United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Name of Property

County and State

Section number ______ Page ______

Name of multiple property listing (if applicable)

SUPPLEMENTARY LISTING RECORD

NRIS Reference Number: 95001162 Date Listed: 10/20/1995

Property Name: Manistee Harbor, South Breakwater

County: Manistee State: MI

This property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation.

Signature of the Keeper

8/9/2010
Date of Action

Amended Items in Nomination:

Section 5: Resource Count

The nomination is hereby amended to include one (1) noncontributing structure.

The original submission neglected to count or describe the non-historic D-9 type light tower located at the ends of the South Breakwater. This cylindrical light was put in place between 1965 and 1980.

The Michigan State Historic Preservation Office was notified of this amendment.

DISTRIBUTION:

National Register property file
Nominating Authority (without nomination attachment)

1162

NPS Form 10-900
(Oct. 1990)

OMB No. 10024-0018

RECEIVED
SEP 8 1995
INTERAGENCY RESOURCES DIVISION
NATIONAL PARK SERVICE
NATIONAL REGISTER BRANCH

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Manistee Harbor, South Breakwater

other names/site number

2. Location

street & number Mouth of the Manistee River at Lake Michigan ☐ not for publication

city or town Manistee ☐ vicinity

state Michigan code MI county Manistee code 101 zip code 49660

3. State/Federal Agency Certification

As the designated authority under the National Historic preservation Act, as amended, I hereby certify that this ☑ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☑ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant ☐ nationally ☐ statewide ☑ locally. (☐ See continuation sheet for additional comments.)

A. Foster Engineer Corps Federal Preservation Officer 9-7-95
Signature of certifying official/Title Date

State or Federal agency and bureau

In my opinion, the property ☒ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

Kathryn B. Eckert SHPO 11-30-93
Signature of certifying official/Title Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is:

☑ entered in the National Register.
☐ See continuation sheet.
☐ determined eligible for the National Register
☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:)

Signature of the Keeper: Patrick Andrus

Date of Action: 10/20/95

5. Classification

Ownership of Property
(Check as many boxes as apply)

- ☐ private
- ☐ public-local
- ☐ public-State
- ☒ public-Federal

Category of Property
(Check only one box)

- ☐ building(s)
- ☐ district
- ☐ site
- ☒ structure
- ☐ object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
		buildings
		sites
1		structures
		objects
1		Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed in the National Register

1

6. Function or Use

Historic Functions
(Enter categories from instructions)

TRANSPORTATION/water-related

Current Functions
(Enter categories from instructions)

TRANSPORTATION/water-related

7. Description

Architectural Classification
(Enter categories from instructions)

OTHER: No style

Materials
(Enter categories from instructions)

foundation round timber piles/driven sheet piles
walls
roof
other log, stone, concrete

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

The south breakwater at Manistee, Michigan, is one of three navigation structures at this location owned and maintained by the U.S. Army Corps of Engineer (Detroit District). The other structures consists of two entrance piers at the mouth of the Manistee River, which serve to stabilize ship access between Lake Manistee (i.e., inner harbor) and the harbor of refugee (i.e., outer harbor created by the south breakwater and the north pier (Figure 1). This latter structure (i.e., north pier) has previously been placed (Harold 1990) on the National Park Service listing of properties on the National Register of Historic Places. The original south pier structure was removed and replaced in 1949-50 with a stone and sand filled structure of driven Z-type steel sheet piling. The present structure does not contribute to the overall historical context of the north pier and south breakwater structures.

(Continued

Narrative Description

The south breakwater is physically marked by a low profile slab and massed concrete superstructure, which extends to the level of the lake surface and obscures the substructure from direct visual examination. The south breakwater extends a total of 2,485 ft in length and consists of two distinct substructural components. The outer element, aligned on a north-northwest axis, extends for 1,300 ft and consists of a timber crib substructure anchored to round upright driven timber piles (Figures 1 and 2:Sections B and B-1). The breakwater shore connection is aligned on a west-northwest axis extending for 1,185 ft. This component is formed by a stone filled causeway substructure formed by a double wakefield type wall of overlapped wood plank sheeting (Figures 1 and 3:Sections M, N, O, O-1, P, Q). Constructed between 1912 and 1920, the extant substructure was subsequently capped with a concrete superstructure during three construction phases in 1916, 1919-20, and 1933.

Rehabilitation activities centered around this structure have been minimal over the past 50 years. These have largely consisted of the stabilization and/or replacement of riprap mound components along the harbor and lake facing breakwater walls and the refilling of certain of the timber crib cells with upwards of 110 tons of stone ballast in 1980. Beyond these modifications, which have tended to obscure its submerged facade, virtually nothing has been done to alter the original breakwater substructure. The replacement of the original timber and wood plank superstructure of the timber crib sections (B-1 and B) of the breakwater in 1933 represents the only substantive structural alteration which has taken place.

The construction schedules for the various sections of the south breakwater as itemized in Figures 1, 2, and 3 are summarized as follows:

Construction Schedules

Section	Length (ft)	Substructure	Superstructure	Rehabilitated
B-1	720	1913, 1915-16, 1919	1933	---
B	580	1913, 1915-16, 1919	1933	1966
	1,300 (Subtotal)			
M	320	1917-20	1919-20	1965
N	145	1917-20	1919-20	1965
O	72	1917-20	1919-20	1965
O-1	183	1917-20	1919-20	1965
P	252	1917-20	1919-20	1965
Q	213	1916	1916	---
	1,185 (Subtotal)			
	2,485 (Total)			

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- ☐ **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- ☐ **B** Property is associated with the lives of persons significant in our past.
- ☒ **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values,or represents a significant and distinguishable entity whose components lack individual distinction.
- ☐ **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria considerations
(Mark "x" in all the boxes that apply.)

Property is:

- ☐ **A** owned by a religious institution or used for religious purposes.
- ☐ **B** removed from its original location.
- ☐ **C** a birthplace or grave.
- ☐ **D** a cemetery.
- ☐ **E** a reconstructed building, object, or structure.
- ☐ **F** a commemorative property.
- ☐ **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)

Engineering

Period of Significance

1913-20

Significant Dates

1913

Significant Person
(Complete if Criterion B is marked above)

N/A

Cultural Affiliation

Architect/Builder

U.S. Army Corps of Engineers

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

Bibliography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

- ☐ preliminary determination of individual listing (36 CFR 67) has been requested
- ☐ previously listed in the National Register
- ☐ previously determined eligible by the National Register
- ☐ designated a National Historic Landmark
- ☐ recorded by Historic American Buildings Survey # ____________
- ☐ recorded by Historic American Engineering Record # ____________

Primary location of additional data:

- ☐ State Historic Preservation Office
- ☐ Other State agency
- ☒ Federal agency
- ☐ Local government
- ☐ University
- ☐ Other

Name of repository:

U.S. COE Office-Grand Haven; U.S. COE Office-Detroit

Manistee Harbor, South Breakwater
Name of Property

Manistee, Michigan
County and State

10. Geographical Data

Acreage of Property 1.3 acres

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	1 6	5 5 1 9 0 5	4 8 9 9 7 9 5
2	1 6	5 5 2 2 9 5	4 8 9 9 3 1 0
3			
4			

☐ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title C. Stephan Demeter/Historical Archaeologist, Historian

organization Commonwealth Cultural Resources Group, Inc. date September 30, 1993

street & number 2530 Spring Arbor Road telephone 517-788-3550

city or town Jackson state Michigan zip code 49203-3602

Additional Documentation
Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional items
(Check with the SHPO or FPO for additional items)

Property Owner
(Complete this item at the request of SHPO or FPO.)

name U.S. ARMY CORPS OF ENGINEERS

street & number DETROIT DISTRICT, POST OFFICE BOX 1027 telephone

city or town DETROIT, MI 48231-1027 state zip code

Narrative Statement of Significance

The Manistee Harbor U.S. Corps of Engineers (COE) owned south breakwater qualifies for nomination to the National Park Service, National Register of Historic Places by virtue of its significance as an expression of traditional (i.e., preindustrial) engineering design adapted to the needs of early twentieth century harbor development (Criterion C).

Engineering Significance (Criterion C)

Technological Overview (General)

The opening of the upper Great Lakes region to a more intensified range of settlement had, by the early 1850s, led to accelerated commercial growth. In addition to increases in the mainstays of agricultural production and logging, this period also witnessed the emergence of the extractive mineral industries of Lake Superior and the development of urban consumer-production centers along the south shores of Lakes Erie and Michigan. The opening of the St. Mary's Ship Canal and the modification of the Welland Canal were important manifestations of this early phase of regional development. Whereas the former project provided direct access to the mining district of Lake Superior, the latter established a direct shipping link between the Great Lakes ports with those along the Atlantic seaboard and Europe (Strickland 1860:340). As an adjunct to the increasingly important role of ship navigation in regional economic growth, harbor construction took on a new significance. While federal involvement in port development projects on the upper Great Lakes had begun as early as the mid-1830s at St. Joseph on Lake Michigan, and at Monroe on Lake Erie, it was not until the early 1850s that these efforts were extended beyond simple channel clearing operations and began to manifest themselves in construction projects aimed at creating refuges along an otherwise largely unprotected coastline (Larson 1981:24).

An integral element of harbor construction activities on the Great Lakes was the creation of pier and breakwater barriers serving as shelter for shipping and the protection of dock and wharf facilities that might otherwise be directly exposed to wave and ice damage. Because of the occurrence of numerous protected harbors along the Atlantic coast the need for breakwater construction, and the prerequisite technology, had been of minimal importance to harbor engineering in the United States up through the early nineteenth century (Strickland 1826). It was not until the needs of a greatly expanded Great Lakes shipping trade began to require extensive harbor improvement projects that direct experience in this field was initiated. According to one turn-of-the-century source, it was directly due to this situation that "...the design and construction of breakwaters... [had]...reached a high [stage of] development" in the United States (Wright 1914:699). The largest proportion of this work was the product of federally legislated United States Army Corps of Engineers activities.

Breakwater design on the Great Lakes since the mid-nineteenth century has depended on a variety of compositional elements, ranging from the use of timber cribbing, wood sheet and timber pilings, concrete, driven steel sheeting, and stone rubble. Variations in design fabrication have been numerous over the past 150 years. While these transitions can ultimately be traced to technological innovations ongoing in the construction trade during this period, other important factors relate directly to per unit costs, the local availability of supplies, function, and environmental stress factors.

The fact that jetties and breakwaters are virtually identical in terms of composition and design, and are nominally categorized under the general heading of pier structures, has tended to create a certain amount of confusion in structure identifications (Wright 1914:699). As defined in the field of marine engineering, jetties and breakwaters are distinguished, in part, according to their placement in relation to the shore (Wright 1914:699). A far more important element serving to segregate the two structural types is associated with their intended functions. These are categorized as follows:

Breakwater

A breakwater is a structure employed to reflect and/or dissipate the energy of water waves and thus prevent or reduce wave action in an area it is desired to protect. Breakwaters for navigation purposes are constructed to create sufficiently calm waters in a harbor area, thereby providing protection for the safe mooring, operating, and handling of ships and protection of shipping facilities. Breakwaters are sometimes constructed within large, established harbors to protect shipping and small craft in an area that would be exposed to excessive wave action. Offshore breakwaters may serve as aids to navigation and/or shore protection, and differ from other breakwaters in that they are generally parallel to and not connected with the shore.

Jetty

A jetty is a structure, generally built perpendicular to the shore, extending into a body of water to direct and confine a stream or tidal flow to a selected channel and to prevent or reduce shoaling of that channel. Jetties at the entrance to a bay or a river also serve to protect the entrance channel from storm waves and crosscurrents, and when located at inlets through barrier beaches jetties also serve to stabilize the inlet location [United States Department of the Army (U.S.D.A.) 1986:1-3].

