



PORT OF MILWAUKEE

Dockwall Condition Report

Capital Improvements Committee

January 20, 2016

The Commercial Port's Mission

The Mission of the Port is to enhance the overall economic and social environment of our region by stimulating trade, business and employment.

Consistent with the Port's water-related location, the Port shall strive to be a premier provider of transportation and distribution services for its commercial customers and support public recreation, leisure and other uses the Port deems to be in the public interest.

The Port of Milwaukee owns and maintains over six miles (32,000 feet) of dockwall and breakwater structures.



Dock Construction

City of Milwaukee Code of Ordinances

Chapter 118

118-7. Dock Construction. 1. **PLANS TO BE FILED WITH BOARD OF HARBOR COMMISSIONERS.** Every person, firm or corporation before proceeding with the construction, erection, rebuilding, alteration or repair of any dock along the banks of any navigable river, public canal or water slip within the corporate limits of the city shall, subject to the approval of the board of harbor commissioners, file with said board drawings, plans and specifications sufficient to enable the board to obtain full and complete information as to the extent and character of the work to be done, which said drawings, plans and specifications shall conform with the standard plans and specifications on file in the office of the board governing the construction, erection, rebuilding, alteration or repair of any dock along the banks of any navigable river, public canal or water slip in the city.

2. **BOARD TO APPROVE PLANS.** If the drawings, plans and specifications indicate to said board of harbor commissioners that the work to be done is not in all respects in accordance with the standard plans and specifications on file in the office of the board of harbor commissioners governing the construction, erection, rebuilding, alteration or repair of any dock along the banks of any river, public canal or water slip in said city, the said board shall refuse to approve the same until such drawings, plans and specifications shall have been made to conform in every respect to said plans and specifications on file in the office of said board of harbor commissioners. Thereafter such work shall be done and performed under the supervision and direction of said board of harbor commissioners.

Compulsory Dock Repairs

Wisconsin Statutes & Annotations

Chapter 30

(3) DOCK WALLS AND SHORE PROTECTION WALLS.

- (a)** Either by itself or in conjunction with another municipality, construct, maintain or repair suitable dock walls or shore protection walls along the shore of any waterway adjoining or within the limits of such municipality, exclusive of privately owned slips. Such structures may be located within or without the municipal limits.
- (b)** Whenever an improvement, alteration, repair or extension of a dock wall or shore protection wall along the bank or shore of any waterway adjoining or within the limits of a municipality is required in order to eliminate menaces to navigation, or to promote the public health, safety or welfare, or to eliminate dilapidation, blight or obsolescence of such dock wall or shore protection wall, the board of harbor commissioners, if such board has been established within the municipality, or the local legislative body if no such board has been created, shall make a determination by resolution that it is essential that such dock wall or shore protection wall be improved, altered, repaired or extended. A certified copy of such resolution shall be served on the owners of the property of which such dock wall or shore protection wall is a part, by either forwarding such certified copy of the resolution by registered mail to the owners or by serving a certified copy of such resolution personally upon such owners if they can be found within the municipality. The resolution shall also specify a period of 90 days within which the owners shall be required to commence work for the improvement, alteration, repair or extension of the dock wall or shore protection wall.
- (c)** If the owners of the property on which the dock wall or shore protection wall is located fail to notify the board of harbor commissioners or the local legislative body within the 90-day period that the work will be commenced as specified in the resolution, the board of harbor commissioners or the local legislative body shall request the city attorney, village attorney, town attorney or corporation counsel for the commencement of an action in the circuit court in the county in which the property is located for determination of whether or not the improvement, alteration, repair or extension of the dock wall or shore protection wall is required and for the fixing of the time by the court within which time the work must be commenced and completed. The action shall be entitled in the name of the state and the municipality, and the attorney general shall participate on behalf of the state. The complaint shall recite the type of improvement, alteration, repair or extension which is required, the approximate cost thereof, the need for such work as related to the reasons stated in par. (b), and such other allegations as may be pertinent. The owners of the property within which the dock wall or shore protection wall is located shall be named defendants. They shall be permitted to plead as provided for in civil actions. The action shall be brought to trial in the circuit court as promptly as possible. If the circuit court determines that the work shall be performed, it shall make a finding to that effect and enter an order directing the owners of the property to commence the work and to complete it within a period of time fixed by the court in the order, or in the alternative provide that the municipality may complete the work and charge the cost thereof to the owners of the property. If the work is performed by the municipality, the cost shall be recovered from the owners of the property as special assessments for benefits to lands provided for in s. 66.0703. Either party to the action may appeal from the determination of the circuit court and the appeal shall be given preference. Only that portion of the cost of the work shall be assessed against the owners which is of benefit to their lands.

Standards For Dockwall Design & Inspection



PIANC – World Association for Waterborne Transport Infrastructure
<http://www.pianc.us/>



AAPA – American Association of Port Authorities
<http://www.aapa-ports.org/>



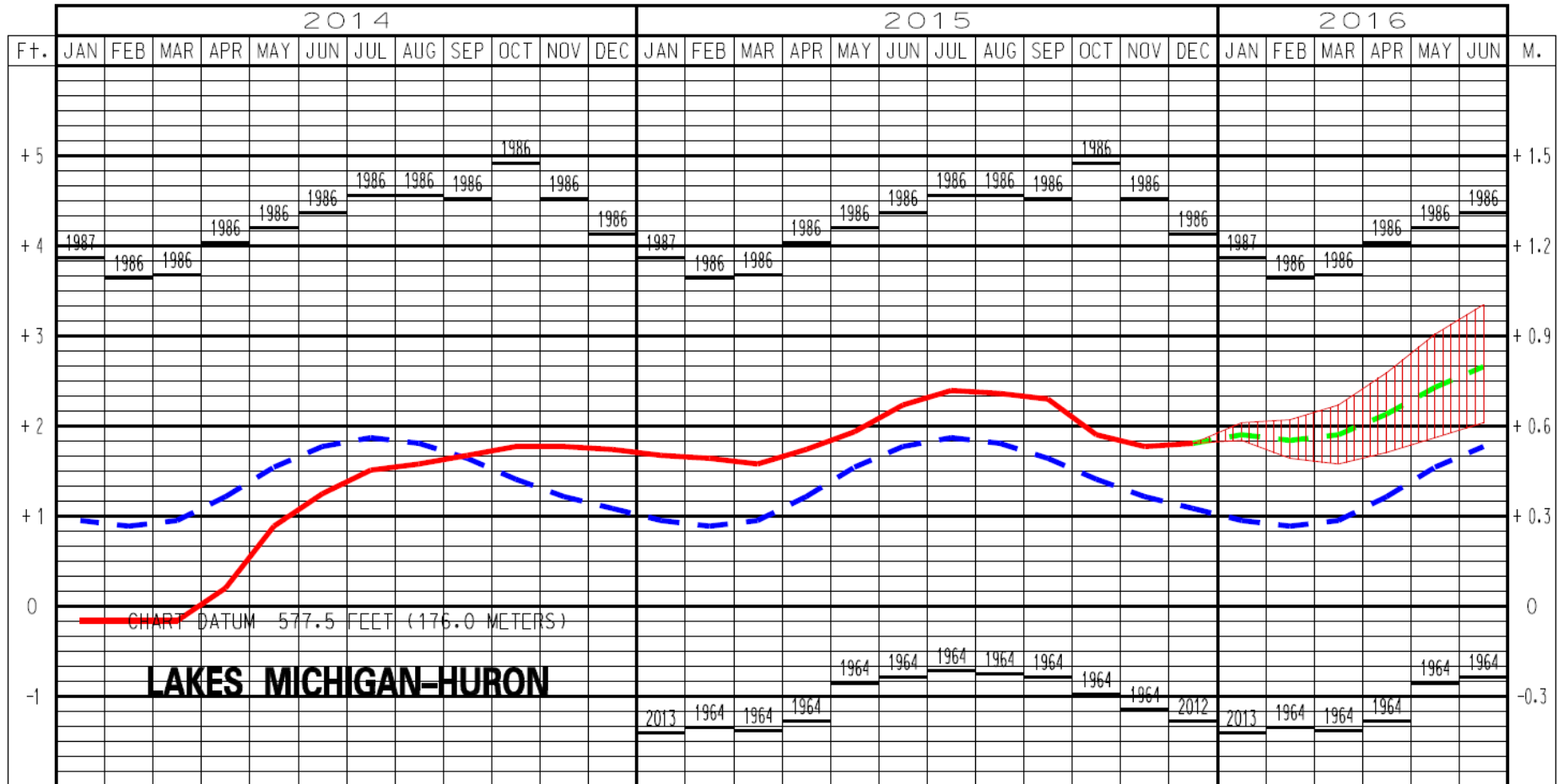
ASCE – American Society of Civil Engineers
<http://www.asce.org/>



WSG – University of Wisconsin Sea Grant Institute
<http://seagrants.wisc.edu/>

Projected Lake Levels

LAKES MICHIGAN-HURON WATER LEVELS - JANUARY 2016

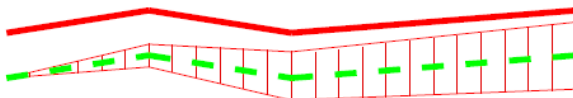


LEGEND

LAKE LEVELS

RECORDED

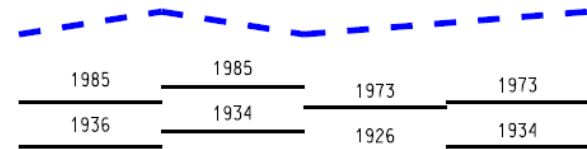
PROJECTED



AVERAGE **

MAXIMUM **

MINIMUM **



** Average, Maximum and Minimum for period 1918-2014

NORTH HARBOR TRACT



Google earth

1000 ft

- | | |
|--------------------------------------|--|
| 1. Offshore Breakwater at Art Museum | 5. Urban Park South Fill Area |
| 2. Walkway at Art Museum | 6. Rubble Mound along Summerfest |
| 3. Municipal North Pier | 7. 20 Acre Fill Site (Marcus Amphitheater) |
| 4. Municipal Pier Breakwater | 8. East Erie Street Dock |

SOUTH HARBOR TRACT



- | | | |
|-----------------------------------|---|-------------------------------------|
| 9. Dock East of MMSD Plant | 16. Type "E" Dock | 21. Greenfield Avenue Dock |
| 10. Dock South East of MMSD Plant | 17. Confined Disposal Facility North and East Sides | 22. Municipal Mooring Basin Dock |
| 11. Terminal 1 Dock (Type "B") | 18. Confined Disposal Facility South Side | 23. City Bulk Cargo Dock Reinforced |
| 12. Type "C" Dock | 19. Russell Avenue Intake sheeting | 24. City Bulk Cargo Dock |
| 13. Type "B" Dock | 20. Grand Trunk Dock | 25. LaFarge North Dock |
| 14. Type "D" Dock | | 26. City Heavy Lift Dock |
| 15. South Pier No. 2 | | 27. Former Carferry Slip |

[illegible]

