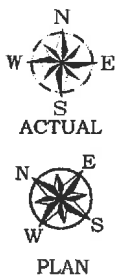


COVER SHEET - FOUNDATION PILE RESTORATION & REPAIRS



SITE VIEW

File No. C24-012-088 (H)
Exhibit D
Date 11-26-24
Initials KP



SITE LOCATION

TABLE OF CONTENTS

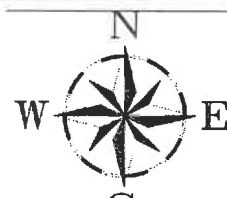
PAGE	PAGE TITLE
F1	COVER
F2	OVERALL SITE LAYOUT
F3	NEW PILE & BEAM LAYOUT FOR PHASE 2
F4	ELEVATION VIEW AND CROSS SECTION FOR PHASE 2 AND SPECIFICATIONS
F5	NEW PILE & STEEL BEAM DETAILS
F6	NEW PILE & STEEL BEAM DETAILS
F7	SOIL INFORMATION
F8	SOIL INFORMATION

RELEASE DATES		
11-12-24	PERMIT & CONSTRUCTION	
SOILS & STRUCTURES		
6480 Grand Haven Road Muskegon, Michigan 49441 (800) 933-3959 Fax (231) 798-1383		
CLIENT:		
		
Arnold Freight 303 Ferry Lane St. Ignace, Michigan 49781 906-643-8288		
PROJECT:		
MACKINAC ISLAND PIER #1 PHASE 2 PIER REPAIRS CITY OF MACKINAC ISLAND MACKINAC COUNTY MICHIGAN		
Drawn by	D. HOHMEYER, P.E.	Date: 5-28-24
Checked by	D. HOHMEYER, P.E.	Date: 5-28-24
Project No.	2024-0070	Sheet No. PH2-F1
		Sequence No. 1 of 8

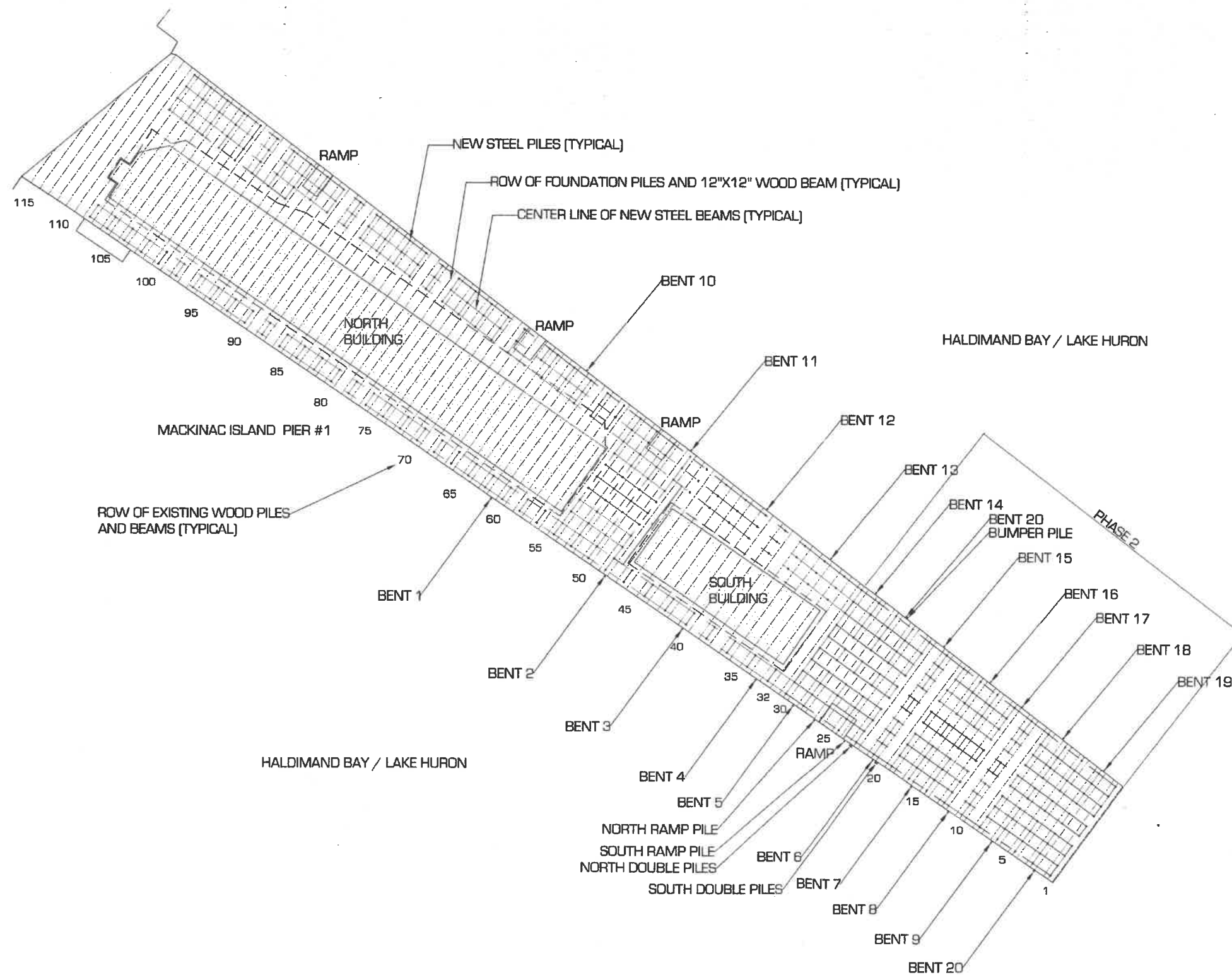
Drawn by D. HOHMEYER, P.E.
Michigan 184680 32829
November 2024



