

Table 98  
Wilson Harbor Piers  
Wilson, New York

Date(s)	Construction and Rehabilitation History
1878-1883	Construction of parallel piers at the site (Figure 273) was completed by private interests. The structures were initially stone-filled timber cribs with timber decks.
1949	The piers were rehabilitated by the US Government as authorized by the River and Harbor Act of 1945. The shoreward 264.9 ft and 149.4 ft of the east and west piers, respectively, were constructed of steel sheetpile at an el of +7.25 ft lwd. The lakeward 398.8 ft of the east pier and the adjacent 356.1 ft of the west pier were repaired by encasing the original timber cribs with steel sheet-piling. The area between the sheetpiling was filled with gravel and capped with concrete (Figure 273). The piers were 22.75 ft wide and had an el of +7.5 ft lwd.
1950	A 161.3-ft-long lakeward extension of the west pier was completed resulting in a total pier length of 666.8 ft. The pier was constructed with parallel steel walls filled with gravel and capped with concrete. It was 22.75 ft wide and had an el of +7.5 ft lwd.
1964	A 200-ft-long stone walkway with a concrete cap was constructed adjacent to the east pier (Figure 273).
1986	Routine maintenance repairs have been performed over the years, and the structures are presently considered to be in good condition. An aerial view of the Wilson Harbor piers is shown in Figure 274.

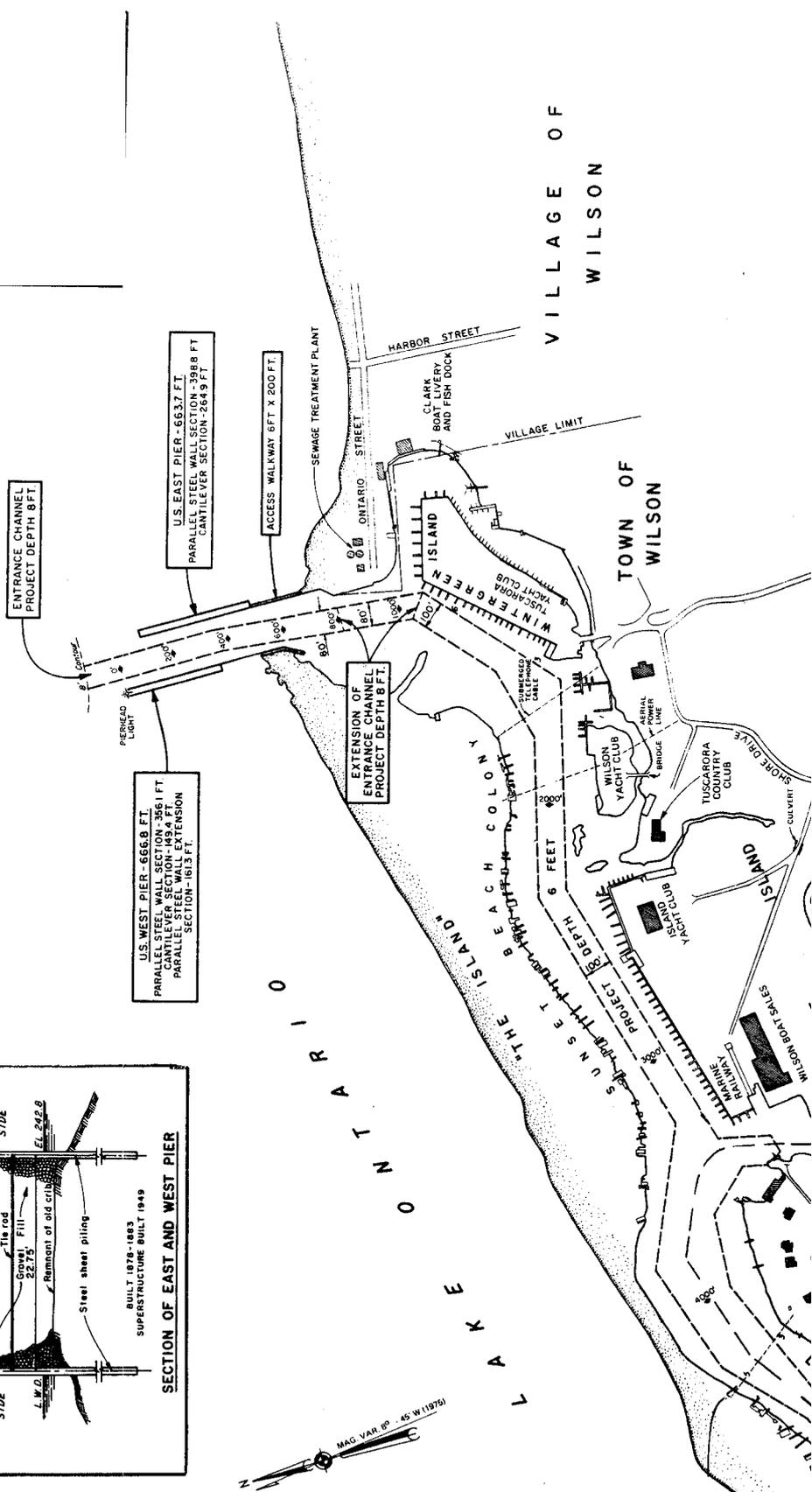
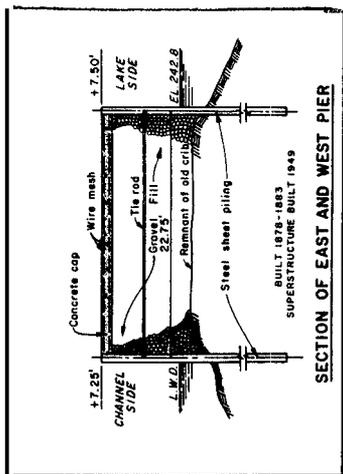


