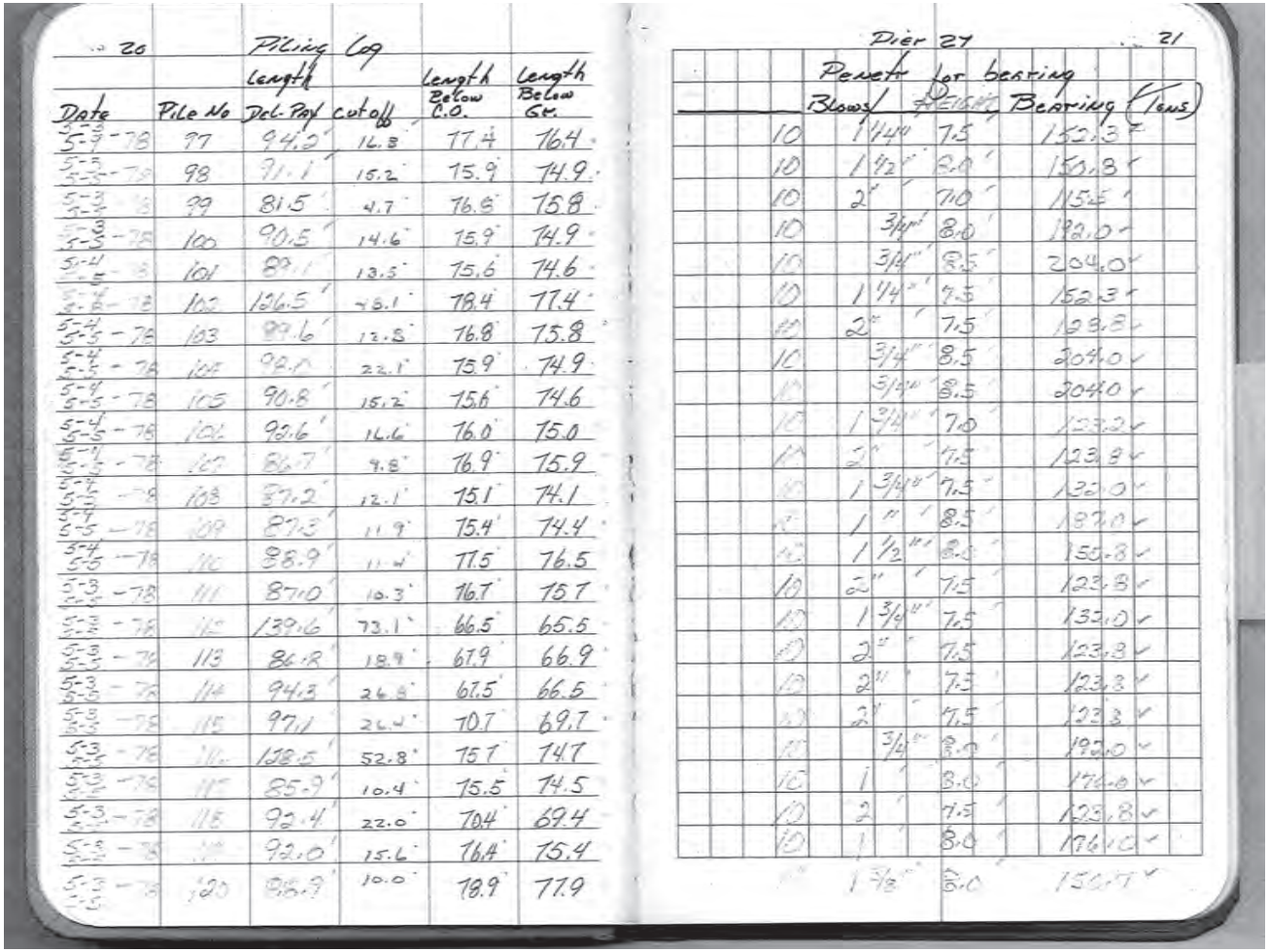


18

Date	Pile No	Piling Length Del-Pay	Cut-off	Length Below C.O.	Length Below Gr.
5-9 5-10-78	73	89.3'	10.9'	78.0'	77.4'
5-9 5-10-78	74	91.0'	4.2'	76.3'	75.8'
5-9 5-10-78	75	93.1'	17.5'	75.6'	74.6'
5-9 5-10-78	76	89.4'	12.6'	75.8'	74.8'
5-9 5-10-78	77	84.2'	8.6'	75.6'	74.6'
5-9 5-10-78	78	90.5'	13.1'	77.4'	76.4'
5-9 5-10-78	79	90.5'	13.3'	77.2'	76.2'
5-9 5-10-78	80	89.2'	17.0'	72.2'	71.2'
5-9-78	81	90.4'	13.1'	77.3'	76.3'
5-9 5-10-78	82	90.2'	14.3'	75.9'	74.9'
5-9-78	83	89.9'	12.5'	77.4'	76.4'
5-9-78	84	86.8'	17.8'	69.0'	68.0'
5-9-78	85	89.4'	10.4'	79.0'	78.0'
5-9-78	86	90.5'	16.6'	73.9'	72.9'
5-9-78	87	144.8'	66.8'	78.0'	77.0'
5-9-78	88	84.0'	15.7'	68.3'	67.3'
5-9-78	89	87.5'	18.9'	68.6'	67.6'
5-9-78	90	82.2'	9.6'	76.6'	75.6'
5-9-78	91	88.0'	10.5'	77.5'	76.5'
5-9-78	92	88.8'	12.1'	76.7'	75.7'
5-9-78	93	91.3'	15.6'	75.7'	74.7'
5-9-78	94	88.3'	17.9'	70.4'	69.4'
5-9-78	95	91.6'	18.6'	73.0'	72.0'
5-9-78	96	101.3'	25.5'	75.5'	74.5'

Pier 27 19

		Penetr for Blows/	Height Bearing	Bearing (Tons)
	10	1 1/2"	7.5'	141.0
	10	1 1/2"	7.0'	132.0
		1 1/2"	8.5'	224.4
		1"	8.0'	176.0
		1"	8.5'	189.0
		1 1/2"	8.0'	150.8
		2"	7.5'	123.8
	10	1 3/4"	7.0'	123.2
		1 1/4"	8.0'	162.5
		"	7.5'	165.0
		"	8.0'	176.0
		1/2"	7.5'	141.0
		"	8.0'	176.0
		3/4"	7.0'	123.2
		1 1/4"	8.0'	162.5
		3/4"	7.0'	123.2
		3/4"	7.5'	132.0
		2"	7.0'	115.5
		1 1/4"	8.0'	162.5
		"	8.5'	176.0
		2"	7.5'	123.8
		1 3/4"	8.5'	132.6
		2"	7.5'	123.8
		1 1/4"	8.5'	165.5

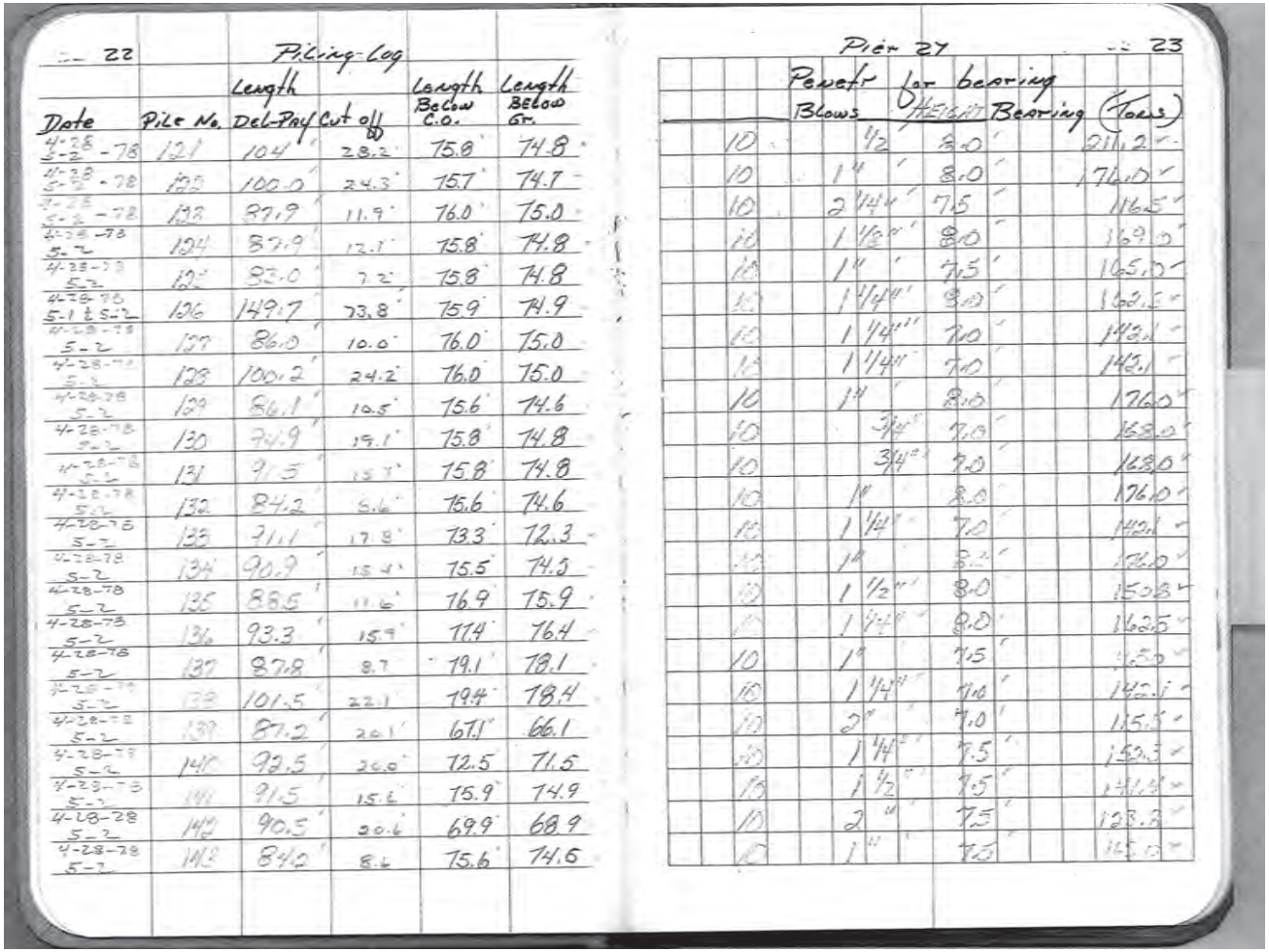


Pier 20 — Piling Log

Date	Pile No	Length Del. Pay	cutoff	Length Below C.O.	Length Below Gr.
5-3-78	97	94.2'	16.8'	77.4'	76.4'
5-3-78	98	91.1'	15.2'	75.9'	74.9'
5-3-78	99	81.5'	4.7'	76.8'	75.8'
5-3-78	100	90.5'	14.6'	75.9'	74.9'
5-4-78	101	89.1'	13.5'	75.6'	74.6'
5-4-78	102	126.5'	48.1'	78.4'	77.4'
5-4-78	103	89.6'	12.8'	76.8'	75.8'
5-4-78	104	90.0'	23.1'	75.9'	74.9'
5-4-78	105	90.8'	15.2'	75.6'	74.6'
5-4-78	106	92.6'	16.6'	76.0'	75.0'
5-7-78	107	86.7'	9.8'	76.9'	75.9'
5-7-78	108	87.2'	12.1'	75.1'	74.1'
5-7-78	109	87.3'	11.9'	75.4'	74.4'
5-4-78	110	88.9'	11.4'	77.5'	76.5'
5-3-78	111	87.0'	10.3'	76.7'	75.7'
5-3-78	112	139.6'	73.1'	66.5'	65.5'
5-3-78	113	86.8'	18.9'	67.9'	66.9'
5-3-78	114	94.3'	26.8'	67.5'	66.5'
5-3-78	115	97.1'	26.4'	70.7'	69.7'
5-3-78	116	138.5'	52.8'	75.7'	74.7'
5-3-78	117	85.9'	10.4'	75.5'	74.5'
5-3-78	118	92.4'	22.0'	70.4'	69.4'
5-3-78	119	92.0'	15.6'	76.4'	75.4'
5-3-78	120	86.9'	10.0'	76.9'	77.9

Pier 21 — Penetration for bearing

Blows/	Penetration	Bearing (Tons)
10	1 1/4"	152.3
10	1 1/2"	150.3
10	2"	145.5
10	3/4"	180.0
10	3/4"	204.0
10	1 1/4"	152.3
10	2"	129.8
10	3/4"	204.0
10	3/4"	204.0
10	1 3/4"	129.8
10	2"	123.8
10	1 3/4"	129.8
10	1"	187.0
10	1 1/2"	155.8
10	2"	123.8
10	1 3/4"	132.0
10	2"	123.8
10	2"	123.8
10	2"	123.8
10	3/4"	180.0
10	1	176.0
10	2	123.8
10	1	176.0
10	1 3/8"	150.7



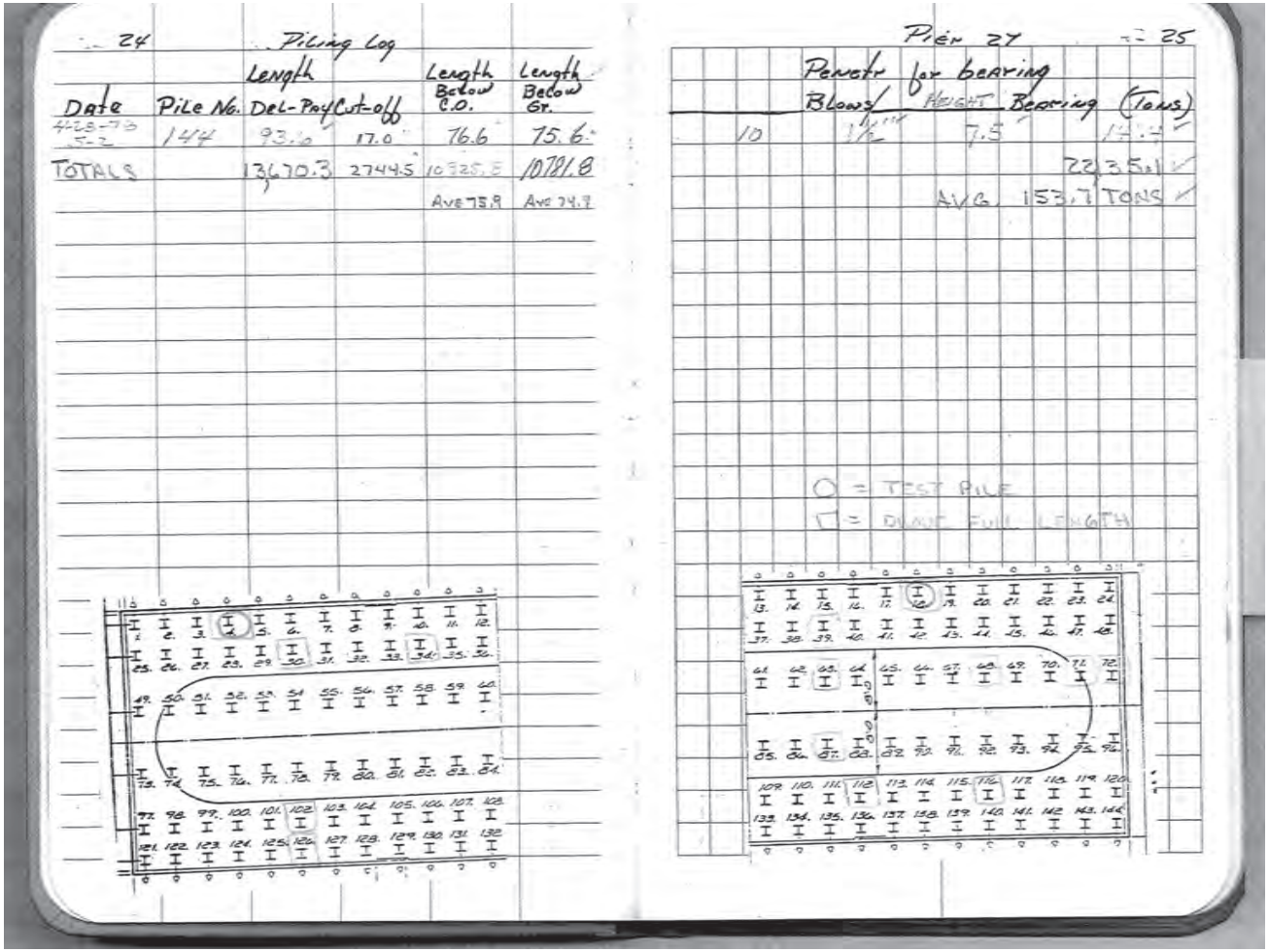
-- 22

Piling Log

Date	Pile No.	Length Del. Pay	Length Cut off	Length Below C.O.	Length Below Gr.
4-28-78 5-2	121	104'	28.2'	75.8'	74.8'
4-28-78 5-2	122	100.0'	24.3'	75.7'	74.7'
4-28-78 5-2	123	87.9'	11.9'	76.0'	75.0'
4-28-78 5-2	124	87.9'	12.1'	75.8'	74.8'
4-28-78 5-2	125	83.0'	7.2'	75.8'	74.8'
4-28-78 5-1 & 5-2	126	149.7'	73.8'	75.9'	74.9'
4-28-78 5-2	127	86.0'	10.0'	76.0'	75.0'
4-28-78 5-2	128	100.2'	24.2'	76.0'	75.0'
4-28-78 5-2	129	86.1'	10.5'	75.6'	74.6'
4-28-78 5-2	130	74.9'	14.1'	75.8'	74.8'
4-28-78 5-2	131	91.5'	15.7'	75.8'	74.8'
4-28-78 5-2	132	84.2'	5.6'	75.6'	74.6'
4-28-78 5-2	133	71.1'	17.8'	73.3'	72.3'
4-28-78 5-2	134	90.9'	15.4'	75.5'	74.5'
4-28-78 5-2	135	88.5'	11.6'	76.9'	75.9'
4-28-78 5-2	136	93.3'	15.9'	77.4'	76.4'
4-28-78 5-2	137	87.8'	8.7'	79.1'	78.1'
4-28-78 5-2	138	101.5'	22.1'	79.4'	78.4'
4-28-78 5-2	139	87.2'	20.1'	67.1'	66.1'
4-28-78 5-2	140	92.5'	20.0'	72.5'	71.5'
4-28-78 5-2	141	91.5'	15.6'	75.9'	74.9'
4-28-78 5-2	142	90.5'	20.6'	69.9'	68.9'
4-28-78 5-2	143	84.2'	8.6'	75.6'	74.6'

Pier 27 -- 23

Blows	Height	Bearing (Tons)
10	1/2"	8.0'	211.2
10	1"	8.0'	176.0
10	2 1/4"	7.5'	116.5
10	1 1/2"	8.0'	169.0
10	1"	7.5'	165.0
10	1 1/4"	8.0'	160.5
10	1 1/4"	7.0'	143.2
10	1 1/4"	7.0'	143.1
10	1"	8.0'	176.0
10	3/4"	7.0'	155.0
10	3/4"	7.0'	165.0
10	1"	8.0'	176.0
10	1 1/4"	7.0'	143.1
10	1"	8.0'	176.0
10	1 1/2"	8.0'	150.3
10	1 1/4"	8.0'	160.5
10	1"	7.5'	165.0
10	1 1/4"	7.0'	143.2
10	2"	7.0'	115.5
10	1 1/4"	7.5'	153.3
10	1 1/2"	7.5'	141.2
10	2"	7.5'	123.2
10	1"	7.5'	165.0



24

Piling Log

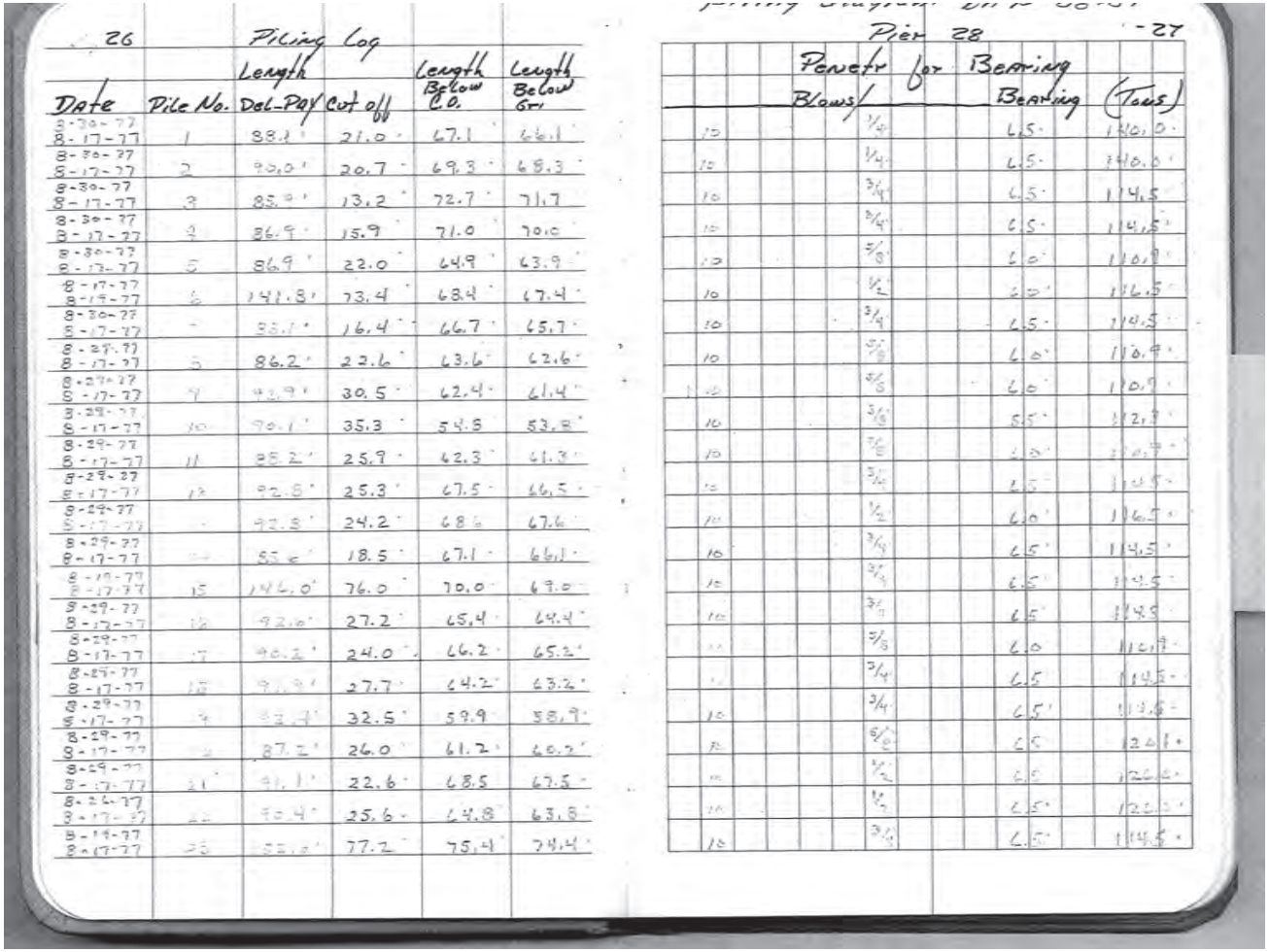
Date	Pile No.	Length Del-Pay	Length Cut-off	Length Below C.O.	Length Below Gr.
4-28-78 5-2	144	93.0	17.0	76.6	75.6
TOTALS		13670.3	2744.5	10925.8	10781.8
				Ave 75.9	Ave 74.7

Pier 27 — 25

Penetr. Blows/	for bearing HEIGHT	Bearing	(Tons)
10	1/4"	7.5	1/4"
			22,350
		AVG	153.7 TONS

○ = TEST PILE

□ = DRIVE FULL LENGTH



26

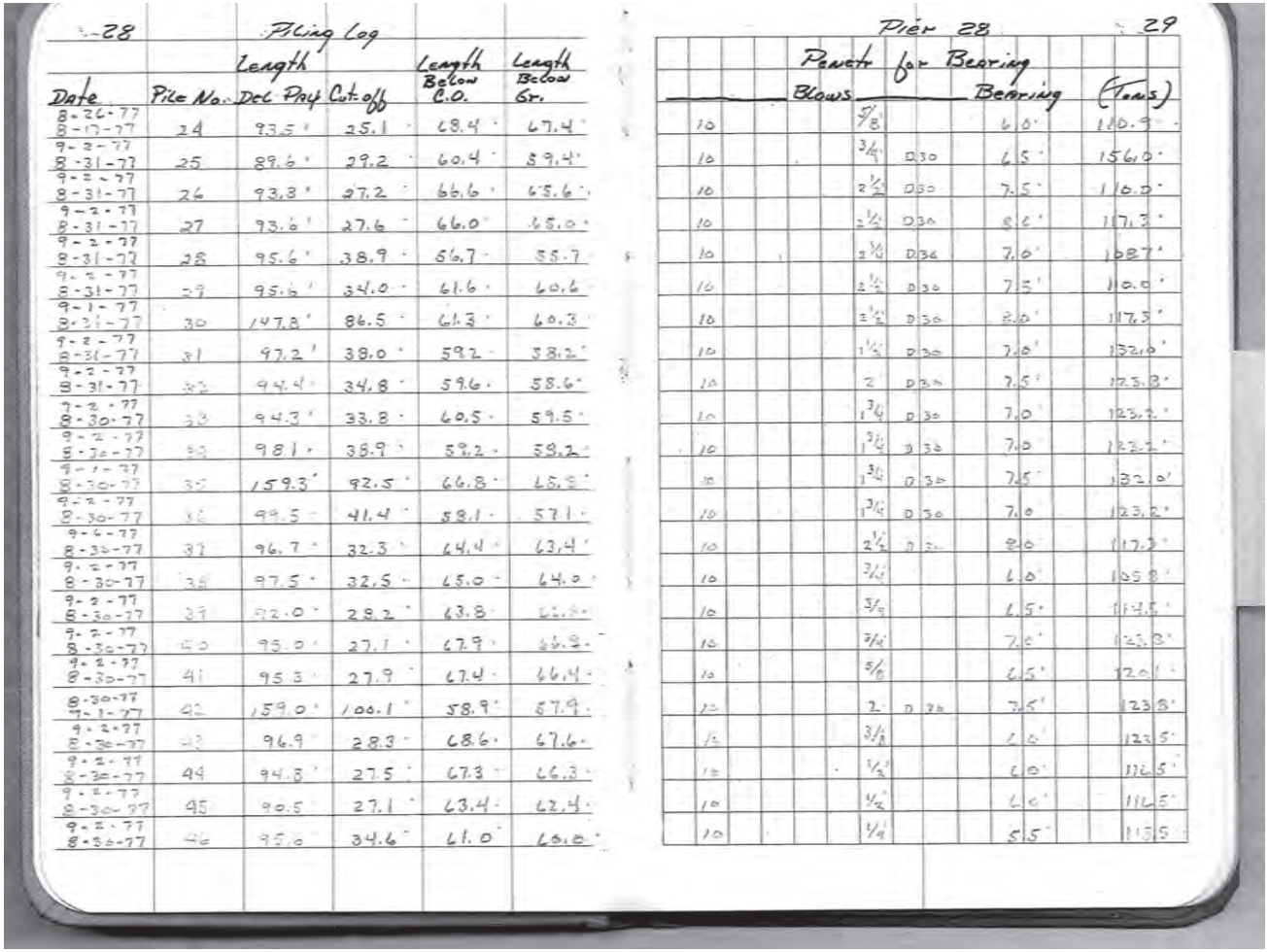
Piling Log

Date	Pile No.	Length Del-Pay	Cut off	Length Below C.O.	Length Below Grd
8-30-77 8-17-77	1	88.1'	21.0'	67.1'	66.1'
8-30-77 8-17-77	2	90.0'	20.7'	69.3'	68.3'
8-30-77 8-17-77	3	85.9'	13.2'	72.7'	71.7
8-30-77 8-17-77	4	86.9'	15.9'	71.0'	70.0
8-30-77 8-17-77	5	86.9'	22.0'	64.9'	63.9'
8-17-77 8-19-77	6	141.8'	73.4'	68.4'	67.4'
8-30-77 8-17-77	-	88.1'	16.4'	66.7'	65.7'
8-29-77 8-17-77	8	86.2'	22.6'	63.6'	62.6'
8-29-77 8-17-77	9	92.9'	30.5'	62.4'	61.4'
8-29-77 8-17-77	10	90.1'	35.3'	54.8	53.8'
8-29-77 8-17-77	11	88.2'	25.9'	62.3'	61.3'
8-29-77 8-17-77	12	92.8'	25.3'	67.5'	66.5'
8-29-77 8-17-77	-	92.8'	24.2'	68.6	67.6'
8-29-77 8-17-77	-	85.6'	18.5'	67.1'	66.1'
8-19-77 8-17-77	15	146.0'	76.0'	70.0	69.0'
8-29-77 8-17-77	16	92.0'	27.2'	65.4'	64.4'
8-29-77 8-17-77	17	90.2'	24.0'	66.2'	65.2'
8-29-77 8-17-77	18	91.8'	27.7'	64.2'	63.2'
8-29-77 8-17-77	19	93.4'	32.5'	59.9	58.9'
8-29-77 8-17-77	20	87.2'	26.0'	61.2'	60.2'
8-29-77 8-17-77	21	91.1'	22.6'	68.5	67.5'
8-24-77 8-17-77	22	90.4'	25.6'	64.8'	63.8'
8-19-77 8-17-77	23	82.0'	77.2'	75.4'	74.4'

Pier 28

-27

	Penetr for Blows/		Bearing Bearing	(Tons)
10		1/8	6.5'	140.0'
10		1/4	6.5'	140.0'
10		3/4	6.5'	114.5'
10		3/4	6.5'	114.5'
10		5/8	6.0'	110.9'
10		1/2	6.0'	110.9'
10		3/4	6.5'	114.5'
10		5/8	6.0'	110.9'
10		5/8	6.0'	110.9'
10		3/8	5.5'	102.9'
10		7/8	6.0'	110.9'
10		3/4	6.5'	114.5'
10		1/2	6.0'	110.9'
10		3/4	6.5'	114.5'
10		3/4	6.5'	114.5'
10		3/4	6.5'	114.5'
10		5/8	6.0	110.9'
10		3/4	6.5	114.5'
10		3/4	6.5'	114.5'
10		5/8	6.5	120.1'
10		1/2	6.5	120.1'
10		1/2	6.5'	120.1'
10		3/4	6.5'	114.5'



28

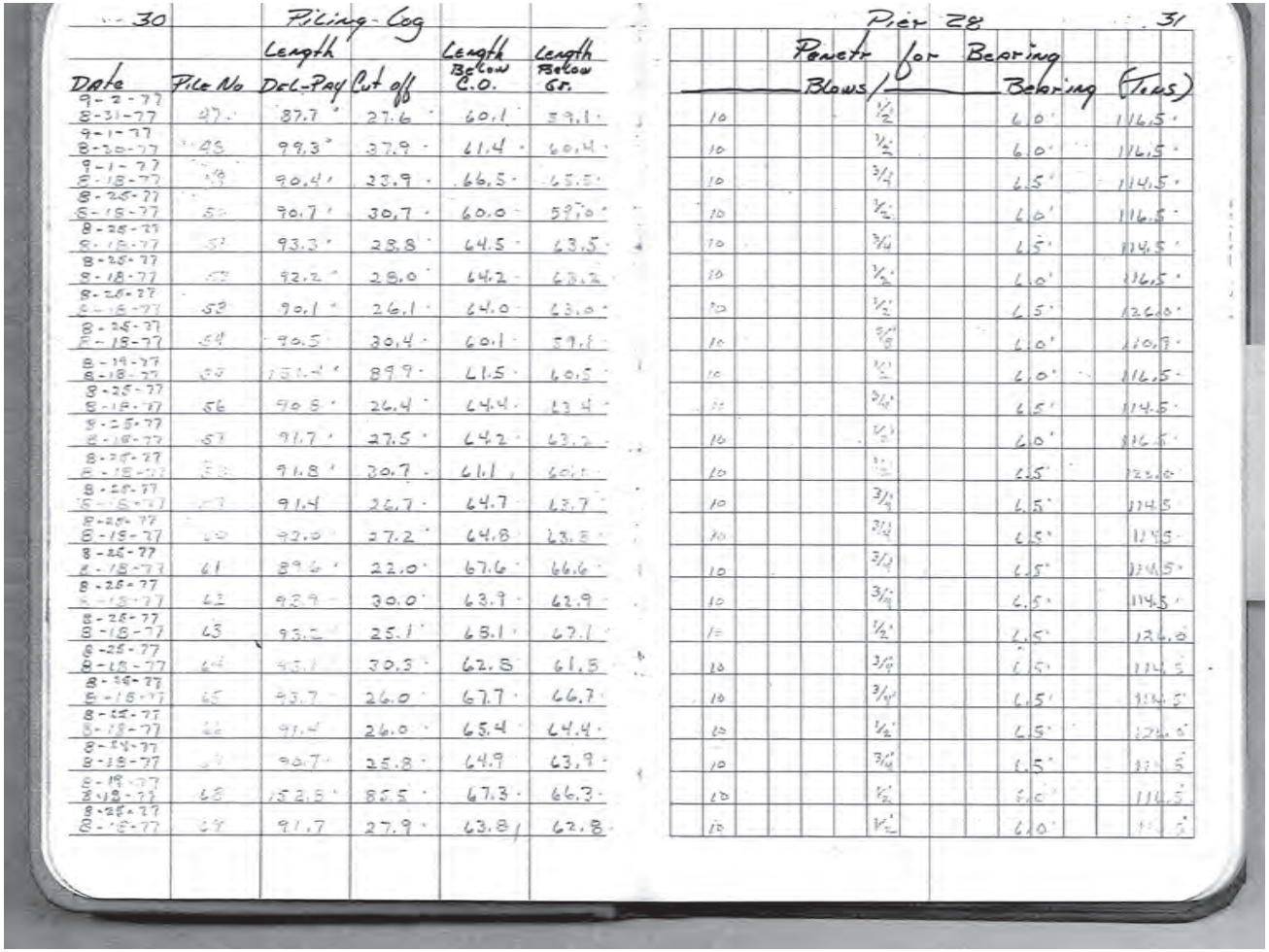
Piling Log

Date	Pile No.	Length Del Proj	Length Cut-off	Length Below C.O.	Length Below Gr.
8-26-77					
8-17-77	24	93.5'	25.1'	68.4'	67.4'
9-2-77					
8-31-77	25	89.6'	29.2'	60.4'	59.4'
9-2-77					
8-31-77	26	93.8'	27.2'	66.6'	65.6'
9-2-77					
8-31-77	27	93.6'	27.6'	66.0'	65.0'
9-2-77					
8-31-77	28	95.6'	38.9'	56.7'	55.7
9-2-77					
8-31-77	29	95.6'	34.0'	61.6'	60.6
9-1-77					
8-31-77	30	147.8'	86.5'	61.3'	60.3
9-2-77					
8-31-77	31	97.2'	38.0'	59.2'	58.2'
9-2-77					
8-31-77	32	94.4'	34.8'	59.6'	58.6'
9-2-77					
8-30-77	33	94.3'	33.8'	60.5'	59.5'
9-2-77					
8-30-77	34	98.1'	38.9'	59.2'	58.2'
9-1-77					
8-30-77	35	159.3'	92.5'	66.8'	65.8'
9-2-77					
8-30-77	36	99.5'	41.4'	58.1'	57.1'
9-6-77					
8-30-77	37	96.7'	32.3'	64.4'	63.4'
9-2-77					
8-30-77	38	97.5'	32.5'	65.0'	64.0'
9-2-77					
8-30-77	39	92.0'	28.2'	63.8'	62.8'
9-2-77					
8-30-77	40	95.0'	27.1'	67.9'	66.9'
9-2-77					
8-30-77	41	95.3'	27.9'	67.4'	66.4'
8-30-77					
9-1-77	42	159.0'	100.1'	58.9'	57.9'
9-2-77					
8-30-77	43	96.9'	28.3'	68.6'	67.6'
9-2-77					
8-30-77	44	94.8'	27.5'	67.3'	66.3'
9-2-77					
8-30-77	45	90.5'	27.1'	63.4'	62.4'
9-2-77					
8-30-77	46	95.0'	34.6'	61.0'	60.0'

Pier 28

29

Penetr for Blows		Bearing	Bearing	(Tons)
10	5/8"		6.0'	100.9'
10	3/4"	D30	6.5'	156.0'
10	2 1/2"	D30	7.5'	110.0'
10	2 1/2"	D30	8.0'	117.3'
10	2 1/2"	D30	7.0'	108.7'
10	2 1/2"	D30	7.5'	110.0'
10	2 1/2"	D30	8.0'	117.3'
10	1 1/2"	D30	7.0'	132.0'
10	2"	D30	7.5'	123.3'
10	1 3/4"	D30	7.0'	123.2'
10	1 3/4"	D30	7.0'	123.2'
10	1 3/4"	D30	7.5'	132.0'
10	1 3/4"	D30	7.0'	123.2'
10	2 1/2"	D30	8.0'	117.3'
10	7/8"		6.0'	100.8'
10	3/4"		6.5'	114.5'
10	7/8"		7.0'	123.2'
10	5/8"		6.5'	120.1'
10	2"	D30	7.5'	123.8'
10	3/8"		7.0'	123.5'
10	1/2"		6.0'	116.5'
10	1/2"		6.0'	116.5'
10	1/4"		5.5'	115.5'



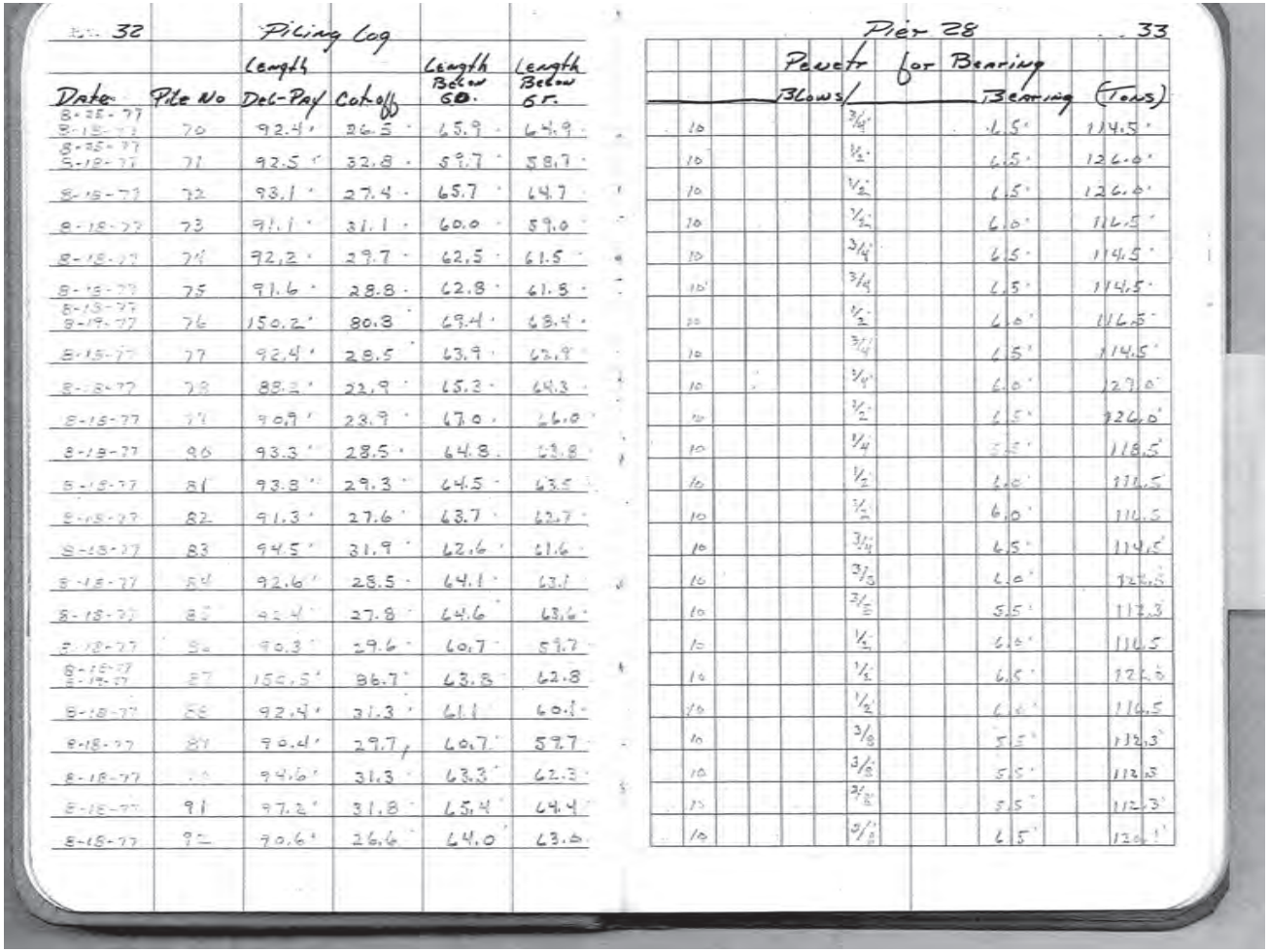
30 — Piling - Log

Date	File No	Length Del-Pay	Length Cut off	Length Below C.O.	Length Below Gr.
9-2-77 / 8-31-77	47	87.7'	27.6'	60.1'	59.1'
9-1-77 / 8-30-77	48	99.3'	37.9'	61.4'	60.4'
9-1-77 / 8-18-77	49	90.4'	23.9'	66.5'	65.5'
8-25-77 / 8-19-77	50	90.7'	30.7'	60.0'	59.0'
8-25-77 / 8-18-77	51	93.3'	28.8'	64.5'	63.5'
8-25-77 / 8-18-77	52	92.2'	29.0'	64.2'	63.2'
8-26-77 / 8-18-77	53	90.1'	26.1'	64.0'	63.0'
8-25-77 / 8-18-77	54	90.5'	30.4'	60.1'	59.1'
8-19-77 / 8-18-77	55	101.4'	89.9'	61.5'	60.5'
8-25-77 / 8-18-77	56	90.8'	26.4'	64.4'	63.4'
8-25-77 / 8-18-77	57	91.7'	27.5'	64.2'	63.2'
8-25-77 / 8-18-77	58	91.8'	30.7'	61.1'	60.1'
8-25-77 / 8-18-77	59	91.4'	26.7'	64.7'	63.7'
8-25-77 / 8-19-77	60	92.0'	27.2'	64.8'	63.8'
8-26-77 / 8-18-77	61	89.4'	22.0'	67.6'	66.6'
8-26-77 / 8-18-77	62	93.9'	30.0'	63.9'	62.9'
8-26-77 / 8-18-77	63	93.2'	25.1'	68.1'	67.1'
8-25-77 / 8-18-77	64	93.1'	30.3'	62.8'	61.8'
8-26-77 / 8-18-77	65	93.7'	26.0'	67.7'	66.7'
8-25-77 / 8-18-77	66	91.4'	26.0'	65.4'	64.4'
8-24-77 / 8-18-77	67	90.7'	25.8'	64.9'	63.9'
8-19-77 / 8-18-77	68	152.5'	85.5'	67.3'	66.3'
8-25-77 / 8-18-77	69	91.7'	27.9'	63.8'	62.8'

Pier 28 — 31

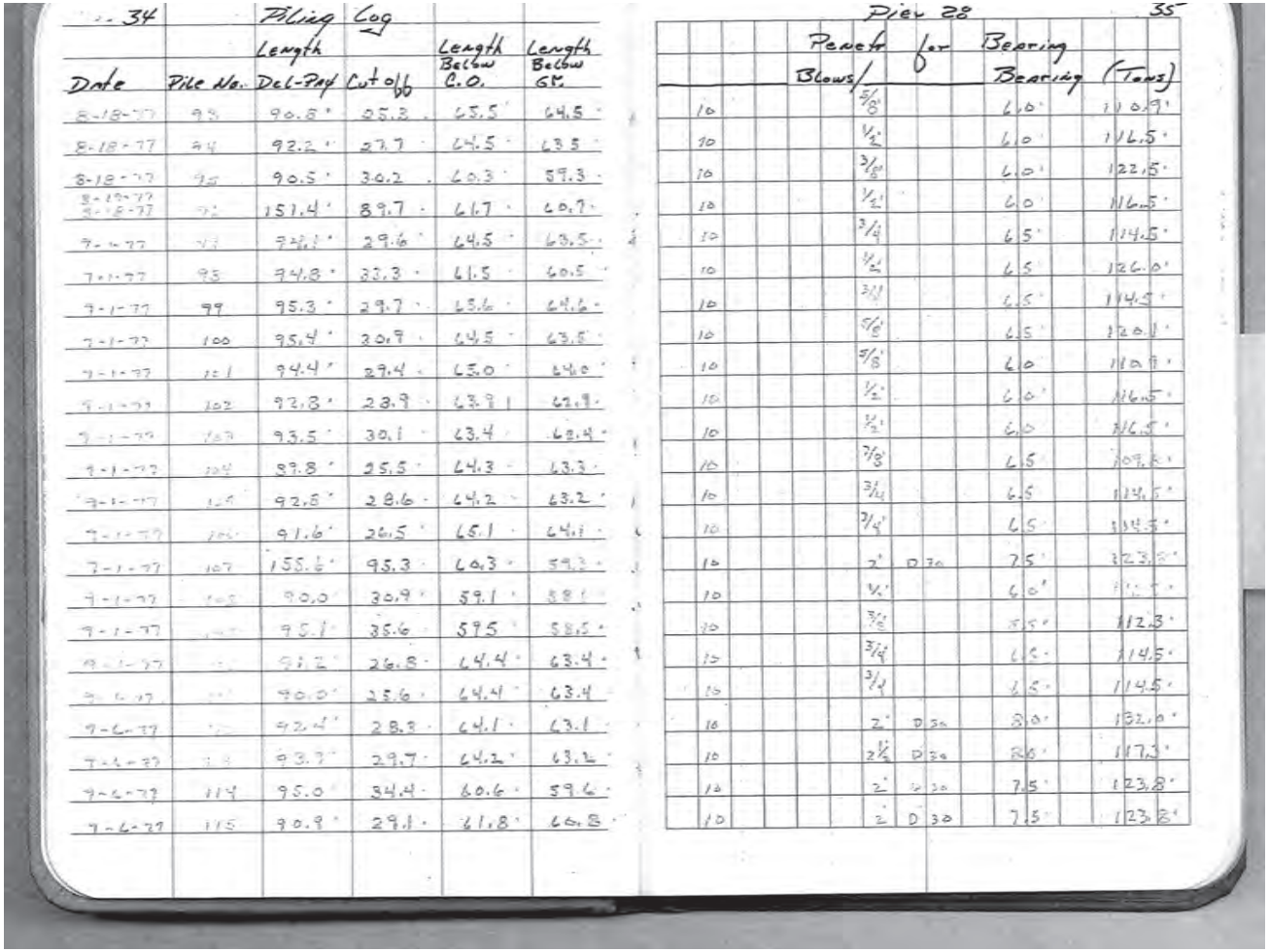
Penetr for Bearing

Blows /		Bearing	(Tons)
10	1/2"	60'	116.5'
10	1/2"	60'	116.5'
10	3/4"	65'	114.5'
10	1/2"	60'	116.5'
10	3/4"	65'	114.5'
10	1/2"	60'	116.5'
10	1/2"	65'	126.0'
10	5/8"	60'	120.9'
10	1/2"	60'	116.5'
10	3/4"	65'	114.5'
10	1/2"	60'	116.5'
10	1/2"	65'	126.0'
10	3/4"	65'	114.5'
10	3/4"	65'	114.5'
10	3/4"	65'	114.5'
10	3/4"	65'	114.5'
10	1/2"	65'	126.0'
10	3/4"	65'	114.5'
10	3/4"	65'	114.5'
10	1/2"	65'	126.0'
10	3/4"	65'	114.5'
10	1/2"	60'	116.5'
10	1/2"	60'	116.5'



Pg. 32 — Piling Log — Pier 28 — 33

Date	Pile No	Length Del-Pay	Cutoff	Length Below G.L.	Length Below S.L.	Blows/	Penetr for Bearing	Bearing (Tons)
8-25-77	70	92.4'	26.5'	65.9'	64.9'	10	3/4"	114.5'
8-25-77	71	92.5'	32.8'	59.7'	58.7'	10	1/2"	126.0'
8-18-77	72	93.1'	27.4'	65.7'	64.7'	10	1/2"	126.0'
8-18-77	73	91.1'	31.1'	60.0'	59.0'	10	1/2"	126.5'
8-18-77	74	92.2'	29.7'	62.5'	61.5'	10	3/4"	114.5'
8-18-77	75	91.6'	28.8'	62.8'	61.8'	10	3/4"	114.5'
8-18-77 8-19-77	76	150.2'	80.8'	69.4'	68.4'	10	1/2"	116.5'
8-15-77	77	92.4'	28.5'	63.9'	62.9'	10	3/4"	114.5'
8-18-77	78	88.3'	22.9'	65.3'	64.3'	10	1/2"	129.0'
8-15-77	79	90.9'	23.9'	67.0'	66.0'	10	1/2"	126.0'
8-19-77	80	93.3'	28.5'	64.8'	63.8'	10	1/4"	118.5'
8-15-77	81	93.8'	29.3'	64.5'	63.5'	10	1/2"	111.5'
8-15-77	82	91.3'	27.6'	63.7'	62.7'	10	1/2"	116.5'
8-15-77	83	94.5'	31.9'	62.6'	61.6'	10	3/4"	114.5'
8-15-77	84	92.6'	28.5'	64.1'	63.1'	10	3/8"	123.5'
8-18-77	85	92.4'	27.8'	64.6'	63.6'	10	3/8"	117.3'
8-18-77	86	90.3'	29.6'	60.7'	59.7'	10	1/2"	116.5'
8-15-77 8-19-77	87	150.5'	86.7'	63.8'	62.8'	10	1/2"	123.5'
8-18-77	88	92.4'	31.3'	61.1'	60.1'	10	1/2"	116.5'
8-18-77	89	90.4'	29.7'	60.7'	59.7'	10	3/8"	117.3'
8-18-77	90	94.6'	31.3'	63.3'	62.3'	10	3/8"	112.5'
8-18-77	91	97.2'	31.8'	65.4'	64.4'	10	3/8"	112.3'
8-15-77	92	90.6'	26.6'	64.0'	63.0'	10	5/8"	126.1'



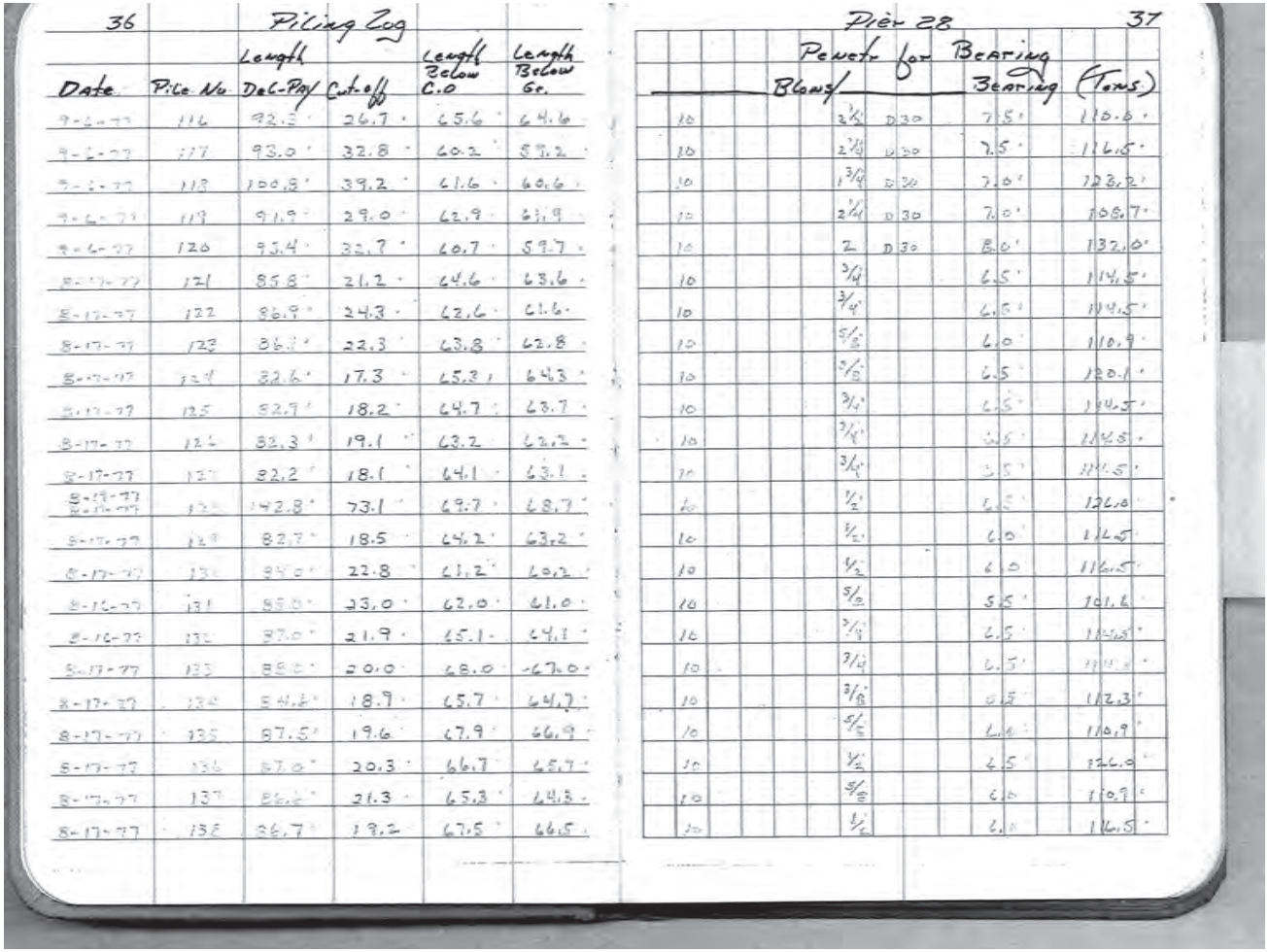
34

Piling Log

Date	Pile No.	Length Del-Pnt	Cut off	Length Below C.O.	Length Below GS.
8-18-77	93	90.8'	25.3'	65.5'	64.5'
8-18-77	94	92.2'	27.7'	64.5'	63.5'
8-18-77	95	90.5'	30.2'	60.3'	59.3'
8-19-77 8-18-77	96	151.4'	89.7'	61.7'	60.7'
9-1-77	97	93.1'	29.6'	64.5'	63.5'
9-1-77	98	94.8'	33.3'	61.5'	60.5'
9-1-77	99	95.3'	29.7'	65.6'	64.6'
9-1-77	100	95.4'	30.9'	64.5'	63.5'
9-1-77	101	94.4'	29.4'	65.0'	64.0'
9-1-77	102	92.8'	28.9'	63.91	62.9'
9-1-77	103	93.5'	30.1'	63.4'	62.4'
9-1-77	104	89.8'	25.5'	64.3'	63.3'
9-1-77	105	92.8'	28.6'	64.2'	63.2'
9-1-77	106	91.6'	26.5'	65.1'	64.1'
9-1-77	107	155.6'	95.3'	60.3'	59.3'
9-1-77	108	90.0'	30.9'	59.1'	58.1'
9-1-77	109	95.1'	35.6'	59.5'	58.5'
9-1-77	110	91.2'	26.8'	64.4'	63.4'
9-6-77	111	90.0'	25.6'	64.4'	63.4'
9-6-77	112	92.4'	28.3'	64.1'	63.1'
9-6-77	113	93.7'	29.7'	64.2'	63.2'
9-6-77	114	95.0'	34.4'	60.6'	59.6'
9-6-77	115	90.9'	29.1'	61.8'	60.8'

Pier 28 35

Blows/			Penetration for Bearing		Bearing (Tons)
10	5/8'		6.0'		110.9'
10	1/2'		6.0'		116.5'
10	3/8'		6.0'		122.5'
10	1/2'		6.0'		116.5'
10	3/4'		6.5'		114.5'
10	1/2'		6.5'		126.0'
10	3/4'		6.5'		114.5'
10	5/8'		6.5'		120.1'
10	5/8'		6.0'		110.9'
10	1/2'		6.0'		116.5'
10	1/2'		6.0'		116.5'
10	7/8'		6.5'		109.8'
10	3/4'		6.5'		114.5'
10	3/4'		6.5'		114.5'
10	2'	D 30	7.5'		132.3'
10	1/2'		6.0'		[illegible]
10	3/8'		5.5'		112.3'
10	3/4'		6.5'		114.5'
10	3/4'		6.5'		114.5'
10	2'	D 30	8.0'		132.0'
10	2 1/2'	D 30	8.0'		117.1'
10	2'	D 30	7.5'		123.8'
10	2'	D 30	7.5'		123.8'



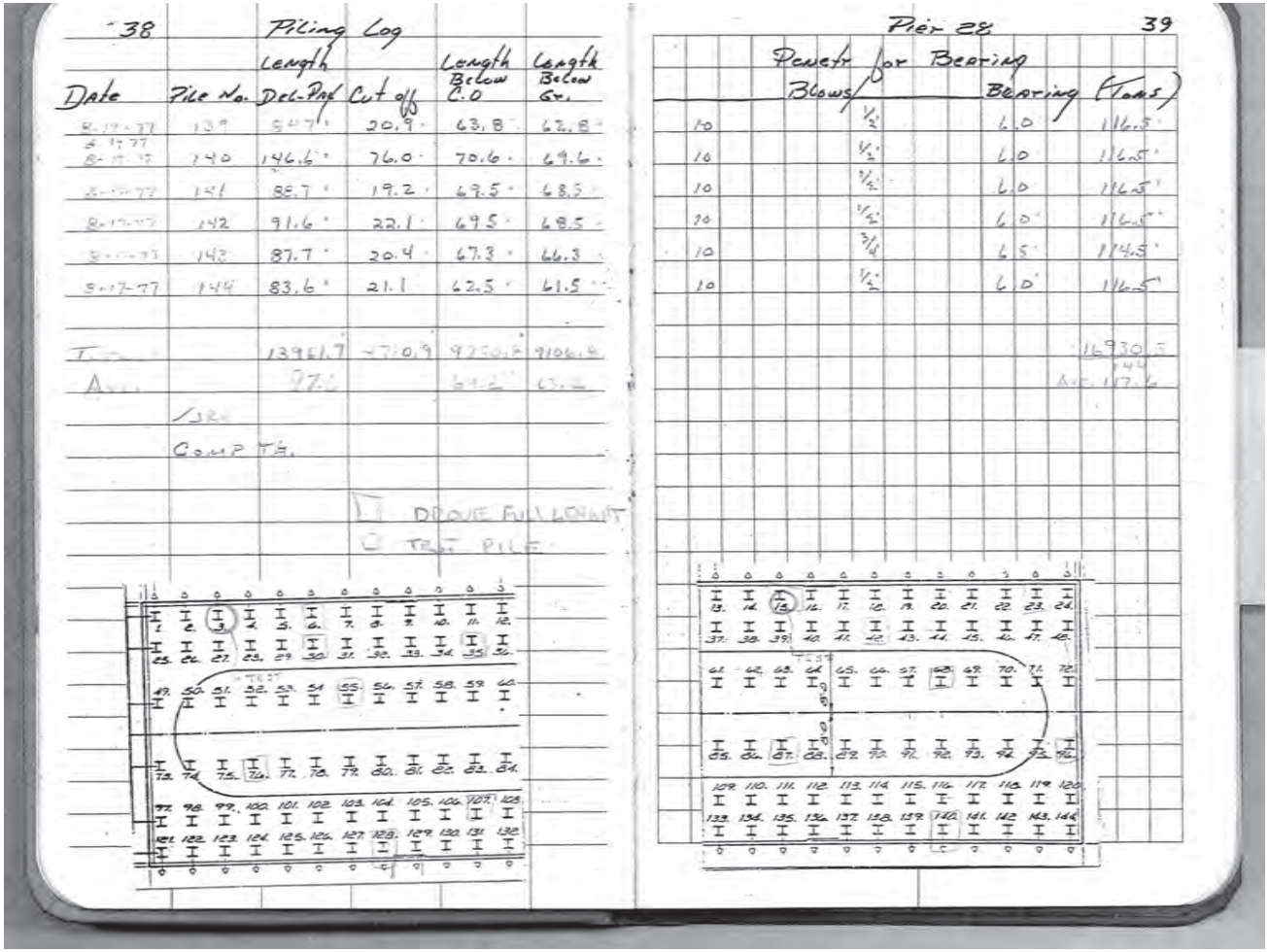
36 Piling Log

Date	Pile No	Length Det-Proj	Cut-off	Length Below C.O	Length Below Gr.
8-16-77	116	92.3'	26.7'	65.6'	64.6'
8-16-77	117	93.0'	32.8'	60.2'	59.2'
8-16-77	118	100.8'	39.2'	61.6'	60.6'
8-16-77	119	91.9'	29.0'	62.9'	61.9'
8-16-77	120	93.4'	32.7'	60.7'	59.7'
8-17-77	121	85.8'	21.2'	64.6'	63.6'
8-17-77	122	86.9'	24.3'	62.6'	61.6'
8-17-77	123	86.1'	22.3'	63.8'	62.8'
8-17-77	124	82.6'	17.3'	65.3'	64.3'
8-17-77	125	82.9'	18.2'	64.7'	63.7'
8-17-77	126	83.3'	19.1'	63.2'	62.2'
8-17-77	127	82.2'	18.1'	64.1'	63.1'
8-19-77 8-17-77	128	142.8'	73.1'	69.7'	68.7'
8-17-77	129	82.7'	18.5'	64.2'	63.2'
8-17-77	130	84.0'	22.8'	61.2'	60.2'
8-16-77	131	85.0'	23.0'	62.0'	61.0'
8-16-77	132	87.0'	21.9'	65.1'	64.1'
8-17-77	133	88.0'	20.0'	68.0'	67.0'
8-17-77	134	84.6'	18.9'	65.7'	64.7'
8-17-77	135	87.5'	19.6'	67.9'	66.9'
8-17-77	136	87.0'	20.3'	66.7'	65.7'
8-17-77	137	86.6'	21.3'	65.3'	64.3'
8-17-77	138	86.7'	19.2'	67.5'	66.5'

Pier 28 37

Penetr for Bearing

Blows/			Bearing	Bearing (Tons)
10	2 1/2"	D 30	7.5'	110.6'
10	2 1/2"	D 30	7.5'	110.5'
10	1 3/4"	D 30	7.0'	103.2'
10	2 1/4"	D 30	7.0'	106.7'
10	2	D 30	8.0'	132.0'
10	3/4"		6.5'	114.5'
10	3/4"		6.5'	114.5'
10	5/8"		6.0'	110.9'
10	5/8"		6.5'	120.1'
10	3/4"		6.5'	114.5'
10	3/4"		6.5'	114.5'
10	3/4"		6.5'	114.5'
10	1/2"		6.5'	126.0'
10	1/2"		6.0'	112.5'
10	1/2"		6.0'	112.5'
10	5/8"		5.5'	101.6'
10	3/4"		6.5'	114.5'
10	3/4"		6.5'	114.5'
10	3/8"		6.5'	112.3'
10	5/8"		6.0'	110.9'
10	1/2"		6.5'	126.0'
10	5/8"		6.0'	110.9'
10	1/2"		6.0'	116.5'



38

Piling Log

Date	File No.	Length Del. Pref	Cut off	Length Below C.O	Length Below Gr.
8-17-77	139	5[illegible]7'	20.9'	63.8'	62.8'
8-17-77	140	146.6'	76.0'	70.6'	69.6'
8-17-77	141	88.7'	19.2'	69.5'	68.5'
8-17-77	142	91.6'	22.1'	69.5'	68.5'
8-17-77	143	87.7'	20.4'	67.3'	66.3'
8-17-77	144	83.6'	21.1'	62.5'	61.5'
T		1396[illegible].7'	-710.9'	9250.8'	9106.4
A		97.2'		64.2'	63.2

/32

COMP T#.