During the past century, numerous innovations have been adopted in pier (i.e., breakwater/jetty) construction on the Great Lakes. To a large extent, these transitions have reflected a delicate balance between factors of need and cost. One example representative of this approach can be seen in the relatively low occurrence of the stone rubble moles, almost universally adapted in Europe and the Mediterranean for breakwater construction since the Classical period. Prior to 1940, its use in the upper Great Lakes, above Lake Erie, was limited to no more than 7,082 ft of free-standing structure, of which more than half (3,949 ft) had been erected between 1910 and 1913; at Ashland and Marquette harbors on Lake Superior; and Mackinac Island Harbor at the north end of Lake Huron (United States Army Engineer District, Detroit [U.S.A.E.D.D] 1986). The use of stone as ballast in timber crib breakwater construction was common throughout the nineteenth century. At soft-bottom harbor sites, it was also deposited as a barrier along the base of the breakwater to prevent scouring or undercutting of the substructure. At locations possessing hard clay or rock bottoms, stone was often employed as a foundation material for timber crib piers which as a result could be extended further into deeper waters than would normally have been possible with the use of crib-work alone. In addition to the above uses, stone was also employed as a shock absorbing sloped barrier on the lakeward side of the breakwaters (Figure 4). In some instances, stone rubble has been laid up along the harbor facing walls or carried up over the top of the original substructure (Figure 5). This approach to breakwater construction reflects one of several employed since the 1910s in rehabilitation projects aimed at stabilizing and improving the earlier dating timber crib or pile substructures. These efforts have led to the creation of composite structures exhibiting the profile of a rubble mound but possessing diverse core elements indicative of prior building phases.

In addition to stone and concrete rubble mounds, the use of interlocking steel sheet piling has widely been employed since its apparent initial use as part of the north breakwater at Port Washington Harbor in 1934 (U.S.A.E.D.D. 1986). This material has been employed both in new construction projects and in the rehabilitation of existing pier substructures. In the latter instance, the "replaced" structure forms the core element of the new structure. Since the late 1940s, the use of steel sheet pile cells, ovate to circular in horizontal cross section, has also been employed in breakwater/jetty construction. These units are customarily filled with combinations of stone, sand, or dredged spoil.

The use of cast-iron sheet piling was first employed during the construction of the Liverpool Dock in 1825. Its use in the United States did not occur for another two decades, when it was employed during the construction of the lighthouse at Brandywine Shoal on Delaware Bay (Kirby and Laurson 1932:258). Its use in the Great Lakes was minimal until the post-World War II period.

In general, the use of wood in harbor construction activities on the Atlantic seacoast of North America was pervasive up through the beginning of the nineteenth-century (Norman 1987). These early works took the form of timber cribs or consisted of vertically driven round timber piles with horizontal planking nailed along the inner side of the piles (Norman 1987:13). Both structure types were generally filled with either rock or soils derived from a variety of sources. Early nineteenth-century pier and bulkhead expansions along the Detroit waterfront indicate an ongoing use of such facilities as a disposal site for community wastes (Demeter and Weir 1987).

The use of driven round timber pile bulkhead supports had become fairly common in New York City wharf construction by the late 1830s (Hunt 1840:313; Norman 1987:21). Its use in wharf and jetty construction was a common feature of port development on the Great Lakes by the close of the following decade (Farmer 1890:816). In addition to stone and earthen fills, the use of wood scrap sawmill wastes was also a unique feature of regional construction techniques. As late as 1906, this approach was employed during the construction of 555 ft of the west pier of Port Wing Harbor (Lake Superior). While the use of such structures in breakwater development was minimal, one attempt utilizing this material was made in setting up 7,363 ft of substructure at Ashland Harbor (Lake Superior) between 1889 and 1894 (Figure 6). The end result was less than desired, leading to the capping of the entire structure, between 1908 and 1910, with an improvised dredge spoil and stone rubble mound (Figure 5).

Out of a total of 80 harbor projects presently under the jurisdiction of the U.S. Army Corps of Engineers, Detroit District, 37 (46.3 percent) exhibit breakwater/jetty elements consisting of timber cribbing. With few exceptions, the bulk of these are now encased as core elements within modified substructures. The timber crib substructure represents the dominant pier form employed throughout the Great Lakes during the nineteenth century. Their continued use into the present century can be documented at 17 locations within the Detroit District; the last of these being associated with the development of the south breakwater at Manistee (Lake Michigan) between 1913 and 1920 (U.S.A.C.E. 1916; U.S.A.E.D.D. 1986). The timber crib was referred to as the simplest substructure employed in breakwater/jetty construction which, by the opening of the twentieth century, was reported to be used "only in minor harbors or under primitive conditions" (Wright 1914:700). The crib substructure was constructed on-shore of hewn logs, floated into position and sunk in place with the addition of stone. The interior of the crib was divided into compartments formed by transverse and longitudinal timber walls with some of the compartments being floored with wood planking in order to receive the stone ballast at the time of sinking. The remaining compartments were subsequently filled to provide additional stability with the individual units being fixed in place with bar and strap iron. The above-water superstructure was next completed with a continuation of timbers or planking, or a combination of both. Unlike the substructure which normally consisted of pine or hemlock (Gary Frankish, personal communication 1993), oak represented the preferred material for the superstructure element and for guard fenders along the structure (U.S.A.C.E. 1883:1706; 1889:2172, 2193). These works normally extended from 5 ft to 10 ft above water level and generally featured a sloping face to the lakeward side designed to deflect the impact of wave forces. The degree of slope, as well as the overall superstructure design of the different works, tended to vary dependent on anticipated wave stresses, the availability of materials, and, to some extent, project specific experimentation. One innovative approach designed for the breakwater at Frankfort Harbor (Lake Michigan) in 1882 called for the construction of a centrally positioned, longitudinally raised element consisting of 12 in × 12 in timbers (Figure 7). A more substantial design was adapted to the superstructure of the east breakwater built in Cleveland in 1887. The superstructure element of this pier was described as having been:

> ...carried up vertically for only 2 ft above water level and was then inclined at an angle of 1 on 2.5 until it attained a height of 10 ft above the water surface on the lake side. From that point it was horizontal until it met the harbor face which was vertical (Wright 1914:700).

This configuration was later modified during the construction of the breakwater at Presque Isle in 1897 in order to accommodate the heavier seas produced on Lake Superior. In this instance, a sloping deck of 6 in × 12 in plank was constructed on the timber superstructure set at 0.5 ft above the low-water datum on the lakeward (parapet) side and extending to 10 ft high on the inner (banquette) harbor facing side. Lacking the flat top of the Cleveland breakwater, the Presque Isle superstructure was designed to allow "...the waves to slide over the work and fall down vertically inside, with a minimum of impact and resistance" (U.S.A.C.E. 1897:2638) (Figure 8).

Vertical iron strapping was added to the lakeward facing side of both the Cleveland and Presque Isle structures in order to anchor the superstructure to the substructure.

The use of a composite breakwater was first attempted in 1882 at Oswego, New York (Lake Ontario). In this instance, a concrete mortared cut stone deck was added as the superstructure to a timber crib substructure. This procedure was quickly abandoned when it became apparent that the flexible crib provided an extremely poor foundation to this variety of masonry work. By the close of the century the substitution of wood and cut stone with massed concrete as the primary constituent of superstructure construction was introduced at Buffalo and Cleveland harbors on Lake Erie.

The use of timber crib substructures in breakwater/jetty construction on the Great Lakes had been adopted in part due to its traditional usage in pier construction and the ready availability of timber and plank; however, crib piers were easily damaged in collision, and suffered from sand and ice erosion. Wave action similarly affected these structures both as a result of direct impact forces against the crib substructures, which often led to structural displacement, and the movement of the fill stone within the crib works. The wedgelike action of smaller stones similarly tended to place additional stress on the timber frame of the crib, either abrading the walls or separating its timber components. Weathering at the water line between high and low lake level horizons also represented a significant problem. By the turn of the twentieth century, it was postulated that timber crib breakwaters had an "average life...[of]... about 15 years" (Wright 1914:700). In effect, they were not designed as permanent structures, but only as stop-gap elements employed to meet the immediate needs of harbors or refuges whose long-term requirements were indeterminant. In all probability, the boomtown atmosphere that necessitated harbor development around lumber and ore shipping centers was viewed as a short-term need likely to evaporate as production in these extractive industries decreased.

In order to reduce maintenance requirements on crib structures, certain procedures had been employed by the U.S. Army Corps of Engineers as public pier facilities began to fall under their jurisdiction during the mid-nineteenth century. Many of the crib structures completed by individuals and municipalities prior to this period had been set in place without adequate foundation preparation. These were, in some instances, anchored in place with the use of riprap mounded along the lakeward and (often) harbor facing walls. By the 1880s, crib components associated with soft-bottom harbor locations were consistently placed on driven round timber pilings with riprap laid along the base to prevent scouring. By the 1890s, those associated with hard-bottom locations were generally fixed on a foundation of small core stone with the upper elements of the substructure being secured with sloped riprap.

In addition to transitions in foundation and superstructure design implemented during the last quarter of the nineteenth and first quarter of the twentieth centuries, the crib substructures were themselves subject to certain modifications. This feature of breakwater/jetty design was most pronounced with regard to crib size. While widths tended to range anywhere from about 20 ft to 35 ft, lengths were fairly standardized. During the third quarter of the nineteenth century, the use of a 32 ft length seems to have been most common (U.S.A.C.E. 1867:153; 1876:469; Wright 1914:700). In the 1880s, crib length was increased to a more or less standardized 50 ft setting (U.S.A.C.E. 1883:1704; 1889:2171). By the 1910s, during the terminal phase of timber crib construction usage, the standard length had increased to 100 ft (U.S.A.C.E. 1916:3032).

The use of concrete as a protective element added to timber crib and stone rubble piers was initially employed during the reconstruction of the mole at Cherbourg completed in 1850 (Hamilton 1958:466). Between 1870 and 1872, a stone rubble breakwater extending for 9,675 ft was constructed at Alexandria, Egypt. This structure ranged up to a maximum of 60 ft in depth, on which a layer of armor stone was placed along the seaward side consisting of 20-ton concrete blocks (Vernon-Harcourt 1891:194). Both projects featured the use of concrete as a superstructure element. In the Cherbourg example, the cement composition utilized was described as "hydraulic lime" capable of hardening below water, while that associated with the construction of the Alexandria breakwater consisted of Portland cement blocks molded on shore and either barged or craned into place.

The shallow water breakwater constructed at Aberdeen Harbor employed both cement varieties. Begun in 1871, the base of this structure consisted of unmixed hydraulic lime placed in sack cloth bags ranging from 50 tons to 100 tons, which were barged into place and sunk to form the foundation. These were laid to within 2 ft above the low water datum and conformed to the uneven harbor bottom prior to setting (Vernon-Harcourt 1891:202-203; Wright 1914:702). The superstructure consisted of a megalithic concrete wall composed of Portland cement deposited in mass within a timber framed mold. The resultant wall measured approximately 23 ft in height and 42 ft at the base, constricting to 30 ft in width at the top. It was surmounted by a 6 ft parapet wall facing to the seaward side (Figure 9).

These advances in the use of concrete composition walls had a rapid impact on engineering standards practiced in the United States. One factor of prime importance in establishing this trend was the securing of a patent for the production of an artificial Portland cement in the United States by David O. Saylor in 1871. Saylor's cement was later specified by the federal government for use in the construction of the South Pass jetties at the Mississippi Delta. Built between 1875 and 1879, the east jetty of this project extended for 1 mi in length with the west jetty running for 0.5 mi in distance. Both were composed of megalithic concrete blocks, the largest of which weighed 260 tons, measuring 5 ft × 13 ft × 55 ft (Condit 1960:228).