Figure 273. Wilson Harbor, New York

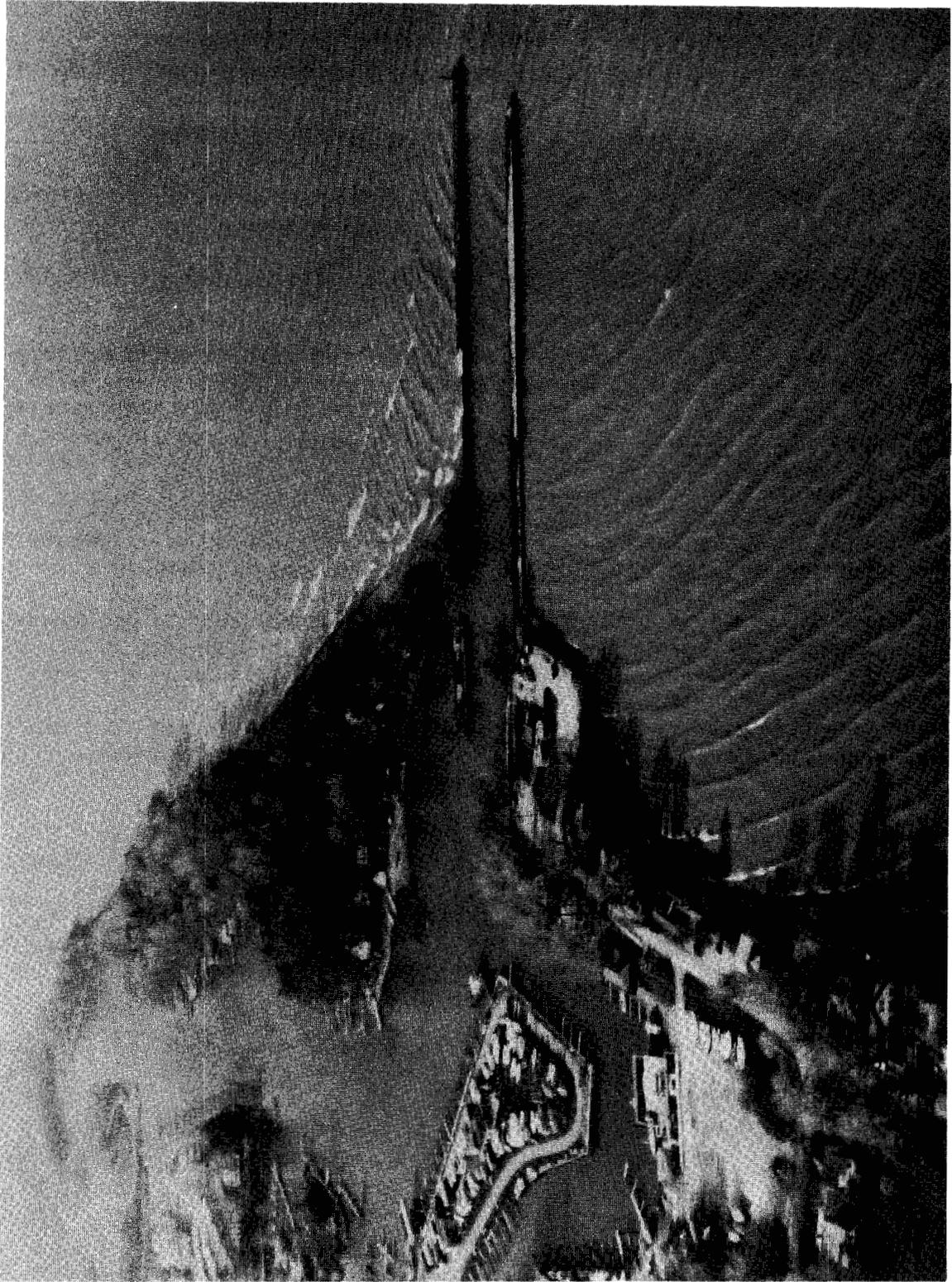


Figure 274. Aerial view of Wilson Harbor. New York

Table 99  
Olcott Harbor Piers  
Olcott, New York

Date(s)	Construction and Rehabilitation History
1918	Construction of an 850-ft-long east pier and and 873-ft-long west pier (Figure 275) was completed. The piers were originally of stone-filled timber crib construction with timber decks.
1930	The east and west piers were capped with stone and concrete superstructures.
1949	Repairs were made to an 800-ft-long portion of the east pier (Figure 275) by driving rows of sheetpiling on each side of the pier, filling the voids with granular fill, and capping the structure with concrete (Figure 276). The pier width was 20 ft, and it had an el of +6.0 ft lwd. The concrete superstructure extended shoreward an additional 22 ft shoreward of the repair section (Figure 275).
1963	Rehabilitation of a 614-ft-long portion of the west pier (Figure 275) was completed which consisted of encasing the existing structure in steel sheet piles (Figure 276). The voids between the old pier and the new steel sheetpiling were granular filled, and the structure was capped with concrete to an el of +7.0 ft lwd. The width of the pier on the lakeward end was about 26 ft (Figures 275, Section A and 276).
1973	Emergency repairs to the west pier were performed consisting of repairs to the stone in portions of the structure and recapping the pier with concrete.
1986	Routine maintenance has been performed on the structures over the years, and they presently are in good condition. An aerial photo of the Olcott Harbor piers is shown in Figure 277.



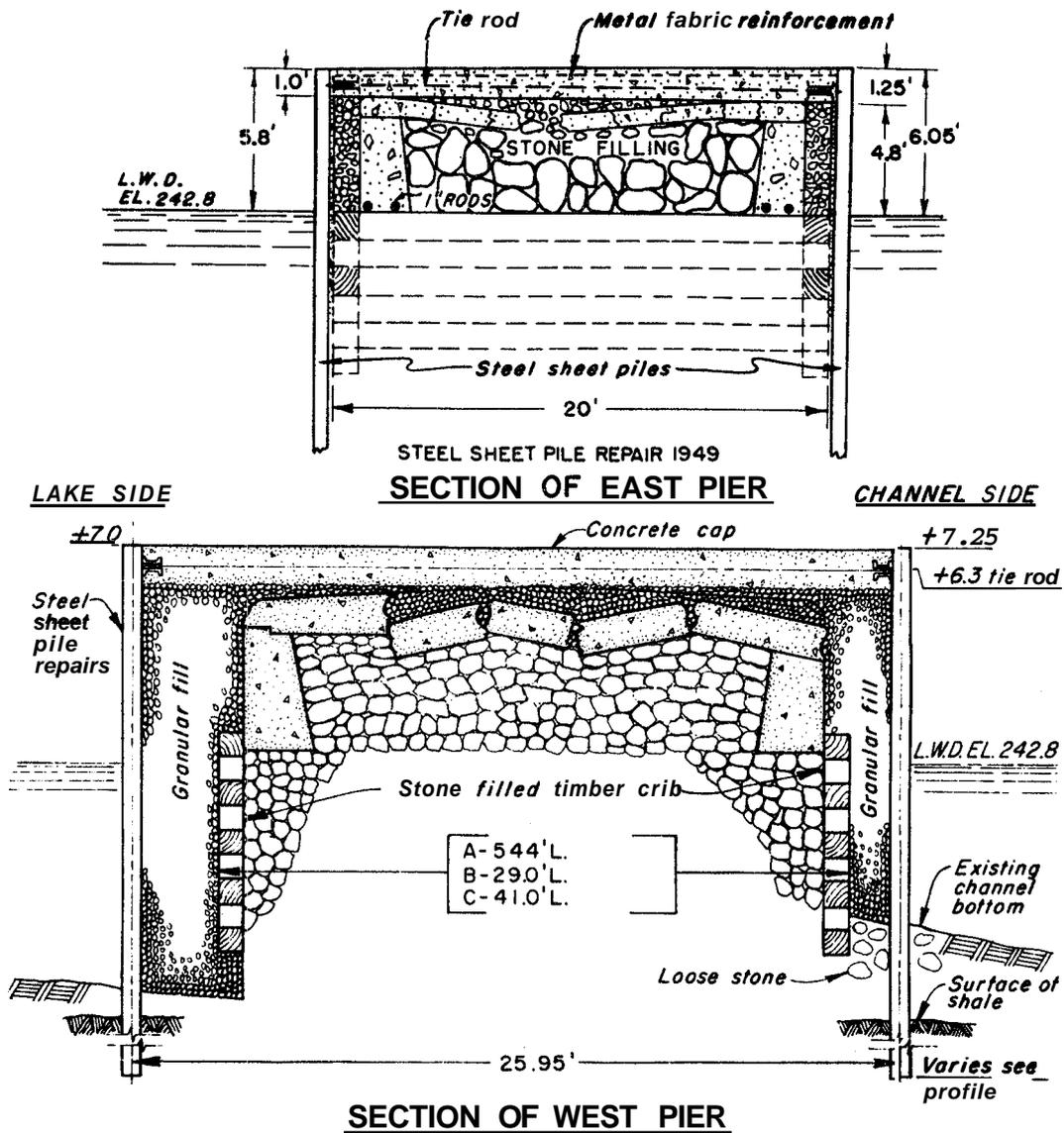


Figure 276. Typical pier cross sections, Olcott Harbor, New York

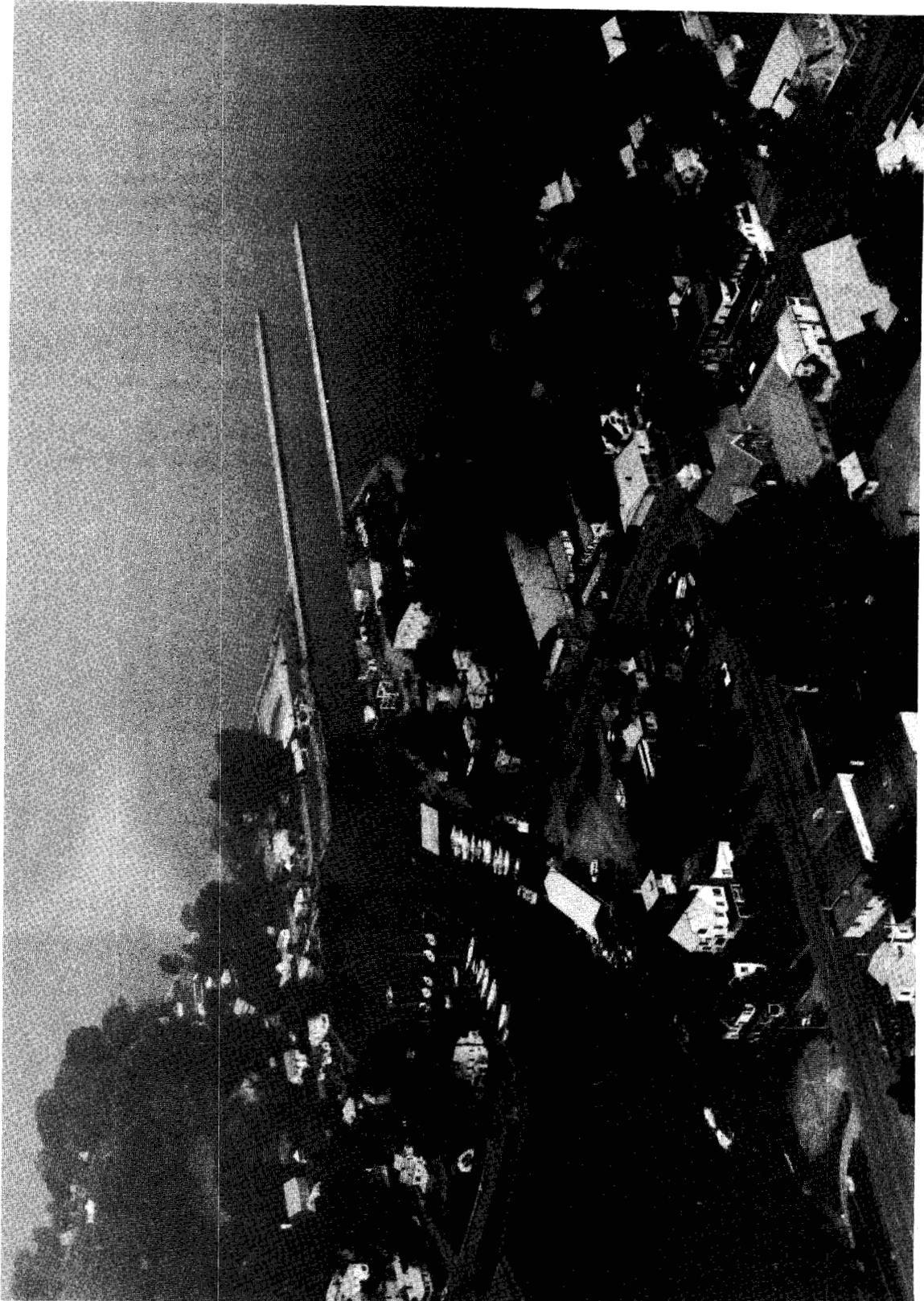


Figure 277. Aerial view of Olcott Harbor, New York

Table 100  
Oak Orchard Harbor Structures  
Oak Orchard, New York

Date(s)	Construction and Rehabilitation History
1975	Construction of parallel piers and a detached breakwater (Figure 278) was completed at the mouth of Oak Orchard Creek. The east and west piers were rubble-mound structures that were 670 and 900 ft long, respectively. They had crest els of +8 ft lwd, crest widths of 12 ft, and cover stones ranging from 3.5 to 7 tons with 50 percent or more of the total stones weighing at least 4.5 tons (Figure 279). A concrete walkway was also installed. The detached breakwater was 550 ft in length and of cellular steel sheet-pile construction. Cell diameters were about 36 ft and included granular fill and concrete caps (Figure 279). The crest el of the breakwater was +8 ft lwd.
1986	No record of maintenance to the structures is available, and they are considered to be in good condition. An aerial view of the Oak Orchard Harbor structures is shown in Figure 280.