DRIVE FULL LENGTH

TEST PILE

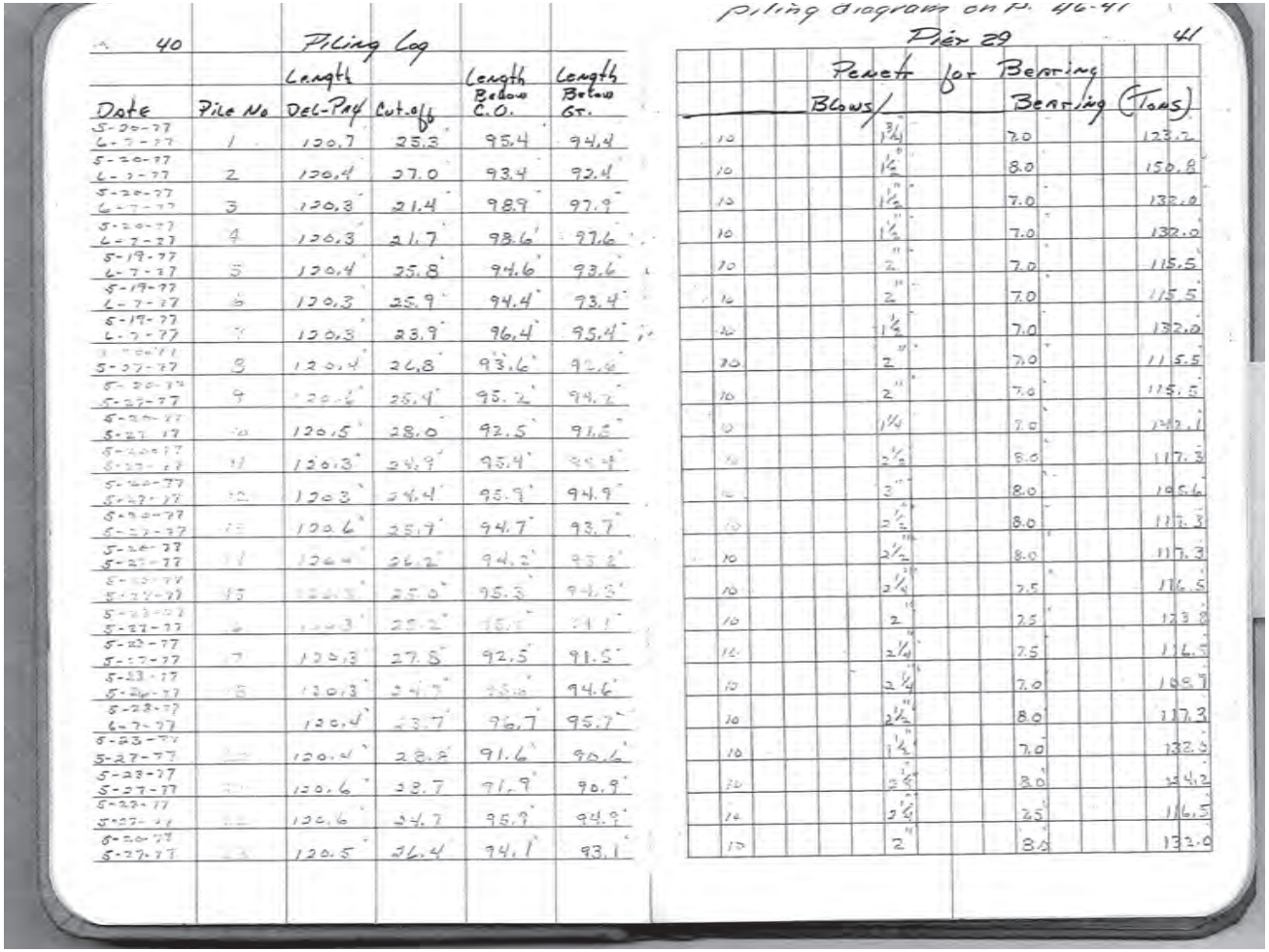
Pier 28

39

Penetr for Bearing

Blows/		Bearing (Tons)
10	1/2"	116.5'
10	1/2"	116.5'
10	1/2"	116.5'
10	1/2"	116.5'
10	3/4"	114.5'
10	1/2"	116.5'

116930 J
144
Ave. 117.1



40

Piling Log

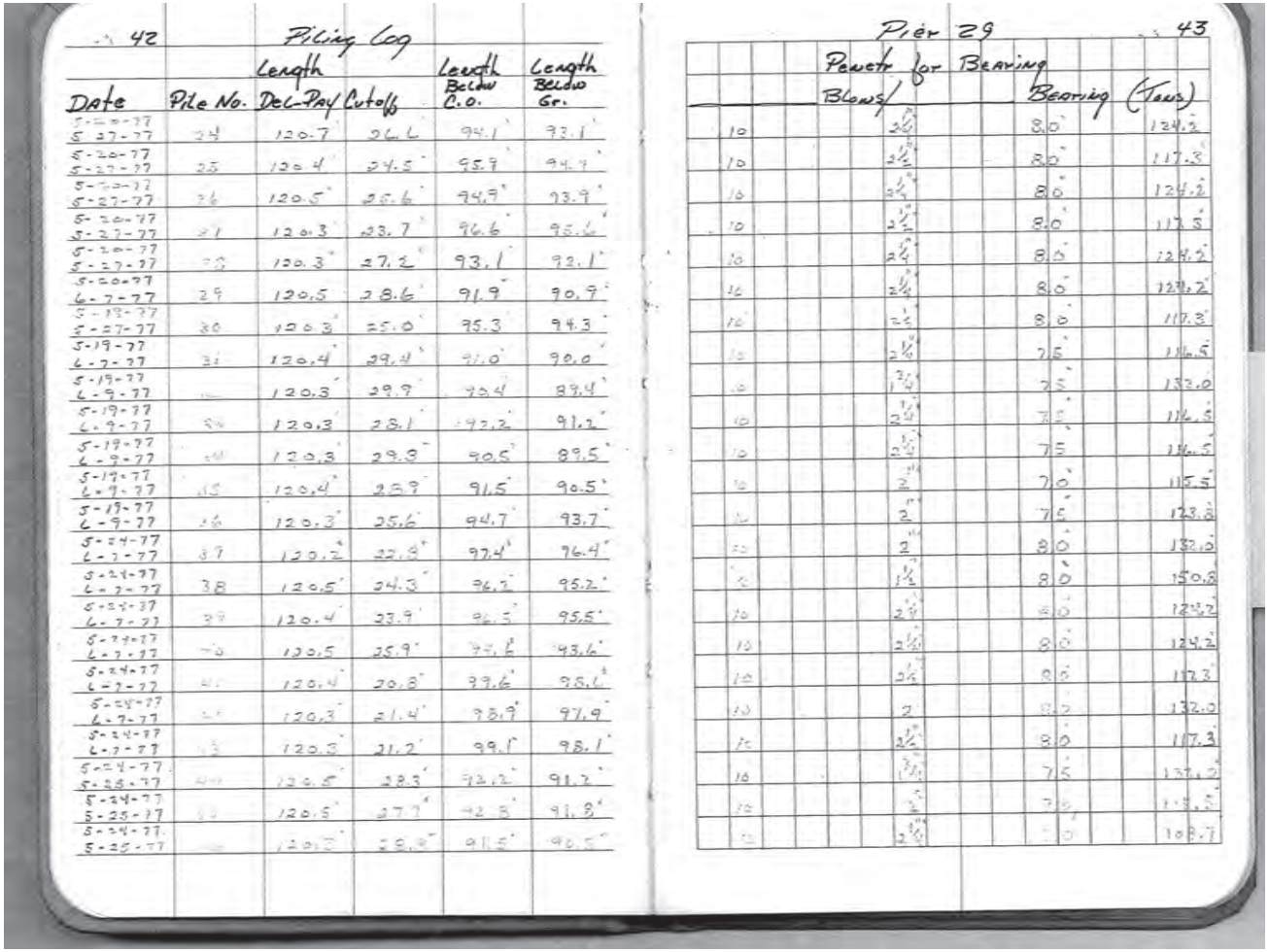
Date	Pile No	Length Del-Pkg	Cut-off	Length Below C.O.	Length Below Gr.
5-20-77 6-7-77	1	120.7	25.3	95.4	94.4
5-20-77 6-7-77	2	120.4	27.0	93.4	92.4
5-20-77 6-7-77	3	120.3	21.4	98.9	97.9
5-20-77 6-7-77	4	120.3	21.7	98.6	97.6
5-19-77 6-7-77	5	120.4	25.8	94.6	93.6
5-19-77 6-7-77	6	120.3	25.9	94.4	93.4
5-19-77 6-7-77	7	120.3	23.9	96.4	95.4
5-27-77	8	120.4	26.8	93.6	92.6
5-27-77	9	120.8	25.4	95.4	94.4
5-27-77	10	120.5	28.0	92.5	91.5
5-27-77	11	120.3	24.9	95.4	94.4
5-27-77	12	120.3	24.4	95.9	94.9
5-27-77	13	120.6	25.7	94.7	93.7
5-27-77	14	120.4	26.2	94.2	93.2
5-27-77	15	120.3	25.0	95.3	94.3
5-27-77	16	120.3	26.2	94.1	93.1
5-27-77	17	120.3	27.8	92.5	91.5
5-26-77	18	120.3	24.7	95.6	94.6
6-7-77		120.4	23.7	96.7	95.7
5-27-77		120.4	28.8	91.6	90.6
5-27-77		120.6	28.7	91.9	90.9
5-27-77		120.6	24.7	95.9	94.9
5-27-77		120.5	26.4	94.1	93.1

Piling diagram on P. 46-47

Pier 29

41

	Blows/	Penetr for Bearing	Bearing (Tons)
10	1¾"	7.0	123.2
10	1½"	8.0	150.8
10	1½"	7.0	132.0
10	1½"	7.0	132.0
10	2"	7.0	115.5
10	2"	7.0	115.5
10	1½"	7.0	132.0
10	2"	7.0	115.5
10	2"	7.0	115.5
10	1¾"	7.0	123.2
10	2½"	8.0	117.3
10	3"	8.0	105.6
10	2½"	8.0	117.3
10	2½"	8.0	117.3
10	2¼"	7.5	116.5
10	2"	7.5	123.8
10	2¼"	7.5	116.5
10	2¼"	7.0	109.7
10	2½"	8.0	117.3
10	1¾"	7.0	132.0
10	2½"	8.0	134.2
10	2¼"	7.5	116.5
10	2"	8.0	132.0



42

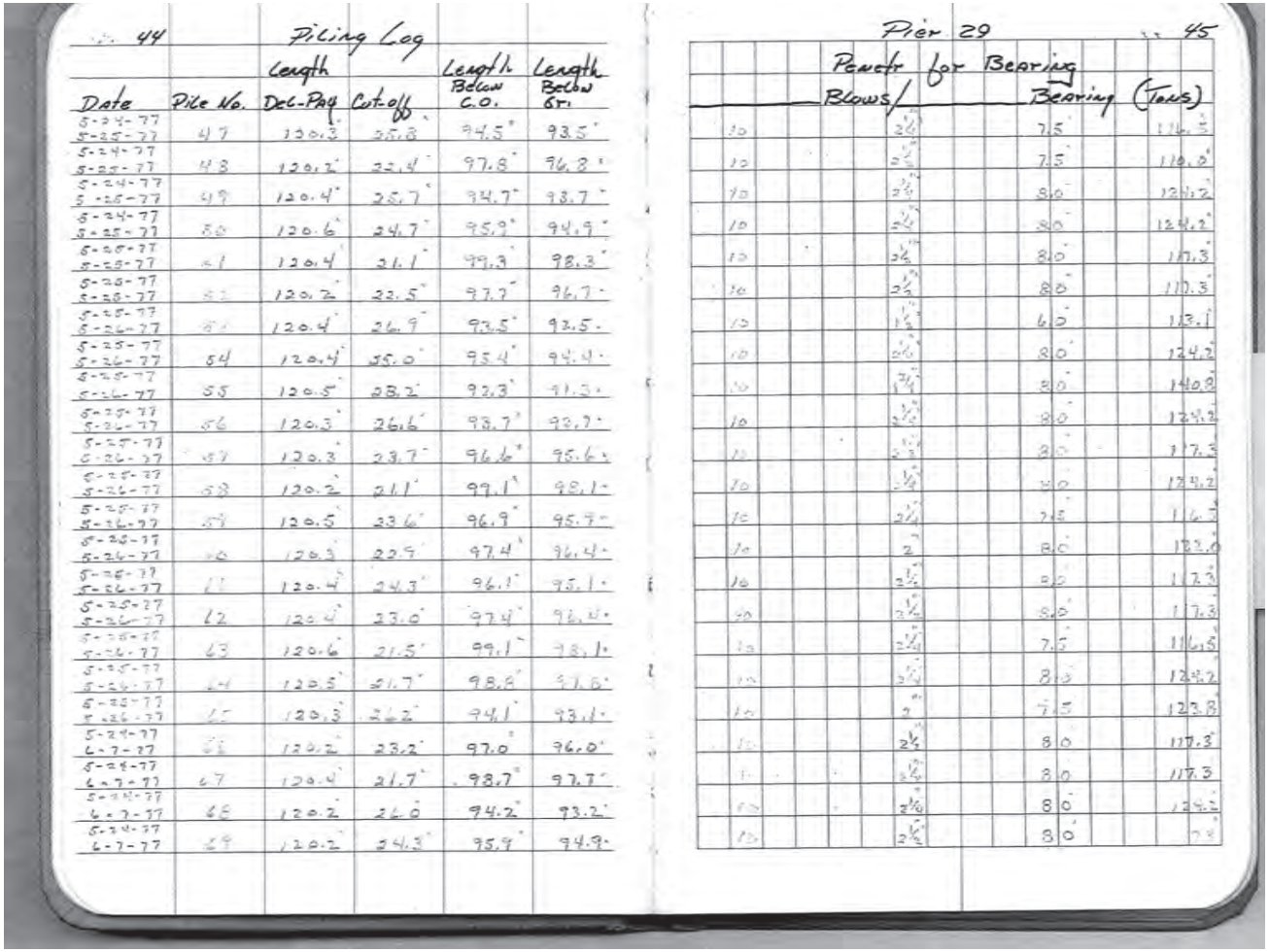
Piling Log

Date	Pile No.	Length Del-Day	Cutoff	Length Below C.O.	Length Below Gr.
5-20-77 5-27-77	24	120.7'	26.6'	94.1'	93.1'
5-20-77 5-27-77	25	120.4'	24.5'	95.9'	94.9'
5-20-77 5-27-77	26	120.5'	26.6'	93.9'	93.9'
5-20-77 5-27-77	27	120.3'	23.7'	96.6'	95.6'
5-20-77 5-27-77	28	120.3'	27.2'	93.1'	93.1'
5-20-77 6-7-77	29	120.5'	28.6'	91.9'	90.9'
5-19-77 5-27-77	30	120.3'	25.0'	95.3'	94.3'
5-19-77 6-7-77	31	120.4'	29.4'	91.0'	90.0'
5-19-77 6-9-77		120.3'	29.9'	90.4'	89.4'
5-19-77 6-9-77	33	120.3'	28.1'	92.2'	91.2'
5-19-77 6-9-77	34	120.3'	29.9'	90.5'	89.5'
5-19-77 6-9-77	35	120.4'	29.9'	91.5'	90.5'
5-19-77 6-9-77	36	120.3'	25.6'	94.7'	93.7'
5-24-77 6-7-77	37	120.2'	22.8'	97.4'	96.4'
5-24-77 6-7-77	38	120.5'	24.3'	96.2'	95.2'
5-24-77 6-7-77	39	120.4'	23.9'	96.5'	95.5'
5-24-77 6-7-77	40	120.5'	25.9'	94.6'	93.6'
5-24-77 6-7-77	41	120.4'	20.8'	99.6'	98.6'
5-24-77 6-7-77	42	120.3'	21.4'	98.9'	97.9'
5-24-77 6-7-77	43	120.3'	21.2'	99.1'	98.1'
5-24-77 5-25-77	44	120.5'	28.3'	92.2'	91.2'
5-24-77 5-25-77	45	120.5'	27.7'	92.8'	91.8'
5-24-77 5-25-77	46	120.2'	28.2'	91.5'	90.5'

Pier 29

43

	Powder for Blows/	Bearing	Bearing (Tons)
10	2½"	8.0'	124.2'
10	2½"	8.0'	117.3'
10	2½"	8.0'	124.2'
10	2½"	8.0'	117.3'
10	2½"	8.0'	124.2'
10	2½"	8.0'	124.2'
10	2½"	8.0'	117.3'
10	2½"	7.5'	116.5'
10	1¾"	7.5'	132.0'
10	2½"	7.5'	116.5'
10	2½"	7.5'	116.5'
10	2"	7.0'	115.5'
10	2"	7.5'	123.8'
10	2"	8.0'	132.0'
10	1½"	8.0'	150.8'
10	2½"	8.0'	124.2'
10	2½"	8.0'	124.2'
10	2½"	8.0'	117.3'
10	2"	8.0'	132.0'
10	2½"	8.0'	117.3'
10	1¾"	7.5'	132.0'
10	2"	7.5'	116.5'
10	2½"	7.5'	108.7'



44

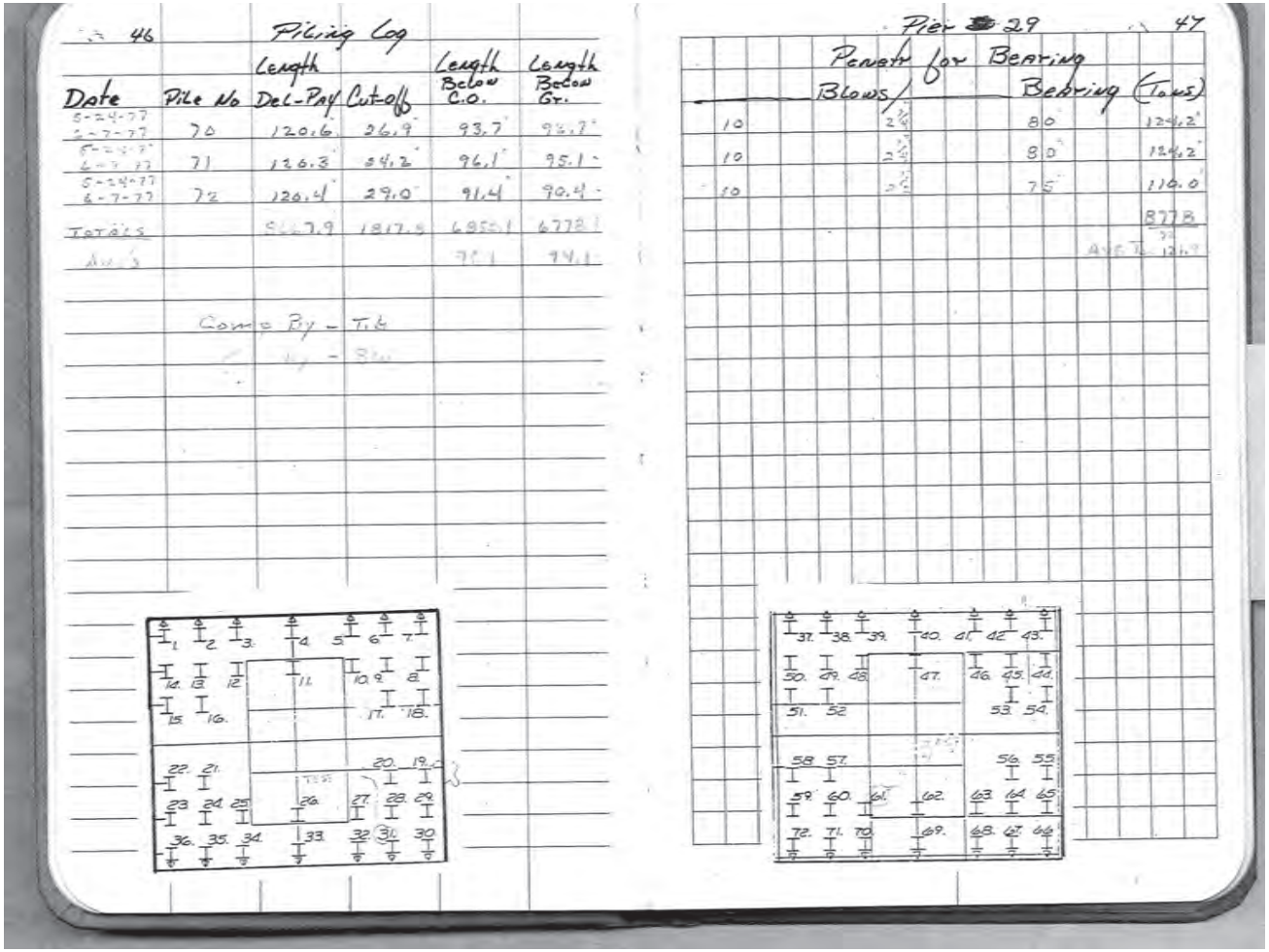
Piling Log

Date	Pile No.	Length Dec-Pay	Length Cut-off	Length Below C.O.	Length Below Str.
5-24-77 5-25-77	47	120.3'	25.8'	94.5'	93.5'
5-24-77 5-25-77	48	120.2'	22.4'	97.8'	96.8'
5-24-77 5-26-77	49	120.4'	25.7'	94.7'	93.7'
5-24-77 5-25-77	50	120.6'	24.7'	95.9'	94.9'
5-25-77 5-25-77	51	120.4'	21.1'	99.3'	98.3'
5-25-77 5-25-77	52	120.2'	22.5'	97.7'	96.7'
5-25-77 5-26-77	53	120.4'	26.9'	93.5'	92.5'
5-25-77 5-26-77	54	120.4'	25.0'	95.4'	94.4'
5-25-77 5-26-77	55	120.5'	28.2'	92.3'	91.3'
5-25-77 5-26-77	56	120.3'	26.6'	93.7'	92.7'
5-25-77 5-26-77	57	120.3'	23.7'	96.6'	95.6'
5-25-77 5-26-77	58	120.2'	21.1'	99.1'	98.1'
5-25-77 5-26-77	59	120.5'	23.6'	96.9'	95.9'
5-25-77 5-26-77	60	120.3'	22.9'	97.4'	96.4'
5-25-77 5-26-77	61	120.4'	24.3'	96.1'	95.1'
5-25-77 5-26-77	62	120.4'	23.0'	97.4'	96.4'
5-25-77 5-26-77	63	120.6'	21.5'	99.1'	98.1'
5-25-77 5-26-77	64	120.3'	21.7'	98.6'	97.6'
5-25-77 5-26-77	65	120.3'	26.2'	94.1'	93.1'
5-24-77 6-7-77	66	120.2'	23.2'	97.0'	96.0'
5-24-77 6-7-77	67	120.4'	21.7'	98.7'	97.7'
5-24-77 6-7-77	68	120.2'	26.0'	94.2'	93.2'
5-24-77 6-7-77	69	120.2'	24.3'	95.9'	94.9'

Pier 29

45

	Penetr for Last Blows/	Bearing (Tons)
10	2 1/2"	7.5	116.3'
10	2 1/2"	7.5	116.3'
10	2 1/2"	8.0	124.2'
10	2 1/2"	8.0	124.2'
10	2 1/2"	8.0	117.3'
10	2 1/2"	8.0	117.3'
10	1 1/2"	6.0	113.1'
10	2 1/2"	8.0	124.2'
10	3 1/4"	8.0	140.8'
10	2 1/2"	8.0	124.2'
10	2 1/2"	8.0	117.3'
10	1 1/2"	6.0	124.2'
10	2 1/4"	7.5	116.3'
10	2"	8.0	123.0'
10	2 1/2"	8.0	117.3'
10	2 1/2"	8.0	117.3'
10	2 1/2"	7.5	116.3'
10	2 1/2"	8.0	124.2'
10	2"	7.5	123.8'
10	2 1/2"	8.0	117.3'
10	2 1/2"	8.0	117.3'
10	2 1/2"	8.0	124.2'
10	2 1/2"	8.0	



46

Piling Log

Date	Pile No	Length Del-Pay	Length Cut-off	Length Below C.O.	Length Below Gr.
5-24-77					
6-7-77	70	120.6'	26.9'	93.7'	92.7'
5-24-77					
6-7-77	71	126.3'	24.2'	96.1'	95.1'
5-24-77					
6-7-77	72	120.4'	29.0'	91.4'	90.4'
TOTALS		367.3'	1817.9	6952.1	6772.1
AVG'S				91.1	94.1

Comp Pay - T.L.

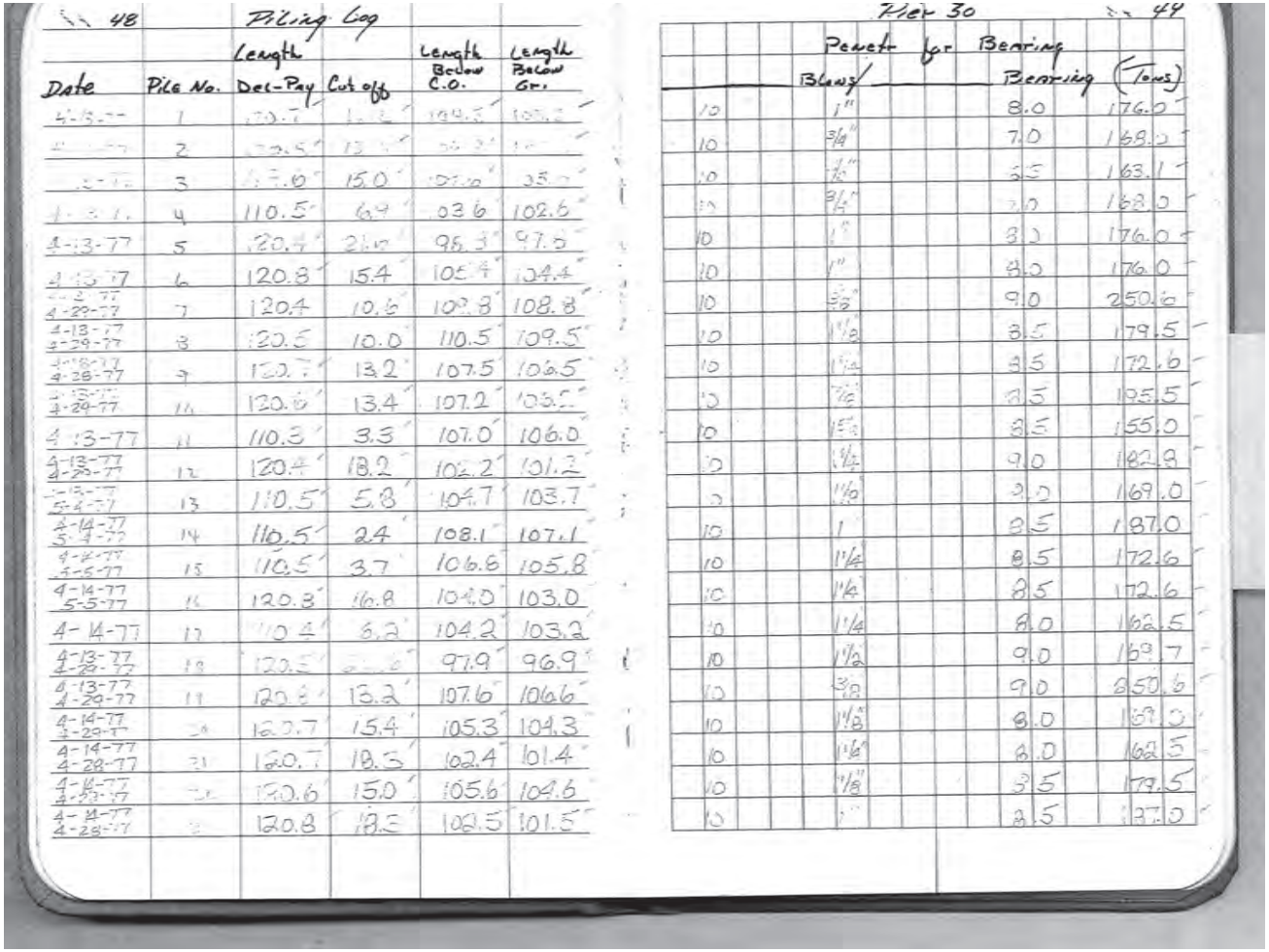
" " - Blow

47

Pier # 29

Penetr for Bearing

Blows/		Bearing (Tons)
10	2 3/4"	80 124.2'
10	2 3/4"	80 124.2'
10	2 3/4"	75 110.0'
		877.8
		AVG. T. 121.9'



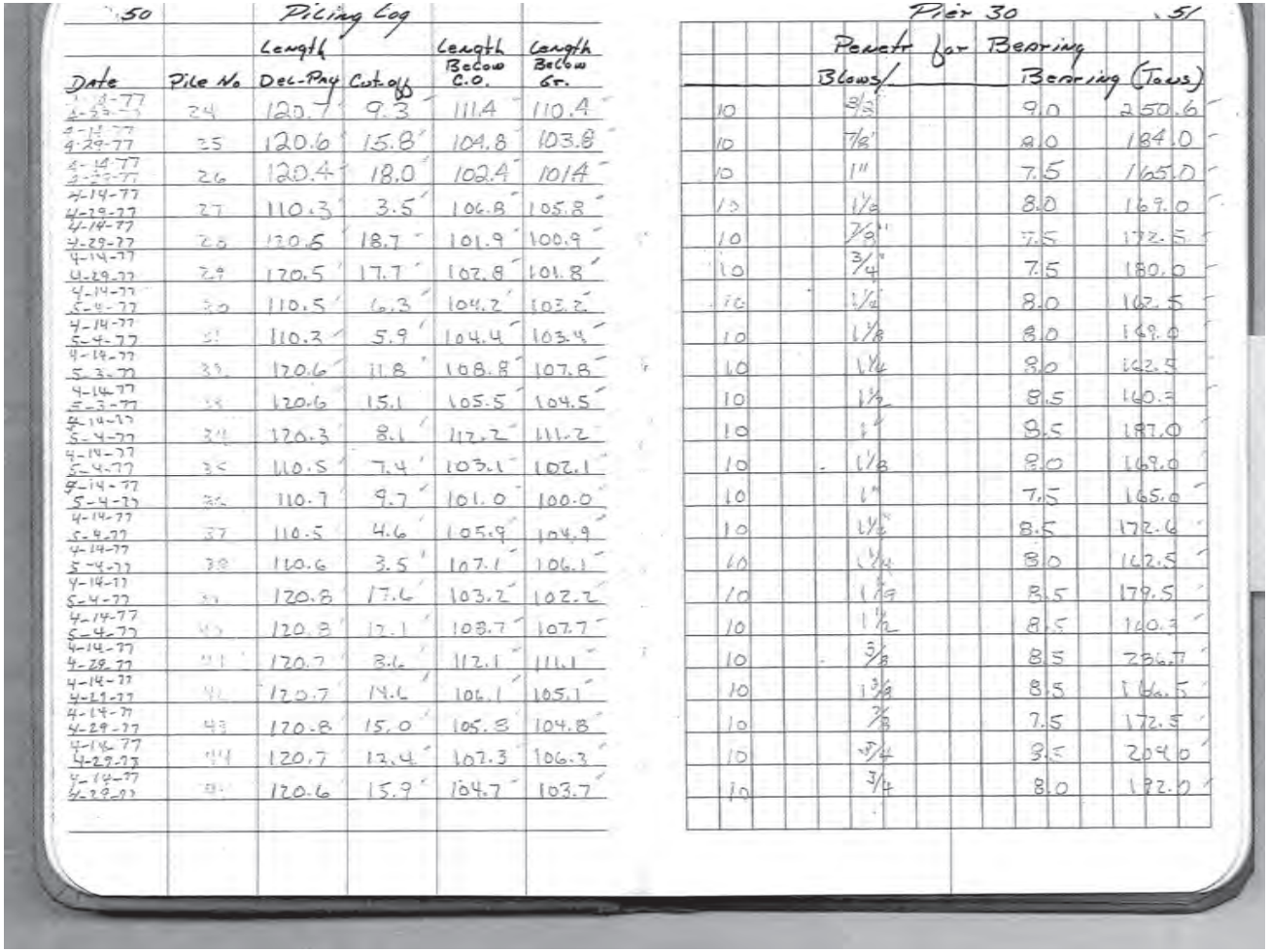
Pile Log

Date	Pile No.	Length Des-Pay	Length Cut off	Length Below C.O.	Length Below Gr.
4-13-77	1	120.7	1.2	104.3	103.1
[illegible]	2	120.5	13.[illegible]	[illegible]	[illegible]
[illegible]	3	[illegible]7.0	15.0	[illegible]07.0	35.[illegible]
[illegible]	4	110.5	6.4	103.6	102.6
4-13-77	5	120.4	24.0	96.3	97.5
4-13-77	6	120.8	15.4	105.4	104.4
4-13-77 4-29-77	7	120.4	10.6	109.8	108.8
4-13-77 4-29-77	8	120.5	10.0	110.5	109.5
4-13-77 4-28-77	9	120.7	13.2	107.5	106.5
4-13-77 4-29-77	10	120.6	13.4	107.2	106.2
4-13-77	11	110.3	3.3	107.0	106.0
4-13-77 4-29-77	12	120.4	18.2	102.2	101.2
4-13-77 5-4-77	13	110.5	5.8	104.7	103.7
4-14-77 5-4-77	14	110.5	2.4	108.1	107.1
4-14-77 5-5-77	15	110.5	3.7	106.6	105.8
4-14-77 5-5-77	16	120.8	16.8	104.0	103.0
4-14-77	17	110.4	6.2	104.2	103.2
4-13-77 4-29-77	18	120.5	[illegible].6	97.9	96.9
4-13-77 4-29-77	19	120.2	13.2	107.6	1066
4-14-77 4-29-77	20	120.7	15.4	105.3	104.3
4-14-77 4-28-77	21	120.7	18.3	102.4	101.4
4-14-77 4-29-77	22	120.6	15.0	105.6	104.6
4-14-77 4-28-77	23	120.8	18.3	102.5	101.5

Pile 30

Penetr for Bearing

Blows/		Bearing	Bearing (Tons)
10	1"	8.0	176.0
10	3/4"	7.0	168.0
10	7/8"	6.5	163.1
10	3/4"	7.0	168.0
10	1"	8.0	176.0
10	1"	8.0	176.0
10	5/8"	9.0	250.6
10	1 1/8	8.5	179.5
10	1 1/4	8.5	172.6
10	7/8	8.5	105.5
10	1 5/8	8.5	155.0
10	1 1/4	9.0	182.9
10	1 1/8	8.0	169.0
10	1	8.5	187.0
10	1 1/4	8.5	172.6
10	1 1/4	8.5	172.6
10	1 1/4	8.0	162.5
10	1 1/2	9.0	169.7
10	3/8	9.0	250.6
10	1 1/8	8.0	169.0
10	1 1/8	8.0	162.5
10	1 1/8	8.5	179.5
10	1"	8.5	187.0



50

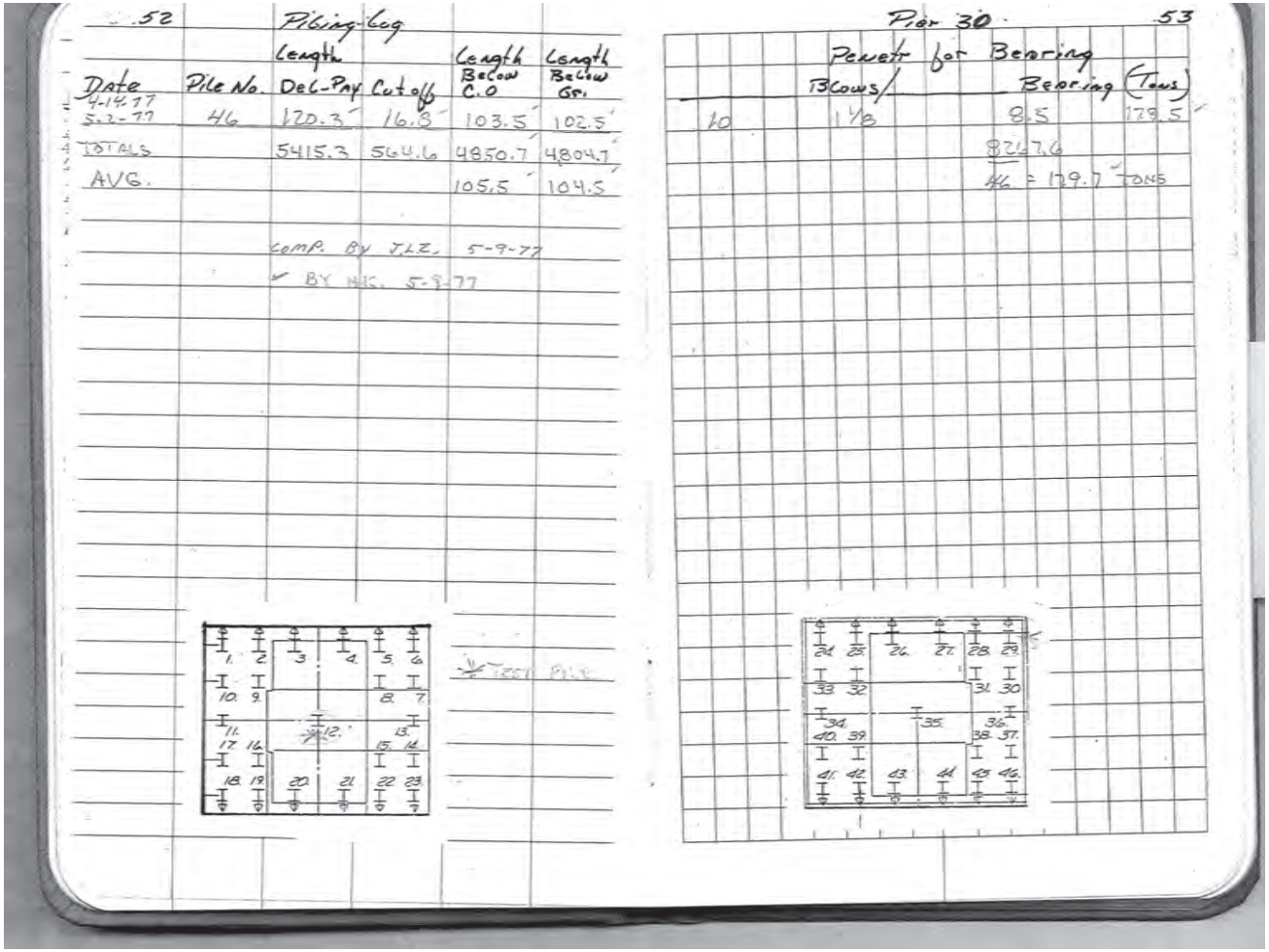
Piling Log

Date	Pile No	Length Del-Pay	Cut-off	Length Below C.O.	Length Below Gr.
4-8-77 4-29-77	24	120.7	9.3	111.4	110.4
4-14-77 4-29-77	25	120.6	15.8	104.8	103.8
4-14-77 4-29-77	26	120.4	18.0	102.4	1014
4-14-77 4-29-77	27	110.3	3.5	106.8	105.8
4-14-77 4-29-77	28	120.5	18.7	101.9	100.9
4-14-77 4-29-77	29	120.5	17.7	102.8	101.8
4-14-77 5-4-77	30	110.5	6.3	104.2	103.2
4-14-77 5-4-77	31	110.3	5.9	104.4	103.4
4-14-77 5-3-77	32	120.6	11.8	108.8	107.8
4-14-77 5-3-77	33	120.6	15.1	105.5	104.5
4-14-77 5-4-77	34	120.3	8.1	112.2	111.2
4-14-77 5-4-77	35	110.5	7.4	103.1	102.1
4-14-77 5-4-77	36	110.7	9.7	101.0	100.0
4-14-77 5-4-77	37	110.5	4.6	105.9	104.9
4-14-77 5-4-77	38	120.6	3.5	107.1	106.1
4-14-77 5-4-77	39	120.8	17.6	103.2	102.2
4-14-77 5-4-77	40	120.8	12.1	108.7	107.7
4-14-77 4-28-77	41	120.7	8.6	112.1	111.1
4-14-77 4-29-77	42	120.7	14.6	106.1	105.1
4-14-77 4-29-77	43	120.8	15.0	105.8	104.8
4-14-77 4-29-77	44	120.7	12.4	107.3	106.3
4-14-77 4-29-77	45	120.6	15.9	104.7	103.7

Pier 30

51

	Blows/	Bearing	Bearing (Tons)
10	3/8"	9.0	250.6
10	7/8"	9.0	184.0
10	1"	7.5	165.0
10	1 1/8"	8.0	169.0
10	7/8"	7.5	172.5
10	3/4"	7.5	180.0
10	1 1/8"	8.0	162.5
10	1 1/8"	8.0	169.0
10	1 1/4"	8.0	162.5
10	1 1/8"	8.5	160.7
10	1"	8.5	187.0
10	1 1/8"	8.0	169.0
10	1"	7.5	165.0
10	1 1/2"	8.5	172.6
10	1 1/4"	8.0	162.5
10	1 1/8"	8.5	179.5
10	1 1/2"	8.5	140.7
10	3/8"	8.5	256.7
10	1 3/8"	8.5	146.5
10	7/8"	7.5	172.5
10	3/4"	3.5	204.0
10	3/4"	8.0	172.0



52

Piling Log

Date	Pile No.	Length Del-Pay	Length Cut off	Length Below C.O	Length Below Gr.
4-14-77					
5-2-77	46	120.3	16.8	103.5	102.5
TOTALS		5415.3	564.6	4850.7	4804.7
AVG.				105.5	104.5

Comp. By JLZ. 5-9-77

✓ BY NK. 5-9-77

* Test Pile

Pier 30

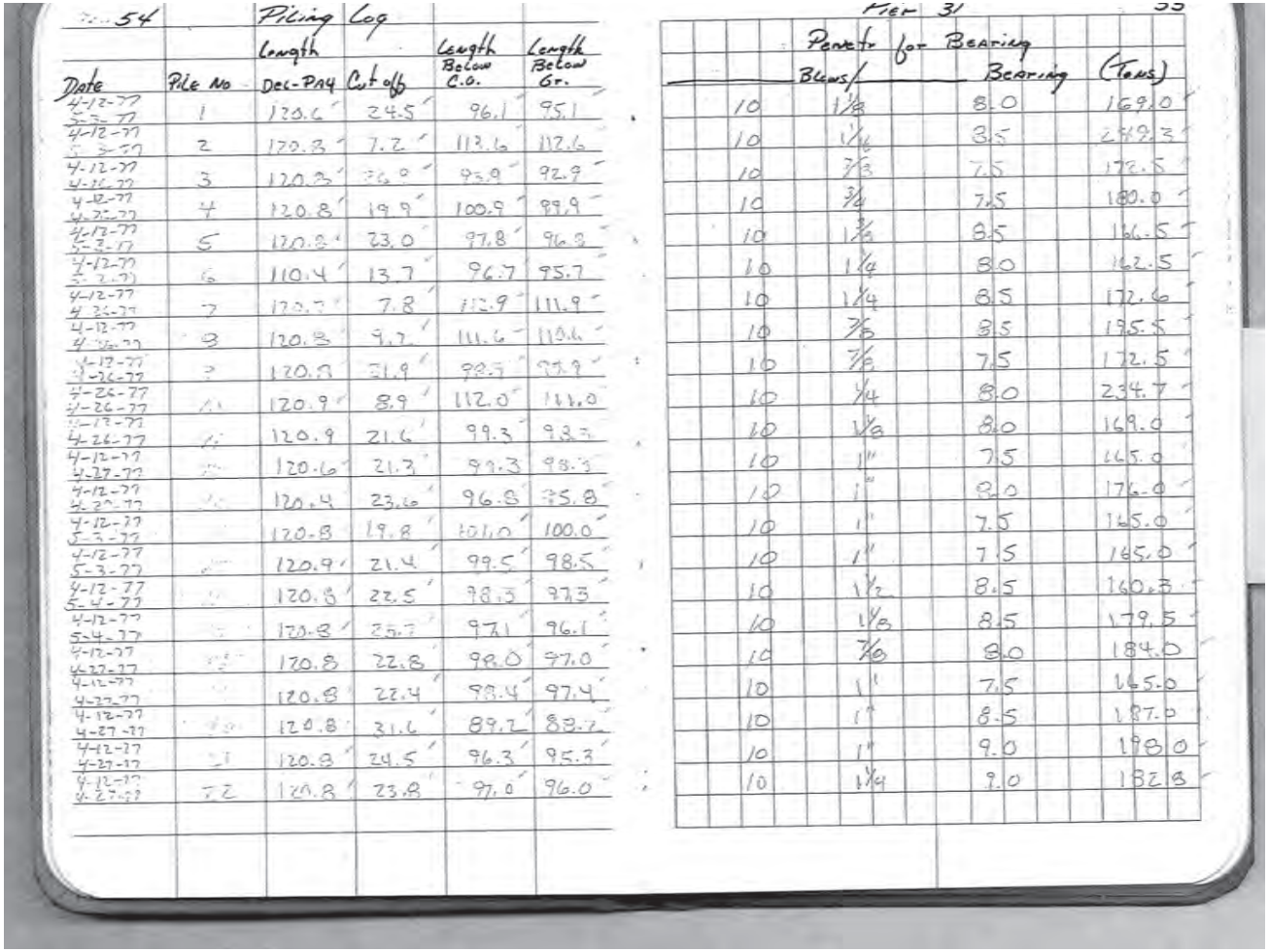
53

Penetr for Bearing

Blows/		Bearing (Tons)	
10	1 1/8	8.5	179.5

$8267.6

46 = 179.7 TONS



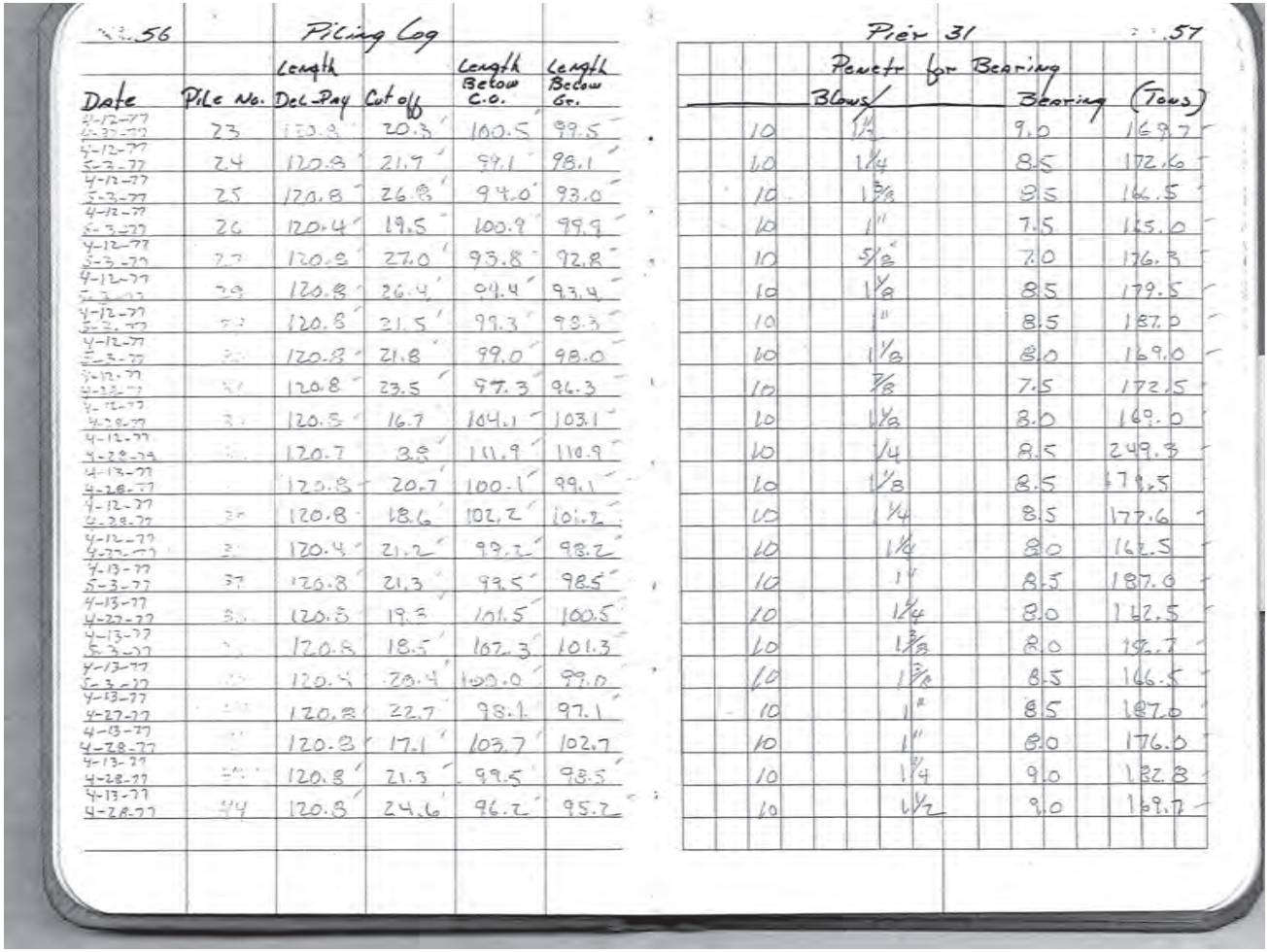
54 — Piling Log

Date	Pile No	Length Dec-Pay	Cut off	Length Below C.O.	Length Below Gr.
4-12-77 5-3-77	1	120.6	24.5	96.1	95.1
4-12-77 5-3-77	2	120.8	7.2	113.6	112.6
4-12-77 4-27-77	3	120.3	27.0	93.3	92.9
4-12-77 4-27-77	4	120.8	19.9	100.9	99.9
4-12-77 5-3-77	5	120.8	23.0	97.8	96.8
4-12-77 5-2-77	6	110.4	13.7	96.7	95.7
4-12-77 4-27-77	7	120.7	7.8	112.9	111.9
4-12-77 4-26-77	8	120.8	9.7	111.6	110.6
4-12-77 4-26-77	9	120.8	21.9	98.9	97.9
4-26-77 4-26-77	10	120.9	8.9	112.0	111.0
4-12-77 4-26-77	11	120.9	21.6	99.3	98.3
4-12-77 4-27-77	12	120.6	21.3	99.3	98.3
4-12-77 4-27-77	13	120.4	23.6	96.8	95.8
4-12-77 5-3-77	14	120.8	19.8	101.0	100.0
4-12-77 5-3-77	15	120.9	21.4	99.5	98.5
4-12-77 5-4-77	16	120.8	22.5	98.3	97.3
4-12-77 5-4-77	17	120.8	25.7	97.1	96.1
4-12-77 4-27-77	18	120.8	22.8	98.0	97.0
4-12-77 4-27-77	19	120.8	22.4	98.4	97.4
4-12-77 4-27-77	20	120.8	31.6	89.2	88.2
4-12-77 4-27-77	21	120.8	24.5	96.3	95.3
4-12-77 4-27-77	22	120.8	23.8	97.0	96.0

Pier 31 — 55

Penetr. for Bearing

Blows/		Bearing	(Tons)
10	1⅛	8.0	169.0
10	1¼	8.5	249.3
10	⅞	7.5	172.5
10	¾	7.5	180.0
10	⅞	8.5	196.5
10	1¼	8.0	162.5
10	1¼	8.5	172.6
10	⅞	8.5	195.5
10	⅞	7.5	172.5
10	¼	8.0	234.7
10	1⅛	8.0	169.0
10	1"	7.5	165.0
10	1"	8.0	176.0
10	1"	7.5	165.0
10	1"	7.5	165.0
10	1½	8.5	160.3
10	1⅛	8.5	179.5
10	⅞	8.0	184.0
10	1"	7.5	165.0
10	1"	8.5	187.0
10	1"	9.0	198.0
10	1¼	9.0	182.8



56

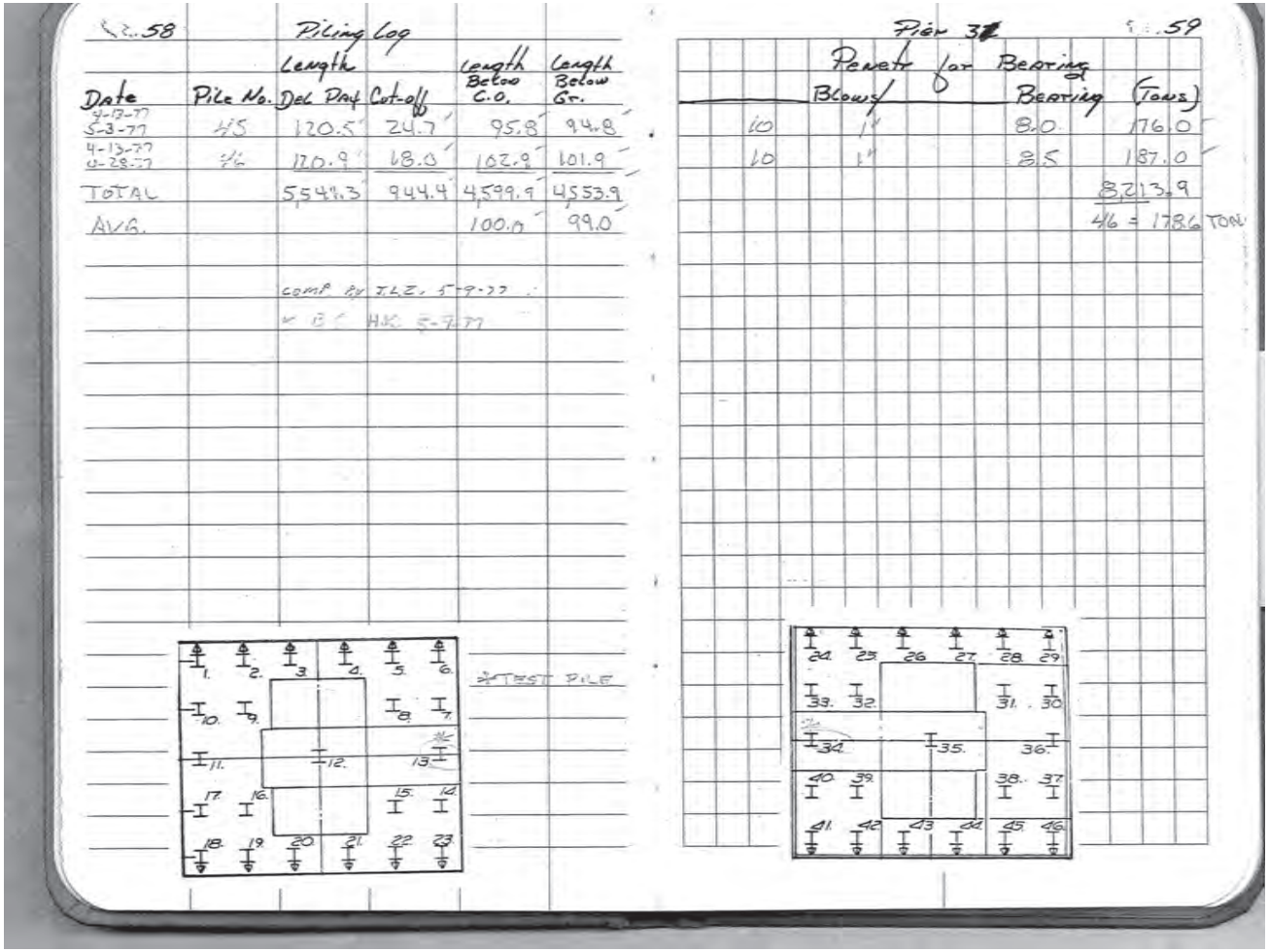
Piling Log

Date	Pile No.	Length Dec. Pay	Length Cut off	Length Below C.O.	Length Below Gr.
4-12-77 5-31-77	23	120.8	20.3	100.5	99.5
4-12-77 5-3-77	24	120.8	21.7	99.1	98.1
4-12-77 5-3-77	25	120.8	26.8	94.0	93.0
4-12-77 5-3-77	26	120.4	19.5	100.9	99.9
4-12-77 5-3-77	27	120.8	27.0	93.8	92.8
4-12-77 5-3-77	28	120.8	26.4	94.4	93.4
4-12-77 5-3-77	[illegible]	120.8	21.5	99.3	98.3
4-12-77 5-3-77	[illegible]	120.8	21.8	99.0	98.0
4-12-77 4-28-77	[illegible]	120.8	23.5	97.3	96.3
4-12-77 4-28-77	[illegible]	120.8	16.7	104.1	103.1
4-12-77 4-28-77	[illegible]	120.7	8.8	111.9	110.9
4-13-77 4-28-77	[illegible]	120.8	20.7	100.1	99.1
4-12-77 4-28-77	[illegible]	120.8	18.6	102.2	101.2
4-12-77 4-27-77	[illegible]	120.4	21.2	99.2	98.2
4-13-77 5-3-77	37	120.8	21.3	99.5	98.5
4-13-77 4-27-77	[illegible]	120.8	19.3	101.5	100.5
4-13-77 5-3-77	[illegible]	120.8	18.5	102.3	101.3
4-13-77 5-3-77	[illegible]	120.4	20.4	100.0	99.0
4-13-77 4-27-77	[illegible]	120.8	22.7	98.1	97.1
4-13-77 4-28-77	[illegible]	120.8	17.1	103.7	102.7
4-13-77 4-28-77	[illegible]	120.8	21.3	99.5	98.5
4-13-77 4-28-77	44	120.8	24.6	96.2	95.2

57

Pier 31

Penetr for Bearing Blows/		Bearing (Tons)
10	1/4	169.7
10	1/4	172.6
10	1/8	166.5
10	1"	165.0
10	5/8	176.3
10	1/8	179.5
10	1"	187.0
10	1/8	169.0
10	7/8	172.5
10	1/8	169.0
10	1/4	249.3
10	1/8	179.5
10	1/4	177.6
10	1/8	162.5
10	1"	187.0
10	1/4	142.5
10	1/8	194.7
10	1/8	166.5
10	1"	187.0
10	1"	176.0
10	1/4	132.8
10	1/2	169.7



52.58

Piling Log

Date	Pile No.	Length Del. Dist.	Cut-off	Length Below C.O.	Length Below Gr.
4-13-77 5-3-77	#5	120.5'	24.7'	95.8'	94.8'
4-13-77 4-28-77	#6	120.9'	18.0'	102.9'	101.9'
TOTAL		5548.3'	944.4'	4599.9'	4553.9'
AVG.				100.0'	99.0'

comp by JLE, 5-9-77
ck'd HK 5-9-77

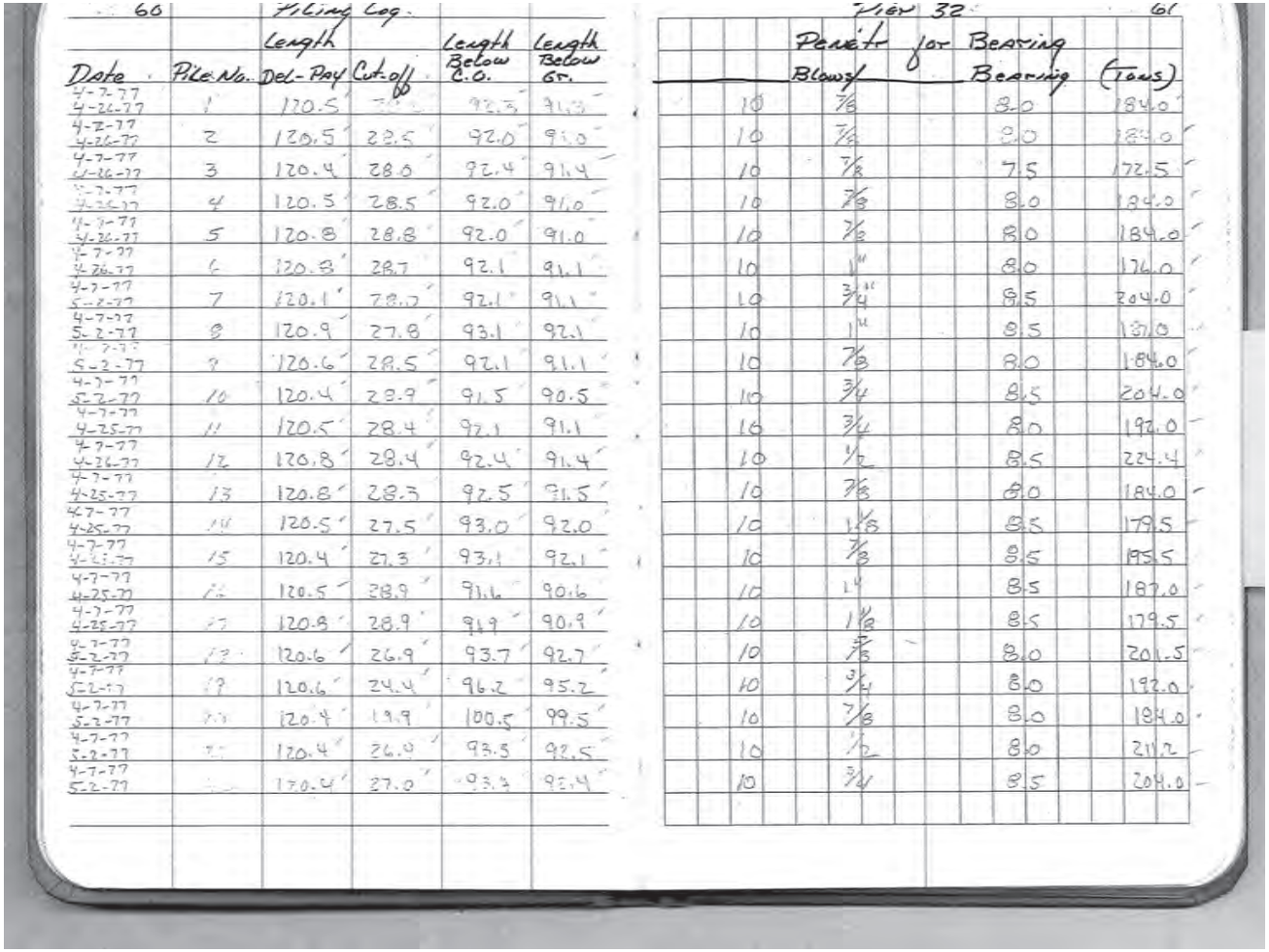
* TEST PILE

Pier 3

52.59

Penetr for Bearing

Blows/		Bearing	(Tons)
10	1"	8.0	176.0
10	1"	8.5	187.0
			8213.9
		4/6 = 1786 TON	



60

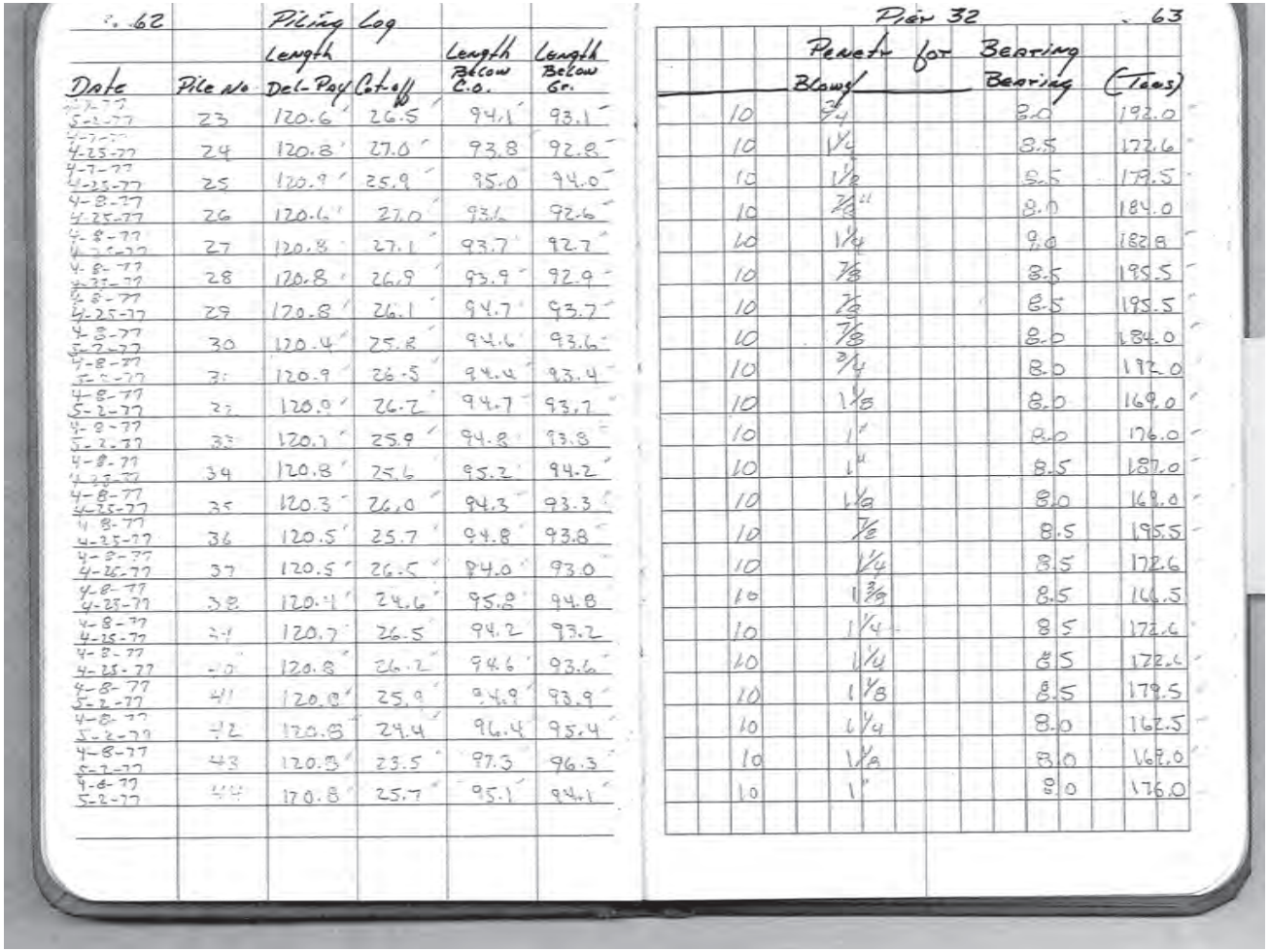
Piling Log.

Date	Pile No.	Length Del-Pay	Cut-off	Length Below C.O.	Length Below Gr.
4-7-77 4-26-77	1	120.5	[illegible]	92.5	91.5
4-7-77 4-26-77	2	120.5	28.5	92.0	91.0
4-7-77 4-26-77	3	120.4	28.0	92.4	91.4
4-7-77 4-26-77	4	120.5	28.5	92.0	91.0
4-7-77 4-26-77	5	120.8	28.8	92.0	91.0
4-7-77 4-26-77	6	120.8	28.7	92.1	91.1
4-7-77 5-2-77	7	120.1	28.0	92.1	91.1
4-7-77 5-2-77	8	120.9	27.8	93.1	92.1
4-7-77 5-2-77	9	120.6	28.5	92.1	91.1
4-7-77 5-2-77	10	120.4	28.9	91.5	90.5
4-7-77 4-25-77	11	120.5	28.4	92.1	91.1
4-7-77 4-26-77	12	120.8	28.4	92.4	91.4
4-7-77 4-25-77	13	120.8	28.3	92.5	91.5
4-7-77 4-25-77	14	120.5	27.5	93.0	92.0
4-7-77 4-25-77	15	120.4	27.3	93.1	92.1
4-7-77 4-25-77	16	120.5	28.9	91.6	90.6
4-7-77 4-25-77	17	120.8	28.9	91.9	90.9
4-7-77 5-2-77	18	120.6	26.9	93.7	92.7
4-7-77 5-2-77	19	120.6	24.4	96.2	95.2
4-7-77 5-2-77	20	120.4	19.9	100.5	99.5
4-7-77 5-2-77	21	120.4	26.0	93.5	92.5
4-7-77 5-2-77	22	120.4	27.0	93.4	92.4

Pier 32

61

Penetr. for Last Blows/	Bearing	Bearing (Tons)
10	7/8	8.0	184.0
10	7/8	8.0	184.0
10	7/8	7.5	172.5
10	7/8	8.0	184.0
10	7/8	8.0	184.0
10	1"	8.0	176.0
10	3/4"	8.5	204.0
10	1"	8.5	187.0
10	7/8	8.0	184.0
10	3/4	8.5	204.0
16	3/4	8.0	192.0
10	1/2	8.5	224.4
10	7/8	8.0	184.0
10	1 1/8	8.5	179.5
10	7/8	8.5	195.5
10	1"	8.5	187.0
10	1 1/8	8.5	179.5
10	7/8	8.0	201.5
10	3/4	8.0	192.0
10	7/8	8.0	184.0
10	1/2	8.0	211.2
10	3/4	8.5	204.0

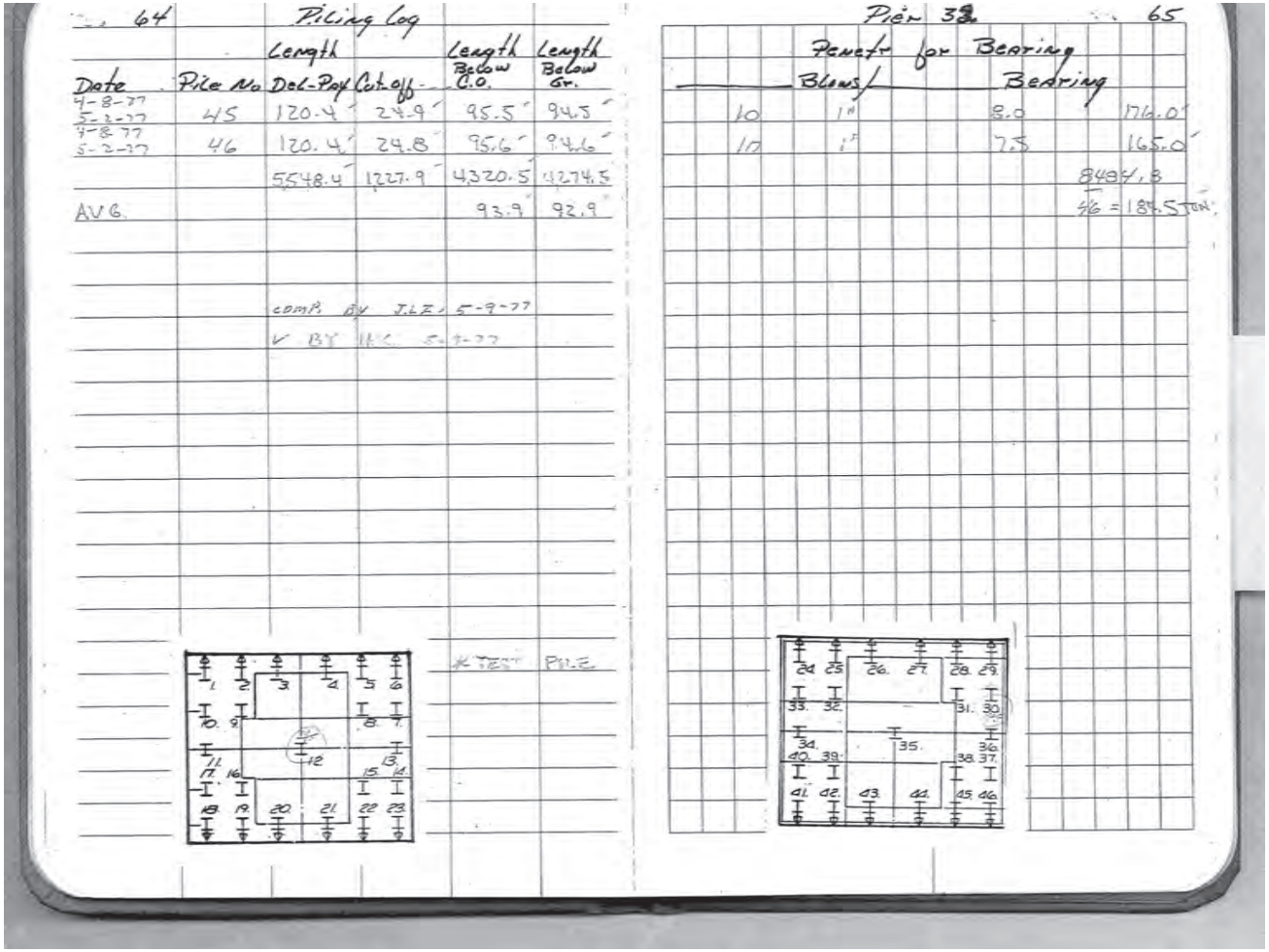


62

Date	Pile No	Piling Length Del-Pay	Log Cut-off	Length Below C.O.	Length Below Gr.
4-7-77 5-2-77	23	120.6'	26.5'	94.1'	93.1'
4-7-77 4-25-77	24	120.8'	27.0'	93.8'	92.8'
4-7-77 4-25-77	25	120.9'	25.9'	95.0'	94.0'
4-8-77 4-25-77	26	120.6'	27.0'	93.6'	92.6'
4-8-77 4-26-77	27	120.8'	27.1'	93.7'	92.7'
4-8-77 4-27-77	28	120.8'	26.9'	93.9'	92.9'
4-8-77 4-25-77	29	120.8'	26.1'	94.7'	93.7'
4-8-77 5-2-77	30	120.4'	25.8'	94.6'	93.6'
4-8-77 5-2-77	31	120.9'	26.5'	94.4'	93.4'
4-8-77 5-2-77	32	120.9'	26.2'	94.7'	93.7'
4-8-77 5-2-77	33	120.1'	25.9'	94.8'	93.8'
4-8-77 4-25-77	34	120.8'	25.6'	95.2'	94.2'
4-8-77 4-25-77	35	120.3'	26.0'	94.3'	93.3'
4-8-77 4-25-77	36	120.5'	25.7'	94.8'	93.8'
4-8-77 4-26-77	37	120.5'	26.5'	94.0'	93.0'
4-8-77 4-25-77	38	120.4'	24.6'	95.8'	94.8'
4-8-77 4-25-77	39	120.7'	26.5'	94.2'	93.2'
4-8-77 4-25-77	40	120.8'	26.2'	94.6'	93.6'
4-8-77 5-2-77	41	120.8'	25.9'	94.9'	93.9'
4-8-77 5-2-77	42	120.8'	24.4'	96.4'	95.4'
4-8-77 5-2-77	43	120.8'	23.5'	97.3'	96.3'
4-8-77 5-2-77	44	120.8'	25.7'	95.1'	94.1'

Pier 32 63

Blows/	Penetr for Bearing	Bearing	(Tons)
10	3/4	8.0	192.0
10	1 1/4	8.5	172.6
10	1 1/2	8.5	179.5
10	3/8"	8.0	184.0
10	1 1/4	9.0	182.8
10	7/8	8.5	195.5
10	7/8	8.5	195.5
10	7/8	8.0	184.0
10	3/4	8.0	192.0
10	1 1/8	8.0	169.0
10	1"	8.0	176.0
10	1"	8.5	187.0
10	1 1/8	8.0	169.0
10	7/8	8.5	195.5
10	1 1/4	8.5	172.6
10	1 3/8	8.5	161.5
10	1 1/4	8.5	172.6
10	1 1/4	8.5	172.6
10	1 1/8	8.5	179.5
10	1 1/4	8.0	162.5
10	1 1/8	8.0	169.0
10	1"	8.0	176.0



64

Piling Log

Date	Pile No	Length Del-Pay	Length Cut-off	Length Below C.O.	Length Below Gr.
4-8-77	45	120.4'	24.9'	95.5'	94.5'
5-2-77					
4-8-77	46	120.4'	24.8'	95.6'	94.6'
5-2-77					
		5548.4'	1227.9'	4320.5'	4274.5
AVG.				93.9'	92.9'

COMP. BY J.L.Z. 5-9-77

V BY [illegible] 5-9-77

* TEST PILE

Pier 38

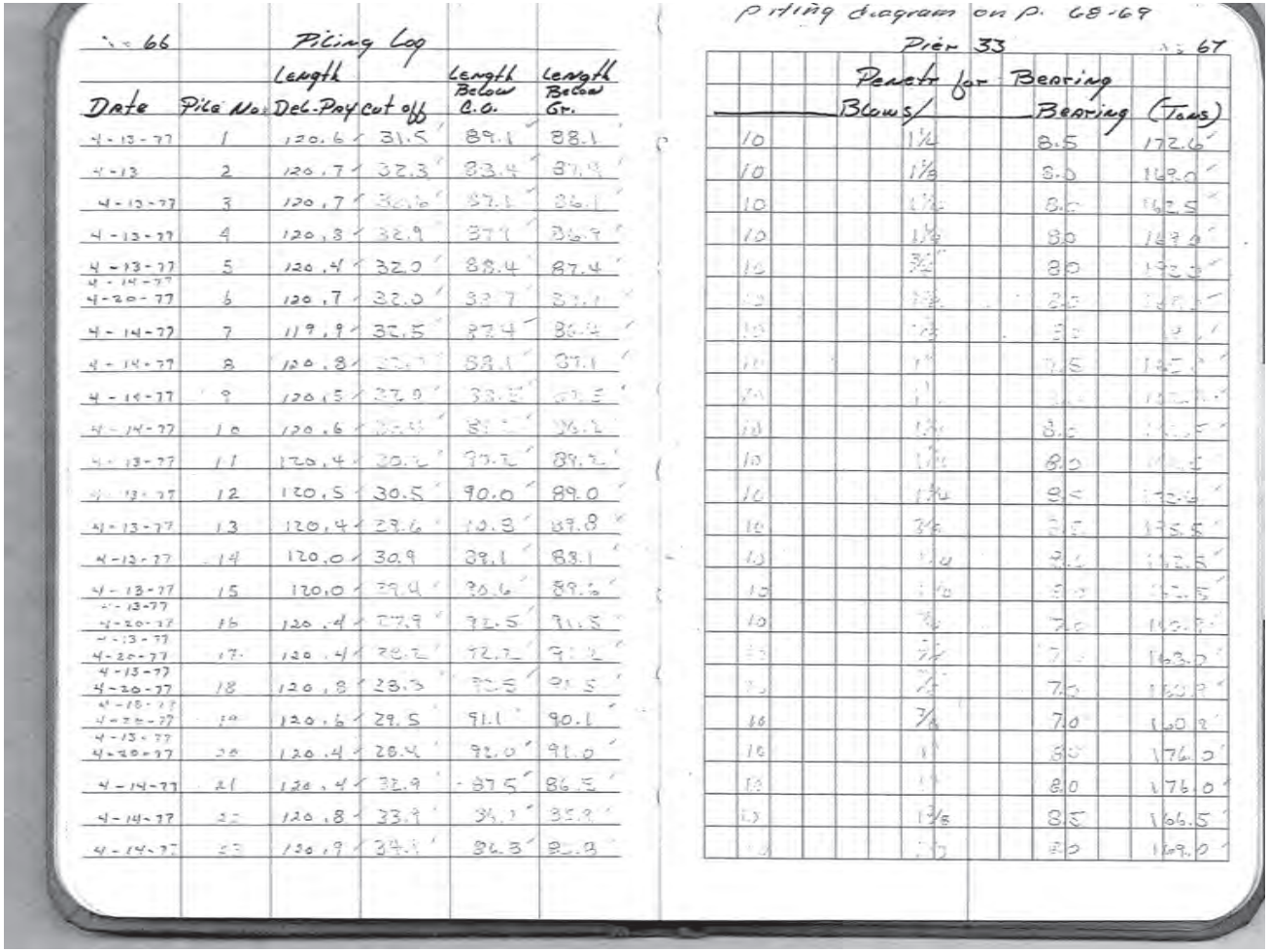
65

Penetr for Bearing

Blows/		Bearing	
10	1"	8.0	176.0'
11	1"	7.5	165.0'

8484.8

46 = 184.5 TON



p. 66

Piling Log

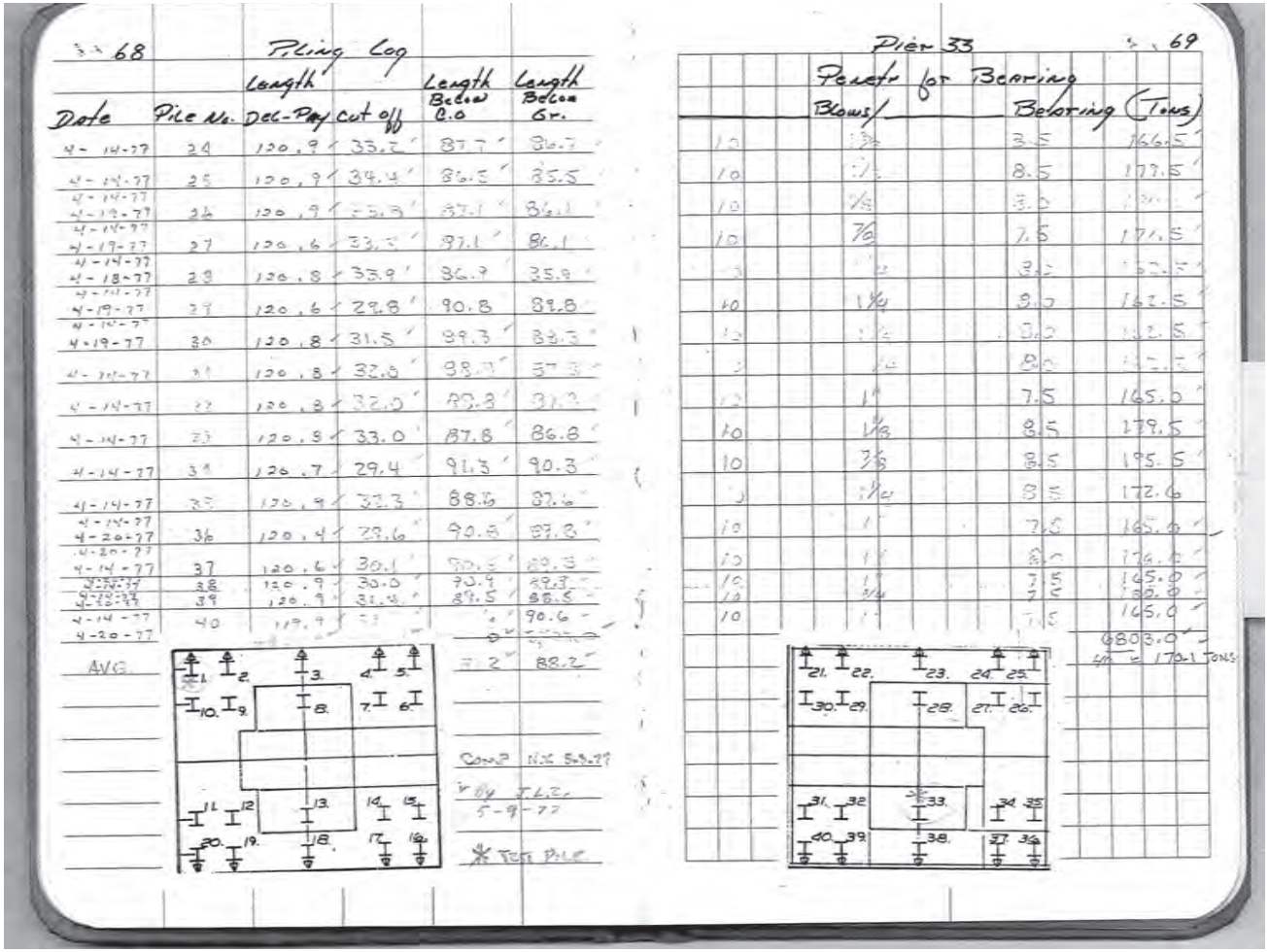
Date	Pile No.	Length Del. Pay	Length cut off	Length Below C.O.	Length Below Gr.
4-13-77	1	120.6	31.5	89.1	88.1
4-13	2	120.7	32.3	88.4	87.4
4-13-77	3	120.7	33.6	87.1	86.1
4-13-77	4	120.8	32.9	87.9	86.9
4-13-77	5	120.4	32.0	88.4	87.4
4-14-77 4-20-77	6	120.7	33.0	87.7	86.7
4-14-77	7	119.9	32.5	87.4	86.4
4-14-77	8	120.8	33.7	87.1	86.1
4-14-77	9	120.5	32.0	88.5	87.5
4-14-77	10	120.6	33.4	87	86.0
4-13-77	11	120.4	30.2	90.2	89.2
4-13-77	12	120.5	30.5	90.0	89.0
4-13-77	13	120.4	29.6	90.8	89.8
4-13-77	14	120.0	30.9	89.1	88.1
4-13-77	15	120.0	29.4	90.6	89.6
4-13-77 4-20-77	16	120.4	27.9	92.5	91.5
4-13-77 4-20-77	17	120.4	28.2	92.2	91.2
4-13-77 4-20-77	18	120.8	29.3	91.5	90.5
4-13-77 4-20-77	19	120.6	29.5	91.1	90.1
4-13-77 4-20-77	20	120.4	28.4	92.0	91.0
4-14-77	21	120.4	32.9	87.5	86.5
4-14-77	22	120.8	33.9	86.9	85.9
4-14-77	23	120.9	34.1	86.8	85.8

piling diagram on p. 68-69

Pier 33

p. 67

Blows/	Penetr for Bearing	Bearing (Tons)
10	1½	172.6
10	1⅛	168.0
10	1⅛	162.5
10	1⅛	180
10	¾	180
10	⅞	170
10	1	180
10	1	176.0
		180
	1⅛	166.5
		169.0