PLAN



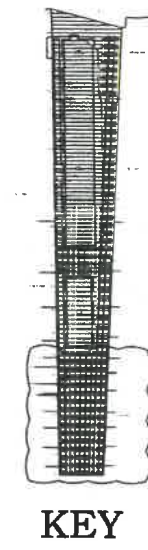
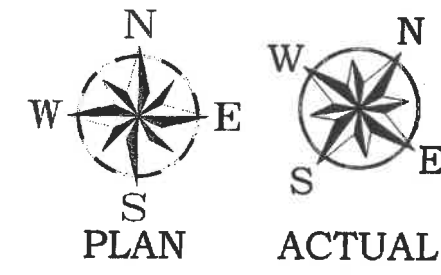
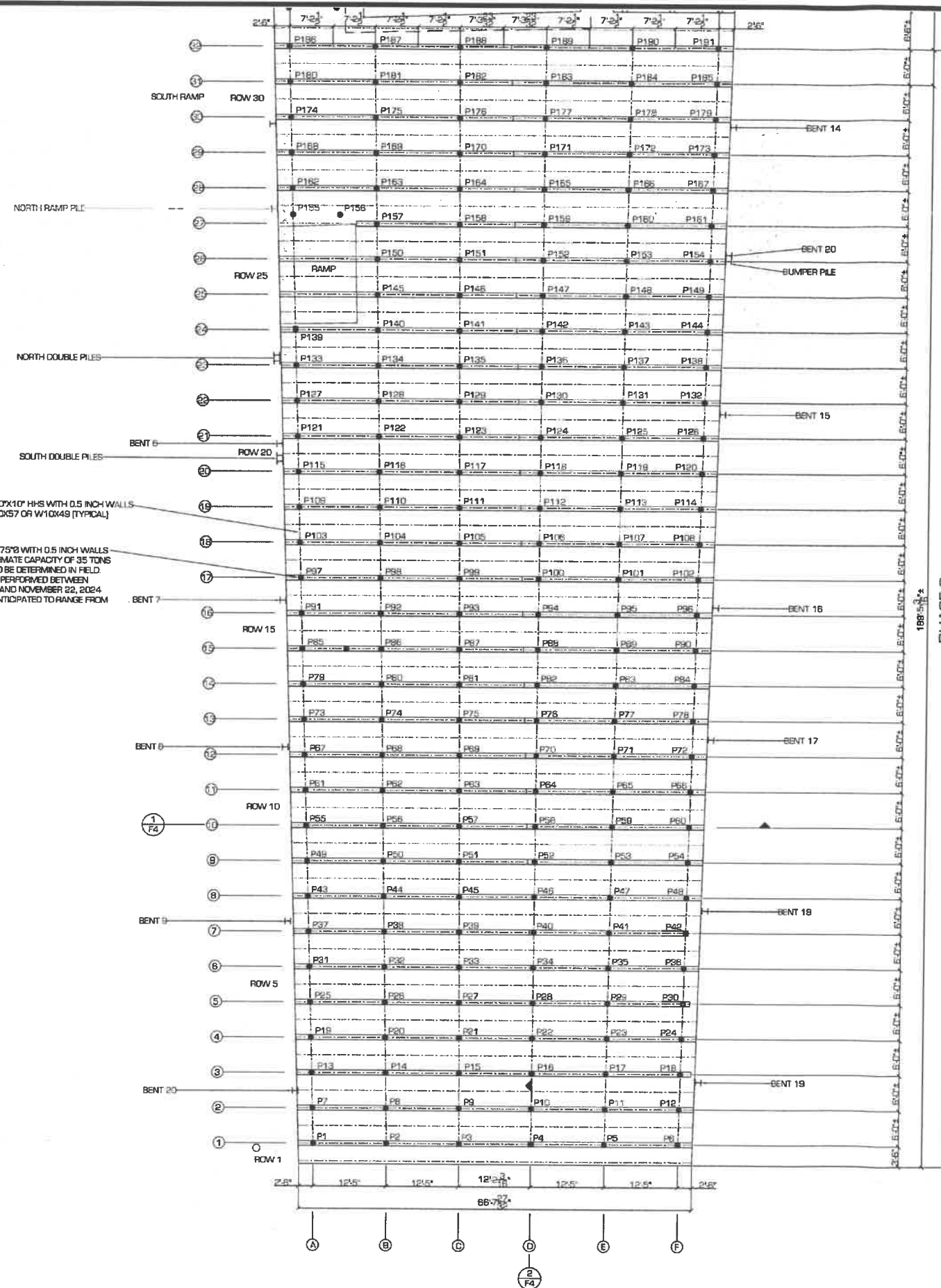
ACTUAL



OVERALL SITE LAYOUT

David J. Hohmeyer, P.E.
Michigan License No. 32823
November 2024

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 SOILS & STRUCTURES		
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Arnold Freight 303 Ferry Lane St. Ignace, Michigan 49781 906-643-8288		
PROJECT:		
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Drawn by: D. HOHMEYER, P.E.	Date: 5-28-24	
Checked by: D. HOHMEYER, P.E.	Date: 5-28-24	
Project No. 2023-0657	Sheet No. PH2-F2	Sequence No. 2 of 8