Material: small stone core with large stone cover

Condition: Good

Estimated
Replacement Value: \$600,000

2. Walkway at Art Museum

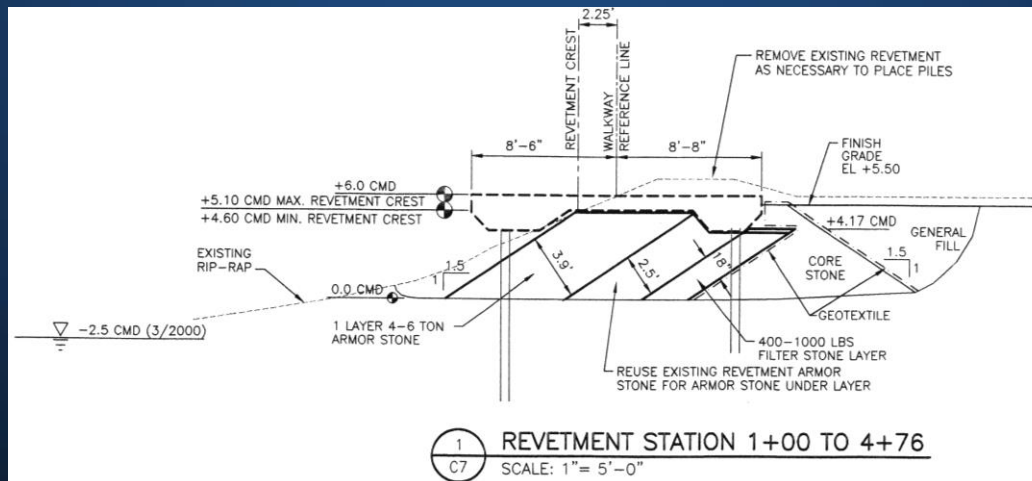
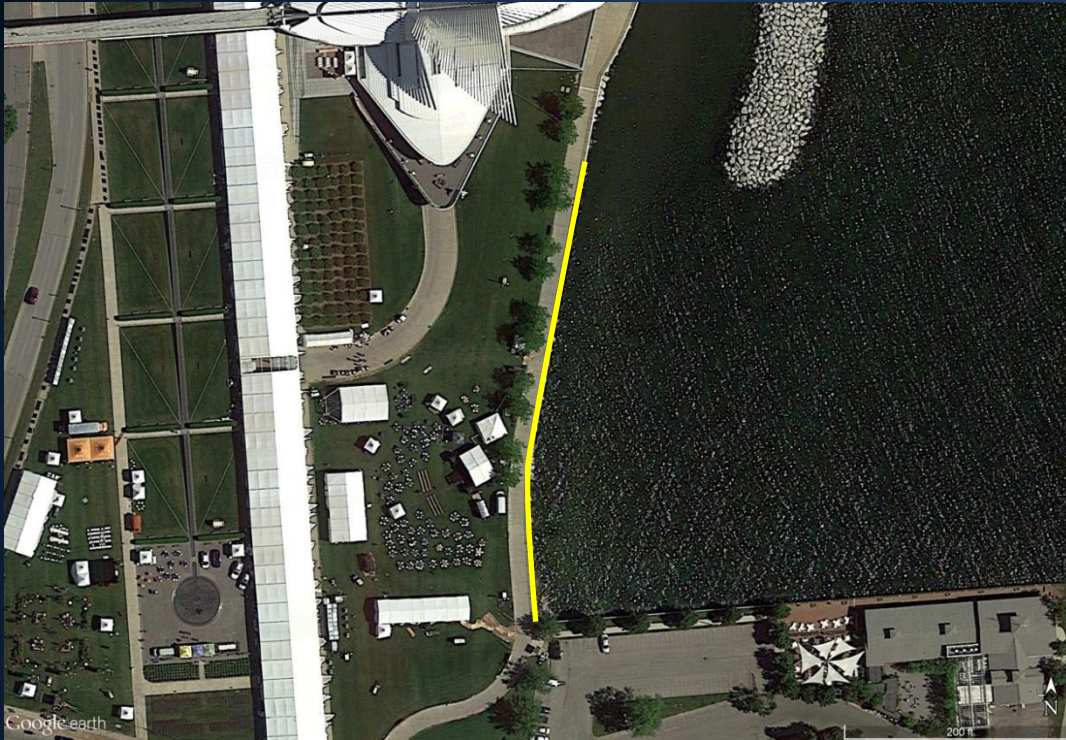
Constructed: 1999

Material: small stone core with large stone cover

Length: 490 feet

Condition: Good

Estimated
Replacement Value: \$1,225,000



4. Municipal Pier Breakwater

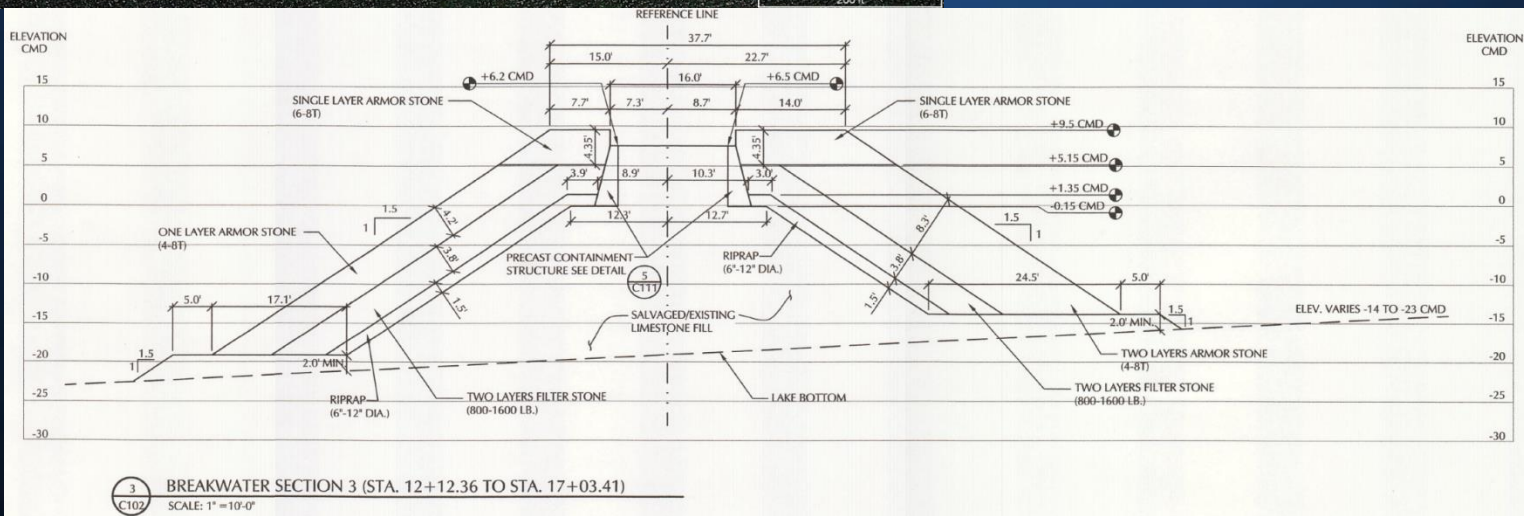
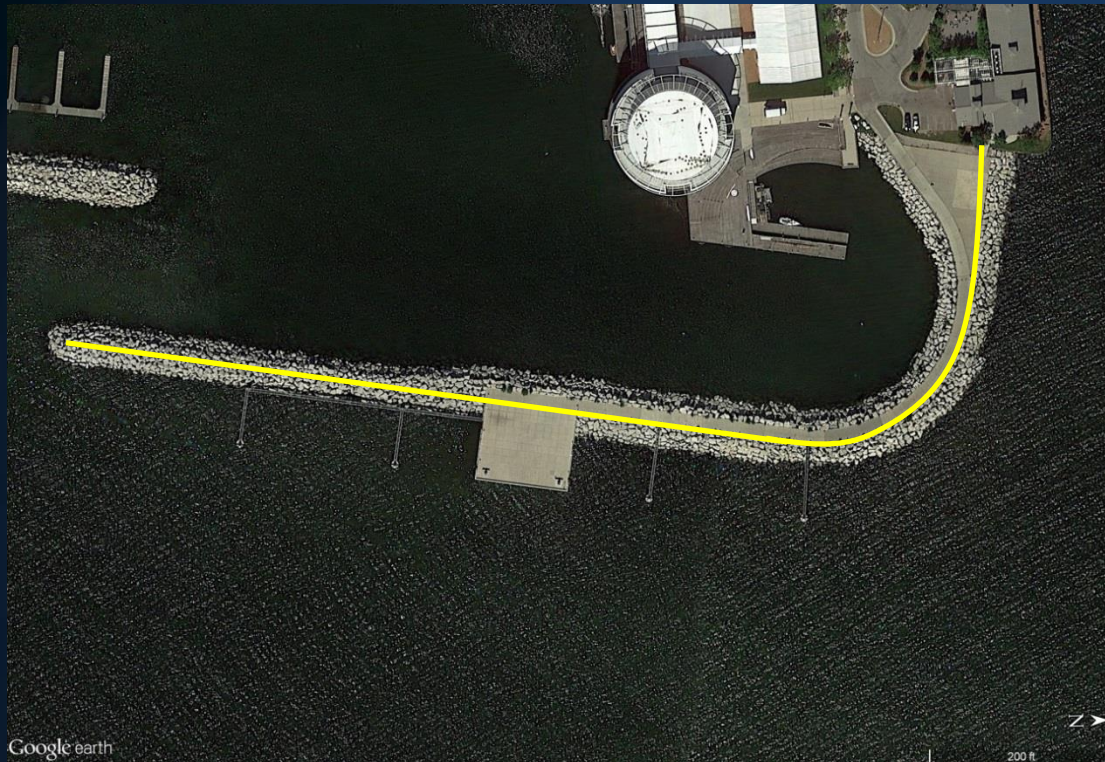
Constructed: 2004