68

Piling Log

Date	Pile No.	Length Dec-Pay	Length cut off	Length Below C.O	Length Below Gr.
4-14-77	24	120.9	33.2	87.7	86.7
4-14-77	25	120.9	34.4	86.5	85.5
4-14-77					
4-19-77	26	120.9	33.8	87.1	86.1
4-14-77					
4-19-77	27	120.6	33.3	87.1	86.1
4-14-77					
4-18-77	28	120.8	33.9	86.7	85.8
4-14-77					
4-19-77	29	120.6	29.8	90.8	89.8
4-14-77					
4-19-77	30	120.8	31.5	89.3	88.3
4-14-77					
4-19-77	31	120.8	32.5	88.3	87.3
4-14-77	32	120.8	32.5	88.3	87.3
4-14-77	33	120.8	33.0	87.8	86.8
4-14-77	34	120.7	29.4	91.3	90.3
4-14-77	35	120.9	32.3	88.6	87.6
4-14-77					
4-20-77	36	120.4	29.6	90.8	89.8
4-20-77					
4-14-77	37	120.6	30.1	90.5	89.5
4-14-77	38	120.9	30.0	90.9	89.9
4-20-77	39	120.9	31.4	89.5	88.5
4-14-77	40	119.9	[illegible]	90.6	
4-20-77					
AVG				88.2	

Comp N.C. 5-3-77
Rdy 7.L.C. 5-9-77
* Test Pile

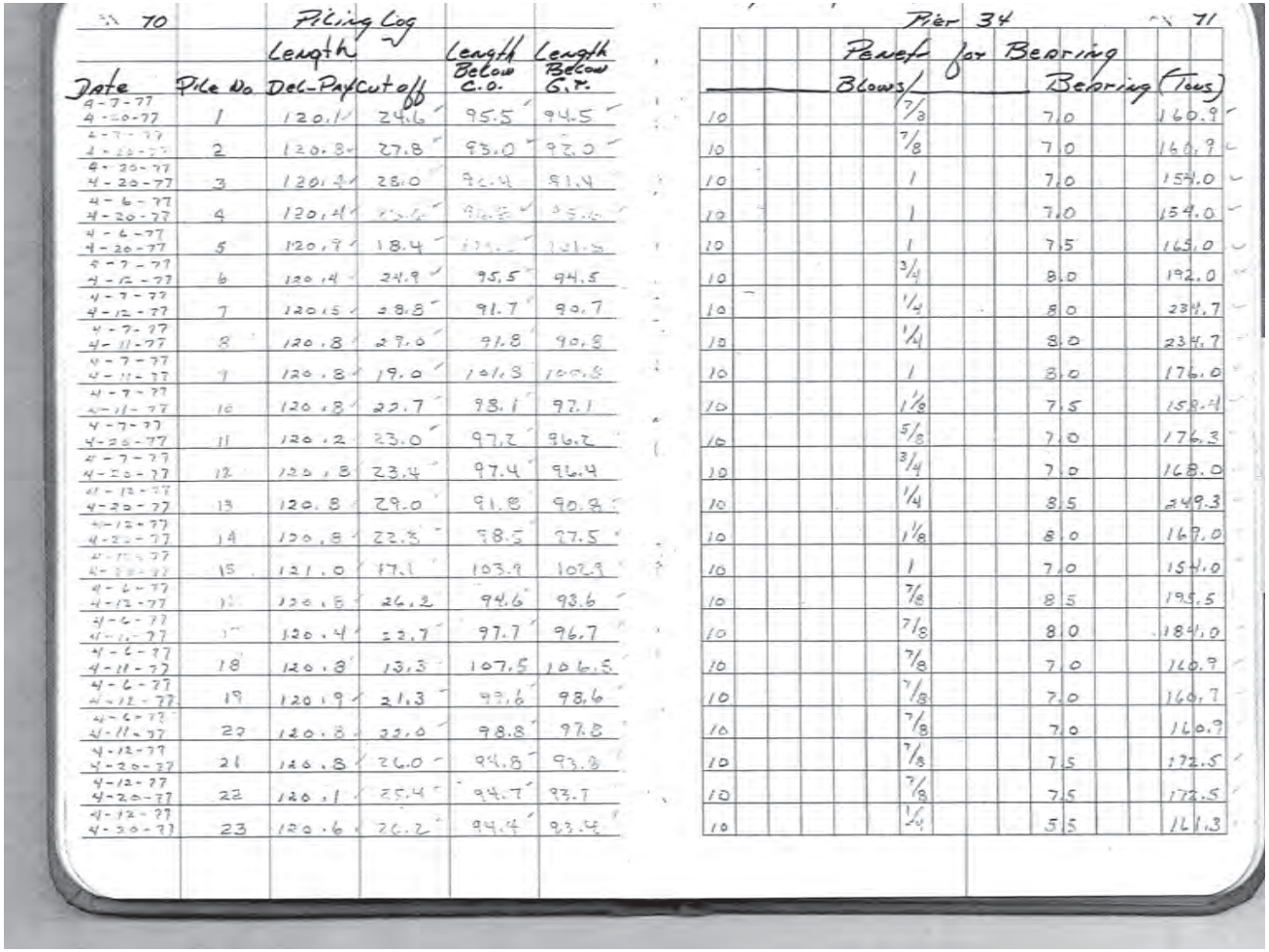
69

Pier 33

Power for Bearing

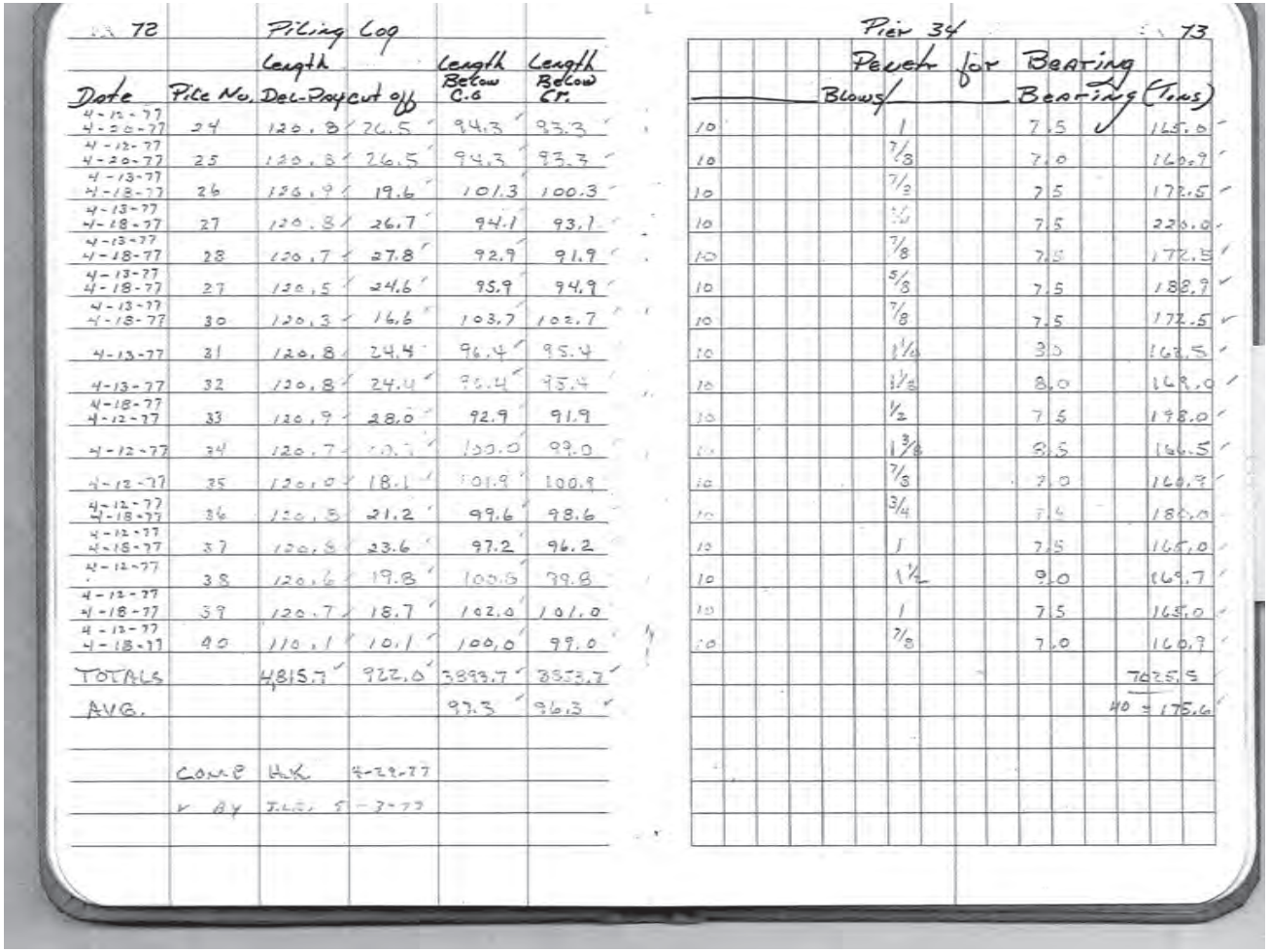
Blows/	Bearing (Tons)
10	166.5
10	177.5
10	
10	171.5
10	167.5
10	165.0
10	179.5
10	195.5
	172.6
10	165.0
10	176.0
10	165.0
10	180.0
10	165.0

6803.0
50% = 170.1 TONS



70 — Piling Log — Pier 34 — 71

Date	Pile No.	Length Del-Pay	Length Cut off	Length Below C.O.	Length Below G.T.	Blows/		Penetration for Bearing	Bearing (Tons)
4-7-77 4-20-77	1	120.1	24.6	95.5	94.5	10	7/8	7.0	160.9
4-7-77 4-20-77	2	120.8	27.8	93.0	92.0	10	7/8	7.0	160.9
4-20-77 4-20-77	3	120.4	28.0	92.4	91.4	10	1	7.0	154.0
4-6-77 4-20-77	4	120.4	[illegible]	[illegible]	[illegible]	10	1	7.0	154.0
4-6-77 4-20-77	5	120.9	18.4	[illegible]	[illegible]	10	1	7.5	165.0
4-7-77 4-12-77	6	120.4	24.9	95.5	94.5	10	3/4	8.0	192.0
4-7-77 4-12-77	7	120.5	28.8	91.7	90.7	10	1/4	8.0	234.7
4-7-77 4-11-77	8	120.8	27.0	91.8	90.8	10	1/4	8.0	234.7
4-7-77 4-11-77	9	120.8	19.0	101.8	100.8	10	1	8.0	176.0
4-7-77 4-11-77	10	120.8	22.7	98.1	97.1	10	1 1/8	7.5	158.4
4-7-77 4-20-77	11	120.2	23.0	97.2	96.2	10	5/8	7.0	176.3
4-7-77 4-20-77	12	120.8	23.4	97.4	96.4	10	3/4	7.0	168.0
4-12-77 4-20-77	13	120.8	29.0	91.8	90.8	10	1/4	8.5	249.3
4-12-77 4-20-77	14	120.8	22.3	98.5	97.5	10	1 1/8	8.0	169.0
4-12-77 4-20-77	15	121.0	17.1	103.9	102.9	10	1	7.0	154.0
4-6-77 4-12-77	16	120.6	26.2	94.6	93.6	10	7/8	8.5	195.5
4-6-77 4-11-77	17	120.4	22.7	97.7	96.7	10	7/8	8.0	184.0
4-6-77 4-11-77	18	120.8	13.3	107.5	106.5	10	7/8	7.0	160.9
4-6-77 4-12-77	19	120.9	21.3	99.6	98.6	10	7/8	7.0	160.7
4-6-77 4-11-77	27	120.8	22.0	98.8	97.8	10	7/8	7.0	160.9
4-12-77 4-20-77	21	120.8	26.0	94.8	93.8	10	7/8	7.5	172.5
4-12-77 4-20-77	22	120.1	25.4	94.7	93.7	10	7/8	7.5	172.5
4-12-77 4-20-77	23	120.6	26.2	94.4	93.4	10	1/4	5.5	141.3



72

Piling Log

Date	Pile No.	Length Del.	Payout off	Length Below C.O	Length Below Gr.
4-12-77 4-20-77	24	120.8	26.5	94.3	93.3
4-12-77 4-20-77	25	120.8	26.5	94.3	93.3
4-13-77 4-18-77	26	120.9	19.6	101.3	100.3
4-13-77 4-18-77	27	120.8	26.7	94.1	93.1
4-13-77 4-18-77	28	120.7	27.8	92.9	91.9
4-13-77 4-18-77	29	120.5	24.6	95.9	94.9
4-13-77 4-18-77	30	120.3	16.6	103.7	102.7
4-13-77	31	120.8	24.4	96.4	95.4
4-13-77	32	120.8	24.4	96.4	95.4
4-18-77 4-12-77	33	120.9	28.0	92.9	91.9
4-12-77	34	120.7	21.7	100.0	99.0
4-12-77	35	120.0	18.1	101.9	100.9
4-12-77 4-18-77	36	120.5	21.2	99.6	98.6
4-12-77 4-18-77	37	120.8	23.6	97.2	96.2
4-12-77	38	120.6	19.8	100.8	99.8
4-12-77 4-18-77	39	120.7	18.7	102.0	101.0
4-12-77 4-18-77	40	110.1	10.1	100.0	99.0
TOTALS		4815.7	922.0	3893.7	3853.7
AVG.				97.3	96.3

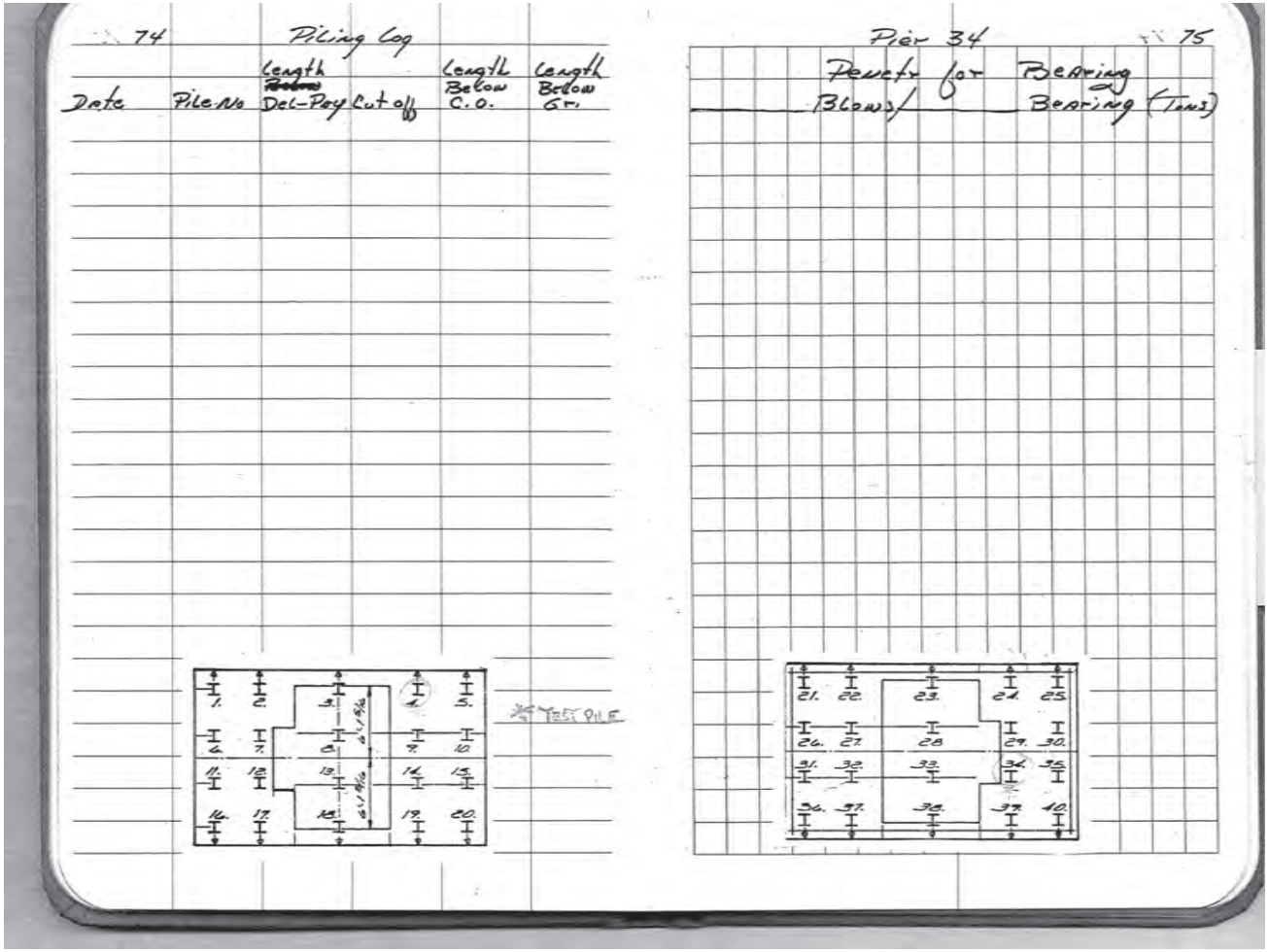
COMP HK 4-29-77

CK BY JLG 5-3-77

Pier 34

73

Blows/	Penetration for	Bearing	Bearing (Tons)
10	1	7.5	165.0
10	7/8	7.0	160.9
10	7/8	7.5	172.5
10	1	7.5	225.0
10	7/8	7.5	172.5
10	5/8	7.5	188.9
10	7/8	7.5	172.5
10	1 1/8	3.5	168.5
10	1 1/8	8.0	169.0
10	1/2	7.5	198.0
10	1 3/8	8.5	166.5
10	7/8	7.0	160.9
10	3/4	7.4	184.0
10	1	7.5	165.0
10	1 1/2	9.0	169.7
10	1	7.5	165.0
10	7/8	7.0	160.9
			7025.5
			40 = 175.6



74

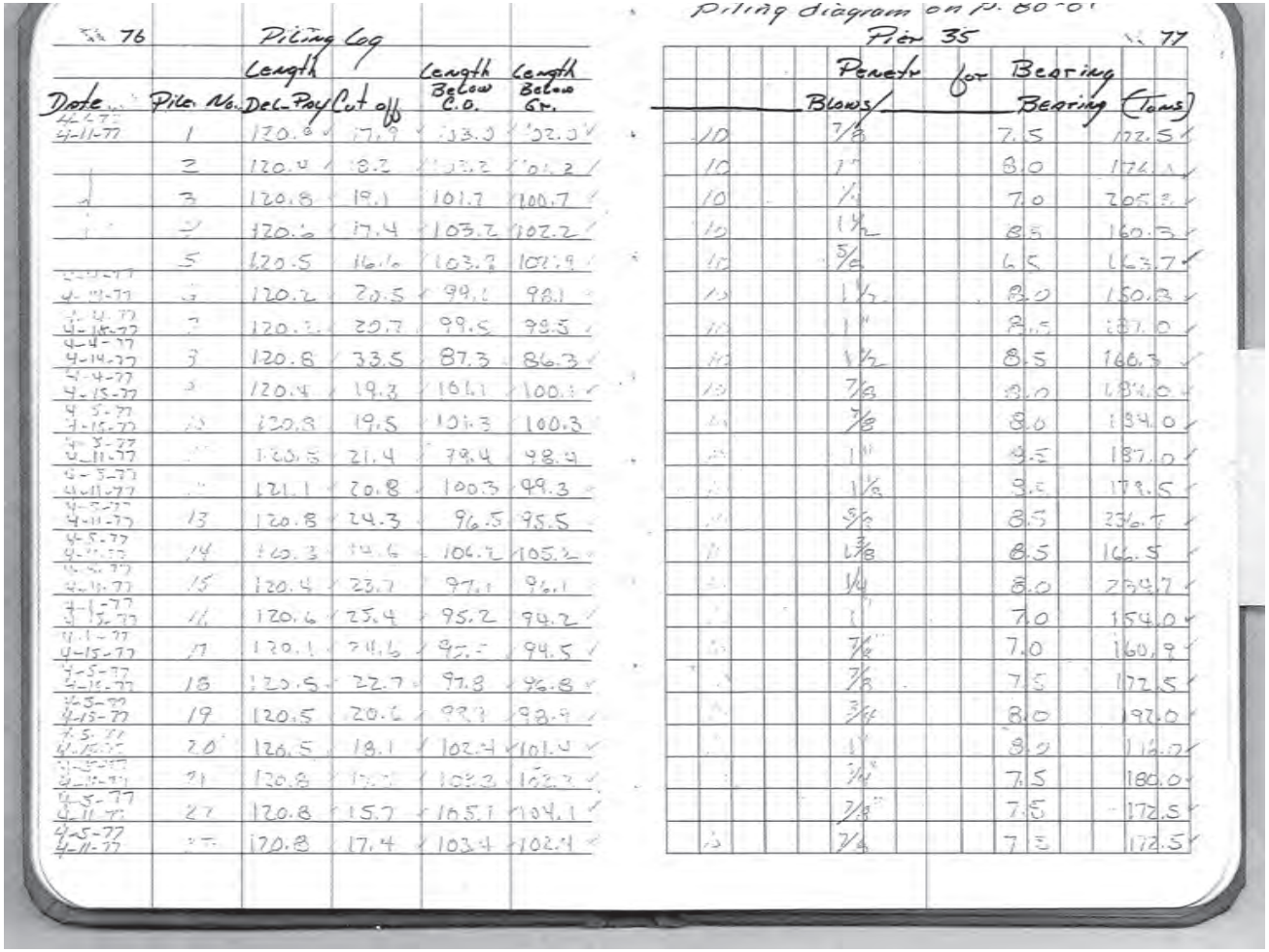
Piling Log

Date	Pile No	Length Del-Pay Cut off	Length Below C.O.	Length Below Gr.

Pier 34

75

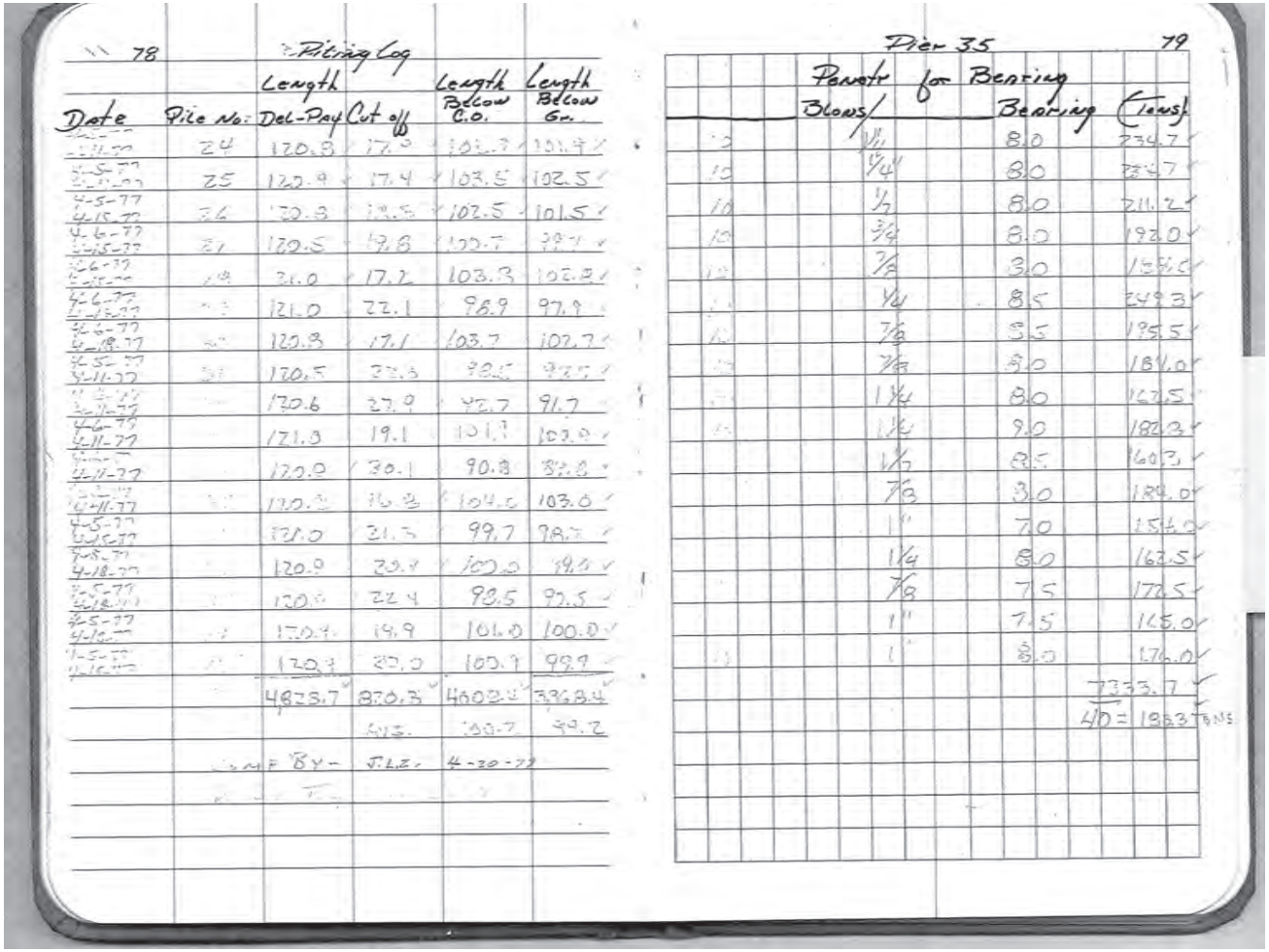
Penetr. for Blows/	Bearing	Bearing (Tons)



Piling Log — Pier 35

Piling diagram on P. 80-01

Date	Pile No.	Length Del. Pay	Length Cut off	Length Below C.O.	Length Below Gr.	Penetr. Blows/	for	Bearing Bearing (Tons)
4-11-77	1	120.0	17.9	103.9	102.9	10	7/8	7.5 / 172.5
	2	120.0	18.2	103.2	101.2	10	1"	8.0 / 176.0
	3	120.8	19.1	101.7	100.7	10	1/4	7.0 / 205.8
	4	120.6	17.4	103.2	102.2	10	1 1/2	8.5 / 160.3
	5	120.5	16.1	103.8	101.9	10	5/8	6.5 / 163.7
4-11-77	6	120.2	20.5	99.1	98.1	10	1 1/2	8.0 / 150.3
4-14-77	7	120.1	20.7	99.5	98.5	10	1"	8.5 / 187.0
4-14-77	8	120.8	33.5	87.3	86.3	10	1 1/2	8.5 / 160.3
4-15-77	9	120.4	19.3	101.1	100.1	10	7/8	8.0 / 184.0
4-15-77	10	120.8	19.5	101.3	100.3	10	7/8	8.0 / 184.0
4-11-77	11	120.5	21.4	99.1	98.1	10	1"	8.5 / 187.0
4-11-77	12	121.1	20.8	100.3	99.3	10	1 1/8	9.5 / 179.5
4-11-77	13	120.8	24.3	96.5	95.5	10	5/8	8.5 / 220.7
4-11-77	14	120.3	14.6	105.7	105.2	10	1 3/8	8.5 / 164.5
4-11-77	15	120.4	23.7	97.1	96.1	10	1/4	8.0 / 204.7
4-11-77	16	120.6	25.4	95.2	94.2	10	1"	7.0 / 154.0
4-15-77	17	120.1	24.6	95.5	94.5	10	7/8	7.0 / 160.9
4-15-77	18	120.5	22.7	97.8	96.8	10	7/8	7.5 / 172.5
4-15-77	19	120.5	20.6	99.9	98.9	10	3/4	8.0 / 192.0
4-15-77	20	120.5	18.1	102.4	101.4	10	1"	9.0 / 216.0
4-15-77	21	120.8	17.5	103.3	102.3	10	3/4"	7.5 / 180.0
4-15-77	22	120.8	15.7	105.1	104.1	10	7/8"	7.5 / 172.5
4-15-77	23	120.8	17.4	103.4	102.4	10	7/8	7.5 / 172.5



78

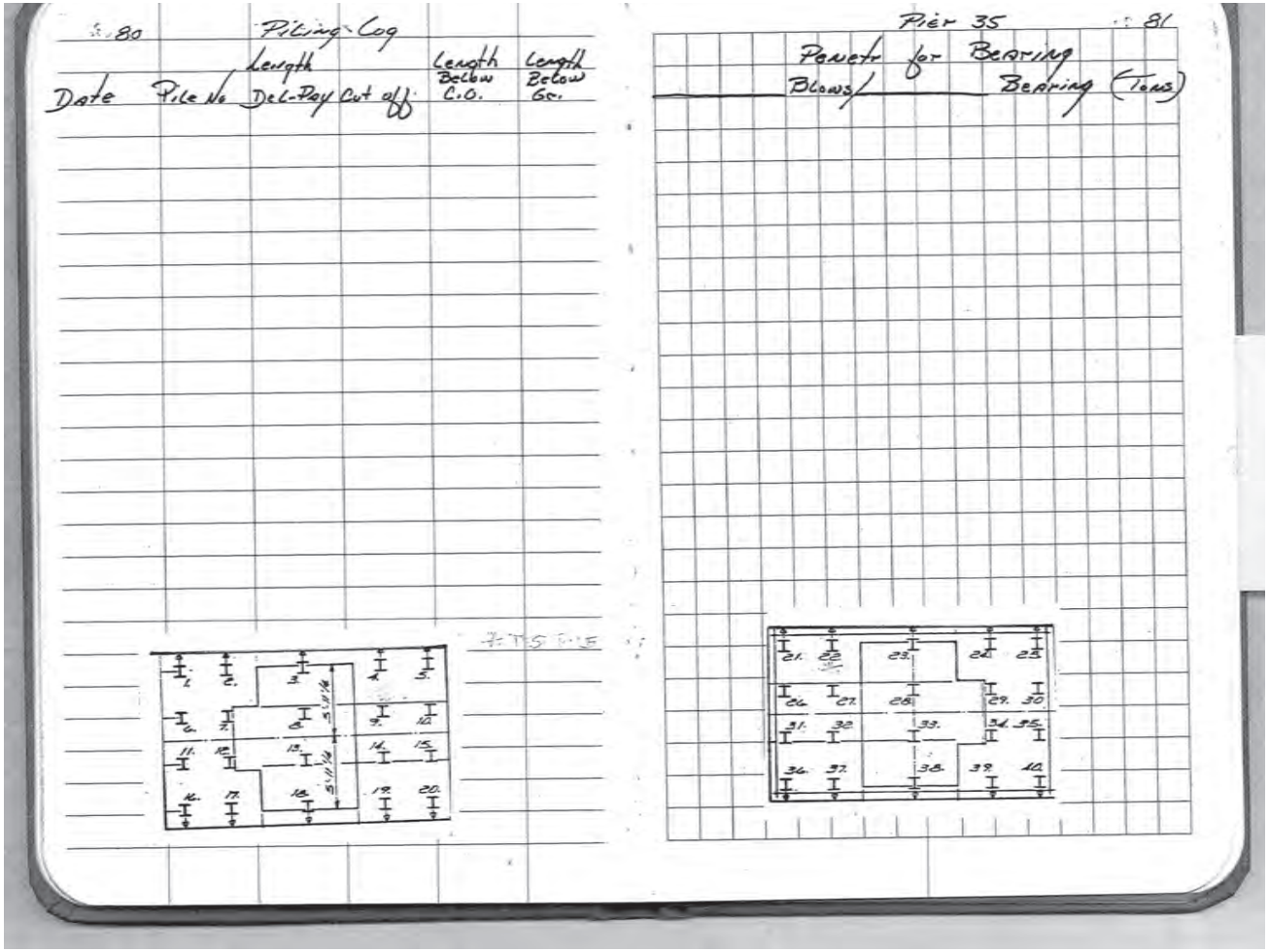
Piling Log

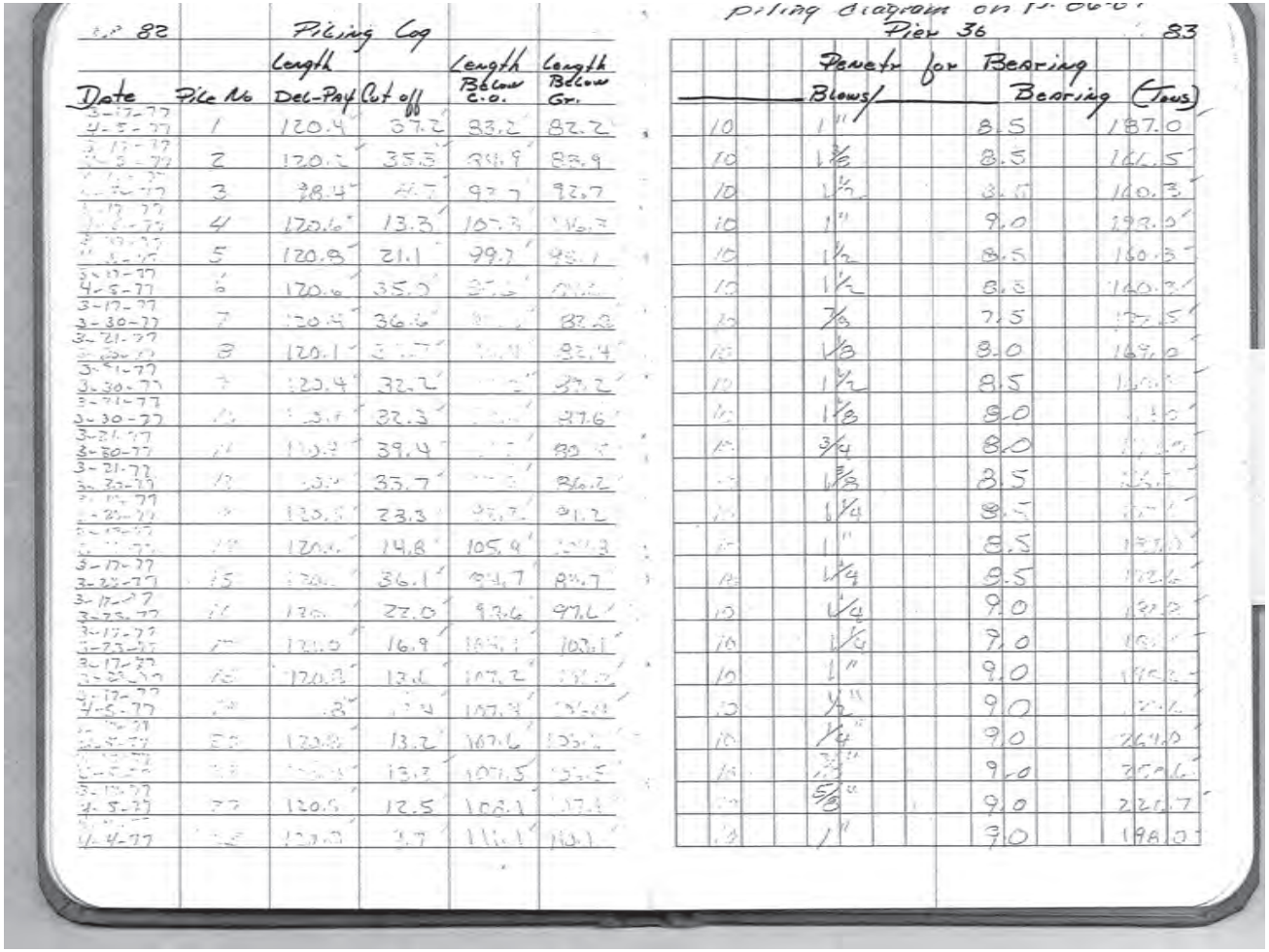
Date	Pile No:	Length Del-Pay	Cut off	Length Below C.O.	Length Below Gr.
4-11-77	24	120.3	17.3	103.0	101.9
4-5-77	25	120.9	17.4	103.5	102.5
4-5-77	26	120.8	18.5	102.5	101.5
4-6-77	27	120.5	19.8	100.7	99.7
4-6-77	28	121.0	17.2	103.8	102.8
4-6-77	29	121.0	22.1	98.9	97.9
4-18-77	30	120.8	17.1	103.7	102.7
4-11-77	31	120.5	22.3	98.2	97.2
4-11-77	32	120.6	29.9	92.7	91.7
4-11-77	33	121.3	19.1	102.2	101.2
4-11-77	34	120.9	30.1	90.8	89.8
4-11-77	35	120.3	16.3	104.0	103.0
4-5-77	36	121.0	21.3	99.7	98.7
4-18-77	37	120.9	20.9	100.0	99.0
4-5-77	38	120.5	22.4	98.5	97.5
4-5-77	39	120.9	19.9	101.0	100.0
4-5-77	40	120.9	20.0	100.9	99.9
		4825.7	820.3	4005.4	3968.4
			AVG.	100.1	99.2
		CHKD BY -	J.L.Z.	4-20-77	

Pier 35

79

Penetr for Blows/	Bearing	Tons
1"	8.0	234.7
1/4	8.0	234.7
1/2	8.0	211.2
3/4	8.0	192.0
7/8	8.0	176.0
1/4	8.5	249.3
3/8	8.5	195.5
7/8	8.0	184.0
1 1/4	8.0	167.5
1 1/4	9.0	180.3
1/2	8.5	160.3
7/8	8.0	184.0
1"	7.0	154.0
1 1/4	8.0	167.5
7/8	7.5	172.5
1"	7.5	165.0
1"	8.0	176.0
		7373.7
	40 =	184.3 TONS


Piling Log
Date
Pile No
Length Del-Pay Cut off
Length Below C.O.
Length Below Gr.
Pier 35
Penetr for Bearing
Blows/
Bearing (Tons)



82

Piling Log

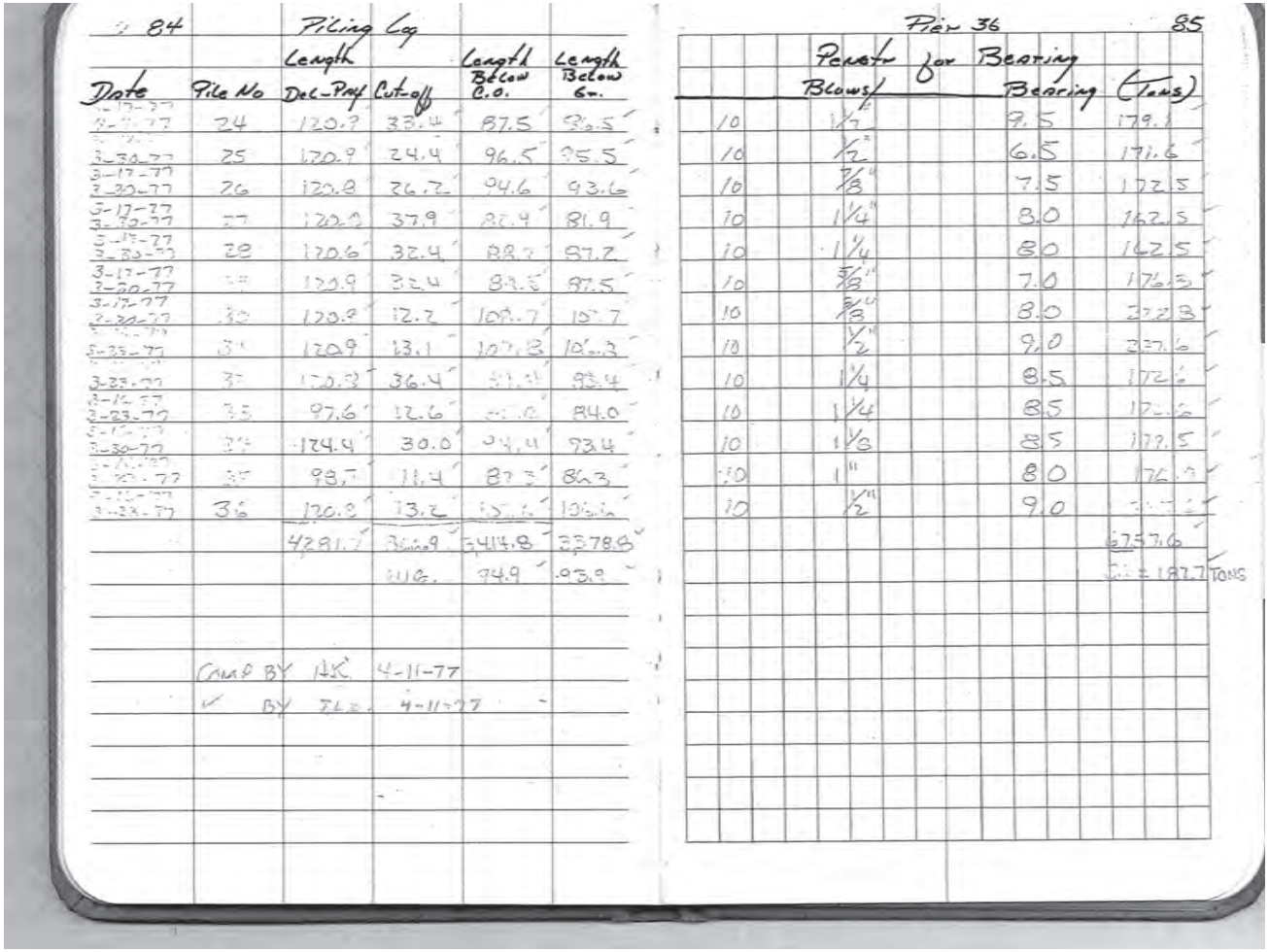
Date	Pile No	Length Del-Proj	Cut off	Length Below C.O.	Length Below Gr.
3-17-77	1	120.4	37.2	83.2	82.2
3-17-77	2	120.2	35.3	84.9	83.9
3-17-77	3	128.4	34.7	93.7	92.7
3-17-77	4	120.6	13.3	107.3	106.3
3-17-77	5	120.8	21.1	99.7	98.7
3-17-77	6	120.6	35.0	85.6	84.6
3-17-77	7	120.4	36.6	83.8	82.8
3-21-77	8	120.1	35.7	84.4	83.4
3-21-77	9	120.4	32.2	88.2	87.2
3-21-77	10	120.4	32.3	88.1	87.6
3-21-77	11	120.7	39.4	81.3	80.3
3-21-77	12	120.2	33.7	86.5	85.5
3-17-77	13	120.5	23.3	97.2	91.2
3-17-77	14	120.4	14.8	105.6	104.3
3-17-77	15	120.8	36.1	84.7	83.7
3-17-77	16	120.6	22.0	98.6	97.6
3-17-77	17	120.9	16.9	104.1	103.1
3-17-77	18	120.8	13.6	107.2	106.2
4-17-77	19	.8	14.4	107.4	106.4
4-5-77	E2	120.8	13.2	107.6	106.6
4-5-77	E3	120.8	13.3	107.5	106.5
3-17-77	22	120.6	12.5	108.1	107.1
4-4-77	E1	120.2	9.7	110.5	109.5

piling diagram on p. 86.1

Pier 36

83

	Penetr for Blows/	Bearing	Bearing (Tons)
10	1"	8.5	187.0
10	1 3/8	8.5	166.5
10	1 1/2	8.5	160.3
10	1"	9.0	198.0
10	1 1/2	8.5	160.3
10	1 1/2	8.5	160.3
10	7/8	7.5	172.5
10	1 1/8	8.0	184.0
10	1 1/2	8.5	166.5
10	1 1/8	8.0	184.0
10	3/4	8.0	184.0
10	1 3/8	8.5	166.5
10	1 1/4	8.5	170.0
10	1"	8.5	187.0
10	1 1/4	9.5	209.0
10	1 1/4	9.0	198.0
10	1 1/2	9.0	180.0
10	1"	9.0	198.0
10	1 1/2"	9.0	180.0
10	1 1/4"	9.0	198.0
10	1 3/4"	9.0	180.0
10	5/8"	9.0	220.7
10	1"	9.0	198.0



84

Piling Log

Date	File No	Length Dec-Proj	Cut-off	Length Below C.O.	Length Below Gr.
3-17-77	24	120.9	33.4	87.5	83.5
3-30-77	25	120.9	24.4	96.5	95.5
3-17-77					
3-30-77	26	120.8	26.2	94.6	93.6
3-17-77					
3-30-77	27	120.9	37.9	82.4	81.9
3-17-77					
3-30-77	28	120.6	32.4	88.2	87.2
3-17-77					
3-30-77		120.9	32.4	88.5	87.5
3-17-77					
3-30-77	30	120.9	12.2	108.7	107
3-25-77	31	120.9	13.1	107.8	106.3
3-23-77	32	120.8	36.4	84.4	83.4
3-17-77					
3-23-77	33	97.6	12.6	85.0	84.0
3-17-77					
3-30-77	34	124.4	30.0	94.4	93.4
3-17-77					
3-30-77	35	98.7	11.4	87.3	86.3
3-17-77					
3-23-77	36	120.9	13.2	107.7	106.7
		4291.7	386.9	5414.8	5378.8
			WG.	94.9	93.9

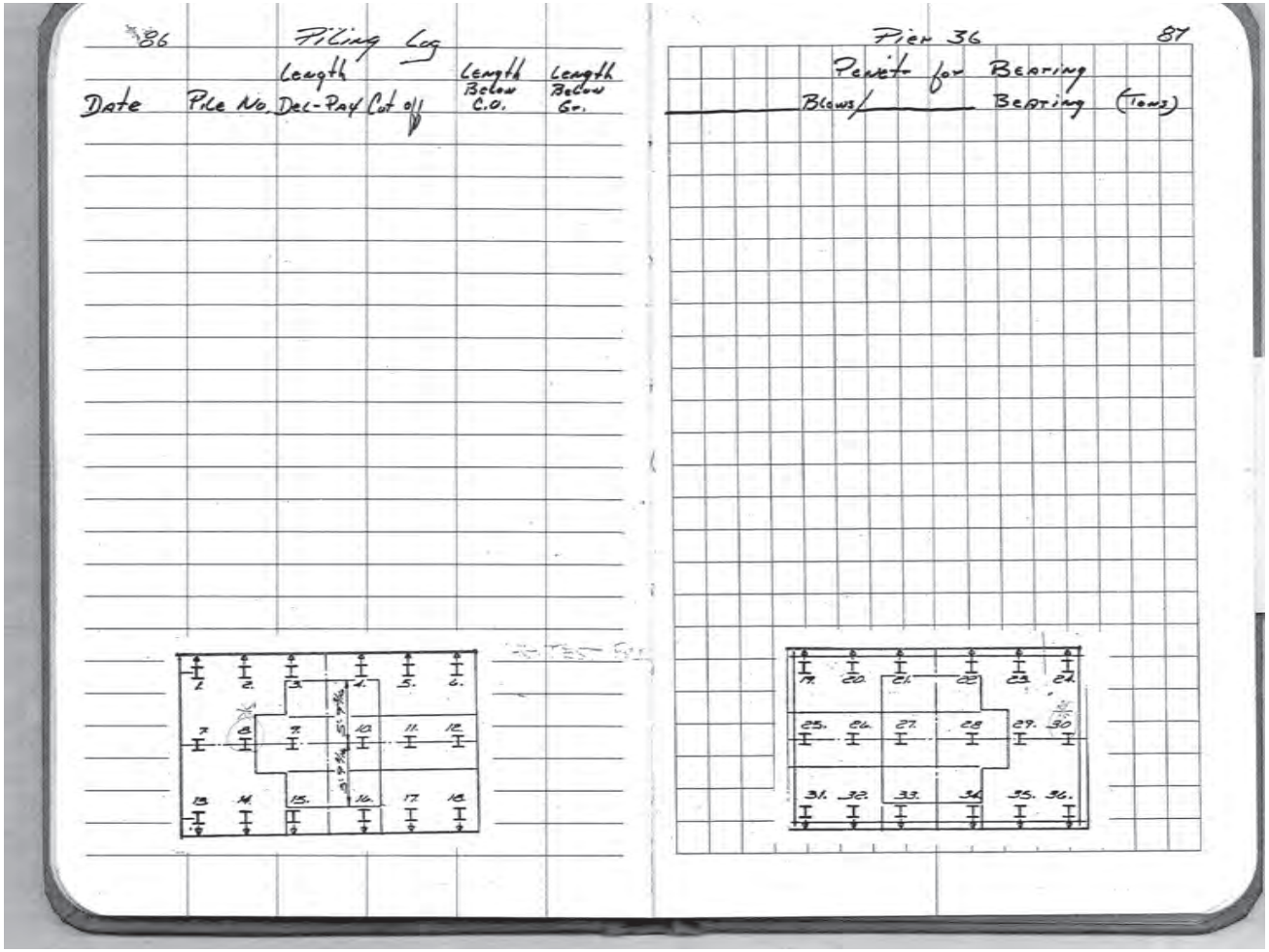
COMP BY NK 4-11-77

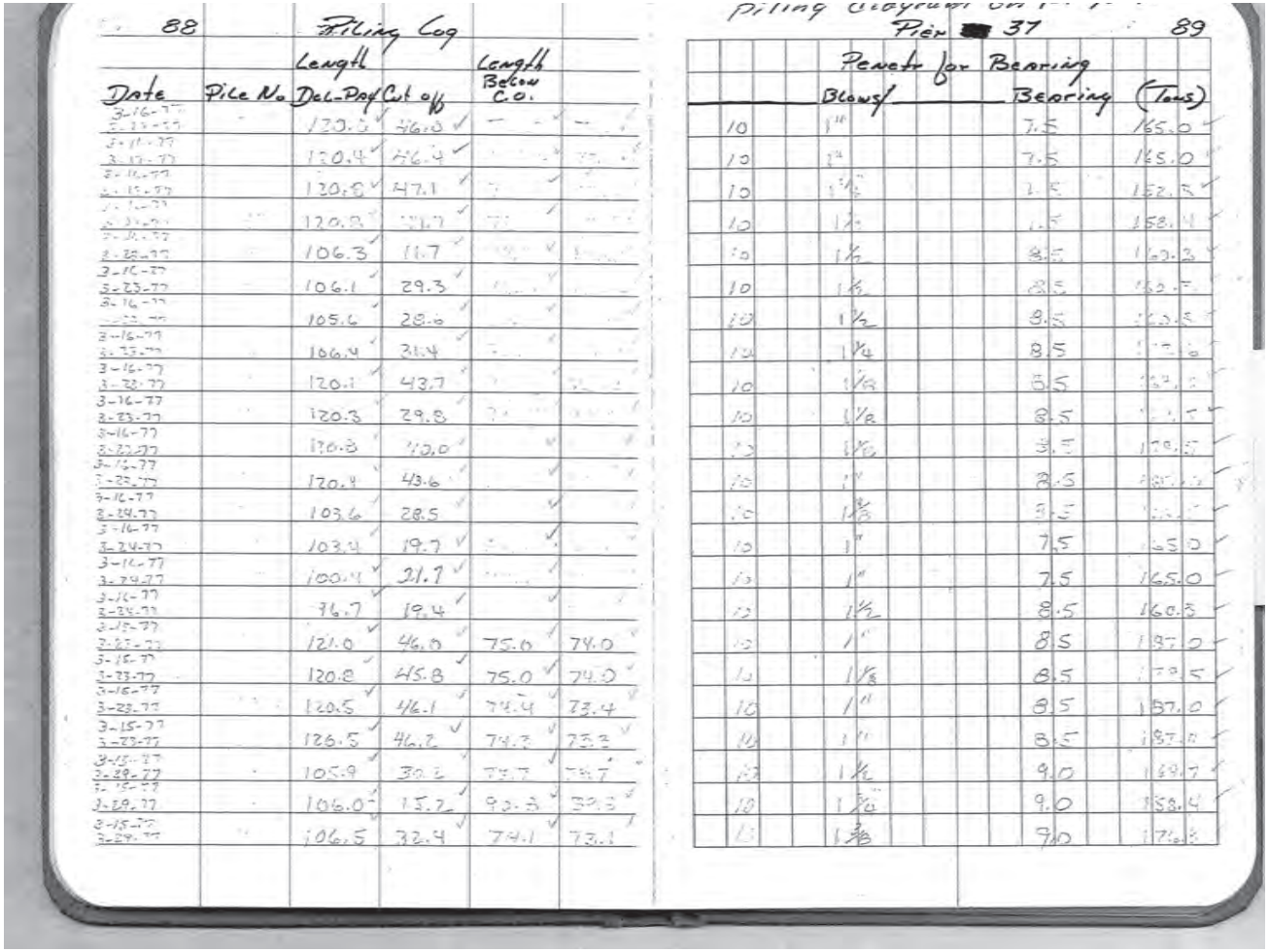
✓ BY [illegible] 4-11-77

Pier 36

85

Blows/	Penetration for	Bearing	Bearing (Tons)
10	1/2"	7.5	179.1
10	1/2"	6.5	171.6
10	7/8"	7.5	172.5
10	1 1/4"	8.0	162.5
10	1 1/4"	8.0	162.5
10	5/8"	7.0	176.5
10	5/8"	8.0	372.3
10	1/2"	9.0	337.6
10	1 1/4"	8.5	172.5
10	1 1/4"	8.5	172.5
10	1 1/8"	8.5	172.5
10	1"	8.0	176.5
10	1/2"	9.0	[illegible]
			6757.6
			∴ ± 187.7 TONS


86
Piling Log
Length
Date
Pile No.
Del-Pay
Cut off
Length Below C.O.
Length Below G.
Pier 36
87
Points for Bearing
Blows/
Bearing
(Tons)



88

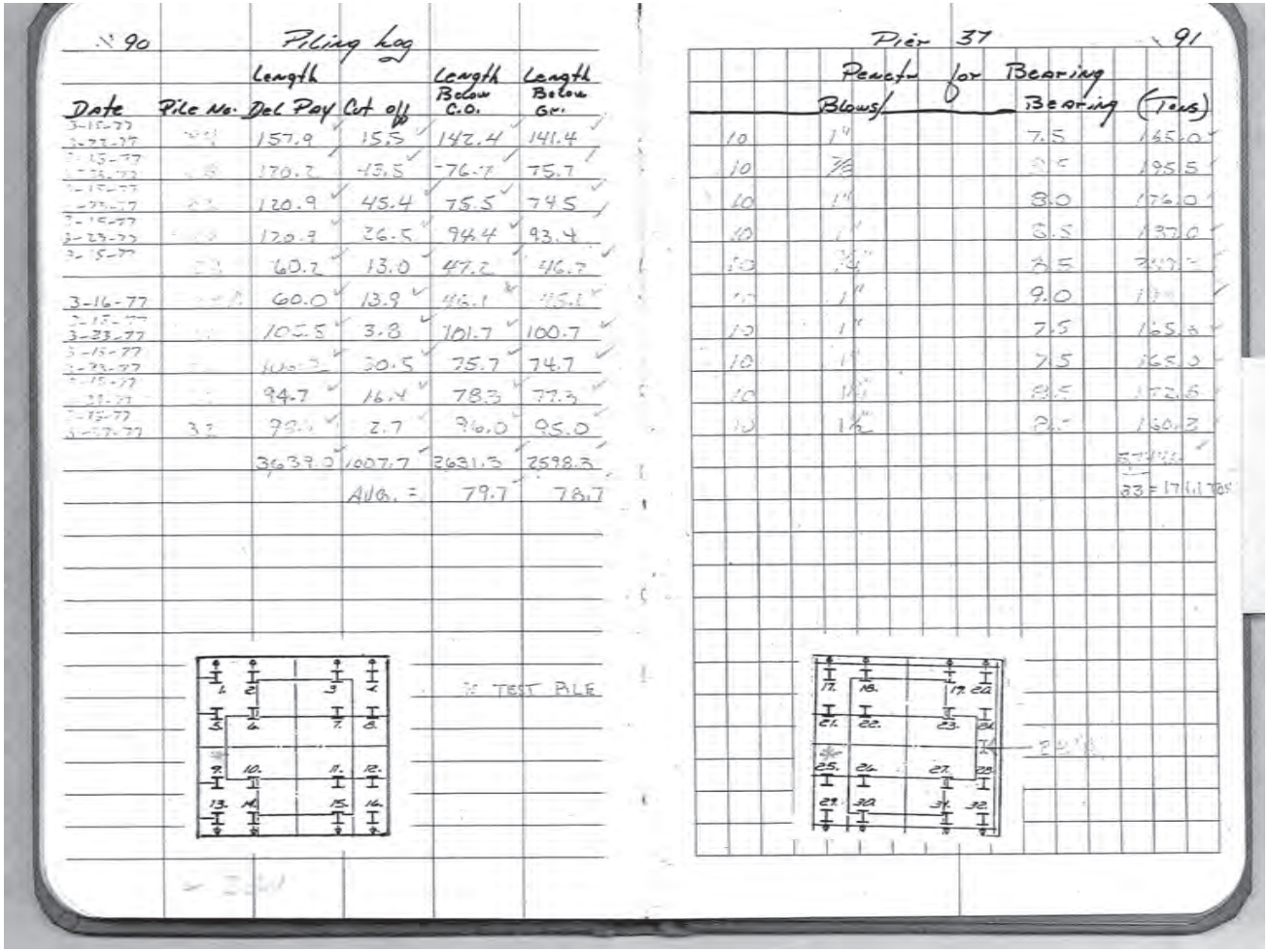
Piling Log

Date	Pile No	Length Del-Prof	Length Cut off	Length Below C.O.	
3-16-77		120.5	46.0	—	—
3-17-77		120.4	46.4		
3-17-77		120.8	47.1		
3-17-77		120.8	47.7		
3-28-77		106.3	11.7		
3-17-77		106.1	29.3		
3-16-77		105.6	28.6		
3-16-77		106.4	31.4		
3-16-77		120.1	43.7		
3-16-77		120.3	29.8		
3-16-77		120.8	10.0		
3-16-77		120.4	43.6		
3-16-77		103.6	28.5		
3-16-77		103.4	19.7		
3-17-77		100.4	21.7		
3-17-77		96.7	19.4		
3-17-77		121.0	46.0	75.0	74.0
3-16-77		120.8	45.8	75.0	74.0
3-16-77		120.5	46.1	74.4	73.4
3-15-77		126.5	46.2	74.2	73.2
3-15-77		105.9	32.2	74.7	73.7
3-15-77		106.0	15.2	93.3	92.3
3-15-77		106.5	32.4	74.1	73.1

Piling Diagram on [redacted] Pier [redacted] 37

89

	Penetr for Bearing Blows/	Bearing	(Tons)
10	1"	7.5	165.0
10	1"	7.5	165.0
10	1 1/8	7.5	152.5
10	1 1/4	7.5	158.4
10	1 1/8	8.5	160.2
10	1 1/8	8.5	160.2
10	1 1/2	8.5	160.2
10	1 1/4	8.5	160.2
10	1 1/8	8.5	160.2
10	1 1/8	8.5	160.2
10	1"	8.5	160.2
10	1 3/8	8.5	160.2
10	1"	7.5	165.0
10	1"	7.5	165.0
10	1 1/8	8.5	160.2
10	1"	8.5	160.2
10	1 1/8	8.5	160.2
10	1"	8.5	160.2
10	1"	8.5	160.2
10	1 1/8	9.0	158.4
10	1 1/8	9.0	158.4
10	1 3/8	9.0	158.4



N 90

Piling Log

Date	Pile No.	Length Del Pay	Length Cut off	Length Below C.O.	Length Below Gr.
3-15-77		157.9	15.5	142.4	141.4
3-22-77		170.2	43.5	-76.7	75.7
3-15-77		120.9	45.4	75.5	74.5
3-15-77		120.9	26.5	94.4	93.4
3-15-77		60.7	13.0	47.2	46.7
3-16-77		60.0	13.9	46.1	45.1
3-15-77		105.5	3.8	101.7	100.7
3-33-77		105.3	30.5	75.7	74.7
3-15-77		94.7	16.4	78.3	77.3
3-22-77		97.7	2.7	96.0	95.0
3-15-77	32				
3-17-77		3639.2	1007.7	2631.3	2598.3
			Avg. =	79.7	78.7

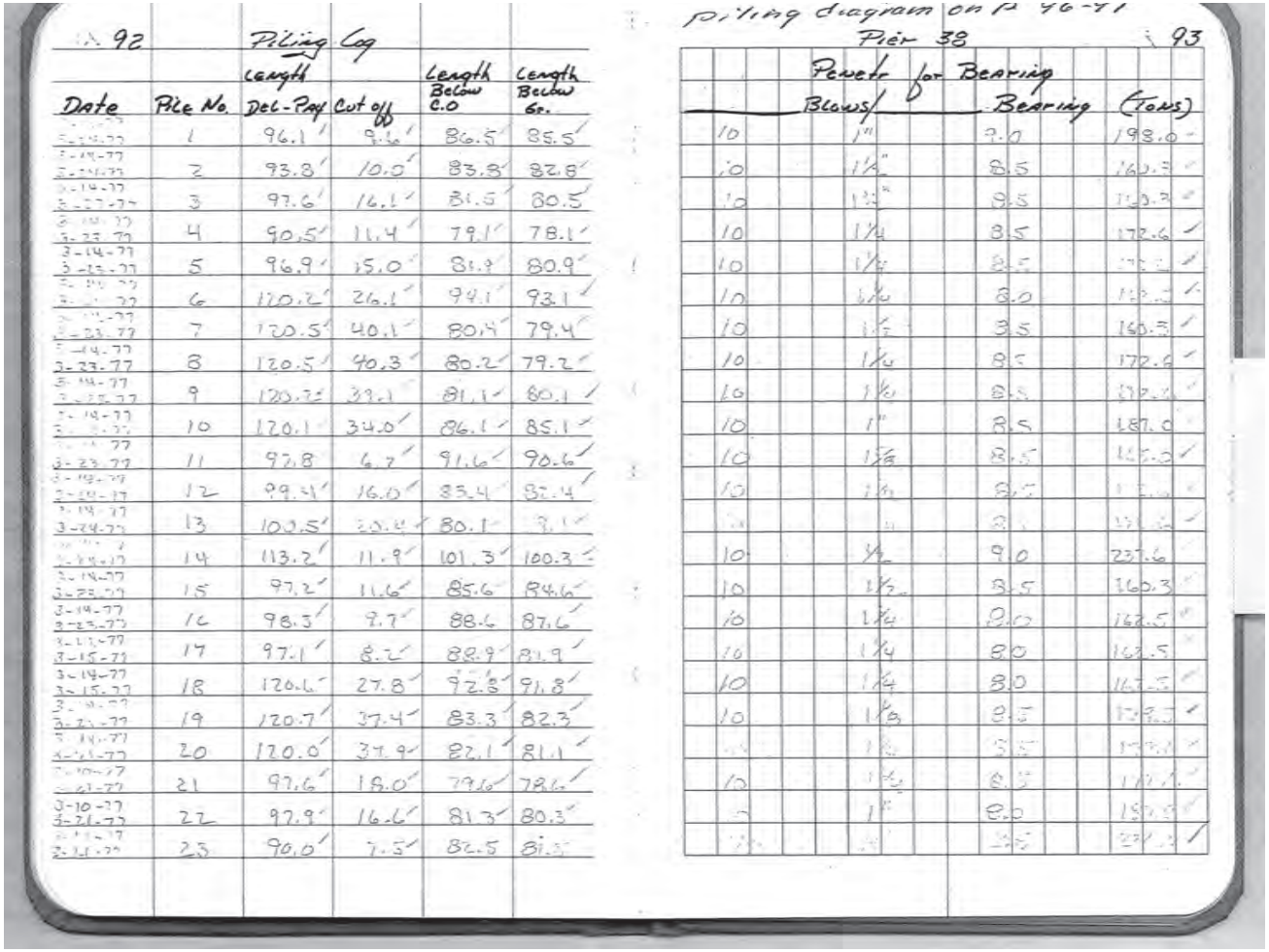
TEST PILE

N 91

Pier 37

Blows/	Penetration for Bearing	Bearing	Tons
10	1"	7.5	165.0
10	7/8	8.5	195.5
10	1"	8.0	176.0
10	1"	8.5	187.0
10	3/4"	8.5	187.0
10	1"	9.0	198.0
10	1"	7.5	165.0
10	1"	7.5	165.0
10	1 1/4"	8.5	187.0
10	1 1/2"	8.0	176.0

@ 33 = 1761 Tons



p. 92

Piling Log

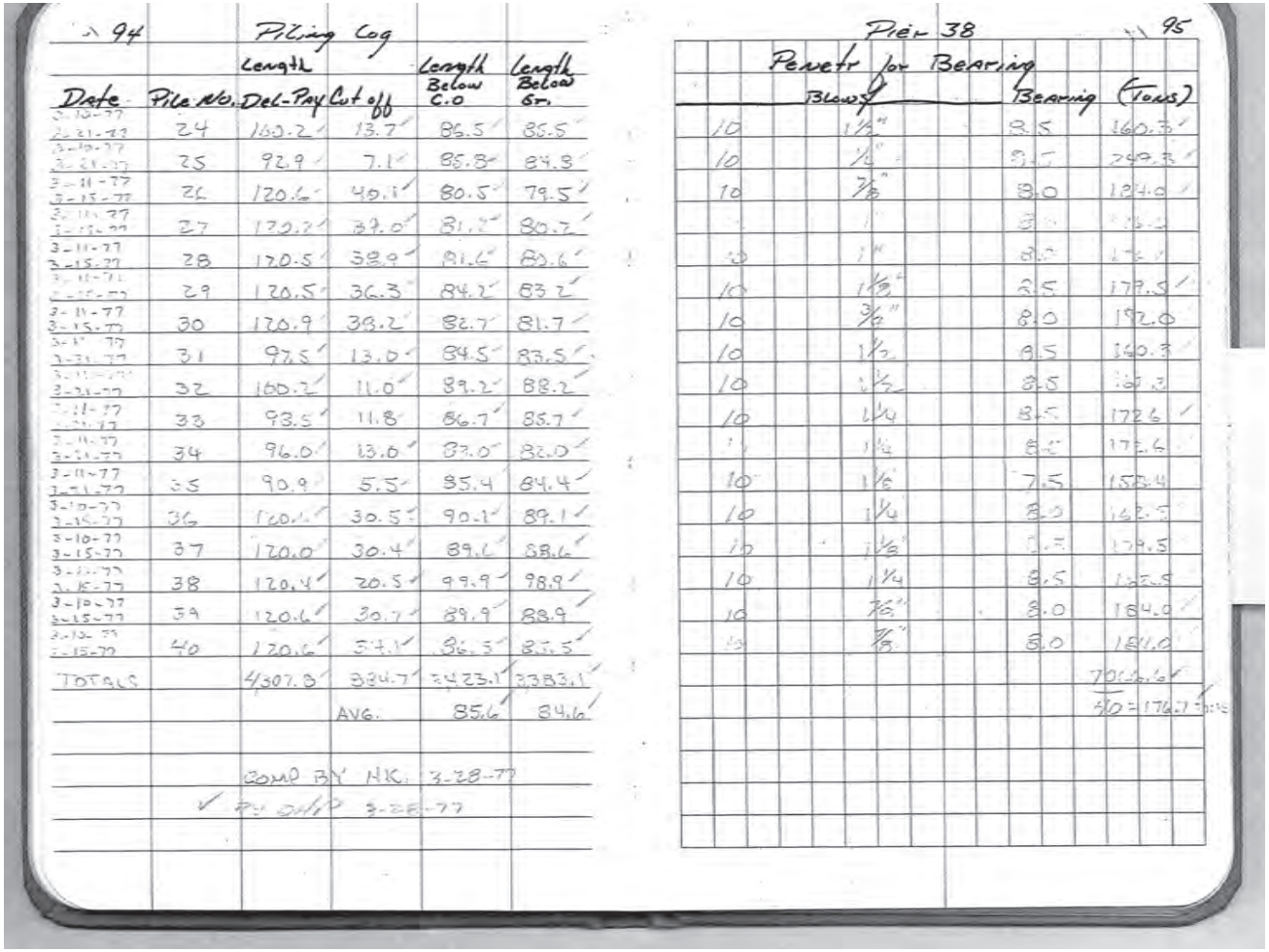
Date	Pile No.	Length Del-Rqd	Length Cut off	Length Below C.O	Length Below Gr.
3-14-77	1	96.1'	9.6'	86.5'	85.5'
3-14-77	2	93.8'	10.0'	83.8'	82.8'
3-14-77	3	97.6'	16.1'	81.5'	80.5'
3-23-77	4	90.5'	11.4'	79.1'	78.1'
3-14-77	5	96.9'	15.0'	81.9'	80.9'
3-23-77	6	120.2'	26.1'	94.1'	93.1'
3-23-77	7	120.5'	40.1'	80.4'	79.4'
3-23-77	8	120.5'	40.3'	80.2'	79.2'
3-23-77	9	120.7'	39.1'	81.1'	80.1'
3-23-77	10	120.1'	34.0'	86.1'	85.1'
3-23-77	11	92.8'	6.7'	91.6'	90.6'
3-23-77	12	99.4'	16.0'	83.4'	82.4'
3-24-77	13	100.5'	20.4'	80.1'	79.1'
3-24-77	14	113.2'	11.9'	101.3'	100.3'
3-25-77	15	97.2'	11.6'	85.6'	84.6'
3-25-77	16	98.3'	9.7'	88.6'	87.6'
3-15-77	17	97.1'	8.2'	88.9'	81.9'
3-15-77	18	120.6'	27.8'	92.8'	91.8'
3-21-77	19	120.7'	37.4'	83.3'	82.3'
4-21-77	20	120.0'	37.9'	82.1'	81.1'
4-21-77	21	97.6'	18.0'	79.6'	78.6'
3-10-77 3-24-77	22	97.9'	16.6'	81.3'	80.3'
3-24-77	23	90.0'	7.5'	82.5'	81.5'

piling diagram on p 46-47

Pier 38

p. 93

Blows/	Power for Bearing	Bearing (Tons)
10	1"	198.0
10	1¼"	160.3
10	1¼"	160.3
10	1¼	172.6
10	1¼	172.6
10	1¼	172.6
10	1¼	160.3
10	1¼	172.6
10	1¼	172.6
10	1"	187.0
10	1⅛	172.6
10	1⅛	172.6
10	1¼	237.6
10	1¼	160.3
10	1¼	162.5
10	1¼	162.5
10	1¼	162.5
10	1⅛	172.6
10	1¼	172.6
10	1"	187.0



94

Piling Log

Date	Pile No.	Length Del-Pay	Length Cut off	Length Below C.O	Length Below Gr.
3-10-77 3-21-77	24	160.2	13.7	86.5	86.5
3-10-77 3-21-77	25	92.9	7.1	85.8	84.8
3-11-77 3-15-77	26	120.6	40.1	80.5	79.5
3-11-77 3-15-77	27	120.2	39.0	81.2	80.2
3-11-77 3-15-77	28	120.5	38.9	81.6	80.6
3-11-77 3-15-77	29	120.5	36.3	84.2	83.2
3-11-77 3-15-77	30	120.9	38.2	82.7	81.7
3-11-77 3-31-77	31	92.5	13.0	84.5	83.5
3-11-77 3-31-77	32	100.2	11.0	89.2	88.2
3-11-77 3-31-77	33	93.5	11.8	86.7	85.7
3-11-77 3-31-77	34	96.0	13.0	83.0	82.0
3-11-77 3-31-77	35	90.9	5.5	85.4	84.4
3-10-77 3-15-77	36	120.1	30.5	90.1	89.1
3-10-77 3-15-77	37	120.0	30.4	89.6	88.6
3-11-77 3-15-77	38	120.4	20.5	99.9	98.9
3-10-77 3-15-77	39	120.6	30.7	89.9	88.9
3-10-77 3-15-77	40	120.6	37.1	86.5	85.5
TOTALS		4307.3	334.7	3423.1	3383.1
			AVG.	85.6	84.6

COMP BY NK 3-28-77

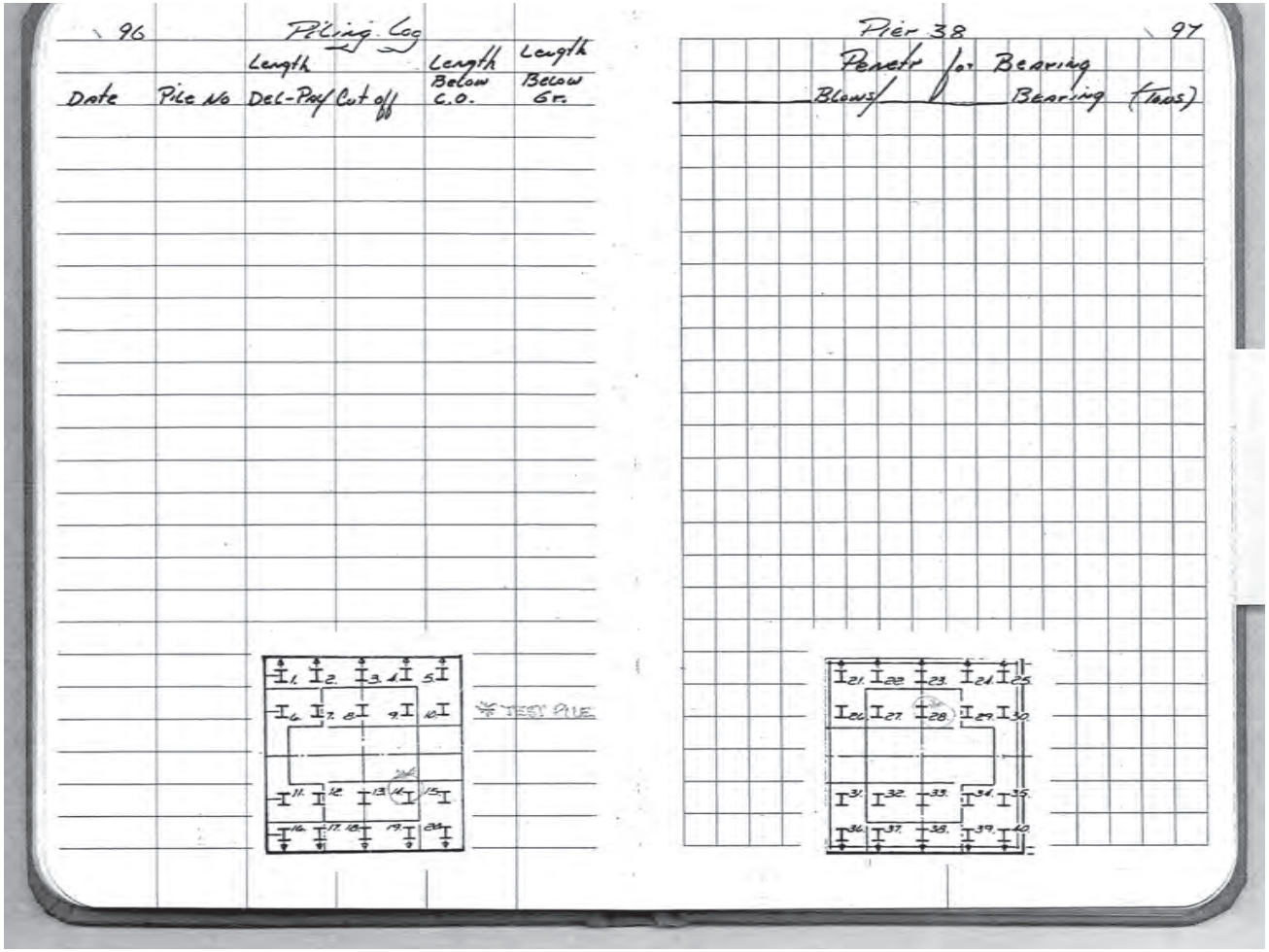
✓ BY CHK'D 3-28-77

95

Pier 38

Penetr for Bearing

Blows/		Bearing	(Tons)
10	1½"	8.5	160.3
10	½"	8.5	160.3
10	⅞"	8.0	154.0
10	1⅛"	9.5	179.5
10	⅜"	8.0	192.0
10	1½"	9.5	160.3
10	1½"	8.5	160.3
10	1¼	8.5	172.6
	1¼	8.0	177.4
10	1⅛	7.5	152.4
10	1¼	8.0	162.5
10	1⅛	9.5	179.5
10	1¼	8.5	162.9
10	⅞"	8.0	184.0
10	⅞"	8.0	184.0
			7016.6
			40 = 176.1



96

Piling Log

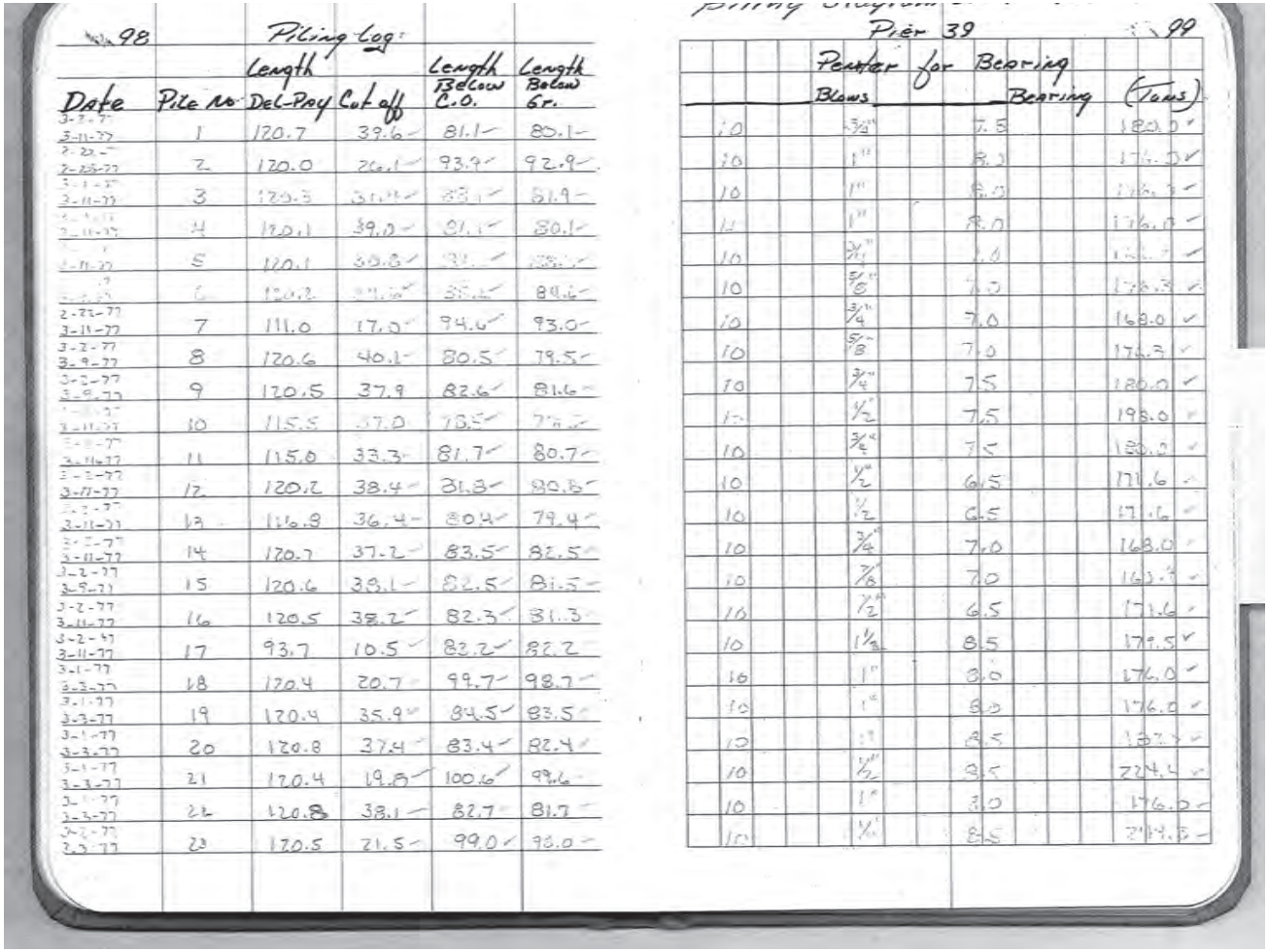
Date	Pile No	Length Del-Proj Cut off	Length Below C.O.	Length Below Gr.