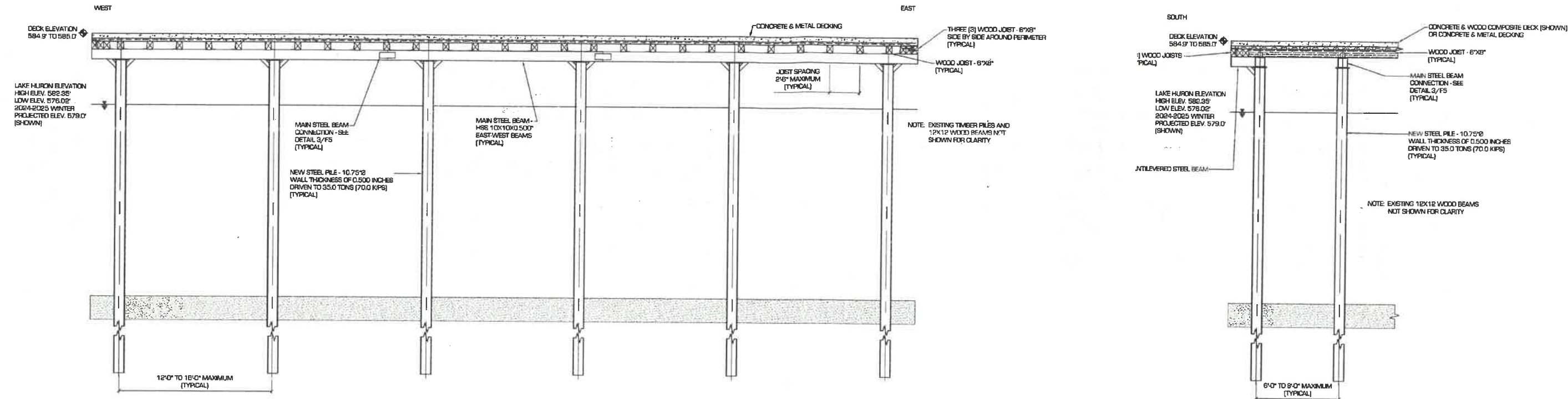


HALDIMAND BAY / LAKE HURON

PHASE 2 - NEW PILE AND BEAM LAYOUT

David D. Hohmeyer, P.E.
Michigan License No. 32829
November 2024

RELEASE DATES	
11-2-24	PERMIT / REVIEW
6480 Grand Haven Road Muskegon, Michigan 49441 (800) 933-3959 Fax (231) 798-1383	
CLIENT: 	
Arnold Freight 303 Ferry Lane St. Ignace, Michigan 49781 906-643-8288	
PROJECT: MACKINAC ISLAND PIER #1 PHASE 2 PIER REPAIRS CITY OF MACKINAC ISLAND MACKINAC COUNTY MICHIGAN	
Drawn by: D. HOHMEYER, P.E. Checked by: D. HOHMEYER, P.E.	Date: 5-28-24 Date: 5-28-24
Project No. 2023-0657	Sheet No. PH2-F3
Sequence No. 3 of 8	



GENERAL NOTES

- ALL APPLICABLE LOCAL, STATE AND FEDERAL RULES, REGULATIONS, ORDINANCES AND CODES SHALL APPLY THROUGHOUT THE PROJECT.
- THE STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH 2015 MICHIGAN BUILDING CODE.
- SOIL INFORMATION USED FOR THE FOUNDATION DESIGN OBTAINED FROM THE REPORT OF SOIL INVESTIGATION BY:
FIRM: SOILS & STRUCTURES, INC.
PHONE: (231) 798-4127
PROJECT NUMBER: 2023.0657
REPORT DATE: TEST BORING TO BE PERFORMED ON NOVEMBER 18, 2018
- THE FOLLOWING LOADS HAVE BEEN USED FOR DESIGN PURPOSES:

A. BUILDING DESIGN CATEGORY	III
B. SNOW LOADS	
GROUND SNOW LOAD (Pg)	50 psf
SNOW EXPOSURE FACTOR (Ce)	1.0
SNOW LOAD IMPORTANCE FACTOR (Is)	1.1
THERMAL FACTOR (Ct)	1.1
SLOPE ROOF FACTOR (Cs)	1.0
FLAT ROOF SNOW LOAD (Ps)	34 psf
SLOPED ROOF SNOW LOAD (Ps)	34 psf
UNBALANCED SNOW LOAD (Pu)	51 psf
C. WIND LOADS	
BASIC WIND SPEED (V)	90 mph
WIND IMPORTANCE FACTOR (Iw)	1.15
WIND EXPOSURE CATEGORY	B
INTERNAL PRESSURE COEFFICIENT (GCp)	±0.18
COMPONENTS & CLADDING PRESSURE	
WINDWARD (ZONE 1)	10 psf
LEEWARD (ZONE 1)	-25 psf
WINDWARD (ZONE 2)	10 psf
LEEWARD (ZONE 2)	-27 psf
WINDWARD (ZONE 3)	10 psf
LEEWARD (ZONE 3)	-46 psf
WINDWARD (ZONE 4)	20 psf
LEEWARD (ZONE 4)	-22 psf
WINDWARD (ZONE 5)	20 psf
LEEWARD (ZONE 5)	-25 psf
MAINTENANCE WIND PRESSURE	21 psf
D. SEISMIC LOAD	
SEISMIC IMPORTANCE FACTOR (Iw)	1.00
MAPPED SPECTRAL RESPONSE COEFFICIENTS	
SHORT PERIOD (Ss)	0.048g
1 SECOND PERIOD (S1)	0.025g
SPECTRAL RESPONSE COEFFICIENTS	
SHORT PERIOD (Ss)	0.051g
1 SECOND PERIOD (S1)	0.004g
RESPONSE MODIFICATION COEFFICIENT (R)	3
SEISMIC RESPONSE COEFFICIENT (Cs)	0.002
SITE CLASS	C
SEISMIC DESIGN CATEGORY	A
TOTAL DESIGN BASE SHEAR (V)	88.0 kips
BASIC SEISMIC FORCE RESISTING SYSTEM	LATERAL PILE CAPACITY
ANALYSIS PROCEDURE	MINIMUM LATERAL FORCE
E. LIVE LOAD	
FIRE TRUCK / H2O	36 kip axle load 16 kip wheel load 1000 pound point load
HORSE & DRAY	100 psf
COMMON/ASSEMBLY AREAS	100 psf
COMMON/ASSEMBLY CORRIDORS	100 psf
STAIRS	100 psf
STORAGE	200 psf