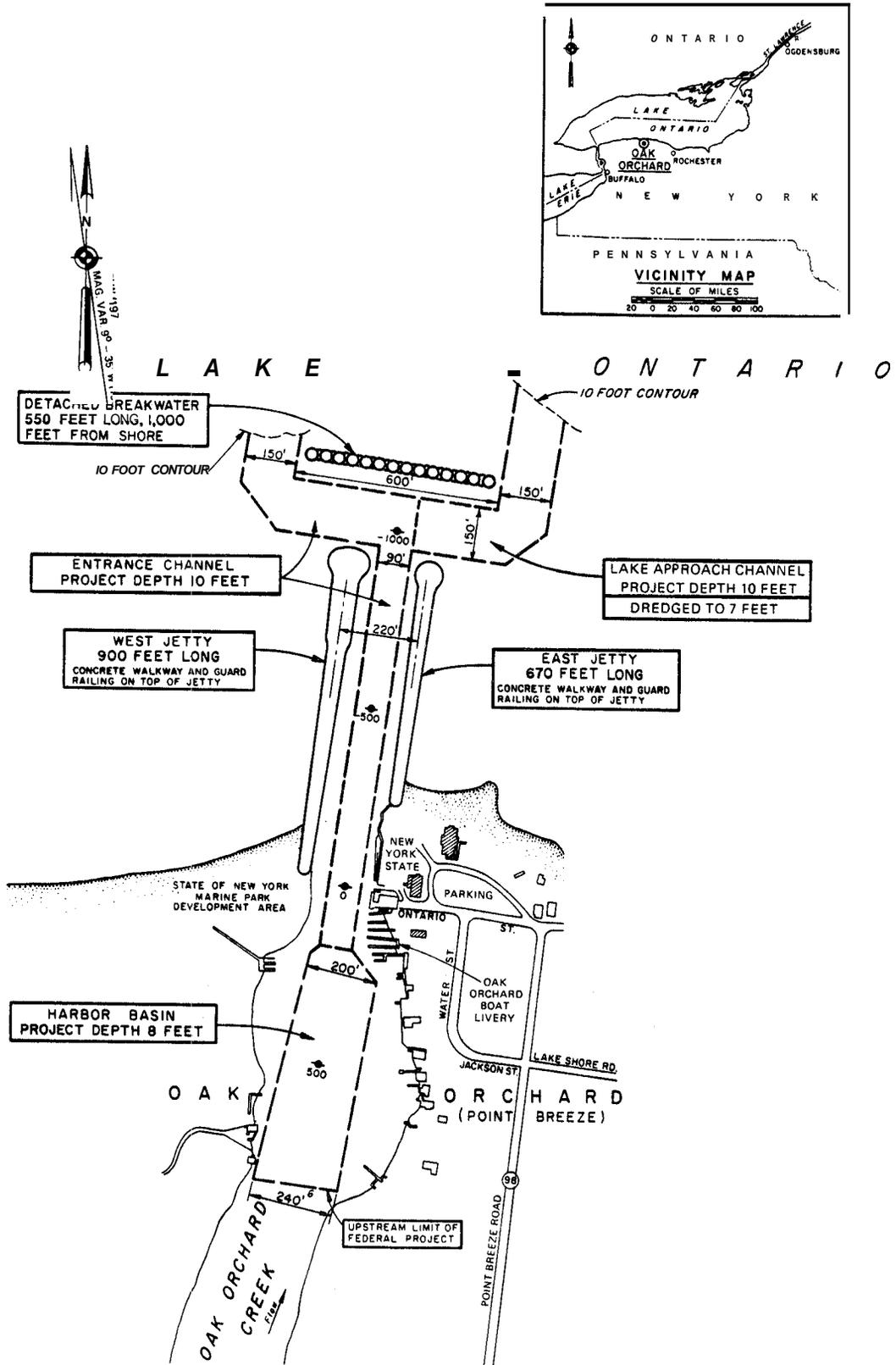
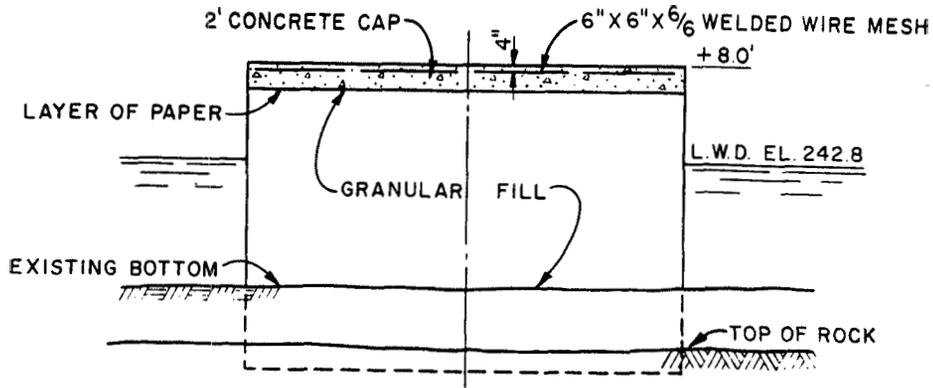
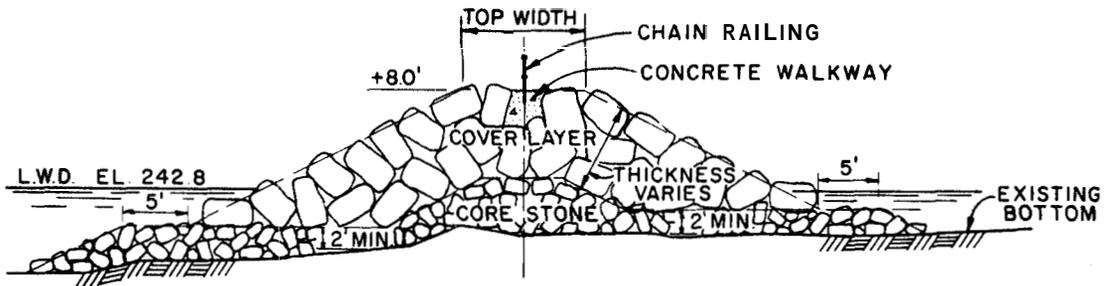