97

Pier 38

Penetr for Bearing

Blows/ Bearing (Tons)

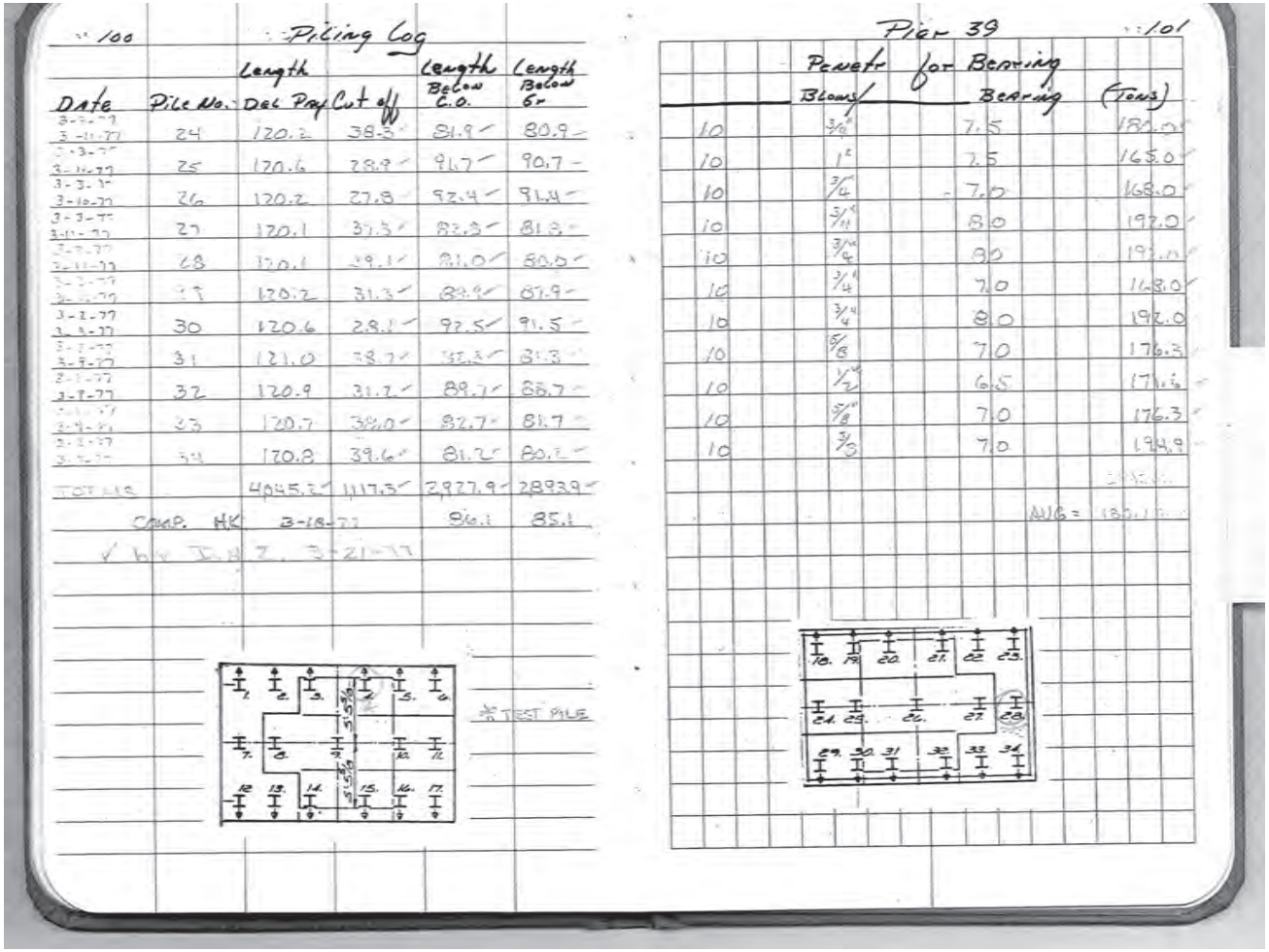


98 Piling Log

Date	Pile No	Length Del-Proj	Length Cut off	Length Below C.O.	Length Below Gr.
3-7-77					
3-11-77	1	120.7	39.6	81.1	80.1
2-23-77					
2-25-77	2	120.0	26.1	93.9	92.9
3-1-77					
3-11-77	3	120.3	31.4	88.9	51.9
3-11-77	4	120.1	39.0	81.1	80.1
3-11-77	5	120.1	38.8	81.3	80.3
3-11-77	6	120.2	34.6	85.6	84.6
2-22-77					
3-11-77	7	111.0	17.0	94.6	93.0
3-2-77					
3-9-77	8	120.6	40.1	80.5	79.5
3-2-77					
3-9-77	9	120.5	37.9	82.6	81.6
3-2-77					
3-11-77	10	115.5	37.0	78.5	77.5
3-2-77					
3-11-77	11	115.0	33.3	81.7	80.7
3-2-77					
3-11-77	12	120.2	38.4	81.8	80.8
3-2-77					
3-11-77	13	116.8	36.4	80.4	79.4
3-2-77					
3-11-77	14	120.7	37.2	83.5	82.5
3-2-77					
3-9-77	15	120.6	38.1	82.5	81.5
3-2-77					
3-11-77	16	120.5	38.2	82.3	81.3
3-2-77					
3-11-77	17	93.7	10.5	83.2	82.2
3-1-77					
3-3-77	18	120.4	20.7	99.7	98.7
3-1-77					
3-3-77	19	120.4	35.9	84.5	83.5
3-1-77					
3-3-77	20	120.8	37.4	83.4	82.4
3-1-77					
3-3-77	21	120.4	19.8	100.6	99.6
3-1-77					
3-3-77	22	120.8	38.1	82.7	81.7
3-2-77					
3-3-77	23	120.5	21.5	99.0	98.0

Pier 39 99

	Pointer for Blows	Bearing	(Tons)
10	3/8"	7.5	180.0
10	1"	6.5	174.0
10	1"	6.5	174.0
10	1"	6.5	174.0
10	3/4"	7.0	168.0
10	5/8"	7.0	168.0
10	3/4"	7.0	168.0
10	3/4"	7.5	180.0
10	1/2"	7.5	180.0
10	3/4"	7.5	180.0
10	1/2"	6.5	174.6
10	1/2"	6.5	174.6
10	3/4"	7.0	168.0
10	7/8"	7.0	168.0
10	1/2"	6.5	174.6
10	1 1/8"	8.5	179.5
10	1"	8.0	174.0
10	1"	8.0	174.0
10	1"	8.5	182.4
10	1/2"	8.5	224.4
10	1"	8.0	174.0
10	1/2"	8.5	224.4



Piling Log

Date	Pile No.	Length Del Pay	Length Cut off	Length Below C.O.	Length Below Gr
3-11-77	24	120.2	38.3	81.9	80.9
3-11-77	25	120.6	28.9	91.7	90.7
3-10-77	26	120.2	27.8	92.4	91.4
3-11-77	27	120.1	37.3	82.8	81.8
3-11-77	28	120.1	39.1	81.0	80.0
3-11-77	29	120.2	31.3	88.9	87.9
3-9-77	30	120.6	28.1	92.5	91.5
3-9-77	31	121.0	38.7	82.3	81.3
3-9-77	32	120.9	31.2	89.7	88.7
3-9-77	33	120.7	38.0	82.7	81.7
3-9-77	34	120.8	39.6	81.2	80.2
TOT +12		4045.3	1117.5	2927.9	28939
COMP. HK		3-18-77		96.1	85.1

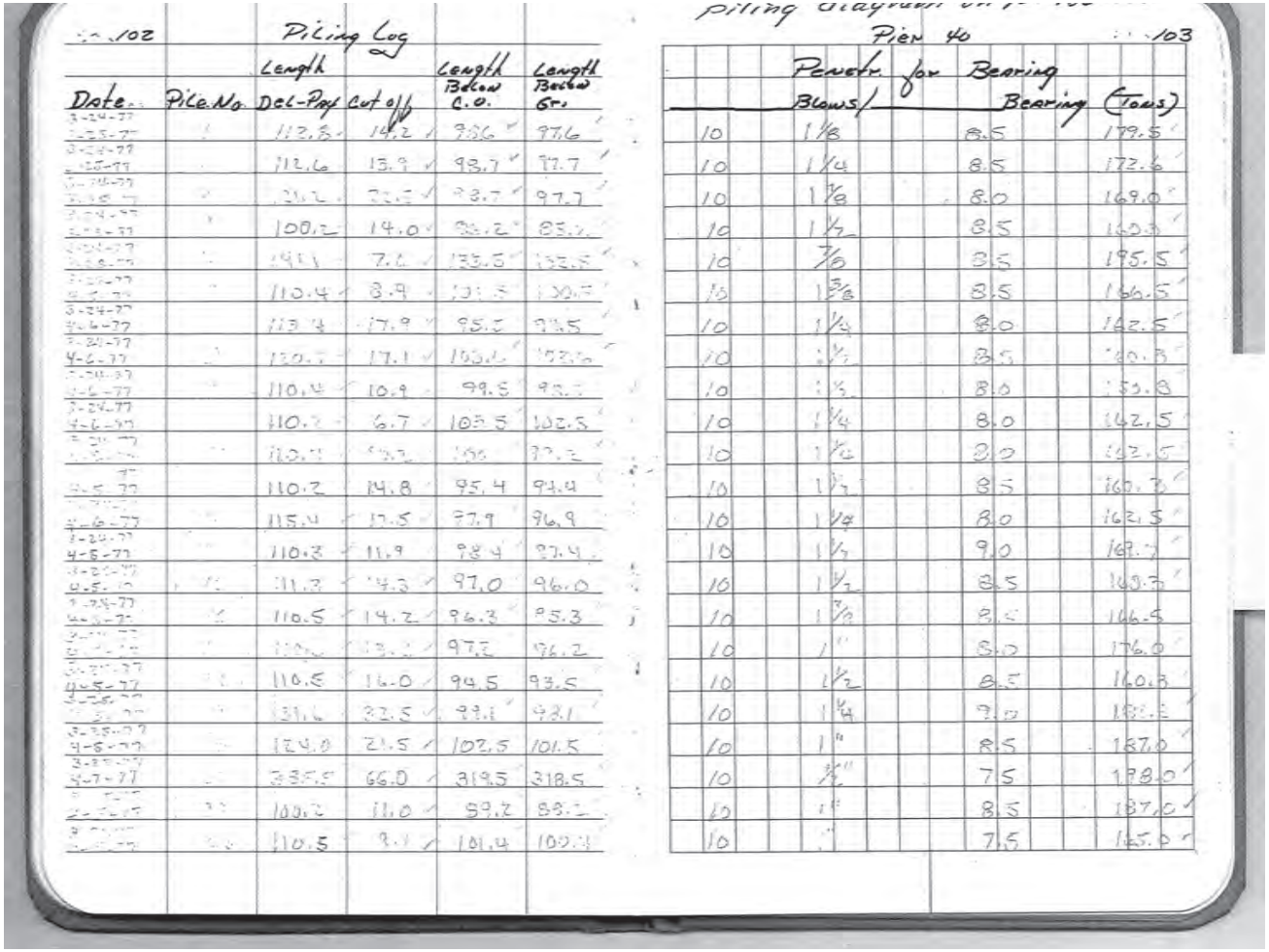
✓ by J.H.Z. 3-21-77

* TEST PILE

Pier 39

	Penetr for Blows/	Bearing	Bearing (Tons)
10	3/8"	7.5	180.0
10	1"	7.5	165.0
10	3/4"	7.0	168.0
10	5/11"	8.0	192.0
10	3/4"	9.0	198.0
10	3/4"	7.0	168.0
10	3/4"	8.0	192.0
10	5/8"	7.0	176.3
10	1/2"	6.5	171.6
10	5/8"	7.0	176.3
10	3/3"	7.0	194.9

NUG = 180.1



102

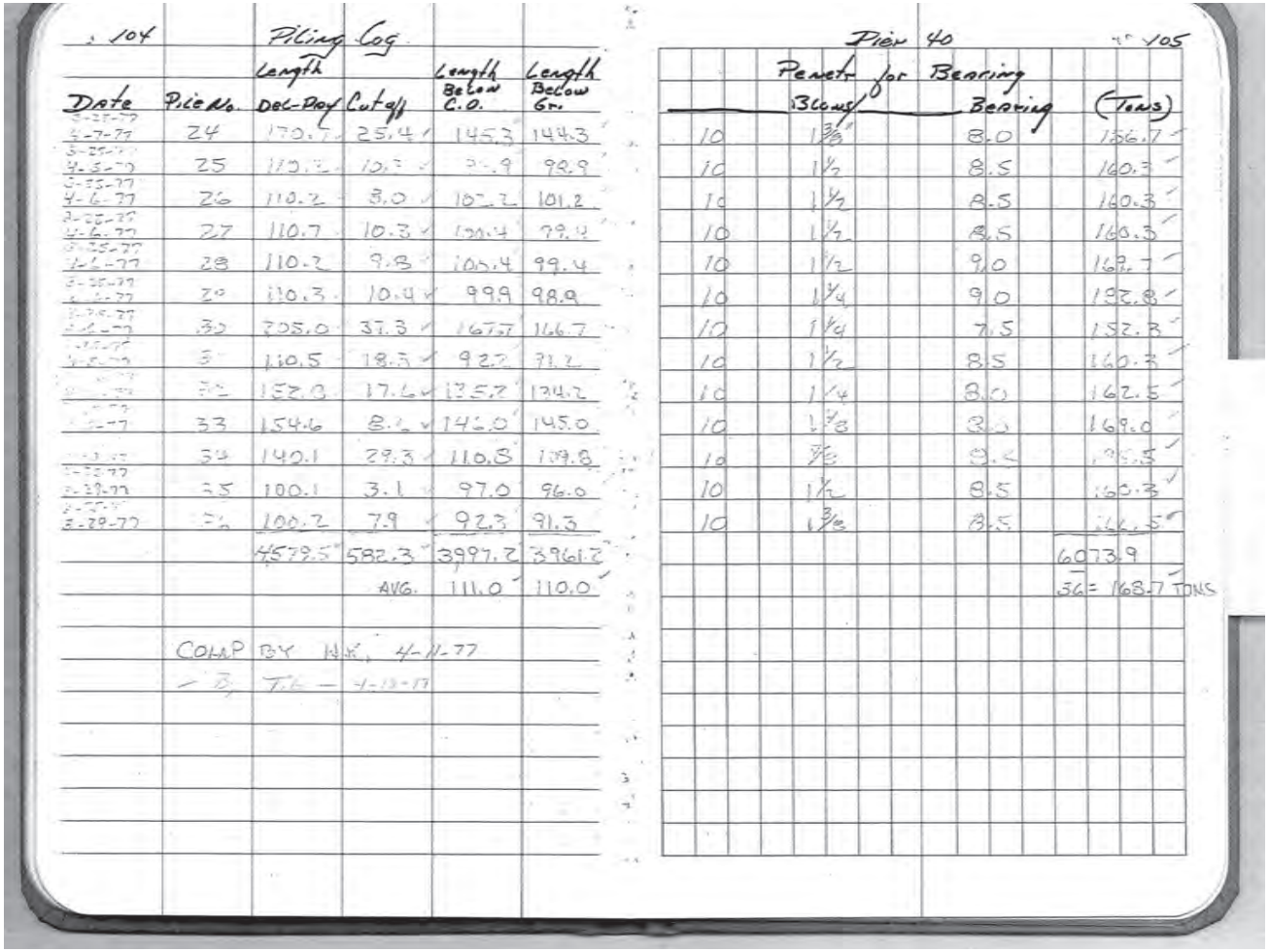
Piling Log

Date	Pile No.	Length Del-Pay	Length cut off	Length Below C.O.	Length Below Gr.
3-24-77		112.8	14.2	98.6	97.6
3-25-77		112.6	13.9	98.7	97.7
3-28-77		111.2	12.5	98.7	97.7
3-29-77		100.2	14.0	86.2	85.2
3-29-77		141.1	7.6	133.5	132.5
3-29-77		110.4	8.9	101.5	100.5
3-24-77		113.8	17.9	95.9	93.5
3-24-77		120.2	17.1	103.1	102.1
3-24-77		110.4	10.9	99.5	98.5
3-24-77		110.2	6.7	103.5	102.5
3-24-77		112.1	13.2	98.9	97.9
3-25-77		110.2	14.8	95.4	94.4
3-26-77		115.4	17.5	97.9	96.9
3-24-77		110.3	11.9	98.4	97.4
3-25-77		111.3	14.3	97.0	96.0
3-24-77		110.5	14.2	96.3	95.3
3-24-77		111.2	13.9	97.3	96.2
3-25-77		110.5	16.0	94.5	93.5
3-25-77		131.6	32.5	99.1	98.1
3-25-77		124.0	21.5	102.5	101.5
3-28-77		385.5	66.0	319.5	318.5
3-29-77		100.2	11.0	89.2	88.2
3-29-77		110.5	9.1	101.4	100.4

Pier 40

103

	Penetr. for Blows/	Bearing	Bearing (Tons)
10	1 1/8	8.5	179.5
10	1 1/4	8.5	172.6
10	1 3/8	8.0	169.0
10	1 1/2	8.5	160.3
10	7/8	8.5	195.5
10	1 5/8	8.5	166.5
10	1 1/4	8.0	162.5
10	1 1/2	8.5	160.3
10	1 1/2	8.0	159.8
10	1 1/4	8.0	162.5
10	1 1/2	8.0	162.5
10	1 1/2	8.5	160.3
10	1 1/4	8.0	162.5
10	1 1/2	9.0	169.3
10	1 1/2	8.5	160.3
10	1 3/8	8.5	166.4
10	1"	8.0	176.0
10	1 1/2	8.5	160.3
10	1 1/4	9.0	169.3
10	1"	8.5	187.0
10	7/8"	7.5	178.0
10	1"	8.5	187.0
10	1"	7.5	165.0



104

Piling Log

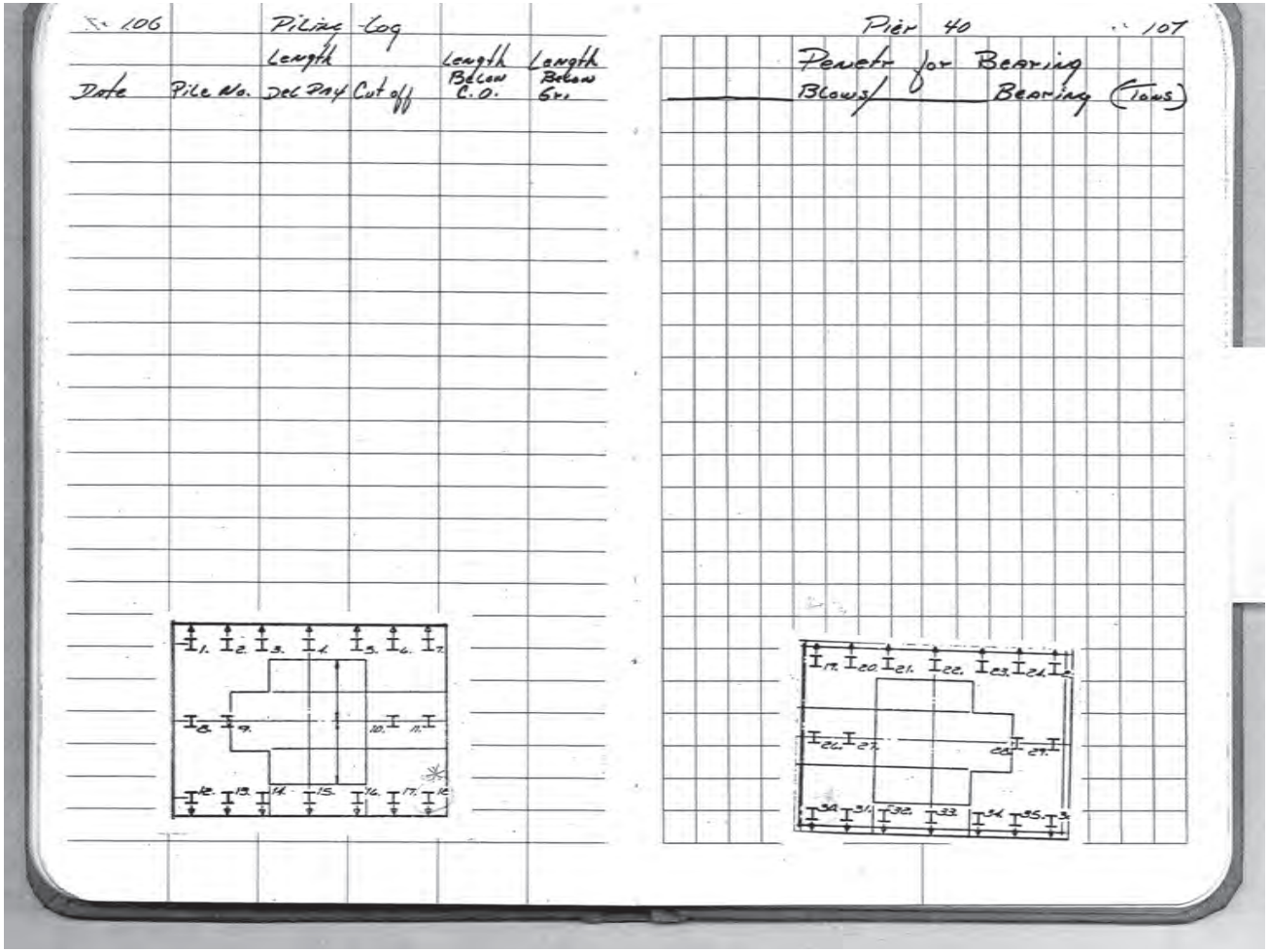
Date	Pile No.	Length Dec-Proj	Cutoff	Length Below C.O.	Length Below Gr.
4-7-77	24	170.7	25.4	145.3	144.3
4-5-77	25	110.2	10.2	99.9	98.9
4-6-77	26	110.2	8.0	102.2	101.2
4-6-77	27	110.7	10.3	100.4	99.4
4-6-77	28	110.2	9.8	100.4	99.4
4-6-77	29	110.3	10.4	99.9	98.9
4-6-77	30	205.0	37.3	167.7	166.7
4-6-77	31	110.5	18.3	92.2	91.2
[illegible]	32	152.3	17.6	135.7	134.7
[illegible]-77	33	154.6	8.6	146.0	145.0
[illegible]	34	140.1	29.3	110.8	109.8
4-29-77	35	100.1	3.1	97.0	96.0
4-29-77	36	100.2	7.9	92.3	91.3
		4579.5	582.3	3997.2	3961.2
			AVG.	111.0	110.0

COMP BY NK, 4-11-77
– B, TL – 4-13-77

Pier 40

105

Penetr. for 3 Blows	Bearing	(Tons)
10	1 3/8"	8.0	156.7
10	1 1/2	8.5	160.3
10	1 1/2	8.5	160.3
10	1 1/2	8.5	160.3
10	1 1/2	9.0	169.7
10	1 1/4	9.0	192.8
10	1 1/4	7.5	152.8
10	1 1/2	8.5	160.3
10	1 1/4	8.0	162.5
10	1 1/8	8.0	169.0
10	1 1/2	8.5	[illegible]
10	1 1/2	8.5	160.3
10	1 3/8	8.5	[illegible]
			6073.9
			36 = 168.7 TONS



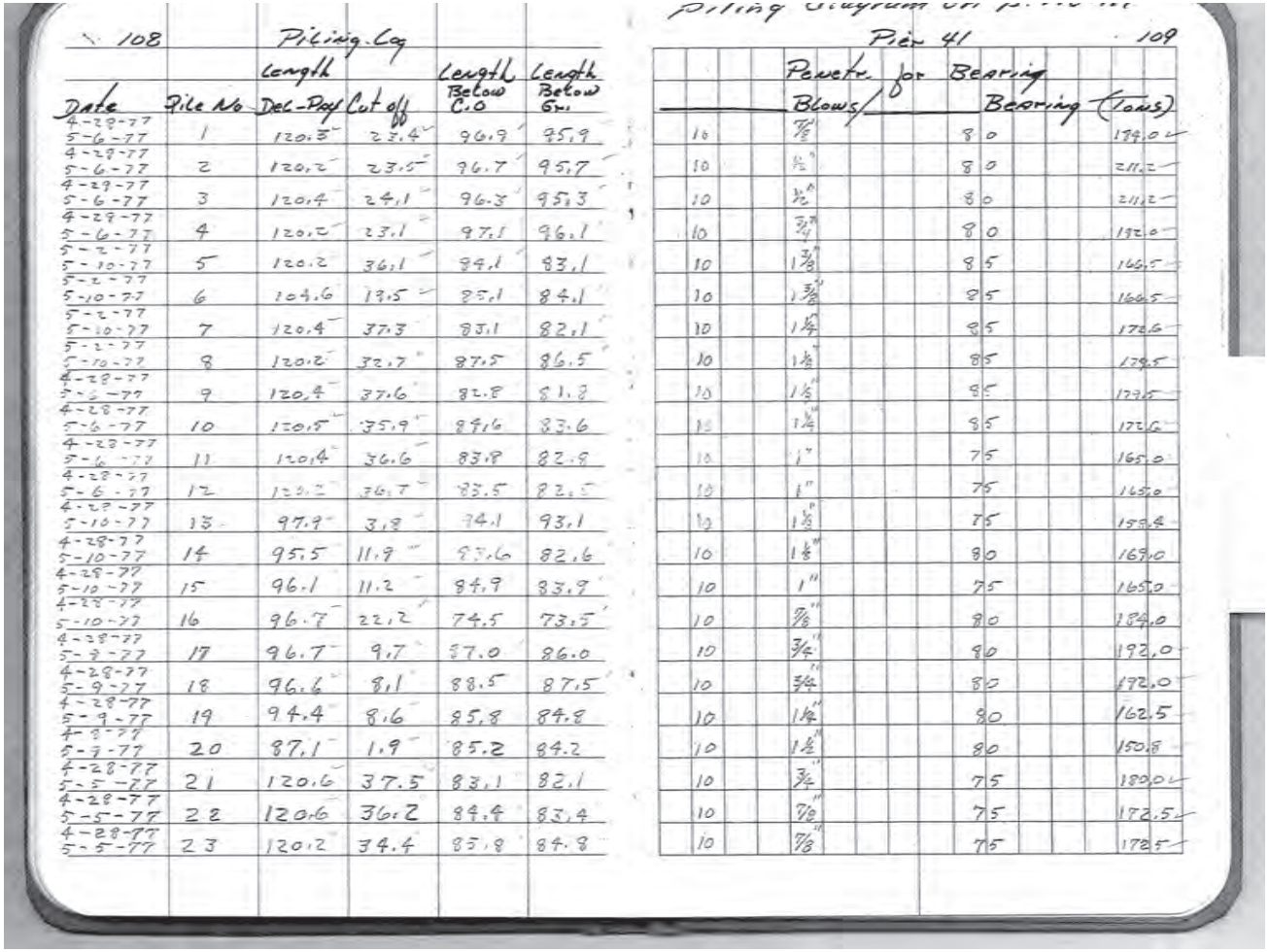
Pier 106

Date	Pile No.	Piling Log Length Dec Pay	Cut off	Length Below C.O.	Length Below Gr.

Pier 40 107

Penetr for Bearing

Blows/ Bearing (Tons)



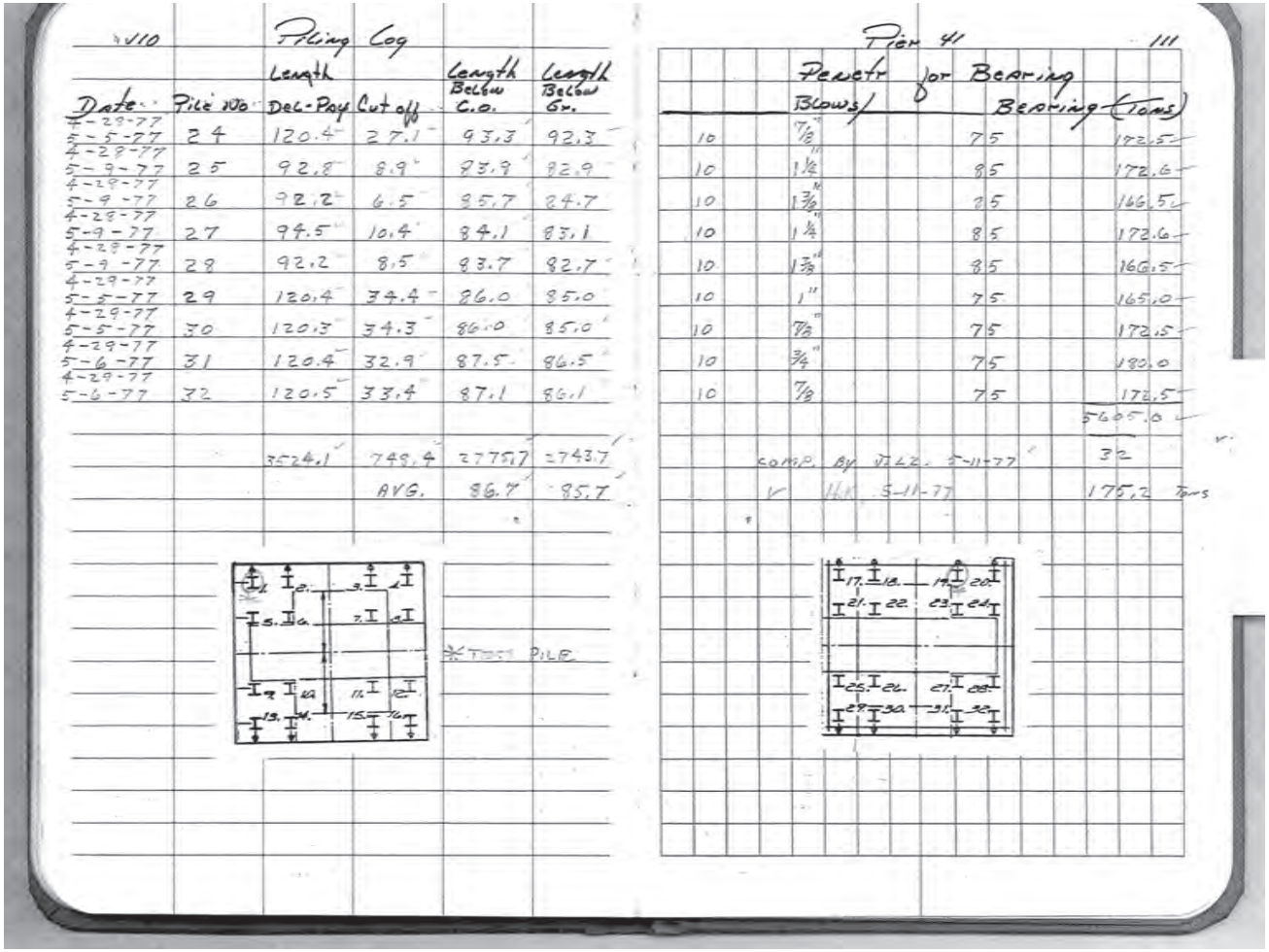
108

Piling Log

Piling Diagram on Pier 41

109

Date	Pile No	Length Dec-Proj	Length Cut off	Length Below C.O	Length Below Gr.	Penetr. for Blows/		Bearing	Bearing (Tons)
4-28-77 5-6-77	1	120.3	23.4	96.9	95.9	10	7/8"	80	184.0
4-28-77 5-6-77	2	120.2	23.5	96.7	95.7	10	1/2"	80	211.2
4-28-77 5-6-77	3	120.4	24.1	96.3	95.3	10	1/2"	80	211.2
4-28-77 5-6-77	4	120.2	23.1	97.1	96.1	10	3/4"	80	192.0
5-2-77 5-10-77	5	120.2	36.1	84.1	83.1	10	1 3/8"	85	166.5
5-2-77 5-10-77	6	104.6	19.5	85.1	84.1	10	1 3/8"	85	166.5
5-2-77 5-10-77	7	120.4	37.3	83.1	82.1	10	1 1/4"	85	172.6
5-2-77 5-10-77	8	120.2	32.7	87.5	86.5	10	1 1/8"	85	179.5
4-28-77 5-5-77	9	120.4	37.6	82.8	81.8	10	1 1/8"	85	179.5
4-28-77 5-6-77	10	120.5	35.9	84.6	83.6	10	1 1/4"	85	172.6
4-28-77 5-6-77	11	120.4	36.6	83.8	82.8	10	1"	75	165.0
4-28-77 5-6-77	12	120.2	36.7	83.5	82.5	10	1"	75	165.0
4-27-77 5-10-77	13	97.9	3.8	94.1	93.1	10	1 1/8"	75	159.4
4-28-77 5-10-77	14	95.5	11.9	83.6	82.6	10	1 1/8"	80	167.0
4-28-77 5-10-77	15	96.1	11.2	84.9	83.9	10	1"	75	165.0
4-28-77 5-10-77	16	96.7	22.2	74.5	73.5	10	7/8"	80	184.0
4-28-77 5-9-77	17	96.7	9.7	87.0	86.0	10	3/4"	80	192.0
4-28-77 5-9-77	18	96.6	8.1	88.5	87.5	10	3/4"	80	192.0
4-28-77 5-9-77	19	94.4	8.6	85.8	84.8	10	1/4"	80	162.5
4-28-77 5-9-77	20	87.1	1.9	85.2	84.2	10	1 1/2"	80	150.8
4-28-77 5-5-77	21	120.6	37.5	83.1	82.1	10	3/4"	75	180.0
4-28-77 5-5-77	22	120.6	36.2	84.4	83.4	10	7/8"	75	172.5
4-28-77 5-5-77	23	120.2	34.4	85.8	84.8	10	7/8"	75	172.5



#110

Piling Log

Date	File No.	Length Dec-Pay	Cut off	Length Below C.O.	Length Below Gr.
4-29-77 / 5-5-77	24	120.4	27.1	93.3	92.3
4-29-77 / 5-9-77	25	92.8	8.9	93.9	82.9
4-29-77 / 5-9-77	26	92.2	6.5	85.7	84.7
4-29-77 / 5-9-77	27	94.5	10.4	84.1	83.1
4-29-77 / 5-9-77	28	92.2	8.5	93.7	82.7
4-29-77 / 5-5-77	29	120.4	34.4	86.0	85.0
4-29-77 / 5-5-77	30	120.3	34.3	86.0	85.0
4-29-77 / 5-6-77	31	120.4	32.9	87.5	86.5
4-29-77 / 5-6-77	32	120.5	33.4	87.1	86.1
		3524.1	749.4	2775.7	2743.7
			AVG.	86.7	85.7

* TEST PILE

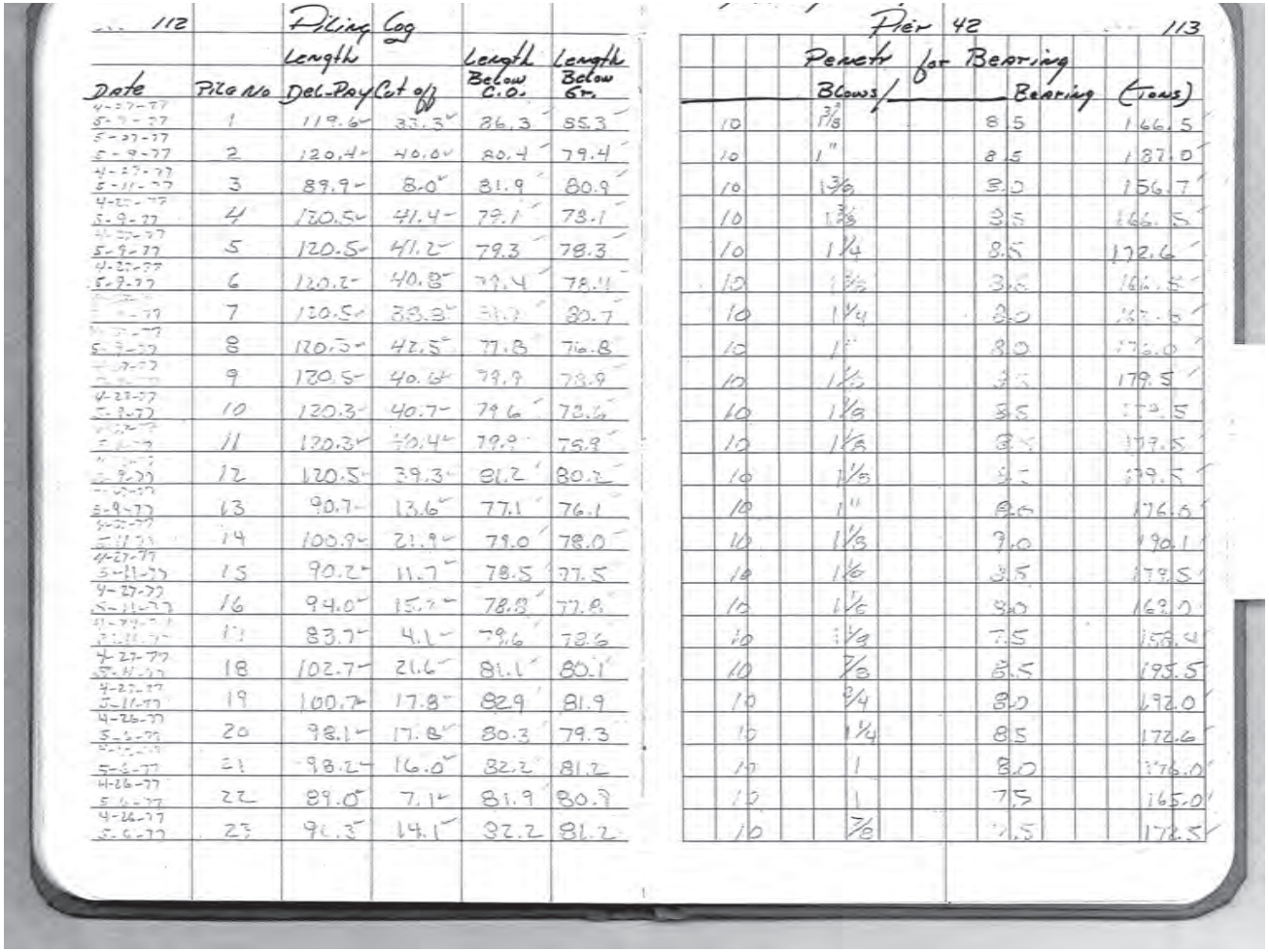
Pier #1 111

Penetr for Bearing

Blows/		Bearing (Tons)
10	7/8"	172.5
10	1 1/2"	172.6
10	1 3/8"	166.5
10	1 1/4"	172.6
10	1 3/8"	166.5
10	1"	165.0
10	7/8"	172.5
10	3/4"	180.0
10	7/8"	172.5
		5665.0
		32
		176.2 Tons

COMP. BY VLZ. 5-11-77

V 11-11 5-11-77



112

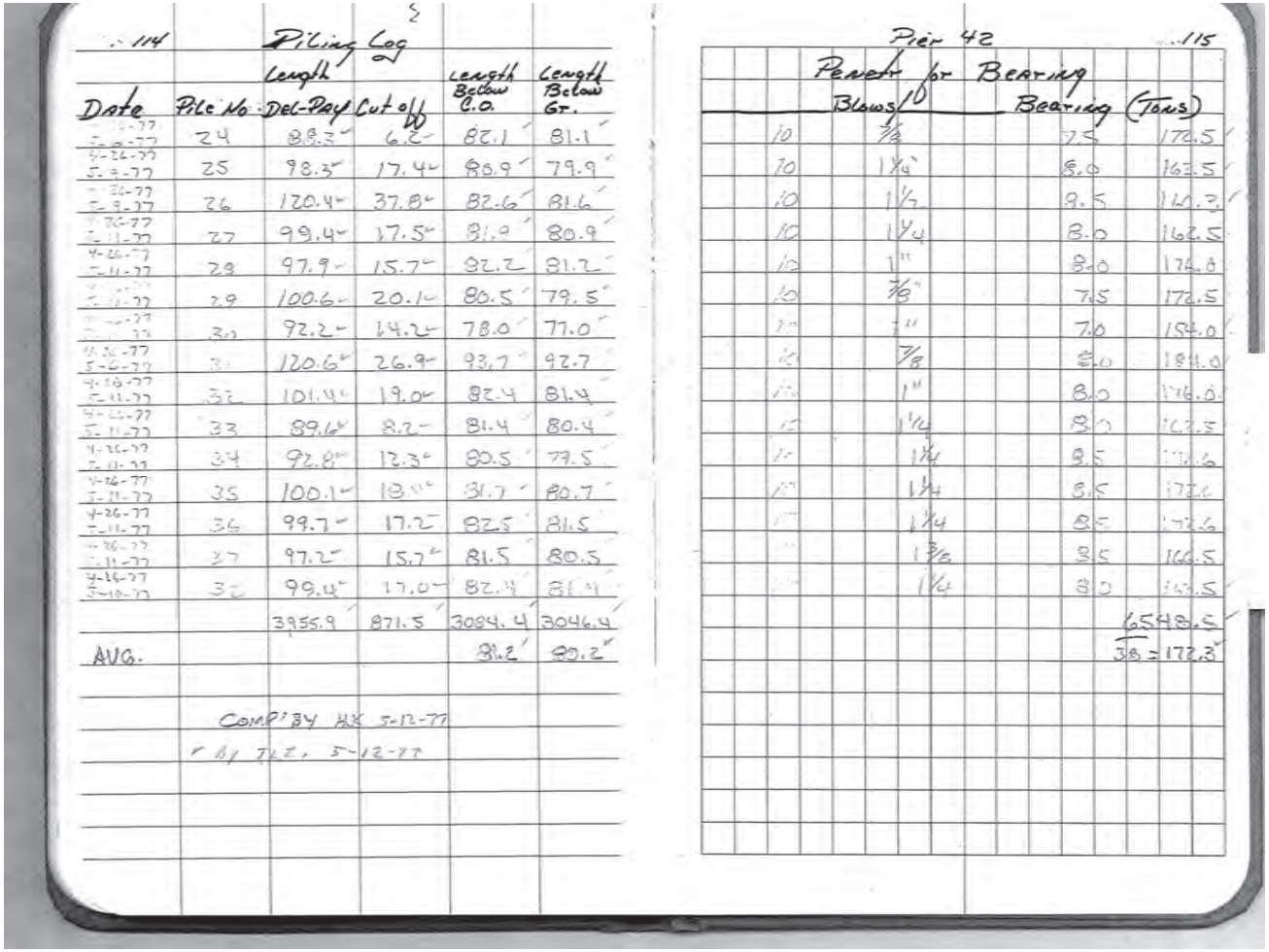
Piling Log

Date	Pile No	Length Del. Pay	Cut off	Length Below C.O.	Length Below Gr.
4-27-77 5-9-77	1	119.6	33.3	86.3	85.3
5-27-77 5-9-77	2	120.4	40.6	80.4	79.4
4-27-77 5-11-77	3	89.9	8.0	81.9	80.9
4-27-77 5-9-77	4	120.5	41.4	79.1	78.1
4-27-77 5-9-77	5	120.5	41.2	79.3	78.3
4-27-77 5-9-77	6	120.2	40.8	79.4	78.4
[illegible]	7	120.5	39.8	80.7	80.7
[illegible] 5-9-77	8	120.5	42.5	77.8	76.8
[illegible]	9	120.5	40.6	79.9	78.9
4-27-77 5-9-77	10	120.3	40.7	79.6	78.6
[illegible]	11	120.3	40.4	79.9	78.9
[illegible] 5-9-77	12	120.5	39.3	81.2	80.2
[illegible] 5-9-77	13	90.7	13.6	77.1	76.1
[illegible]	14	100.9	21.9	79.0	78.0
4-27-77 5-11-77	15	90.2	11.7	78.5	77.5
4-27-77 5-11-77	16	94.0	15.2	78.8	77.8
[illegible]	17	83.7	4.1	79.6	78.6
4-27-77 5-11-77	18	102.7	21.6	81.1	80.1
4-27-77 5-11-77	19	100.7	17.8	82.9	81.9
4-26-77 5-6-77	20	98.1	17.8	80.3	79.3
[illegible] 5-6-77	21	98.2	16.0	82.2	81.2
4-26-77 5-6-77	22	89.0	7.1	81.9	80.9
4-26-77 5-6-77	23	91.3	14.1	82.2	81.2

Pier 42

113

	Penetr for Blows/		Bearing	(Tons)
10	3/8		8.5	166.5
10	1"		8.5	187.0
10	1 3/8		9.0	156.7
10	1 3/8		9.5	166.5
10	1 1/4		8.5	172.6
10	1 3/8		9.5	166.5
10	1 1/4		8.0	162.0
10	1"		8.0	176.0
10	1 1/8		9.5	179.5
10	1 1/8		9.5	179.5
10	1 1/8		9.5	179.5
10	1 1/8		9.5	179.5
10	1"		8.5	176.0
10	1 1/8		9.0	190.1
10	1 1/8		9.5	179.5
10	1 1/8		8.0	162.0
10	1 1/8		7.5	158.4
10	7/8		8.5	195.5
10	3/4		8.0	192.0
10	1 1/4		8.5	172.6
10	1		8.0	176.0
10	1		7.5	165.0
10	7/8		7.5	172.5



114

Piling Log

Date	Pile No	Length Del-Pay	Cut off	Length Below C.O.	Length Below Gr.
5-9-77	24	88.3'	6.2'	82.1'	81.1'
5-9-77	25	98.3'	17.4'	80.9'	79.9'
5-9-77	26	120.4'	37.8'	82.6'	81.6'
5-11-77	27	99.4'	17.5'	81.9'	80.9'
5-11-77	28	97.9'	15.7'	82.2'	81.2'
5-11-77	29	100.6'	20.1'	80.5'	79.5'
5-11-77	30	92.2'	14.2'	78.0'	77.0'
5-12-77	31	120.6'	26.9'	93.7'	92.7'
5-11-77	32	101.4'	19.0'	82.4	81.4
5-11-77	33	89.6'	8.2'	81.4	80.4
5-11-77	34	92.8'	12.3'	80.5	79.5
5-11-77	35	100.1'	18.4'	81.7	80.7
5-11-77	36	99.7'	17.2'	82.5	81.5
5-11-77	37	97.2'	15.7'	81.5	80.5
5-10-77	38	99.4'	17.0'	82.4	81.4
		3955.9'	871.5'	3084.4'	3046.4'
AVG.				81.2'	80.2'

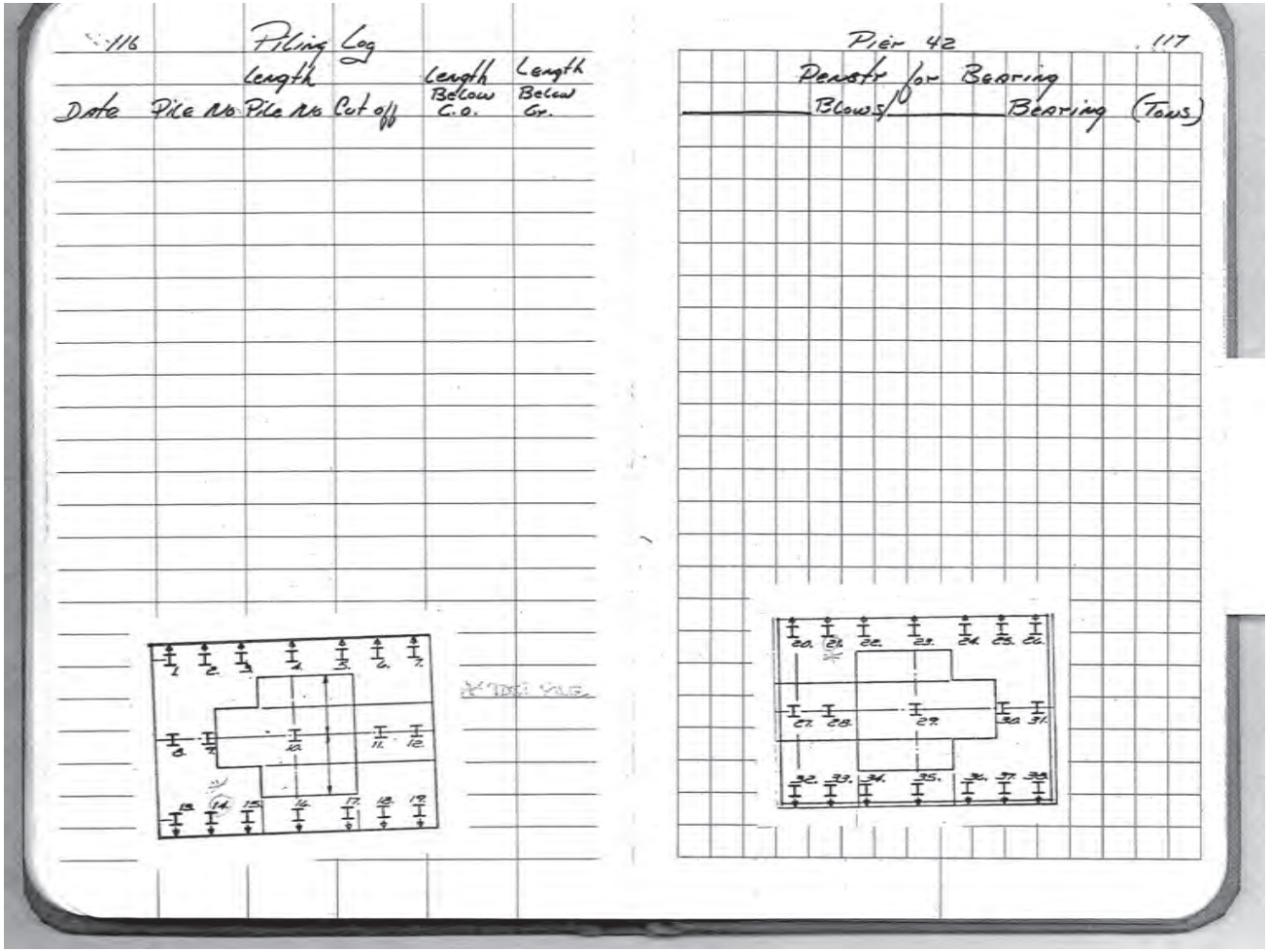
Comp'd by HK 5-12-77
Ck'd by JLZ, 5-12-77

115

Pier 42

Penetration for Bearing

Blows/1"	Bearing (Tons)
10	7/8	7.5	172.5
10	1 1/4"	6.0	162.5
10	1 1/2	8.5	140.3
10	1 1/4	8.0	162.5
10	1"	8.0	174.0
10	7/8"	7.5	172.5
10	1"	7.0	154.0
10	7/8	6.0	184.0
10	1"	8.0	176.0
10	1 1/4	8.0	162.5
10	1 1/4	9.5	174.0
10	1 1/4	8.5	172.0
10	1 1/4	8.5	172.0
10	1 3/8	8.5	166.5
10	1 1/4	8.0	147.5
			6548.5
			38 = 172.3'



116

Piling Log

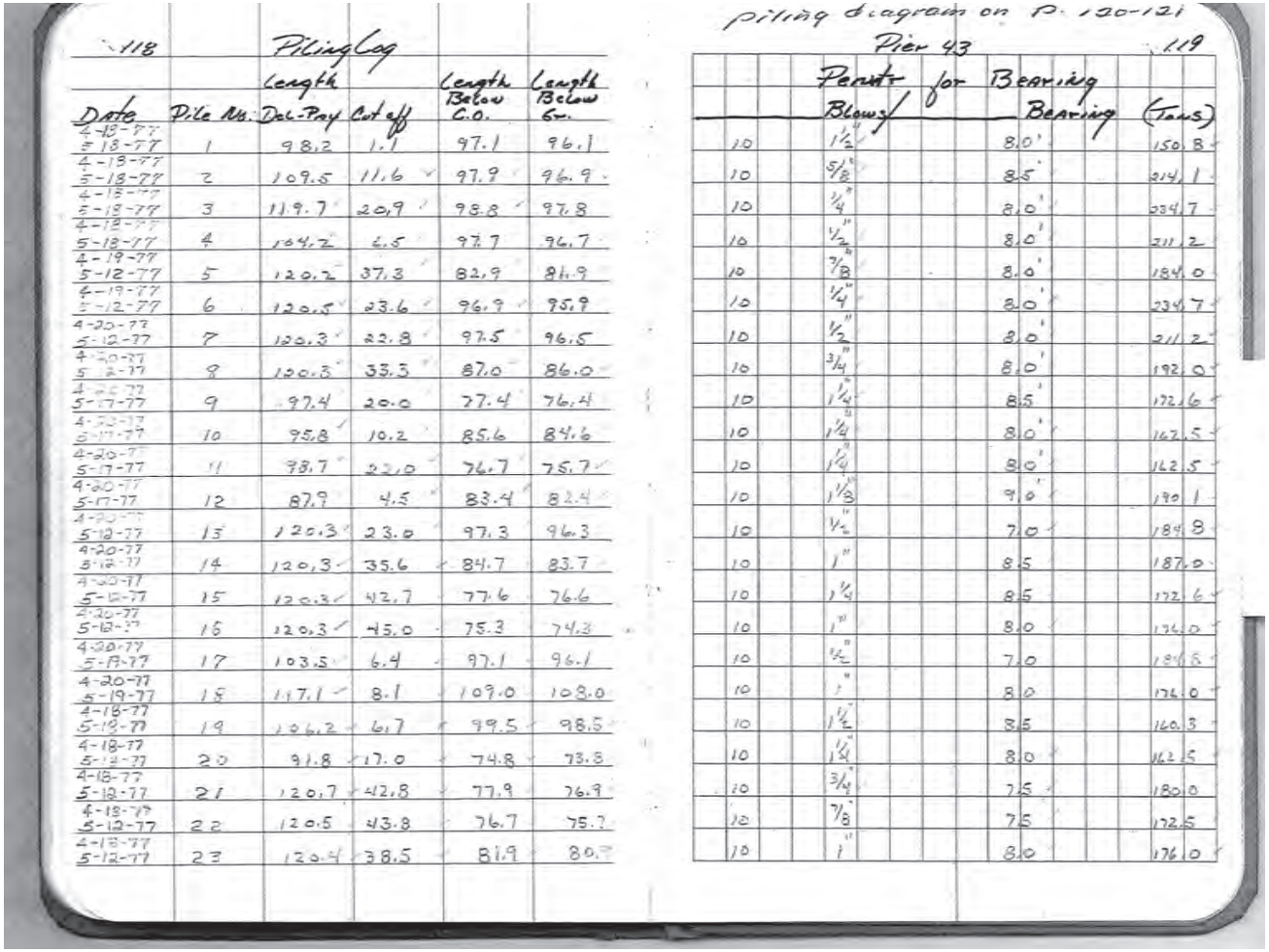
Date	Pile No	Pile No	Length Cut off	Length Below C.O.	Length Below Gr.

117

Pier 42

Penetr for Bearing

Blows/ Bearing (Tons)



118

Piling Log

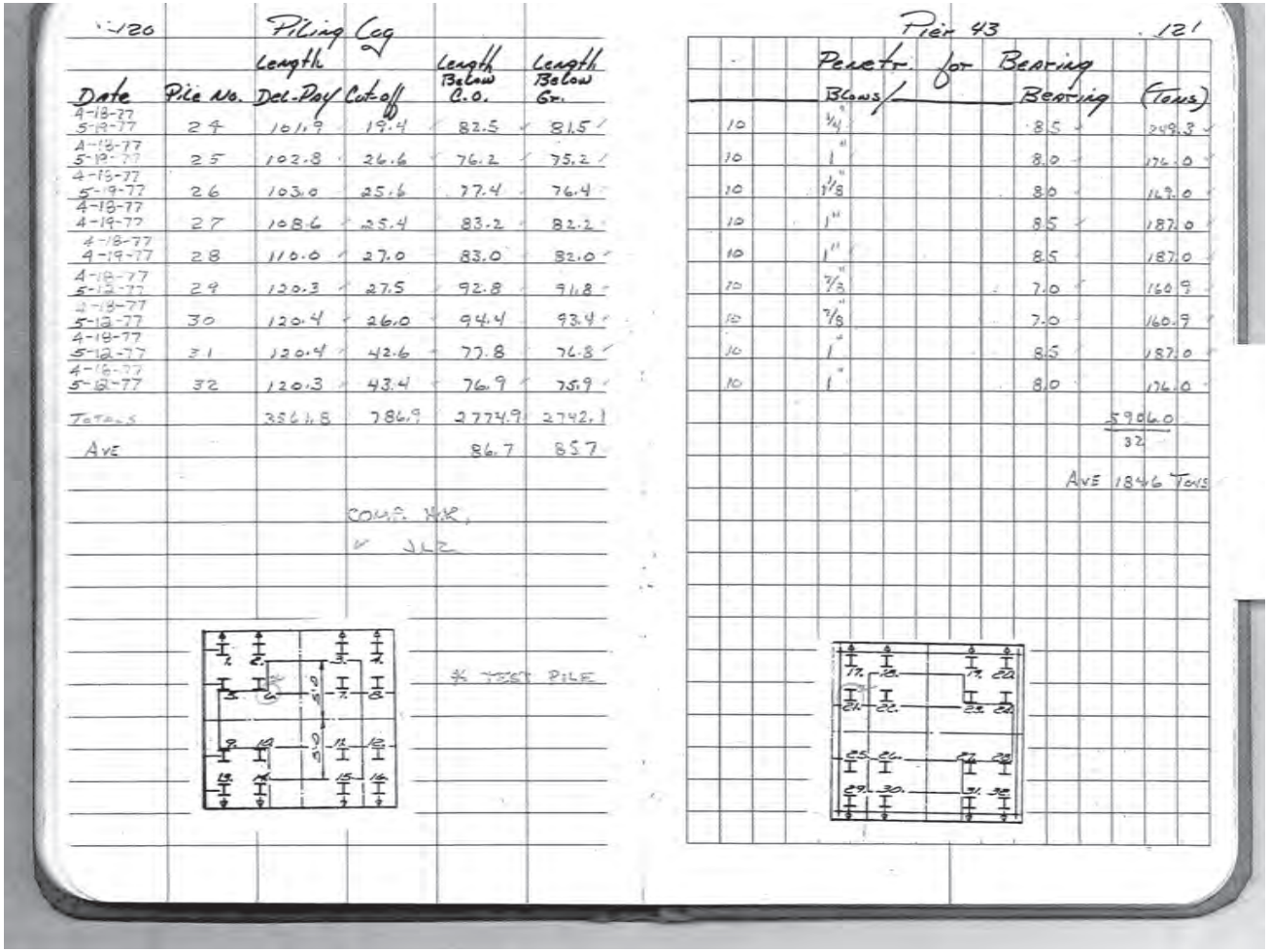
Date	Pile No.	Length Del-Pay	Length Cut off	Length Below C.O.	Length Below Gr.
4-18-77 5-18-77	1	98.2	1.1	97.1	96.1
4-18-77 5-18-77	2	109.5	11.6	97.9	96.9
4-18-77 5-18-77	3	119.7	20.9	98.8	97.8
4-18-77 5-18-77	4	104.2	6.5	97.7	96.7
4-19-77 5-12-77	5	120.2	37.3	82.9	81.9
4-19-77 5-12-77	6	120.5	23.6	96.9	95.9
4-20-77 5-12-77	7	120.3	22.8	97.5	96.5
4-20-77 5-12-77	8	120.3	33.3	87.0	86.0
4-20-77 5-17-77	9	97.4	20.0	77.4	76.4
4-20-77 5-17-77	10	95.8	10.2	85.6	84.6
4-20-77 5-17-77	11	98.7	22.0	76.7	75.7
4-20-77 5-17-77	12	87.9	4.5	83.4	82.4
4-20-77 5-12-77	13	120.3	23.0	97.3	96.3
4-20-77 5-12-77	14	120.3	35.6	84.7	83.7
4-20-77 5-12-77	15	120.3	42.7	77.6	76.6
4-20-77 5-12-77	16	120.3	45.0	75.3	74.3
4-20-77 5-19-77	17	103.5	6.4	97.1	96.1
4-20-77 5-19-77	18	117.1	8.1	109.0	108.0
4-18-77 5-19-77	19	106.2	6.7	99.5	98.5
4-18-77 5-12-77	20	91.8	17.0	74.8	73.8
4-18-77 5-12-77	21	120.7	42.8	77.9	76.9
4-18-77 5-12-77	22	120.5	43.8	76.7	75.7
4-18-77 5-12-77	23	120.4	38.5	81.9	80.9

piling diagram on P. 120-121

Pier 43

119

	Points for Blows/	Bearing	Bearing (Tons)
10	1½"	8.0'	150.8
10	5/8"	8.5'	214.1
10	¼"	8.0'	334.7
10	½"	8.0'	211.2
10	7/8"	8.0'	184.0
10	¼"	8.0'	334.7
10	½"	8.0'	211.2
10	¾"	8.0'	192.0
10	1¼"	8.5'	172.6
10	1¼"	8.0'	162.5
10	1¼"	8.0'	162.5
10	1⅛"	9.0'	190.1
10	½"	7.0'	184.8
10	1"	8.5	187.0
10	1¼	8.5	172.6
10	1"	8.0	174.0
10	½"	7.0	184.8
10	1"	8.0	174.0
10	1½"	8.5	160.3
10	1¼"	8.0	162.5
10	¾"	7.5	180.0
10	⅞"	7.5	172.5
10	1"	8.0	174.0



120

Piling Log

Date	Pile No.	Length Del-Proj	Length Cut-off	Length Below C.O.	Length Below Gr.
4-18-77 5-19-77	24	101.9	19.4	82.5	81.5
4-18-77 5-19-77	25	102.8	26.6	76.2	75.2
4-15-77 5-19-77	26	103.0	25.6	77.4	76.4
4-18-77 4-19-77	27	108.6	25.4	83.2	82.2
4-18-77 4-19-77	28	110.0	27.0	83.0	82.0
4-18-77 5-12-77	29	120.3	27.5	92.8	91.8
4-18-77 5-12-77	30	120.4	26.0	94.4	93.4
4-18-77 5-12-77	31	120.4	42.6	77.8	76.8
4-16-77 5-12-77	32	120.3	43.4	76.9	75.9
TOTALS		3564.8	786.9	2774.9	2742.1
AVE				86.7	85.7

COMP. HR. & JLZ

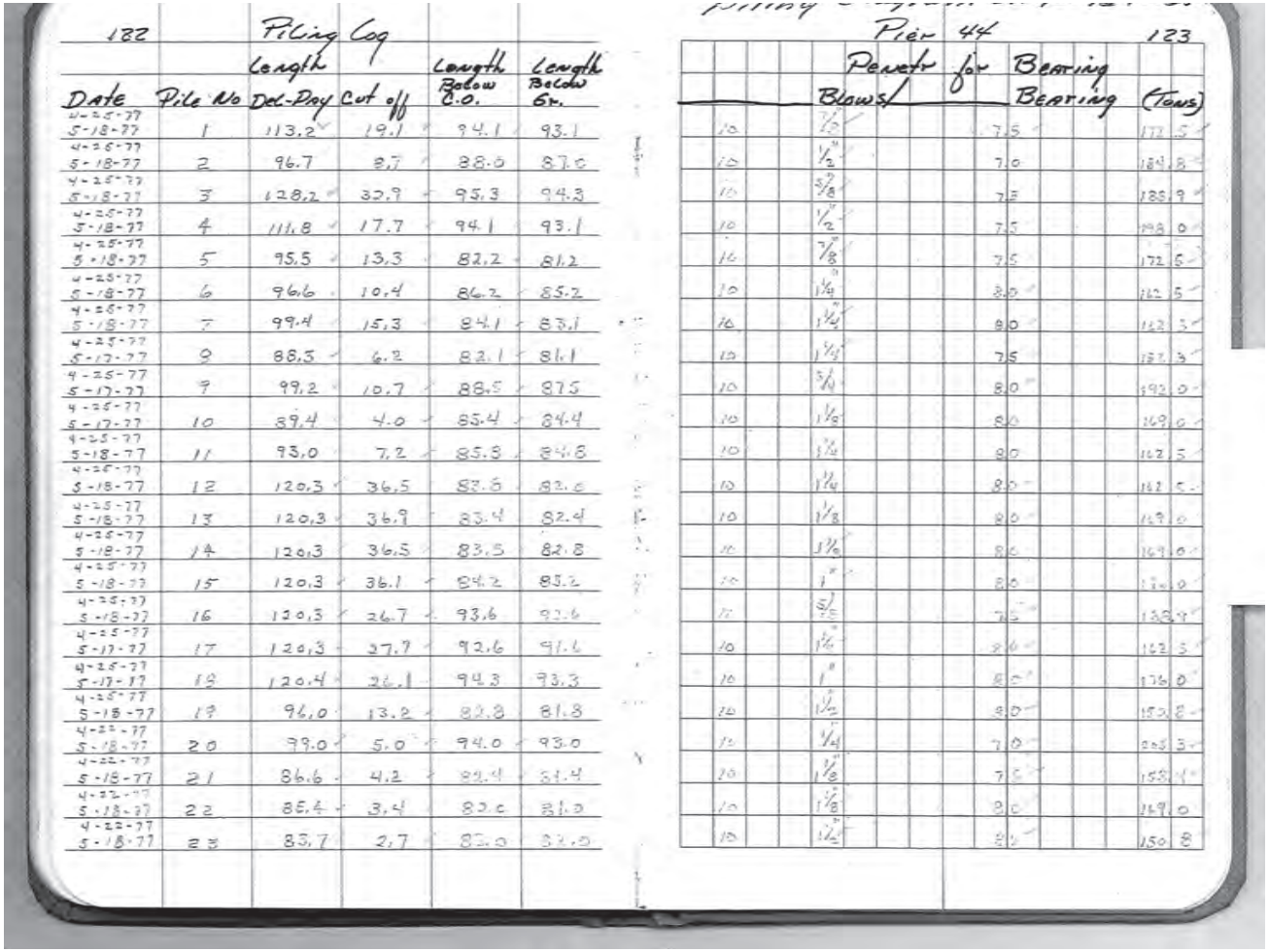
* TEST PILE

Pier 43 121

Penetr. for Bearing

	Blows/	Bearing	(Tons)
10	¼"	8.5	249.3
10	1"	8.0	176.0
10	1⅛"	8.0	169.0
10	1"	8.5	187.0
10	1"	8.5	187.0
10	⅞"	7.0	160.9
10	⅞"	7.0	160.9
10	1"	8.5	187.0
10	1"	8.0	176.0
			5906.0
			32

AVE 1846 TONS



182

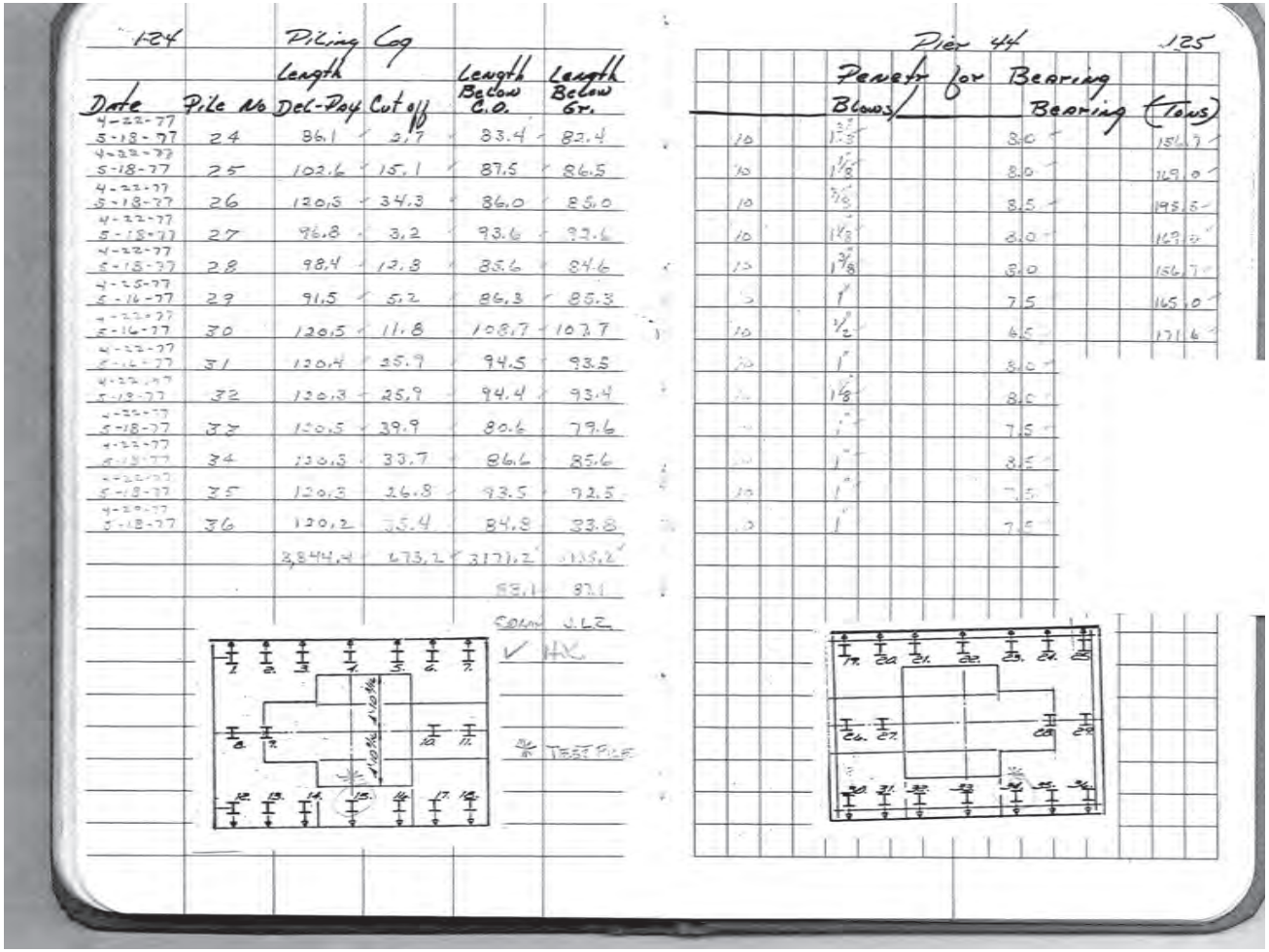
Piling Log

Date	Pile No	Length Del-Day	Cut off	Length Below C.O.	Length Below Gr.
4-25-77 5-18-77	1	113.2	19.1	94.1	93.1
4-25-77 5-18-77	2	96.7	8.7	88.0	87.0
4-25-77 5-18-77	3	128.2	32.9	95.3	94.3
4-25-77 5-18-77	4	111.8	17.7	94.1	93.1
4-25-77 5-18-77	5	95.5	13.3	82.2	81.2
4-25-77 5-18-77	6	96.6	10.4	86.2	85.2
4-25-77 5-18-77	7	99.4	15.3	84.1	83.1
4-25-77 5-17-77	9	88.3	6.2	82.1	81.1
4-25-77 5-17-77	9	99.2	10.7	88.5	87.5
4-25-77 5-17-77	10	89.4	4.0	85.4	84.4
4-25-77 5-18-77	11	93.0	7.2	85.8	84.8
4-25-77 5-18-77	12	120.3	36.5	83.8	82.8
4-25-77 5-18-77	13	120.3	36.9	83.4	82.4
4-25-77 5-18-77	14	120.3	36.5	83.8	82.8
4-25-77 5-18-77	15	120.3	36.1	84.2	83.2
4-25-77 5-18-77	16	120.3	26.7	93.6	92.6
4-25-77 5-17-77	17	120.3	27.7	92.6	91.6
4-25-77 5-17-77	18	120.4	26.1	94.3	93.3
4-25-77 5-18-77	19	96.0	13.2	82.8	81.8
4-22-77 5-18-77	20	99.0	5.0	94.0	93.0
4-22-77 5-18-77	21	86.6	4.2	82.4	81.4
4-22-77 5-18-77	22	85.4	3.4	82.0	81.0
4-22-77 5-18-77	23	83.7	2.7	82.0	81.0

Pier 44

123

	Blows/	Penetr for	Bearing Bearing	(Tons)
10	7/0"		7.5	173.5
10	1/2"		7.0	184.8
10	5/8"		7.5	186.9
10	1/2"		7.5	198.0
10	7/8"		7.5	172.5
10	1 1/4"		8.0	162.5
10	1 1/4"		8.0	162.5
10	1 1/4"		7.5	157.3
10	5/8"		8.0	192.0
10	1 1/8"		8.0	169.0
10	1 1/8"		8.0	162.5
10	1 1/4"		8.0	162.5
10	1 1/8"		8.0	169.0
10	1 1/8"		8.0	169.0
10	1"		8.0	176.0
10	5/8"		7.5	158.4
10	1 1/4"		8.0	162.5
10	1"		8.0	176.0
10	1 1/2"		9.0	153.8
10	1/4"		7.0	205.3
10	1 1/8"		7.0	155.4
10	1 1/8"		8.0	169.0
10	1 1/2"		9.0	150.8



I-124

Piling Log

Date	Pile No	Length Del-Pay	Cut off	Length Below C.O.	Length Below Gr.
4-22-77 5-18-77	24	86.1	3.7	83.4	82.4
4-22-77 5-18-77	25	102.6	15.1	87.5	86.5
4-22-77 5-18-77	26	120.3	34.3	86.0	85.0
4-22-77 5-18-77	27	96.8	3.2	93.6	93.6
4-22-77 5-18-77	28	98.4	12.8	85.6	84.6
4-25-77 5-16-77	29	91.5	5.2	86.3	85.3
4-22-77 5-16-77	30	120.5	11.8	108.7	107.7
4-22-77 5-16-77	31	120.4	25.9	94.5	93.5
4-22-77 5-18-77	32	120.3	25.9	94.4	93.4
4-22-77 5-18-77	33	120.5	39.9	80.6	79.6
4-22-77 5-18-77	34	120.3	33.7	86.6	85.6
4-22-77 5-18-77	35	120.3	26.8	93.5	92.5
4-22-77 5-18-77	36	120.2	35.4	84.8	83.8
		3,844.4	673.2	3171.2	3135.2
				88.1	87.1

Solum J.L.C.