Material: small stone core with large stone cover

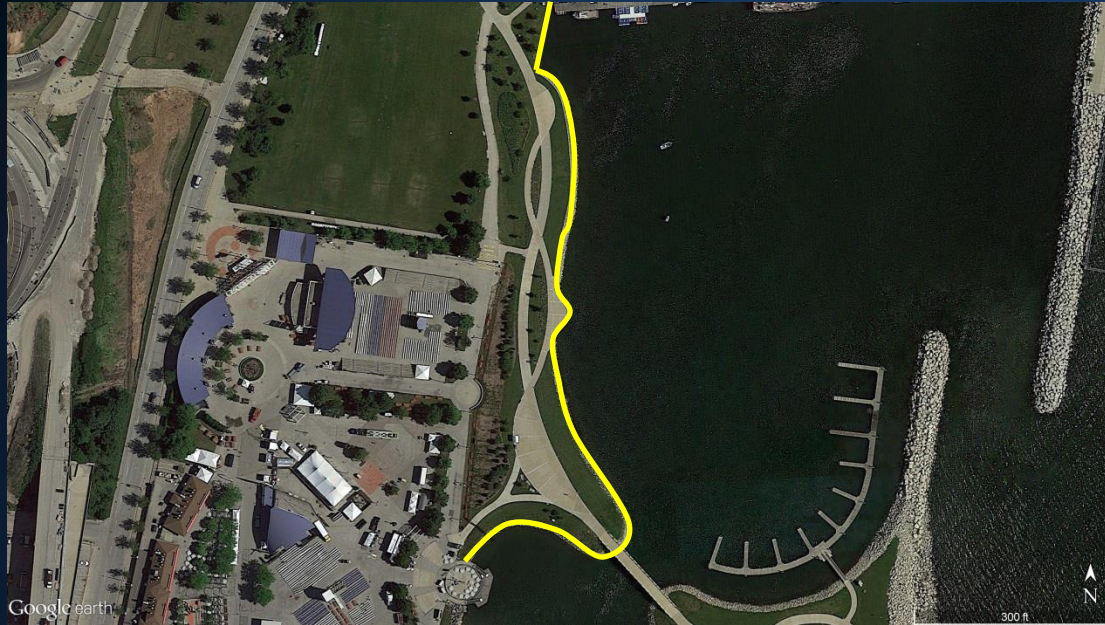
Length: 1,200 feet

Condition: Good

Estimated
Replacement Value: \$2,400,000



5. Urban Park South Fill Area



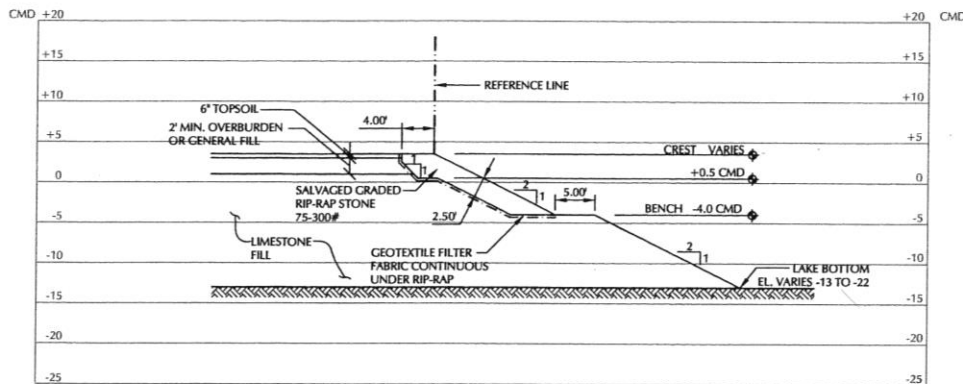
Constructed: 2005

Material: small stone core with large stone cover

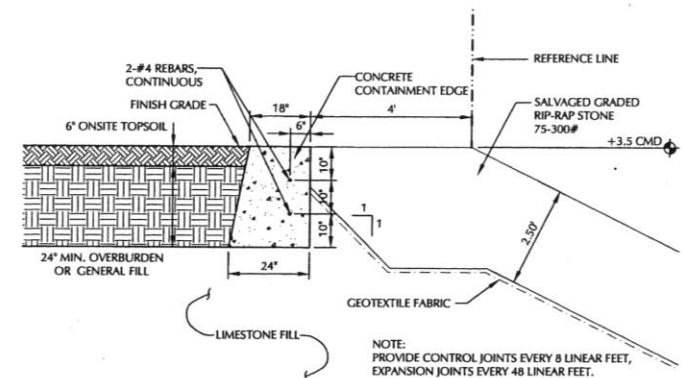
Length: 1,100 feet

Condition: Good

Estimated Replacement Value: \$2,750,000

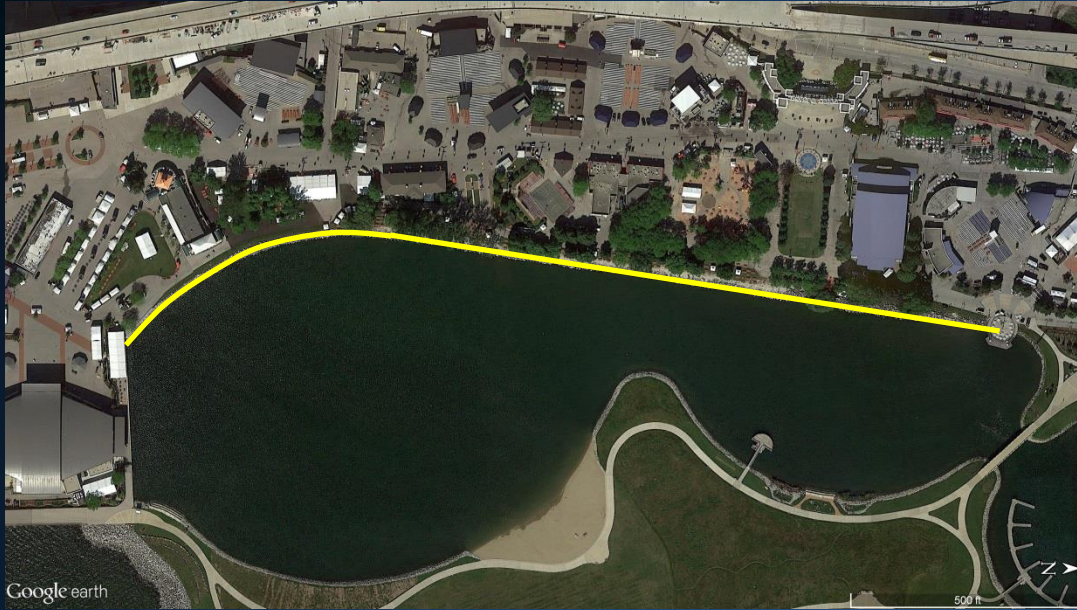


1 REVETMENT AT QUIET WATER BASIN
BR 6 SCALE 1" = 10'



4 CONCRETE CONTAINMENT EDGE - SECTION
BR 6 SCALE 1/2" = 1'-0"

6. Rubble Mound along Summerfest



Constructed: 1931

Material: small stone core with large stone cover

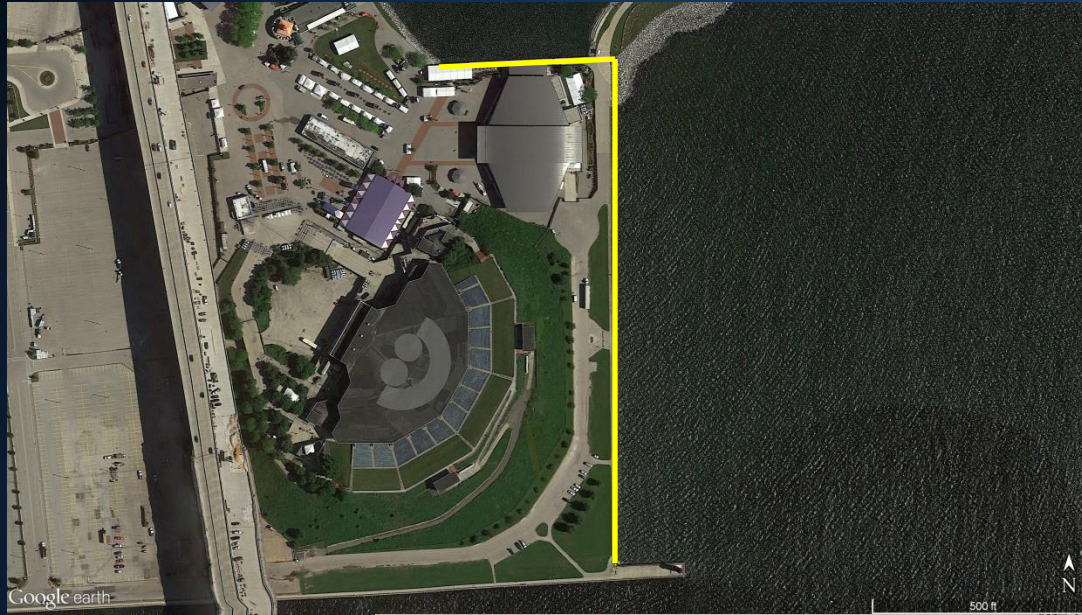
Length: 2,000 feet

Condition: Fair

Estimated
Replacement Value: \$3,000,000



7. 20 Acre Fill Site (Marcus Amphitheater)



Constructed: 1956

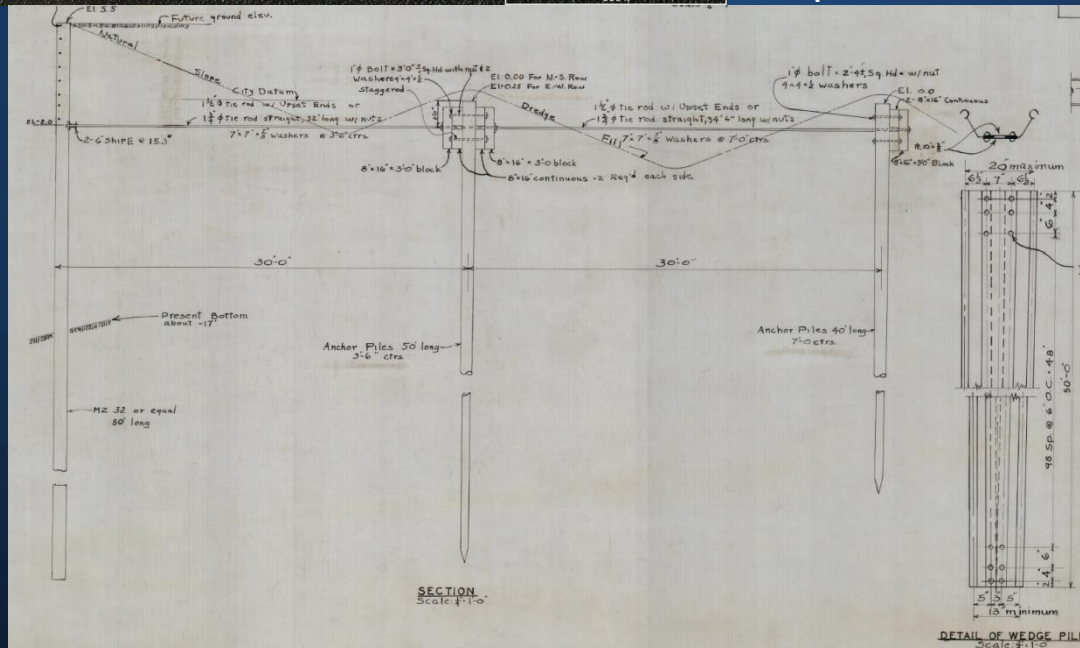
Material: steel sheeting with tie-back system

Length: 1,500 feet

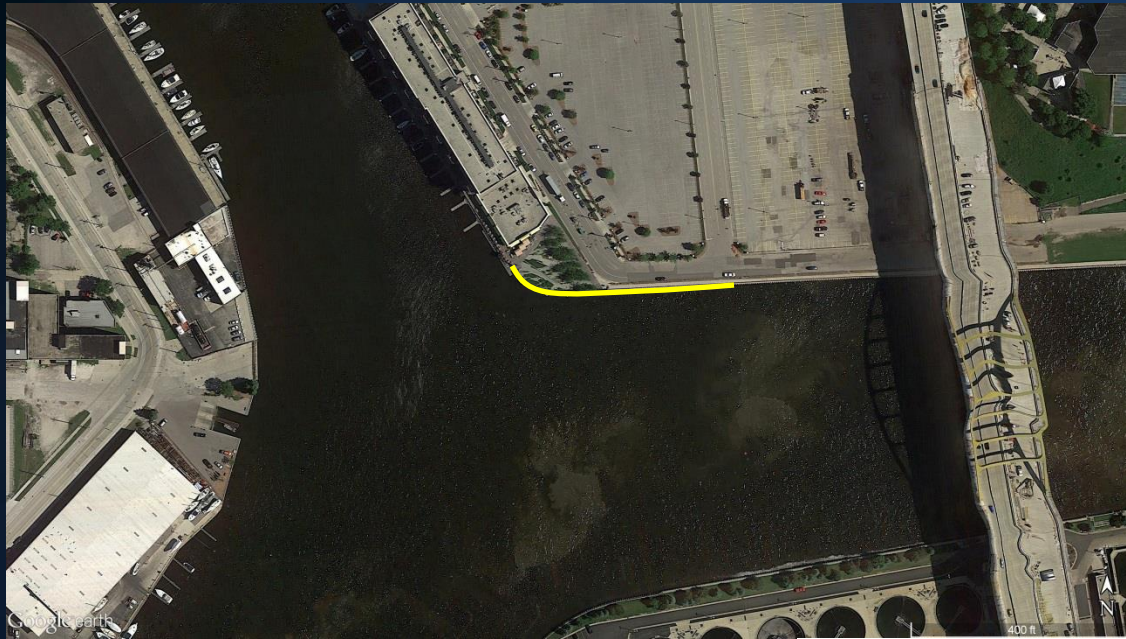
Condition: Fair

Estimated

Replacement Value: \$4,500,000



8. East Erie Street Dock



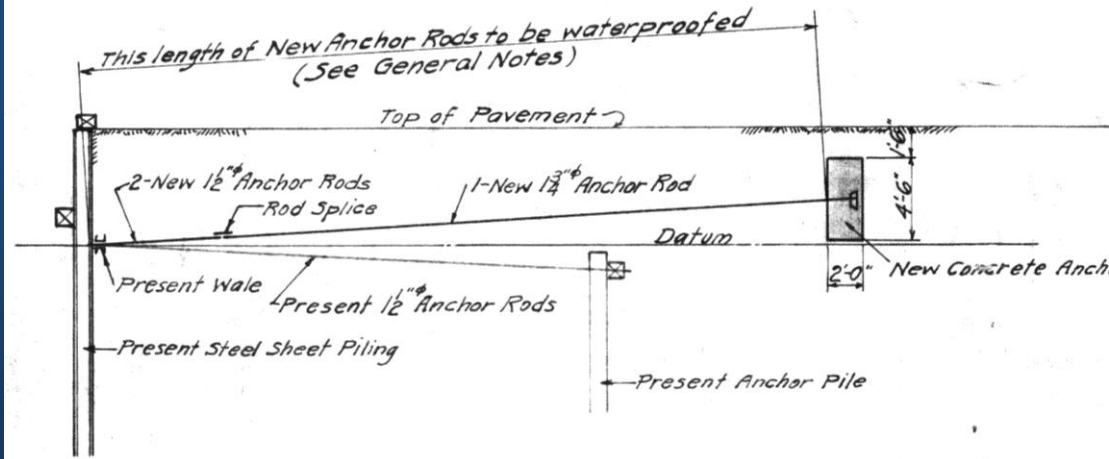
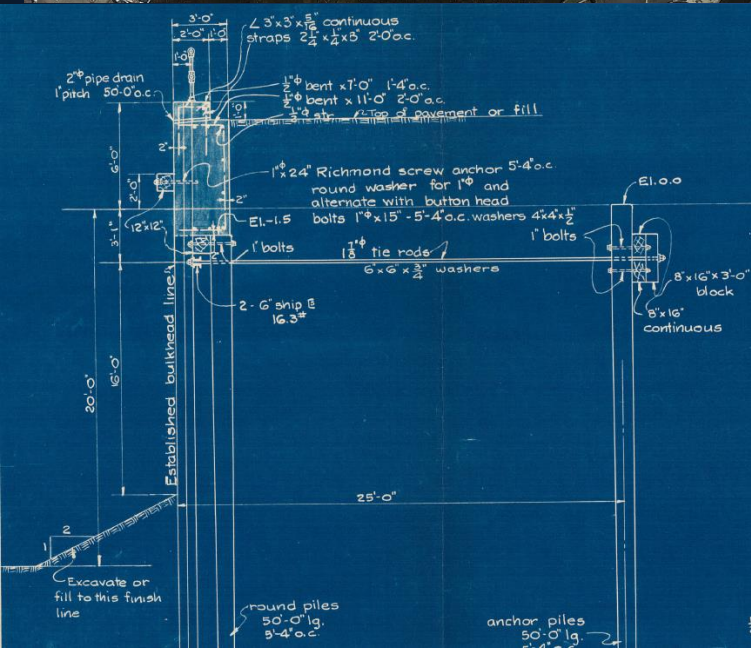
Constructed: 1934, 1949