- VERIFY ALL APPLICABLE DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO FABRICATION.
- DO NOT SCALE DRAWINGS.
- CONTRACTOR TO COORDINATE WITH ARCHITECTURAL, MECHANICAL AND ELECTRICAL FOR ALL OPENINGS AND PENETRATIONS. NO OPENINGS SHALL PENETRATE STRUCTURAL ELEMENTS WITHOUT THE ENGINEER OF RECORD'S APPROVAL.
- ALL SPECIAL INSPECTIONS AND STRUCTURAL TESTS SHALL BE PERFORMED IN ACCORDANCE WITH CHAPTER 17 OF THE 2015 MICHIGAN BUILDING CODE.
- IF THERE ARE ANY CONFLICTS BETWEEN THE SPECIFICATIONS AND DESIGN DRAWINGS PLEASE NOTIFY THE ENGINEER.
- THE CONTRACTORS SHALL BE SOLELY RESPONSIBLE TO PROVIDE ADEQUATE TEMPORARY BRACING IF REQUIRED. THIS REQUIREMENT SHALL ALSO INCLUDE ANY SUPERIMPOSED CONSTRUCTION LOADS.
- ALL INDICATED STRUCTURAL ELEVATIONS ARE BASED ON THE DECK LEVEL WHICH IS MATCH APPROXIMATELY THE EXISTING DECK ELEVATION.
- CONTRACTOR PROPOSED ALTERNATES TO THE CONTRACT DRAWINGS AND SPECIFICATIONS WILL BE CONSIDERED IF THEY RESULT IN SUBSTANTIAL SAVINGS TO THE OWNER WITHOUT ADVERSELY IMPACTING THE INTEGRITY AND FUNCTION OF THE STRUCTURE. ANY REQUEST FOR SUBSTITUTION SHALL BE ACCOMPANIED BY WRITTEN DOCUMENTATION OF THE SAVINGS INCLUDING ALL BACKUP DATA AND SEALED ENGINEERING CALCULATIONS NECESSARY TO EVALUATE THE MERITS OF THE PROPOSED ALTERNATE. ADDITIONAL ENGINEERING AND ARCHITECTURAL REVIEW COSTS MAY IMPACT THE VIABILITY OF ANY PROPOSED ALTERNATE.
- FRAMING CONDITIONS NOT SPECIFICALLY DETAIL OR INDICATED SHALL BE FRAMED SIMILAR TO USING MATERIAL OR CONDITION.

STRUCTURAL NOTES

CONCRETE

- ALL CONCRETE HAS BEEN DESIGNED AND SHALL BE BUILT IN ACCORDANCE WITH THE LATEST EDITION OF ACI 318.
- ALL CONCRETE TO HAVE A 28-DAY COMPRESSIVE STRENGTH OF 4500 PSI.
- THE USE OF CHLORIDE ACCELERATORS IN ANY CONCRETE MIX DESIGN IS NOT PERMITTED.
- CONCRETE EXPOSED TO FREEZE THAW CYCLES OR DEICING CHEMICALS SHALL BE AIR ENTRAINMENT WITH AIR CONTENT PER ACI TABLE 4.2.1.
- ALL REINFORCING STEEL BARS TO BE ASTM A615 GRADE 60 DEFORMED AND ALL DEFORMED WELDED WIRE FABRIC TO BE ASTM A185. ALL REINFORCING TO BE PLACED IN ACCORDANCE WITH THE LATEST EDITION OF ACI 318 AND CRSI SPECIFICATIONS.
- CONCRETE COVER FOR REINFORCING (UNLESS NOTED OTHERWISE):
 - CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH = 3"
 - EXPOSED TO EARTH OR WEATHER:
 - #5 THRU #18 BARS = 2"
 - #5 BARS AND 5/8" WIRE AND SMALLER = 1-1/2"
 - NOT EXPOSED TO EARTH OR WEATHER:
 - SLABS, WALLS AND JOISTS:
 - #8 AND LARGER BARS = 1-1/2"
 - #6 AND #7 BARS = 1"
 - #5 AND SMALLER BARS = 3/4"
 - BEAMS, GIRDERS AND COLUMNS:
 - PRINCIPAL REINFORCEMENT, TIES, STIRRUPS AND SPIRALS = 1-1/2"

- MINIMUM CLEAR SPACE BETWEEN PARALLEL BARS IN A LAYER INCLUDING SPICE BARS, SHALL NOT BE LESS THAN:
 - FOR COLUMNS & PEDESTALS:
 - THE DIAMETER OF THE BAR TIMES 1.5
 - 1-1/2"
 - 1.33 TIMES THE MAXIMUM AGGREGATE SIZE.
 - FOR ALL OTHER BARS:
 - THE DIAMETER OF THE BAR
 - 1"
 - 1.33 TIMES THE MAXIMUM AGGREGATE SIZE.
- ALL NEW CONCRETE SHALL BE CURED IMMEDIATELY AFTER FINISHING OF REMOVING FORMWORK. CURING SHALL BE EITHER A MOIST CURE METHOD OR THE USE OF A CURING COMPOUND.
- PROVIDE CORNER BARS THAT MATCH CONTINUOUS REINFORCEMENT SIZE AND QUANTITY AT ALL INTERSECTIONS AND CORNERS OF FOOTINGS AND WALLS.
- THE WELDING OF REINFORCING STEEL BARS IS NOT PERMITTED, INCLUDING BUT NOT LIMITED TO TACK WELDS, BUTT WELDS, GROOVE WELDS, ETC.