✓ HK

5/8 Test Pile

Pier 44

I-125

Penetr for Bearing

Blows/		Bearing	(Tons)
10	1 3/8"	8.0	156.7
10	1 1/8"	8.0	169.0
10	7/8"	8.5	198.5
10	1 1/8"	8.0	169.0
10	1 3/8"	8.0	156.7
5	1"	7.5	165.0
10	1/2"	6.5	171.6
10	1"	8.0	
10	1 1/8"	8.0	
10	1"	7.5	
10	1"	8.5	
10	1"	7.5	
10	1"	7.5	

Preliminary Site Investigation Report
(September 5, 1973)

WA Kline
3104 Mid Vale

DEPARTMENTAL CORRESPONDENCE

SEP 6 1973

Date: September 5, 1973

To: Mr. C. Ryan, District Engineer
Attn: Mr. W. W. Bruss, District Chief Materials Engineer

From: Mr. G. H. Zuehlke, Chief Materials Engineer

Subject: MATERIALS
SOILS
PRELIMINARY SITE INVESTIGATION REPORT
Project I.D. 1220-05-00
I.H. 57 over Fox River (Tower Drive)
Structure B-5-158
Brown County

BRIDGE SECTION	
W. A. K.	
W. J. S.	
R. L. R.	
D. E. F.	
N. F. W.	
J. F. M.	
S. W. W.	
FILE	
RETURN	

Attached are the subsurface exploration sheets (three) for the borings taken at the Tower Drive structure. These borings are preliminary only and they were randomly spaced along the proposed ℄ of IH-57. There are several borings spaced a considerable distance apart due to dikes, high water and other natural obstructions. When span lengths are determined, borings can and should be made at definite pier locations in these areas.

The proposed structure will carry IH-57 over the Fox River at Tower Drive. Fifteen borings were made at the proposed structure site. Standard Penetration Tests (AASHO T-206) were made to estimate relative soil density, evaluate bearing capacity and to estimate pile support values. Shelby tubes were taken in the following borings.

Boring Number	Station
1	789+00 on T_L
2	805+00 on T_L
3	809+50 on T_L
7	825+33 5' Rt. on R_L
11	849+00 on T_L
13	856+50 on T_L
20	899+00 80' Lt. T_L
21	905+30 120' Lt. T_L

Unconfined strengths were estimated by hand penetrometer on other samples.

Borings 1, 2, 3, 19, 20 and 21 were drilled outside the present proposed limits of this structure. The copies of the field boring logs for these borings are attached. They would be helpful in analyzing approach fills to determine if the structure can be shortened or if necessary, lengthened.

Spread footings do not appear to be feasible within the estimated length of this structure. Some borings indicate high unconfined strengths but loads of the magnitude generated by a structure as large as this would overload the soft clays at and below elevation 550±.

Economics would be the determining factor of displacement piles versus non-displacement piles driven to bedrock.

Bedrock was cored in seven borings with a low of 95% recovery. This rock is very competent and H-piles would have little or no penetration into bedrock. Slabs of bedrock were encountered in Boring 15, immediately above bedrock. Boulders were also encountered in Borings 5, 7, 8, 9, and 16. These were not at the same elevations and do not appear to be stratified or laterally continuous from boring to boring.

Seals will be needed at the water piers. The soil conditions at this structure are similar to those at Mason Street. The problems encountered at water piers there will be similar here. A review of the construction practices used at Mason Street would be helpful to the designer of the Tower Drive structure. This information can be supplied by District 3 Soil Supervisor, if desired.

Copies of the field boring logs and a sepia of the plotted boring logs are attached.

When additional borings are needed, please contact the Central Soils Office.

By:

C. N. Laughter
Soils Engineer

CNL:WRF:qvf

cc: GHZ
ICH
WAK (2)
District 3 (3)
M.O.

Supplemental Test Borings and Lab Test Data for River Piers (October 31, 1974)

DEPARTMENTAL CORRESPONDENCE

Date: October 31, 1974

To: Mr. W. A. Kline, Chief Bridge Engineer
Attn: Mr. Don Fugere, Preliminary Bridge Design Engineer-Supervisor

From: Mr. G. H. Zuehlke, Chief Materials Engineer

Subject: MATERIALS
SOILS
Structure B-5-158
Project I.D. 1220-05-00
I-43 over Fox River
Brown County

I am attaching copies of boring logs and tests on shallow soils on the proposed bridge main channel piers. We presume the soils in the channel area will be similar. As noted here the soils are predominantly fine sand and silt.

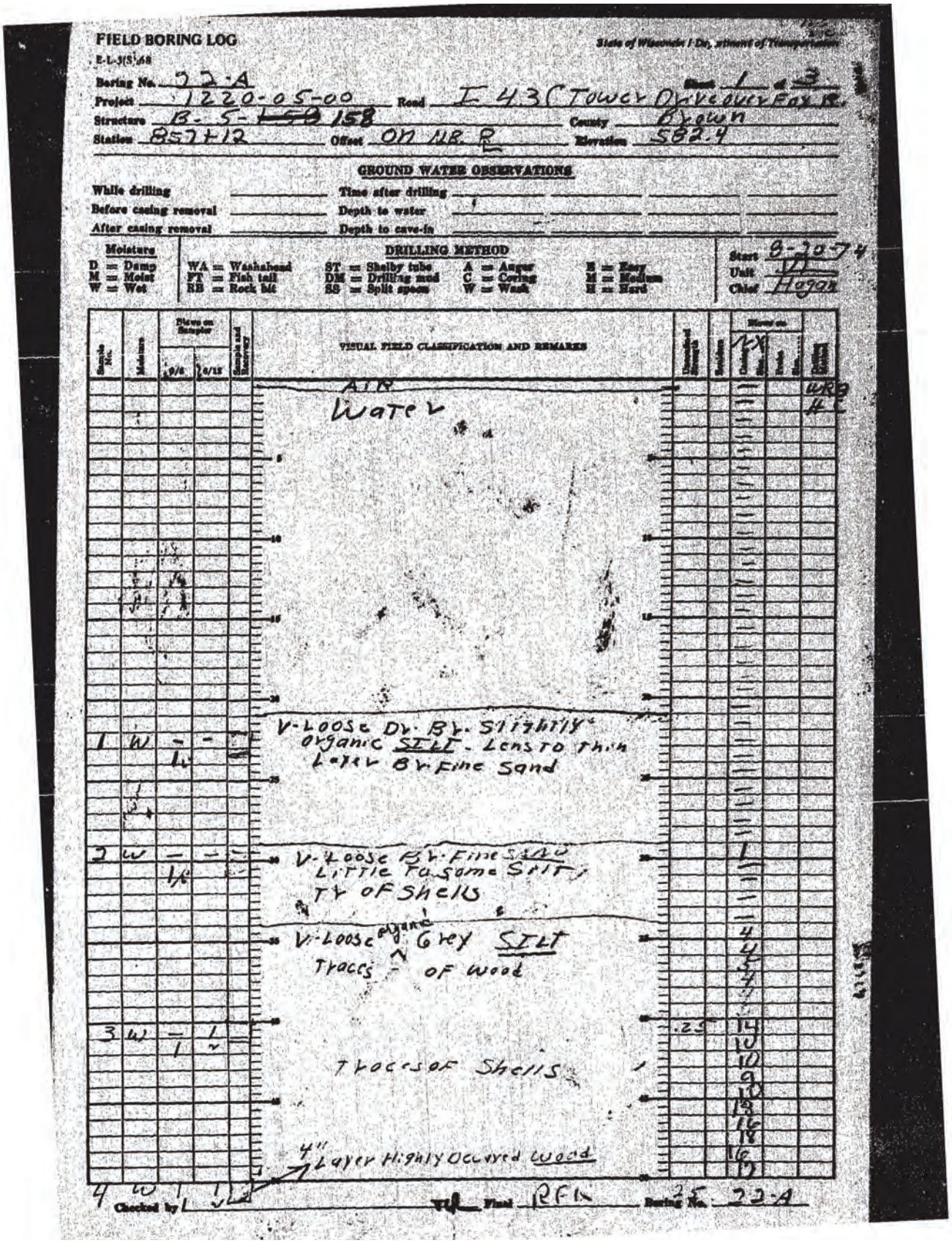
We understand that some concern exists over erosion or scour if the channel is deepened. The material, when drilled, appeared to be a product of sedimentation and the general area indicates a continuing deposition of sediment.

Without proposing any great knowledge of this total problem, it seems likely that sedimentation and filling may present more problems in the future than scour or erosion. If a slope analyses for a deepened channel is desired, we will do so.

By: C. N. Laughter

C. N. Laughter
Soils Engineer

GHZ:CNL:gvf



FIELD BORING LOG

State of Wisconsin / Department of Transportation

E-L-3(S) 68

Boring No. 22-A | Sheet 1 of 3

Project 1220-05-00 | Road I-43 (Tower Dr. over Fox R.)

Structure B-5-158 | County Brown

Station 857+12 | Offset ON NB R | Elevation 582.4

GROUND WATER OBSERVATIONS

While drilling | Time after drilling

Before casing removal | Depth to water

After casing removal | Depth to cave-in

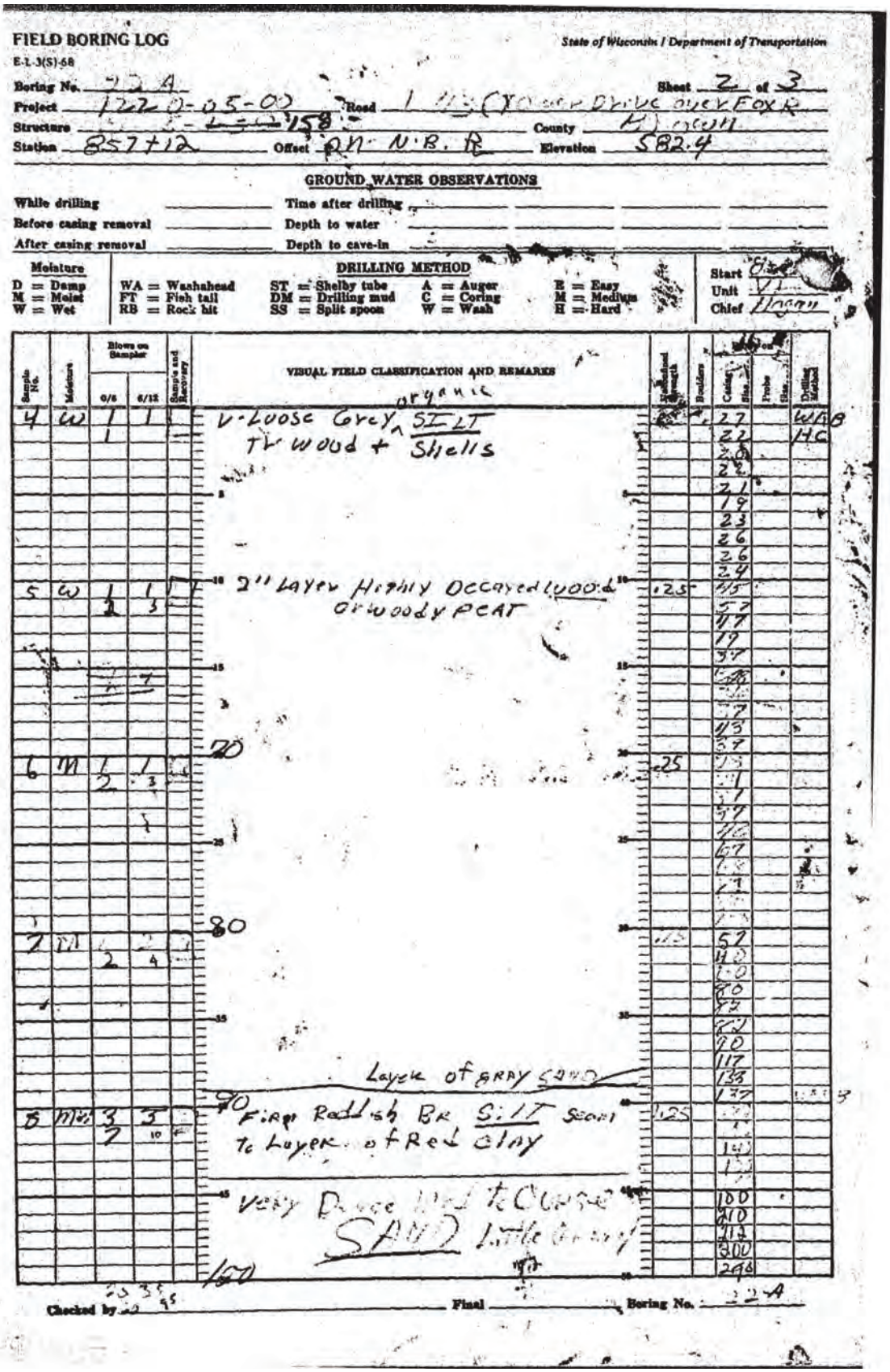
Moisture: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-20-74 | Unit VI | Chief Hogan

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKES	Blows on
					AIR	WR 9
					Water	#1
1	W	-	-		V-Loose Dk. Br. Slightly Organic SILT - Lens to Thin Layer Br. Fine Sand	
		1/1				
2	W	-	-		V-Loose Br. Fine SAND Little to some SILT; TR OF SHELLS	
		1/1				
					V-Loose Dk. Grey SILT	4
					TRACES OF WOOD	4
						5
						4
3	W	-	1			.25 14
		1	1/1			10
					TRACES OF SHELLS	10
						9
						12
						13
						16
						18
					4" Layer Highly Decayed Wood	16
4	W	1	1			17
			1/2			

Checked by L | Final RFK | Boring No. 22-A



FIELD BORING LOG

State of Wisconsin / Department of Transportation

E-1.3(S)-68

Boring No. 22A — Sheet 2 of 3

Project 1220-05-00 — Road I 43 (Old Hwy Drive over Fox R.

Structure B-05-158 — County Brown

Station 857+12 — Offset 20' N.B. Rt — Elevation 582.4

GROUND WATER OBSERVATIONS

While drilling — Time after drilling

Before casing removal — Depth to water

After casing removal — Depth to cave-in

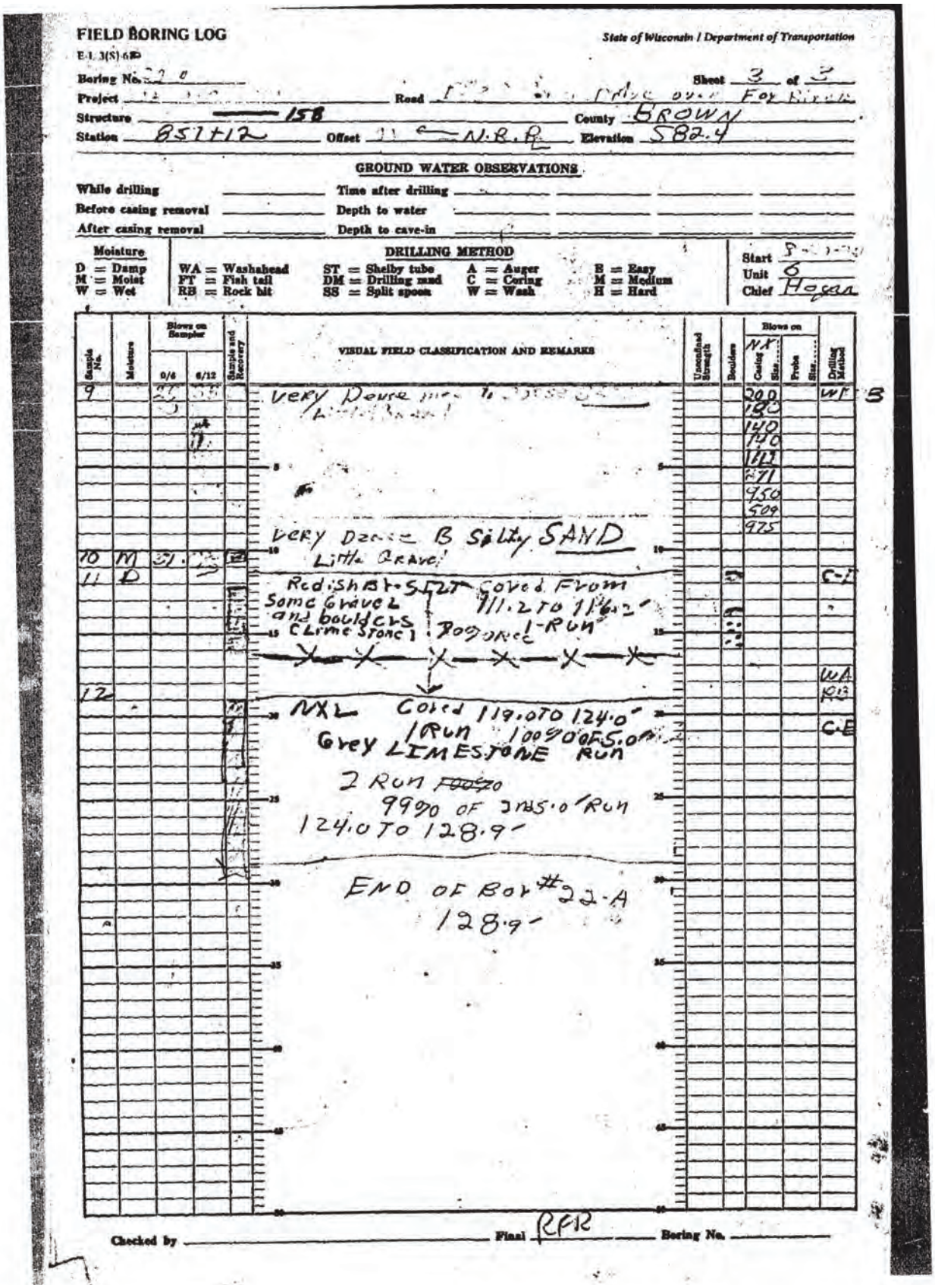
Moisture: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 6/5 — Unit V — Chief Haggu

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Casing Size	Probe Size	Drilling Method
4	W	1	1		V-Loose Grey organic SILT Tr Wood + Shells			27		WAB
		1						22		HC
								20		
								22		
								21		
								19		
								23		
								26		
								26		
								24		
5	W	1/2	1/3		2" Layer Highly Occayed Wood or Woody PEAT	.125		15		
								17		
								17		
								17		
								28		
								7		
								13		
								17		
6	M	1/2	1/3			.25		1		
			1					17		
								12		
								17		
								17		
								1		
7	M	2	4			.125		52		
								40		
								70		
								70		
								77		
								90		
								90		
								117		
					Layer of GRAY SAND			133		
								127		
8	M	3/7	5/10		First Reddish Br SILT Seam To Layer of Red Clay	.125		1		
								1		
								140		
								1		
					Very Dense Red to Coarse SAND Little Gravel			100		
								210		
								217		
								300		
								296		

Checked by — Final — Boring No. 22A



FIELD BORING LOG

State of Wisconsin / Department of Transportation

E-L 3(S) 6-80

Boring No. 22-0 Sheet 3 of 3

Project [illegible] Road [illegible] Drive over Fox River

Structure 158 County BROWN

Station 851+12 Offset 21' ← N.B.L. Elevation 582.4

GROUND WATER OBSERVATIONS

While drilling — Time after drilling —

Before casing removal — Depth to water —

After casing removal — Depth to cave-in —

Moisture: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

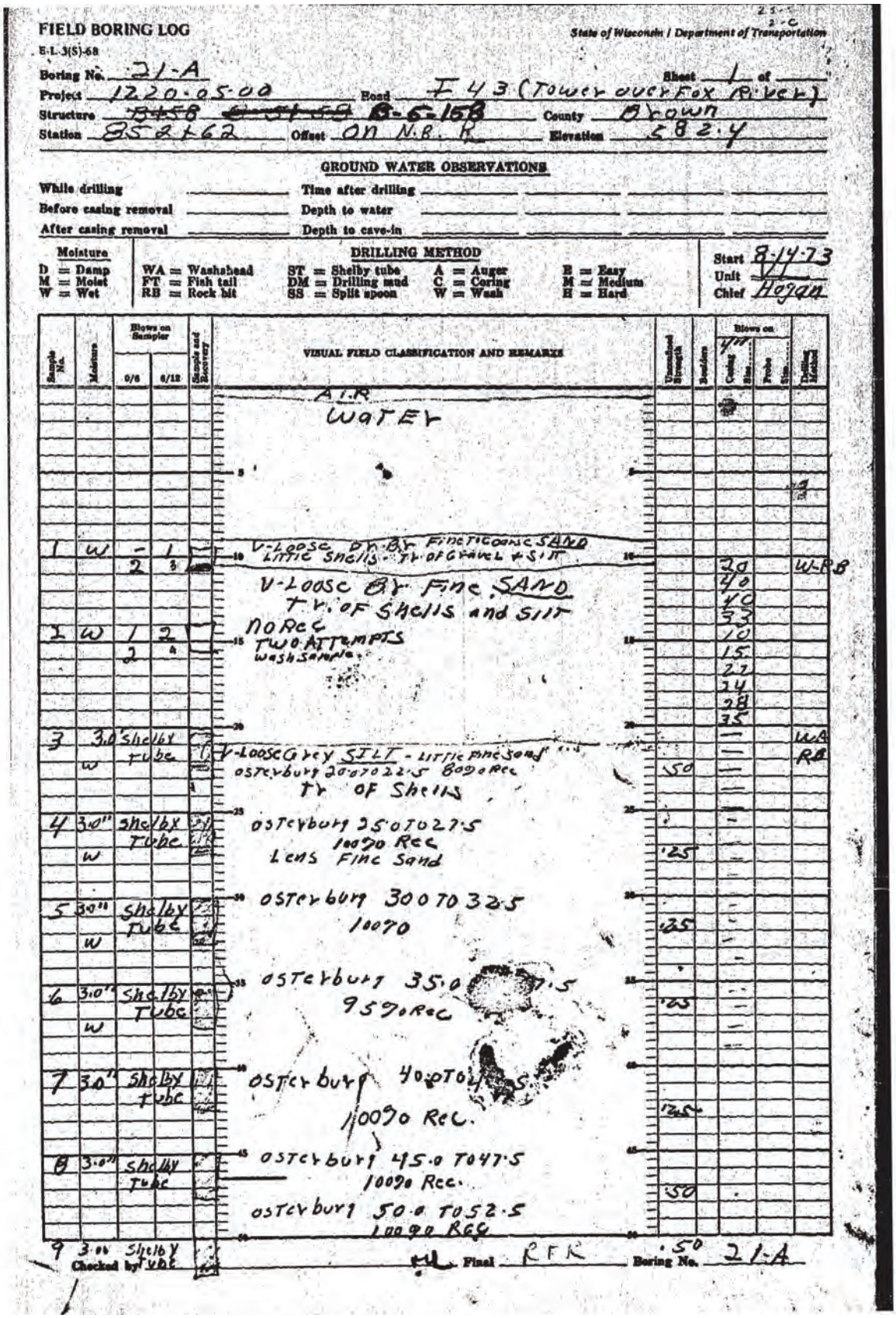
Start 8-[illegible]-79

Unit 6

Chief Hogan

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing NX	Blows on Size	Blows on Probe Size	Drilling Method
9		WH 2	4 11		very Dense [illegible]			200 180 140 140 171 271 450 509 975			WH
10	M	31	[illegible]		very Dense B Silty SAND Little GRAVEL						
11	D				Reddish Brown Color From 111.2 TO 119.0' Some Gravel and boulders Clime Stone Dense 1-RUN						C-E
12					NXL Cored 119.0 TO 124.0' 1 RUN 100% OF 5.0' RUN Grey LIMESTONE 2 RUN 99% OF 3.5' RUN 124.0 TO 128.9'						WA NR C-E
					END OF BOR #22-A 128.9'						

Checked by — Final RFR — Boring No. —



FIELD BORING LOG

State of Wisconsin / Department of Transportation

E-L 3(S)-68

Boring No. 21-A Sheet 1 of

Project 1220-05-00 Road I 43 (TOWER over FOX RIVER)

Structure B-450 ~~B-6-168~~ B-6-168 County Brown

Station 852+62 Offset ON N.B. R Elevation 582.4

GROUND WATER OBSERVATIONS

While drilling — Time after drilling —

Before casing removal — Depth to water —

After casing removal — Depth to cave-in —

Moisture: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washhead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-14-73 Unit Chief Hojan

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Deviation	Blows on 4" Casing Dia.	Blows on 4" Fresh Dia.	Blows on 4" Dia.	Drilling Method
					AIR WATER						
1	W	-	1		V-Loose Dk. Br. Fine to Coarse SAND Little Shells - Tr. of Gravel & Silt			30			W-RB
		2	3					40			
					V-Loose Br. Fine SAND Tr. of Shells and Silt			40			
								33			
2	W	1	2		No Rec TWO ATTEMPTS Wash Sample			10			
		2	4					15			
								27			
								34			
								28			
								35			
3	3.0" W	Shelby Tube			V-Loose Grey SILT - Little Fine Sand Osterburg 20.0 TO 22.5 Bad Rec Tr OF Shells	150		—			W-RB
4	3.0" W	Shelby Tube			Osterburg 25.0 TO 27.5 100% Rec Lens Fine Sand	125		—			
5	3.0" W	Shelby Tube			Osterburg 30.0 TO 32.5 100%	125		—			
6	3.0" W	Shelby Tube			Osterburg 35.0 TO 37.5 95% Rec	125		—			
7	3.0"	Shelby Tube			Osterburg 40.0 TO 42.5 100% Rec.	125		—			
8	3.0"	Shelby Tube			Osterburg 45.0 TO 47.5 100% Rec.	150		—			
					Osterburg 50.0 TO 52.5 100% Rec						
9	3.0"	Shelby Tube			Final RFK	150		—			

Checked by VBE Boring No. 21-A

FIELD BORING LOG

E-L-3(S)-68

State of Wisconsin / Department of Transportation

Boring No. 21-A Sheet 2 of 3

Project 1220-05-00 Road I43 (Tower Drive over Fox R.

Structure B-5-158 County Brown

Station 852+62 Offset On N.B. ℄ Elevation 582.4

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After casing removal ____ Depth to cave-in ____

Moisture: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

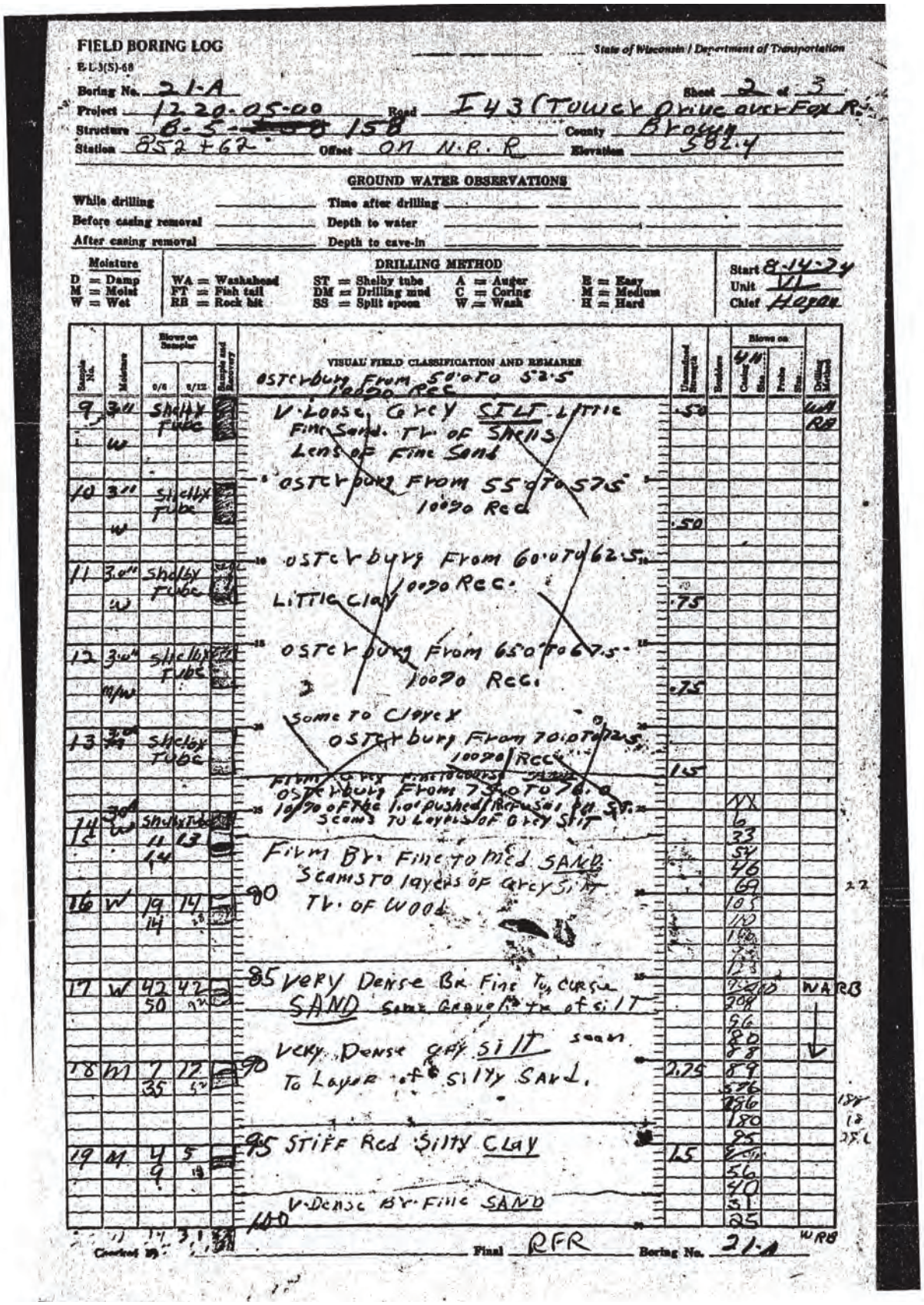
Start 8-14-24 Unit VL Chief [illegible]

Sample No.	Moisture	Blows on Sampler 0/6	6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Probe Size	Drilling Method
					Osterburg From 50.0 TO 52.5 10090 Rec					
9	3.1" W	Shelby Tube			V. Loose Grey SILT - Little Fine Sand. Tr. of Shells Lens of Fine Sand	.50				WA RB
10	3" W	Shelby Tube			Osterburg From 55.0 TO 57.5 10090 Rec.	.50				
11	3.0" W	Shelby Tube			Osterburg From 60.0 TO 62.5 Little Clay 10090 Rec.	.75				
12	3.0" M/W	Shelby Tube			Osterburg From 65.0 TO 67.5 10090 Rec.	.75				
13	3.2"	Shelby Tube			Some To Clayey Osterburg From 70.0 TO 72.5 10090 Rec.	1.5				
					FIRM Grey Fine To Coarse SAND Osterburg From 75.0 TO 76.0					
14	3.0" W	Shelby Tube	11 13 14 27		10090 Of The 1.0' Pushed (Refusal on S.T. Seems To Layers Of Grey Silt					

Caution

continued on next log

Checked by ____ Final R.I. Boring No. 21-A



FIELD BORING LOG

State of Wisconsin / Department of Transportation

B-L-3(S)-68

Boring No. 21-A Sheet 2 of 3

Project 1220-05-00 Road I-43 (Tower Drive over Fox R.)

Structure B-5-158 County Brown

Station 852+62 Offset ON N.B.R. Elevation 582.4

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After casing removal ____ Depth to cave-in ____

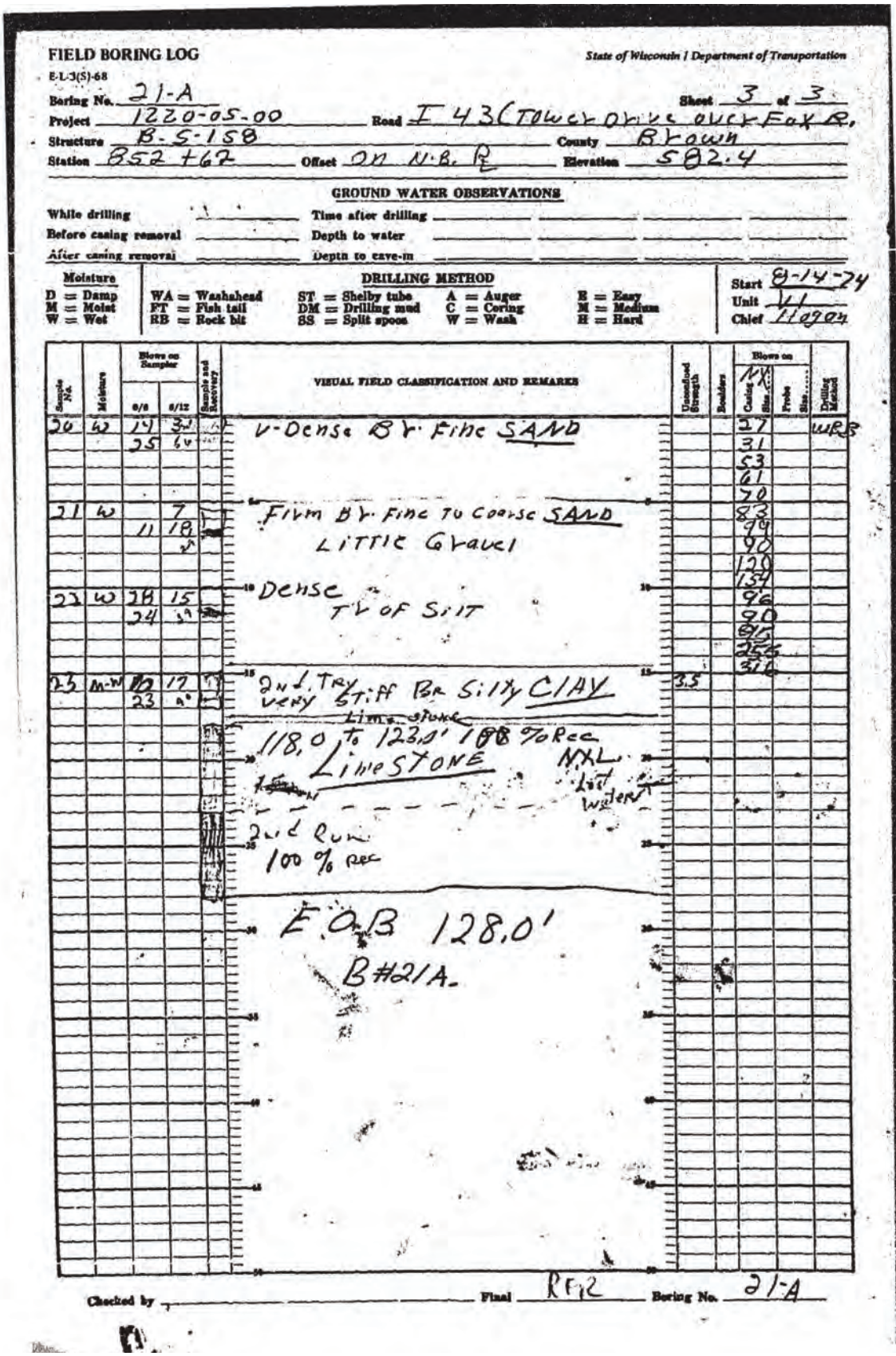
Moisture: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-14-24 Unit VL Chief Hayer

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Elevation/Remarks	Boulders	Blows on Casing	Blows on Hammer	Blows on Drilling
					OSTERBURG FROM 50.0 TO 52.5 10030 REC					
9	3.0" W	Shelby Tube			V. Loose, Grey SILT-Little Fine Sand. TR. of Shells. Lens of Fine Sand	580				WH RB
10	3.0" W	Shelby Tube			OSTERBURG FROM 55.0 TO 57.5 10030 Rec	575				
11	3.0" W	Shelby Tube			OSTERBURG FROM 60.0 TO 62.5 10030 Rec. LITTLE CLAY	575				
12	3.0" M/W	Shelby Tube			OSTERBURG FROM 65.0 TO 67.5 10030 Rec. Some to Clayey	575				
13	3.0" M	Shelby Tube			OSTERBURG FROM 70.0 TO 72.5 10030 REC	575				
14 15	3.0" W	Shelby Tube 11 13 14			FIRM BY. FINE TO MED SAND. OSTERBURG FROM 75.0 TO 76.0 10030 OF the 1.0' pushed Recovered 0.8' Seems TO Layers OF Grey SILT	570		NR 6 23 54 46 69 105 112 126 125		
16	W	19 14	14		FIRM BY. FINE TO MED SAND. Seams TO layers OF Grey SILT TR. OF WOOD	90				22
17	W	42 50	42		VERY Dense BR. Fine To COARSE SAND Some Gravel TR of SILT	85		208 56 80 88		WARB
18	M	7 35	12		VERY Dense GRY SILT seam To Layer of SILTY SAND.	90	2.75	89 176 196 180		188 13 25.0
19	M	4 9	5		STIFF Red SILTY CLAY	95	2.5	85 56 40 31 25		
					V. Dense BY. Fine SAND	100				

Checked by ____ Final RFR Boring No. 21-A WRB



FIELD BORING LOG

State of Wisconsin / Department of Transportation

E-L-3(S)-68

Boring No. 21-A Sheet 3 of 3

Project 1220-05-00 Road I 43 (TOWER DRIVE OVER FOX R.

Structure B-5-158 County BROWN

Station 852+67 Offset ON N.B. R Elevation 582.4

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After casing removal Depth to cave-in

Moisture: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 8-14-74

Unit 41

Chief 11a904

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing NX Size	Blows on Probe Size	Drilling Method
20	W	14	30		V-Dense BR. Fine SAND			27		WRB
		25	64					31		
								53		
								61		
								70		
21	W		7		Firm BR. Fine TO Coarse SAND			83		
		11	18		LITTLE Gravel			96		
								90		
								120		
								134		
22	W	28	15		Dense			96		
		24	39		TR OF SILT			90		
								86		
								256		
								316		
23	M-W	19	17		2ND TRY	3.5				
		23	40		VERY STIFF BR Silty CLAY					
					Lime STONE					
					118.0 to 123.0' 100% Rec					
					LIMESTONE NXL					
					1st WATER					
					2nd Run					
					100% Rec					
					E.O.B 128.0'					
					B#21A					

Checked by Final RFR Boring No. 21-A

E-L-19(L) 12-70

Division of Highways - Materials Laboratory
304 North Randall Avenue
Madison, Wisconsin 53715

REPORT OF TESTS ON SOILS

D

State of Wisconsin / Department of Transportation

Report No. 22

Test Number 4-89-74

Document	Date Mo.-Day-Yr.	Charge Project	Yr.	Func	Credit Project	Yr.	Quantity
K 7801	10 30 74	1220 500		89	190	489	

County: Brown
Project Name: Tower Drive I-43
Contractor:
Material: Soils
Source: Borings - Structure B-5-158
Tests Requested By: Soils Unit
Submitted by Soils Unit
Date: 10-25-74

Boring Number	21A	21A	22A			
Sample Number	1	2	1			
Depth, ft.	9-10.5	14-15.5	22.0-24			
Mechanical Analysis						
Boulders (Ret. 3")	0					
Gravel (Pass 3" - Ret. #10)	10	0				
Coarse Sand (Pass #10 - Ret. #40)	32	1	0			
Fine Sand (Pass #40 - Ret. #200)	52	94	36			
Silt (Pass #200 - Ret. 0.002mm)	6 *	5 *	52 +			
Clay (Pass 0.002mm)	—	—	12 +			
Liquid Limit	Non-Coh	Non-Coh	47.3			
Plasticity Index	NP	NP	18.5			
AASHO Classification	A-3(0)	A-3(0)	A-7-6(10)			
Moisture Content, %	—	—	—			
Loss on Ignition, %	1.0	0	6.7			
Unconfined Compression Test						
Unit Weight, PCF						
Unconfined Compression, TSF						

Remarks
* Total Silt and Clay
+ Estimated. 0.0032 mm. = 18.6%.

Distribution - Soils Unit (2)
District 3 (2)
Chief Materials Engineer

By K. J. Engeldinger
Materials Tests Engineer Supervisor

Site Investigation Report
(May 22, 1975)

CORRESPONDANCE/MEMORANDUM

FILING

STATE OF WISCONSIN

MAY 27 RECD

BRIDGE SECTION	
W. A. K.	
W. J. S.	
R. L. R.	
D. E. F.	
N. F. W.	
J. E. M.	
S. W. W.	
FILE	
RETURN	

Date: May 22, 1975 File Ref:

To: Mr. C. R. Ryan, District Engineer
Attn: Mr. W. W. Bruss, District Materials Engineer

From: Mr. G. H. Zuehlke, Chief Materials Engineer

Subject: MATERIALS
SOILS
SITE INVESTIGATION REPORT
Project I.D. 1220-05-00
I.H. 43 over Fox River
Structure B-5-158
Brown County

We are attaching copies of a Site Investigation Report for the project noted above. A supplemental report for the East Abutment and Piers 5 and 37 will be submitted when borings are completed.

By:

C. H. Laughter

C. H. Laughter
Soils Engineer

GHZ:CNL:gvf

cc: GHZ
ICH
WAK (2)
District 3 (3)
M.O.

AD-75

SITE INVESTIGATION REPORT
Project I.D. 1220-05-00
I.H. 43 over Fox River
Structure B-5-158
Brown County

1. General

This is a report of subsurface conditions for the proposed bridge carrying I.H. 43 over the Fox River in Green Bay (also called Tower Drive Bridge). Borings were made at all foundation units and due to change of span lengths there are borings between piers.

An earlier report has been made for a Pile Load Test program on this project and it has been considered jointly.

The bridge is some 8,000 feet long, goes over marsh, over or near oil tank farms, over river channel, through industrial development, and across settling lagoons for a paper mill.

This report does not include borings at 3 locations where additional information is required. These are: East Abutment, station 813+20, access refused until ground dries; Pier 5, station 819+25, access refused until ground dries; Pier 37, station 874+82, marsh area awaiting Bombardier Unit.

A geological report prepared by R. F. Robinson is appended.

2. Subsurface Conditions

Forty-four borings have been made on the site. Three more are to be made at the locations listed above. Generally, borings were made according to AASHTO T-206 although the Standard Penetration Test was omitted for all or most of the depth at a few locations. Some Shelby tube samples were taken according to AASHTO T-207. Pocket penetrometer readings were made to approximate unconfined compressive strengths. On the heavier clays, the results from the pocket penetrometer readings are considerably less than laboratory unconfined compression test results, probably due to sample disturbance during the penetration test. The clays in this area are known to be moderately sensitive.

At all pier locations 10 foot rock cores, predominantly NX, were cut. Recovery was extremely good, more often 100% than not. The minimum recovery was 75% with the remainder above 90%. RQD values ranged from 30 to 92 with almost all being above 70. The RQD of 30 may have involved damage in coring.

Soil textures noted are driller's field identification with a subsequent textural check in the Central Soils Office and isolated verifying laboratory tests.

From the east abutment, station 813+20±, to station 824±, there is generally either a surface of black topsoil, or a paved or graveled surface. Below this a stiff brown clay was logged to elevation 560± although some surface deposits of looser soil can be expected. Below this, loose silt or soft clay was generally logged down to elevation 480 while dense soil was overlaying dolomite bedrock at elevation 455±. Some cobbles and boulders are noted in this dense zone. An exception to this was at the East abutment and Pier 1 where a heavy layer of dense gravel and sand are noted for a considerable depth (say 40±) over the bedrock.

From station 824± (vicinity of Pier 9) to 827+50± there are settling basins that have diked perimeters and the surface conditions reflect some reworking of local surface soils. In this segment, stiff clays or silty clays are logged down to elevation 458± with loose soils, either silts or clays, down to elevation 465±. Below this stiff soil was logged to dolomite bedrock at 455±.

It can be noted here that the bedrock surface dips slightly from west to east.

From station 827+50± to 848+50±, the upper 4 to 10 feet is a miscellaneous fill of sawdust, paper mill waste, cinders, ashes, woodchips or other waste materials from the industrial developments in the area. Below this stiff to hard clay or silty clay was logged down to elevation 560± with loose silts or silty clays being logged to 480± where dense soils were generally noted. Piers 18 through 22 showed a 20± foot sand layer in this dense zone. Bedrock was logged at elevation 465±.

Station 848+50± to 859+50 is largely the Fox River or its immediate environs. Borings 20A and 21A for Piers 26 and 27 respectively, show water or loose soil down to elevation 500± where dense soil, predominantly sand, was logged to bedrock at elevation 465±. Borings 22A and 23A for Piers 28 and 29 logged water or loose soil to elevation 480± where dense soil was logged. Dolomitic bedrock was encountered at elevation 465±.

From station 859± to 866±, a 1 to 3 foot layer of water and/or peaty organic soil was encountered at the surface. Below this, a firm to stiff silty clay was noted down to elevation 560± with soft silty clay or clay being logged to elevation 480±. Below this, dense soil was logged down to rock elevation 460±.

Station 866± to 882±, the same general conditions exist largely as above except for some fill around Bylsby Avenue, but the firm to stiff clay is noted down to elevation 540± and the rock line comes up to near 480.

The segment from station 882± to the west abutment, station 893± has predominantly loose or soft soil down to elevation 500± where a dense layer was encountered to bedrock, elevation 480±. One notable exception to this is a 10± foot layer of firm and dense soils centered approximately around elevation 560±.

Elevations and stations used previously are to largely delineate general soil conditions. Variance to a degree will be found but the data given is sufficient for setting up pile lengths, footing grades, and other germane features of design.

Ground water levels over a long period of time should stabilize at Fox River levels of 580±. However, for short term periods, excavations could be maintained dry with minimal pumping in the clay zones. Some piers fall in areas of ponded surface water over organic silts or similar soils.

3. Bearing Capacity

The layers of soft soils found across the entire structure preclude consideration of spread footings for foundations. Settlements would be excessively high and unequal.

4. Piles

The pile load test indicates H-piles can be driven to a minimum of 14,000 psi in steel for all units except the Fox River piers. These river piers should be designed at 9,000 psi in the steel.

5. Drilled Caissons or Shafts

With the layers of soft soil to considerable depth, drilled-in construction does not offer any economic advantages.

6. Construction Problems

The river piers will have soft soil near footing grade. An option for multiple pours in seals, if used, or a thin poured mudsill if seals are not used should be offered to the contractor.

For 14,000 psi-in-steel loads, extraordinary care must be used in inspection of pile driving. This is discussed at length in the Pile Load Test report.

The usual mud problems will be experienced for the work in shallow water and marsh.

7. Recommendations

Piles are indicated. Both the borings and pile load test indicate steel H-piles driven to 14,000 psi and 9,000 psi in steel for land and river piers respectively are suited to the site.

An option for a mud-sill pour for footings or seals is desirable.

The pile loads are higher than previously used. An extraordinary close inspection of pile driving is warranted to insure adequate penetration, yet avoid over-driving.

Even though ground water is rather high, minimal pumping should dewater footing excavations except in the river area.

APPENDIX

GEOLOGY OF THE GREEN BAY AREA*

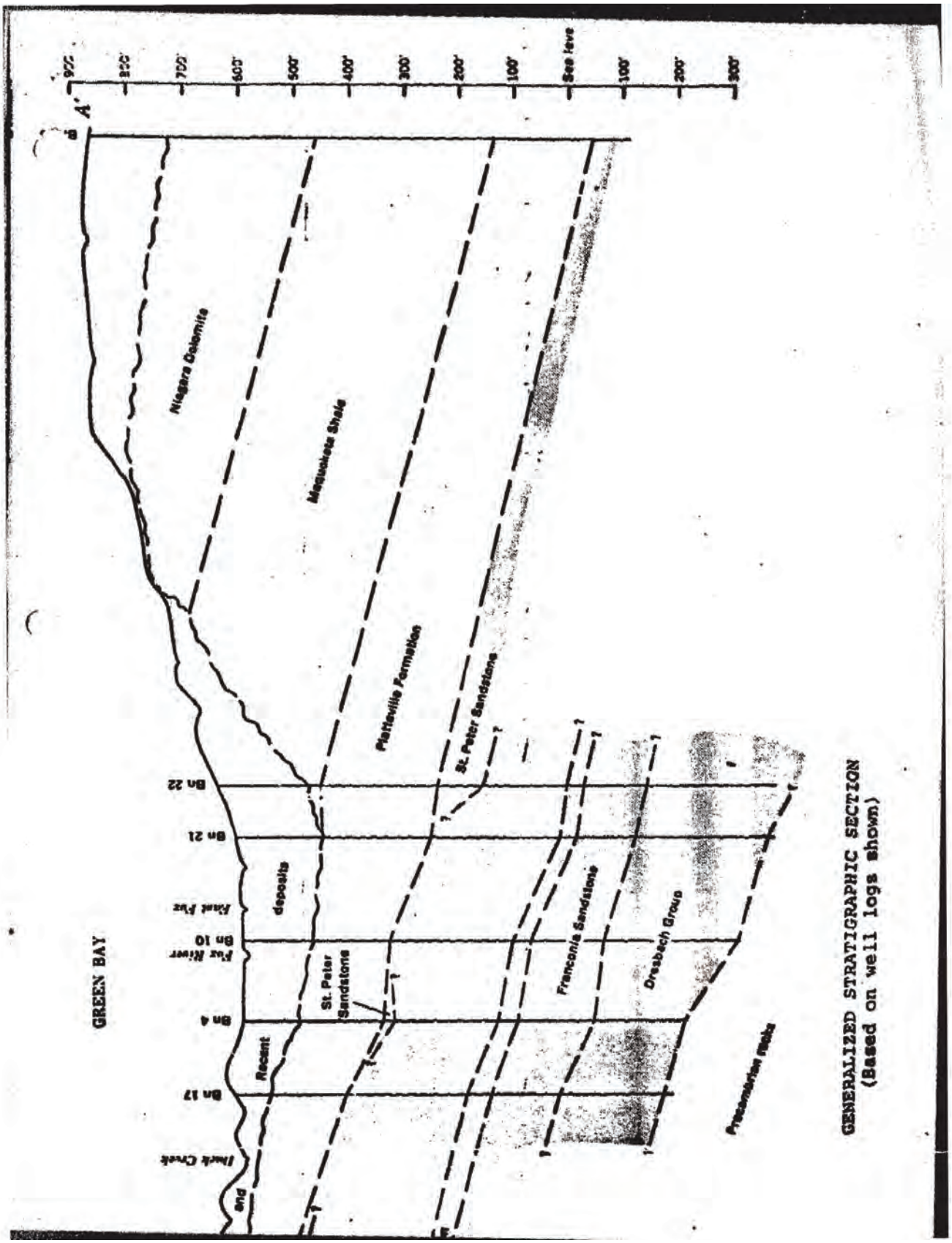
The Green Bay area lies in a trough formed by glacial erosion. Pleistocene and recent surface deposits overlie dolomite of the Platteville formation in the immediate area of Green Bay proper. Maquoketa shale is reported at the Eastern edge of the city, but this is probably beyond the I-43 project area.

The pleistocene and surface deposits consist of glacio-lacustrine clay and silt. Some surficial sand is found in the area. Till deposits may also be part of the pleistocene deposits.

The Platteville formation is described as dolomite, thin to medium bedded and ranges in thickness based on well logs from 60 to 213 feet thick. It contains some chert and shale. It is not a prominent acquifer and it is, rather, relatively impermeable but water occurs in openings along fractures and bedding planes. The degree of fracturing is unknown.

---

*Source - "Ground Water Conditions of the Green Bay Area Wisconsin", 1950-1960. U.S.G.S. Water Supply Paper 1669J.


GENERALIZED STRATIGRAPHIC SECTION
(Based on well logs shown)
GREEN BAY
Niagara Dolomite
Maquoketa Shale
Platteville Formation
St. Peter Sandstone
Franconia Sandstone
Dresbach Group
Precambrian rocks
Recent deposits
St. Peter Sandstone
Fox River
Duck Creek
Bn 22
Bn 21
Bn 10
Bn 4
Bn 17
Bnd
See level

RQD

Rock Quality Designation (RQD) is an indirect measurement to indicate the general quality of a rock for engineering purposes. The value is obtained by summing up the total length of core recovered, but counting only hard sound core lengths of 4 inches or more. The RQD is expressed as a percentage of recovery of 4 inch or greater lengths compared to the total depth cored.

Percent recoveries and RQD values from cores taken are listed below.

BORING	CORE SIZE	% RECOVERY	RQD
East Abutment	No Core	---	--
1A	NXL	100	82
2A	NXL	100	35
3A	NXL	100	99
4A	NXL	80	71
5A	NXL	83	36
6A	NXL	100	72
7A	NXL	100	75
8A	NXL	98	76
9A	NXL	100	99
10A	NXL	100	97
11A	NXL	100	82
12A	NXL	99	83
13A	NXL	100	73
18	NXL	97	98
14A	NXL	100/80	77
15A	No Core	---	--
16A	NXL	100	73
17A	NXL	100	97

BORING	CORE SIZE	% RECOVERY	RQD
18A	NXL	99/100	83
19A	NXL	100	Not Determined
20A	NXL	100	73
21A	NXL	100	83
22A	NXL	100/99	82
23A	NXL	100	72
24A	NXL	100	65
25A	NXL	100	66
26A	NXL	100	61
27A	NXL	89/100	79
28A	NXL	95	53
29A	NXL	---	3*
30A	NXL	95/100	87
31X	NXL	100/80	78
32X	NXL AXL	100 100	100 55
16	NXL	98/100	Not Determined
34A	NXL	100	84
35A	NXL	90/100	82
36A	NXL	97/100	92
37A	NXL	100	74
38A	NXL	85/75/90	74
48	NXL	96/100	97
40A	AXL	95/100	30
41A	NXL	97/100	85
West Abutment	NXL	100	83

*Core taken in dense clay till above bedrock.

Site Investigation Supplement
(July 2, 1975)

CORRESPONDANCE/MEMORANDUM

STATE OF WISCONSIN

JUL 08 RECD

BRIDGE SECTION	
W. A. K.	
W. I. S.	
R. L. R.	✓
R. E. F.	
M. F. W.	
J. E. M.	
S. W. W.	
FILE	
RETURN	

Date: July 2, 1975 *File Ref:*

To: Mr. C. R. Ryan, District Engineer
Attn: Mr. W. W. Bruss, District Materials Engineer

From: Mr. G. H. Zuehlke, Chief Materials Engineer

Subject: MATERIALS
SOILS
SITE INVESTIGATION/SUPPLEMENT
Project I.D. 1220-05-00
I.H. 43 over Fox River
Structure B-5-158
Brown County

This supplemental report is for the four additional borings taken at the East Abutment and Piers 5, 35, and 37 for the above noted structure. These borings were made to obtain rock cores in areas where there was some question of rock elevation. Standard Penetration Tests (AASHTO T-206) were also made near the surface to evaluate foundation soils in the pile cap area.

Soils encountered were similar to those noted in the original report. Percent recoveries and RQD values from the cores taken are listed below:

BORING	CORE SIZE	% RECOVERY	RQD %
1L	NXL	90	50
	AXL	100	24
5X	NXL	100/75	94
35X	AXL	80/100	9
37X	AXL	92/100	8/0

Recommendations as given in the original site report of May 22, 1975 remain valid. H-pile driven to rock and stressed to 14,000 psi in the steel is the logical foundation type for land units.

Please add the additional borings logs and updated prints to your report. Previously distributed prints should be destroyed.

By: C. N. Laughter
C. N. Laughter
Soils Engineer

CNL:GCW:gvf

cc: GHZ M.O.
WAK (2)
ICH
District 3 (3)

AD-75

Pile Load Test Results
(May 9, 1975)

CORRESPONDANCE/MEMORANDUM

STATE OF WISCONSIN

Date: May 9, 1975 File Ref:

To:

From: Mr. G. H. Zuehlke, Chief Materials Engineer

Subject: MATERIALS
SOILS
PILE LOAD TESTS
Project I.D. 1220-05-00
I.H. 43, Tower Drive Segment over Fox River
Structure B-5-158
Brown County

We are enclosing a report on Pile Load Tests conducted by the Bridge Section, Soils Unit and District 3 for the structure noted. Our normal Site Investigation Report will be forthcoming showing borings for all piers and other data.

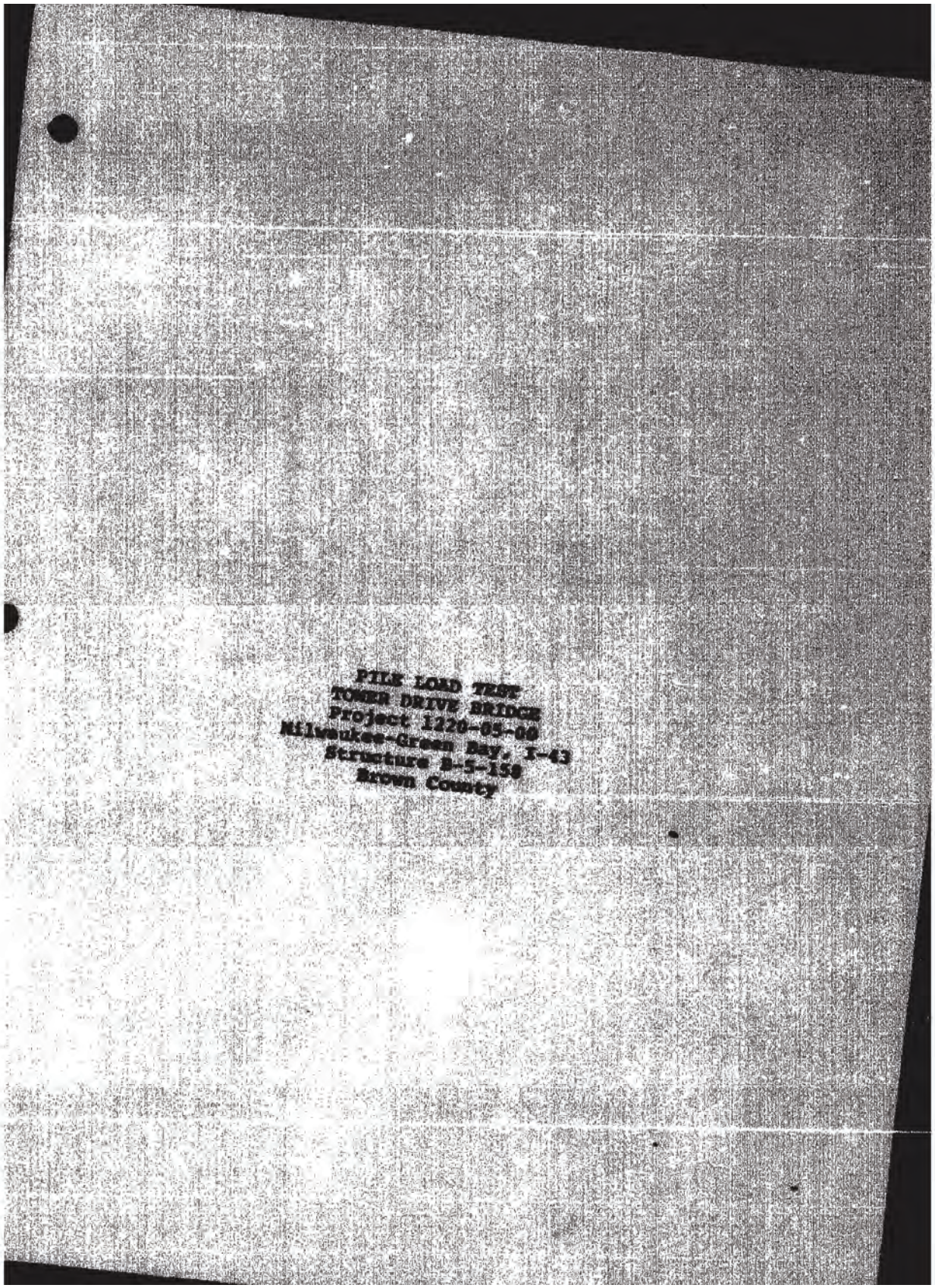
By:

C. N. Laughter
Soils Engineer

CNL:GCW:gvf

cc: District 3 (3)
Bridge Section (4)
GHZ
M.O.

AD-75


PILE LOAD TEST
TOWER DRIVE BRIDGE
Project 1220-05-00
Milwaukee-Green Bay, I-43
Structure B-5-158
Brown County

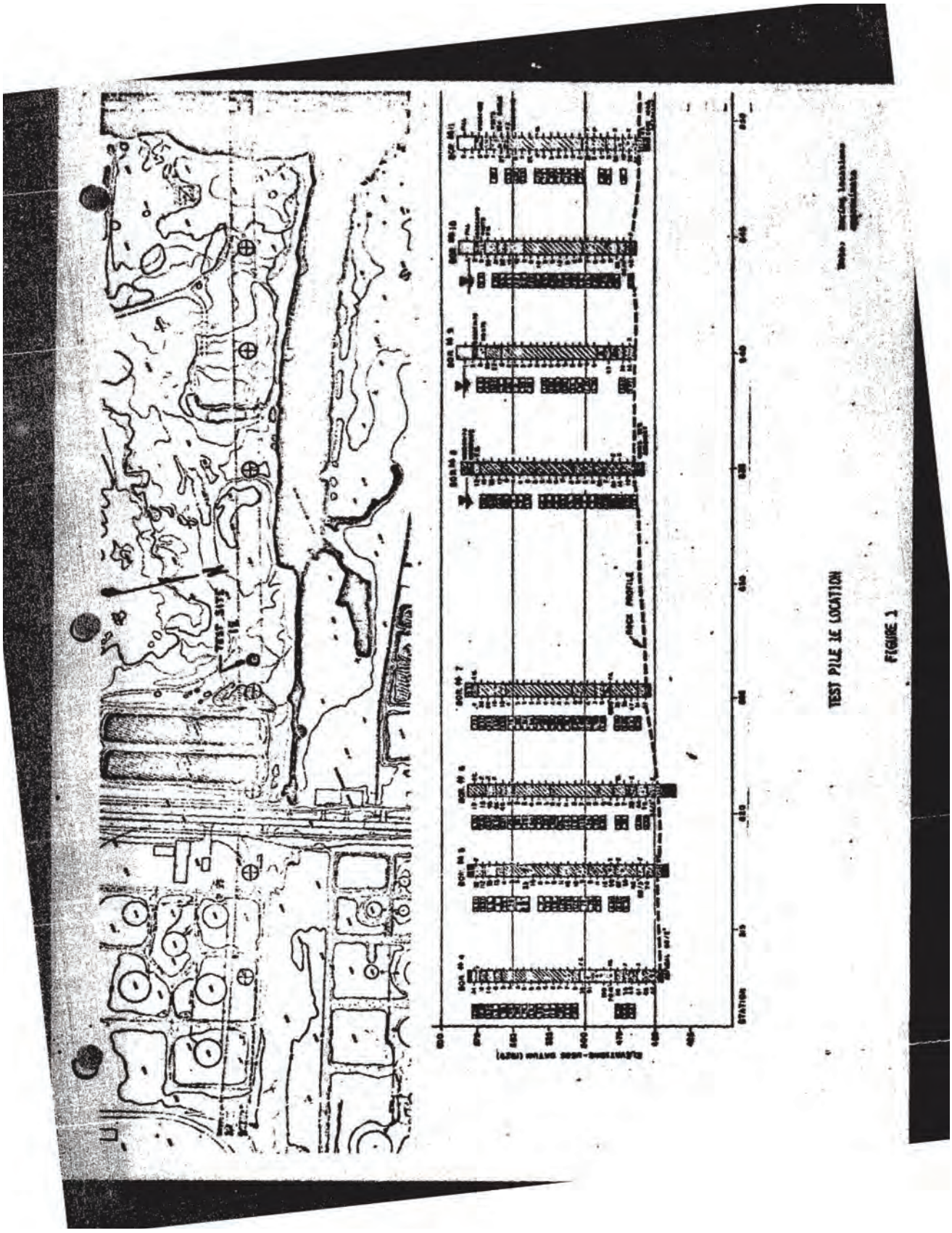
PILE LOAD TEST
TOWER DRIVE BRIDGE
Milwaukee-Green Bay Road
I.H. 43

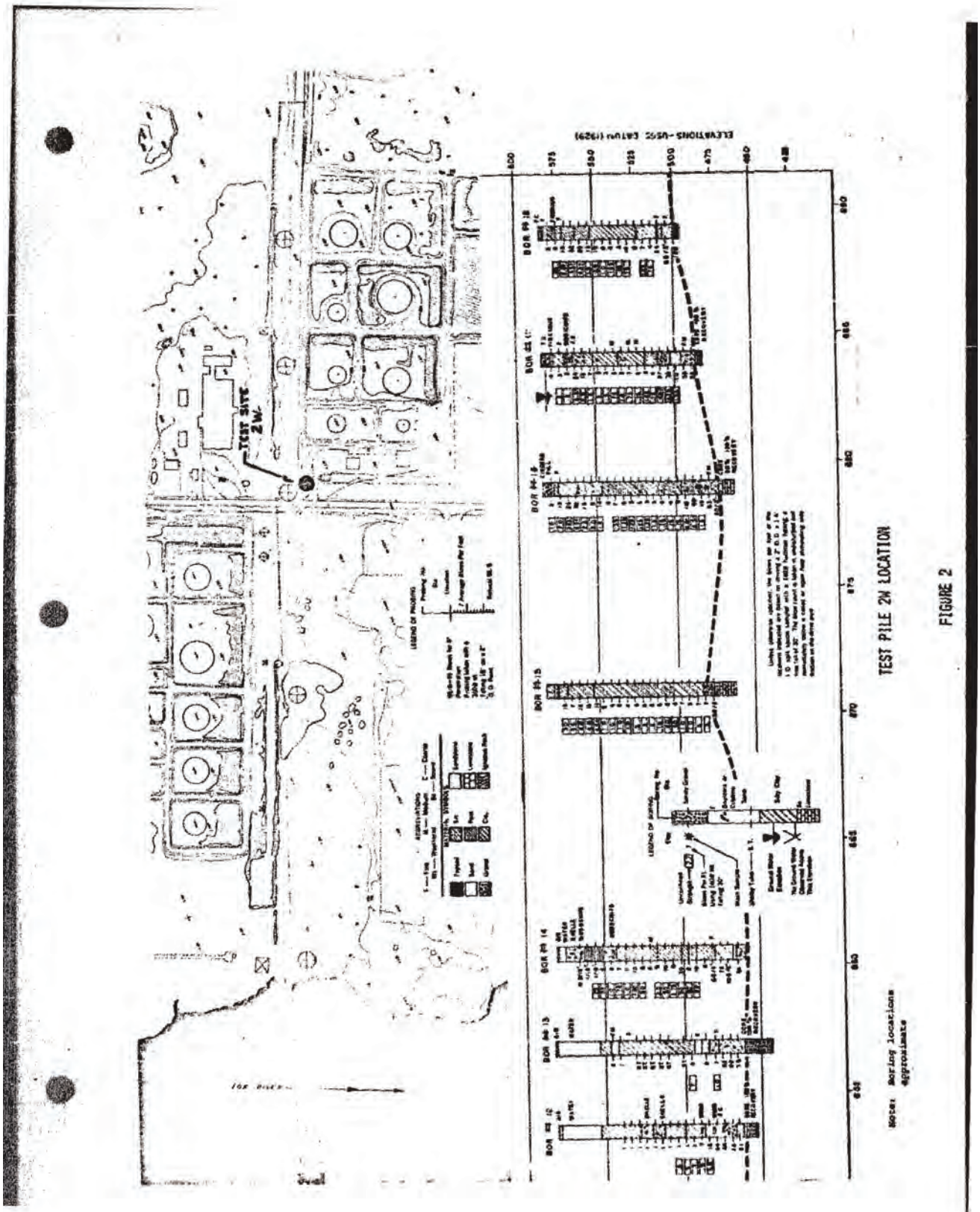
1. Introduction

With the inclusion of a route from Milwaukee to Green Bay in the national system of Interstate and Defense Highways, preliminary engineering studies for a Fox River crossing in Green Bay were undertaken. This initial effort culminated in a Preliminary Design Report for the Tower Drive Bridge. The preliminary design report concluded that an 8215 foot bridge, with some 40 piers, was required. To aid in the preparation of this report, 15 soil borings were made. Results of this preliminary subsurface exploration program, shown in Figures 1 & 2, indicated steel H-piling driven to bedrock to be the most suitable foundation type. Preliminary design and subsequent cost estimates were based upon a selection of 14 inch 73 pound H-pile driven to 96 tons bearing. To substantiate this design load, and to explore the possibility of increased loadings, it was decided to undertake a test pile loading program.