The growth of the cement industry in the United States during the succeeding decade took advantage of a discovery made in about 1875 that utilized slaked blast furnace slag in the manufacture of an "adulterated" variety of Portland cement (Burchard 1914:759; Condit 1960:227; Thorpe 1898:483-485). Its use, in combination with slaked lime, was also widely employed in the manufacture of artificial puzzolanic cements employed in underwater work (Burchard 1914:760). When correctly ground as a sharp particle aggregate, slags were also utilized as a substitute for quartz sands in concrete production (Baker 1894:79). This material typically consisted of 6 to 8 parts of slag aggregate to 1 part of cement (Condit 1960:227-228). The increased importance of concrete as a construction material in North America can be seen to correlate with increases in iron ore production. During the 16-year period between 1856 and 1872, the cumulative production of iron ore from the Lake Superior region was estimated at 5,567,373 tons (Tuttle 1873:575). This figure represents slightly less than 17 percent of the total iron ore tonnage that passed through the Soo Locks alone in 1905, amounting to 34,353,456 tons (Dunbar 1965:503).

The adaptation of concrete in pier construction in the Great Lakes remained limited until the closing decade of the nineteenth century, when it began to emerge as a preferred material in superstructure construction and rehabilitation activities associated with timber crib breakwaters and jetties. Among the earlier of the projects of this type carried out by the U.S. Army Corps of Engineers on the Great Lakes was the reconstruction of the "old breakwater" superstructure in Buffalo Harbor built in

1887/89 (Baker 1894:543; U.S. Army Engineer District, Buffalo [U.S.A.E.D.B.] 1989) (Figure 10). The composition employed in this instance was described as a "natural cement concrete," a low temperature calcinated limestone generally referred to as Roman cement (Burchard 1914:759).

The general configuration of the Buffalo breakwater superstructure was subsequently adopted in the rehabilitation (1898) of the West Breakwater superstructure in Cleveland Harbor (Wright 1914:701; U.S.A.E.D.B. 1989). In this instance, the timber crib substructure was removed to a point approximately 3 ft below mean water level and capped by three parallel lines of precast Portland cement concrete blocks, each measuring 4 ft × 4 ft × 8 ft. The open spacing between the blocks was filled with stone and the entire structure capped with a 5 ft thick banquette deck surmounted on the lake facing side by a sloped 5 ft high concrete parapet (Figure 11).

Within the present boundaries of the Detroit District Corps office, the superstructure of the Marquette Harbor breakwater represents a significant innovation in the use of mass concrete construction design. Rather than employing a raised outer parapet on the lake facing side, this portion of the superstructure exhibits an offset bileveled sloping face designed to break up the heavier wave forces produced on Lake Superior. Built between 1896 and 1905 on a timber crib substructure, this work entailed the placement of two parallel coarses of precast concrete sill blocks (rectangular in cross section) positioned atop the outer and inner crib walls with the space between being filled with stone. This was surmounted by a mass concrete deck structure standing a maximum of 8.4 ft above the foundation blocks on the harbor side. In addition to the offset lakeward slope face, this superstructure also featured an enclosed gallery walkway within the harbor side of the structure (Figure 4).

The conversion from wood plank and timber to concrete pier superstructures remained an ongoing feature of breakwater and jetty reconstruction projects for the next half century. During this same period, another innovation took place in the substitution of smooth surfaced concrete sill blocks (Figure 11) with recessed surface blocks designed to reduce the potential of shifting that might result from storm action, collision or decomposition of the timber substructure. This was initially introduced during the reconstruction of the main breakwater at Harbor Beach, on Lake Huron, in 1905 (Wright 1914:702; U.S.A.E.D.D. 1986) (Figure 12). Another development that occurred during this period was the introduction of the reinforced concrete caisson as a substitute for the timber crib substructure. Having first been introduced during the construction of the Algoma breakwater (Lake Superior) in 1908, these caissons measured 24 ft × 20 ft × 18 ft with 10 in thick vertical walls and a 14 in thick floor (U.S.A.C.E. 1908:1954). These were manufactured on-shore and floated to the construction site where they were sunk along the alignment of the proposed breakwater/jetty locations that had been prepared with wood piles. The caissons were next filled with stone riprap and capped with a concrete deck. This structure type was initially reinforced with 6 in × 6 in horizontal timbers and 12 in × 12 in vertical support posts along the interior walls. This element was further secured by the placement of transverse and longitudinal walls composed of 6 in × 6 in timbers that served to subdivide the structure into four compartments (Figure 13). The arrangement was similar to that of the timber crib which the concrete caisson was designed to replace. This usage presumably also lent itself to the adoption of the erronious designation for the concrete caisson as being a "concrete crib" (Wright 1914:703).

As with the timber crib, the vertical wall configuration of the original concrete caisson design accepted the full impact of wave forces that invariably led to a certain amount of shafting of the substructure. This was compensated for by the use of riprap stone mounded along both the lakeward and harbor facing sides of substructure (U.S.A.E.D.D. 1986). The rectangular cross-sectioned concrete caisson was last employed during the construction of the Sheboygan Harbor breakwater (Lake Michigan) in 1913-15. During the construction of the south breakwater (Lake Michigan) extension at Racine Harbor (Lake Michigan) in 1917-19, a sloped wall concrete caisson design was introduced. These had the advantage of not only deflecting the force of wave impacts, but also required lesser volumes of stone fill within the caisson module. This latter feature, combined with the utilization of sand as an alternative ballast fill served to reduce the material cost of construction.

The use of concrete caissons in breakwater/jetty construction on the Great Lakes was limited to Lake Michigan within the boundaries of the defunct Milwaukee District office; since absorbed by the Detroit District. Out of a total of 80 harbor projects presently under the jurisdiction of the Detroit District, only 9 (11.25 percent) exhibit the usage of concrete caissons in breakwater/jetty construction. The latest of these occurred in conjunction with a 540 ft extension of the north breakwater at Kewaunee Harbor in 1936-37 (U.S.A.E.D.D. 1986).

Historic Background (Site Specific)

The origin and early development of the Manistee community was a direct outgrowth of the lumber and mill industries that grew up around Lake Manistee beginning in the late 1840s. Access to this natural harbor was limited, however, due to a series of sand bars that obstructed the mouth of the Manistee River connecting Lake Manistee to Lake Michigan. As a result, a new channel was cut across the split of land to the west of Lake Manistee in 1854 (Powers 1912:377). This diversion followed the line of the channel presently maintained by the U.S. Army Corps of Engineers (COE). COE involvement at Manistee Harbor was initiated through the River and Harbor Act of March 2, 1867 (U.S.A.C.E. 1922:1557). This legislation authorized the replacement of the privately built slab piers along the channel with timber crib substructures. It also provided for the dredging of the channel from its 7 ft to 8 ft average to a depth of from 12 ft to 15 ft (U.S.A.C.E. 1867b:142-143; 1931:1158).

While Manistee had become an important lumber producing center, ranked second in the state in 1866, its significance to lake navigation and commerce was due to a variety of contributing factors. These centered to a large extent upon its potential as a wooding point for steam vessels and the fact that lake and river currents at the location tended to keep the mouth of the harbor clear of float ice. Its position within 12 mi of the chief shipping route along the east side of Lake Michigan similarly made it an ideal site for a harbor of refuge for lake vessels during the stormy spring and fall periods (U.S.A.C.E. 1867a:116).

During the three succeeding decades following the COEs takeover of the administration and management of the harbor at Manistee, logging remained the principal industry of the community. While the community no longer ranked among the top lumber centers of the upper Great Lakes as of 1890, this loss of status was not a true reflection of area production which was still on the increase amounting to something over $1.2 million above the recorded 1880 value of area timber products (Priest 1891:20-21). The 1880s actually witnessed significant expansions in the commercial base of the Manistee community; with one important addition during this period being the extension, in 1881, of the Flint and Pere Marquette Railroad (Powers 1912:385). Within a short time several other railroads were chartered, such as the Manistee and Luther (1886), the Manistee and North-Eastern (1889) and the Manistee and Grand Rapids (1889) railroads (Powers 1912:185-186). These were initially developed as logging railroads providing access to the regions interior. Manistee's in-place mill industry and easy market availability through either ship or rail transport tended to give unprocessed forest products a higher value than could be achieved in other processing sites in the region. Similarly, wood scraps and other mill waste products, while no longer employed in fueling lake steamers, found a ready market in the city's growing salt industry (Powers 1912:386). At the close of the first decade of the twentieth century, Manistee was producing upwards of 138,000,000 ft of lumber and 28,000,000 shingles per year. The city was similarly reported to be "...one of the greatest salt-producing cities in the world", with an annual output of 2,100,000 barrels. Almost 58 percent of the city's adult male population was employed in one aspect or another of these two industries (Powers 1912:384-386).

The commerce of Manistee Harbor was described in COE reports at the turn of the century as being "principally local in character" (U.S.A.C.E. 1910:823; 1913a:1160). While specifics are generally not provided, cargo schedules for 1913 indicate that of the 338,032 short tons of goods shipped out of the harbor that year a total of 188,735 tons (55.8 percent) consisted of salt with 145,600 tons (43 percent) consisting of lumber products such as railroad ties, shingles, lath, bark and boards (U.S.A.C.E.

1913b:2853). The receipts of the port for the year amounted to 17,708 tons. These consisted primarily of manufactured goods and provisions (9,572 tons), listed under the broad heading of "Miscellaneous, and crushed stone (7,424 tons) imported by the COE for the south breakwater under construction at that time (U.S.A.C.E. 1913b:2853).

Processed goods exiting Manistee Harbor in 1913 consisted primarily of bulk cargos easily adapted to ship transport which, between 1910 and 1913, ranged anywhere from 30 percent to 21 percent below the freight rates charged by the railroads (U.S.A.C.E. 1910:823; 1913a:1160). The advantage of having a modern harbor was obvious to the Manistee business community whose ownership of steam vessels was at that time the third largest on Lake Michigan, being ranked only below Chicago and Milwaukee. Realizing that the lumber industry was rapidly declining the Manistee Board of Trade sought to promote new industrial growth by noting the potentials for development around Lake Manistee's "ten miles of deep water shore line" and the existence of 20 mi of railroad siding around the city. Other attractions that were upcoming in the city's economic horizon included accessibility to cheap hydroelectric power through Consumers Power Company's dam developments along the upper Manistee River and the Federal governments proposed harbor improvements inclusive of channel dredging, to accommodate vessels drawing 18 ft of water, and the contemplated spending of "$700,000 in protecting the entrance of the harbor" (Powers 1912:385).

The River and Harbor Act approved on July 25, 1912, authorized a series of modifications to be carried out by the U.S. Army Corps of Engineers. These included: (a) the construction of a south breakwater, 1,300 ft long, with a shore connection about 1,200 ft long; (b) the removal of 450 ft of the lakeward end of south pier; (c) dredging an entrance basin and the channel between the piers to a depth of 20 ft below the low water datum; (d) dredging the Manistee River from the inner end of the north pier to Lake Manistee to a depth of 18 ft below the low water datum; (e) the extension of the north pier 200 ft (if required); and (f) the maintenance of the project. The estimated cost was $456,000 for construction and $6,000 annually for maintenance. The project was made contingent on the donation, without cost to the United States, of a strip of land on the shoreline at least 200 ft wide, 100 ft on each side of the center line of the shore connection of the breakwater, and 200 ft long, to ensure free access to the pier and full control of the same (U.S.A.C.E. 1912:1046).

The shore connection for the breakwater was deeded to the United States on April 10, 1913. The contracts for this work were let out to Greiling Brothers Company on April 26 and October 7, 1912. Work on the breakwater began on May 8, 1913. At the end of July it was reported that the foundation piling for two timber cribs 100 ft × 30 ft in horizontal size, 14.5 ft and 16.5 ft, respectively, had been set in place (U.S.A.C.E. 1913:2851) (Figures 1 and 2). As of June 30, 1915, one crib had been set in place with another 600 ft reported to be "under construction" (U.S.A.C.E. 1915:1302). Between June 30 and September 30, 1915, the foundation pilings for cribs 7 and 8 (200 lineal ft) were set, with cribs 6 (100 ft × 30 ft × 20.5 ft) and 7 (100 ft × 30 ft × 18.5 ft) being sunk in place and filled with stone. A wood plank superstructure 1 ft high on the lakeward side and 5 ft high on the harbor side was also completed (U.S.A.C.E. 1916:3032).