Material: steel sheeting with tie-back system

Length: 400 feet

Condition: Poor

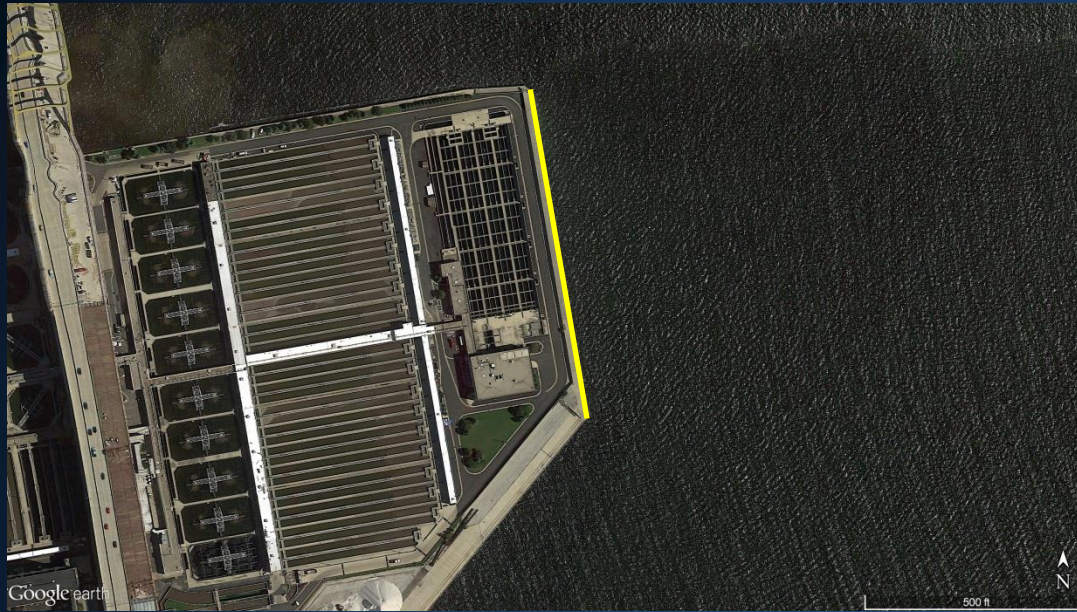
Estimated Replacement Value: \$800,000



Typical Cross Section - BB

Scale 1/8" = 1'-0"

9. Dock East of MMSD Plant



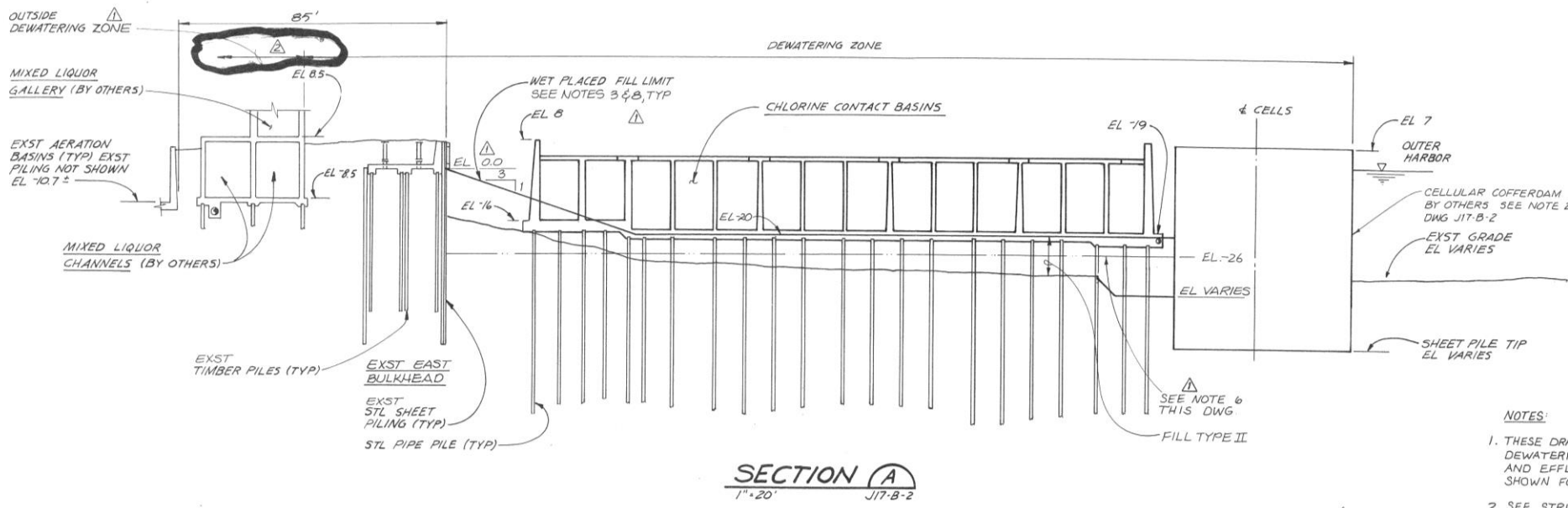
Constructed: 1985

Material: steel cells with concrete deck and face sheeting

Length: 700 feet

Condition: Good

Estimated Replacement Value: \$2,100,000



10. Dock South East of MMSD Plant

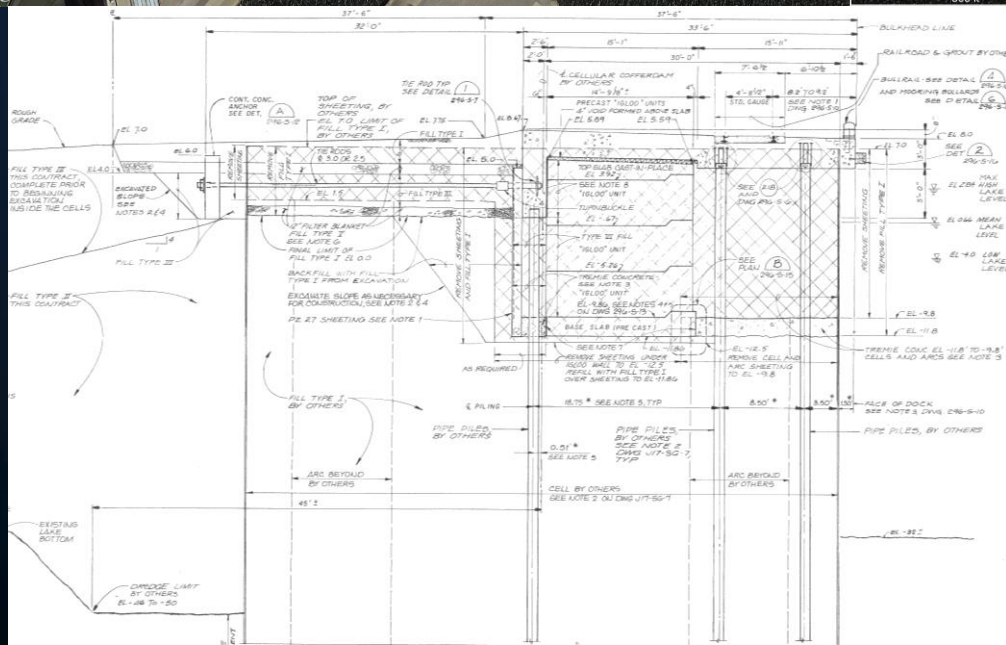
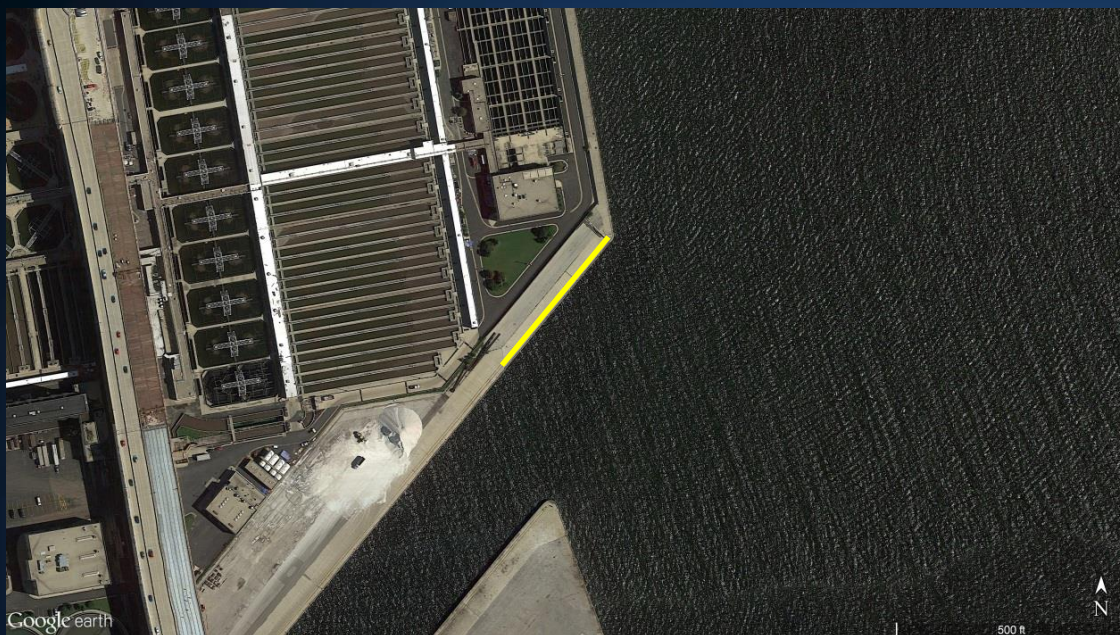
Constructed: 1985

Material: steel cells with concrete deck and wave attenuating device

Length: 400 feet

Condition: Good

Estimated
Replacement Value: \$1,400,000



I DOCK LOADING

A. UNIFORM LIVE LOAD = 1000 psf (SOUTH DOCK ONLY)

B. CRANE (SOUTH DOCK ONLY)

PEH MODEL 5300 CRAWLER 600K CAPACITY

249K

30'

2'

5'

BOOM

72 PSI MAX REACTION
(51.8 K CONCENTRATED AT ANY LOCATION)

(150' BOOM @ 35' RADIUS)

LOCOMOTIVE CRANE MODEL 850/80 DE

200K 5' BOOM 129

25 SQ. FT. — 2' — 6"

Q. R.R. TRACKS

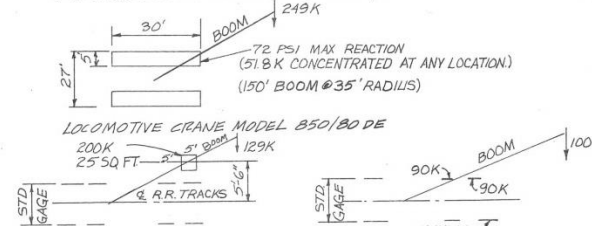
(60' BOOM @ 17' RADIUS)

RAIL LOADING COOPER E80 (SOUTH ROCK ONLY)

2. RAIL LOADING EFFICIENCY (SOUTH DUCK ONLY)
BK/FT. OF RAIL

2. AASHTO HS 20

2. ANALYSIS

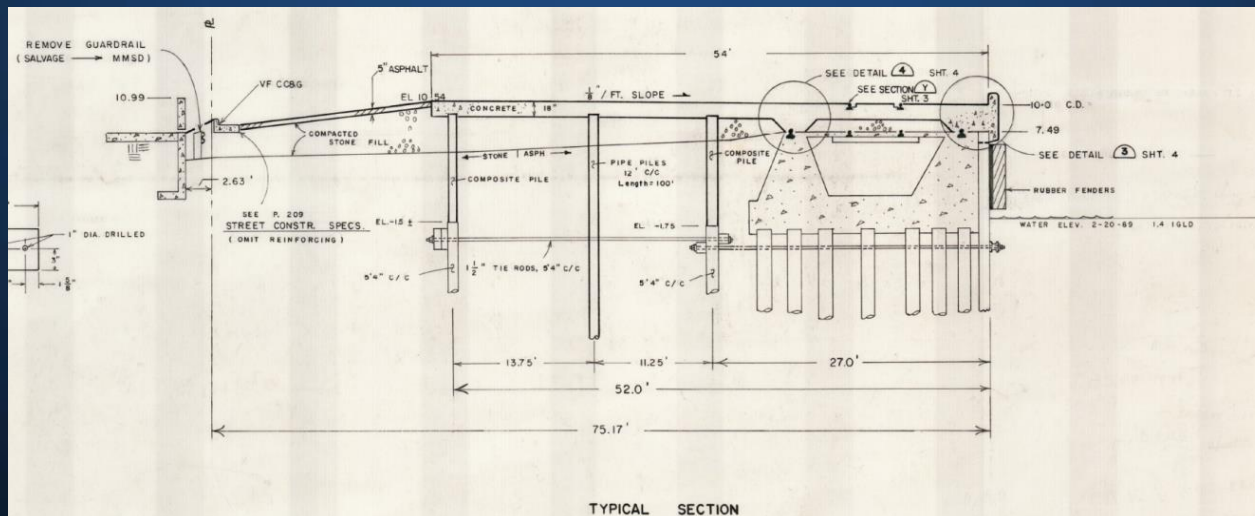


An aerial photograph of a wastewater treatment plant. The image shows several large circular aeration tanks in the lower-left corner, a rectangular clarifier building in the upper-left, and a long, narrow rectangular structure in the center. A yellow line is drawn along the right side of this central structure, extending from the top towards the bottom. The surrounding area includes roads, parking lots, and other industrial buildings. A scale bar indicating 500 feet and a north arrow are visible in the bottom right corner. The Google Earth logo is in the bottom left corner.