2. General

Upon approval of a final corridor for the structure, an additional 40 standard penetration borings were made at proposed pier locations. These borings substantiated the preliminary investigation, again finding soft clays over bedrock. Considerably stiffer clays were often found at the ground surface, but they were not of sufficient strength to


TEST SITE
TEST PILE 1E LOCATION
FIGURE 1


TEST SITE 2W
TEST PILE 2W LOCATION
FIGURE 2

allow the use of spread footings. Bedrock was encountered at depths ranging from 101 feet at the west abutment to 134 feet at the east end. Bedrock in this vicinity consists of Platteville dolomite, and while the rock generally dips to the east, the rock surface does undulate slightly. A more detailed geologic description is provided an Appendix A. With H-piles again the obvious foundation choice, 10 foot NX cores were taken at each pier location. Core recoveries ranged from 80% to 100%, with RQD's in the seventies and eighties, indicating the rock to be very competent. With this additional information it was felt that H-piling driven to bedrock could support substantially more than the 9,000 psi steel stress used in the preliminary design, possibly up to the AASHTO maximum of 16,000 psi.

To confirm this, two pile load tests were conducted. Site locations, one on each side of the channel, were chosen as representing soil conditions in the area, and for ease of access. These locations will be referred to as 1E, station 829+09, and 2W, station 880+13.

3. Subsurface Conditions

These two locations represent the two general soil conditions found throughout the area. Site 1E consisted of some of the poorest strength soils encountered in the area, while Site 2W represented one of the highest strength conditions found on the project. Standard Penetration Test (AASHTO T-206) borings were made at each location. Drilling logs and laboratory test results from undisturbed Shelby tube samples taken, can be found in Appendix B.

Site 1E

Test location 1E is in an area of waste disposal for American Can Company. Boring 9A was taken on the test site. Foundry sand and loose organic silts were found at the ground surface to a depth of 13 feet. A 15 foot layer of hard silty clay and firm silts was then encountered and found to overlie very soft to stiff clay to a depth of 93 feet. Loose silt and very soft clays were found to 115 feet, where very stiff clays were encountered to bedrock. Dolomitic limestone was encountered at 126 feet and cored with 97.5% and 100% recoveries for two 5 foot runs respectively. The combined Rock Quality Designation (RQD) number for the cores is 99% (See Appendix B). Water elevations observed at the time of load testing were within 3 feet of ground surface.

Site 2W

Test site 2W was at the corner of Tower Drive and Bylsby Avenue, near Cities Service Oil Company property. Boring 34A, taken on the site, encountered loose silt and sands to 15 feet, then hard silty clay and firm silts to 28 feet. Very stiff to stiff clays were found to 73 feet, where an 18 foot layer of very soft silty clay was encountered. From 91 feet to bedrock, 105 feet, sandy silts and a very dense silty clay till with gravel was found. Core recoveries were 100%, with an RQD value of 84%. Water elevations at the time of drilling indicated water table to be approximately 3 feet below ground surface.

4. Contract Provisions

After bids had been received, a contact was let with

Lunda Construction Company of Black River Falls, Wisconsin, to perform the load test. Provisions for the project are given in Appendix C.

5. Pile Driving

HP14x73 piles were driven to refusal in bedrock. A single acting Kobe #25 diesel hammer with a rated energy of 54,200 ft. lbs. per blow was used to drive the piles. Pile bearing capacities were determined by the Wisconsin Division of Highways' dynamic formula of:

$$P = \frac{2WH}{S+0.2}$$

See Figures 3 and 4.

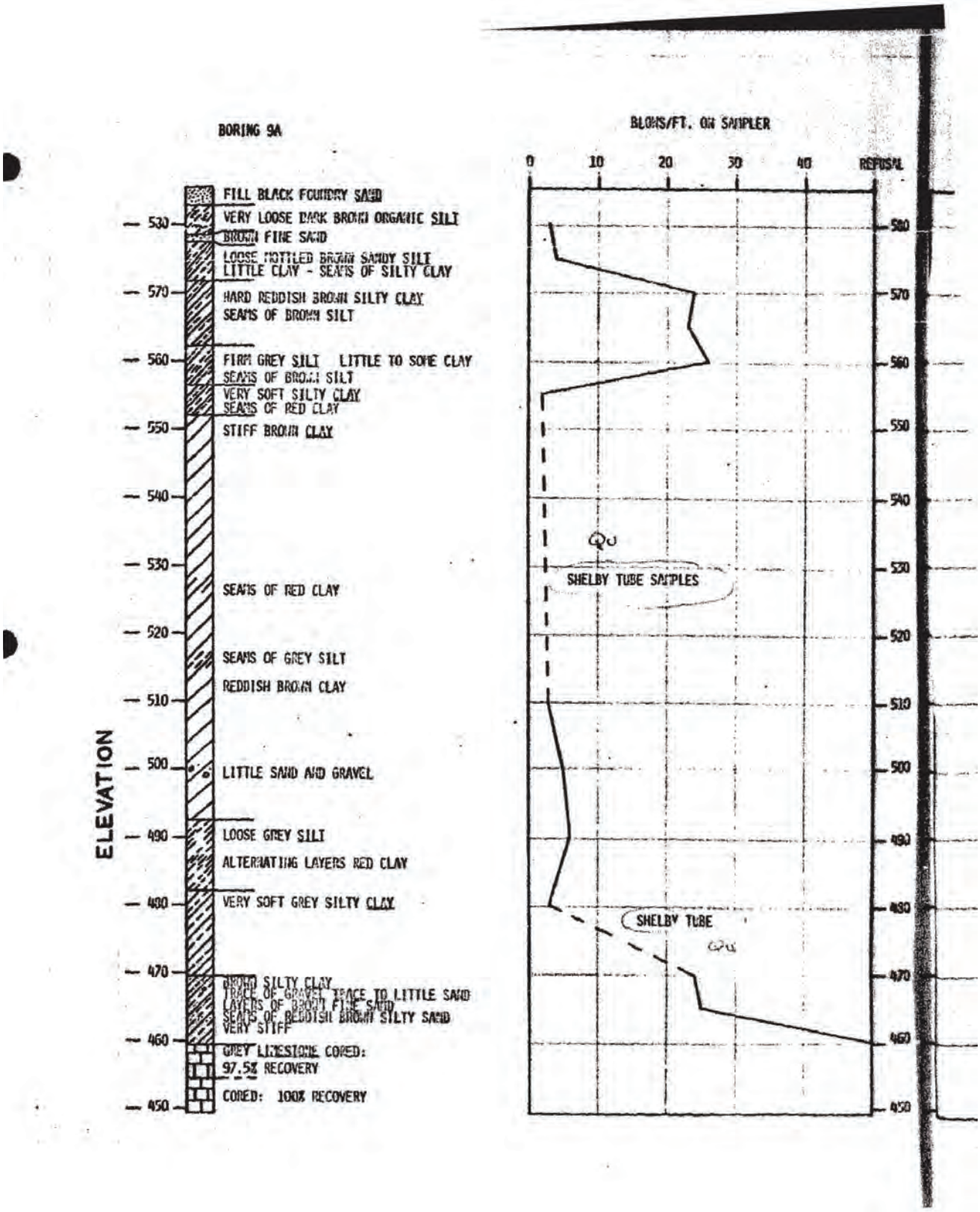
Pile splices were butt welded with three splice plates.

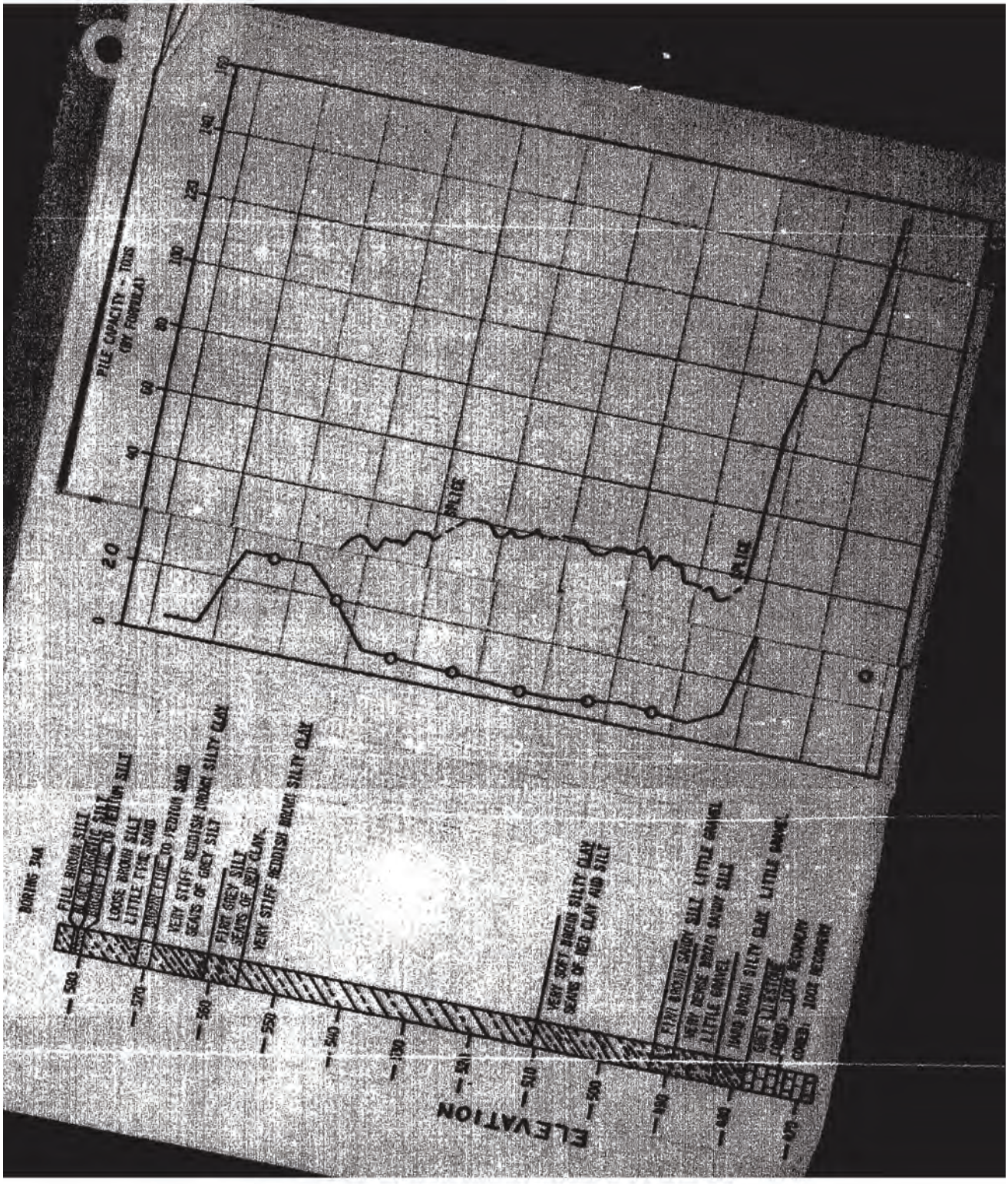
Pile driving for Site 1E appeared to be relatively routine. Some difficulty was experienced at Site 2W where high blows/ft. were required to penetrate the very dense gravelly clay till above bedrock. This till material was not encountered at Site 1E. Pile driving records are given in Appendix D.

After completion of the load test, piles were extracted for inspection by use of an L. B. Foster 20H5 vibratory driver-extractor.

6. Test Loading

Loads were applied concentrically to each test pile with a 400 ton capacity hydraulic jack. The completed load test consisted of four loading cycles, involving loading to a value of 2"P" for each cycle. Values of "P" were 64 tons, 96 tons,


BORING 9A
BLOWS/FT. ON SAMPLER
0
10
20
30
40
REFUSAL
ELEVATION
FILL BLACK FOUNDRY SAND
VERY LOOSE DARK BROWN ORGANIC SILT
BROWN FINE SAND
LOOSE MOTTLED BROWN SANDY SILT
LITTLE CLAY - SEAMS OF SILTY CLAY
HARD REDDISH BROWN SILTY CLAY
SEAMS OF BROWN SILT
FIRM GREY SILT LITTLE TO SOME CLAY
SEAMS OF BROWN SILT
VERY SOFT SILTY CLAY
SEAMS OF RED CLAY
STIFF BROWN CLAY
SEAMS OF RED CLAY
SEAMS OF GREY SILT
REDDISH BROWN CLAY
LITTLE SAND AND GRAVEL
LOOSE GREY SILT
ALTERNATING LAYERS RED CLAY
VERY SOFT GREY SILTY CLAY
BROWN SILTY CLAY
TRACE OF GRAVEL TRACE TO LITTLE SAND
LAYERS OF BROWN FINE SAND
SEAMS OF REDDISH BROWN SILTY SAND
VERY STIFF
GREY LIMESTONE CORED:
97.5% RECOVERY
CORED: 100% RECOVERY
Qu
SHELBY TUBE SAMPLES
SHELBY TUBE
Qu
580
570
560
550
540
530
520
510
500
490
480
470
460
450


PILE CAPACITY - TONS
OR POUNDS
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
420
440
460
480
500
520
540
560
580
600
620
640
660
680
700
720
740
760
780
800
820
840
860
880
900
920
940
960
980
1000
PILE
PILE
BORING NO.
FILL BROWN SILT
LOOSE BROWN SILT
LITTLE FINE SAND
VERY STIFF TO HARD GRAY SILTY CLAY
SEAMS OF GREY SILT
FIRM GREY SILT
SEAMS OF GREY CLAY
VERY STIFF REDDISH BROWN SILTY CLAY
VERY SOFT BROWN SILTY CLAY
SEAMS OF RED CLAY AND SILT
FIRM BROWN SILTY CLAY
LITTLE FINE SAND
LITTLE GRAVEL
HARD BROWN SILTY CLAY
LITTLE SAND
SOFT TO FIRM REDDISH BROWN SILTY CLAY
LITTLE SAND
LITTLE GRAVEL
ELEVATION
590
580
570
560
550
540
530
520
510
500
490
480
470
460
450
440
430
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
260
250
240

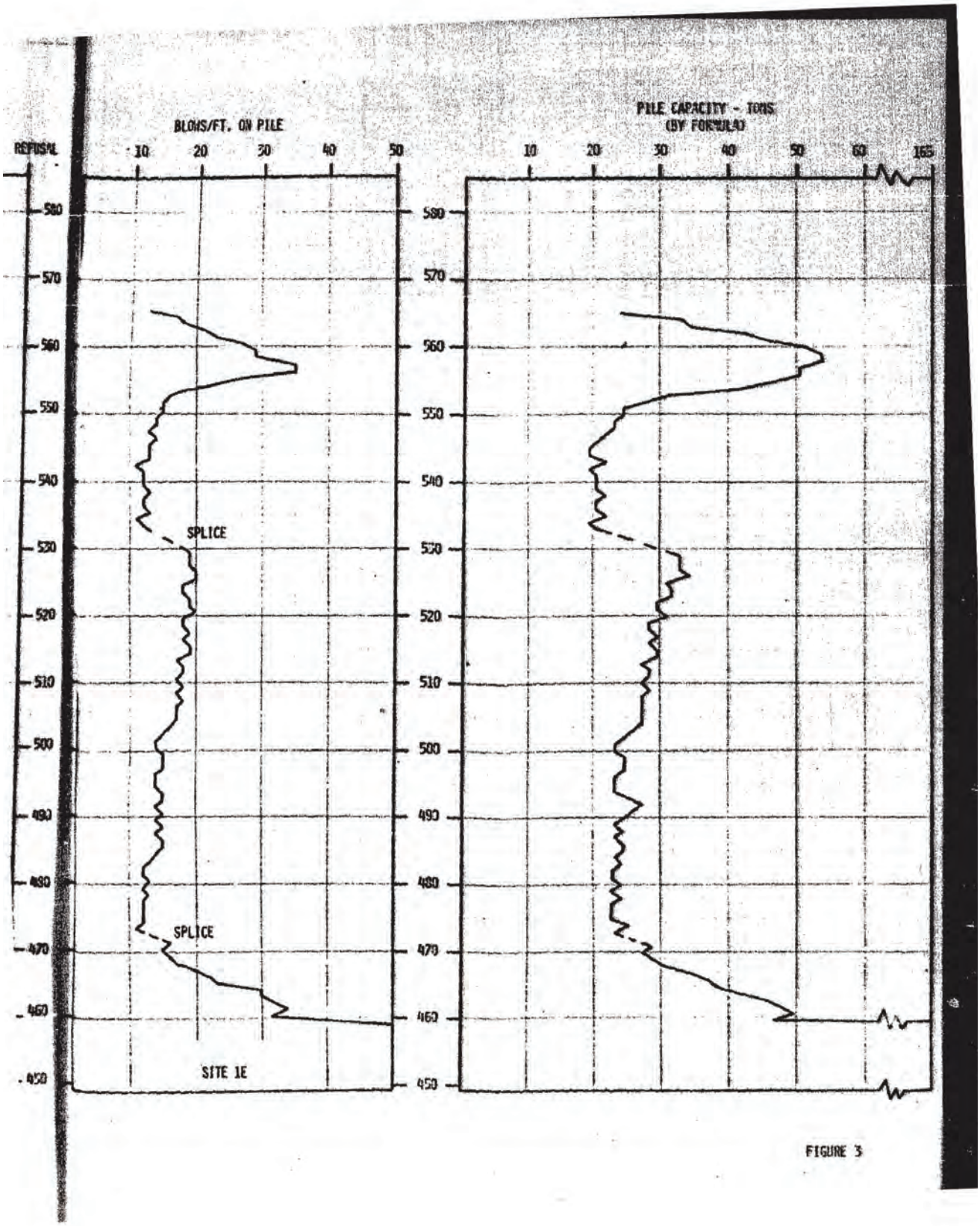

BLOWS/FT. ON PILE
REFUSAL
10
20
30
40
50
PILE CAPACITY - TONS
(BY FORMULA)
10
20
30
40
50
60
165
580
570
560
550
540
530
520
510
500
490
480
470
460
450
SPLICE
SPLICE
SITE 1E

FIGURE 3

128 tons, and 172 tons respectively. These values were chosen as they corresponded to pile stress values of 6,000 psi, 9,000 psi, 12,000 psi, and 16,000 psi in the steel.

Loads were applied in increments, with the initial application equal to "P". Additional increments of one-fourth "P" were applied after all measurable settlement due to the previous loading had ceased. At the completion of each loading cycle, the pile was unloaded in two increments, each equal to "P". Pile settlements were measured by two Ames dials reading to .001", with a wire line and mirror arrangement used as a back up. Horizontal pile movements were also measured with Ames dials.

7. Test Load Results

Time-Load-Settlement curves are plotted and shown in Figures 5 and 6. The maximum load of 344 tons was held on pile 1E for 80 minutes, and on 2W for a total of 115 minutes.

Pile 1E

Pile 1E had a total driven length of 126 feet, with a tip elevation of 459.3. Total settlement was 1.725 inches, with a net settlement of 0.394 inches. Horizontal movements were approximated, due to instrument slippage, to be 0.1 inches at the top of the pile.

Pile 2W

Pile 2W had a driven length of 105 feet, with a tip elevation of 459.1. Maximum settlements of 1.684 inches were recorded, with a permanent settlement of 0.486 inches. Maximum horizontal movements were measured to be 0.193 inches.

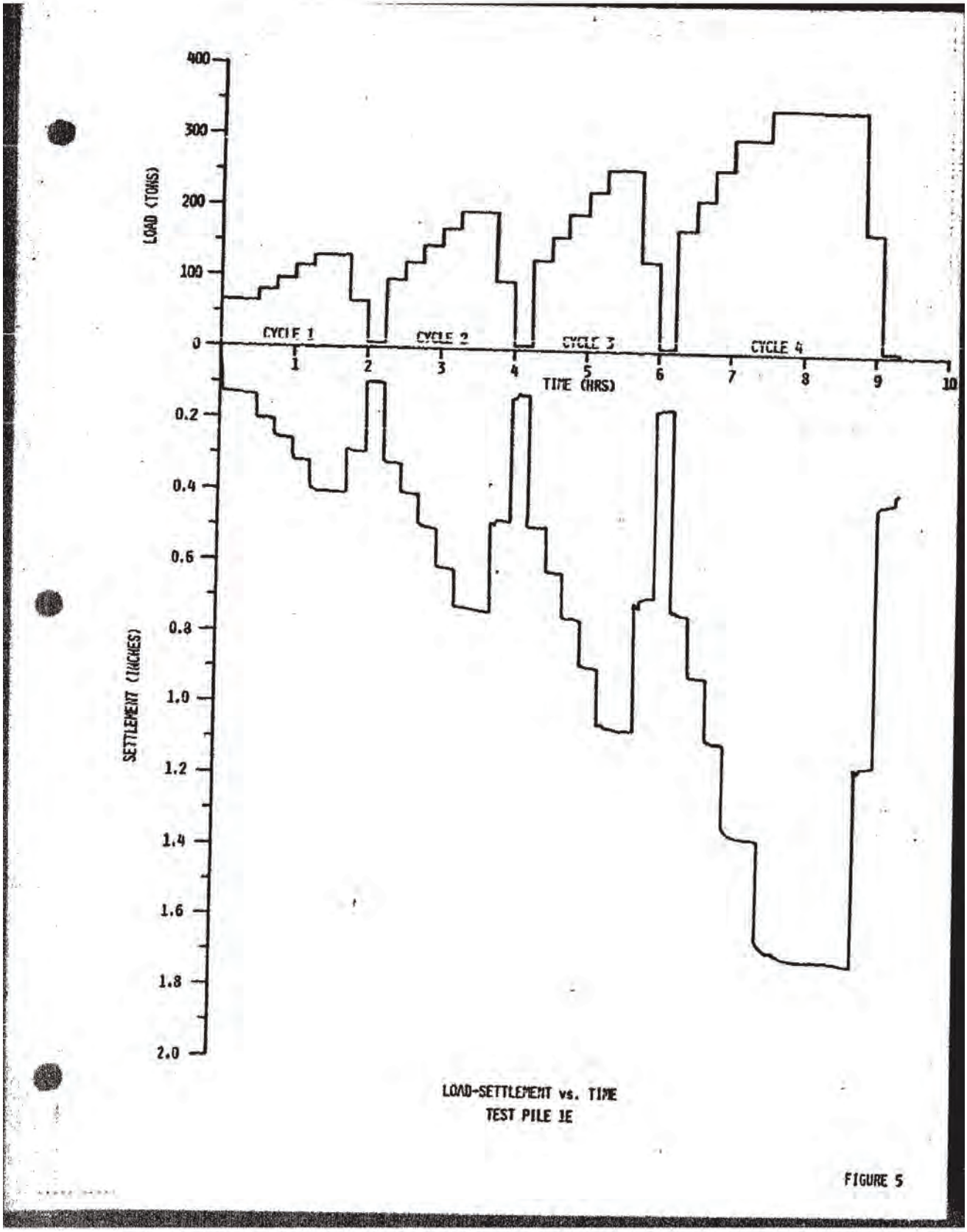
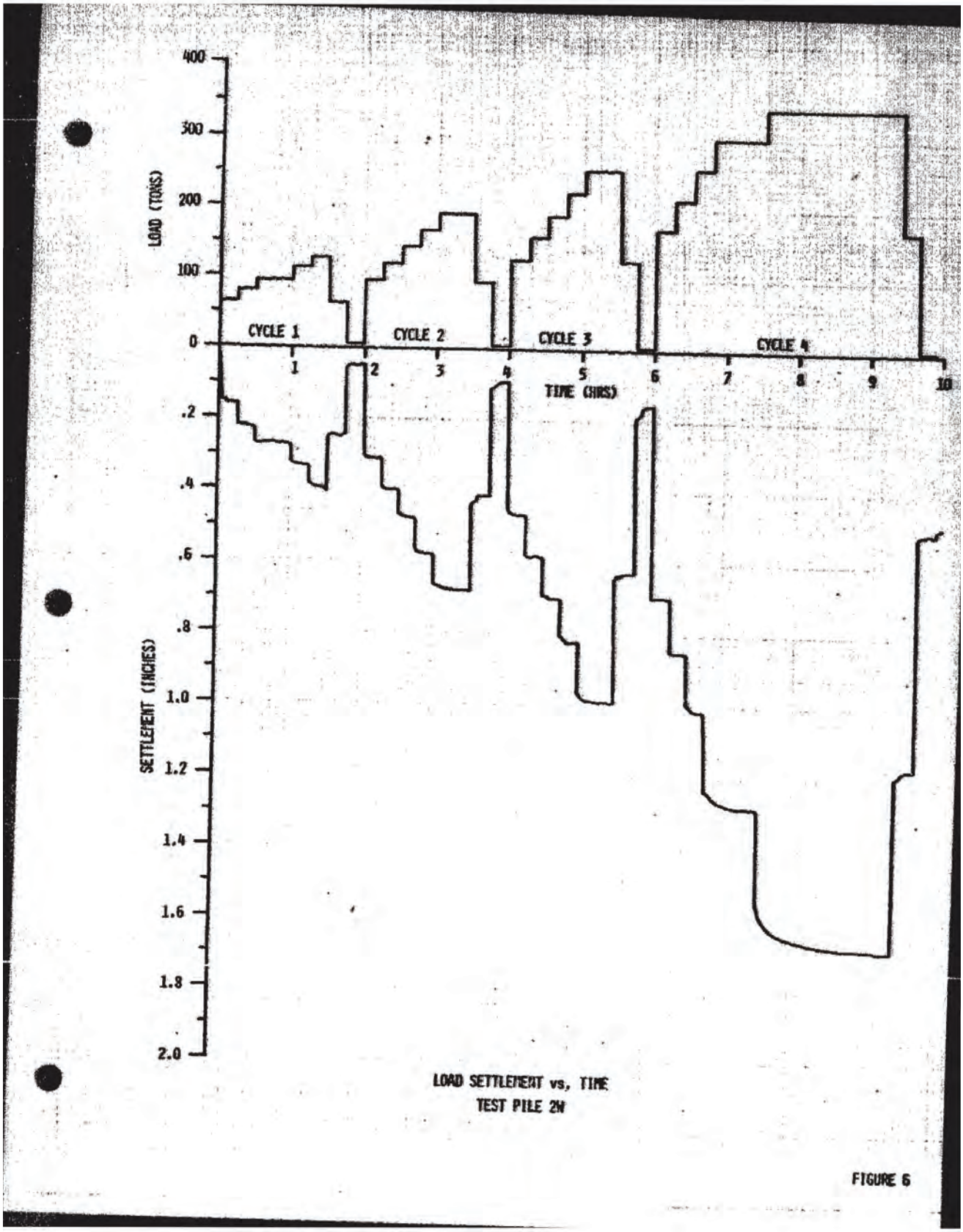

LOAD (TONS)
400
300
200
100
0
CYCLE 1
CYCLE 2
CYCLE 3
CYCLE 4
1
2
3
4
5
6
7
8
9
10
TIME (HRS)
SETTLEMENT (INCHES)
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
LOAD-SETTLEMENT vs. TIME
TEST PILE 1E

FIGURE 5



LOAD SETTLEMENT vs, TIME
TEST PILE 2W

FIGURE 6

8. Interpretation of Results

Neither pile was loaded to a plunging failure during this loading program. There is no idea of the reserve capacity, as these piles were merely proof loaded to twice the maximum design load, making a definition of failure much more difficult. Many arbitrary methods have been suggested for determining the safe allowable pile load, some of which will be applied in interpreting the test load results shown in Figures 7 & 8.

Most of the "failure" definitions require a sustained load for several hours. It was felt that these criteria remained valid for the end bearing condition with shorter time requirements, as long as settlements had essentially ceased.

A. AASHTO

The safe allowable load shall be considered as 50 per cent of that load which, after a continuous application of 48 hr, produces a permanent settlement not greater than 1/4 inch measured at the top of the pile. This maximum settlement shall not be increased by continuous application of test load for 60 hr or longer.

Site 1E

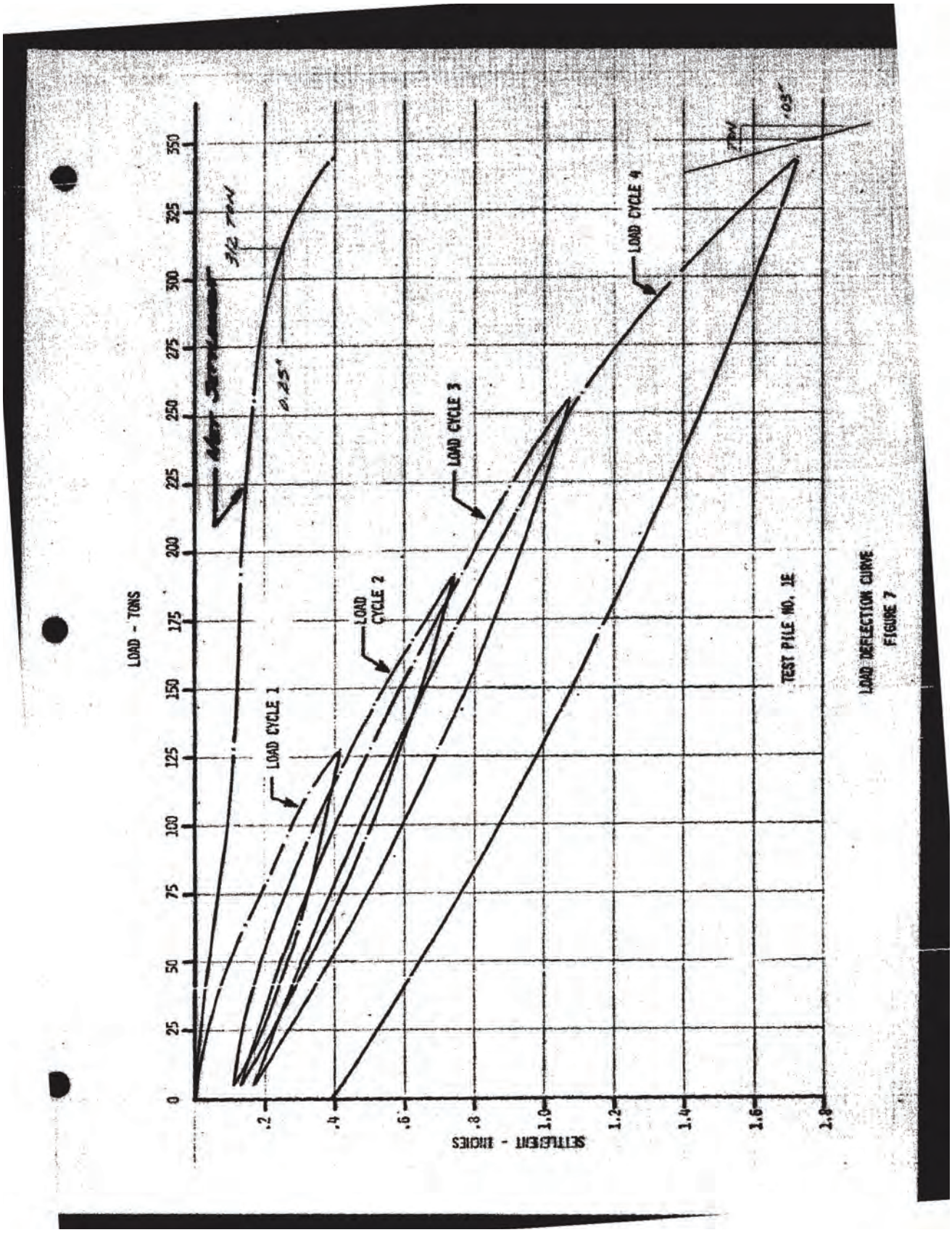
Load @ 1/4" = 312 tons

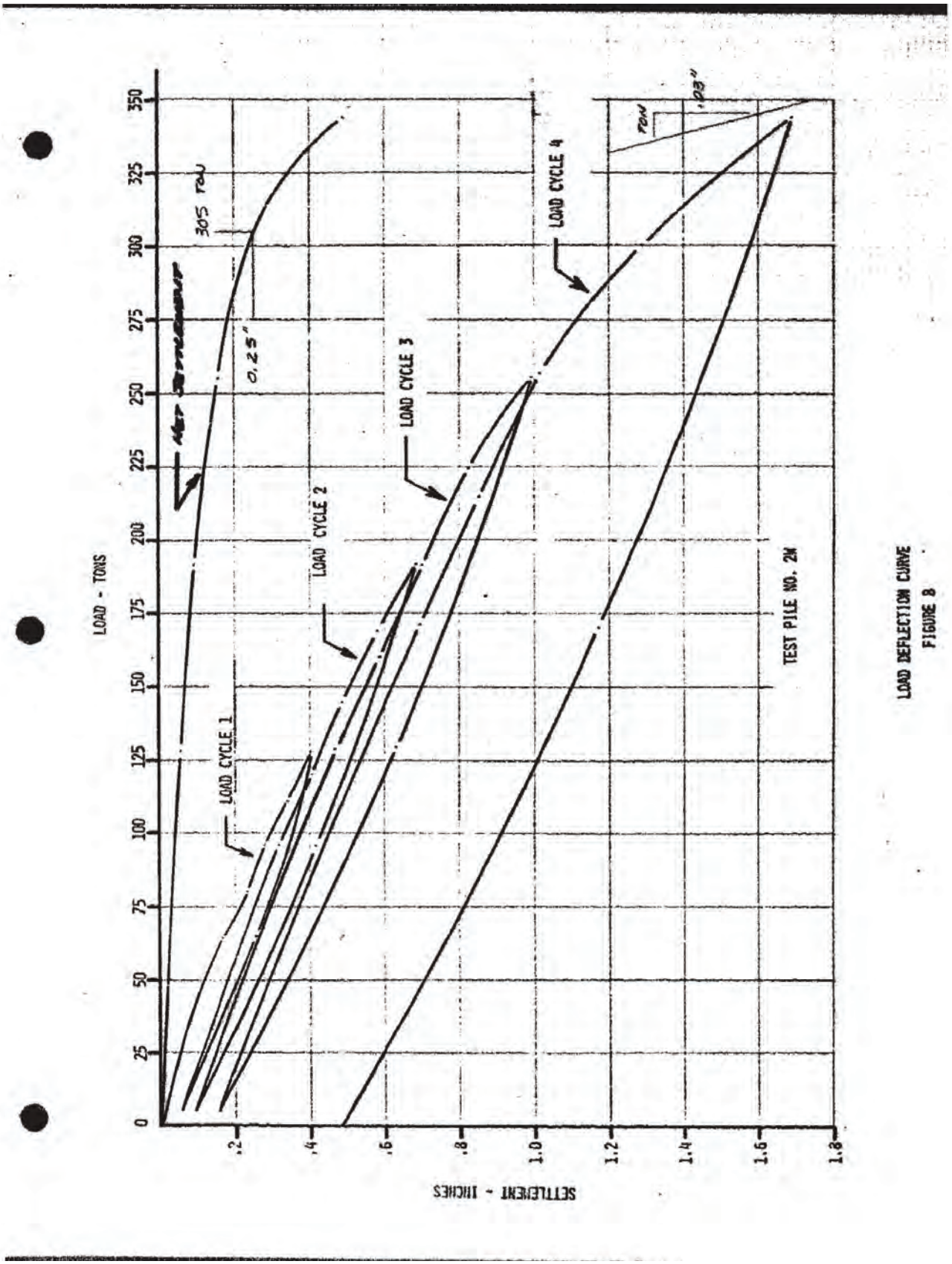
50% x 312 = 156 tons

Site 2W

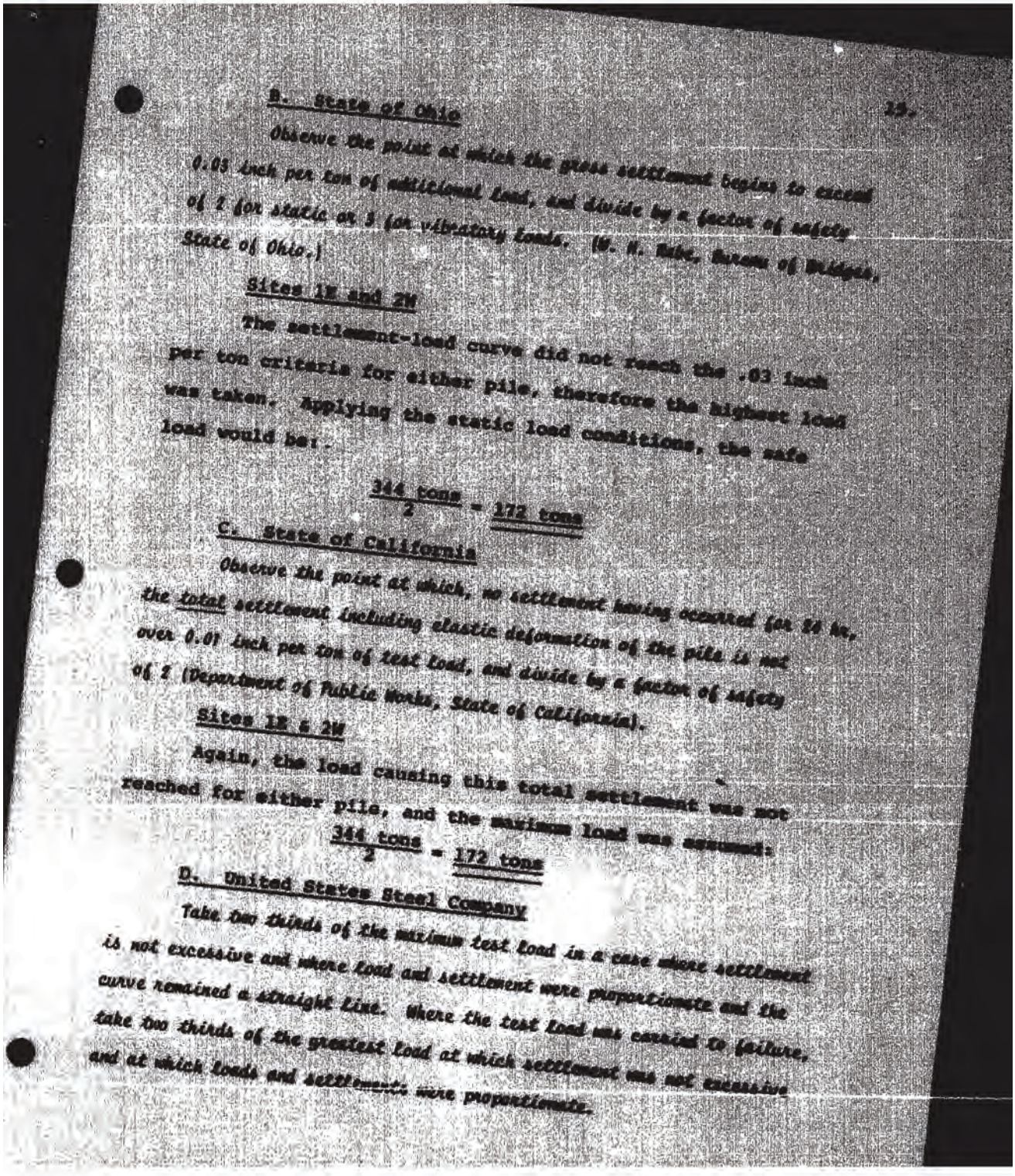
Load @ 1/4" = 305 tons

50% x 305 = 152 tons


LOAD - TONS
SETTLEMENT - INCHES
LOAD CYCLE 1
LOAD CYCLE 2
LOAD CYCLE 3
LOAD CYCLE 4
TEST PILE NO. 1E
LOAD DEFLECTION CURVE
FIGURE 7



LOAD DEFLECTION CURVE
FIGURE 8



B. State of Ohio

15.

Observe the point at which the gross settlement begins to exceed 0.03 inch per ton of additional load, and divide by a factor of safety of 2 for static or 3 for vibratory loads. (W. K. Hale, Bureau of Bridges, State of Ohio.)

Sites 1E and 2W

The settlement-load curve did not reach the .03 inch per ton criteria for either pile, therefore the highest load was taken. Applying the static load conditions, the safe load would be:

$$\frac{344 \text{ tons}}{2} = 172 \text{ tons}$$

C. State of California

Observe the point at which, no settlement having occurred for 24 hr, the total settlement including elastic deformation of the pile is not over 0.01 inch per ton of test load, and divide by a factor of safety of 2 (Department of Public Works, State of California).

Sites 1E & 2W

Again, the load causing this total settlement was not reached for either pile, and the maximum load was assumed:

$$\frac{344 \text{ tons}}{2} = 172 \text{ tons}$$

D. United States Steel Company

Take two thirds of the maximum test load in a case where settlement is not excessive and where load and settlement were proportionate and the curve remained a straight line. Where the test load was carried to failure, take two thirds of the greatest load at which settlement was not excessive and at which loads and settlements were proportionate.

Sites 1E & 2W

In both of these load tests, the load-settlement curves, for the last load cycle, remained essentially a straight line through the 256 ton loading. Thus giving a safe load of:

2/3 x 256 ton = 170 tons

E. Building Codes

One-half of the test load shall be allowed for the carrying load, if the test shows no settlement for 24 hr and the total settlement does not exceed 0.01 inch multiplied by the test load in tons (Chicago Building Code).

The test load will be twice the contemplated design load and shall be maintained constant for at least 24 hr and until settlement or rebound does not exceed 0.22 inch in 24 hr. The design load shall not exceed one-half the maximum applied load provided the load-settlement curve shows no signs of failure and the permanent settlement of the top of the pile, after completion of the test, does not exceed 1/2 inch (Boston Building Code).

Tests shall be made with 200 per cent of the proposed load and considered unsatisfactory if, after standing 24 hr, the total net settlement after rebound is over 0.01 inch per ton of total test load (Building Laws of the City of New York).

Application of the above building codes would suggest that a design load of 172 tons would not be excessive, and that such a loading would result in a minimum safety factor of 2.

9. Discussion

In increasing the design load beyond the 96 ton loading, many factors should be considered. Increasing the loading above

the 9,000 psi stress level would significantly reduce the total amount of piling, but assurance of penetration into bedrock would be required. Borings, with rock cores, at each pier location would give required pile tip elevations, and rock competency. Most of the proposed pier locations have been drilled previous to this report, giving good data for a cost comparison.

Several borings did indicate the presence of a dense till layer, which will result in more driving difficulties, and possibly higher bid prices/ft. of driven pile. Making the driving records from this test load available to prospective contractors might eliminate some of the driving contingencies, and give more precise bid prices.

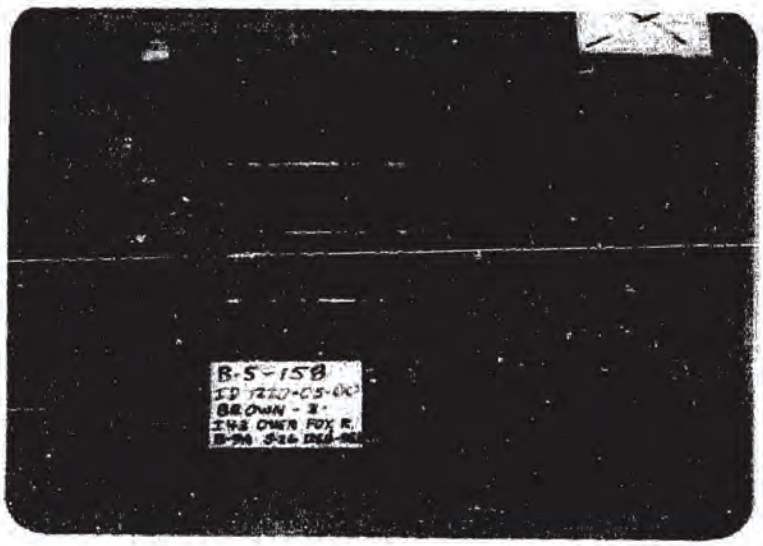
Hammers with rated energies in the 50,000 ft. lb. range will be required to penetrate the dense till. This might be putting a limiting condition on the number of prospective contractors available. Regardless, design loads even at the 9,000 psi stress level would require pile penetration into rock. Thus increasing up to possibly the 16,000 stress level would not make any more stringent requirements on the driving equipment.

Results from this load test would suggest that higher than 9,000 psi steel stresses should be used on approach spans to the Tower Drive structure. Even the most conservative evaluation approach (AASHTO) suggests use of a minimum steel stress of 14,000 psi in the steel, while the other methods clearly show a 16,000 psi stress would be acceptable.

Extracted piles were inspected and found to be in remarkably good condition. A slight bend was found in the lower section of both piles, but the pile tips looked very good considering the hard driving on 2W. Extracted segments are shown in the photographs included with this report.

10. Conclusions

Based upon the load test results, increased loadings up to 16,000 psi stress in the steel is suggested for approach span units on the Tower Drive Bridge. However, soil conditions in and near the channel are significantly different enough to not warrant increasing pile loads beyond the initial steel design stress of 9,000 psi. This steel stress is suggested for the main channel units, and for each approach span adjacent to the channel. While rock core recoveries and RQD values indicate the rock to be adequate quality, the soils are sands and silts of very low strength. Outside the channel area, there exists a hard clay crust near the surface which will collar the pile and increase lateral stability. The absence of this upper crust, and the low strength soils in the channel area, warrants a decrease in pile loadings.



NX core from
Boring 9A (Site 1E)
100% recovery



Example of very dense gravelly clay till found above bedrock. Note embedded pieces of limestone mixed throughout.



Extracted piling from Site 2W. Slight bend in bottom segment.



Pile tip from 2W after being driven through very dense till to bedrock.



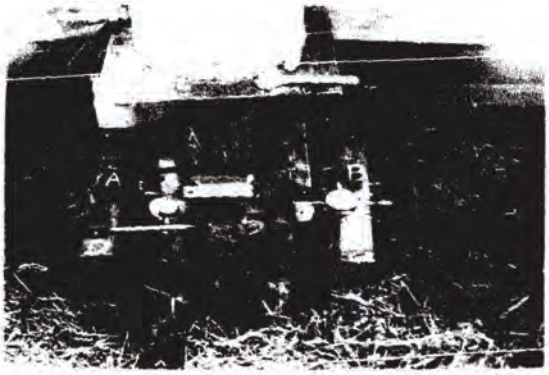
Load placement at Site 1E.



Pressure intensifier and pump for hydraulic jack.



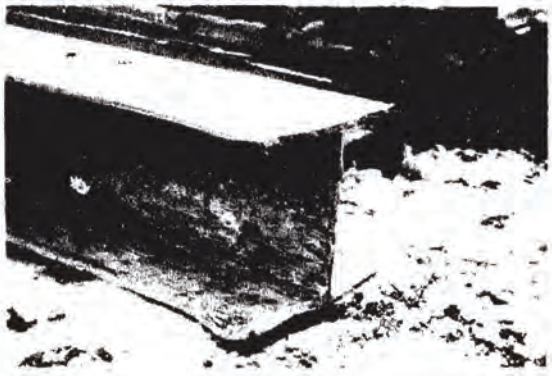
Two views of ton capacity hydraulic jack and lateral restraint.



Vertical and horizontal dead load and wire-line mirror arrangement.







APPENDIX A

GEOLOGY OF THE GREEN BAY AREA*

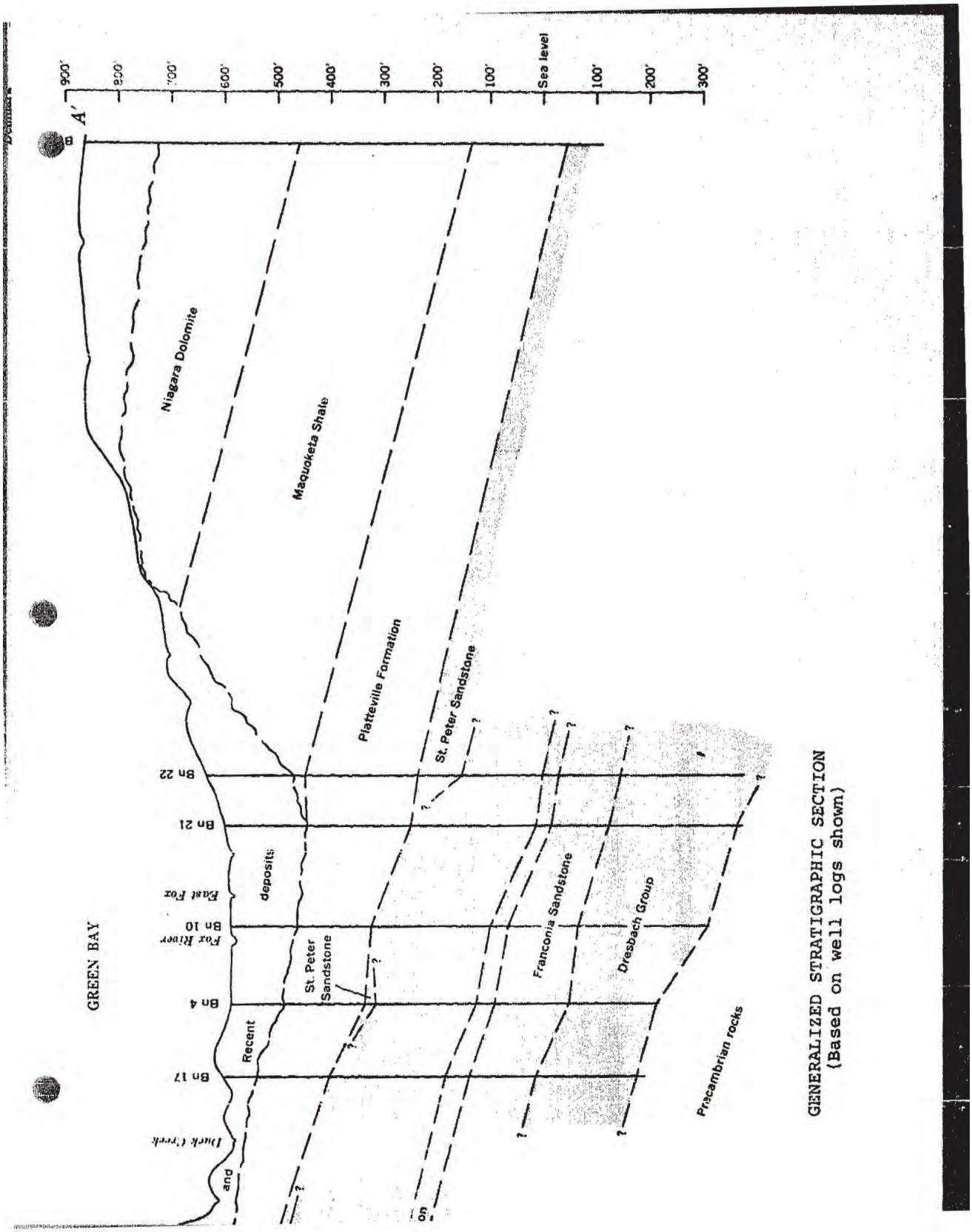
The Green Bay area lies in a trough formed by glacial erosion. Pleistocene and recent surface deposits overlie dolomite of the Platteville formation in the immediate area of Green Bay proper. Maquoketa shale is reported at the Eastern edge of the city, but this is probably beyond the I-43 project area.

The pleistocene and surface deposits consist of glacio-lacustrine clay and silt. Some surficial sand is found in the area. Till deposits may also be part of the pleistocene deposits.

The Platteville formation is described as dolomite, thin to medium bedded and ranges in thickness based on well logs from 60 to 213 feet thick. It contains some chert and shale. It is not a prominent acquifer and it is, rather, relatively impermeable but water occurs in openings along fractures and bedding planes. The degree of fracturing is unknown.

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*Source - "Ground Water Conditions of the Green Bay Area Wisconsin", 1950-1960. U.S.G.S. Water Supply Paper 1669J.


GENERALIZED STRATIGRAPHIC SECTION
(Based on well logs shown)
GREEN BAY
Niagara Dolomite
Maquoketa Shale
Platteville Formation
St. Peter Sandstone
Franconia Sandstone
Dresbach Group
Precambrian rocks
St. Peter Sandstone
Recent
deposits
Bn 22
Bn 21
Bn 10
Bn 4
Bn 17
Sea level
900'
800'
700'
600'
500'
400'
300'
200'
100'
100'
200'
300'


GREEN BAY
ALLOUEZ
BELLEVUE
HWELL LOG LOCATIONS
ASHWAUBENON
Duck Creek
Howard
Allouez
Preble
Bellevue Sch
Jackson Sch
Park View Sch
Baird P
Cedar Creek Sch
Hillcrest Sch
Riverside Sch
Elm Tree Corners
Pleasant Hill
Ha-Ni-Ka Sch
Babcock Sch
Tower Hall
Creek
Airport
Dickman
Green Island
Light
Cem
Sch
Ch
Hall
Mission
Stadium
Park
Pk
Rd
Ave
St
Dr
Ct
Pl
Hwy
Creek
Corners
Hill
Grove
Valley
Heights
Terrace
Manor
Estates
Addition
Subdivision
Plat
Lot
Block
Section
Township
Range
Meridian
Boundary
Line
Road
Street
Avenue
Drive
Court
Place
Highway
Interstate
Railroad
Bridge
Tunnel
Overpass
Underpass
Interchange
Ramp
Exit
Entrance
Toll
Gate
Booth
Plaza
Station
Depot
Yard
Shop
Garage
Lot
Parking
Meter
Sign
Signal
Light
Pole
Wire
Cable
Fiber
Optic
Conduit
Duct
Manhole
Handhole
Vault
Splice
Case
Enclosure
Cabinet
Rack
Panel
Module
Card
Port
Connector
Jack
Plug
Socket
Adapter
Coupler
Repeater
Amplifier
Transceiver
Modem
Router
Switch
Hub
Server
Workstation
Terminal
Monitor
Keyboard
Mouse
Printer
Scanner
Camera
Sensor
Detector
Alarm
Siren
Horn
Speaker
Microphone
Headset
Handset
Telephone
Intercom
Radio
Antenna
Tower
Mast
Pole
Guy
Wire
Anchor
Foundation
Footing
Pad
Slab
Curb
Gutter
Sidewalk
Crosswalk
Median
Island
Shoulder
Ditch
Culvert
Drainage
Inlet
Outlet
Pipe
Manhole
Catch
Basin
Grate
Cover
Frame
Ring
Lid
Hinge
Latch
Lock
Key
Padlock
Chain
Cable
Wire
Rope
Strap
Buckle
Clamp
Bracket
Mount
Support
Beam
Girder
Truss
Arch
Span
Pier
Abutment
Wingwall
Bearing
Expansion
Joint
Deck
Railing
Barrier
Guardrail
Fence
Gate
Post
Rail
Mesh
Screen
Net
Cover
Tarp
Canopy
Awning
Shelter
Building
Office
Trailer
Container
Box
Crate
Pallet
Skid
Forklift
Crane
Hoist
Winch
Pulley
Block
Tackle
Rigging
Scaffold
Ladder
Platform
Stairs
Handrail
Step
Tread
Riser
Landing
Elevator
Escalator
Conveyor
Belt
Roller
Chute
Hopper
Bin
Silo
Tank
Pump
Motor
Engine
Generator
Transformer
Switchgear
Breaker
Fuse
Relay
Contactor
Starter
Drive
Gear
Shaft
Bearing
Coupling
Clutch
Brake
Valve
Gauge
Meter
Sensor
Transmitter
Receiver
Transducer
Actuator
Solenoid
Cylinder
Piston
Rod
Seal
Gasket
O-Ring
Packing
Flange
Bolt
Nut
Washer
Screw
Rivet
Weld
Solder
Braze
Glue
Adhesive
Tape
Wrap
Insulation
Jacket
Sheath
Shield
Ground
Bond
Strap
Lug
Terminal
Connector
Splice
Crimp
Compression
Fitting
Coupling
Adapter
Reducer
Elbow
Tee
Cross
Union
Nipple
Bushing
Plug
Cap
Valve
Faucet
Hose
Nozzle
Sprinkler
Irrigation
Drip
Emitter
Tube
Line
Supply
Return
Header
Manifold
Zone
Controller
Timer
Sensor
Rain
Freeze
Wind
Shut-off
Backflow
Preventer
Vacuum
Breaker
Pressure
Regulator
Filter
Screen
Strainer
Meter
Flow
Totalizer
Pulse
Output
Input
Signal
Wire
Cable
Conduit
Trench
Backfill
Compaction
Grade
Slope
Contour
Elevation
Datum
Benchmark
Survey
Monument
Marker
Stake
Flag
Paint
Mark
Locate
Ticket
Call
Dig
Excavate
Bore
Jack
Push
Pull
Thread
Feed
Route
Path
Alignment
Offset
Radius
Curve
Tangent
Intersection
Junction
Crossing
Turnout
Switch
Point
Frog
Guard
Rail
Tie
Ballast
Subgrade
Roadbed
Track
Gauge
Flange
Wheel
Axle
Truck
Bogie
Coupler
Buffer
Draft
Gear
Car
Locomotive
Engine
Cab
Caboose
Hopper
Tank
Flat
Box
Refrigerator
Passenger
Coach
Sleeper
Dining
Observation
Baggage
Mail
Express
Freight
Yard
Siding
Spur
Industrial
Track
Main
Line
Branch
Junction
Terminal
Station
Depot
Platform
Canopy
Waiting
Room
Ticket
Office
Agent
Conductor
Engineer
Fireman
Brakeman
Switchman
Dispatcher
Operator
Signal
Tower
Block
Interlocking
Automatic
Manual
Centralized
Traffic
Control
Dispatch
Radio
Telephone
Intercom
Public
Address
System
Clock
Schedule
Timetable
Bulletin
Notice
Rule
Book
Manual
Instruction
Training
Safety
Meeting
Briefing
Debriefing
Report
Form
Log
Record
Archive
Storage
Retrieval
Search
Index
Catalog
Database
Software
Hardware
Network
Server
Client

FIELD BORING LOG

State of Wisconsin / Department of Transportation

E-L-3(S)-68

Boring No. 9-A Pier Sheet 1 of 3

Project 1220-05-00 Road I-H. 43 - Tower Drive

Structure B-5-158 County Brown

Station 829+09 Offset 30.0' Rt. of NB R_L Elevation 585.4

GROUND WATER OBSERVATIONS

While drilling ____ Time after drilling ____

Before casing removal ____ Depth to water ____

After casing removal ____ Depth to cave-in ____

Moisture: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, FT = Fish tail, DB = Rock bit, ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 10-14-74

Unit III

Chief Hogan

Samp'e No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
					Fill black foundry SAND					AF
1	M	~ 2	1		Very loose dark brown organic SILT Some fibers Trace of gravel	.0				
					Brown fine SAND					
2	W	1 2	2		Loose mottled brown sandy SILT Little clay Seams of silty clay Thin layers brown sand	.75				WA RB
3	D	6 15	9		Hard reddish brown silty CLAY Seams of brown silt	4.5+				
4	D	5 14	9			4.5+				
					Firm gray SILT Little to some clay					
5	D/M	7 14	12		Seams of reddish brown silty clay	4.5+				
					Very soft gray Seams of red clay					
6	W	1 1	1		Silty CLAY	.25				
					Stiff brown CLAY					
7	W	3" Osterburg S.T.			35.0' to 37.5' 100%	1.5				
					40.0' to 42.5' 100%					
8	W	3" Osterburg S.T.				1.25				
					45.0' to 47.5' 100%					
9	W	3" Osterburg S.T.				1.50				
					50.0' to 52.5' 100%					
10	W	3" Osterburg S.T.				1.35				

Checked by ____ Final ____ Boring No. 9-A

FIELD BORING LOG

State of Wisconsin / Department of Transportation

B-L-3(5)-68

Boring No. 9-A Pier Sheet 2 of 3

Project 1220-05-00 Road I.H. 43 - Tower Drive

Structure B-5-158 County Brown

Station 829+09 Offset 30.0' Rt. of NB Rf. Elevation 585.4

GROUND WATER OBSERVATIONS

While drilling Time after drilling

Before casing removal Depth to water

After casing removal Depth to cave-in

Moisture: D = Damp, M = Moist, W = Wet

DRILLING METHOD: WA = Washahead, PT = Fish tail, RB = Rock bit, ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 10-14-74 Unit III Chief Hogan

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Resilient	Blows on Casing	Blows on Sta.	Blows on Probe	Drilling Method
10	3" W	Osterburg S.T.			Stiff brown CLAY 50.0' to 52.5' 100%	1.35					WA RB
11	3" W	Osterburg S.T.			55.0' to 57.5' 100%	1.25					
12	M 3"	Osterburg S.T.			60.0' to 62.5' 100% Seams of red clay	1.75					
13	M 3"	Osterburg S.T.			65.0' to 67.5' 100%	1.65					
14	M 3"	Osterburg S.T.			70.0' to 72.5' 100% Reddish brown seams of gray silt	1.75					
15	M/W	1 2	1		medium	.75					
16	M 3"	Osterburg S.T.			80.0' to 82.5' 100%	2.0					
17	M	1 3	2		Little sand & gravel	1.0					
18	M	Osterburg S.T.			90.0' to 92.5' 100%	1.5					
19	W	2 4	2		Loose gray SILT with alternating layers medium red clay	.75 1.5					
20	W	Osterburg			100.0' to 102.5 100%	1.5					

Boring 96.5; Casing, 19.0'; water, 18.0; 10-16-74

Checked by Final Boring No. 9-A

FIELD BORING LOG

State of Wisconsin / Department of Transportation

ES-3(S)-68

Boring No. 9-A Pier — Sheet 3 of 3

Project 1220-05-00 — Road I.H. 43 - Tower Drive

Structure B-5-158 — County Brown

Station 829+09 — Offset 30.0' Rt. of NB R_L — Elevation 585.4

GROUND WATER OBSERVATIONS

While drilling — Time after drilling

Before casing removal — Depth to water

After casing removal — Depth to cave-in

Moisture: D = Damp, M = Moist, W = Wet

C.I.: WA = Washahead, FT = Fish tail, RB = Rock bit

DRILLING METHOD: ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash

S = Easy, M = Medium, H = Hard

Start 10-14-75

Unit III

Chief Hogan

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Cuttings	Blows on Bits	Blows on Probe	Blows on Bits	Drilling Method
20	W	Osterburg S.T.			Loose gray SILT with alternating layers medium red clay 100.0' to 102.5' 100%							WA RB
					Very soft gray silty CLAY							
21	W	1 2	1		105	105 .20						
22	W				110 Osterburg S.T. 110.0' to 112.5' 100%	110 1.75						
23	W	3 19	5		115 Brown silty CLAY Trace of gravel Trace to little sand Layer brown fine sand	115 .75 1.25						
24	W/M	7 15	8		120 Seams reddish brown silty sand Very stiff	120 2.0						
25	W	5			125	125 1.5						CN
26					Gray LIMESTONE cored 1st run 125.8' to 130.8' 97.5% Lost 100% water 2nd void							
					130 Cored 2nd run 130.8' to 135.8' 100%	130						
					135 End of Boring #9-A 135.8'	135						
					140	140						
					145	145						
					150	150						

Checked by — Final — Boring No. 9-A

E-L-19(L) 12-70

Division of Highways - Materials Laboratory
304 North Randall Avenue
Madison, Wisconsin 53715

REPORT OF TESTS ON SOILS

State of Wisconsin / Department of Transportation

REPORT No. 21

Test Number 4-89-74

Document	Date Mo.-Day-Yr.	Charge Project	Yr.	Func	Credit Project	Yr.	Quantity
K 7979	11 05 74	1220	5	00	1909	48	9

County: Brown

Project Name: Tower Drive over Fox River

Contractor: —

Material: Soils

Source: Borings : B-5-158

Tests Requested By: Soils Unit

Submitted by Soils Unit — Date: 10-22-74

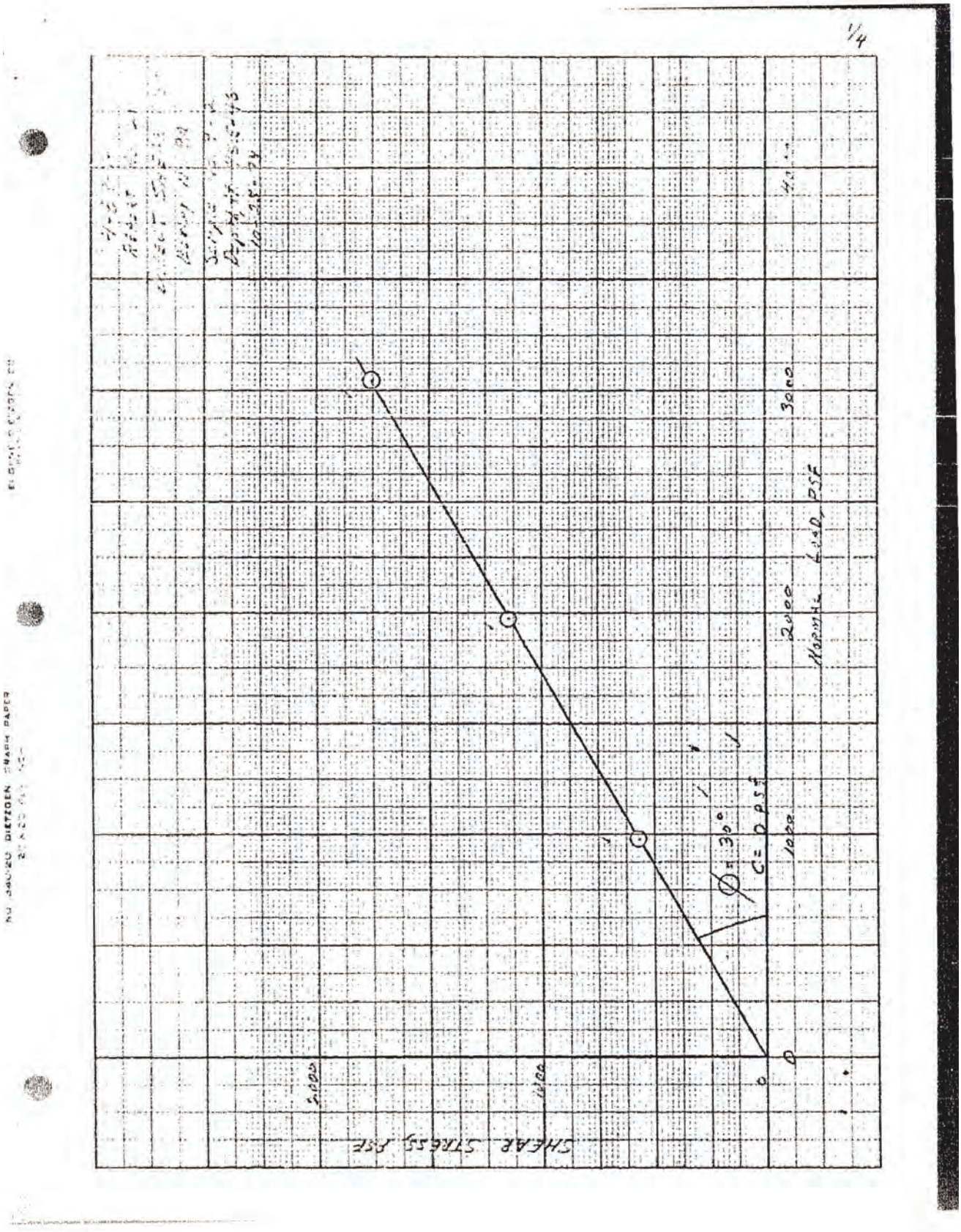
Boring Number	9A	9A	9A	9A	9A	
Sample Number	9-2	9-4	12-6	12-8	12-10	
Depth, ft.	45.5-46	46.5-47	60-60.5	61-61.5	62-62.5	
Mechanical Analysis						
Boulders (Ret. 3")						
Gravel (Pass 3" - Ret. #10)	✓	0		✓		
Coarse Sand (Pass #10 - Ret. #40)	0	1	0			
Fine Sand (Pass #40 - Ret. #200)	1	3	2			
Silt (Pass #200 - Ret. 0.002mm)	75	49	45			
Clay (Pass 0.002mm)	24	47	53		—	
Liquid Limit	21.0	32.9	38.8		—	
Plasticity Index	6.2	17.4	22.0		—	
AASHO Classification	A-4(8)	A-6(11)	A-6(13)		—	
Moisture Content, %	23.7	27.1	32.4	34.0	28.0	
Loss on Ignition, %	—	—	—	—	—	
Unconfined Compression Test						
Unit Weight, PCF	—	—	—	—	—	
Unconfined Compression, TSF	—	—	—	—	1.0	
Consolidation Test						
Moisture Before, %	—	28.8	—	33.1	—	
Moisture After, %	—	22.7	—	26.9	—	
Compression Index	—	0.355	—	—	—	
Direct Shear Test						
Moisture, %	23.7	—	32.4	—	—	
Angle of Int. Frict., deg.	30	—	18.5	—	—	
Cohesion, lbs./sq. ft.	0	—	675	—	—	