STEEL

- ALL STEEL HAS BEEN DESIGNED AND SHALL BE BUILT IN ACCORDANCE WITH THE LATEST EDITION OF THE AISC STEEL CONSTRUCTION MANUAL.
- ALL STEEL TO BE AS FOLLOWS UNLESS NOTED OTHERWISE:

A. W SHAPES	ASTM A992 GRADE 50
B. PLATE AND BAR	ASTM A36
C. HSS TUBES	ASTM A500 GRADE B
D. MISC. STEEL	ASTM A36
E. STRUCTURAL BOLTS	ASTM A325N
F. PIPE	ASTM A53 GRADE B
G. HEADED STUD AND/OR	ASTM A108 TYPE B 6S KSI
- ALL WELDING TO BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF AWS D1.1. ALL WELD ELECTRODES TO BE E7018 LOW HYDROGEN.
- STEEL DECKING SHALL BE GALVANIZED SHALL BE IN ACCORDANCE WITH ASTM A123. BOLTS AND NUTS TO BE GALVANIZED SHALL BE IN ACCORDANCE WITH ASTM A153.
- ANY DAMAGE TO GALVANIZING SHALL BE TOUCHED UP WITH VOIGHT AND SCHWETZER LZ09 ZINC PASTE OR AN APPROVED EQUAL.

WOOD

- ALL WOOD MEMBER DESIGN SHALL CONFORM WITH THE LATEST EDITIONS OF AITC TIMBER CONSTRUCTION MANUAL, NDS, AND TPI.
- ALL DIMENSIONAL LUMBER IS TO BE SPRUCE PINE-FIR #2 GRADE OR BETTER. EXCEPT WALL STUDS ARE PERMITTED TO BE SPRUCE PINE-FIR STUD GRADE OR BETTER.
- CONNECTIONS FOR WOOD MEMBERS SHALL CONFORM TO 2008 MIBC TABLE 2304.9.1 AS A MINIMUM UNLESS OTHERWISE DETAILED.
- NAILS SIZES SPECIFIED ON THE PLANS, DETAILS AND TO BE USED IN SIMPSON STRONG-TIE CONNECTORS SHALL BE COMMON NAILS THAT CONFORM TO ASTM F1687.
- ALL DIMENSIONAL LUMBER HEADERS WITH PLYWOOD SPACERS SHALL BE GLUED AND NAILED TOGETHER. THE PLYWOOD SPACERS SHALL BE A FULL DEPTH SPACER.
- HOLES AND NOTCHES DRILLED OR CUT INTO WOOD FRAMING MEMBERS SHALL NOT EXCEED THE REQUIREMENTS OF THE 2008 MIBC. REFERENCE SECTIONS 2308.9.10, 2308.9.11 AND 2308.10.4.2.

REBAR WELDING NOTES:

- ALL WELDING TO BE DONE BY AN AWS CERTIFIED WELDER IN ACCORDANCE W/ THE LATEST EDITION OF AWS D1.4.
- REINFORCING STEEL THAT IS TO BE WELDED SHALL BE ASTM A706 GRADE 60.
- ALL ELECTRODES SHALL BE E7018, LOW HYDROGEN.
- REBAR SHALL NOT BE WELDED WITHOUT SOILS & STRUCTURES APPROVAL OTHER THAN IN THE INDICATED DETAILS.
- ALL REINFORCING STEEL THAT IS WELDED MUST BE INSPECTED BY AN INDEPENDENT INSPECTOR FOR CONFORMANCE TO THE PLANS, BUILDING CODE AND AWS D1.4.

ADDITIONAL NOTES:

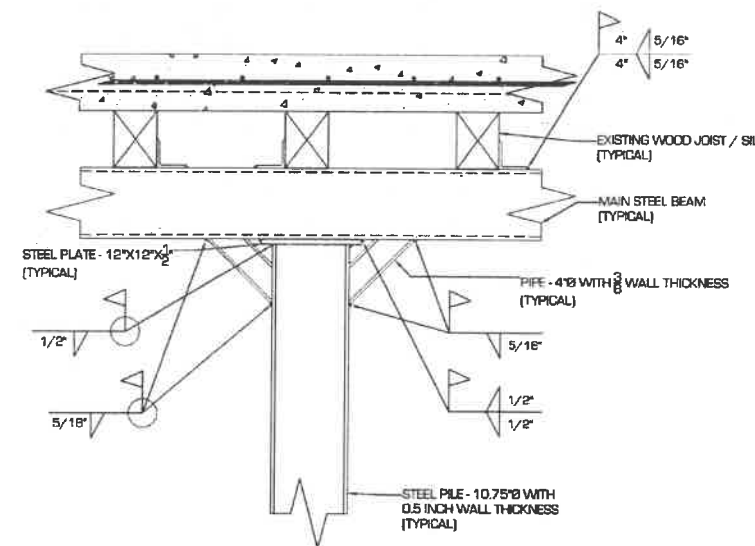
- EXISTING WELD SURFACES SHALL BE CLEAN AND FREE OF ANY PAINT, GALVANIZING, RUST, ETC. PRIOR TO FIELD WELDING.
- VERIFY ALL APPLICABLE EXISTING DIMENSIONS, ELEVATIONS AND CONDITIONS PRIOR TO FABRICATION AND CONSTRUCTION.
- IF EXISTING CONDITIONS DIFFER FROM WHAT IS SHOWN SOILS AND STRUCTURES SHALL BE NOTIFIED IMMEDIATELY SO THAT THE DESIGN MAY BE PROPERLY MODIFIED.
- ALL SPECIAL INSPECTIONS AND STRUCTURAL TESTS SHALL BE PERFORMED IN ACCORDANCE WITH CHAPTER 17 OF THE 2008 MICHIGAN BUILDING CODE. THE FOLLOWING ITEMS ARE A MINIMUM TO BE INSPECTED:
 - BAR SIZE, GRADE, SPACING, LOCATIONS AND CLEARANCE
 - BAR IS FREE OF EXCESSIVE RUST, DIRT, OIL, DAMAGE, ETC.
 - LAP LENGTHS AND LOCATIONS
 - BAR IS PROPERLY SUPPORTED
 - FORM DIMENSIONS
 - SAMPLE AND TEST ALL CONCRETE IN ACCORDANCE WITH ASTM C31, C39, C14 AND C231
- ALL CONCRETE TO HAVE A 28-DAY COMPRESSIVE STRENGTH OF 4500 PSI. CONCRETE MIX SHALL BE SILICA FUME BASED AND HAVE A MAXIMUM WATER TO CEMENT RATIO OF 0.40. COARSE AGGREGATE SHALL BE CRUSHED Limestone.
- ALL REINFORCING STEEL TO BE ASTM A615 GRADE 60 AND PLACED IN ACCORDANCE WITH THE LATEST EDITION OF ACI 318 AND CRSI SPECIFICATIONS. REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH ASTM A775 OR ASTM A934.

PILE NOTES:

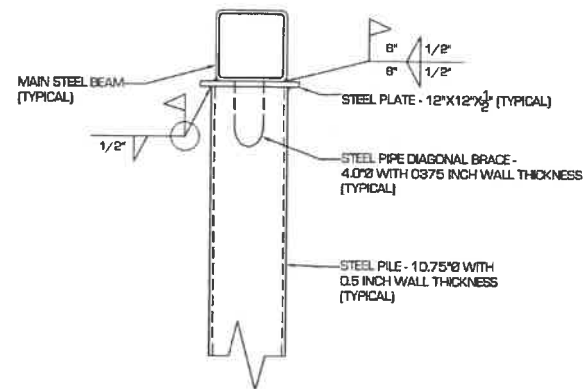
- ALL PILES SHALL BE 10.75" DIAMETER WITH A WALL THICKNESS 0.500 INCHES. THE PILES SHALL BE DRIVEN OPEN ENDED. THE PILES MAY BE INSTALLED WITH A VIBRATORY HAMMER UNTIL SUBSTANTIAL RESISTANCE IS ENCOUNTERED. AN IMPACT HAMMER SHALL BE USED TO DRIVE THE PILES TO BEARING. PILE DRIVING SHALL BE INSTALLED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT WHICH WILL BE PROVIDED UPON COMPLETION OF THE TEST BORINGS SCHEDULED FOR THE WEEK OF NOVEMBER 18TH. THE PILES SHALL BE DRIVEN TO AN ULTIMATE CAPACITY 35 TONS (70.0 KIPS).
- THE PILES MAY BE LEFT UNFILLED.
- PILE STEEL SHALL BE GRADE 50.
- PILE TIP ELEVATION TO BE DETERMINED IN THE FIELD BASED ON DRIVING RESISTANCE. PILE CUTOFF ELEVATION TO BE DETERMINED FROM DECK ELEVATION AND DETAILS.
- PILES THAT ARE INSTALLED WITHIN 2' OF THE INDICATED LOCATION ON THE PLANS ARE ACCEPTABLE. PILES THAT ARE LOCATED FURTHER THAN 3' FROM THE SPECIFIED LOCATION SHALL BE REPORTED TO SOILS AND STRUCTURES TO DETERMINE IF ADDITIONAL PILES OR MODIFICATIONS TO THE FRAME ARE REQUIRED.
- PILE LOAD TEST MAY BE OMITTED PROVIDED FULL TIME PILE INSPECTION IS PERFORMED.

Drawn by: D. HOHMEYER, P.E.
Checked by: D. HOHMEYER, P.E.
November 18, 2024
Professional Engineer
Michigan State Board of Engineering
License No. 32823
32823

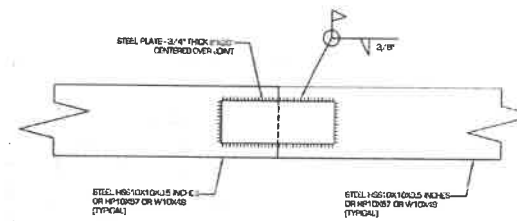
RELEASE DATES	
11-23-24	CONSTRUCTION & PERMIT
SOILS & STRUCTURES	
6480 Grand Haven Road Muskegon, Michigan 49441 (800) 933-3959 Fax (231) 798-1383	
CLIENT:	
Arnold Freight 303 Ferry Lane St. Ignace, Michigan 49781 906-643-8288	
PROJECT:	
MACKINAC ISLAND PIER #1 PHASE 2 PIER REPAIRS CITY OF MACKINAC ISLAND MACKINAC COUNTY MICHIGAN	
Drawn by: D. HOHMEYER, P.E.	Date: 5-28-24
Checked by: D. HOHMEYER, P.E.	Date: 5-28-24
Project No.	Sheet No.
2023-0657	PH2-F4
Sequence No.	4 of 8