Figure 278. Oak Orchard Harbor, New York



**TYPICAL SECTION OF CELLULAR STEEL SHEET PILE DETACHED BREAKWATER**



**TYPICAL SECTION OF EAST AND WEST JETTIES**

Figure 279. Typical structure cross sections, Oak Orchard Harbor, New York

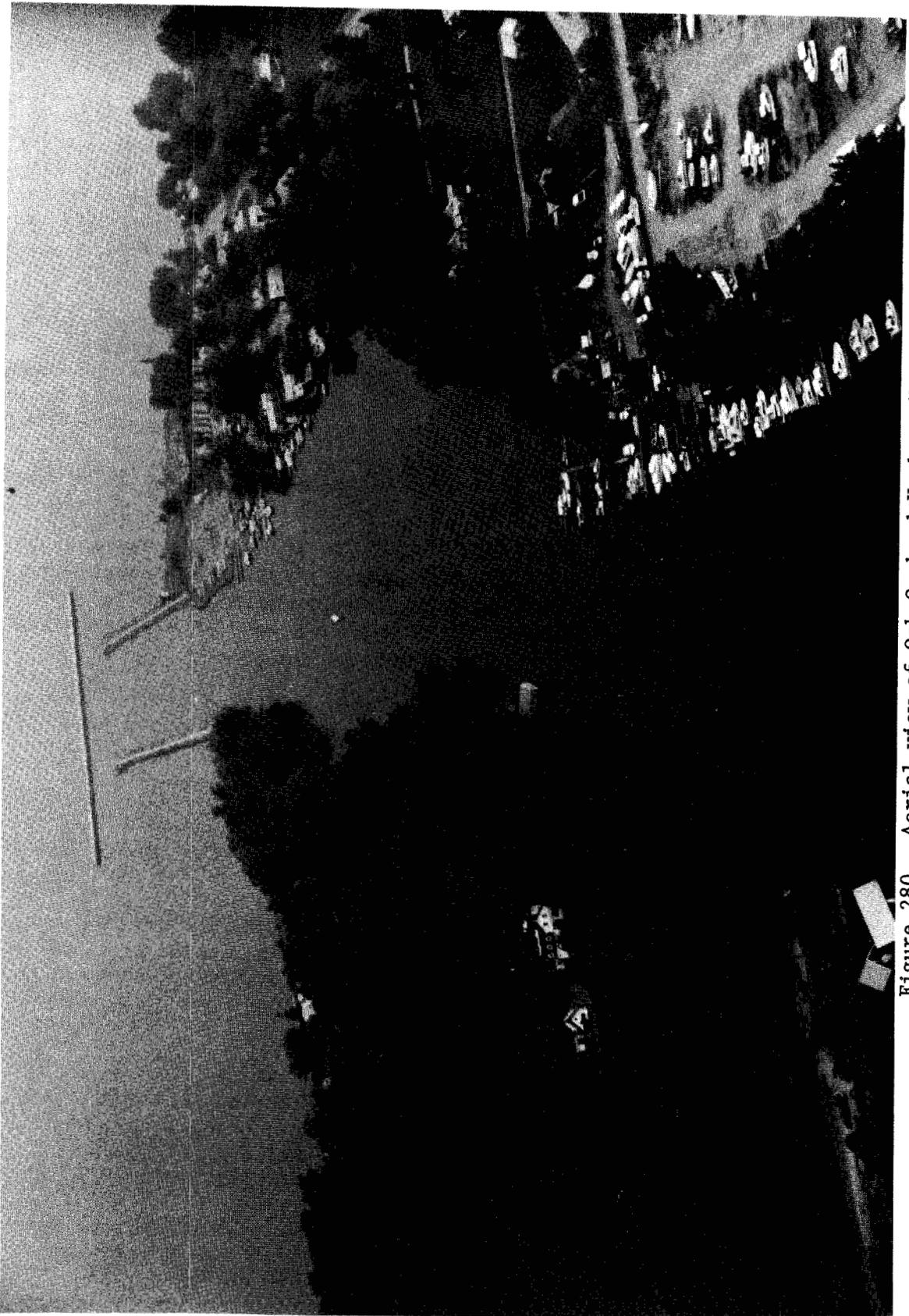


Figure 280. Aerial view of Oak Orchard Harbor, New York

Table 101

Rochester Harbor PiersRochester, New York

Date(s)	Construction and Rehabilitation History
1835	Construction of two parallel piers at the mouth of the Genesee River (Figure 281) was completed. The lengths of the east and west piers were 2,706 ft and 3,064 ft, respectively. The structures were originally constructed of 20-ft-wide stone-filled timber cribs with stone and concrete superstructures (Figure 282) with crest els of +7.5 ft lwd.
1934	Rehabilitation of a 345-ft-long portion of the west pier was completed (Figure 281). Repairs consisted of encasing the original structure with steel sheetpiling (Figure 282). The pier was capped with concrete to an el of 7.37 ft lwd, and the width of the structure was 22.63 ft.
1938	A 238-ft-long portion of the west pier (Figure 281) was rehabilitated. Construction was similar to that of 1934.
1948- 1949	The lakeward 901 ft of the west pier was rehabilitated (Figure 281). Steel sheet pile was driven on each side of the existing structure (about 27 ft apart). The voids between the sheetpiling and the existing structure were granular filled, and the pier was capped with concrete to an el of +8 ft lwd (Figure 282).
1954	Rehabilitation of the lakeward 551-ft-long portion of the east pier was completed (Figure 281). The repairs were similar to those of the west pier completed during 1948-49 (Figure 282).
1971	Additional rehabilitation of the 706 ft of the east pier was completed (Figure 281). Repair methods consisted of parallel steel sheetpiling, granular fill, and a concrete cap, similar to that done previously (Figure 282).
1980- 1981	Rehabilitation of a 410-ft-long portion (Figure 281) of the west pier was completed. Repairs consisted of the installation of parallel steel sheet-pile walls (on each side of the existing structure). Voids were granular filled, and the pier was capped with concrete. The crest el of the repaired structure was +7.5 ft lwd, and the pier width was 22 ft.
1983- 1984	A 1,125-ft-long portion of the west pier (Figure 281) was rehabilitated. Repairs were similar to those done previously by encasing the existing structure in steel sheetpiling, filling the voids with granular fill, and capping the structure with concrete.
1986	The structures presently are in good condition with the exception of minor repairs needed on the shoreward ends of both piers. An aerial photo of the Rochester Harbor piers is shown in Figure 283.

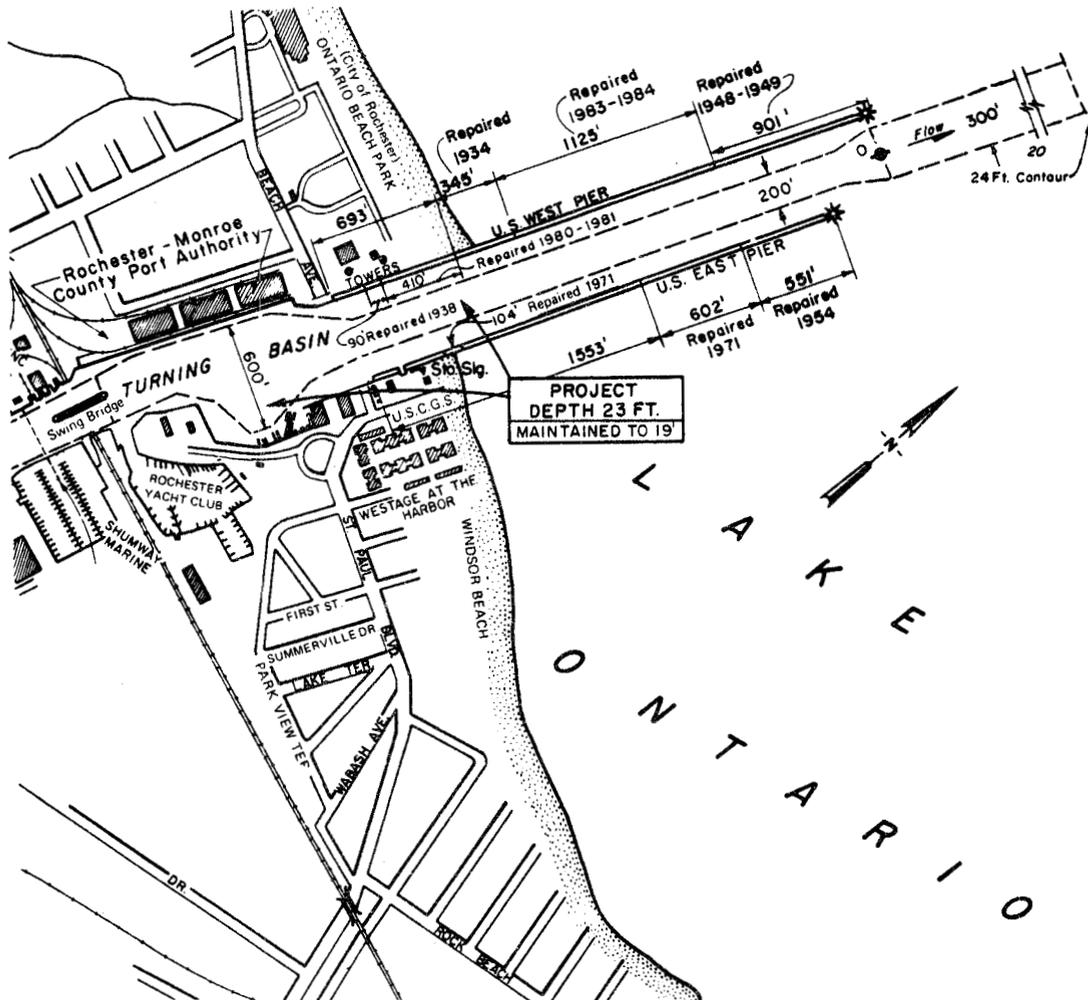


Figure 281. Rochester Harbor, New York

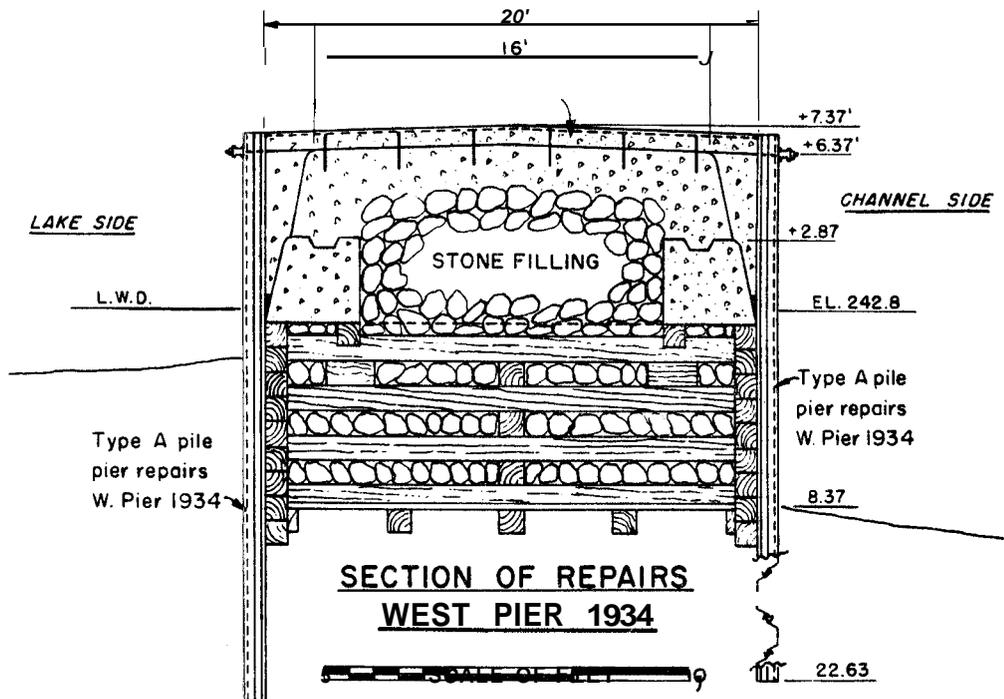
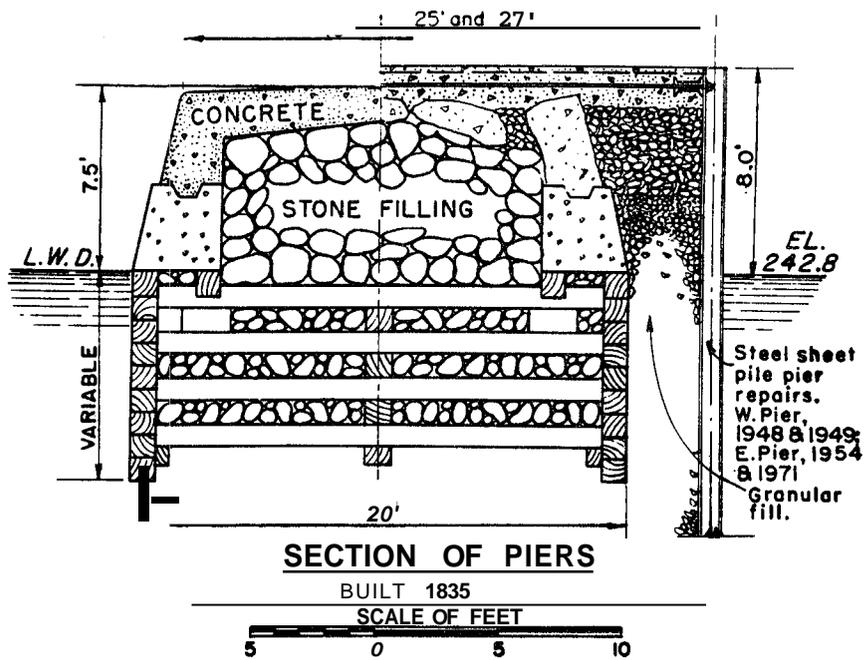