Material: steel sheet piling with pile supported concrete relieving platform and railroad track

Condition: Fair

Estimated
Replacement Value: \$3,250,000



An aerial view of a wastewater treatment plant. On the left, there are several large circular aeration tanks with central agitators. To the right of these is a large rectangular tank, likely an anaerobic digester. A yellow line is drawn along the edge of the rectangular tank. The surrounding area includes roads, parking lots, and some industrial buildings. A scale bar in the bottom right corner indicates 300 feet. The Google Earth logo is visible in the bottom left corner.

Material: steel sheeting with tie-back system and pile supported concrete slab

Condition: Poor

Estimated
Replacement Value: \$675,000

13. Type "B" Dock

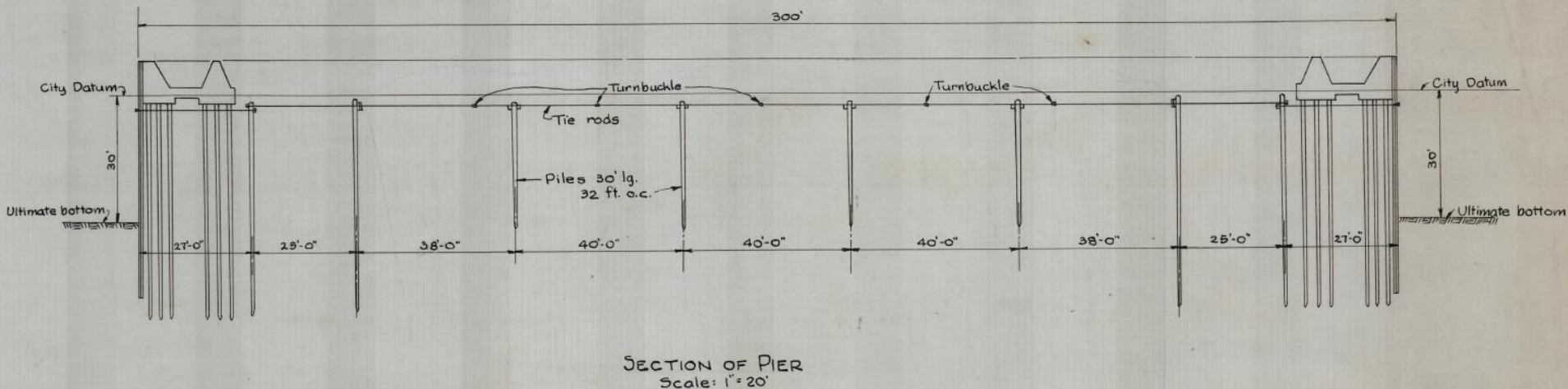
Constructed: 1932

Material: steel sheet piling with pile supported concrete relieving platform and railroad track (new surface concrete deck added)

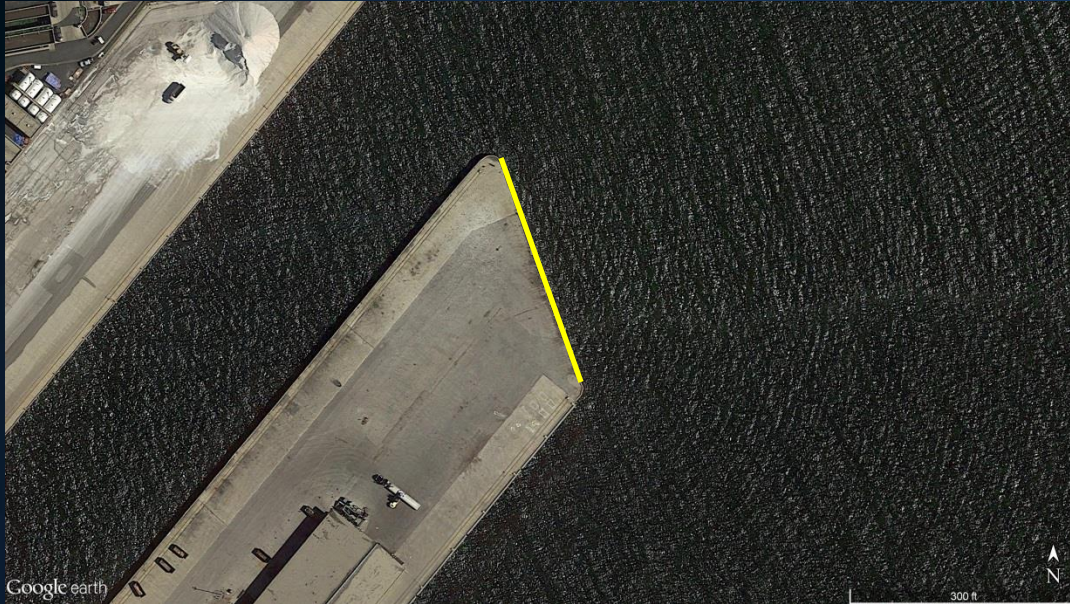
Length: 2,000 feet

Condition: Poor

Estimated Replacement Value: \$6,500,000



14. Type "D" Dock



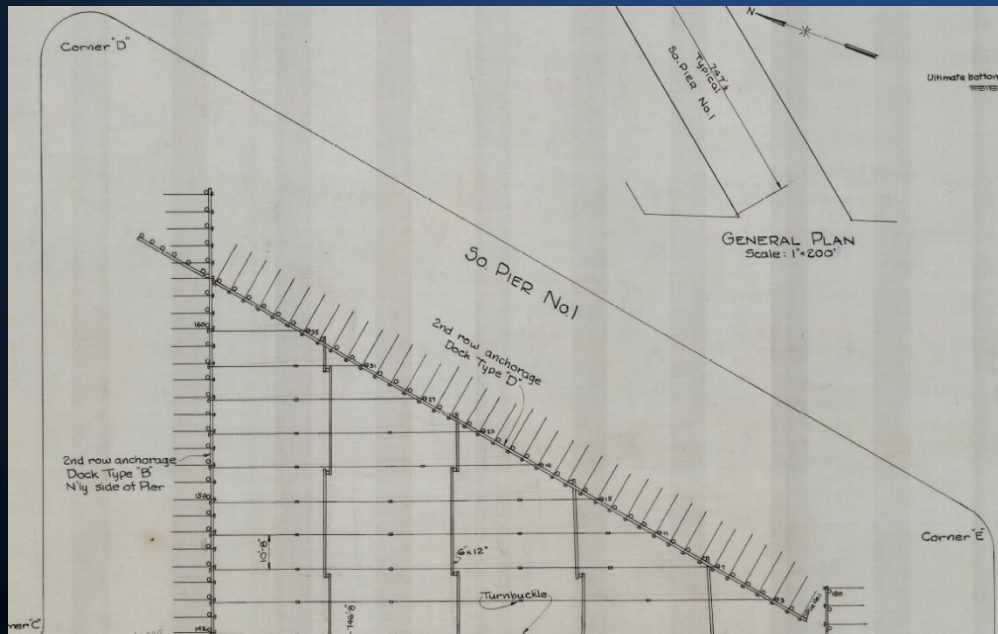
Constructed: 1931

Material: steel sheeting with tie-back system and pile supported concrete slab

Length: 350 feet

Condition: Poor

Estimated Replacement Value: \$787,500



Loading on South Pier No. 1 – Type “B” & Type “D” Docks



15. South Pier No. 2



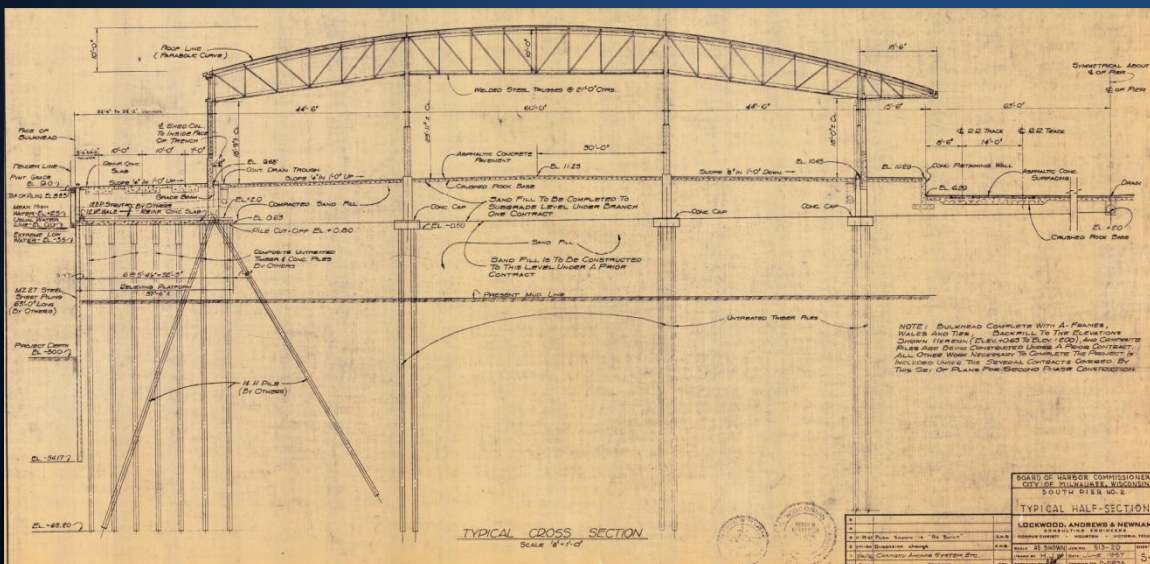
Constructed: 1958

Material: steel sheet piling with pile supported concrete relieving platform and railroad track (new surface concrete deck added)

Length: 2,600 feet

Condition: Poor

Estimated Replacement Value: \$8,450,000



16. Type "E" Dock

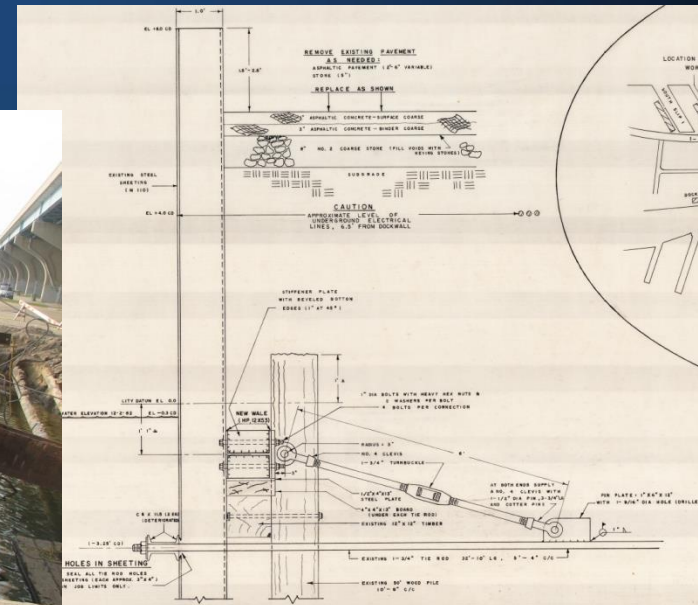
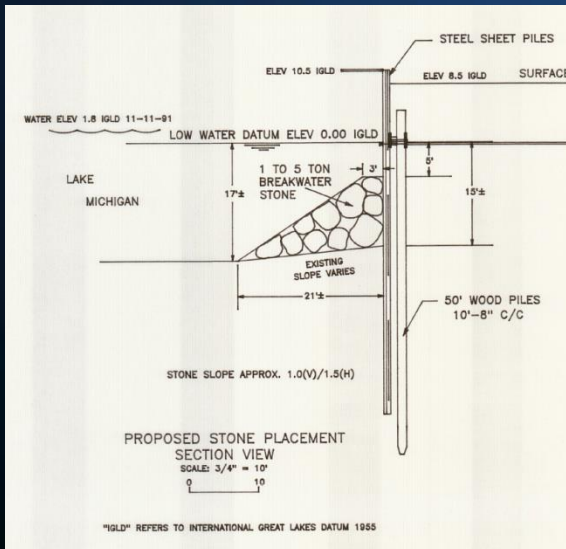
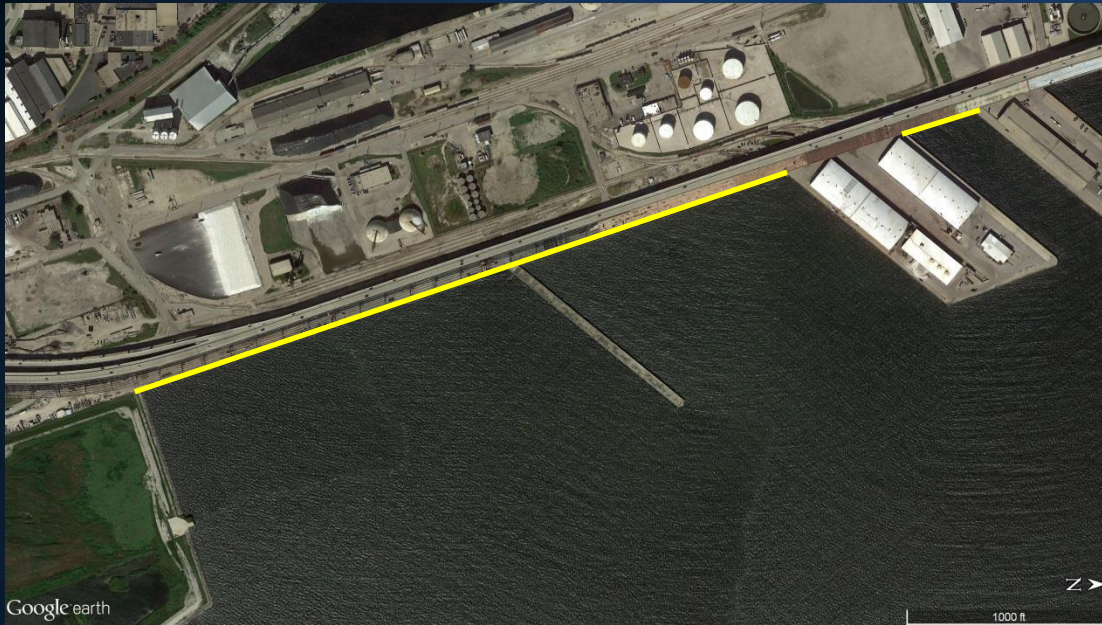
Constructed: 1931