During the spring and summer of 1916 the foundation line for cribs 9 through 13 was dredged and pilings set for cribs 9 through 11. Cribs 8 through 10 were built, with the former two units being sunk and filled with stone (U.S.A.C.E. 1916:3032) (Figure 14). This latter work was carried out by John Ginzel who was awarded the contract for the breakwater and shore connection on March 7, 1916. It was at this time that the contract specifications for the superstructure of the breakwater were changed to "built-in-place concrete" and "concrete for deck slabs" (U.S.A.C.E. 1916:3035).

The placement of the timber crib component of the breakwater and a portion of the shore connection was completed by 1917/18. By November 1918, 600 ft of the wood plank sheet pile shore connection had been built; 366.8 tons of large rip-rap had been placed on the lake side of the breakwater and 138.7 tons of quarry spalls along the shore connection

(Figure 3). The stone fill used in the shore connection had itself been salvaged from a 450 ft section of the old south pier removed during this period (U.S.A.C.E. 1919:3233). Work on the project was completed in 1920. Subsequent work on the breakwater carried out in 1933 entailed the replacement of the crib superstructure with a concrete deck (Figure 1).

The importance of the south breakwater to the Manistee community was minimal in that the proposed industrialization of the harbor never really materialized. In noting the overall effect of the harbor improvement to local economics, the *1922 Annual Report of the Chief of Engineers* stated that:

> The principle benefit to commerce has been the improved facilities for the shipment from Manistee of forest products and salt, but these shipments are decreasing (U.S.A.C.E. 1922:1559).

When compared to the 1913 tonnage ratios which calculated imports as being only 5 percent of the harbor trade, the figures for 1935 placed imports (132,558 tons) at 79 percent of the total tonnage (167,236) handled in the port. Exports out of Manistee at this time consisted entirely of salt products amounting to only 34,678 tons; or less than 18 percent of the city's 1913 output of this article (U.S.A.C.E. 1935:813).

The south breakwater of Manistee Harbor derives its significance through its transitory position in the engineering technology of Great lakes harbor design. Built during the 1913-1920 period the south breakwater represents a final stage in the COE's usage of timber crib substructures in pier/breakwater construction. The 100 ft lengths of the cribs employed in this project, are, in turn, illustrative of the ongoing COE adaptation of what might best be termed a traditional preindustrial technology to the needs of modern port development. This shift towards the use of longer substructure components was largely dictated through the adoption of concrete superstructure designs that required a more stable footing than the plank and timber elements which had been the dominant superstructure component employed during the pre-1890/1900 period. As a by-product of regional industrialization the introduction of concrete in superstructure design significantly increased the overall 15-year life expectancy of timber crib pier/breakwater structures. This feature, combined with a growing scarcity of suitable local timber stocks, had, by 1908, prompted the COE to substitute steel reinforced concrete caissons for timber cribbing. Although more costly, these units more than made up their initial expense in low maintenance and increased life. The fact that they did not figure in the development of the south breakwater at Manistee readily suggests the way in which the COE viewed the overall long-term significance to Great Lakes commerce which the Manistee Harbor project was likely to have.

The south breakwater of Manistee Harbor was constructed between 1913 and 1920 under the direction of the U.S. Army Corps of Engineers, Milwaukee District, by contract with Greiling Brothers Company and John Grinzel. Its position in Great Lakes harbor development history is unique in that the timber crib substructure element of the works represents the terminal (post-1910) phase in the usage of this building type in breakwater construction. Of the 37 harbor projects exhibiting timber crib pier and breakwater components within the U.S. Corps of Engineers, Detroit District, only four other sites (Ashland, Wisconsin; Manistique, Michigan; South Haven, Michigan; Muskegon, Michigan) possess similar temporal components.

The concrete superstructure of the 1,185 ft long sheet pile shore connection represents an original element of the work. The wood plank decking that originally formed the superstructure of the 1,300 ft long timber crib component of the breakwater was replaced in 1933. This represents the only significant modification to the original structure design.

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Verbal Boundary Description

The boundary of this nomination is restricted to the COE-owned south breakwater structure at Manistee, Michigan, and does not include the abutting shore or lake and harbor bottoms.

The limits of this structure can be described as beginning at the east end of the breakwater shore extension located approximately 150 ft west-northwest of the foot of First Street, approximately 1,100 ft east-southeast of the Lake Michigan shoreline. From this point of beginning the nominated structure extends west-northwest (along the sheet pile shore extension) for a distance of 1,185 ft into Lake Michigan and turns 45° north-northwest continuing (along timber crib breakwater element) for a distance of 1,500 ft to the north end of the south breakwater.

Boundary Justification

spatially?

This nomination is spacially defined by the area of the COE-owned south breakwater structure encompassing an area of 2,485 lineal ft, with varied widths of from 10 ft to 30 ft, equaling approximately 56,775 ft^2 or 1.3 acres.

Photographs

1. Photographer: C.S. Demeter
   Date: 9 June 1993
   Negative Location: Commonwealth Cultural Resources Group, Inc., Jackson, MI
   Description: Concrete Superstructure of Shore Extension (South Breakwater), Manistee Harbor. View to Northwest

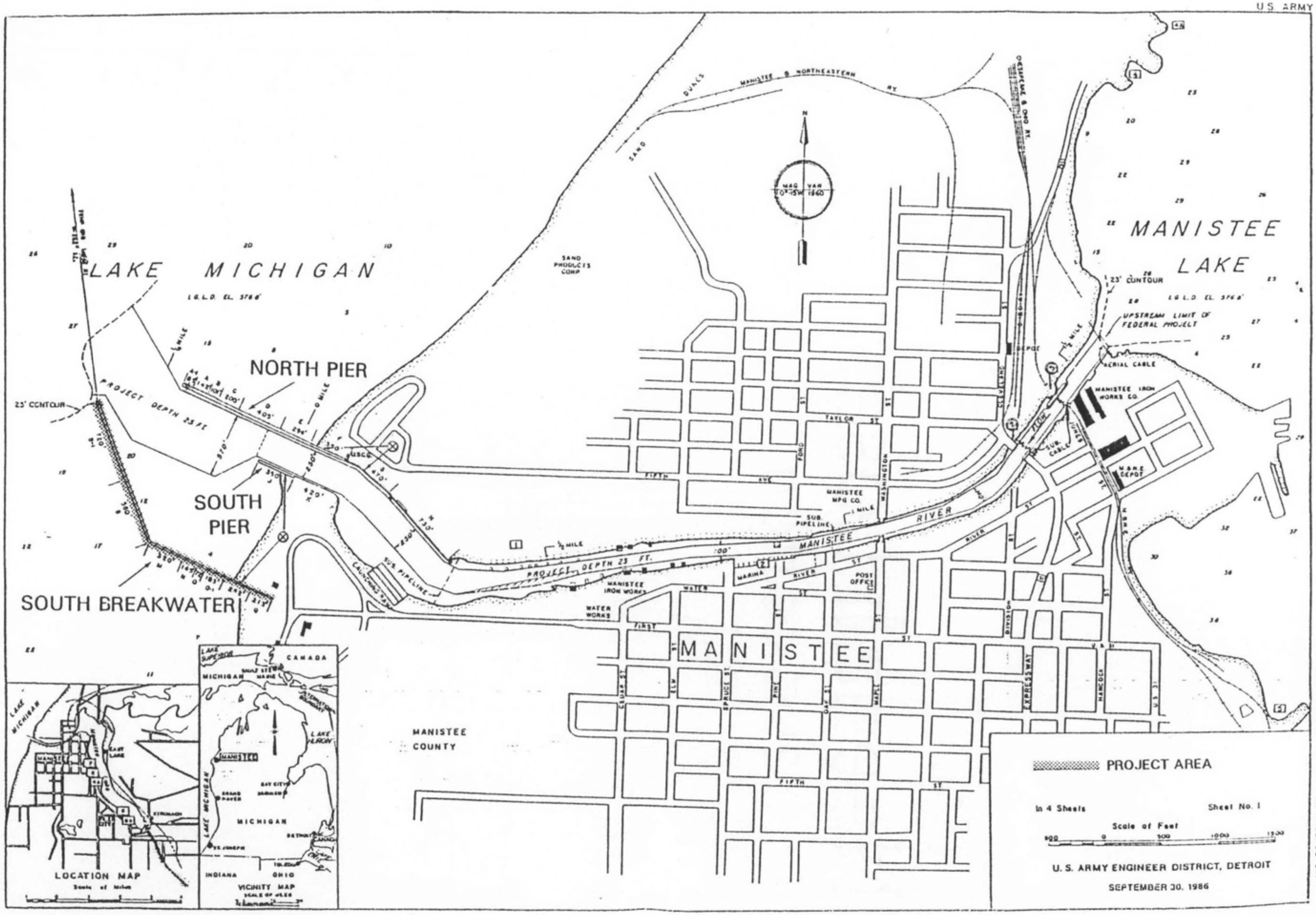
2. Photographer: C.S. Demeter
   Date: 9 June 1993
   Negative Location: Commonwealth Cultural Resources Group, Inc., Jackson, MI
   Description: South Breakwater, Manistee Harbor. View to West

Source: U.S.G.S. 7.5' Manistee (1982) and Parkdale (1983) Quadrangles

Manistee Harbor Entrance at Lake Michigan

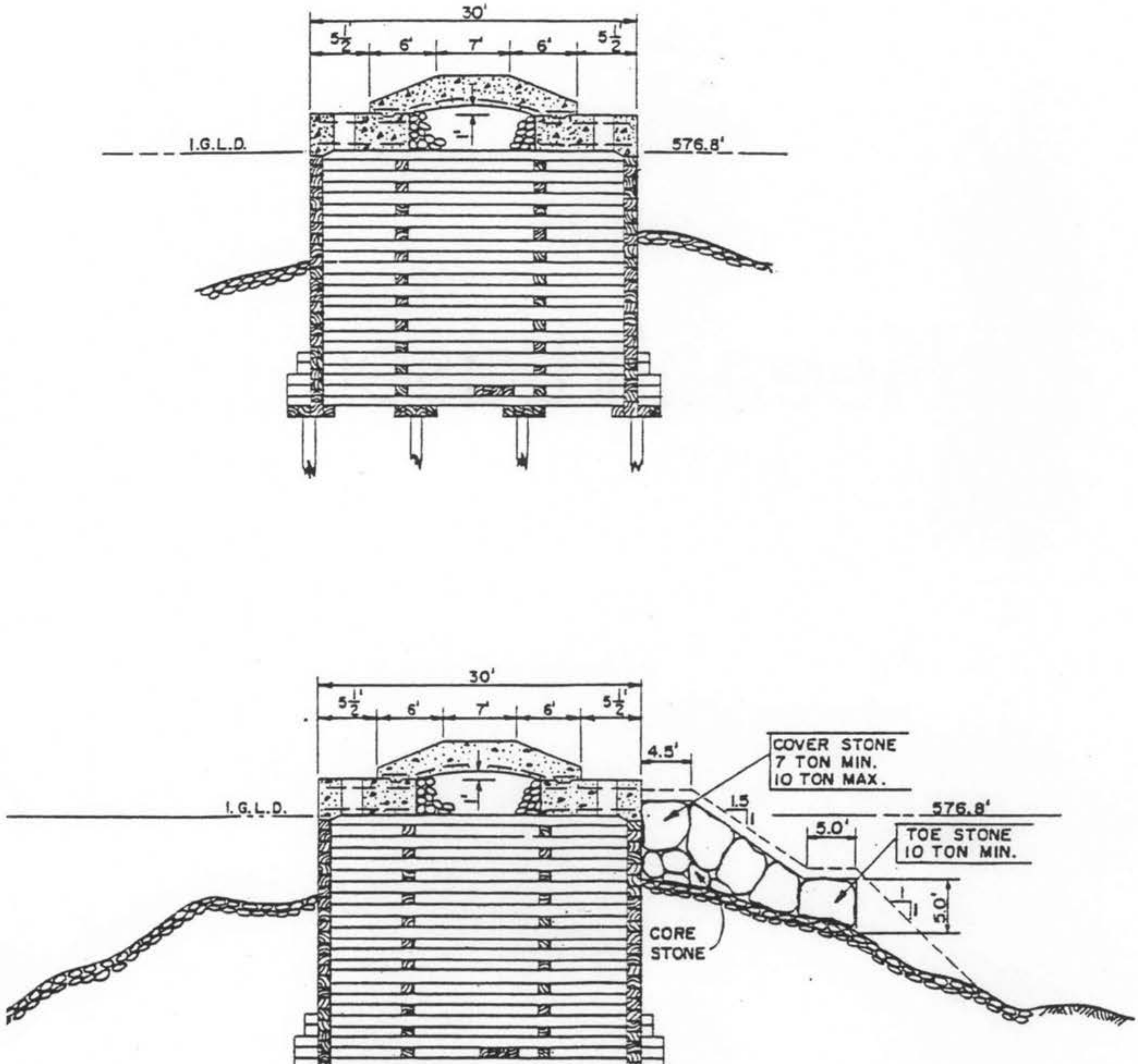
1. South Breakwater, Manistee County, Michigan