Figure 282. Typical pier cross sections, Rochester Harbor, New York

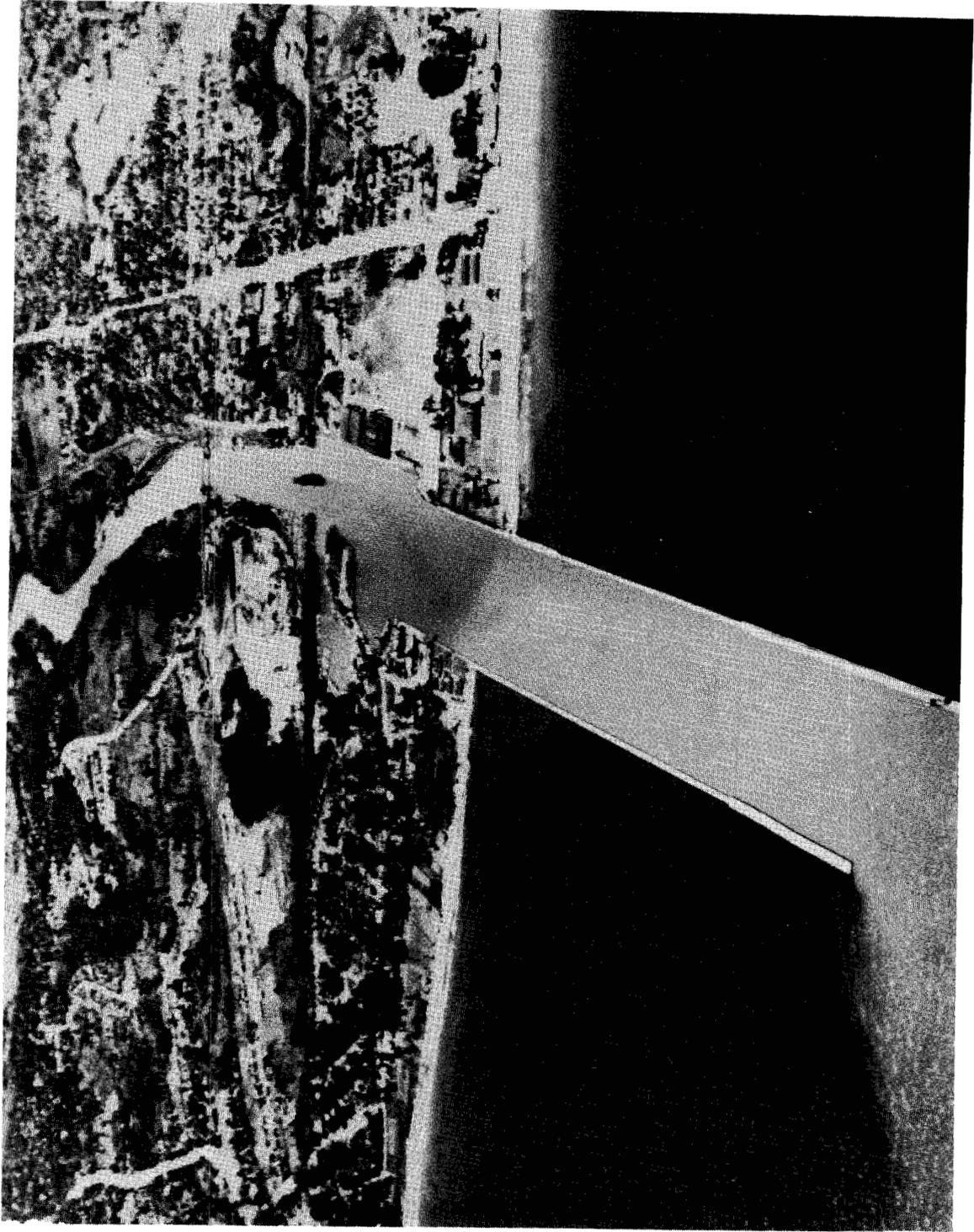


Figure 283 Aerial view of Rochester Harbor New York

Irondequoit Bay StructuresIrondequoit Bay, New York

Date(s)	Construction and Rehabilitation History
1985	<p>Construction of a 1,350-ft-long west breakwater and a 750-ft-long east jetty (Figure 284) was completed. The structures were built of rubble-mound materials with crest els of +10 ft lwd (Figure 285). The trunk section of the east jetty had an 11-ft-wide crest width, 1-V:1.5-H side slopes, and 0.5- to 1.5-ton armor stone. The east jetty head section and the shoreward arm of the west breakwater had crest widths of 14 ft and armor stones ranging from 3.0 to 6.5 tons. The head section of the east jetty had side slopes of 1V:2H. The lakeward arm of the west breakwater included armor stone ranging from 7 to 15.5 tons and a crest width of 16 ft. Side slopes of the west breakwater were 1V:1.5H, with the exception of the head which had 1-V:2-H slopes. An aerial view of the Irondequoit Bay structures taken during construction is shown in Figure 286. (Note the channel had not been dredged.)</p>

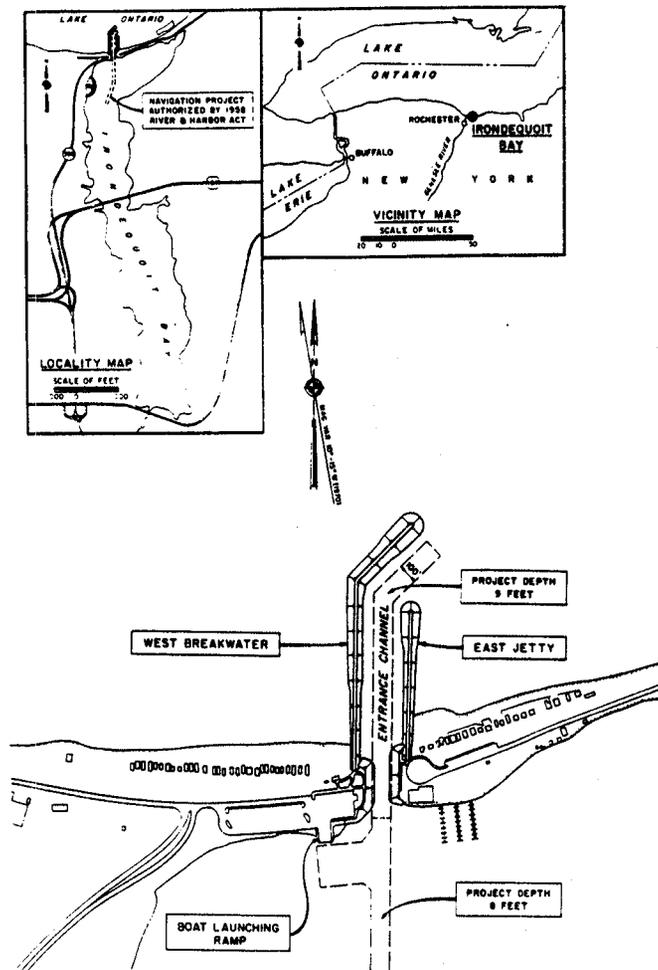
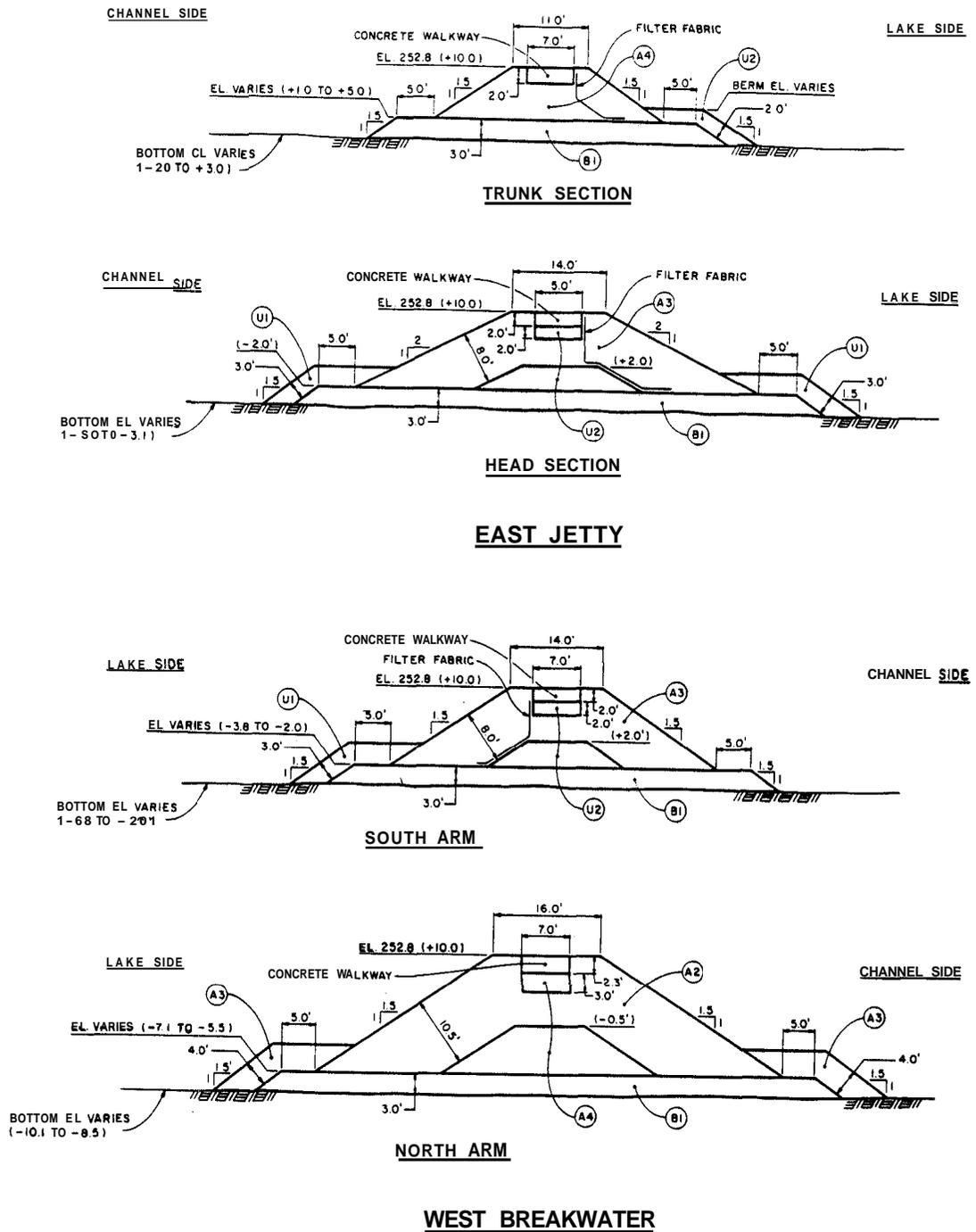