Material: steel sheeting with tie-back system

Length: 3,800 feet

Condition: Poor

Estimated Replacement Value: \$6,650,000



17. Confined Disposal Facility North & East Sides



Constructed: 1975

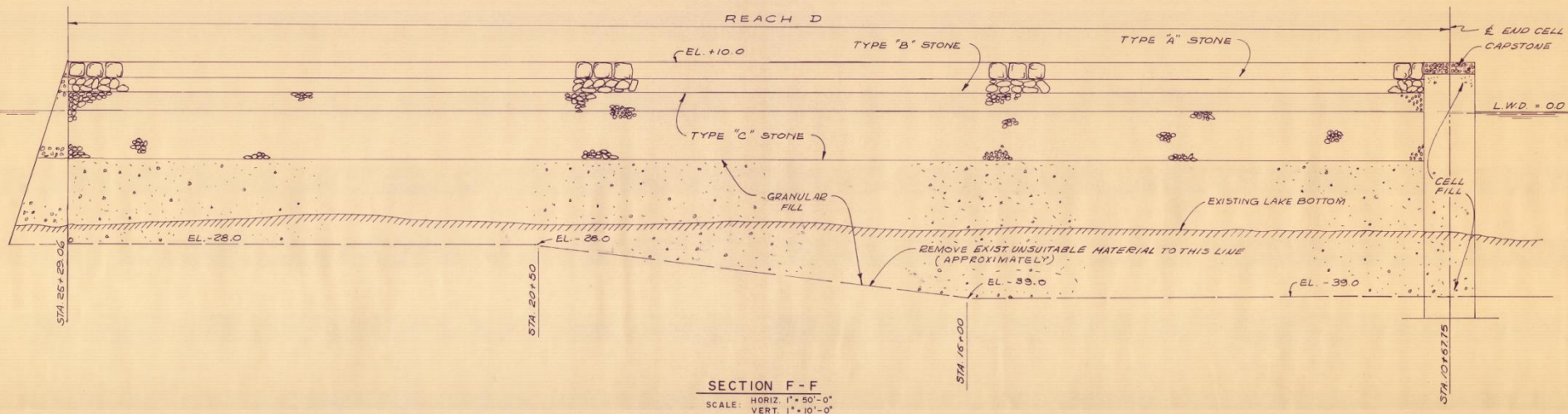
Material: rubble mound dike

Length: 2,600 feet

Condition: Fair

Estimated

Replacement Value: \$3,900,000



18. Confined Disposal Facility South Side



Constructed: 1975

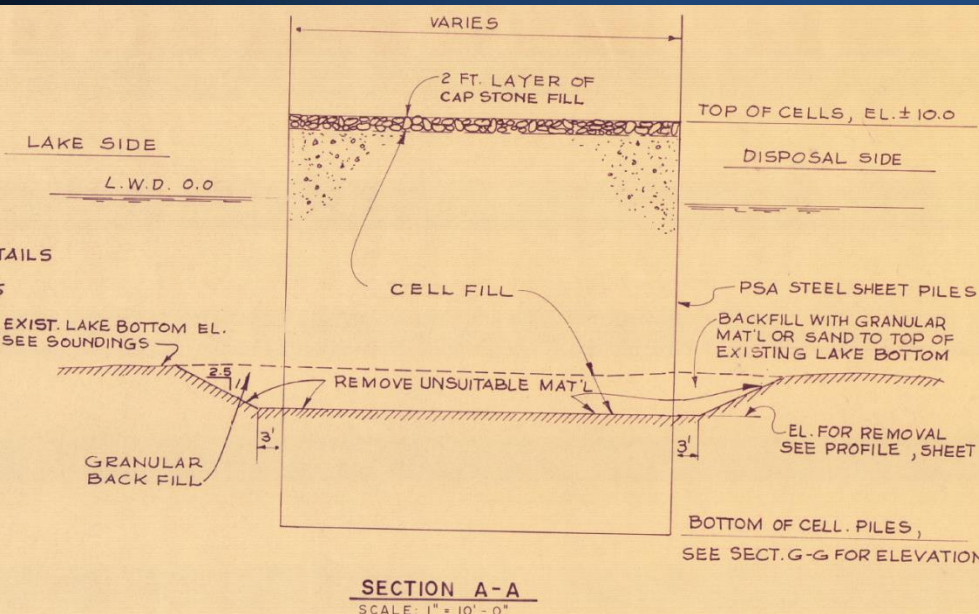
Material: steel cells

Length: 1,000 feet

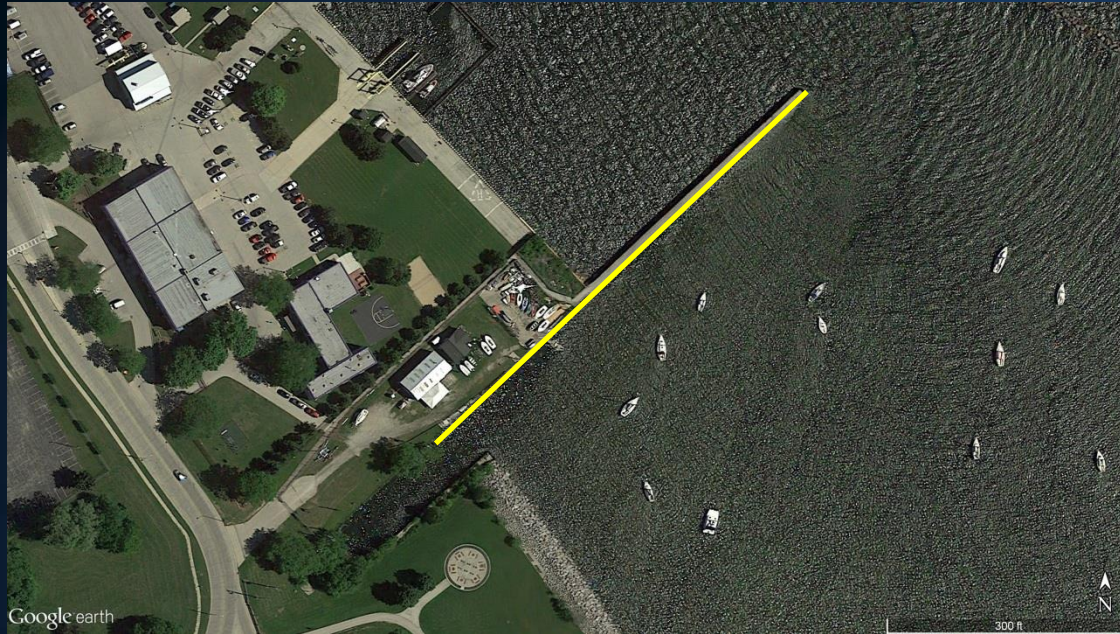
Condition: Fair

Estimated

Replacement Value: \$2,250,000



19. Russell Avenue Intake Sheeting



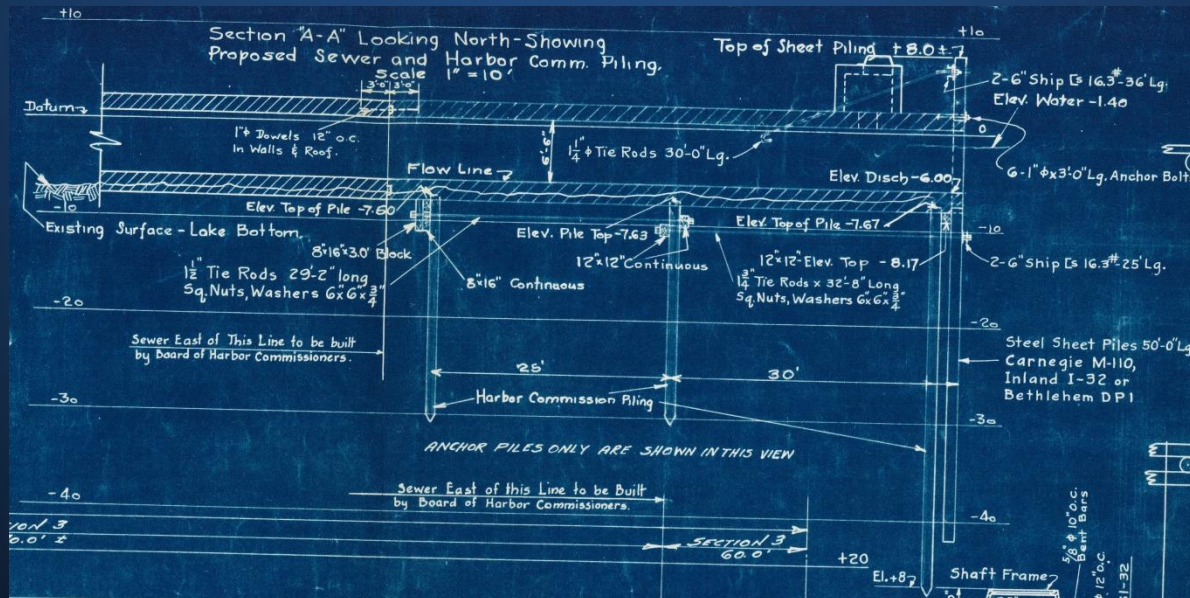
Constructed: 1939

Material: steel sheeting with tie-back system

Length: 600 feet

Condition: Poor

Estimated Replacement Value: \$1,050,000



20. Grand Trunk Dock



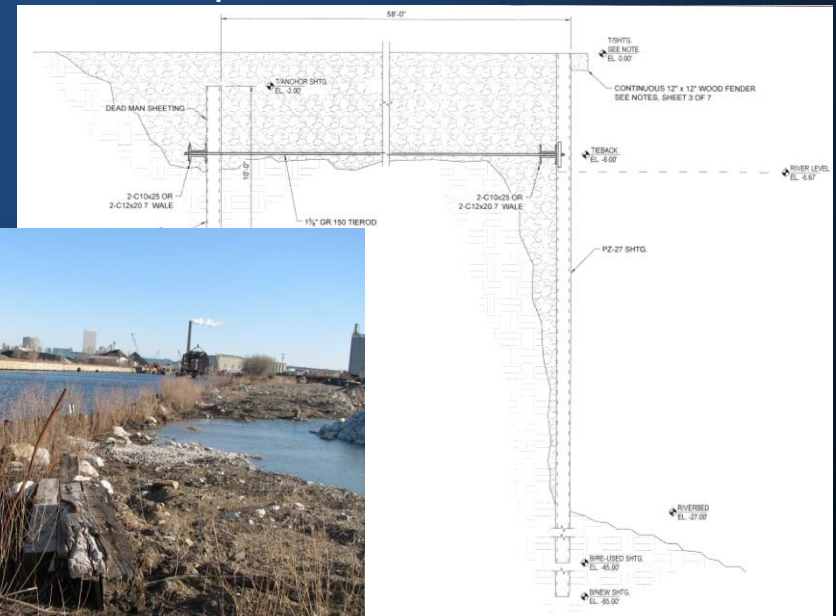
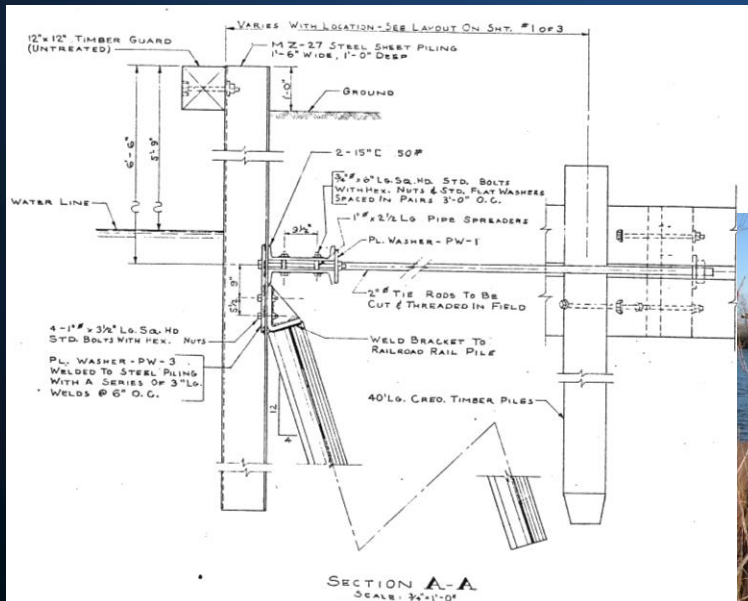
Constructed: 1945, 1954, 1958