2. *South Breakwater, Manistee County, Michigan*



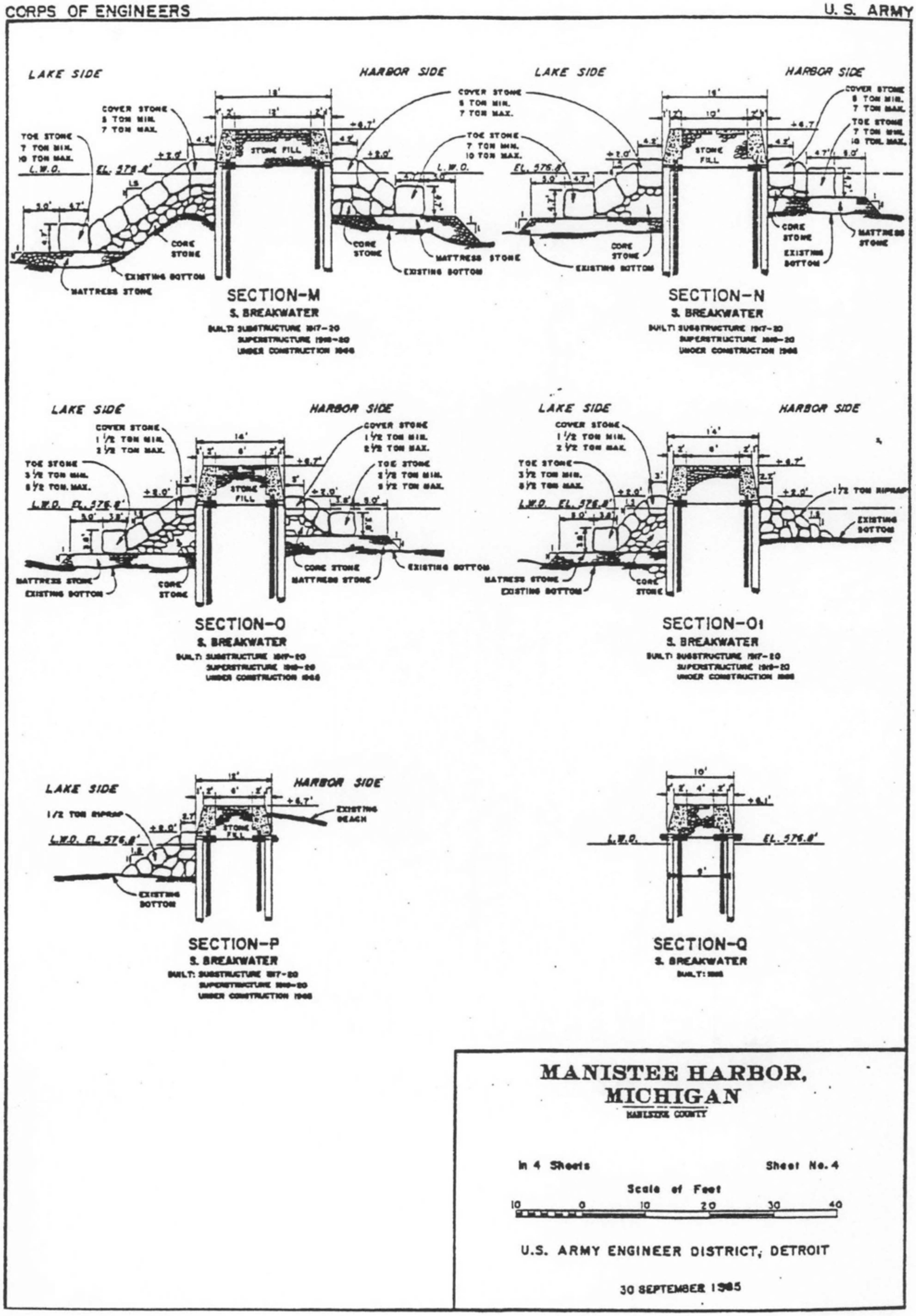
Source: U.S.A.E.D.D. (1986)

Figure 1. Manistee Harbor, South Breakwater



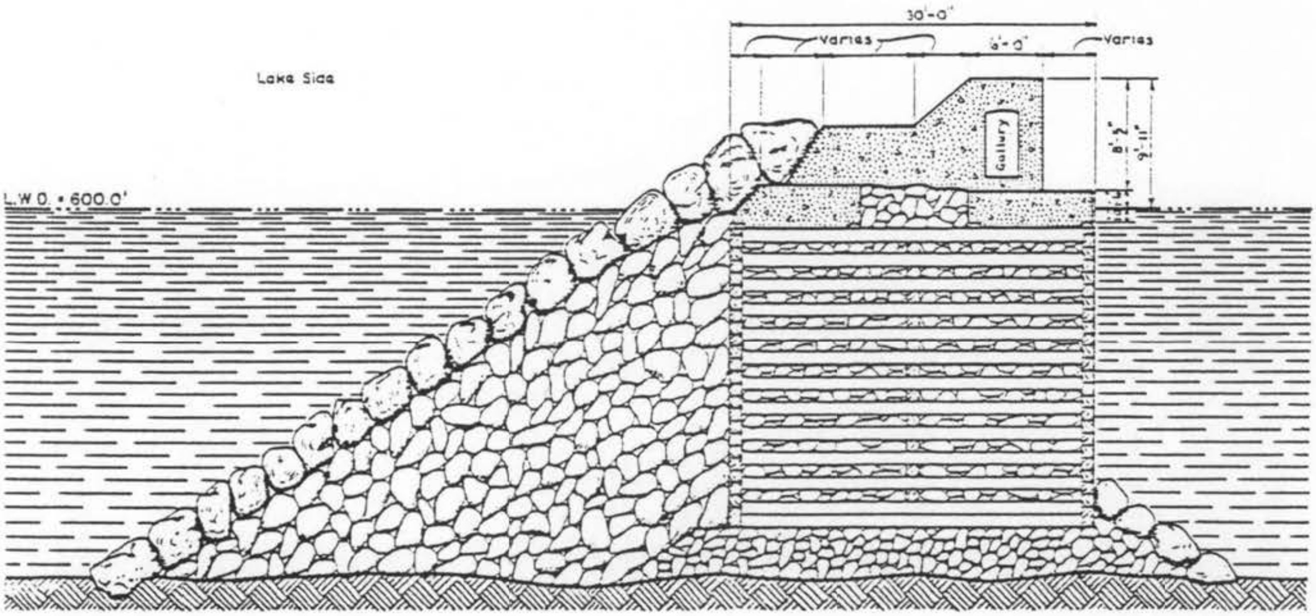
Source: U.S.A.E.D.D. (1986)

Figure 2. Manistee Harbor, South Breakwater



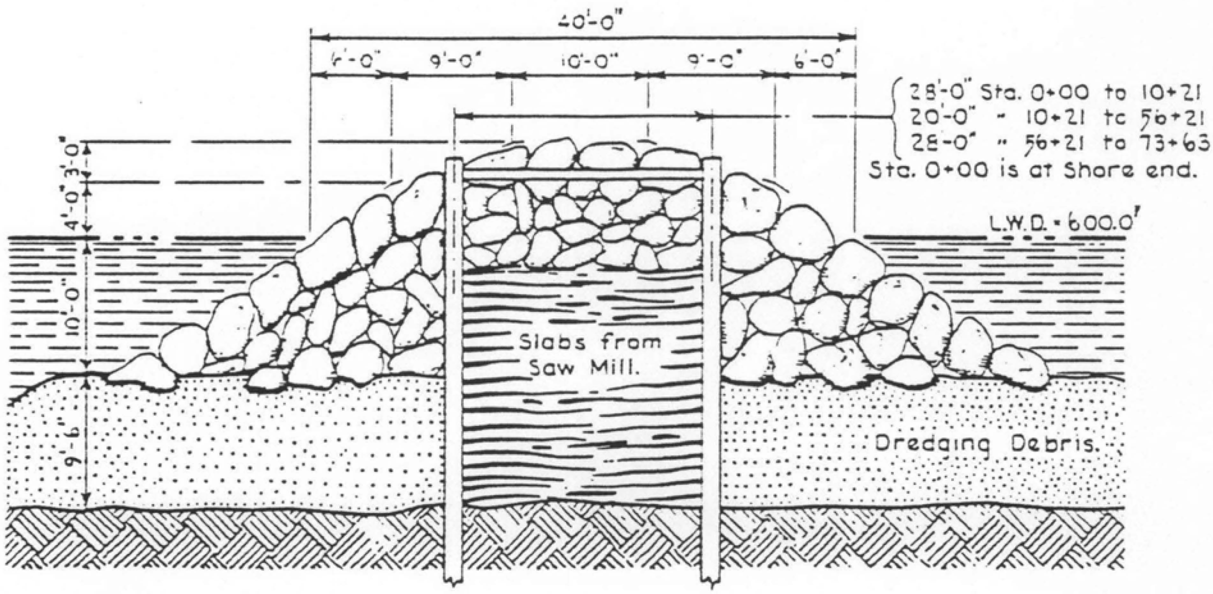
Source: U.S.A.E.D.D. (1986)