Figure 284. Irondequoit Bay, New York



A2	ARMOR STONE	70 TO 15.5 TONS
A3		30 TO 6.5 TONS
A4		05 TO 15 TONS
B1	BEDDING MATERIAL	0 TO 15 IN
U1	UNDERLAYER STONE	1500 TO 5000 LBS
u2		400 TO 1300 LBS

Figure 285. Typical structure cross sections, Irondequoit Bay, New York

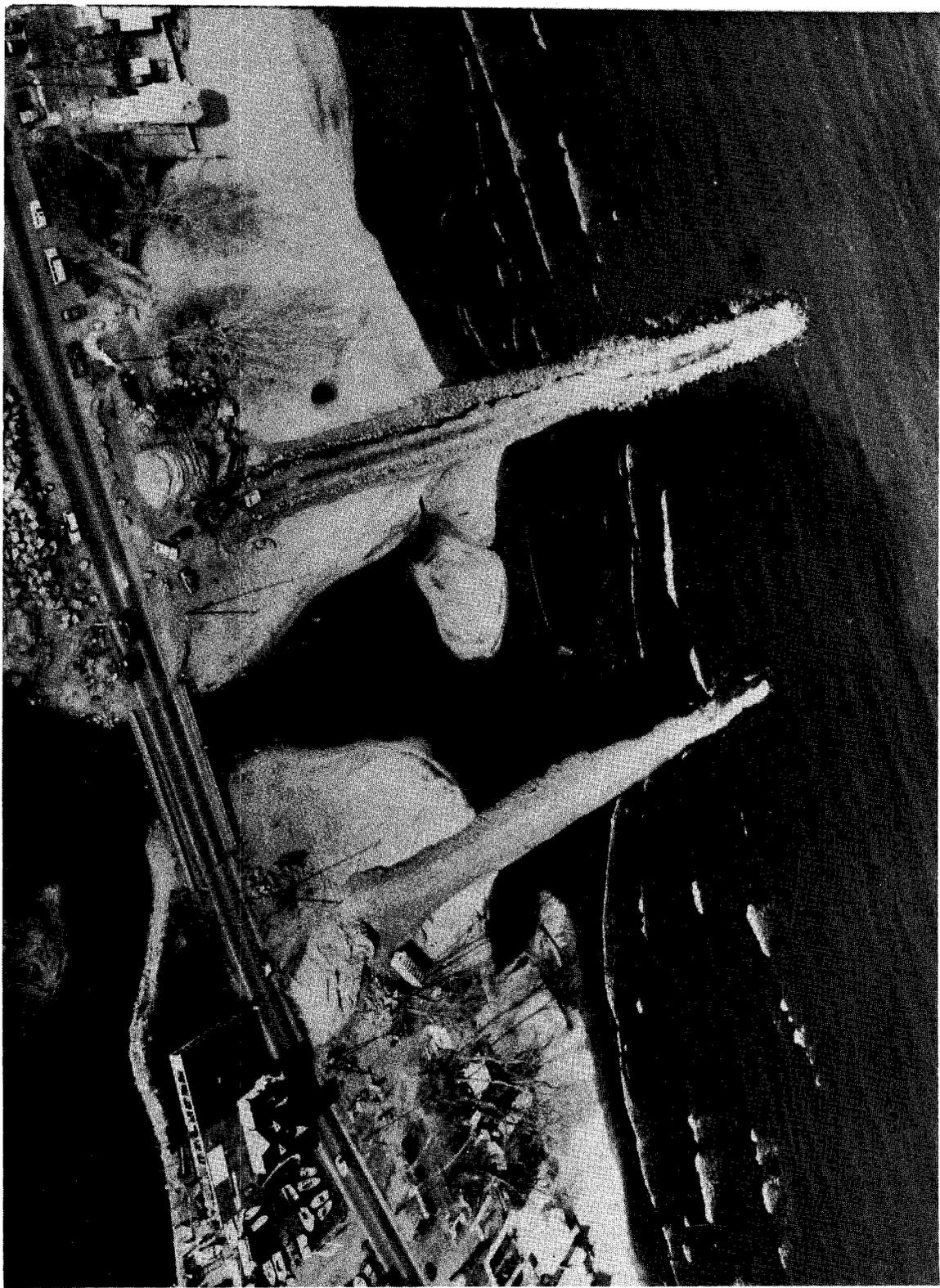


Figure 286. Aerial view of Irondequoit Bay, New York

Table 103  
Great Sodus Bay Harbor Structures  
Sodus Point, New York

Date(s)	Construction and Rehabilitation History
1910- 1919	Construction of a 1,294-ft-long east pier and and 1,580-ft-long west pier (Figure 287) was completed during this time. The piers consisted of stone-filled timber crib construction with stone and concrete superstructures (Figure 288). The structures were 18 ft in width and had crest els of +7.4 ft lwd.
1920- 1931	Construction of a 1,653-ft-long east breakwater (Figure 287) was completed during this period. The breakwater consisted of stone-filled timber cribs with a concrete cap (Figure 288). It was 14 ft wide and had a maximum el of +7.4 ft lwd.
1948	Rehabilitation of the east breakwater was performed which included the installation of steel sheet-pile walls on each side of the existing structure. The voids between the old timber crib and the new sheetpiling were filled with stone, and the breakwater was capped with concrete to an el of +8.5 ft lwd.
1958	A 503-ft-long portion of the west pier was repaired (Figure 287). The existing pier was encased with steel sheetpiling driven 27 ft apart. Voids were granular-filled, and the pier section was capped with concrete (Figure 288). The el of this portion of the pier was +8.7 ft lwd.
1962- 1963	A 557-ft-long portion of the west pier and two portions (445 and 449 ft) of the east pier (Figure 287) were rehabilitated. Repairs were similar to those done on the west pier in 1958 (Figure 288). The els of these pier portions were +8.8 ft lwd.
1974	Rehabilitation of the remaining 400-ft section of the east pier (Figures 287 and 288) was completed. Repairs included two sheet-pile walls, granular fill, and a concrete superstructure (similar to previous rehabilitation of the structure). Repairs to the west pier, also performed during this year, consisted of the placement of riprap stone on the lakeside of the structure. The stone ranged in weight from 400 lb to 2 tons and extended to the lwd el.
1976	A 400-ft-long section of the east breakwater (immediately east of the east pier) was repaired using stone fill and recapping the structure with concrete. Stone was also placed on the lakeside of the breakwater in this location.
1978	Repairs to the west pier were performed which included placing fill stone in portions of the pier and capping the structure with concrete. Riprap was also placed along the channel side of the pier. Riprap stone ranged in weight from 250 to 500 lb,

(Continued)

Table 103 (Concluded)