Material: steel sheeting with tie-back system

Length: 1,500 feet

Condition: Fair

Estimated Replacement Value: \$3,750,000



21. Greenfield Avenue Dock



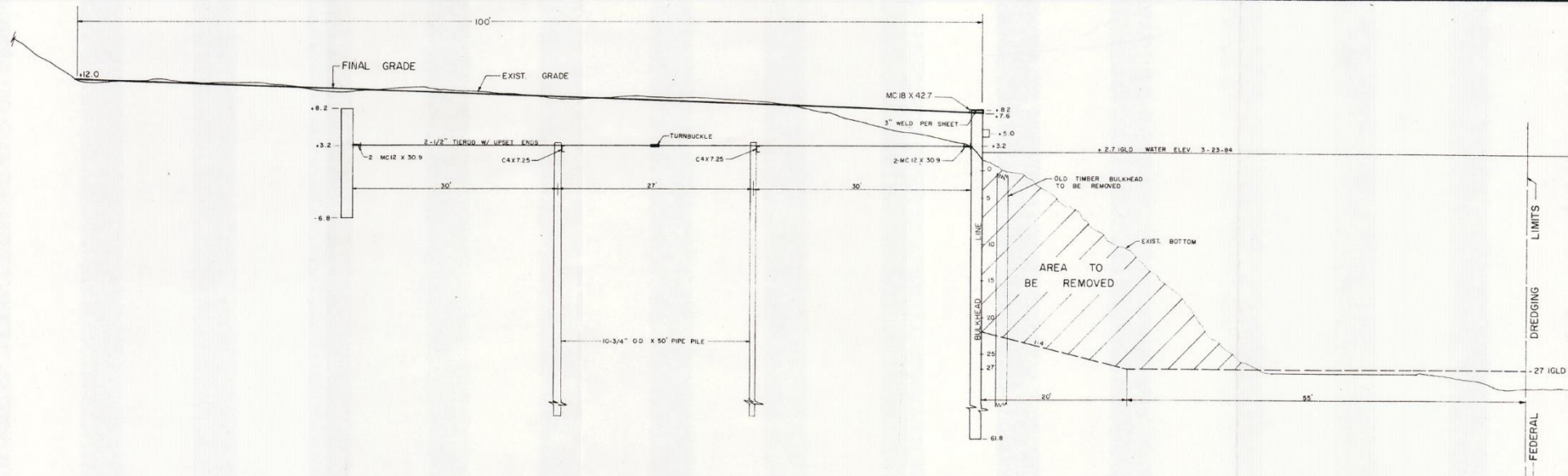
Constructed: 1984

Material: steel sheeting with tie-back system

Length: 800 feet

Condition: Fair

Estimated Replacement Value: \$2,200,000



22. Municipal Mooring Basin Dock



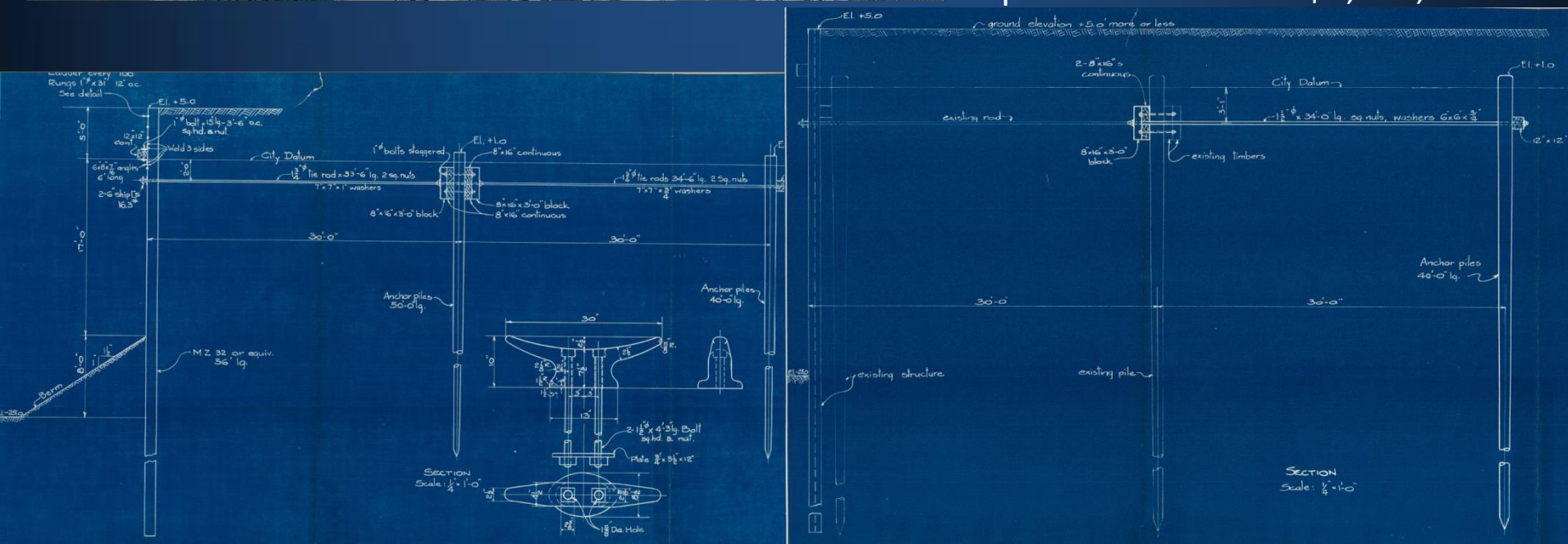
Constructed: 1932, 1943, 1947

Material: steel sheeting with tie-back system (some upgrades)

Length: 2,900 feet

Condition: Poor

Estimated Replacement Value: \$5,075,000



23. City Bulk Cargo Dock Reinforced



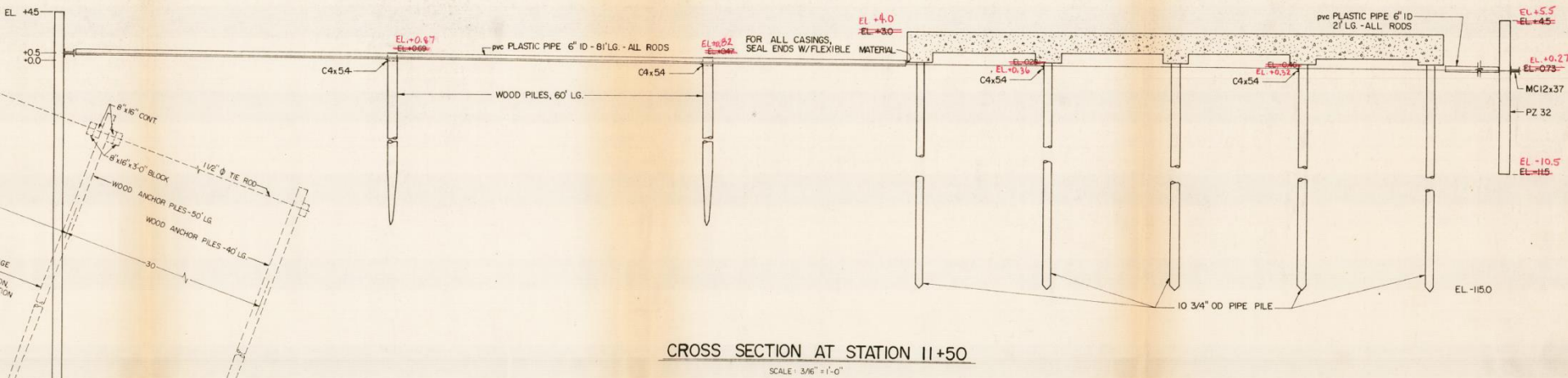
Constructed: 1947, 1978

Material: steel sheeting with tie-back system and pile supported concrete slab

Length: 330 feet

Condition: Poor

Estimated Replacement Value: \$990,000



24. City Bulk Cargo Dock



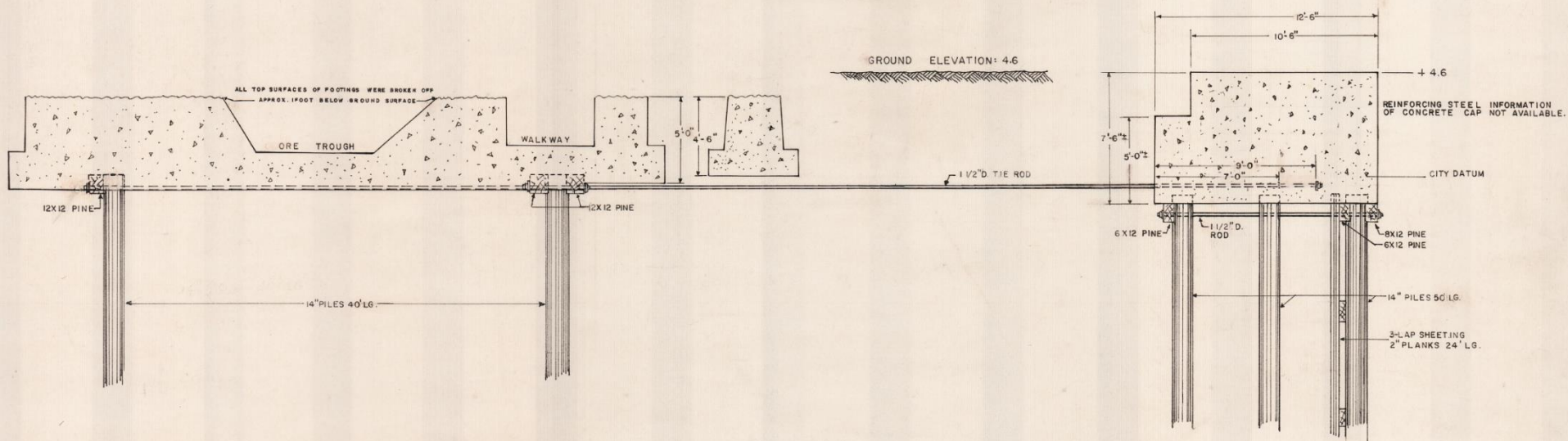
Constructed: 1940's

Material: steel sheeting with tie-back system (some upgrades)