Figure 3. Manistee Harbor, South Breakwater



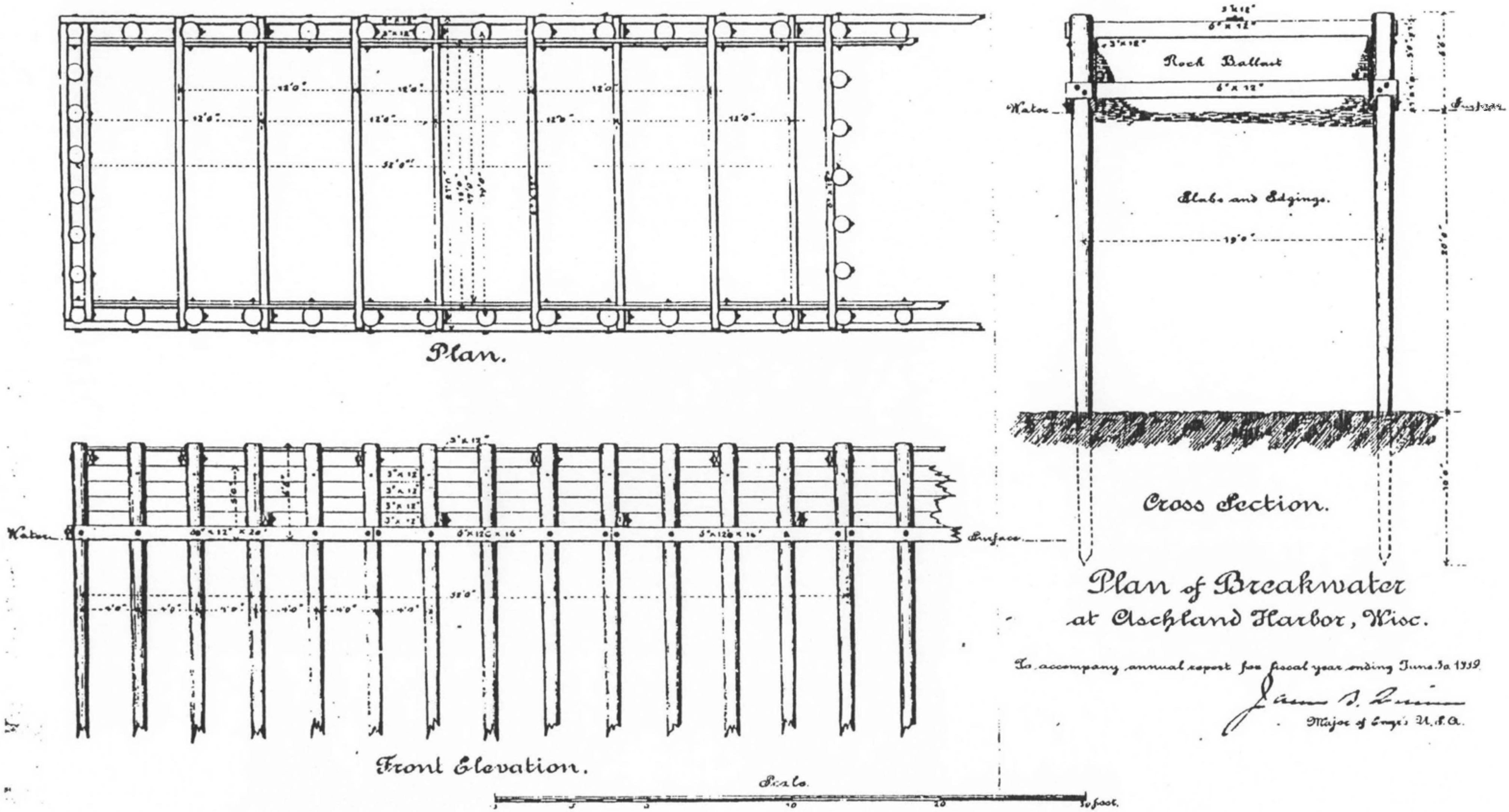
Source: U.S.A.E.D.D.(1986)

Figure 4. Marquette Harbor Breakwater



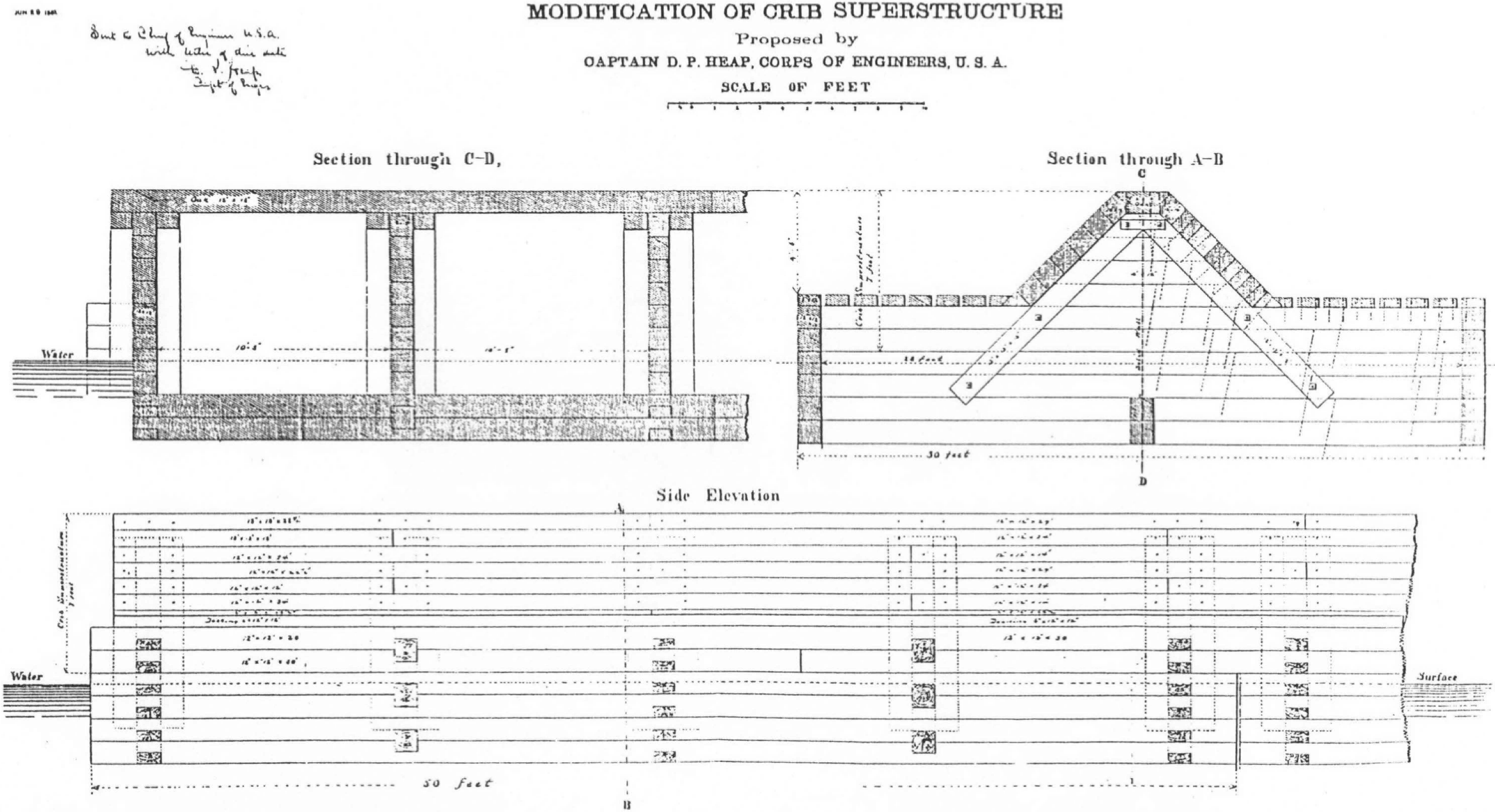
Source: U.S.A.E.D.D. (1986)

Figure 5. Ashland Harbor Breakwater



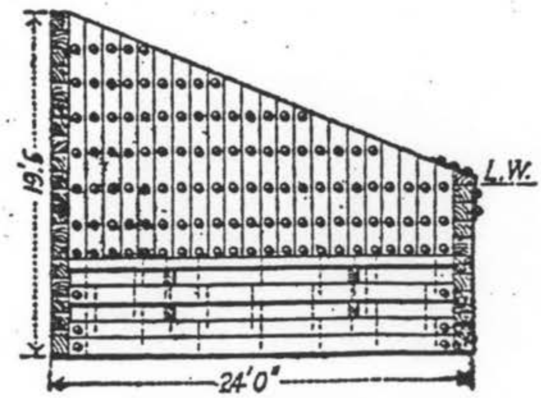
Source: U.S.A.C.E (1889)

Figure 6. Slab Breakwater, Ashland Harbor

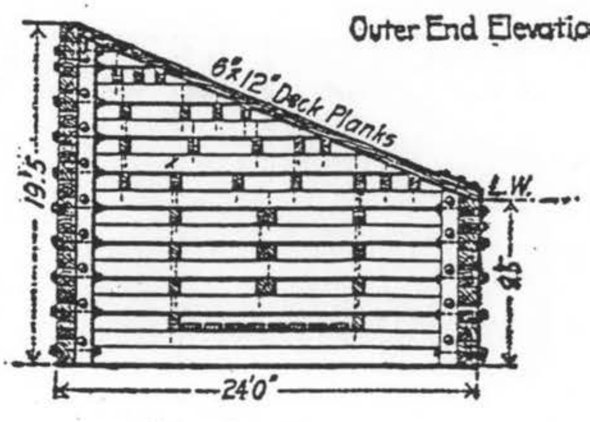


Source: U.S.A.C.E. (1883)

Figure 7. Breakwater Superstructure, Frankfort Harbor



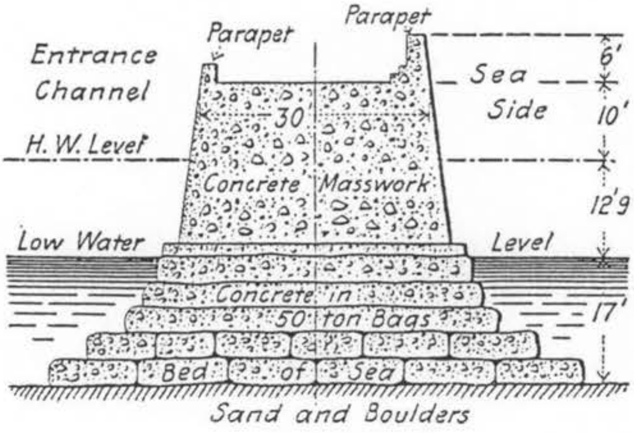
Outer End Elevation.



Cross Section

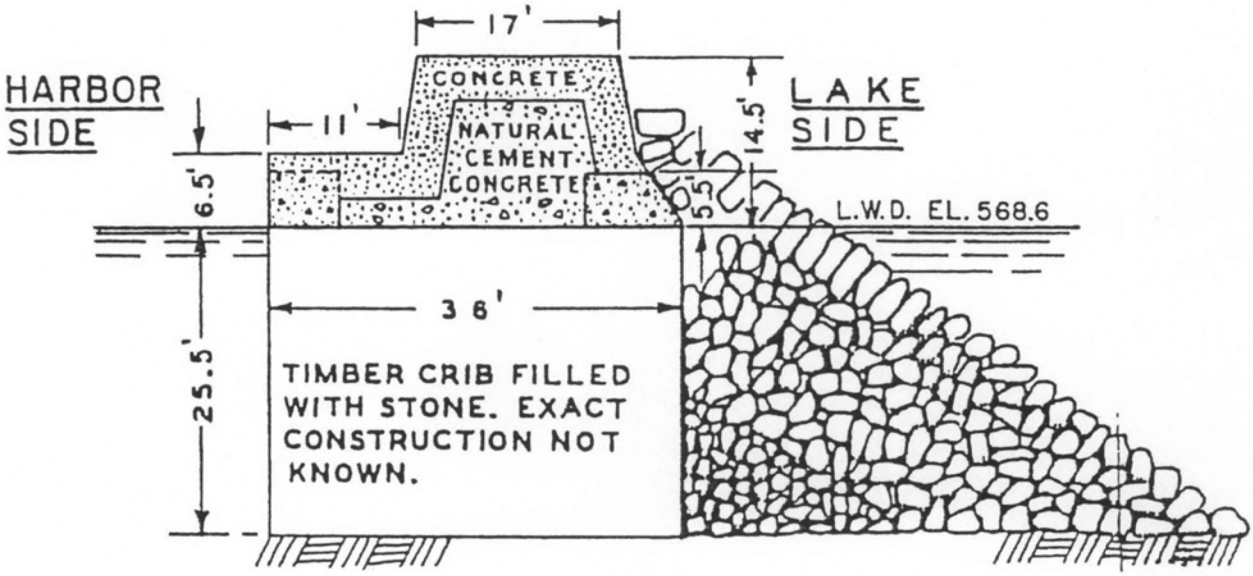
Source: Wright (1914:701)