Date(s)	Construction and Rehabilitation History
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1986	<p>The piers presently are in satisfactory condition, and no immediate repairs are required. The east breakwater, however, appears to have areas where undermining is prevalent and concrete is spalled. Repairs have been recommended. An aerial photo of the Great Sodus Bay Harbor structures is shown in Figure 289.</p>
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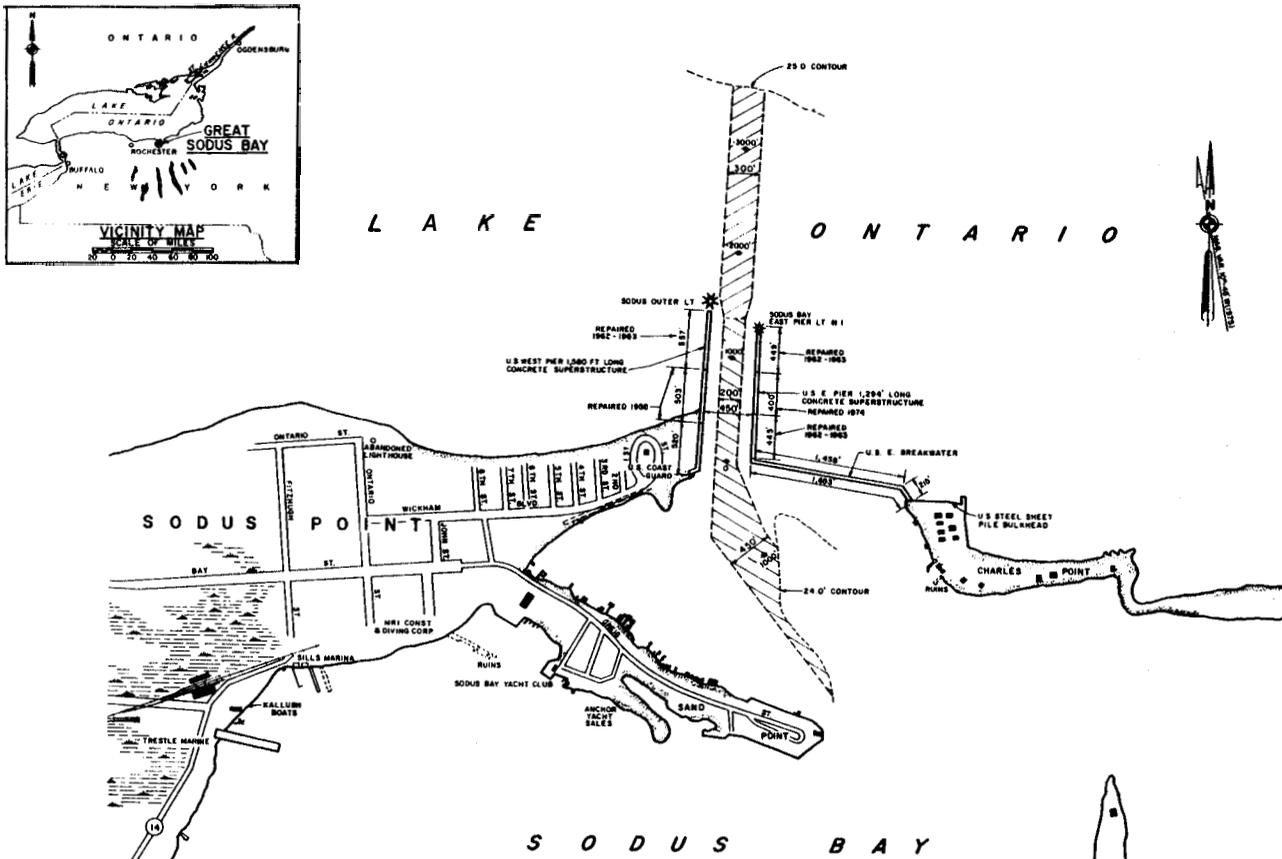


Figure 287. Great Sodus Bay Harbor, New York

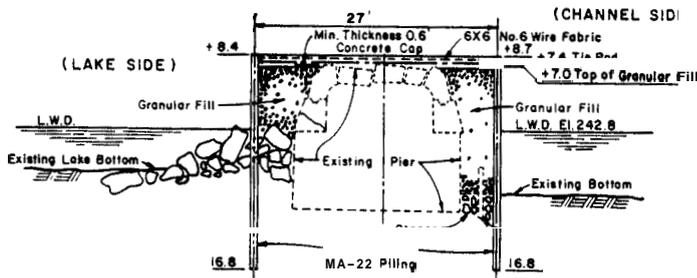
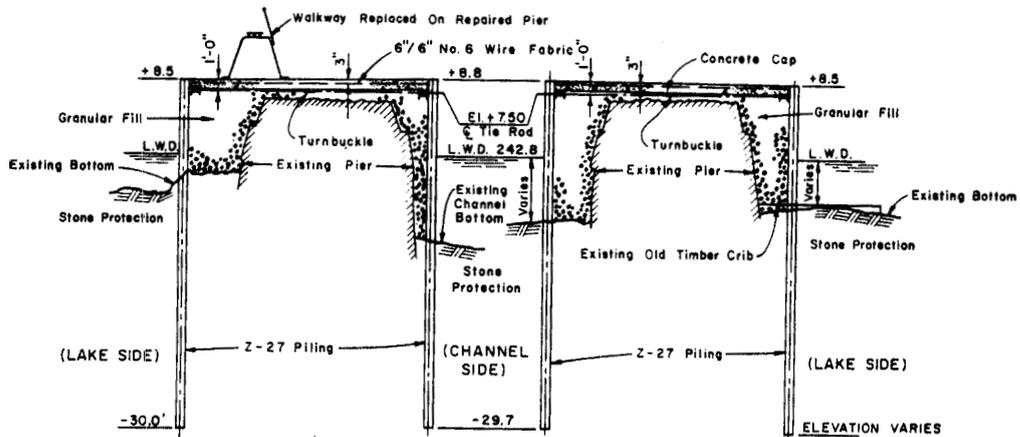
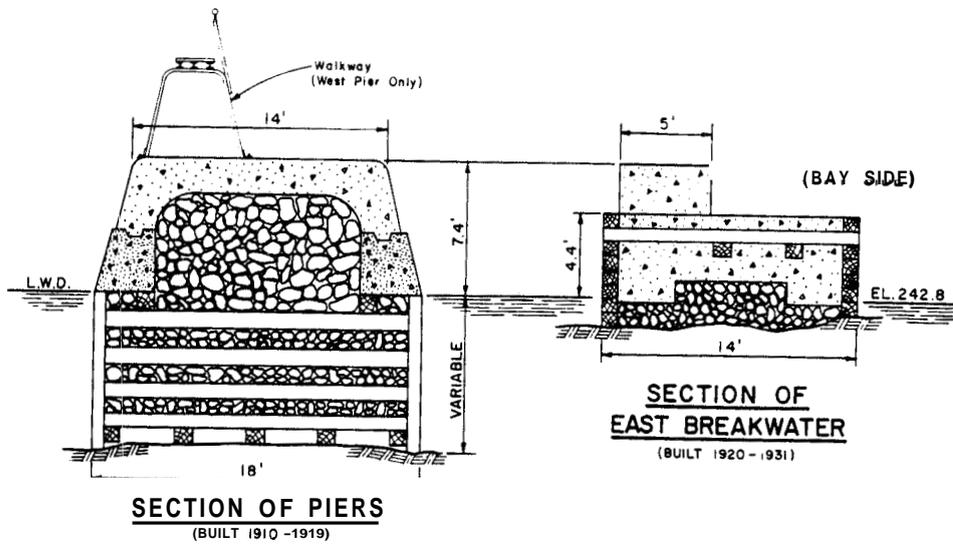