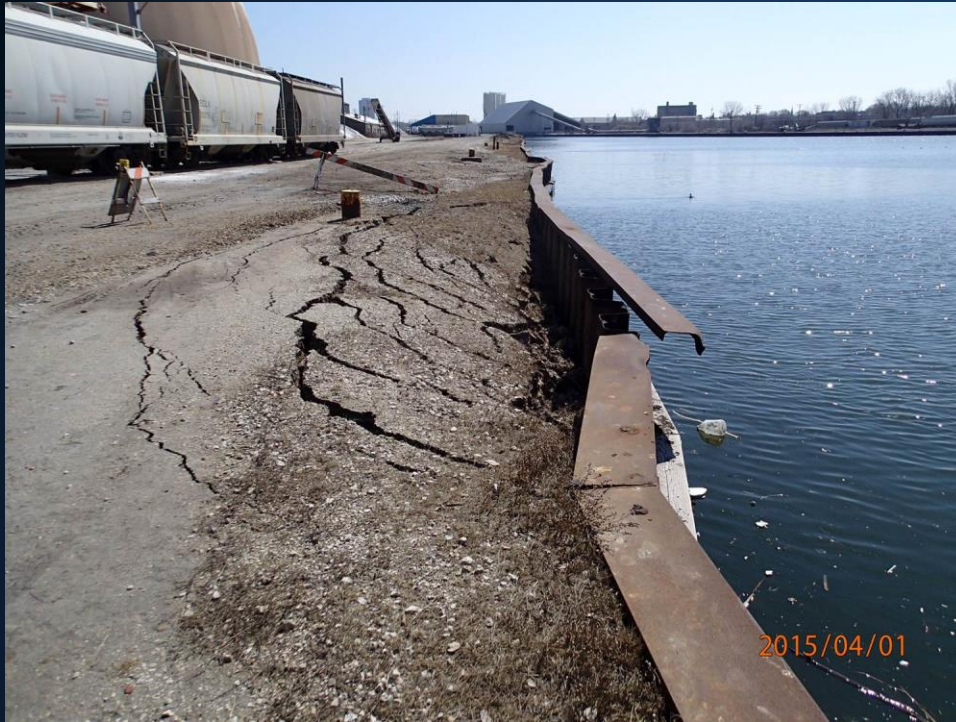
Length: 400 feet

Condition: Poor

Estimated Replacement Value: \$1,050,000



Failures & Spot Repairs



25. LaFarge North Dock

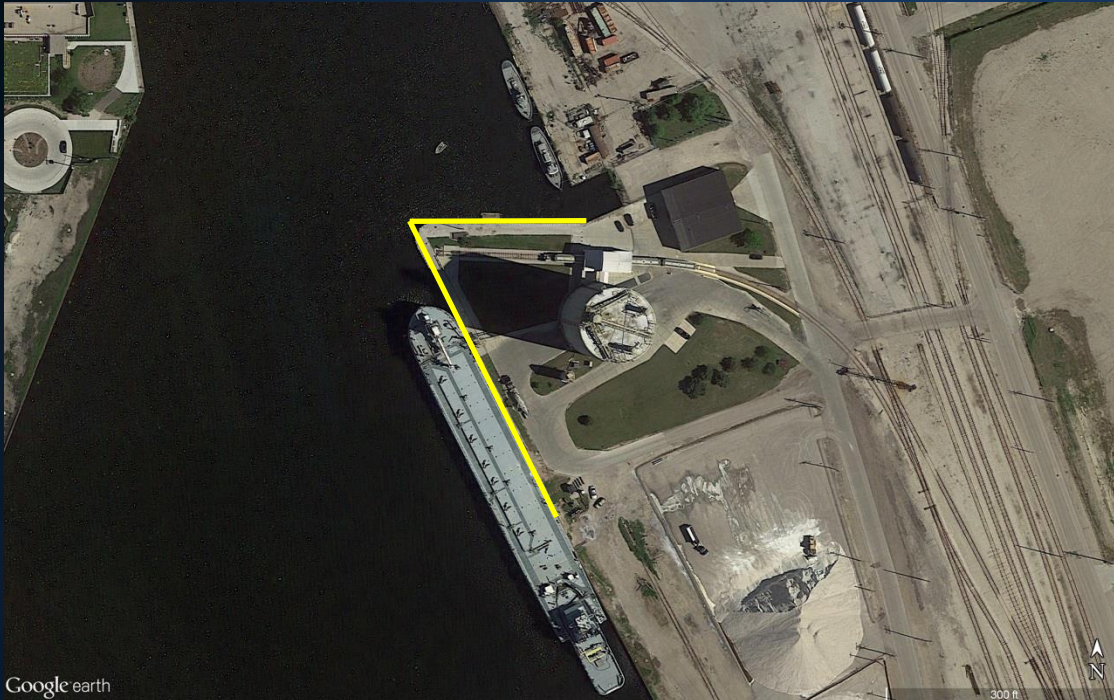
Constructed: 1946

Material: steel sheeting with tie-back system

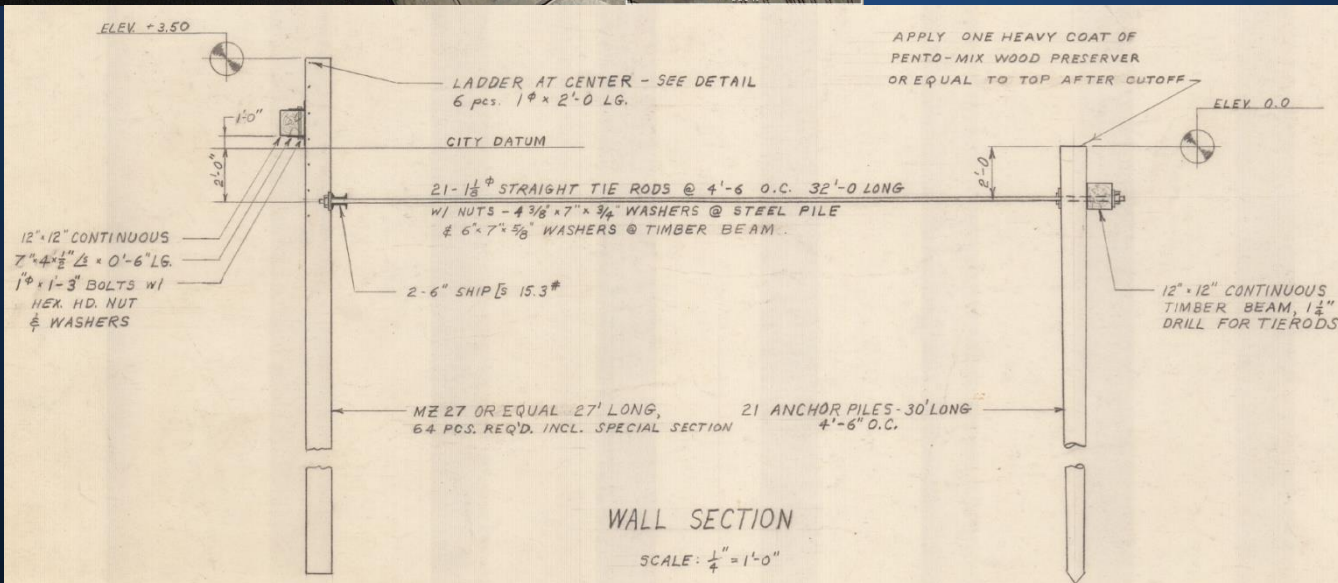
Length: 600 feet

Condition: Fair

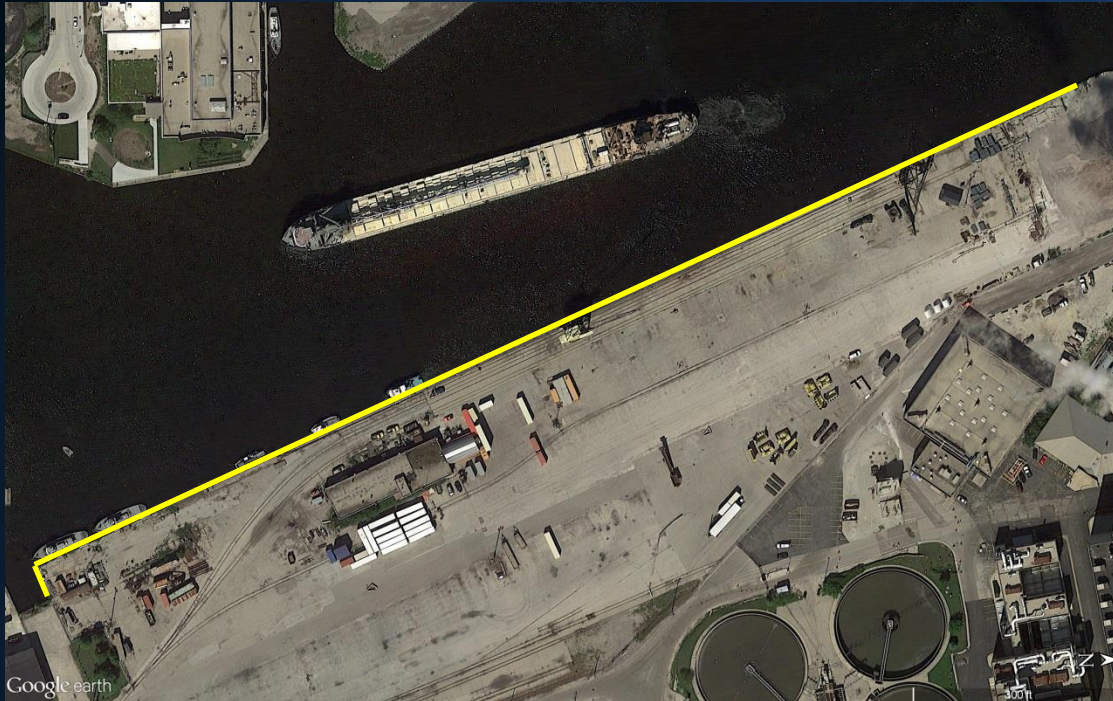
Estimated
Replacement Value: \$1,085,000



Google earth



26. City Heavy Lift Dock



Constructed: 1920's

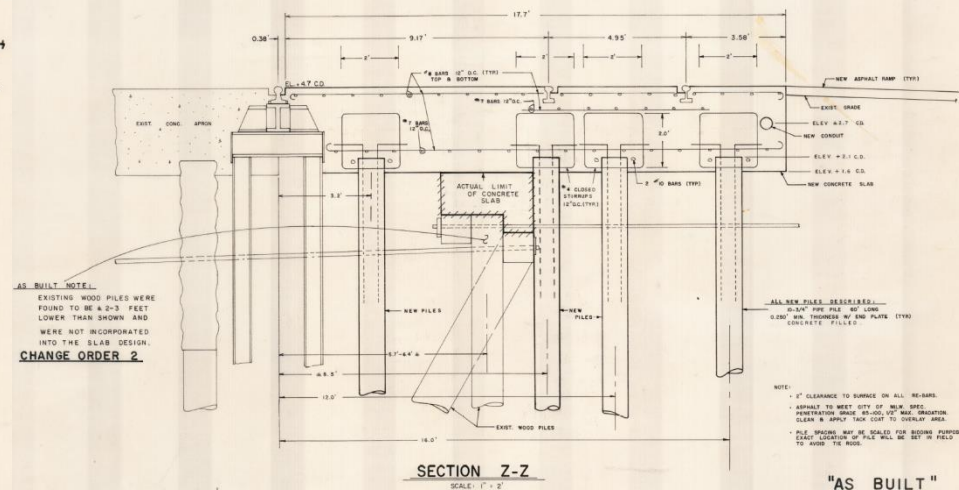
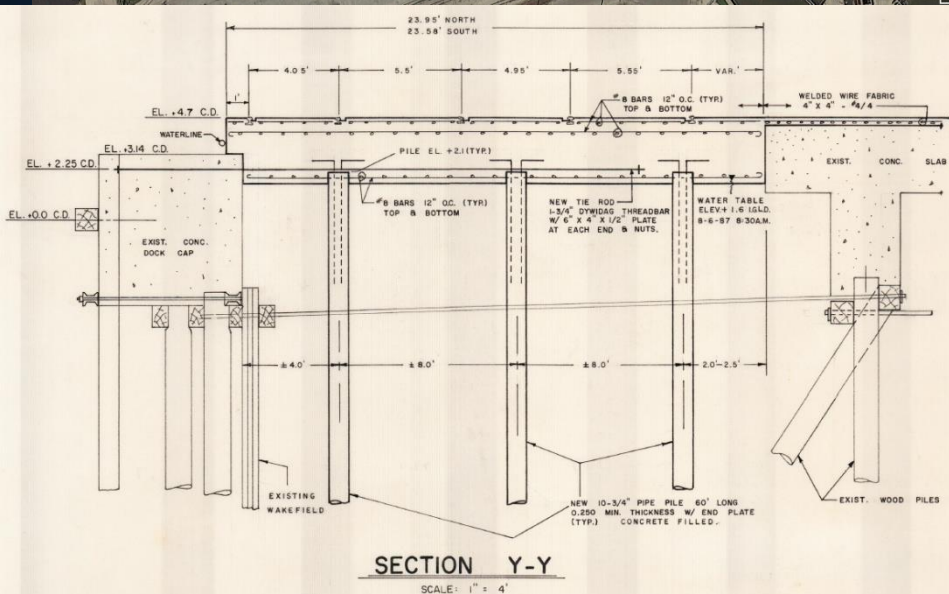
Material: steel sheet piling with pile supported concrete relieving platform and railroad track (new surface concrete deck added)

Length: 1,700 feet

Condition: Poor

Estimated

Replacement Value: \$5,525,000



27. Former Carferry Slip



Constructed: 2007

Material: steel cells

Length: 400 feet

Condition: Good

Estimated
Replacement Value: \$900,000

Google earth



Condition Summary



— Good

— Fair

— Poor

PORT OF MILWAUKEE



Questions?
Comments?

THANK YOU!