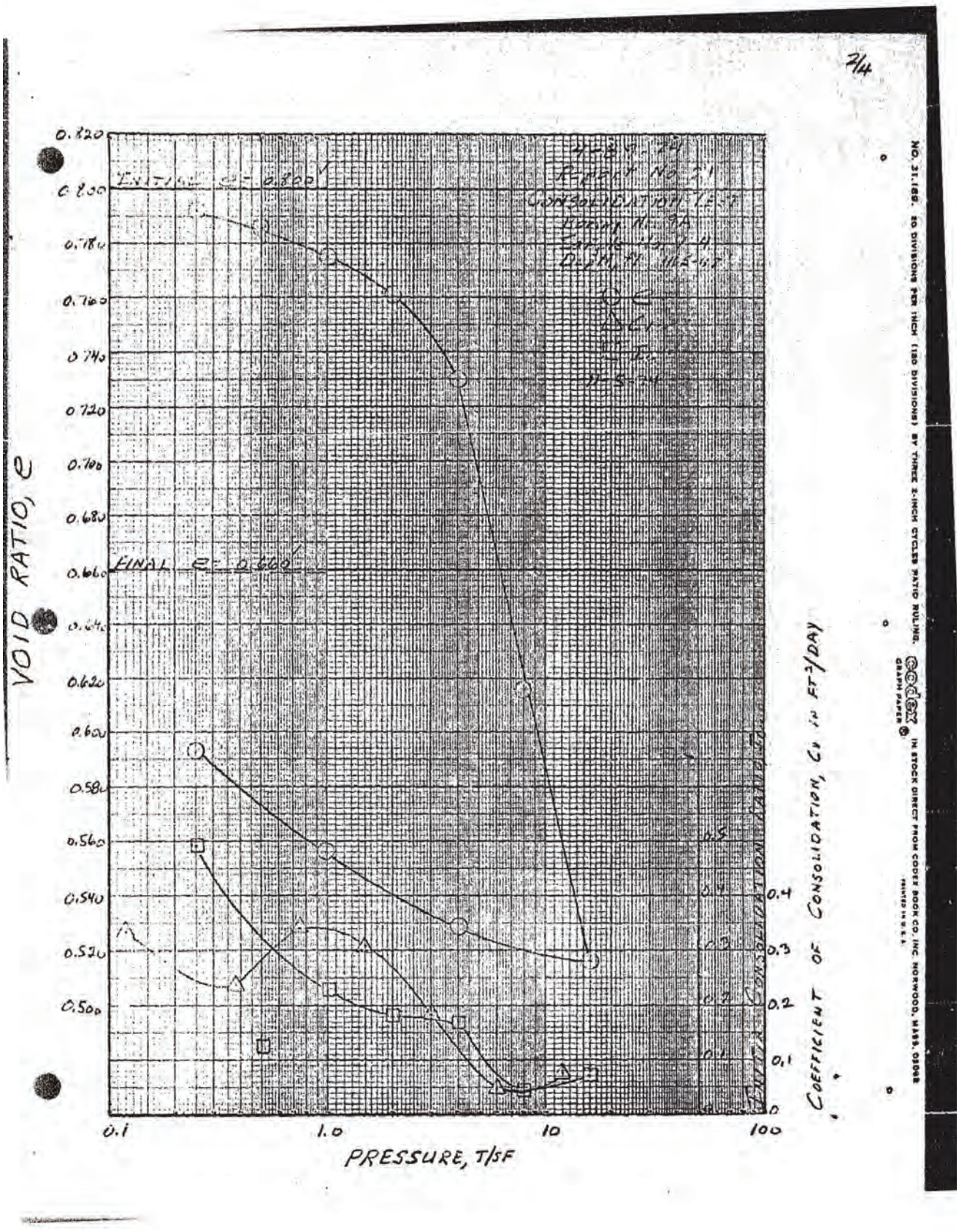
Distribution - Soils Unit (2)

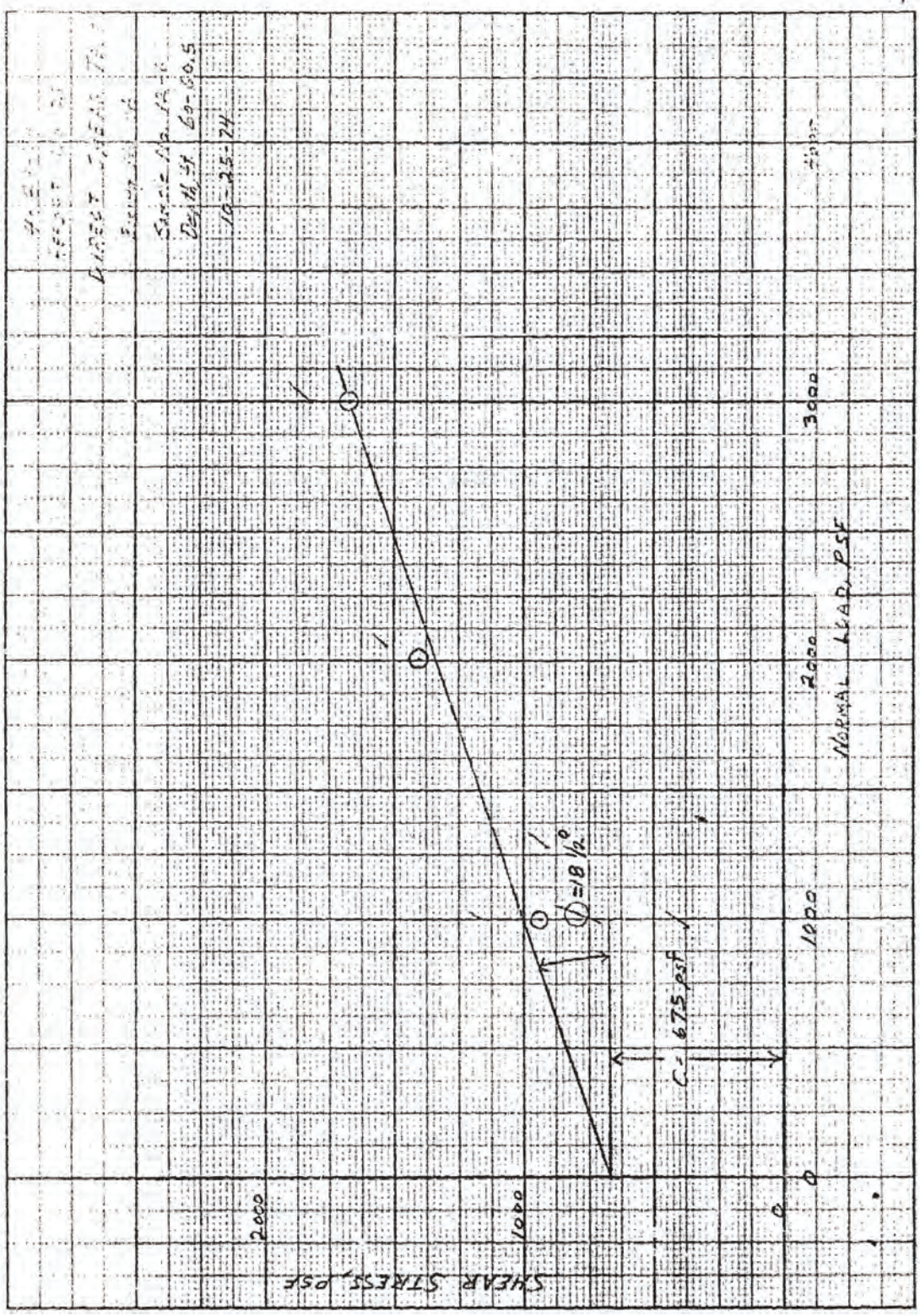
Chief Materials Engineer

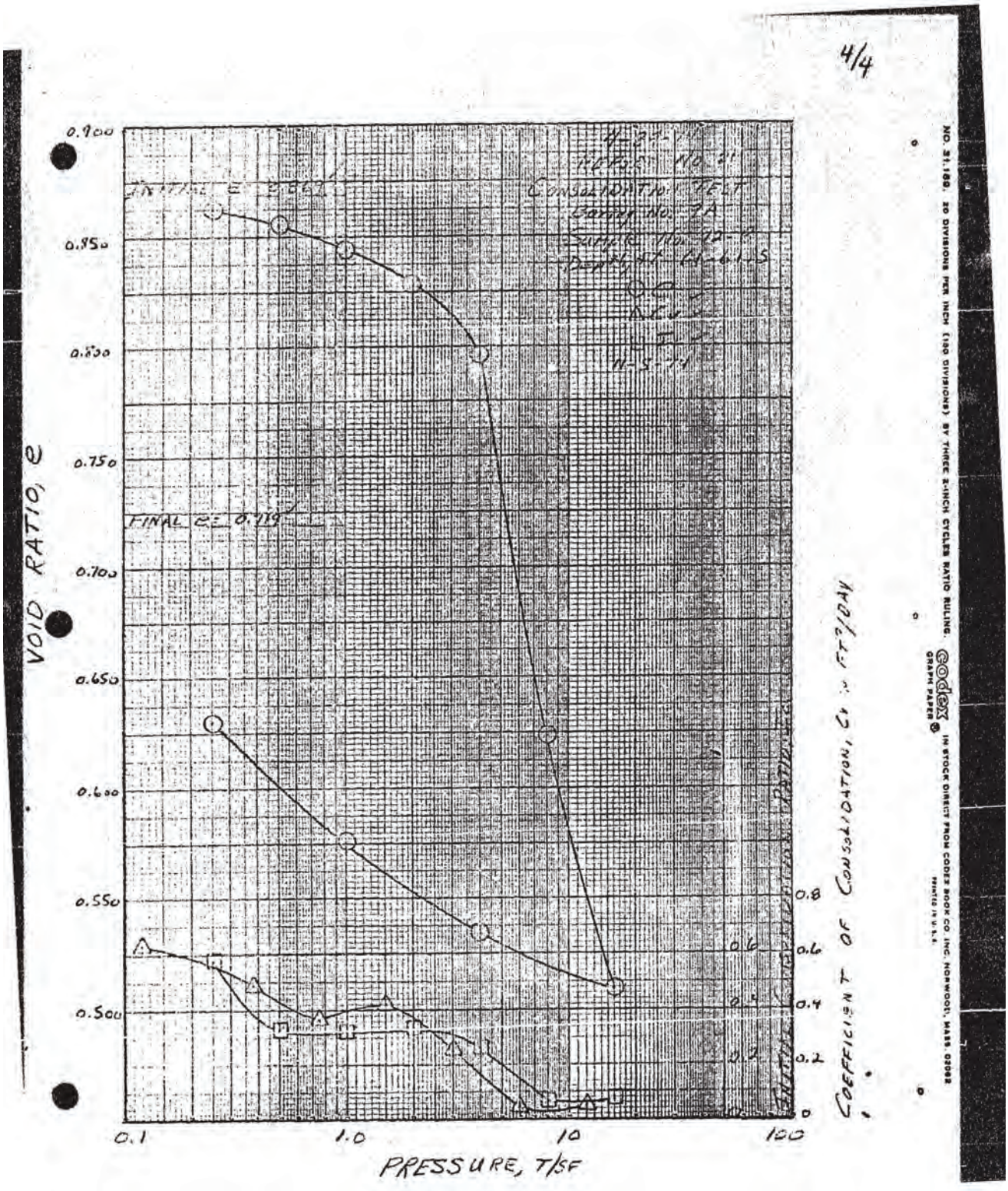
+L3

By K. J. Engeldinger 13
Materials Tests Engineer Supervisor


1/4
SHEAR STRESS, PSF
NORMAL STRESS, PSF
C = 0 PSF
Ø = 30°


2/4
VOID RATIO, e
PRESSURE, T/SF
COEFFICIENT OF CONSOLIDATION, Cv in FT²/DAY
INITIAL e = 0.800
FINAL e = 0.600
0.820
0.800
0.780
0.760
0.740
0.720
0.700
0.680
0.660
0.640
0.620
0.600
0.580
0.560
0.540
0.520
0.500
0.1
1.0
10
100
0.5
0.4
0.3
0.2
0.1
0
NO. 31.188. 80 DIVISIONS PER INCH (100 DIVISIONS) BY THREE 2-INCH CYCLES RATIO RULING.
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PRINTED IN U.S.A.


3/4
3000
2000
1000
0
NORMAL LOAD, PSF
SHEAR STRESS, PSF
2000
1000
0
ϕ=18 1/2°
C = 675 psf


4/4
0.900
0.850
0.800
0.750
0.700
0.650
0.600
0.550
0.500
VOID RATIO, e
INITIAL e = 0.867
FINAL e = 0.719
0.1
1.0
10
100
PRESSURE, T/SF
0.8
0.6
0.4
0.2
0
COEFFICIENT OF CONSOLIDATION, Cv in FT²/DAY
codex
GRAPH PAPER

F L-1911) 12-70

Division of Highways - Materials Laboratory
304 North Randall Avenue
Madison, Wisconsin 53715

REPORT OF TESTS ON SOILS

State of Wisconsin / Department of Transportation

REPORT NO. 23

Test Number 4-89-74

Document	Date Mo.-Day-Yr.	Charge Project	Yr.	Func	Credit Project	Yr.	Quantity
K					1,9,0 4 8,9		

County

Project Name

Contractor

Material: Soils

Source

Tests Requested By: Soils Unit

Submitted by Soils Unit — Date

Boring Number	9-A	9-A	9-A	9-A	9-A	
Sample Number	14	16	18	20	22	
Depth, ft.	70-72.5	80-82.5	90-92.5	100-102.5	110-112.5	
Mechanical Analysis						
Boulders (Ret. 3")						
Gravel (Pass 3" - Ret. #10)	1					
Coarse Sand (Pass #10 - Ret. #40)	0			1		
Fine Sand (Pass #40 - Ret. #200)	2			0		
Silt (Pass #200 - Ret. 0.002mm)	47			64		
Clay (Pass 0.002mm)	51	—	—	36	—	
Liquid Limit	37.5	—	—	28.7	—	
Plasticity Index	21.4	—	—	11.6	—	
AASHO Classification	A-6(13)	—	—	A-6(9)	—	
Moisture Content, %	30.6	32.2	33.4	27.7	26.9	
Loss on Ignition, %	—	—	—	—	—	
Unconfined Compression Test						
Unit Weight, PCF	96.2	91.4	96.1	98.7	98.6	
Unconfined Compression, TSF	1.2	1.6	1.7	1.4	1.2	
Consolidation Test						
Moisture Before, %	—	—	—	—	—	
Moisture After, %	—	—	—	—	—	
Compression Index	—	—	—	—	—	
Direct Shear Test						
Moisture, %	30.9	—	—	29.6	—	
Angle of Int. Frict., deg.	21	—	—	17	—	
Cohesion, lbs./sq. ft.	324	—	—	865	—	

Distribution: Soils Unit (2)
District 3 (2)
Chief Materials Engineer

+L3

By K. J. Engeldinger L3
Materials Tests Engineer Supervisor

E-L-19(L) 12-70
Division of Highways - Materials Laboratory
104 North Randall Avenue
Madison, Wisconsin 53715

REPORT OF TESTS ON SOILS

State of Wisconsin / Department of Transportation

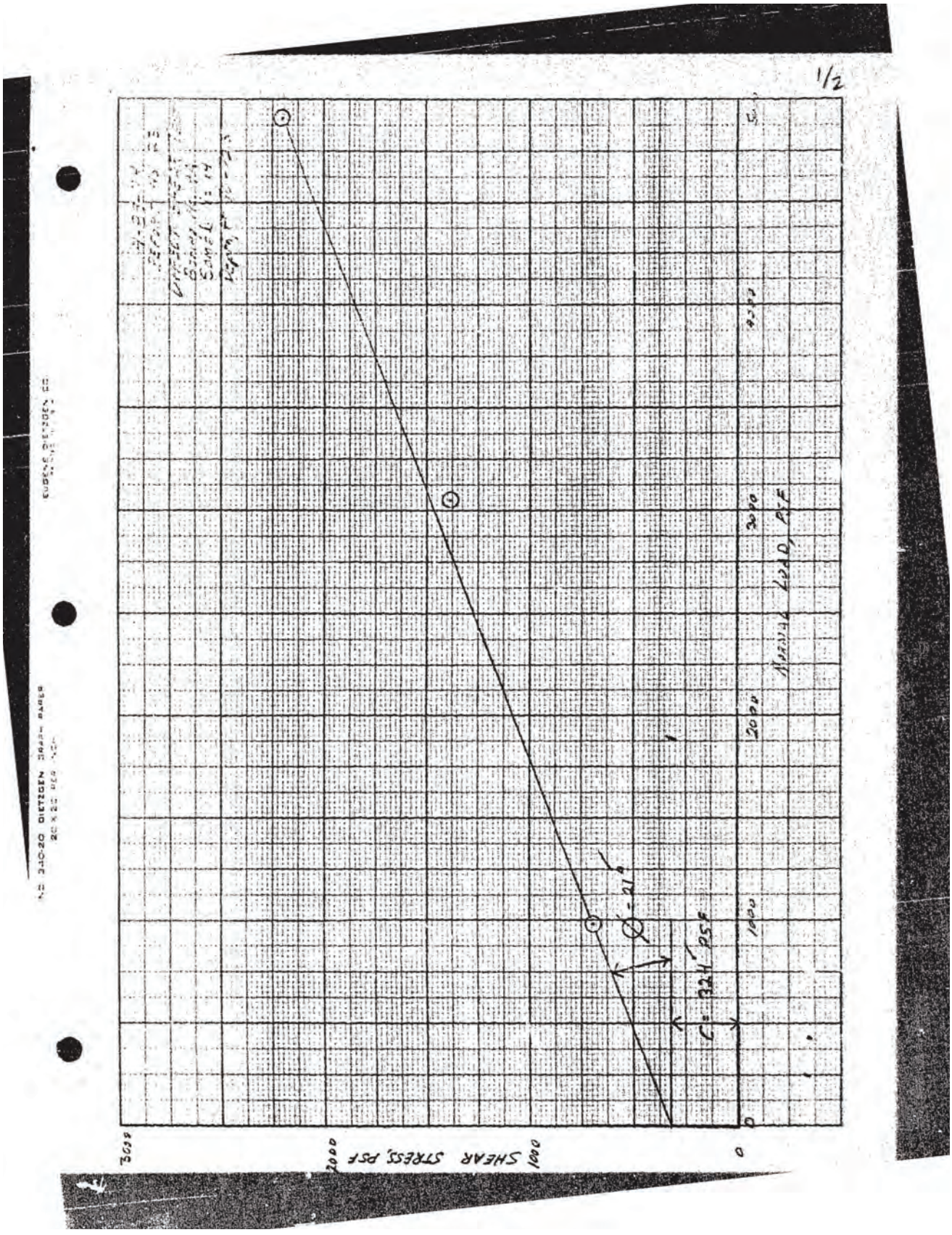
REPORT No. 23

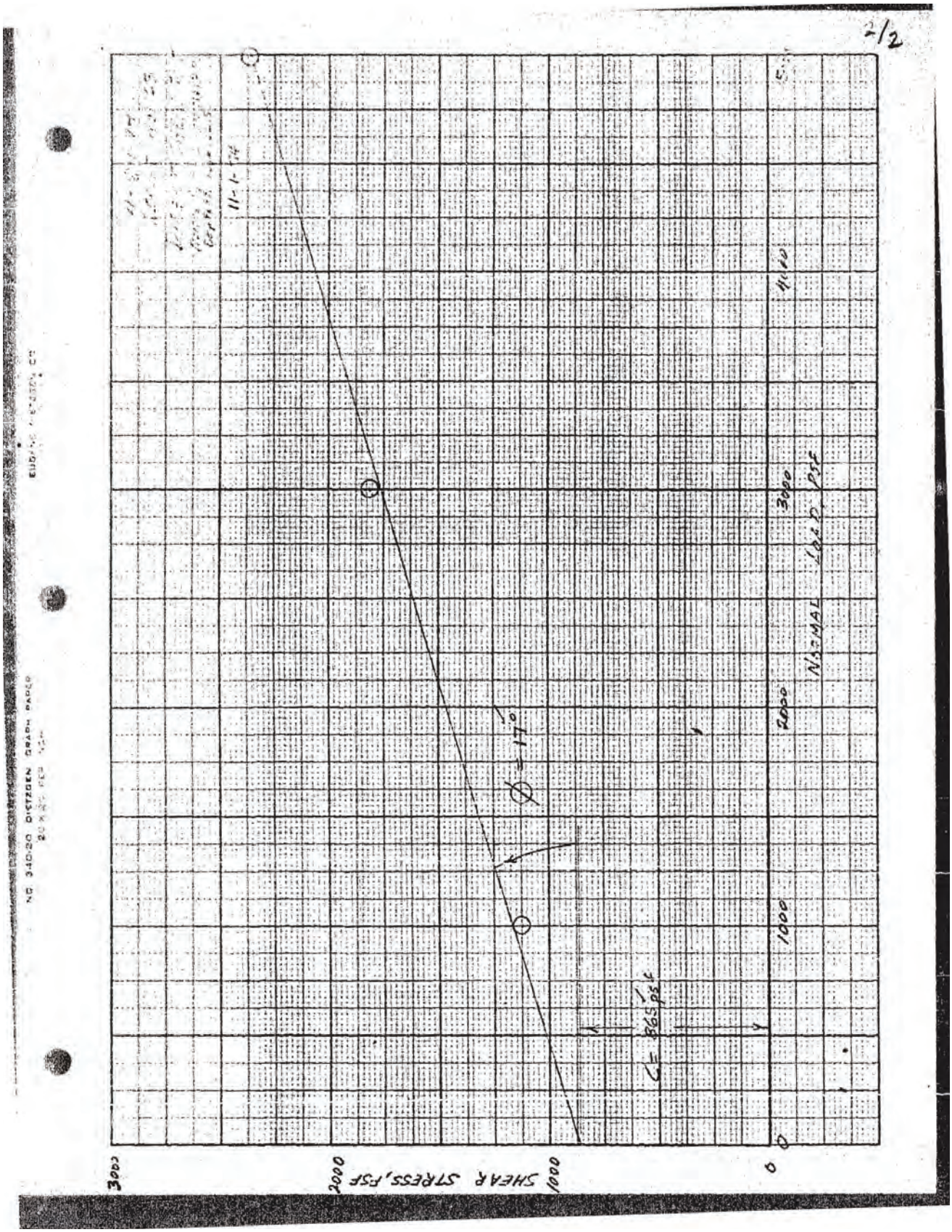
Page 1 of 2

Document	Date No.-Day-Yr.	Charge Project	Yr.	Func	Credit Project	Yr.	Quantity	Test Number
K 2980	11 05 74	1220 50 0			1190 4189			4-B9-74

County: Brown
Project Name: Tower Drive
Contractor: —
Material: Soils
Source: Borings: B-5-158
Tests Requested by: Soils Unit
Submitted by: Soils Unit
Date: 10-28-74

Boring Number—	9-A	9-A	9A	9-A	9-A
Sample Number	7	8	10	11	13
Depth, ft.	35-37.5	40-41.5	50-52.5	55-57.5	65-67.5
Mechanical Analysis					
Boulders (Ret. 3")	/				
Gravel (Pass 3" - Ret. #10)	0				
Coarse Sand (Pass #10 - Ret. #40)	2				
Fine Sand (Pass #40 - Ret. #200)	43				
Silt (Pass #200 - Ret. 0.002mm)	55				
Clay (Pass 0.002mm)					
Liquid Limit	38.7				
Plasticity Index	21.9				
AASHO Classification	A-6 (13)				
Moisture Content, %	22.7	32.0	32.3	31.5	32.7
Loss on Ignition, %					
Unconfined Compression Test					
Unit Weight, PCF	89.2	91.4	90.8	92.3	90.0
Unconfined Compression, TSF	1.0	0.91	0.95	1.0	1.3


1/2
SHEAR STRESS, PSF
NORMAL LOAD, PSF
C = 324 PSF
φ = 21°


2/2
SHEAR STRESS, PSF
3000
2000
1000
0
NOMINAL LOAD, PSF
4000
3000
2000
1000
0
C = 865 psf
ϕ = 17°

FIELD BORING LOG

State of Wisconsin / Department of Transportation

E-L-3(S)-68

Boring No. 34-A Pier — Sheet 1 of 3

Project 1220-05-00 — Road I.H. 43 - Tower Drive

Structure B-5-158 — County Brown

Station 880+13 — Offset 42.0' Rt. of NB R_1 — Elevation 584.0

GROUND WATER OBSERVATIONS

While drilling	Time after drilling	9-16	9-17	9-18	9-19
Before casing removal	Depth to water	3.0	3.0	3.3	3.3
After casing removal	Depth to cave-in	9.8	9.8	9.5	9.5

Moisture: D = Damp, M = Moist, W = Wet

C.I.: WA = Washabead, FT = Fish tail, RB = Rock bit

DRILLING METHOD: ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash

E = Easy, M = Medium, H = Hard

Start 9-9-74 — Unit III — Chief Hogan

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing 4½ Size	Blows on Probe Size	Drilling Method
					Fill brown SILT					AP
					Black organic SILT					
					Brown fine to medium SAND					
1	W	1	2		Loose mottled brown SILT	.75				
		3			Little to some fine sand					
2	W	1	2		Slightly mottled brown Loose brown SILT. Little to some fine sand	1.25		10		
		3						9		
					Brown fine to medium SAND			17		
								20		
3	D	3	6		Very stiff reddish brown silty CLAY	3.5				WA
		23								FT
4	D	Shelby			Hard, Seams to layers of gray silt	4.5+				
	3"	tube			(Only went 1.0' blew hose 20.0' to 21.0' Osterburg 75% recovery)					
					Firm gray SILT Seams to layers of red clay					
5	D	4	14			4.25				
		15								
					Very stiff reddish brown silty CLAY					
					Osterburg from 30.0' to 31.0'					
6	M				100% (Too hard for Osterburg to go all	3.0				
	3"	S.T.			the way out)					
					Stiff					
7	M	3	3			1.5				
		4								
					Very stiff 40.0' to 41.5'					
8	M	Shelby			Osterburg 100% (Osterburg is not going all	3.0				
	3"	tube			the way to hard)					
					Stiff					
9	M	2	3			1.25				
		3								
10	M	Shelby			Osterburg from 50.0' to 51.3' 100% recovery	2.25				
		tube								

Checked by _____ Final _____ Boring No. 34-A

FIELD BORING LOG — *State of Wisconsin / Department of Transportation*

E-L-3(S)-68

Boring No. 34-A Pier — Sheet 2 of 3

Project 1220-05-00 — Road I.H. 43 - Tower Drive

Structure B-5-158 — County Brown

Station 880+13 — Offset 42.0' Rt. of NB RL — Elevation 584.0

GROUND WATER OBSERVATIONS

While drilling		Time after drilling	9-20	9-23	9-25	9-26
Before casing removal		Depth to water	3.3	3.4	3.5	3.4
After casing removal		Depth to cave-in	9.5			

Moisture: D = Damp, M = Moist, W = Wet

C.I.: WA = Washahead, FT = Fish tail, RB = Rock bit

DRILLING METHOD: ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash

E = Easy, M = Medium, H = Hard

Start 9-9-74 — Unit III — Chief Hogan

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size	Blows on Probe Size	Drilling Method
10	M 3"	Shelby tube			Very stiff reddish brown silty CLAY Osterburg from 50.0' to 51.3' 100% did not push all the way	2.25				WA FT
11	M	2 3	2		Stiff	1.0				
12	M 3"	Shelby tube			Osterburg from 60.0' to 62.5' 100%	2.5				
13	M W	1 2	2			1.0				
14	M 3"	Shelby tube			Osterburg from 70.0' to 72.0' 100%	1.75				
15	M W	2 4	3		Very soft brown silty CLAY with seams to layers of red clay and silt	.25				
16	M 3"	Shelby tube			Osterburg from 30:0' to 82.5' 100%	1.5				
17	W	1 3	2			.50				
18	W	3 6	4		Firm brown sandy SILT little gravel	.75				
19	W	16 31	28		Very dense brown sandy SILT Little gravel					WA RB
20	W	10	37		Hard brown silty CLAY little gravel					

Checked by 34 — Final — Boring No. 34-A

9-11-74 Boring, 66.5; casing, 15.0'; water, 5.0'

FIELD BORING LOG

E-L-3(5)-68

State of Wisconsin / Department of Transportation

Boring No. 34-A Pier — Sheet 3 of 3

Project 1220-05-00 — Road I.H. 43 - Tower Drive

Structure B-5-158 — County Brown

Station 880+13 — Offset 42.0' Rt. of NB RL — Elevation 584.0

GROUND WATER OBSERVATIONS

While drilling — Time after drilling

Before casing removal 60.0 — Depth to water

After casing removal — Depth to cave-in

Moisture: D = Damp, M = Moist, W = Wet

C.I.

DRILLING METHOD: WA = Washahead, FT = Fish tail, RB = Rock bit, ST = Shelby tube, DM = Drilling mud, SS = Split spoon, A = Auger, C = Coring, W = Wash, E = Easy, M = Medium, H = Hard

Start 9-9-74

Unit III

Chief Hogan

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on Casing Size 4"	Blows on Probe Size	Drilling Method
20	W/D	10	37		Hard brown silty CLAY					UA
		34			Little gravel	4.5+				RB
					105 No recovery 105					
		47	20/0		Gray LIMESTONE					CE
					1st run 105.3' to 110.3'					NXL
					100% lost 100% of water					
					110 2nd run 110.3 to 110.5' AXL 100% 110					AXL
					3rd run 110.5' to 115.3'					NXL
					100% NXL					
					115 115					
					End of boring 115.3'					
					120 120					
					125 125					
					130 130					
					135 135					
					140 140					
					145 145					
					150 150					

Checked by _____ Final _____ Boring No. 34-A

DT-L-19(L) 12-70

Division of Highways - Materials Laboratory
304 North Randall Avenue
Madison, Wisconsin 53715

REPORT OF TESTS ON SOILS

State of Wisconsin / Department of Transportation

D

REPORT No. 20

Test Number 4-89-74

Document	Date Mo.-Day-Yr.	Charge Project	Yr.	Func	Credit Project	Yr.	Quantity
K 6392	9 26 74	1,2,2,0 5 0,0		8,9	1,9,0 4 8,9		

County: Brown

Project Name: Tower Drive

Contractor: -

Material: Soils

Source: B-5-158 IH 43 (Tower Drive) over Fox River

Tests Requested By: Soils Unit

Submitted by Soils Unit

Date: 9-16-74

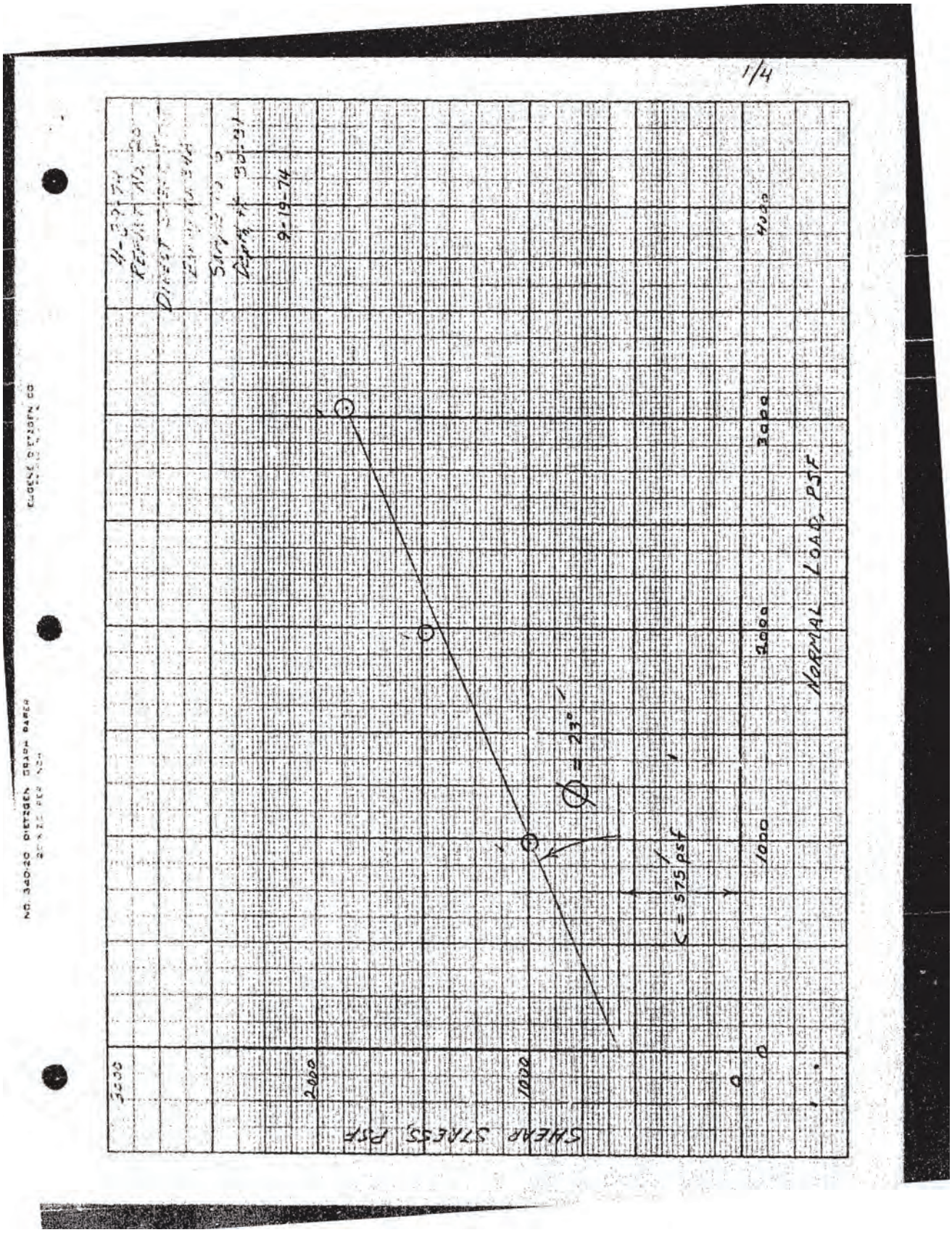
Boring Number	34A	34A	34A	34A	34A	34A	34A
Sample Number	4	6	8	10	12	14	16
Depth, ft.	20-21	30-31	40-41	50-51.3	60-62.5	70-72	80-82
Mechanical Analysis							
Boulders (Ret. 3")							
Gravel (Pass 3" - Ret. #10)		0		0	0		
Coarse Sand (Pass #10 - Ret. #40)		1		1	1		
Fine Sand (Pass #40 - Ret. #200)		2		2	5		0
Silt (Pass #200 - Ret. 0.002mm)		41		44	47		56
Clay (Pass 0.002mm)	-	56	-	53	47	-	44
Liquid Limit		44.6	41.8	42.5	38.0		31.3
Plasticity Index		26.9	25.0	25.1	22.1		15.3
AASHO Classification		A-7-6 (16)	-	A-7-6 (14)	A-6 (13)		A-6 (10)
Moisture Content, %	24.7	25.2	27.1	27.3	25.6	23.6	25.8
Loss on Ignition, %	—	—	—	—	—	—	—
Unconfined Compression Test							
Unit Weight, PCF	101.2	—	100.5	—	99.2	101.4	97.6
Unconfined Compression, TSF	1.7	*	1.9	*	1.6	2.0	1.3
Consolidation Test	*Insufficient material for test						
Moisture Before, %	—	—	—	—	—	—	—
Moisture After, %	—	—	—	—	—	—	—
Compression Index	—	—	—	—	—	—	—
Direct Shear Test							
Moisture, %	—	25.2	—	26.9	26.6	—	24.7
Angle of Int. Frict., deg.	—	23	—	26	20	—	25½
Cohesion, lbs./sq. ft.	—	575	—	485	560	—	500

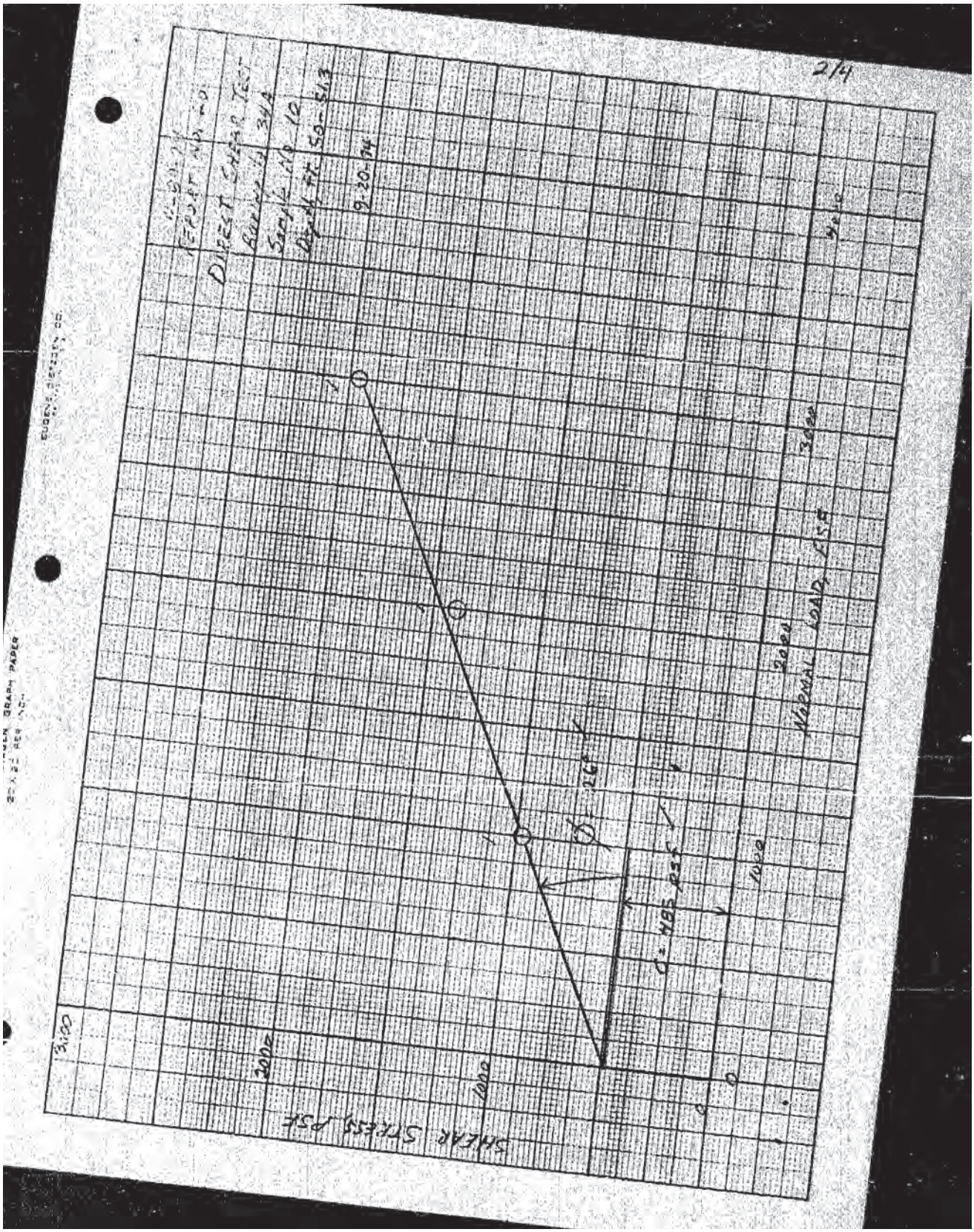
Distribution: Soils Unit (2)
District 3 (2)
Chief Materials Engineer

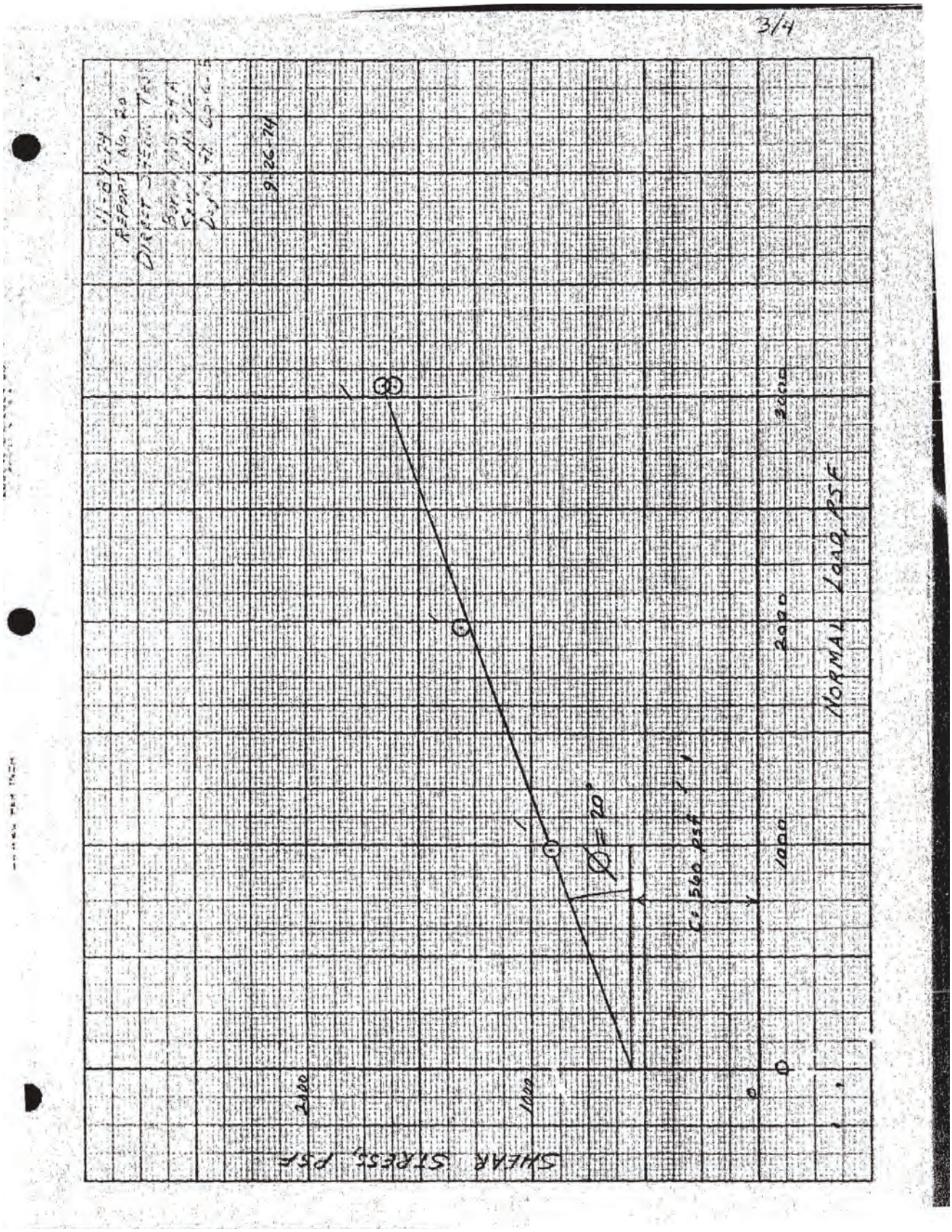
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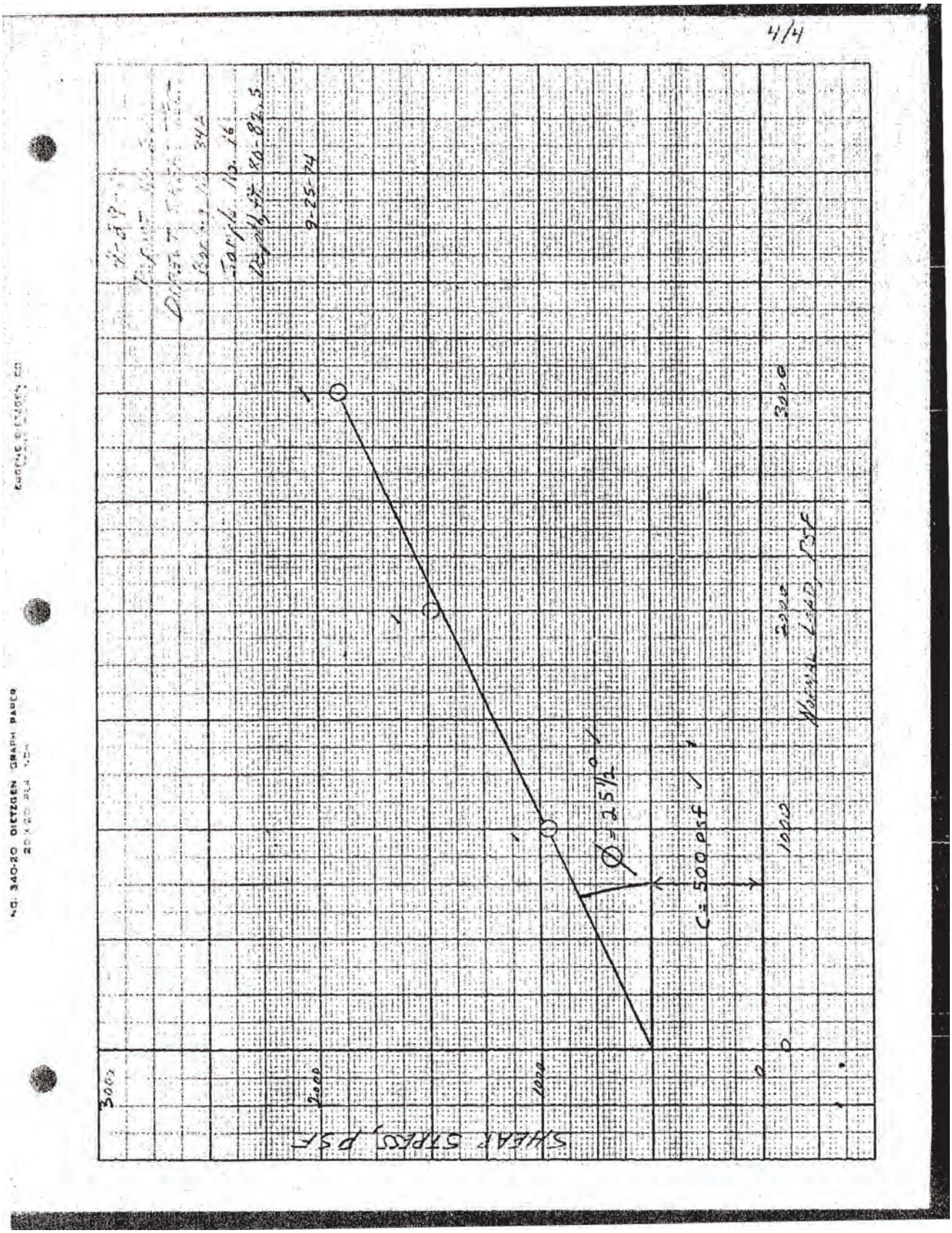
By K. J. Engeldinger 3
Materials Test Engineer Supervisor

L


1/4
9-19-74
NORMAL LOAD, PSF
SHEAR STRESS, PSF
Ø = 23°
C = 575 psf
0
1000
2000
3000
4000
5000


2/4
Direct Shear Test
Sand
Depth
9-20-94
Normal Load
Shear Stress psf
1000
2000
3000
4000
5000
6000
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
11000
12000
13000
14000
15000
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81000
82000
83000
84000
85000
86000
87000
88000
89000
90000
91000
92000
93000
94000
95000
96000
97000
98000
99000
100000


3/4
9-26-74
NORMAL LOAD, PSF
SHEAR STRESS, PSF
Ø = 20°
C = 560 psf
0
1000
2000
3000


4/4
SHEAR STRESS, PSF
C = 500 psf
Ø = 25½°

RQD

Rock Quality Designation (RQD) is an indirect measurement to indicate the general quality of a rock for engineering purposes. The value is obtained by summing up the total length of core recovered, but counting only hard sound core lengths of 4 inches or more. The RQD is expressed as a percentage of recovery of 4 inch or greater lengths compared to the total depth cored.

Percent recoveries and RQD values from NX cores for the two borings are listed below.

BORING	% RECOVERY	RQD
#9A (Site 1E)	97.5%/100%	99%
#34A (Site 2W)	100%	84%

APPENDIX C

SPECIAL PROVISIONS

1. General. The work under this contract for the construction of Project 1220-5-00, also identified as federal aid Project I 57-1(3)97, the Milwaukee-Green Bay Road (Tower Drive Bridge), Contract 1, located on IH 57 in Brown County, Wisconsin, shall be in accordance with the plans therefore, and shall be executed under the requirements of the State of Wisconsin, Department of Transportation, Division of Highways Standard Specifications for Road and Bridge Construction, Edition 1969 approved March 3, 1969; the Federal Aid Contract Provisions approved November 15, 1968, the attached supplemental specifications, and these special provisions.

2. Scope of Work. The work under this contract consists of pile test load and all incidental items necessary to complete the work shown on the plans and included in the proposal and contract.

3. Traffic. Interstate Highway 57 on which this project is located is a newly located highway that will not be open to traffic during construction operations under this project.

   The contractor shall not impede the free flow of local traffic when performing the work under this contract.

4. Prosecution and Progress. Work under this contract shall not be started until a written order to do so has been issued by the engineer and shall be started within ten days after the date of such notice.

5. Work to Be Performed on Private Property. This work will be performed on property owned by the Cities Service Oil Company and the American Can Corporation. Right of entry has been acquired by the Division of Highways which right will be extended to the contractor.

   Security measures will be provided by the companies during normal working hours. Any reasonable and actual cost of additional security measures required by Cities Service Oil Company and American Can Corporation will be the expense of the contractor performing the test pile work for the State of Wisconsin.

   Any incurred cost of additional security measures shall be considered incidental to other items of work and shall be paid directly to the owner.

6. Pile Test Load, Item 90001. Description. Work under this item shall consist of furnishing and driving two test piling at the locations shown on the plan and the application of test loads to each pile; The information obtained shall be used to determine a bearing capacity for use in the design of the sub-structure.

   Piling shall be HP 14 x 73 with an approximate length of 120 feet and shall be driven with an approved hammer developing not less than 48,000 foot pounds of energy per blow to refusal.

   The test load shall be concentrically applied by such method that the test load acting on the pile at any time may be definitely determined and controlled. Piling shall be restrained in the lateral directions.

Settlement measurement equipment shall be in accordance with ASTMD-1143, Paragraph Four, or an alternate approved by the engineer.

The contractor shall furnish and maintain adequate facilities for the engineer for making load, settlement and lateral movement measurements twenty-four hours per day. This shall include all dials, gages and devices necessary except such engineering instruments and equipment as are included in an engineer's regular equipment.

Suitable wind breaks and heaters shall be furnished by the contractor for the protection of the engineer.

Prior to loading the test piles, the contractor shall submit to the engineer for approval, plans showing methods and equipment he proposes using for loading the test pile and the provisions and equipment for observing the application of the test loads and measurement of the settlement.

Application of Loads. The load shall be applied to the pile as near the ground surface as possible. The piling shall be substantially vertical. Pile test loading shall begin not less than three days and not more than seven days after driving.

Four complete load tests cycles will be made on each piling using the following values for the bearing value "P": 64 tons, 96 tons, 128 tons, and 172 tons. Piles shall be tested to 2 "P".

The load shall be applied in increments. The initial application shall be approximately equal to the bearing value "P" of the pile.

An additional load increment of approximately one-fourth "P" shall be applied after all measurable settlement due to the previous loading has ceased. The least settlement that will be considered measurable is twelve thousandths of an inch. Similar increments of one-fourth "P" shall be added and measurements taken until the load application of two "P" is completed. The pile shall then be unloaded in a minimum of two increments each of which is approximately equal to "P". Piling shall be substantially unloaded before beginning the next test series using the next larger "P" value.

The application of load will be considered complete when the value of 2 "P" is reached, or when the settlement reaches the yieldpoint. This is defined as where the rate of settlement exceeds three-hundredths inch per ton for the last increment of load applied.

Method of Measurement. The item Pile Test Load shall be measured by the unit and each unit shall consist of the test pile and the four complete test load cycles on that piling.

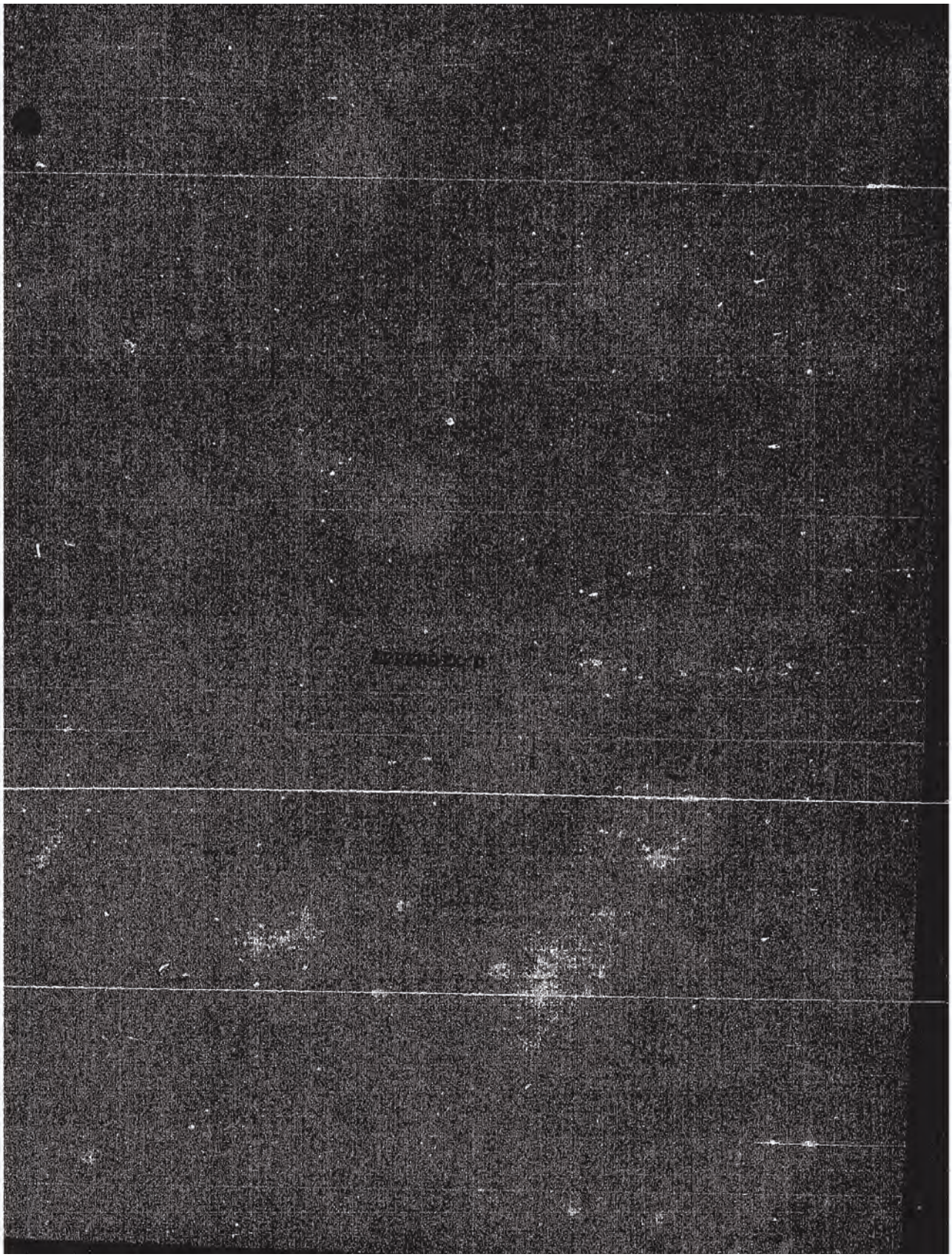
Basis of Payment. The work under this item Pile Test Load measured as provided above shall be paid for at the contract unit price, which price shall be payment in full for furnishing all required material, all labor, tools, equipment, and incidentals necessary to complete the work in accordance with the contract.

7. Removing Piling. Item 90002. Description. Work under this item shall consist of the extraction of the steel piling used in the test loading.

Method of Measurement. The item Removing Piling shall be measured as units and each piling removed shall be one unit.

Basis of Payment. This item, measured as provided above, shall be paid for at the contract unit bid price which will be payment in full for pulling and disposing of the piling; for furnishing all labor, equipment, materials and incidentals necessary to complete this item in accordance with the contract.

8. Field Office. Section 642 of the standard specifications is hereby deleted.



Form E-L-1(S)-67

SITE 1E

Wisconsin Department of Transportation

TEST PILE DATA

Project Number 1220-5-00
Name of Road MILWAUKEE-GREEN BAY ROAD
Name of Structure TOWN 2 DRIVE BRIDGE
Structure Number _____ County BROWN
I Highway I-43 Contract Number 1
Contractor LUNDA CONSTRUCTION CO.
Required Bearing E.E., Plan Length 126', Ordered Length 126'

Pile Number 1 In (Abt. or Pier No.) _____
Location: Stationing 329+00 Offset 4'
Footing Elevation _____

Test Pile: No. 1 Date Driven 1-21,22-75
Type: Timber - Untreated _____ Treated _____
Steel - H Beams: (Give size & wt.) 14 x 73
Concrete- Cast-in-place (give shell thickness) _____ Dia. _____
Precast _____
Others (Describe fully) _____
Diameter: Butt _____ in. Tip _____ in.
Length: _____ ft. _____ in.
Mandrel (if used): Description NONE
Length _____ ft. _____ in.
Follower (if used): Description NONE
Length _____ ft. _____ in.

Hammer: Make and Model KOBE 25
(Check) Gravity _____
Single-acting DIESEL (Steam or Air)
Double-acting _____ (Steam, Air or Diesel)

For Gravity or Single-Acting Hammer:
Weight of Striking Part of Hammer 5500 pounds.
*Height of fall 9.3 ft.

For Double-Acting Hammer:
Area of Piston _____ sq. in.
Steam or Air Pressure at Hammer _____ psi
Manufacturers Rated Energy _____ ft. lbs.

Driving Cap, Anvil, Helmet, Etc.:
Weight _____ lb. and/or Description _____

(Make Sketch on back)

* Note any falling off in rated speed and height of fall during driving.

The driving record shall indicate the penetration resistance of the test pile in blows per foot in one-foot increments below footing elevation and length of any delays or interruptions of the driving. Show all augering through fills. Show all jetting. The driving record may be continued on the back of this report along with any remarks, or on additional sheets.

Note:
For any test pile driven, submit copies to:
Bridge Section (Central office);
Soils Engineer, Materials Section
304 North Randall Avenue, Madison, Wisconsin 53702

DRIVING RECORD

RE-BOUND (FT.)	Depth Below Fig. Elev. From	To	Penetration Resistance (Blows ft.)	Bearing (Tons)
	0	1		
	1	2		
	2	3		
	3	4		
	4	5		
	5	6		
	6	7		
	7	8		
	8	9		
	9	10		
	10	11		
	11	12		
	12	13		
	13	14		
	14	15		
	15	16		
	16	17		
	17	18		
	18	19		
	19	20		
5	20	21	13	24.4
5.5	21	22	17	33.4
5.5	22	23	18	34.8
6	23	24	21	42.7
6	24	25	23	45.9
6	25	26	27	51.2
6	26	27	29	53.8
6	27	28	29	53.8
5	28	29	35	50.5
5	29	30	35	50.5
5.5	30	31	27	46.9
5.5	31	32	23	42.0
5	32	33	18	31.7
5	33	34	16	28.9
4.5	34	35	15	24.8
4.5	35	36	15	24.8
4.5	36	37	14	23.4
4.5	37	38	14	23.4
4.5	38	39	13	22.0
4	39	40	14	20.8
4	40	41	13	19.6
4	41	42	13	19.6
4.5	42	43	13	22.0
4.5	43	44	11	19.4
4.5	44	45	12	20.6
4.5	45	46	12	20.6
4.5	46	47	12	20.6
4.5	47	48	13	22.0
4.5	48	49	12	20.6
4.5	49	50	12	20.6
4.5	50	51	13	22.0
4.5	51	52	11	19.4
4.5	52	53	12	20.6
	53	54		
	54	55		

DRIVING RECORD

	Depth Below Frg. Elev.		Penetration Resistance	Bearing
(FT.)	From	To	(Blows ft.)	(Tons)
	55	56		
5	56	57	19	33.0
5	57	58	19	33.0
5	58	59	19	33.0
5	59	60	20	34.4
4.5	60	61	20	31.0
5	61	62	18	31.7
5	62	63	18	31.7
4.5	63	64	19	29.7
4.5	64	65	19	29.7
4.5	65	66	20	31.0
4.5	66	67	18	29.5
4.5	67	68	18	28.5
4.5	68	69	19	29.7
4.5	69	70	18	29.5
4.5	70	71	19	29.7
4.5	71	72	19	29.7
4.5	72	73	17	27.4
4.5	73	74	18	28.5
4.5	74	75	18	28.5
4.5	75	76	17	27.4
4.5	76	77	18	20.5
4.5	77	78	17	27.4
4.5	78	79	18	28.5
4.5	79	80	17	27.4
4.5	80	81	17	27.4
4.5	81	82	17	27.4
4.5	82	83	16	26.0
4.5	83	84	15	24.8
4.5	84	85	14	23.4
4.5	85	86	14	23.4
4.5	86	87	15	24.8
4.5	87	88	15	24.8
4.5	88	89	15	24.8
4.5	89	90	14	23.4
4.5	90	91	14	23.4
4.5	91	92	14	23.4
4.5	92	93	15	24.8
5	93	94	15	27.5
5	94	95	14	26.0
4.5	95	96	15	24.8
4.5	96	97	14	23.4
4.5	97	98	15	24.8
4.5	98	99	14	23.4
4.5	99	100	15	24.8

SITE 1E

-Form E-L-1(S)-67

Wisconsin Department of Transportation

TEST PILE DATA

Project Number 1220-5-00 (CONT.)
Name of Road
Name of Structure
Structure Number County
Highway Contract Number
Contractor
Required Bearing , Plan Length , Ordered Length

Pile Number 1 In (Abt. or Pier No.)
Location: Stationing Offset
Footing Elevation

Test Pile: No. Date Driven
Type: Timber - Untreated Treated
Steel - H Beams: (Give size & wt.)
Concrete- Cast-in-place (give shell thickness) Dia.
Precast
Others (Describe fully)
Diameter: Butt in. Tip in.
Length: ft. in.
Mandrel (if used): Description
Length ft. in.
Follower (if used): Description
Length ft. in.

Hammer: Make and Model
(Cook) Gravity
Single-acting (Steam or Air)
Double-acting (Steam, Air or Diesel)

For Gravity or Single-Acting Hammer:
Weight of Striking Part of Hammer pounds.
*Height of fall ft.

For Double-Acting Hammer:
Area of Piston sq. in.
Steam or Air Pressure at Hammer psi
Manufacturers Rated Energy ft. lbs.

Driving Cap, Anvil, Helmet, Etc.:
Weight lb. and/or Description

(Make Sketch on back)

* Note any falling off in rated speed and height of fall during driving.

The driving record shall indicate the penetration resistance of the test pile in blows per foot in one-foot increments below footing elevation and length of any delays or interruptions of the driving. Show all augering through fills. Show all jetting. The driving record may be continued on the back of this report along with any remarks, or on additional sheets.

Note:
For any test pile driven, submit copies to:
Bridge Section (Central office);
Soils Engineer, Materials Section
304 North Randall Avenue, Madison, Wisconsin 53702

DRIVING RECORD

RE-BOUND (FT.)	Depth Below Ftg. Elev. From	To	Penetration Resistance (Blows ft.)	Bearing (Tons)
4.5	100	101	15	24.8
4.5	1	2	14	23.4
5	2	3	13	24.4
5	3	4	12	22.9
5	4	5	12	22.9
5	5	6	13	24.4
5	6	7	12	22.9
5	7	8	13	24.4
5	8	9	12	22.9
5	9	10	12	22.9
5	110	111	12	22.9
5.5	11	12	12 V	25.2
5.5	12	13	11	23.4
	13	14		
5	14	15	16	28.9
5	15	16	15	27.5
5	16	17	16	28.9
5	17	18	17	30.4
5	18	19	20	34.4
5	19	20	22	37.0
5	120	121	23	38.2
4.5	21	22	30	44.3
5	22	23	30	45.8
5	23	24	32	47.8
5	24	25	34	49.8
5	25	26	31	46.8
	26	27		
	27	28		
	28	29		
	29	30		
	130	131		
	31	32		
	32	33		
	33	34		
	34	35		
	35	36		
	36	37		
	37	38		
	38	39		
	39	40		
	40	41		
	41	42		
	42	43		
	43	44		
	44	45		
	45	46		
	46	47		
	47	48		
	48	49		
	49	50		
	50	51		
	51	52		
	52	53		
	53	54		
	54	55		

DRIVING TIME

BEGAN DRIVING 1:00 P.M. - 1-21-75.
0-20' INSUFFICIENT RESISTANCE TO START HAMMER.
53' STOP TO MAKE SPLICE 1:30 P.M.
53-56' GETTING HAMMER STARTED 8:30 AM ON 1-22-75.
113' STOP FOR SPLICE 9:00 A.M.
113-114 GETTING HAMMER STARTED 11:30 A.M.
126' STOP DRIVING 11:50 A.M. 1-22-75

FINAL 50 BLOWS

BLOWS	FALL	SETTLEMENT	BEAR-TON
10	5	3 1/2"	50.0
10	5.5	2 3/4"	63.7
10	6	1/2"	132.0
10	6	1/8"	155.6
10	6	0"	165.0

DRIVING RECORD

Depth Below Fig. Elev. From	To	Penetration Resistance (Blows ft.)	Bearing (Tons)
55	56		
56	57		
57	58		
58	59		
59	60		
60	61		
61	62		
62	63		
63	64		
64	65		
65	66		
66	67		
67	68		
68	69		
69	70		
70	71		
71	72		
72	73		
73	74		
74	75		
75	76		
76	77		
77	78		
78	79		
79	80		
80	81		
81	82		
82	83		
83	84		
84	85		
85	86		
86	87		
87	88		
88	89		
89	90		
90	91		
91	92		
92	93		
93	94		
94	95		
95	96		
96	97		
97	98		
98	99		
99	100		

Form E-L-1(S)-67

SITE 2W

Wisconsin Department of Transportation

TEST PILE DATA

Project Number 1220-5-00
Name of Road MILWAUKEE - GREEN BAY RD.
Name of Structure TOWER DRIVE BRIDGE
Structure Number _____ County BROWN
I Highway 57 43 Contract Number 1
Contractor LUNDA CONSTRUCTION COMPANY
Required Bearing REF, Plan Length 105', Ordered Length 105'

Pile Number 2 In (Abt. or Pier No.) _____
Location: Stationing BP0+13 Offset 45 RT.
Footing Elevation _____

Test Pile: No. 2 Date Driven 1-30-75
Type: Timber - Untreated _____ Treated _____
Steel - H Beams: (Give size & wt.) 14x73
Concrete- Cast-in-place (give shell thickness) _____ Dia.
Precast _____
Others (Describe fully) _____
Diameter: Butt _____ in. Tip _____ in.
Length: _____ ft. _____ in.
Mandrel (if used): Description NONE
Length _____ ft. _____ in.
Follower (if used): Description NONE
Length _____ ft. _____ in.

Hammer: Make and Model KOBE 25
(Check) Gravity _____
Single-acting DIESEL (Steam or Air)
Double-acting _____ (Steam, Air or Diesel)

For Gravity or Single-Acting Hammer:
Weight of Striking Part of Hammer 5500 pounds.
*Height of fall 9.6 ft.

For Double-Acting Hammer:
Area of Piston _____ sq. in.
Steam or Air Pressure at Hammer _____ psi
Manufacturers Rated Energy _____ ft. lbs.

Driving Cap, Anvil, Helmet, Etc.:
Weight _____ lb. and/or Description _____

_____
(Make Sketch on back)

* Note any falling off in rated speed and height of fall during driving.

The driving record shall indicate the penetration resistance of the test pile in blows per foot in one-foot increments below footing elevation and length of any delays or interruptions of the driving. Show all augering through fills. Show all jetting. The driving record may be continued on the back of this report along with any remarks, or on additional sheets.

Note:
For any test pile driven, submit copies to:
Bridge Section (Central office);
Soils Engineer, Materials Section
304 North Randall Avenue, Madison, Wisconsin 53702

DRIVING RECORD

RE-BOUND	Depth Below Ftg. Elev. From	To	Penetration Resistance (Blows ft.)	Bearing (Tons)
FT.				
	0	1		
	1	2		
	2	3		
	3	4		
	4	5		
	5	6		
	6	7		
	7	8		
	8	9		
	9	10		
	10	11		
	11	12		
	12	13		
	13	14		
	14	15		
	15	16		
	16	17		
	17	18		
	18	19		
	19	20		
	20	21		
	21	22		
4	22	23	9	15.7
4	23	24	11	17.1
4	24	25	11	17.1
4	25	26	12	18.3
4	26	27	13	19.6
4	27	28	14	20.8
4	28	29	16	23.2
4	29	30	15	22.0
4	30	31	15	22.0
4	31	32	17	24.3
4	32	33	20	27.5
4.5	33	34	18	28.5
4.5	34	35	18	28.5
4	35	36	19	26.4
4	36	37	19	26.4
4.5	37	38	19	29.7
4	38	39	21	28.5
4	39	40	22	29.6
4	40	41	21	28.5
4.5	41	42	22	33.3
4.5	42	43	22	33.3
4.5	43	44	22	33.3
4.5	44	45	21	32.0
	45	46		
	46	47		
	47	48		
5.5	48	49	21	39.2
5.5	49	50	22	40.7
5.5	50	51	22	40.7
5.5	51	52	22	40.7
5	52	53	24	39.3
5	53	54	22	37.0
5	54	55	22	37.0

DRIVING TIME

BEGIN DRIVING 9:A.M. 1-30-75
0'-2' INSUFFICIENT RESISTANCE TO START HAMMER
45' STOP FOR SPLICE 9:30 AM.
45'-48' STARTING HAMMER 1:10 P.M.
90' STOP FOR SPLICE 1:35 P.M.
90-91' STARTING HAMMER 3:30 P.M.
101' STOP DRIVING 4:10 P.M.

FINAL 50 BLOWS

BLOWS	FALL	SETTLEMENT	BEAR-TON
10	6.75'	1/8"	175
10	6.75'	1/16"	180
10	6.75'	1/16"	180
10	6.75'	0"	186
10	6.75'	0"	186

DRIVING RECORD

RE-BOUND	Depth Below Fig. Elev.		Penetration Resistance	Bearing
FT.	From	To	(Blows ft.)	(Tons)
5	55	56	24	39.3
5	56	57	23	38.2
5	57	58	23	38.2
5	58	59	24	39.3
5	59	60	26	41.6
5	60	61	24	39.3
5	61	62	24	39.3
5	62	63	25	40.4
5.5	63	64	22	40.7
5.5	64	65	22	40.7
5.5	65	66	22	40.7
5.5	66	67	22	40.7
5.5	67	68	21	39.2
5.5	68	69	20	37.8
5.5	69	70	20	37.8
5.5	70	71	21	39.2
5.5	71	72	22	40.7
5.5	72	73	22	40.7
5.5	73	74	22	40.7
5.5	74	75	22	40.7
6	75	76	21	42.7
6	76	77	20	41.3
6	77	78	17	36.5
6	78	79	20	41.3
6	79	80	20	41.3
6	80	81	19	39.6
6	81	82	19	39.6
5.5	82	83	18	34.8
5.5	83	84	18	34.8
5.5	84	85	18	34.8
5.5	85	86	17	33.4
5.5	86	87	18	34.8
5.5	87	88	16	31.8
5.5	88	89	16	31.8
5.5	89	90	17	33.4
	90	91		
5.5	91	92	28	48.1
5.5	92	93	75	84.0
5.5	93	94	99	94.0
6	94	95	105	105
6	95	96	105	105
6	96	97	97	102
6	97	98	103	104
6	98	99	120	110
6	99	100	133	114
6	100	101	140	115
6	101	102	142	116
6.5	102	103	158	130
6.5	103	104	400	155

Appendix E
Pile Source Data

153

Name and Address of Dealer.

NORTH STAR STEEL
MINNEAPOLIS, MINN.

SCHUSTER READY MIX
GREEN BAY

PHOENIX STEEL
END CURVES, WIS

153

Materials Recoded

Name and Address of Manufacturer or Supplier

Bar Steel Reinf. PHOENIX STEEL CORP. END CURVES, WIS.

Steel Piling U.S. STEEL CORP. CHICAGO, ILL.

Galv. Pipe. CONSOLIDATED STEEL CO. GREEN BAY, WIS.

Apron E.W. "

Fertilizer

Seed.

Coated High Str. Bar Steel MIDWEST PIPE COATING SCHERERVILLE, IND.

Welding Rod. LINCOLN ELECTRIC COMP. CLEVELAND, OHIO

Cement MEDUSA CEMENT COMP. CLEVELAND HEIGHTS, OHIO

Conc. Aggr. SCHUSTER PIT DENMORE, WIS.