Figure 8. Presque Isle Harbor Breakwater



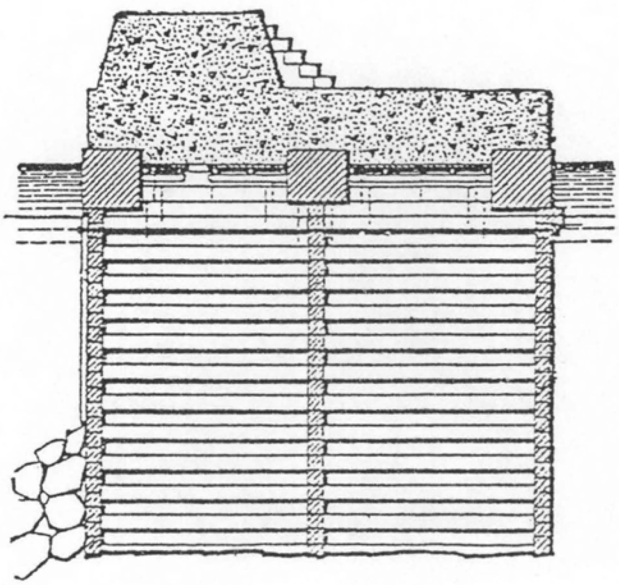
Source: Wright (1914:702)

Figure 9. Aberdeen Harbor Breakwater



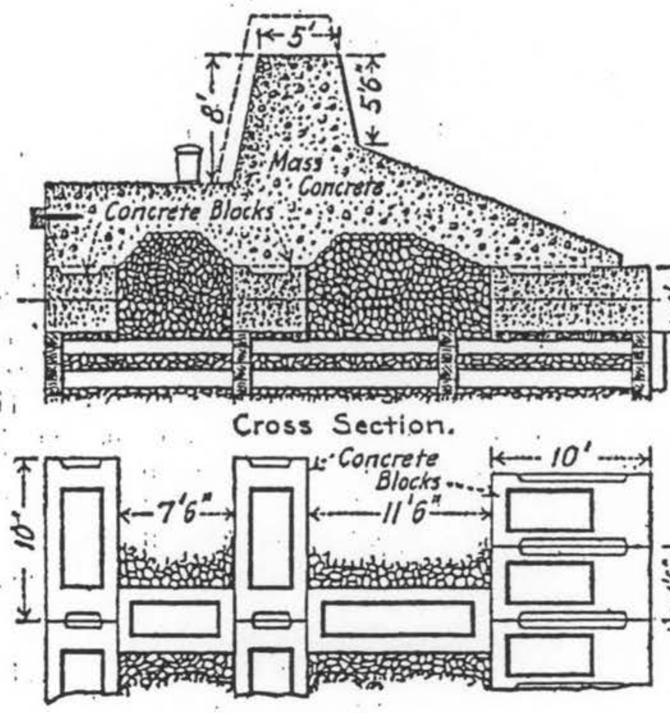
Source: U.S.A.E.D.B. (1989)

Figure 10. Buffalo Harbor "Old Breakwater"



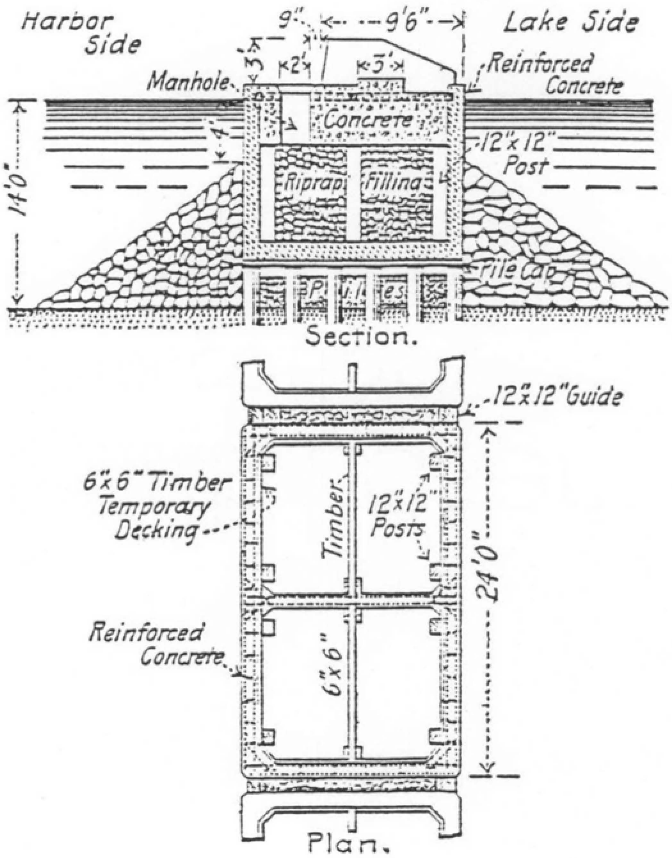
Source: Wright (1914:701)

Figure 11. Cleveland West Harbor Breakwater



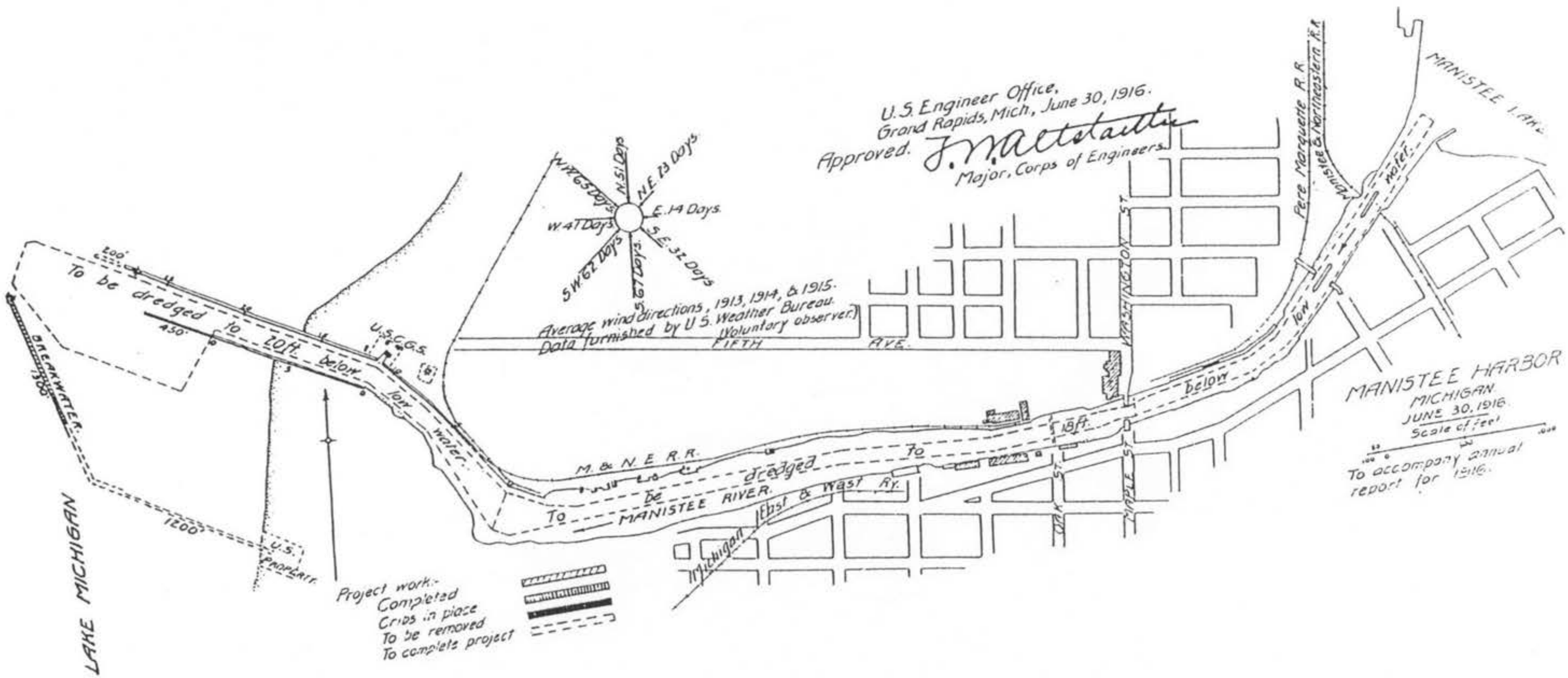
Source: Wright (1914:702)

Figure 12. Harbor Beach Breakwater Superstructure



Source: Wright (1914:703)

Figure 13. Algoma Harbor Breakwater



Source: U.S.A.C.E. (1916)

Figure 14. Manistee Harbor, South Breakwater (1916)

ITEM 1
SOUTH BREAKWATER
MANISTEE Co., Mi

ITEM 2
SOUTH BREAKWATER
MANISTEE Co., Mi

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PARKDALE QUADRANGLE
MICHIGAN–MANISTEE CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

Manistee Harbor
South Breakwater
Manistee Co., Michigan
UTM References
1. 16/551905/4899795
2. 16/552295/4899310
(See Manistee Quad)

PRODUCED BY THE UNITED STATES GEOLOGICAL SURVEY
CONTROL BY .... USGS AND NOS/NOAA
COMPILED FROM AERIAL PHOTOGRAPHS TAKEN 1977
FIELD CHECKED .... 1979. MAP EDITED 1983
PROJECTION .... LAMBERT CONFORMAL CONIC
GRID: 1000-METER UNIVERSAL TRANSVERSE MERCATOR .... ZONE 16
10,000-FOOT STATE GRID TICKS .... MICHIGAN, CENTRAL ZONE
UTM GRID DECLINATION .... 0°29′ EAST
1983 MAGNETIC NORTH DECLINATION .... 2°30′ WEST
VERTICAL DATUM .... NATIONAL GEODETIC VERTICAL DATUM OF 1929
HORIZONTAL DATUM .... 1927 NORTH AMERICAN DATUM
To place on the predicted North American Datum of 1983 move the projection lines as shown by dashed corner ticks (3 meters north and 3 meters east)
There may be private inholdings within the boundaries of any Federal and State reservations shown on this map
Gray tint indicates area in which selected buildings are shown

PROVISIONAL MAP
Produced from original manuscript drawings. Information shown as of date of field check. 3

NORTH

SCALE 1:25 000

KILOMETERS 1 .5 0 1 2
METERS 1000 0 1000 2000
MILES 1 .5 0 1
FEET 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10 000

CONTOUR INTERVAL 3 METERS
SUPPLEMENTARY CONTOUR INTERVAL 1.5 METERS
CONTROL ELEVATIONS SHOWN TO THE NEAREST 0.1 METER
OTHER ELEVATIONS SHOWN TO THE NEAREST 0.5 METER
To convert meters to feet multiply by 3.2808
To convert feet to meters multiply by .3048
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
AND THE GEOLOGICAL SURVEY DIVISION
MICHIGAN DEPARTMENT OF NATURAL RESOURCES, LANSING, MICHIGAN 48909

MICHIGAN
QUADRANGLE LOCATION

1	2	3	1 2 3 Bear Lake 4 5 Onekama 6 Manistee NW 7 Manistee 8 Star Corners
4		5	
6	7	8	