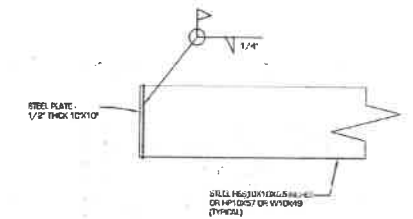
1 STEEL PILE TO STEEL BEAM CONNECTION
FS SCALE 1" = 1'-0"



2 STEEL PILE TO STEEL BEAM CONNECTION
FS SCALE 1" = 1'-0"



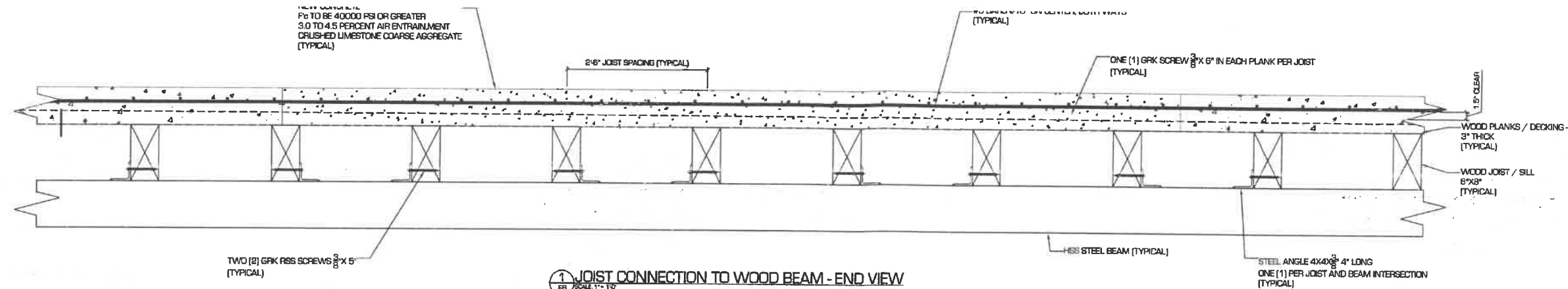
3 STEEL BEAM TO STEEL BEAM CONNECTION
FS SCALE 1" = 1'-0"



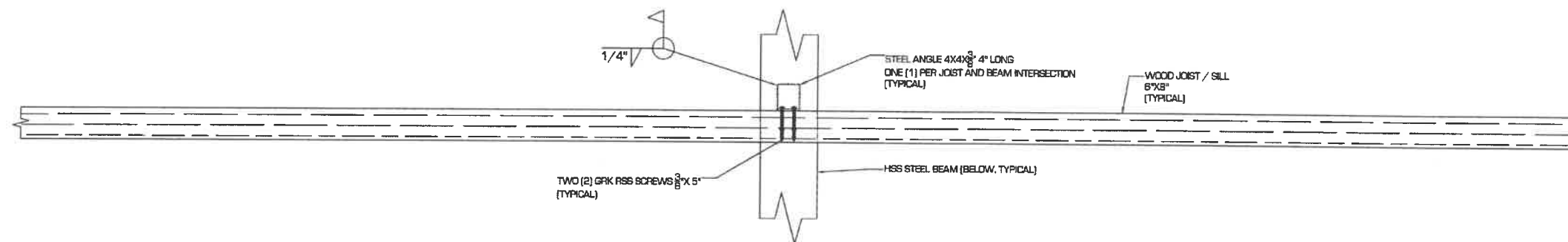
4 END OF STEEL BEAM DETAIL
FS SCALE 1" = 1'-0"

David D. Hohmeyer, P.E.
Michigan Professional Engineer
November 18, 2024
32823
24

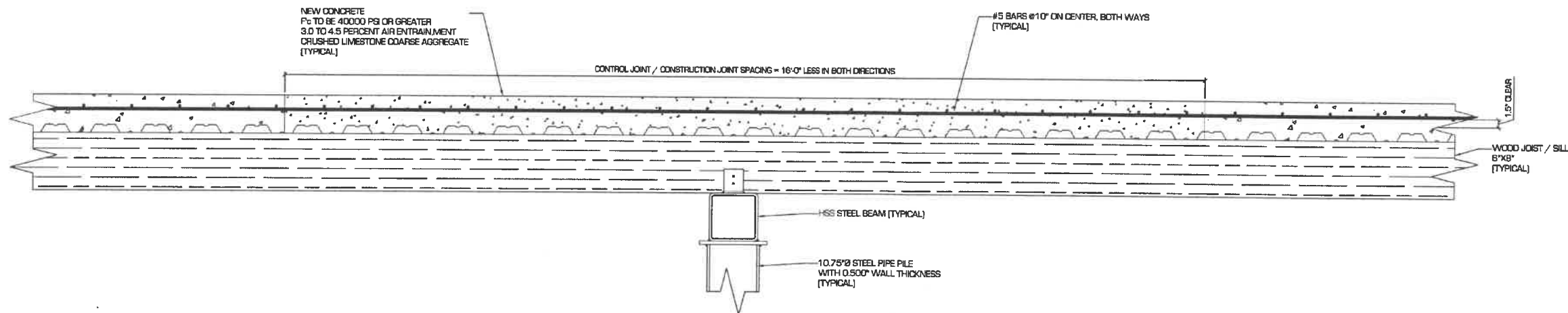
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Drawn by: D. HOHMEYER, P.E.	Date: 5-28-24
Checked by: D. HOHMEYER, P.E.	Date: 5-28-24
Project No. 2023-0657	Sheet No. PH2-F5
Sequence No. 5 of 8	