Water for Conc. CITY OF GREEN BAY

UNITED STATES STEEL CORPORATION
COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31400-3141	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-09-76	187-44364

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08279	11/08/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	J 90850	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 FT LENGTH IN 60 0			
	HEAT-NO K24369 PIECES 23 FT. 60 INCHES 0	POUNDS 100740	100740	CENTS/LB 14.0500
				14153.97 13096.20
		TOTAL		14153.97 13046.20
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	587.10 521.23
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~100740~~	~~.5900~~ ~~594.37~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 23
POUNDS 100740
B/L 100740

65.48
DISC AMT ~~70.77~~ INVOICE AMT 13551.95 ~~15335.44~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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Rev 4

UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

REMIT 004933487
T 0- 0- 1 PO BOX 3052
S 2- 0- 0 ST. PAUL, MINN 55166
I 2- 0- 0 TO

USS CONTROL NO.	USS ORDER NO.	PAGE
31605-3161	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44693

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08381	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008.0M	MILL	EJE 90463	PP

H-PILES CARBON ASTM A36-75

ITEM	DESCRIPTION	FT	LENGTH IN					
01	HP14X73		60	0				
	HEAT-NO	PIECES	FT.	INCHES	POUNDS		CENTS/LB	
	K24443	25	60	0	109500	109500	14.0500	15384.75 14235.00
					TOTAL			15384.75 14235.00
PLUS SALES/USE TAX STATE					PERCENT		4.0000	638.16 566.53
~~PLUS TRANSPORTATION CHARGE CL SOM~~					~~PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann UNITED STATES STEEL CORPORATION

71.18

DISC AMT ~~71.18~~ INVOICE AMT ~~14730.37~~ 14663.96

NET 30 MATURITY OR DISCOUNT DATE RUNS FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO
10/26/76	1026

USS CONTROL NO	USS ORDER NO	PAGE
31605-3161	MC60105	1

TERMS	INVOICE DATE	INVOICE NO
30-1/2-10	11-11-76	187-44694

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO	DATE SHIPPED	FROM	ROUTE/CARRIER
B09375	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

TERMS	MINIMUM WEIGHT	FOR	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	EJE 90897	PP

H-PILES CARBON ASTM A36-75

ITEM	DESCRIPTION	FT	LENGTH IN			Quantity	Unit Price	Amount
01	HP14X73	60		0				
	HEAT-NO	PIECES	FT.	INCHES	POUNDS			
	1R6861	7	60	0	30660			
	1R6864	11	60	0	48180			
	J32114	2	60	0	8760			
	J32113	10	60	0	43800			
		30			131400	131400	CENTS/LB 14.0500	18461.70 17082.00
					TOTAL			18461.70 17082.00
	PLUS SALES/USE TAX STATE				PERCENT		4.0000	765.79 679.56
	~~PLUS TRANSPORTATION CHARGE~~ CL NON				~~PER 100LB~~	~~131400~~	~~.5900~~	~~775.26~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

85.41 17676.3

DISC AMT ~~92.33~~ INVOICE AMT ~~20302.7~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31605-3161	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44698

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08344	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	J 90300	PP

Item No	Description			Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75					
ITEM 01	DESCRIPTION HP14X73	FT 60	LENGTH IN 0			
	HEAT-NO	PIECES	FT. INCHES	POUNDS		
	1R6864	7	60 0	30660		
	2R7097	18	60 0	78840		
		25		109500	109500 CENTS/LB	14.0500 15384.75
				TOTAL		15384.75
	PLUS SALES/USE TAX STATE			PERCENT		4.0000 638.16
	~~PLUS TRANSPORTATION CHARGE~~ CL 80M			~~PER 100LB~~	~~109500~~	~~.5900~~ ~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Dauman
UNITED STATES STEEL CORPORATION

PIECES 25
POUNDS 109500
B/L 109500

71.18
DISC AMT ~~76.92~~ INVOICE AMT ~~16668.96~~ 14730.3

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31605-3161	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44699

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO
004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08320	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	J 90893	PP

Item No	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO 1R6861 — PIECES 10 — FT. 60 — INCHES 0 — POUNDS 43800			
	HEAT-NO 1R6860 — PIECES 3 — FT. 60 — INCHES 0 — POUNDS 13140			
	HEAT-NO H28866 — PIECES 17 — FT. 60 — INCHES 0 — POUNDS 74460			
	30 — POUNDS 131400	131400	CENTS/LB 14.0500	18461.70 17082.0
	TOTAL			18461.70 17582.0
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	765.79 679.8(
	~~PLUS TRANSPORTATION CHARGE CL BOM~~ — ~~PER 100LB~~	~~131400~~	~~.5900~~	~~775.26~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 30 POUNDS 131400
B/L 131400

85.41

DISC AMT ~~92.31~~ INVOICE AMT ~~20002.75~~ 17676.4

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44700

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08321	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	J 90658	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT 60 LENGTH IN 0			
	HEAT--NO 1R6860 — PIECES 14 — FT. 60 — INCHES 0 — POUNDS 61320			
	1R6861 — 10 — 60 — 0 — 43800			
	H28866 — 8 — 60 — 0 — 35040			
	32	140160	CENTS/LB 14.0500	19692.48
				18945.99
	TOTAL			19692.48
				18945.99
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	816.84
				725.19
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~140160~~	~~.5900~~ ~~826.94~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 32 POUNDS 140160
B/L 140160

DISC AMT ~~98.46~~ INVOICE AMT ~~21336.26~~ 18854.87

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U S A

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44701

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO	DATE SHIPPED	FROM	ROUTE/CARRIER
B08314	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008 0M	MILL	ATSF 168198	PP

Item No	Description				Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75						
ITEM 01	DESCRIPTION HP14X73	FT 60	LENGTH IN 0				
	HEAT-NO	PIECES	FT.	INCHES	POUNDS		
	1R6861	10	60	0	43800		
	J32100	11	60	0	48180		
	1R6860	4	60	0	17520		
		25			109500	109500	CENTS/LB 14.0500
							15384.75 14235.00
					TOTAL		15384.75 14235.00
	PLUS SALES/USE TAX STATE				PERCENT	4.0000	638.16 566.53
	~~PLUS TRANSPORTATION CHARGE~~ CL BOM				~~PER 100LB~~	~~109500~~	~~.5900~~ ~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25
B/L
POUNDS 109500
109500

71.18 DISC AMT ~~76.92~~ INVOICE AMT 14730.37 ~~16668.96~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31605-3161	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44702

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT 004933487
T 0- 0- 1 PO BOX 3052
S 2- 0- 0 ST. PAUL, MINN 55166
I 2- 0- 0 TO

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08327	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	CNW 95143	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT 60 LENGTH IN 0			
	HEAT-NO 1R6860 — PIECES 2 — FT. 60 — INCHES 0 — POUNDS 8760			
	HEAT-NO K24437 — PIECES 14 — FT. 60 — INCHES 0 — POUNDS 61320			
	HEAT-NO H28866 — PIECES 8 — FT. 60 — INCHES 0 — POUNDS 35040			
	HEAT-NO K24369 — PIECES 1 — FT. 60 — INCHES 0 — POUNDS 4380			
	25	109500	CENTS/LB 14.0500	15384.75 14235.00
	TOTAL			15384.75 14235.00
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	638.16 566.55
	~~PLUS TRANSPORTATION CHARGE CL BOM~~	~~PER 100LB~~	~~109500~~	~~.5900~~ ~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

DISC AMT ~~70.92~~ 71.18 INVOICE AMT ~~16668.91~~ 14730.3

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44703

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08330	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	00800M	MILL	ATSF 168268	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO: IR6861 — PIECES 4 — FT. 60 — INCHES 0 — POUNDS 17520			
	HEAT-NO: K24437 — PIECES 9 — FT. 60 — INCHES 0 — POUNDS 39420			
	HEAT-NO: IR6860 — PIECES 2 — FT. 60 — INCHES 0 — POUNDS 8760			
	HEAT-NO: H28866 — PIECES 10 — FT. 60 — INCHES 0 — POUNDS 43800			
	25 — POUNDS 109500	109500	CENTS/LB 14.0500	15384.75 14235.00
	TOTAL			15384.75 14235.0
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	638.1 586.53
	~~PLUS TRANSPORTATION CHARGE C.L. 80M — PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

71.15 DISC AMT ~~76.92~~ INVOICE AMT ~~16668.9~~ 14730.3

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44704

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08312	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	J 90393	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
ITEM 01	DESCRIPTION HP14X73 — FT 60 LENGTH IN 0			
	HEAT-NO J32100 — PIECES 8 — FT. 60 — INCHES 0 — POUNDS 35040			
	HEAT-NO 1R6860 — PIECES 6 — FT. 60 — INCHES 0 — POUNDS 26280			
	HEAT-NO 1R6861 — PIECES 11 — FT. 60 — INCHES 0 — POUNDS 48180			
	25 — POUNDS 109500	109500	CENTS/LB 14.0500	15384.75 / 14235.00
	TOTAL			15384.75 / 14235.00
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	638.16 / 566.55
	~~PLUS TRANSPORTATION CHARGE — CL — BOM — PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500

71.15

DISC AMT ~~76.82~~ INVOICE AMT ~~16668.96~~ 14730.3

BASE DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO
10/26/76	1026

USS CONTROL NO	USS ORDER NO	PAGE
31605-3161	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44705

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO	DATE SHIPPED	FROM	ROUTE/CARRIER
B0B315	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	EJE 90807	PP

Item No	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
ITEM 01	DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO K24369 — PIECES 3 — FT. 60 — INCHES 0 — POUNDS 13140			
	HEAT-NO J32100 — PIECES 15 — FT. 60 — INCHES 0 — POUNDS 65700			
	HEAT-NO 1R6861 — PIECES 12 — FT. 60 — INCHES 0 — POUNDS 52560			
	30 — 131400	131400	CENTS/LB 14.0500	18461.70
				17082.00
	TOTAL			18461.70
				17082.00
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	765.79
				679.86
	~~PLUS TRANSPORTATION CHARGE~~ ~~CL 80M~~ — ~~PER 100LB~~	~~131400~~	~~.5900~~	~~775.26~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 30
POUNDS 131400
B/L 131400

85.41

DISC AMT ~~92.31~~ INVOICE AMT ~~20082.71~~ 17676.3

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31605-3161	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44706

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO	DATE SHIPPED	FROM	ROUTE/CARRIER
B08326	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	J 90172	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO H28866 — PIECES 9 — FT. 60 — INCHES 0 — POUNDS 39420			
	1R6861 — 2 — 60 — 0 — 8760			
	K24437 — 14 — 60 — 0 — 61320			
	25	109500	109500 CENTS/LB 14.0500	15384.75 14235.00
	TOTAL			15384.75 14235.00
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	638.16 586.55
	~~PLUS TRANSPORTATION CHARGE CL 80M — PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: a. a. Baumann UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

DISC AMT 71.15 ~~76.92~~ INVOICE AMT 14230.37 ~~16668.96~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31605-3161	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44707

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487 "
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08331	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	PRR 441769	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 HP14X73 — DESCRIPTION — FT LENGTH 60 IN 0			
	HEAT-NO 1R6860 — PIECES 5 — FT. 60 — INCHES 0 — POUNDS 21900			
	HEAT-NO K24437 — PIECES 10 — FT. 60 — INCHES 0 — POUNDS 43800			
	HEAT-NO 1R6863 — PIECES 10 — FT. 60 — INCHES 0 — POUNDS 43800			
	25 — POUNDS 109500	109500	CENTS/LB 14.0500	15384.75 14935.00
	TOTAL			15384.75 14935.00
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	638.16 566.53
	~~PLUS TRANSPORTATION CHARGE CL 80M — PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25
POUNDS 109500
B/L 109500

DISC AMT ~~76.92~~ 74.78 INVOICE AMT ~~16668.91~~ 14790.53

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31605-3161	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44708

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

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T 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08373	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	EJE 90707	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT 60 — LENGTH IN 0			
	HEAT-NO 2R7097 — PIECES 27 — FT. 60 — INCHES 0 — POUNDS 118260			
	HEAT-NO 1R6864 — PIECES 3 — FT. 60 — INCHES 0 — POUNDS 13140			
	30 — POUNDS 131400	131400	CENTS/LB 14.0500	18461.70 17082.00
	TOTAL			18461.70 17082.00
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	765.79 679.86
	~~PLUS TRANSPORTATION CHARGE CL 80M~~ — PER 100LB	131400	.5900	~~775.26~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 30 POUNDS 131400
B/L 131400

85.41

DISC AMT ~~92.31~~ INVOICE AMT ~~20002.75~~ 17676.14

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31605-3161	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44709

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

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S 2- 0- 0
I 2- 0- 0

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO	DATE SHIPPED	FROM	ROUTE/CARRIER
B08347	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	ATSF 168657	PP

Item No	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
ITEM 01	DESCRIPTION HP14X73 — FT 60 LENGTH IN 0			
	HEAT-NO 2R7097 — PIECES 12 — FT. 60 — INCHES 0 — POUNDS 52560			
	J32114 — 1 — 60 — 0 — 4380			
	1R6864 — 12 — 60 — 0 — 52560			
	25	109500	CENTS/LB 14.0500	15384.75 14235.00
	TOTAL			15384.75 14235.00
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	638.16 566.53
	~~PLUS TRANSPORTATION CHARGE CL 80M — PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25 — POUNDS 109500
B/L 109500

DISC AMT ~~20.02~~ 71.15 — INVOICE AMT ~~16668.96~~ 14730.31

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44730

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

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I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO	DATE SHIPPED	FROM	ROUTE/CARRIER
B08345	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	ATSF 168576	PP

Item No	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
01	ITEM 01 HP14X73 — DESCRIPTION — FT LENGTH IN 60 0			
	HEAT-NO 1R6864 — PIECES 4 — FT. 60 — INCHES 0 — POUNDS 17520			
	HEAT-NO J32113 — PIECES 7 — FT. 60 — INCHES 0 — POUNDS 30660			
	HEAT-NO 2R7097 — PIECES 1 — FT. 60 — INCHES 0 — POUNDS 4380			
	HEAT-NO J32114 — PIECES 13 — FT. 60 — INCHES 0 — POUNDS 56940			
	25 — 109500	109500	CENTS/LB 14.0500	15384.75 14235.00
	TOTAL			15384.75 14235.88
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	638.16 566.53
	~~PLUS TRANSPORTATION CHARGE CL 80M — PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25
POUNDS 109500
B/L 109500

71.18
DISC AMT ~~76.92~~ INVOICE AMT ~~16668.96~~ 14730.37

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31605-3161	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44731

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08346	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	J 90103	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO / PIECES / FT. / INCHES / POUNDS			
	J32114 10 60 0 43800			
	J32113 12 60 0 52560			
	1R6861 2 60 0 8760			
	1R6860 1 60 0 4380			
	25	109500	CENTS/LB 14.0500	15384.75
	TOTAL			15384.75
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	638.16
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~109500~~	~~.5900~~ ~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25
POUNDS 109500
B/L 109500

71.18
DISC AMT ~~76.97~~ INVOICE AMT ~~16668.96~~ 14730.3

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

TS 0-0-1 TO
2-0-0
2-0-0

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44790

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08335	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	J 90422	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT 60 LENGTH IN 0			
	HEAT--NO K24437 — PIECES 13 — FT. 60 — INCHES 0 — POUNDS 56940			
	HEAT--NO H28867 — PIECES 12 — FT. 60 — INCHES 0 — POUNDS 52560			
	25 — POUNDS 109500	109500	CENTS/LB 14.0500	15384.75 14235.80
	TOTAL			15384.75 14235.80
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	638.16 586.55
	~~PLUS TRANSPORTATION CHARGE CL 80M — PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
109500

DISC AMT 71.15 INVOICE AMT ~~15030.80~~ 14735.30

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44791

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
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R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08337	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	ATSF 168540	PPD

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 HP14X73 — DESCRIPTION; FT 60 LENGTH IN 0			
	HEAT-NO H28867 — PIECES 17 — FT. 60 — INCHES 0 — POUNDS 74460			
	1R6863 — PIECES 3 — FT. 60 — INCHES 0 — POUNDS 13140			
	J33114 — PIECES 5 — FT. 60 — INCHES 0 — POUNDS 21900			
	25 — POUNDS 109500	109500	CENTS/LB 14.0500	15384.75 14235.00
	TOTAL			15384.75 14235.00
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	638.16 566.55
	~~PLUS TRANSPORTATION CHARGE~~ CL 80M — ~~PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Barman
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

DISC AMT 71.18 ~~26.97~~ INVOICE AMT 14730.31 ~~16666.96~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

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10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44792

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

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S 2- 0- 0
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R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08338	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	J 90165	PPD

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT 60 LENGTH IN 0			
	HEAT-NO H28867 — PIECES 8 — FT. 60 — INCHES 0 — POUNDS 35040			
	HEAT-NO 1R6863 — PIECES 2 — FT. 60 — INCHES 0 — POUNDS 8760			
	HEAT-NO J32114 — PIECES 15 — FT. 60 — INCHES 0 — POUNDS 65700			
	25	109500	CENTS/LB 14.0500	15384.75 14235.00
	TOTAL			15384.75 14235.00
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	638.16 566.55
	~~PLUS TRANSPORTATION CHARGE - CL 80M~~	~~PER 100LB~~	~~109500~~ ~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25
POUNDS 109500
B/L 109500

DISC AMT 71.18 ~~76.92~~ INVOICE AMT 14730.37 ~~16668.96~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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PAYABLE IN U.S. DOLLARS

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10/26/76	1026

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31615-3162	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44793

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

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I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08339	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	J 90364	PPD

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM DESCRIPTION FT LENGTH IN 60 0			
01	HP14X73			
	HEAT-NO PIECES FT. INCHES POUNDS			
	H28867 5 60 0 21900			
	H28866 6 60 0 26280			
	1R6863 13 60 0 56940			
	1R6861 1 60 0 4380			
	25 109500	109500	CENTS/LB 14.0500	15384.75 14235.00
	TOTAL			15384.75 14235.00
	PLUS SALES/USE TAX STATE PERCENT		4.0000	638.16 566.55
	~~PLUS TRANSPORTATION CHARGE CL 80M PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 25
POUNDS 109500
B/L 109500

71.18
DISC AMT ~~70.01~~ INVOICE AMT 14730.37 ~~14668.91~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

REMIT 004933487
T 0- 0- 1 PO BOX 3052
S 2- 0- 0 ST. PAUL, MINN 55166
I 2- 0- 0 TO

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44794

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER OR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08340	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	J 90693	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM DESCRIPTION FT LENGTH IN 01 HP14X73 60 0 HEAT-NO PIECES FT. INCHES POUNDS 1R6863 17 60 0 74460 1R6860 2 60 0 8760 H28867 11 60 0 48180			
	30 131400	131400	CENTS/LB 14.0500	18461.70 17082.00
	TOTAL			18461.70 17082.00
	PLUS SALES/USE TAX STATE PERCENT		4.0000	765.79 679.86
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~ ~~131400~~	~~.5900~~	~~775.26~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 30 POUNDS 131400
B/L 131400

85.41
DISC AMT ~~92.51~~ INVOICE AMT ~~17676.45~~ 17676.45 ~~20602.75~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44796

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT 004933487
T 0- 0- 1 PO BOX 3052
S 2- 0- 0 ST. PAUL, MINN 55166
I 2- 0- 0 TO

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08341	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	ATSF 168554	PPD

Item No	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO: 1R6860 — PIECES 3 — FT. 60 — INCHES 0 — POUNDS 13140			
	K24437 — 1 — 60 — 0 — 4380			
	H28866 — 10 — 60 — 0 — 43800			
	H28867 — 5 — 60 — 0 — 21900			
	1R6863 — 6 — 60 — 0 — 26280			
	25 — 109500	109500	CENTS/LB 14.0500	15384.75 14935.00
	TOTAL			15384.75 14935.00
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	638.16 566.55
	PLUS TRANSPORTATION CHARGE CL 80M	PER 100LB	109500 .5900	646.05

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

71.18 DISC AMT ~~76.93~~ INVOICE AMT ~~16668.98~~ 14730.37

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44797

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08342	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	MP 650053	PPD

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT 60 LENGTH IN 0			
	HEAT-NO 1R6860 — PIECES 5 — FT. 60 — INCHES 0 — POUNDS 21900			
	HEAT-NO J32114 — PIECES 7 — FT. 60 — INCHES 0 — POUNDS 30660			
	HEAT-NO H28867 — PIECES 13 — FT. 60 — INCHES 0 — POUNDS 56940			
	25 — 109500	109500	CENTS/LB 14.0500	15384.75 14235.00
	TOTAL			15384.75 14235.00
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	638.16 566.55
	~~PLUS TRANSPORTATION CHARGE CL 80M — PER 100LB~~	~~109500~~	~~.5900~~	646.05

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

DISC AMT 71.18 ~~70.92~~ INVOICE AMT 14730.37 ~~14668.00~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44798

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08359	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	LN 25273	PP[

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
ITEM 01	DESCRIPTION HP14X73 — FT 60 LENGTH IN 0			
	HEAT-NO 2R7098 — PIECES 1 — FT. 60 — INCHES 0 — POUNDS 4380			
	HEAT-NO K24444 — PIECES 24 — FT. 60 — INCHES 0 — POUNDS 105120			
	PIECES 25 — POUNDS 109500	109500	CENTS/LB 14.0500	15384.75 ~~14935.00~~
	TOTAL			15384.75 ~~14935.00~~
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	638.16 ~~566.53~~
PL	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~109500~~	~~.5900~~ ~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25 — POUNDS 109500
B/L 109500

DISC AMT ~~76.92~~ 71.18 — INVOICE AMT ~~15060.96~~ 14730.3[illegible]

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

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30-1/2-10	11-11-76	187-44799

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08360	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	CEI 655327	PPD

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
01	ITEM DESCRIPTION HP14X73 — FT 60 LENGTH IN 0			
	HEAT-NO: 1R6864 — PIECES 1 — FT. 60 — INCHES 0 — POUNDS 4380			
	J32114 — 5 — 60 — 0 — 21900			
	2R7097 — 7 — 60 — 0 — 30660			
	K24443 — 12 — 60 — 0 — 52560			
	25	109500	109500	CENTS/LB 14.0500 — 15384.75 / 14235.00
	TOTAL			15384.75 / 14235.00
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	638.16 / 566.55
	~~PLUS TRANSPORTATION CHARGE CL BOM~~	~~PER 100LB~~	~~109500~~	~~.5900~~ ~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25
POUNDS 109500
B/L 109500

DISC AMT 71.18 INVOICE AMT 14730.39 / ~~15068.96~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44800

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08361	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	J 90640	PP

Item No	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 HP14X73 — FT 60 LENGTH IN 0			
	HEAT-NO K24445 — PIECES 5 — FT. 60 — INCHES 0 — POUNDS 21900			
	2R7097 — 8 — 60 — 0 — 35040			
	1R6864 — 2 — 60 — 0 — 8760			
	1R6865 — 8 — 60 — 0 — 35040			
	1R6860 — 1 — 60 — 0 — 4380			
	J32113 — 1 — 60 — 0 — 4380			
	25 — 109500	109500	CENTS/LB 14.0500	15384.75 14235.00
	TOTAL			15384.75 14235.00
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	638.16 566.55
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~109500~~	~~.5900~~ ~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

71.18 14730.37

DISC AMT ~~7[illegible]92~~ INVOICE AMT ~~[illegible]~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION
COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44801

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT 004933487
T 0- 0- 1 PO BOX 3052
S 2- 0- 0 ST. PAUL, MINN 55166
I 2- 0- 0 TO

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08362	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	J 90749	PPD

Item No	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO / PIECES / FT. / INCHES / POUNDS			
	2R7098 8 60 0 35040			
	K24443 6 60 0 26280			
	K24445 3 60 0 13140			
	IR6865 12 60 0 52560			
	29	127020	CENTS/LB 14.0500	17846.31
				165 12.60
	TOTAL			17846.31
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	165 12.60
				740.26
				657.20
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~127020~~	~~.5900~~ ~~749.42~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 29
B/L 127020
POUNDS 127020

DISC AMT ~~82.54~~ INVOICE AMT ~~18336.94~~ 17087.24

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44802

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO
004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
1 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08363	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	J 90611	PPD

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH 60 IN 0			
	HEAT-NO: J32113 — PIECES 8 — FT. 60 — INCHES 0 — POUNDS 35040			
	HEAT-NO: K24443 — PIECES 10 — FT. 60 — INCHES 0 — POUNDS 43800			
	HEAT-NO: K24444 — PIECES 8 — FT. 60 — INCHES 0 — POUNDS 35040			
	HEAT-NO: 1R6864 — PIECES 5 — FT. 60 — INCHES 0 — POUNDS 21900			
	31 — 135780	135780	CENTS/LB 14.0500	19077.09 17651.40
	TOTAL			19077.09 17651.40
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	791.31 703.53
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~135780~~	~~.5900~~ ~~801.10~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 31 POUNDS 135780
B/L 135780

SP.24

DISC AMT ~~381.74~~ INVOICE AMT ~~20669.54~~ 18765.67

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44803

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08364	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	J 90809	PPD

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO / PIECES / FT. / INCHES / POUNDS			
	1R6865 / 5 / 60 / 0 / 21900			
	K24444 / 3 / 60 / 0 / 13140			
	K24449 / 15 / 60 / 0 / 65700			
	K24445 / 9 / 60 / 0 / 39420			
	32 / 140160	140160	CENTS/LB 14.0500	19692.48 18220.80
	TOTAL			19692.48 18220.80
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	816.84 725.19
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~.5900~~	~~826.94~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 32 POUNDS 140160
B/L 140160

DISC AMT 91.10 INVOICE AMT 18554.87 ~~18336.26~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

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10/26/76	1026

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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44804

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08366	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	EJE 90440	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
ITEM 01	DESCRIPTION HP14X73 — FT LENGTH 60 IN 0			
	HEAT-NO 2R7098 — PIECES 8 — FT. 60 — INCHES 0 — POUNDS 35040			
	HEAT-NO K24445 — PIECES 6 — FT. 60 — INCHES 0 — POUNDS 26280			
	HEAT-NO 1R6865 — PIECES 8 — FT. 60 — INCHES 0 — POUNDS 35040			
	HEAT-NO J32114 — PIECES 3 — FT. 60 — INCHES 0 — POUNDS 13140			
	25 — POUNDS 109500	109500	CENTS/LB 14.0500	15384.75 / 14235.00
	TOTAL			15384.75 / 14235.00
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	638.16 / 566.55
	~~PLUS TRANSPORTATION CHARGE — CL — 80M — PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

DISC AMT 71.18 ~~76.92~~ INVOICE AMT 14730.37 ~~14808.96~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44805

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08369	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008 0M	MILL	EJE 90187	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO: K24445 — PIECES 3 — FT. 60 — INCHES 0 — POUNDS 13140			
	HEAT-NO: K24449 — PIECES 16 — FT. 60 — INCHES 0 — POUNDS 70080			
	HEAT-NO: K24450 — PIECES 5 — FT. 60 — INCHES 0 — POUNDS 21900			
	24 — POUNDS 105120	105120	CENTS/LB 14.0500	14769.36
	TOTAL			14769.36
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	612.63
	~~PLUS TRANSPORTATION CHARGE CL 00M — PER 100LB~~	~~105120~~	~~.5900~~	~~620.21~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 24 — POUNDS 105120
B/L 105120

DISC AMT ~~73.05~~ 68.33 — INVOICE AMT ~~16002.21~~ 14141.16

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44806

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08370	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	EJE 90445	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT 60 LENGTH IN 0			
	HEAT-NO K24445 — PIECES 1 — FT. 60 — INCHES 0 — POUNDS 4380			
	HEAT-NO 1R6865 — PIECES 13 — FT. 60 — INCHES 0 — POUNDS 56940			
	HEAT-NO 1R6864 — PIECES 2 — FT. 60 — INCHES 0 — POUNDS 8760			
	HEAT-NO K24444 — PIECES 9 — FT. 60 — INCHES 0 — POUNDS 39420			
	25 — 109500	109500	CENTS/LB 14.0500	15384.75 14235.00
	TOTAL			15384.75 14235.00
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	638.16 566.55
	~~PLUS TRANSPORTATION CHARGE CL BOM~~	~~PER 100LB~~	~~109500~~	~~.5900~~ ~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

DISC AMT ~~2000~~ 711.15 INVOICE AMT ~~14668.95~~ 14730.55

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44807

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

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R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08384 MP	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	ATSF 169060	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 FT LENGTH 60 IN 0			
	HEAT-NO K24449 PIECES 10 FT. 60 INCHES 0 POUNDS 43800			
	2R7098 7 60 0 30660			
	K24445 2 60 0 8760			
	J32113 2 60 0 8760			
	1R6865 3 60 0 13140			
	2R7097 1 60 0 4380			
	K24444 1 60 0 4380			
	K24450 4 60 0 17520			
	30	131400	CENTS/LB 14.0500	18461.70 17682.00
	TOTAL			18461.70 17682.00
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	765.79 679.86
	~~PLUS TRANSPORTATION CHARGE~~ CL BOM	~~PER 100LB~~	~~131400~~	~~.5900~~ ~~775.26~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 30 POUNDS 131400
B/L 131400

85.41

DISC AMT ~~92.21~~ INVOICE AMT ~~20007.75~~ 17676.45

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO	PAGE
31615-3162	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44808

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

T 0- 0- 1 REMIT 004933487
S 2- 0- 0 PO BOX 3052
I 2- 0- 0 TO ST. PAUL, MINN 55166

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO	DATE SHIPPED	FROM	ROUTE/CARRIER
B08385	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	J 90293	PP

Item No	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH 60 IN 0			
	HEAT-NO K24450 — PIECES 6 — FT. 60 — INCHES 0 — POUNDS 26280			
	HEAT-NO 2R7098 — PIECES 7 — FT. 60 — INCHES 0 — POUNDS 30660			
	HEAT-NO K24449 — PIECES 4 — FT. 60 — INCHES 0 — POUNDS 17520			
	HEAT-NO K24444 — PIECES 8 — FT. 60 — INCHES 0 — POUNDS 35040			
	25 — 109500	109500	CENTS/LB 14.0500	15384.75 M235.00
	TOTAL			15384.75 14235.01
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	638.16 566.55
	~~PLUS TRANSPORTATION CHARGE CL 80M — PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

71.18

DISC AMT ~~76.92~~ INVOICE AMT ~~16668.96~~ 14730.31

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WISCONSIN DEPARTMENT OF TRANSPORTATION

UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44809

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT 004933487
PO BOX 3052
ST. PAUL, MINN 55166

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SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08389	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	ATSF 168415	PPD

Item No	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO / PIECES / FT. / INCHES / POUNDS			
	K24444 2 60 0 8760			
	2R7098 5 60 0 21900			
	K24443 12 60 0 52560			
	1R6864 2 60 0 8760			
	J32113 4 60 0 17520			
	25 109500	109500	CENTS/LB 14.0500	15384.75 14735.00
	TOTAL			15384.75 14735.00
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	638.16 566.55
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~10950C~~ ~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

71.18
DISC AMT ~~70.42~~ INVOICE AMT 14730.37 ~~14668.96~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44810

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487 "
PO BOX 3052
ST. PAUL, MINN 55166

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SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08391	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOR	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	EJE 90411	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO / PIECES / FT. / INCHES / POUNDS			
	2R7097 2 60 0 8760			
	2R7098 7 60 0 30660			
	K24443 1 60 0 4380			
	K24445 15 60 0 65700			
	25 109500	109500	CENTS/LB 14.0500	15384.75
	TOTAL			15384.75
	PLUS SALES/USE TAX STATE PERCENT		4.0000	638.16
	~~PLUS TRANSPORTATION CHARGE CL 80M PER 100LB~~	~~109500~~	~~.5900~~	~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 25
POUNDS 109500
B/L 109500

71.18

DISC AMT ~~76.92~~ INVOICE AMT ~~15068.86~~ 14730.3

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
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TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44811

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

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SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08392	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008 0M	MILL	EJE 90705	PPD

H-PILES CARBON ASTM A36-75

Item No	Description	Quantity	Unit Price	Amount
01	HP14X73 60 FT 0 IN			
	HEAT-NO K24450 — 2 PCS — 60 FT 0 IN — 8760 LBS			
	HEAT-NO K24444 — 2 PCS — 60 FT 0 IN — 8760 LBS			
	HEAT-NO K24445 — 1 PCS — 60 FT 0 IN — 4380 LBS			
	HEAT-NO 2R7098 — 8 PCS — 60 FT 0 IN — 35040 LBS			
	HEAT-NO K24449 — 17 PCS — 60 FT 0 IN — 74460 LBS			
	30 PCS — 131400 LBS	131400	CENTS/LB 14.0500	18461.70 17082.00
	TOTAL			18461.70 17082.00
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	765.79 679.86
	~~PLUS TRANSPORTATION CHARGE CL 80M — PER 100LB~~	~~131400~~	~~.5900~~	~~775.26~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 30
POUNDS 131400
B/L 131400

DISC AMT ~~97.31~~ 85.41 INVOICE AMT ~~20002.75~~ 19678.45

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44812

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

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SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B0E397	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOR	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	EJE 90823	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO / PIECES / FT. / INCHES / POUNDS			
	1R6864 3 60 0 13140			
	2R7098 9 60 0 39420			
	J32114 1 60 0 4380			
	2R7097 1 60 0 4380			
	K24449 6 60 0 26280			
	K24450 8 60 0 35040			
	1R6863 1 60 0 4380			
	K24444 1 60 0 4380			
	30	131400	CENTS/LB 14.0500	18461.70
				17082.00
	TOTAL			18461.70
				17082.00
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	765.79
				679.86
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~131400~~ ~~.5500~~	~~775.26~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 30
POUNDS 131400
B/L 131400

85.41

DISC AMT ~~77.31~~ INVOICE AMT ~~20002.71~~ 17676.45

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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AS PM

UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLAR

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44813

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

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SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08399	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	J 90208	PPD

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO / PIECES / FT. / INCHES / POUNDS			
	1R6863 2 60 0 8760			
	2R7097 5 60 0 21900			
	J32113 1 60 0 4380			
	2R7098 6 60 0 26280			
	K24445 1 60 0 4380			
	K24449 2 60 0 8760			
	1R6864 8 60 0 35040			
	25 109500	109500	CENTS/LB 14.0500	15384.75 14235,00
	TOTAL			15384.75 14235,00
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	638.15 566.55
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~109500~~	~~.5900~~ ~~646.05~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 1 109500

DISC AMT 71.18 INVOICE AMT 14230.37 ~~14302.80~~

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44814

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

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S 2- 0- 0
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R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
808400	11/10/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOR	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	J 90150	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 60 FT LENGTH IN 0			
	HEAT-NO / PIECES / FT. / INCHES / POUNDS			
	K24450 3 60 0 13140			
	1R6865 3 60 0 13140			
	K24449 1 60 0 4380			
	2R7098 5 60 0 21900			
	2R7097 1 60 0 4380			
	K24445 7 60 0 30660			
	20	87600	87600 CENTS/LB 14.0500	12307.80 11388.00
	TOTAL			12307.80 11388.00
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	510.52 453.24
	~~PLUS TRANSPORTATION CHARGE CL 80M~~	~~PER 100LB~~	~~87600~~ ~~.5900~~	~~516.84~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 20
POUNDS 87600
97600
B/L

DISC. AMT 54.94 ~~61.54~~ INVOICE AMT 11784.3 ~~13335.14~~

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UNITED STATES STEEL CORPORATION

COUNTRY OF ORIGIN U.S.A. — PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31615-3162	MC60105	1

REMIT 004933487
T 0- 0- 1 PO BOX 3052
S 2- 0- 0 ST. PAUL, MINN 55166
I 2- 0- 0 TO

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-11-76	187-44849

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08411	11/11/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	LN 25192	PP

H-PILES CARBON ASTM A36-75

ITEM	DESCRIPTION	FT LENGTH IN					
C1	HP14X73		60	0			
	HEAT-NO	PIECES	FT.	INCHES	POUNDS		
	J32100	1	60	0	4380		
	K24445	3	60	0	13140		
	K24449	3	60	0	13140		
	1R6860	1	60	0	4380		
	1R6864	3	60	0	13140		
	1R6863	3	60	0	13140		
	K24437	1	60	0	4380		
	K24450	1	60	0	4380		
	J32114	2	60	0	8760		
	1R6865	4	60	0	17520		
	2R7098	1	60	0	4380		
		23			100740	100740	CENTS/LB 14.0500
					TOTAL		
	PLUS SALES/USE TAX STATE				PERCENT		4.0000
	~~PLUS TRANSPORTATION CHARGE CL 80M~~				~~PER 100LB~~	~~100740~~	~~.5900~~

Amount
14153.97
13096.20
14153.97
13096.20
587.10
521.23
~~594.37~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 23
POUNDS 100740
B/L 100740

65.48

DISC AMT ~~71.77~~ INVOICE AMT ~~14535.44~~ 13551.95

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UNITED STATES STEEL CORPORATION

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6181921033

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10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
31716-3172	MC60105	

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-12-76	187-45010

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REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
LUNDA CONSTRUCTION CO
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BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08412	11/12/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	008OM	MILL	J 90359	PP

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO: 1R6864 — PIECES 7 — FT. 60 — INCHES 0 — POUNDS 30660			
	1R6865 — 2 — 60 — 0 — 8760			
	K24444 — 3 — 60 — 0 — 13140			
	K24443 — 5 — 60 — 0 — 21900			
	J32113 — 1 — 60 — 0 — 4380			
	K24445 — 1 — 60 — 0 — 4380			
	19	83220	CENTS/LB 14.0500	11692.41 10818.60
	TOTAL			11692.41 10818.60
	PLUS SALES/USE TAX STATE	PERCENT	4.0000	485.00 430.58
	~~PLUS TRANSPORTATION CHARGE CL BOM~~	~~PER 100LB~~	~~83220~~ ~~.5900~~	~~491.00~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Bauman
UNITED STATES STEEL CORPORATION

PIECES 19 POUNDS 83220
B/L 83220

DISC AMT 54.09 INVOICE AMT 11185.09 12668.41

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PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
32005-3191	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-15-76	187-45327

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PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

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LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08497	11/13/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0008M	MILL	J 90453	PPD

H-PILES CARBON ASTM A36-75

ITEM	DESCRIPTION	PIECES	FT. LENGTH	IN	POUNDS
01	HP14X73		60	0	
	HEAT-NO				
	K24449	1	60	0	4380
	J31689	1	60	0	4380
	K24444	1	60	0	4380
	K24444	6	60	0	26280
	1R6865	6	60	0	26280
	2R7098	1	60	0	4380
	K24449	1	60	0	4380
	2R6640	1	60	0	4380
	K24449	1	60	0	4380
		19			83220

Item No.	Description	Quantity	Unit Price	Amount
		83220	CENTS/LB 14.0500	11692.41 10818.60
	TOTAL			11692.41 10818.60
	PLUS SALES/USE TAX STATE		PERCENT 4.0000	485.00 450.58
	~~PLUS TRANSPORTATION CHARGE CL 8M~~	~~83220~~	~~PER 100LB .5900~~	~~491.00~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Damman
UNITED STATES STEEL CORPORATION

PIECES 19
POUNDS 83220
B/L 83220

DISC AMT ~~58.46~~ 54.09 INVOICE AMT ~~12668.41~~ 11195.09

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RJM

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6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
33522-3353	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-30-76	187-47554

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004933487
PO BOX 3052
ST. PAUL, MINN 55166

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

R 21

SOLD TO
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P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08929	11/30/76	SOUTH CHICAGO ILL.	EJE MMILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	0080M	MILL	J 90830	COL

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
	ITEM 01 HP14X73 — DESCRIPTION; FT LENGTH 60; IN 0			
	HEAT-NO J32352 — PIECES 19 — FT. 60 — INCHES 0 — POUNDS 83220			
	HEAT-NO J32340 — PIECES 9 — FT. 60 — INCHES 0 — POUNDS 39420			
	HEAT-NO J32345 — PIECES 5 — FT. 60 — INCHES 0 — POUNDS 21900			
	33 — 144540	144540	CENTS/LB 14.0500	20307.87
				18790.20
	TOTAL			20307.87
				18790.20
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	808.25
				747.85

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 33 — POUNDS 144540
B/L 144540

93.95

DISC AMT ~~101.54~~ — INVOICE AMT ~~21116.12~~ 19444.10

6 DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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R 3 84

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COUNTRY OF ORIGIN U.S.A.

PAYABLE IN U.S. DOLLARS

6181921033

PURCHASE ORDER DATE	PURCHASE ORDER NO.
10/26/76	1026

USS CONTROL NO.	USS ORDER NO.	PAGE
33522-3353	MC60105	1

TERMS	INVOICE DATE	INVOICE NO.
30-1/2-10	11-30-76	187-47555

PLEASE REFER TO THE ABOVE INVOICE NO. IN YOUR REMITTANCE

T 0- 0- 1
S 2- 0- 0
I 2- 0- 0

REMIT TO 004933487
PO BOX 3052
ST. PAUL, MINN 55166

R 21

SOLD TO
LUNDA CONSTRUCTION CO
P O BOX 26
BLACK RIVER FALLS WISC 54615

SHIP TO
LUNDA CONSTRUCTION CO
PHONE NO 715-284-2811
%TERMINAL SPUR FOR CMSTP&P
NEW TOWER DR BRIDGE SITE
GREEN BAY WISC

SHIPPERS NO.	DATE SHIPPED	FROM	ROUTE/CARRIER
B08930	11/30/76	SOUTH CHICAGO ILL.	EJE MILW

SHIP MODE	MINIMUM WEIGHT	FOB	VEHICLE IDENT	PREPAID COLLECT
CL	00800M	MILL	J 90455	COL

Item No.	Description	Quantity	Unit Price	Amount
	H-PILES CARBON ASTM A36-75			
ITEM 01	DESCRIPTION HP14X73 — FT LENGTH IN 60 0			
	HEAT-NO J32352 — PIECES 10 — FT. 60 — INCHES 0 — POUNDS 43800			
	HEAT-NO J32345 — PIECES 5 — FT. 60 — INCHES 0 — POUNDS 21900			
	HEAT-NO H29002 — PIECES 10 — FT. 60 — INCHES 0 — POUNDS 43800			
	25 — POUNDS 109500	109500	CENTS/LB 14.0500	15384.75 ~~14235.00~~
	TOTAL			15384.75 ~~14235.00~~
	PLUS SALES/USE TAX STATE — PERCENT		4.0000	612.31 ~~566.55~~

RECEIVED PAYMENT IN FULL ON 12/27/76 BY: A. A. Baumann
UNITED STATES STEEL CORPORATION

PIECES 25 POUNDS 109500
B/L 109500

21.18 DISC AMT ~~76.92~~ INVOICE AMT ~~15997.06~~ 14730.37

DAYS TO MATURITY OR DISCOUNT DATE RUN FROM DATE OF INVOICE

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Appendix F
Bridge Inspection Report

Leo Frigo Bridge
I-43 over the Fox River
Green Bay, WI

B-05-158



Inspection Report

October 4, 2013

Prepared by:

Mike Carpenter, P.E.
Michael Baker Jr., Inc.

Table of Contents

1. Introduction 1

2. Inspection Findings 1

3. Summary 2

Exhibit A - Overall Plan & Limits of Inspection 4

Exhibit B - Inspection Sketch 7

Exhibit C - Site Inspection Photos 9



1. Introduction

Michael Baker Jr., Inc. was retained to provide a superstructure inspection of the Leo Frigo I-43 Bridge over the Fox River in Green Bay, Brown County, WI, following the settlement of Pier 22 which was reported on the morning of September 25, 2013. Pier 22 lies within unit 7 of the bridge. This inspection encompassed unit 7, along with the adjacent units 6 & 8.

The inspection was limited to underneath the bridge. Access was gained by a man lift stationed below the bridge. Brown County assisted by constructing access paths under span 21 due to the soft ground limiting the access of the man lift in this area. The pier caps were accessible from catwalks placed with the original bridge construction. The inspection began on Sunday, September 29, 2013 and concluded on Tuesday, October 1, 2013.

Inspection Team:

- Mike Carpenter, P.E., Michael Baker, Jr., Inc. (all three days)
  WisDOT Bridge Inspection Team Leader, Inspector ID #9552
- Dale Weber, WisDOT Northeast Region Bridge Maintenance Supervisor (9/29/13)
  WisDOT Bridge Inspection Team Leader, Inspector ID #3007
- Jim McDowell, WisDOT Northeast Region Bridge Maintenance (9/30/13 & 10/1/13)
  WisDOT Bridge Inspection Team Leader, Inspector ID #3008

The purpose of the inspection was to perform a damage inspection to assess the effects that the superstructure experienced due to the settlement of the pier. WisDOT personnel who assisted with the inspection will file a separate damage inspection with the WisDOT online Highway Structures Information System (HSIS).

2. Inspection Findings

Except as noted below, there were no apparent signs of unusual distress due to the pier settlement, such as bearing rotation, plastic member deformation (i.e. bent to a degree where a member could not be bent back) or paint cracking. There is new paint on the bearings and girders adjacent to the piers from work which was performed on the structure earlier this year. This new paint made it very easy to verify the lack of any unusual distress throughout the limits of the inspection. All superstructure elements were inspected; including girders, horizontal and vertical bracing, horizontal and vertical stiffeners, flange-to-web welds of the girders, and pin & hanger assemblies.

There were remarkably few observed adverse effects from the pier settlement. The defects noted are as follows. Photo references listed are found under Exhibit C – Site Inspection Photos.

a) Pier 22:
   i) One horizontal angle of a vertical cross-brace was slightly buckled approximately 3/8-inch. See 10-01-2013 photos #69, (p. 54), #82 & #83 (p. 60).

ii) Very minor spalling at the top flange / bottom of deck interface at girders 1 & 2. See 10-01-2013 photos #79 (p. 59) and #80 (p. 60).

b) Pin & Hangers in Span 21
   i) The vertical hanger plates were rotated approximately 3.5 degrees: however, they were observed to be still be flat (i.e. not warped or bent). See 10-01-2013 photos #24 # #25 (p. 39), #30 & #31 (p. 43), #35 (p. 44), and #38 (p. 46).
   ii) The bottom of the wind lock plates were not in contact with the top of the bottom flange of the adjacent girder. The average gap at the end of the wind lock bars was approximately 5/8-inch. See 10-01-2013 photos #23 (p. 38), #29 (p. 41), #32 & #33 (p. 43), #37 (p. 45), #39 (p. 46), #40 & #41 (p. 47) and #42 (p. 48).

c) Pin & Hangers in Span 23
   i) Vertical hanger plates were vertical and flat. See 10-01-2013 photos #08 (p. 32), #11 (p. 34), and #18 (p. 37).
   ii) Wind Lock plates were in contact with the top of the bottom flange of the adjacent girder at the end of the adjacent girder. At the end of the wind lock plate itself, there was a gap of approximately an average of 3/16". See 10-01-2013 photos #09 & #10 (p. 33), #15 (p. 35), and #16 & #17 (p. 36).

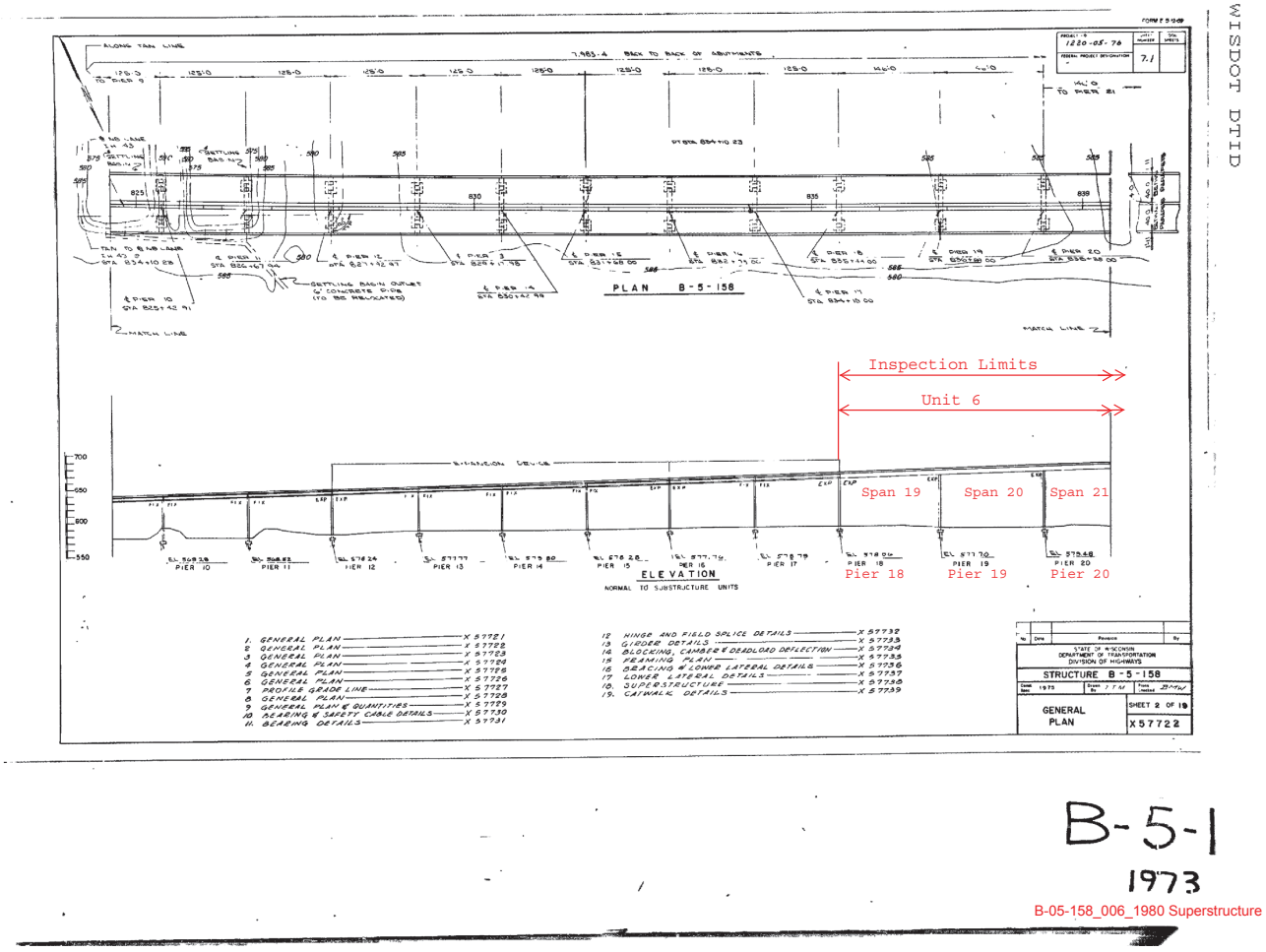
The pin & hangers at pier 25 looked as they normally should. In general there was no observed tipping/rotating of any girder bearings. This was especially easy to observe given the recent paint job. Any cracks, minor as they were, were very visible. Obviously the pier settlement resulted in bending of the girders, but we observed no specific deficiencies directly related to this (buckling, cracking of any steel or any welds, etc.).

3. Summary

In general the underside of the bridge was found to be in good condition despite the considerable sag in the superstructure due to the settled pier. There are no immediate concerns regarding the safety or serviceability of the superstructure.

EXHIBIT A

OVERALL PLAN AND LIMITS OF INSPECTION


WISDOT DTID
PLAN B-5-158
Inspection Limits
Unit 6
Span 19
Span 20
Span 21
ELEVATION
NORMAL TO SUBSTRUCTURE UNITS
Pier 18
Pier 19
Pier 20
STRUCTURE B-5-158
GENERAL PLAN
SHEET 2 OF 19
X57722
B-5-1
1973
B-05-158_006_1980 Superstructure

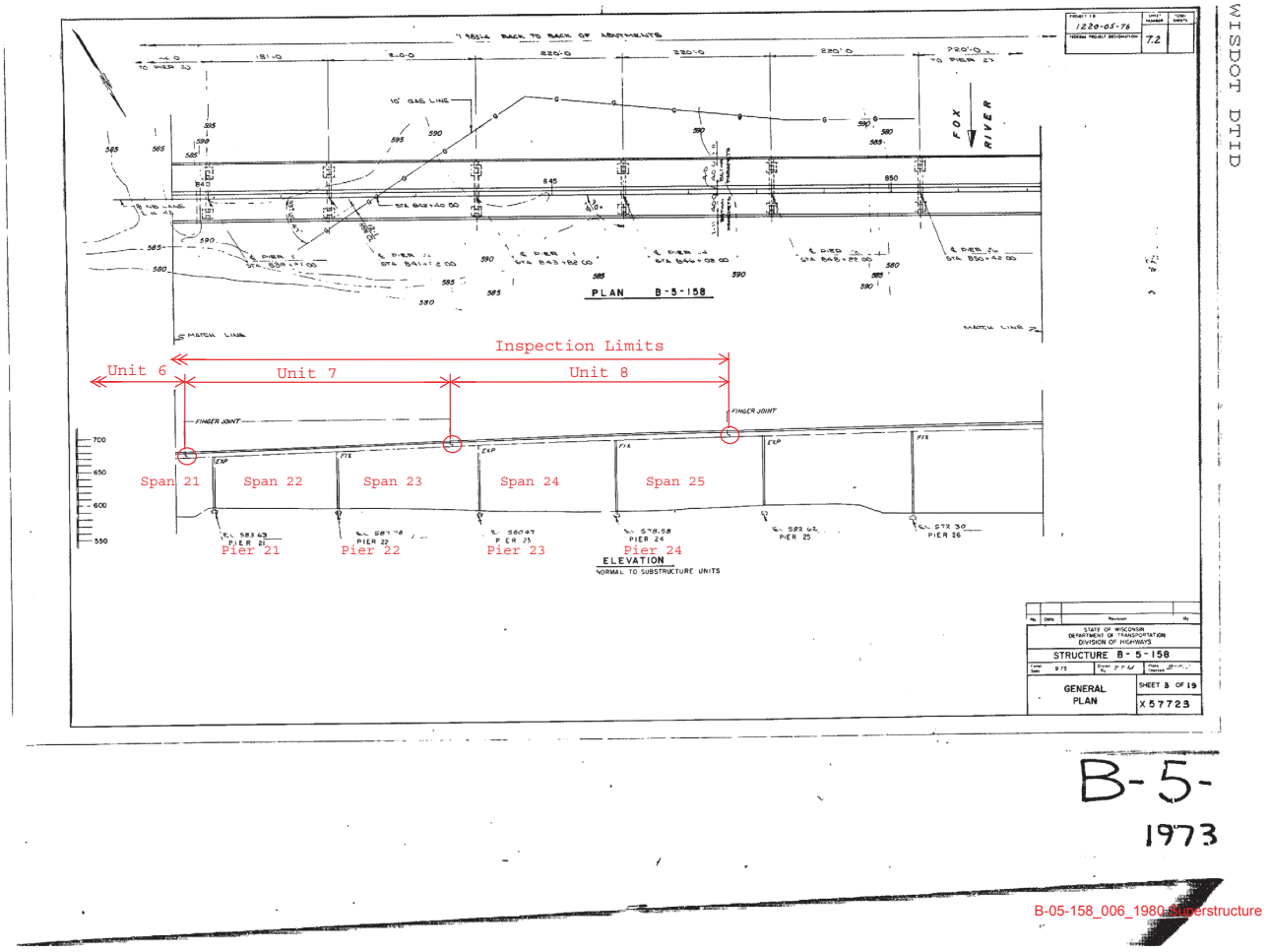

WISDOT DTID
PLAN B-5-158
Inspection Limits
Unit 6
Unit 7
Unit 8
Span 21
Span 22
Span 23
Span 24
Span 25
Pier 21
Pier 22
Pier 23
Pier 24
ELEVATION
NORMAL TO SUBSTRUCTURE UNITS
STRUCTURE B-5-158
GENERAL PLAN
B-5-
1973
B-05-158_006_1980_Superstructure

EXHIBIT B

INSPECTION SKETCH
SPAN 21 PIN & HANGER ASSEMBLY VERTICAL HANGER BAR ROTATION

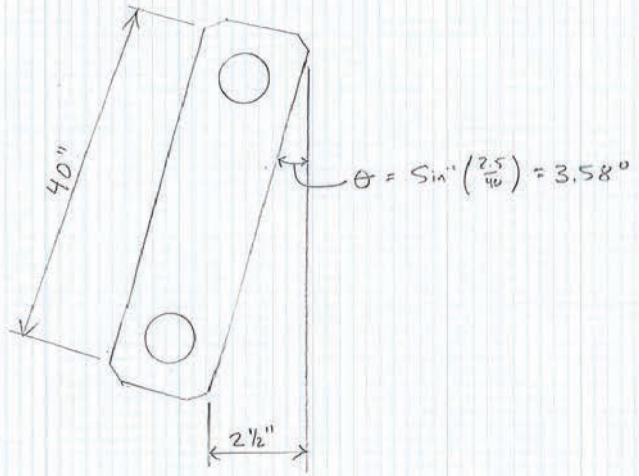
S.O. No. _____

Subject: Leo Frigo Bridge

Sheet No. _____ of _____

Drawing No. _____

Computed by MSL Checked By _____ Date 10/2/13



Typical Hangar Plate Rotation
At Joint Nearest Pier 21

EXHIBIT C

SITE INSPECTION PHOTOS



09-29-2013 Photo #01. Pier 18 Looking East



09-29-2013 Photo #02. Pier 18 Looking East



09-29-2013 Photo #03. Span 19 Looking East 1 of 2



09-29-2013 Photo #04. Span 19 Looking East 2 of 2



09-29-2013 Photo #06. Pier 18 Exterior Bearing - Girder #1



09-29-2013 Photo #07. Pier 18 Interior Bearing - Girder #2



09-29-2013 Photo #08. Span 19 Looking West Between Structures



09-29-2013 Photo #09. Span 19 Looking West at North Exterior Girder



09-29-2013 Photo #10. Span 19 Upper Cross Bracing



09-29-2013 Photo #11. Span 19 Lower Cross Bracing



09-29-2013 Photo #12. Pier 19 Exterior Girder Bearing - Girder #1



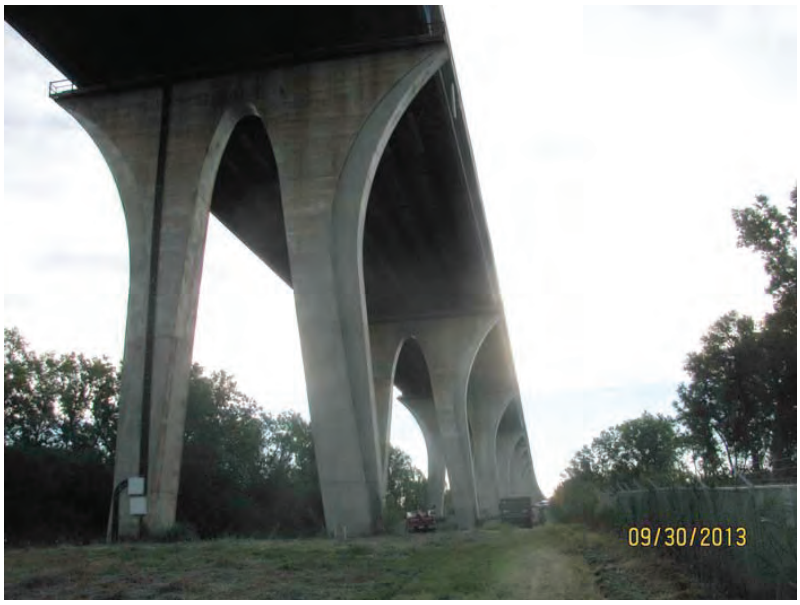
09-29-2013 Photo #13. Pier 19 Interior Girder Bearing - Girder #2



09-29-2013 Photo #14. Span 20 Looking West Between Girders 1 & 2



09-30-2013 Photo #01. Main Arch Span Looking West



09-30-2013 Photo #02. Spans Looking East Near Approx. Pier 25



09-30-2013 Photo #03. Pier 20 Girder 1 Bearing



09-30-2013 Photo #04. Pier 20 Girder 2 Bearing



09-30-2013 Photo #05. Span 21 - Looking West



09-30-2013 Photo #06. Span 22 Girder 2 Pin & Hanger



09-30-2013 Photo #07. Span 22 Girder 2 Pin & Hanger



09-30-2013 Photo #08. Span 22 Joint Between Girders 2 & 3



09-30-2013 Photo #09. Span 22 Girder #3 Pin & Hanger



09-30-2013 Photo #10. Span 22 Girder 2 Wind Lock Plates Photo 1 of 2



09-30-2013 Photo #11. Span 22 Girder 2 Wind Lock Plates Photo 2 of 2



09-30-2013 Photo #12. Span 22 Girder 5 Pin & Hanger



09-30-2013 Photo #13. Span 22 Girder 4 Wind Lock Plates 1 of 2



09-30-2013 Photo #14. Span 22 Girder 4 Wind Lock Plates 2 of 2



09-30-2013 Photo #16. Span 23 at Pier 23 Looking East



09-30-2013 Photo #17. Pier 23 Span 24 Looking West



09-30-2013 Photo #19. Pier 23 Span 23 Looking East - North Exterior



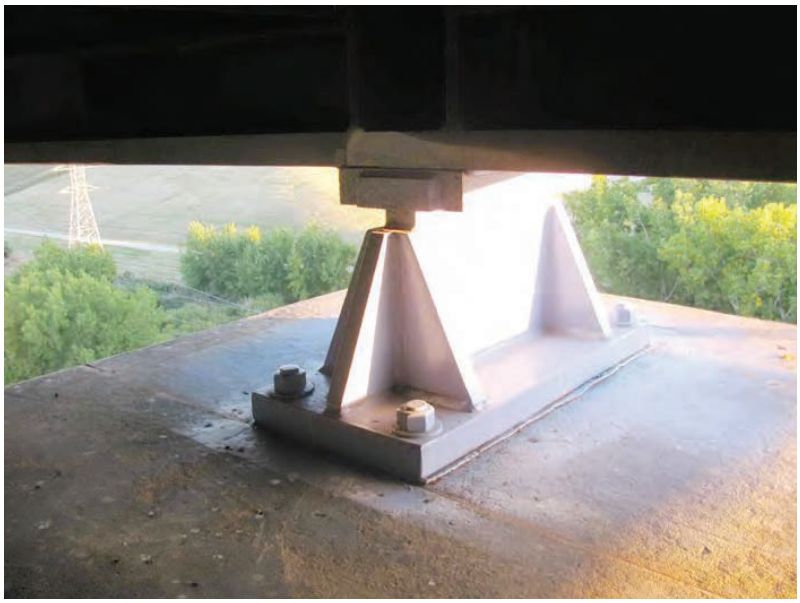
09-30-2013 Photo #20. Pier 23 Girder 1 Exterior Bearing



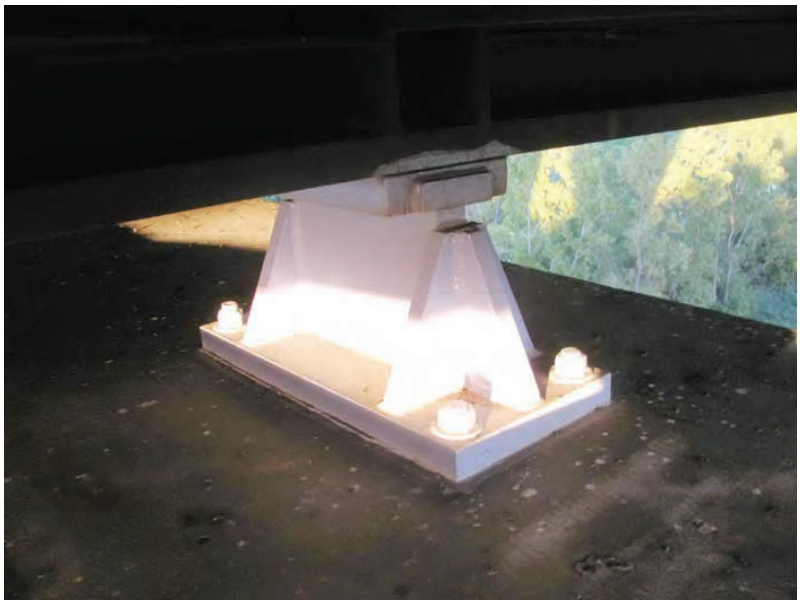
09-30-2013 Photo #21. Pier 23 Girder 2 Interior Bearing



09-30-2013 Photo #22. Pier 23 Looking East - South Exterior



09-30-2013 Photo #24. Pier 24 Girder 1 Exterior Bearing



09-30-2013 Photo #25. Pier 24 Girder 2 Interior Bearing



09-30-2013 Photo #26. Pier 24 Girder 2 Interior Beairng



09-30-2013 Photo #27. Span 24 at Pier 24 Looking East



09-30-2013 Photo #28. Span 25 at Pier 24 Looking West



10-01-2013 Photo #01. Span 25 Pin & Hanger at Girder 1 - Exterior



10-01-2013 Photo #02. Span 25 Pin & Hanger at Girder 2 - Interior



10-01-2013 Photo #03. Span 25 Pin & Hanger at Girder 1



10-01-2013 Photo #04. Span 25 Pin & Hanger at Girder 7 Looking South



10-01-2013 Photo #05. Span 25 Pin & Hanger at Girder 7 - Underside of Dec



10-01-2013 Photo #06. Span 25 Looking East



10-01-2013 Photo #07. Span 23 Pin & Hanger at Girder 1



10-01-2013 Photo #08. Span 23 Pin & Hanger at Girder 2



10-01-2013 Photo #09. Span 23 Pin & Hanger Wind Lock Plates at Girder 1
0.1875-inch Gap at End



10-01-2013 Photo #10. Span 23 Pin & Hanger Wind Lock Plates at Girder 2



10-01-2013 Photo #11. Span 23 Pin & Hanger at Girder 2



10-01-2013 Photo #12. Span 23 Joint Between Girders 1 & 2



10-01-2013 Photo #13. Span 23 Looking East



01-2013 Photo #15. Span 23 Pin & Hanger Wind Lock Plates at Girder 6 Loc
East - 0.1875-inch Gap 2 of 2



10-01-2013 Photo #16. Span 23 Wind Lock Plates at Girder 5 Looking South



1-2013 Photo #17. Span 23 Wind Lock Plates at Girder 6 - Top of Bottom Fla
Slightly Misaligned



10-01-2013 Photo #18. Span 23 Pin & Hanger at Girder 5 Looking South



10-01-2013 Photo #19. Span 23 Looking East at Girders 5 & 6



-01-2013 Photo #22. Span 21 Wind Lock Plates at Girder 6 Looking North 1



-01-2013 Photo #23. Span 21 Wind Lock Plates at Girder 6 Looking North 2



10-01-2013 Photo #24. Span 21 Pin & Hanger at Girder 6 Looking North



10-01-2013 Photo #25. Span 21 Pin & Hanger at Girder 5 Looking South



10-01-2013 Photo #26. Span 21 Wind Lock Plates at Girder 5 Looking South



10-01-2013 Photo #27. 11-inch Gap at Span 21 Joint



10-01-2013 Photo #28. Span 21 Joint



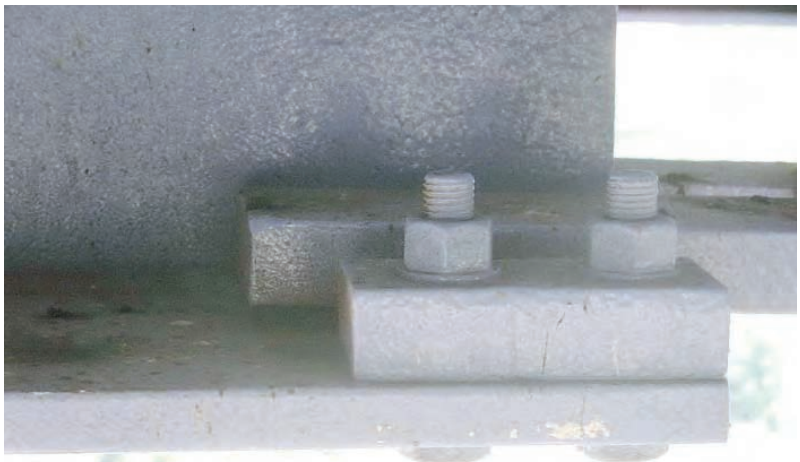
01-2013 Photo #29. Span 21 Girder 7 Wind Lock Plates 0.625-inch Gap Betv
Lock Plates and Bottom Flange



10-01-2013 Photo #30. Span 21 Pin & Hanger at Girder 7 Looking South



10-01-2013 Photo #31. Span 21 Pin & Hanger at Girder 8 Looking North



-01-2013 Photo #32. Span 21 Wind Lock Plates at Girder 8 Looking North 1



-01-2013 Photo #33. Span 21 Wind Lock Plates at Girder 8 Looking North 2



1-2013 Photo #34. Span 21 Looking West at Pier 21 - Bend in Bottom Flang
West of Pier 22



10-01-2013 Photo #35. Span 21 Pin & Hanger at Girder 9 - 1 of 2



10-01-2013 Photo #36. Span 21 Pin & Hanger at Girder 9 - 2 of 2



0-01-2013 Photo #37. Span 21 Wind Lock Plates at Girder 9 - 0.625-inch Ga



10-01-2013 Photo #38. Span 21 Pin & Hanger at Girder 10 - 1 of 5



10-01-2013 Photo #39. Span 21 Pin & Hanger at Girder 10 - 2 of 5



10-01-2013 Photo #40. Span 21 Pin & Hanger at Girder 10 - 3 of 5



1-2013 Photo #41. Span 21 Pin & Hanger at Girder 10 - 4 of 5 - 0.375-inch G
Wind Lock Plates



1-2013 Photo #42. Span 21 Pin & Hanger at Girder 10 - 5 of 5 - 0.375-inch G
Wind Lock Plates



10-01-2013 Photo #57. Pier 21 Girder 7 Typical Bend in Girder



10-01-2013 Photo #58. Span 21 Looking East



10-01-2013 Photo #59. Span 22 Looking West



10-01-2013 Photo #60. Pier 21 Girder 1 Bearing



10-01-2013 Photo #61. Pier 21 Girder 2 Bearing



10-01-2013 Photo #62. Span 21 Looking East



10-01-2013 Photo #63. Span 22 Looking East



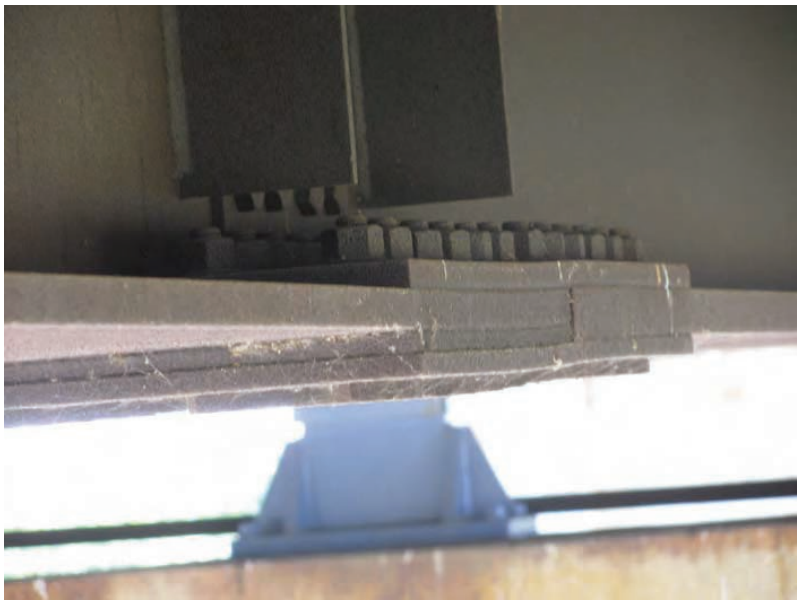
10-01-2013 Photo #64. Span 22 Bolted Splice Plate



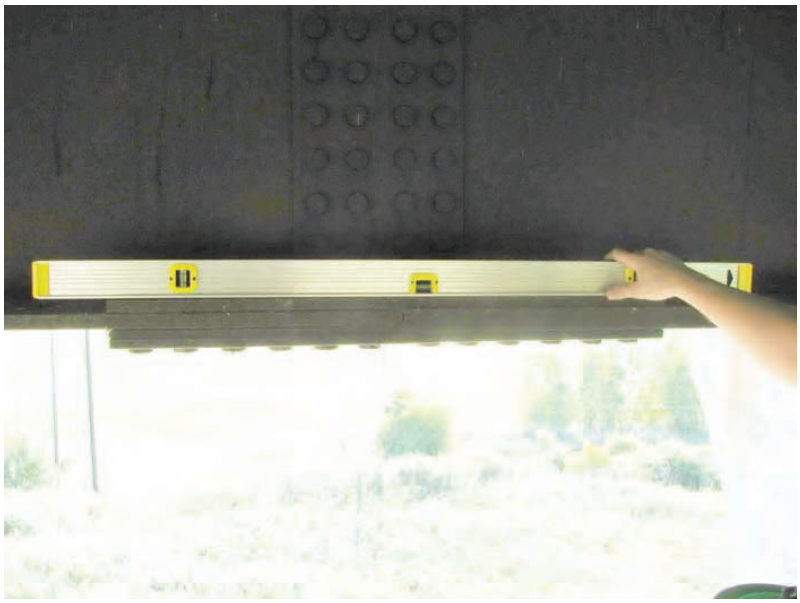
10-01-2013 Photo #65. Span 22 Looking West Toward Pier 22



10-01-2013 Photo #66. Span 22 Looking East Toward Pier 21



10-01-2013 Photo #67. Span 22 Flange Splice Plate 1 of 2



10-01-2013 Photo #68. Span 22 Flange Splice Plate 2 of 2



01-2013 Photo #69. Pier 22 Bent Angle at Vertical Bracing Between Girders 6



10-01-2013 Photo #70. Pier 22 Bearing at Girder 10



10-01-2013 Photo #71. Pier 22 Bearing at Girder 9



10-01-2013 Photo #72. Span 23 Looking West at Pier 22



10-01-2013 Photo #73. Span 22 Looking East at Pier 22 1 of 3



10-01-2013 Photo #74. Span 22 Looking East at Pier 22 2 of 3



10-01-2013 Photo #75. Span 22 Looking East at Pier 22 3 of 3



10-01-2013 Photo #76. Span 22 Looking East at Pier 22 3 of 4



L-2013 Photo #77. Pier 22 Typical Pack Rust & Fracture at Lower Lateral Bra
of 2



L-2013 Photo #78. Pier 22 Typical Pack Rust & Fracture at Lower Lateral Bra
of 2



)1-2013 Photo #79. Pier 22 Looking Up Toward Girder 2 - Minor Spalling at T
Flange



)1-2013 Photo #80. Pier 22 Looking Up Toward Girder 1 - Minor Spalling at T Flange



-2013 Photo #81. Pier 22 Bent Angle at Vertical Bracing Between Girders 6 a of 3



-2013 Photo #82. Pier 22 Bent Angle at Vertical Bracing Between Girders 6 a
of 3



-2013 Photo #83. Pier 22 Bent Angle at Vertical Bracing Between Girders 6 a
of 3