ADJOINING 7.5′ QUADRANGLE NAMES
CONTOURS AND ELEVATIONS IN METERS

INTERIOR—GEOLOGICAL SURVEY RESTON VIRGINIA—1983

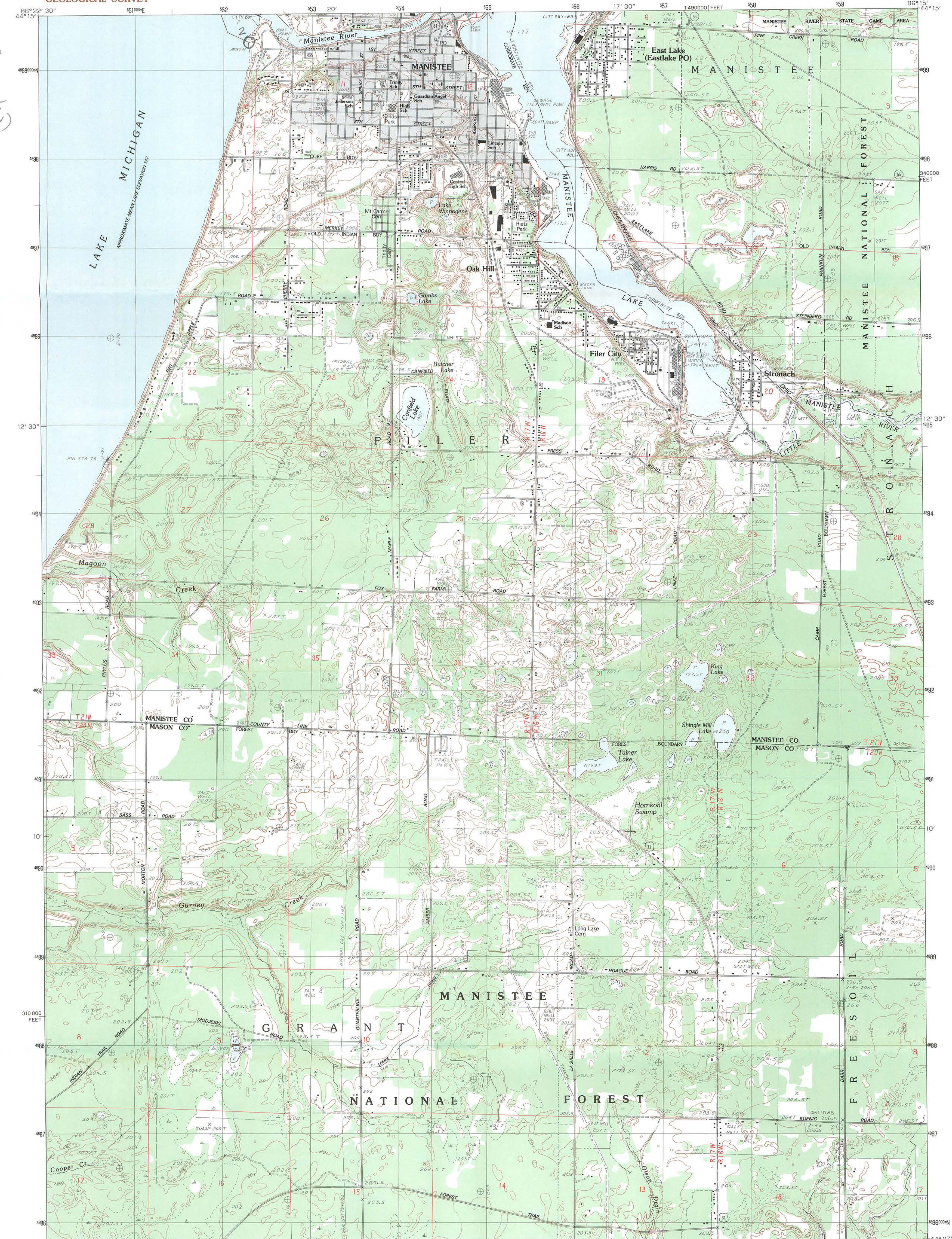
ROAD LEGEND
Improved Road ....
Unimproved Road ....
Trail ....
Interstate Route U. S. Route State Route

PARKDALE, MICHIGAN
PROVISIONAL EDITION 1983
44086-C3-TM-025

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

MANISTEE QUADRANGLE
MICHIGAN
7.5 MINUTE SERIES (TOPOGRAPHIC)

Manistee Harbor
South Breakwater
Manistee Co., Michigan
UTM References
2. 16/552295/4899310
1. 16/551905/4899795
(See Parkdale Quad)



PRODUCED BY THE UNITED STATES GEOLOGICAL SURVEY
CONTROL BY .... USGS AND NOS/NOAA
COMPILED FROM AERIAL PHOTOGRAPHS TAKEN 1977
FIELD CHECKED .... 1979. MAP EDITED 1982
PROJECTION .... LAMBERT CONFORMAL CONIC
GRID: 1000-METER UNIVERSAL TRANSVERSE MERCATOR .... ZONE 16
10,000-FOOT STATE GRID TICKS .... MICHIGAN, CENTRAL ZONE
UTM GRID DECLINATION .... 0°29′ EAST
1982 MAGNETIC NORTH DECLINATION .... 2°30′ WEST
VERTICAL DATUM .... NATIONAL GEODETIC VERTICAL DATUM OF 1929
HORIZONTAL DATUM .... 1927 NORTH AMERICAN DATUM

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SCALE 1:25 000

CONTOUR INTERVAL 3 METERS
SUPPLEMENTARY CONTOUR INTERVAL 1.5 METERS
CONTROL AND FIELD ESTABLISHED ELEVATIONS SHOWN TO THE NEAREST 0.5 METER
OTHER ELEVATIONS SHOWN TO THE NEAREST 0.5 METER
To convert meters to feet multiply by 3.2808
To convert feet to meters multiply by .3048

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MICHIGAN DEPARTMENT OF NATURAL RESOURCES, LANSING, MICHIGAN 48909

MICHIGAN
QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1
2 Parkdale
3 Onekama
4 Manistee NW
5 Star Corners
6 Hamlin Lake
7 Kings Corners
8 Freesoil

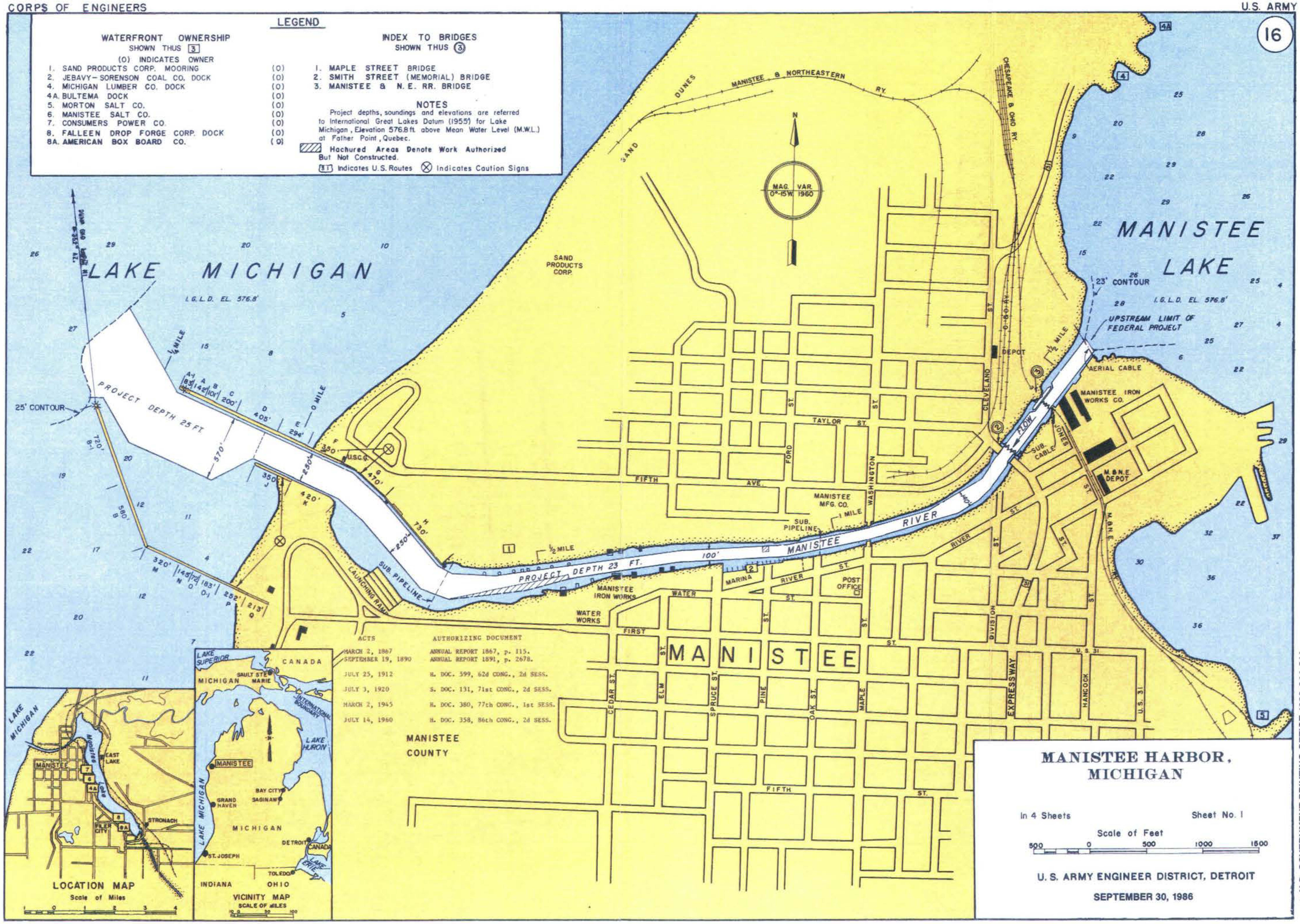
ADJOINING 7.5′ QUADRANGLE NAMES

CONTOURS AND ELEVATIONS IN METERS

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1983

ROAD LEGEND
Improved Road
Unimproved Road
Trail
Interstate Route U. S. Route State Route

MANISTEE, MICHIGAN
PROVISIONAL EDITION 1982
44086-B3-TM-025



☆ U.S. GOVERNMENT PRINTING OFFICE 1986-644-214

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

REQUESTED ACTION: NOMINATION

PROPERTY NAME: Manistee Harbor, South Breakwater

MULTIPLE NAME:

STATE & COUNTY: MICHIGAN, Manistee

DATE RECEIVED: 9/08/95 DATE OF PENDING LIST: 9/19/95
DATE OF 16TH DAY: 10/05/95 DATE OF 45TH DAY: 10/23/95
DATE OF WEEKLY LIST:

REFERENCE NUMBER: 95001162

NOMINATOR: FEDERAL

REASONS FOR REVIEW:

APPEAL:	N	DATA PROBLEM:	N	LANDSCAPE:	N	LESS THAN 50 YEARS:	N
OTHER:	N	PDIL:	N	PERIOD:	N	PROGRAM UNAPPROVED:	N
REQUEST:	N	SAMPLE:	Y	SLR DRAFT:	N	NATIONAL:	N

COMMENT WAIVER: N

___ACCEPT ___RETURN ___REJECT ____________ DATE

ABSTRACT/SUMMARY COMMENTS:

Significant engineering work - early 20th century breakwater constructed by the Corps of Engineers as part of its program to develop harbors in the Great Lakes area.

RECOM./CRITERIA accept C

REVIEWER Patrick Andrus DISCIPLINE Historian

TELEPHONE DATE 10/20/95

DOCUMENTATION see attached comments Y/N see attached SLR Y/N

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

7 SEP 1995

Policy Review and Analysis Division
Office of Environmental Policy

Ms. Carol Shull
Chief of Registration
National Register of Historic Places
Department of the Interior
National Park Service
Post Office Box 37127
Washington, D.C. 20013-7127

Dear Ms. Shull:

Enclosed are four National Register of Historic Places nominations for historic structures in Michigan and Minnesota. The nominations are: Navigation Structures at South Haven Harbor, Van Buren County, Michigan; South Breakwater at Manistee Harbor, Manistee County, Michigan; Piers and Revetments at Grand Haven, Ottawa County, Michigan; and U.S. Army Corps of Engineers Vessel Yard at Duluth, St. Louis County, Minnesota. These nominations were prepared by the Corps Detroit District in conjunction with the Michigan and Minnesota State Historic Preservation Offices.

As the Corps Federal Preservation Officer, I have reviewed the nominations and have certified by signing Section 3. of the enclosures that the four historic properties should be included in the National Register of Historic Places. I request that you take the actions necessary to list these properties and inform me when the process is complete. Should you find that these submittals require revision or, if additional information is needed, please return the nomination(s) to me with your requirements.

Sincerely,

A. Forester Einarsen
Chief, Office of Environmental Policy
Policy Review and Analysis Division

Enclosures

Copies Furnished:
Commander, North Central Division, ATTN: CENCD-PE-PD-ER
Commander, Detroit District, ATTN: CENCE-EP-E