1 JOIST CONNECTION TO WOOD BEAM - END VIEW
SCALE 1\"/>



2 JOIST CONNECTION TO WOOD BEAM - TOP VIEW
SCALE 1\"/>

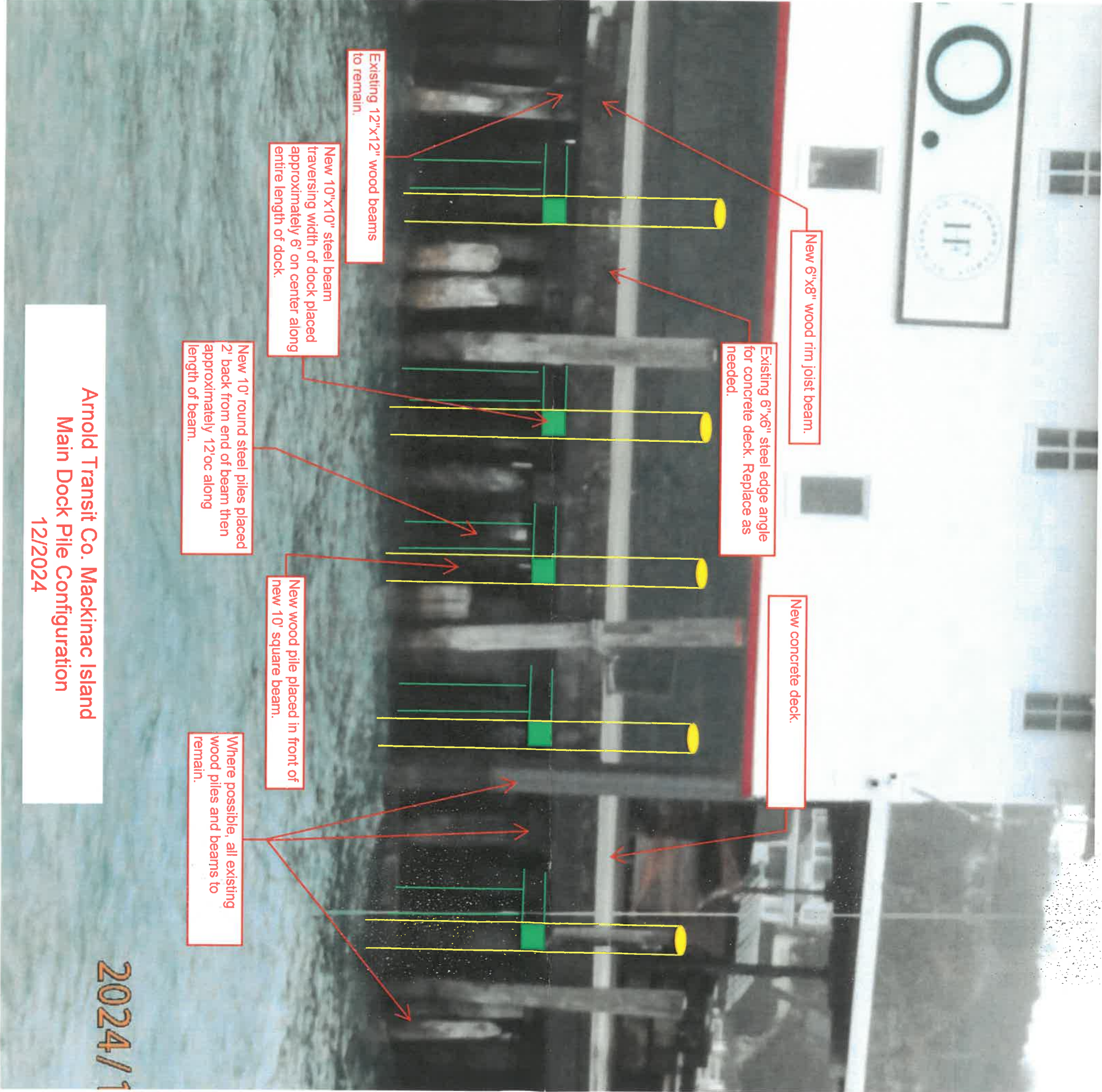


3 JOIST CONNECTION TO STEEL BEAM - SIDE VIEW
SCALE 1\"/>

Drawn by D. HOHMEYER, P.E.
Michigan License No. 18748
November 24, 2024



RELEASE DATES	
11-23-24	CONSTRUCTION & PERMIT
SOILS & STRUCTURES 6480 Grand Haven Road Muskegon, Michigan 49441 (800) 933-3959 Fax (231) 798-1383	
CLIENT:  Arnold Freight 303 Ferry Lane St. Ignace, Michigan 49781 906-643-8288	
PROJECT: MACKINAC ISLAND PIER #1 PHASE 2 PIER REPAIRS CITY OF MACKINAC ISLAND MACKINAC COUNTY MICHIGAN	
Drawn by <u>D. HOHMEYER, P.E.</u>	Date: <u>5-28-24</u>
Checked by <u>D. HOHMEYER, P.E.</u>	Date: <u>5-28-24</u>
Project No. <u>2023-0657</u>	Sheet No. <u>PH2-F6</u>
Sequence No. <u>6 of 8</u>	



Arnold Transit Co. Mackinac Island
Main Dock Pile Configuration
12/2024

2024/1

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