Figure 288. Typical structure cross sections  
Great Sodus Bay Harbor, New York

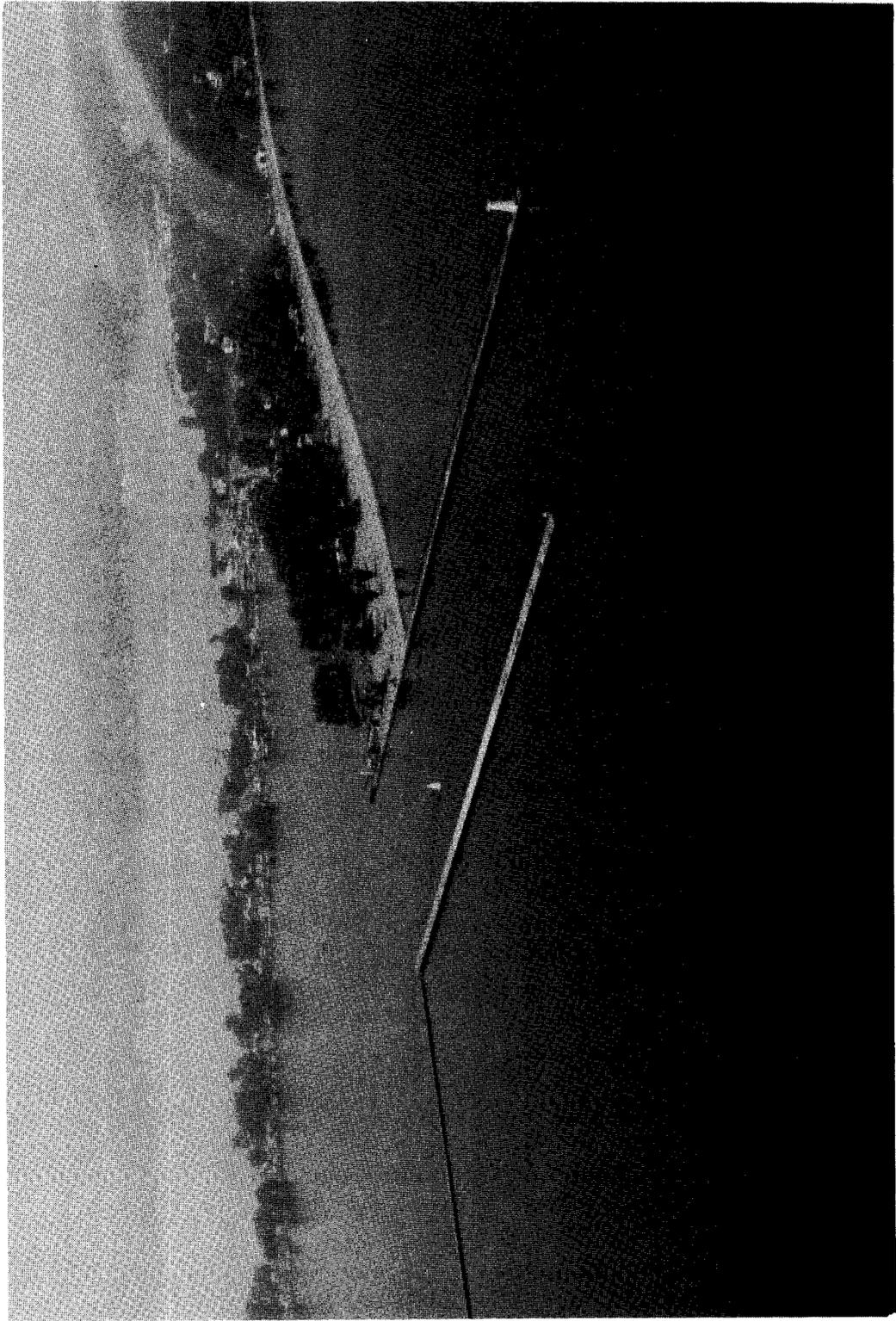


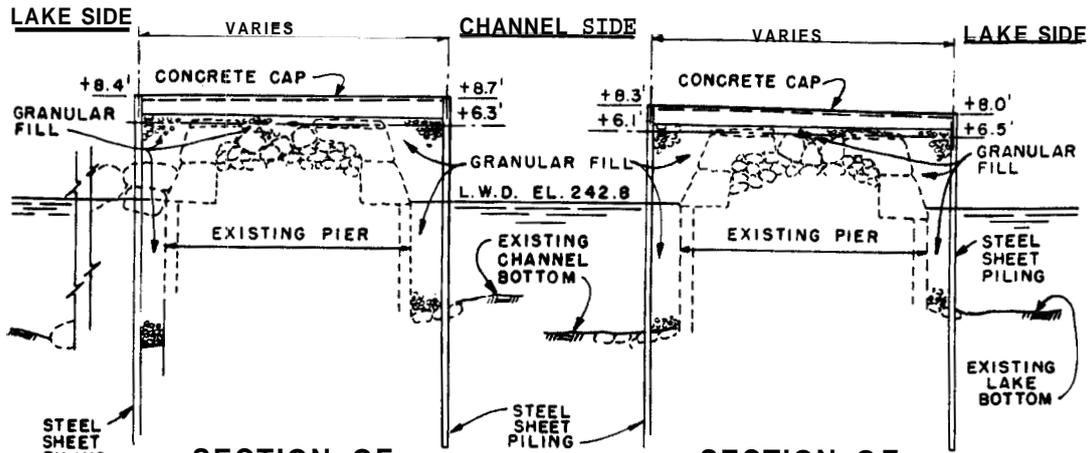
Figure 289. Aerial view of Great Sodus Bay Harbor, New York

Table 104

Little Sodus Bay Harbor StructuresLittle Sodus Bay, New York

Date(s)	Construction and Rehabilitation History
1867- 1906	Construction of a 1,810-ft-long east pier and a 1,747-ft-long west pier (Figure 290) was completed during this period. The structures were stone-filled timber cribs with widths of 20 ft (Figure 291).
1873- 1885	Construction of a 1,680-ft-long east breakwater (Figure 290) was completed during this time. The breakwater was constructed with stone-filled timber cribs that were 20 ft in width (Figure 291).
1913	The east and west piers were capped with a concrete and stone superstructure (Figure 291). The el of the piers was +7.1 ft lwd.
1916	The east breakwater was capped with a concrete superstructure (Figure 291). Of the 20-ft width of the breakwater, 9 ft had an el of +7.4 ft lwd, and the remaining 11 ft had an el of +4.4 ft lwd.
1945	Rehabilitation of 272 ft of the east pier (Figure 290) was completed. Repairs consisted of driving steel sheet-pile walls on each side of the pier sections, filling the voids between the new steel pile walls with stone, and placing a concrete cap (Figure 291). The width of the repaired sections was about 22 ft, and the crest el was +7.4 ft lwd.
1967	Repairs to 300 ft of the east pier and 1,127 ft of the west pier (Figure 290) were completed. They included encasing the existing structures with steel sheet-pile walls, filling the voids between the new sheetpiling and the existing pier with granular fill, and capping the structure with concrete (Figure 291). The crest el of the east pier was +8.3 ft lwd, and the west structure had an el of +8.7 ft lwd.
1971- 1972	Rehabilitation of another 626 ft of the east pier (Figure 290) was completed. Repairs were similar to those completed in 1967 (Figure 291).
1974	Remaining portions of the east pier (those not rehabilitated at an earlier date) were repaired (Figure 290). Rehabilitation consisted of similar construction methods used in earlier repairs which included steel sheet-pile walls, granular fill, and concrete caps (Figure 291).
1978	Repairs to the shoreward 620-ft-long portion of the west pier were completed (Figure 290). Rehabilitation consisted of encasing the existing pier with steel sheet-pile walls, installing granular fill in the voids between the new walls and the old timber crib, and pouring a concrete cap.
1986	During their lifetime the entire east and west piers have been rehabilitated. There is no record of repairs to the west breakwater; however, the concrete cap is currently spalled and cracked in many locations. Presently the structures are considered to be in fair condition.



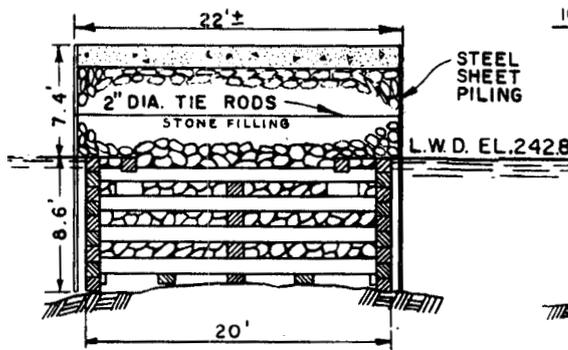


**SECTION OF WEST PIER REPAIRS**

REHABILITATION WORK INITIATED IN SEPT 1965 AND COMPLETED IN JULY 1967

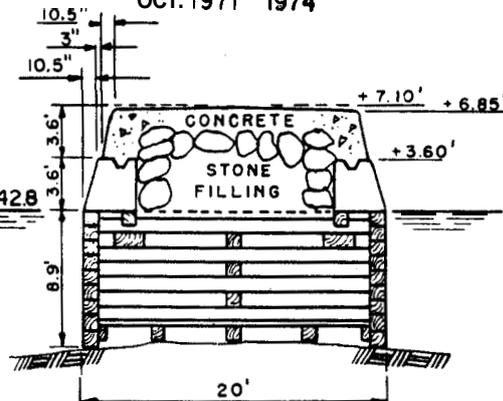
**SECTION OF EAST PIER REPAIRS**

MAY - JULY 1967  
OCT. 1971 - 1974



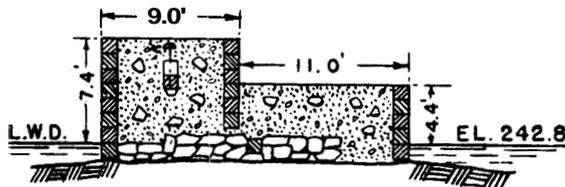
**SECTION OF REPAIRS**

MADE TO EAST PIER IN 1945



**SECTION OF PIERS**

(BUILT 1867-1906)  
SUPERSTRUCTURE 1913



**SECTION OF EAST BREAKWATER**

(BUILT 1873-1885)  
SUPERSTRUCTURE 1916

Figure 291. Typical structure cross sections, Little Sodus Bay Harbor, New York

Table 105  
Oswego Harbor Breakwaters  
Oswego, New York

Date(s)	Construction and Rehabilitation History
1882	Construction of a 4,515-ft-long west breakwater (Figure 292, Sections C and D) was completed. The structures consisted of stone-filled timber cribs with widths of 35 ft (Figure 293, Sections C and D).
1931- 1932	Construction of a stone and concrete superstructure (Figures 292 and 293, Sections C and D) was completed on the existing timber crib structures. A 2,700-ft-long west arrowhead and a 2,200-ft-long east arrowhead breakwater (Figure 292, Sections A and B) were also constructed. The arrowheads were rubble-mound structures with crest els of +8.5 ft lwd and widths of 10 ft. Side slopes were <b>1V:1.5H</b> on the lakeside and <b>1V:1.3H</b> on the harbor side (Figure 293, Sections A and B). Armor stones weighing 3 tons (minimum) with not less than 60 percent of 6 tons or more were used.
1942	Stone was placed along the lakeside of the timber crib west breakwater (Figures 292 and 293, Sections C and D). A slope of 1V:2H was used, and the el at the top of the slope ranged from 6 to 6.5 ft lwd. Cover stone weighed from 3 to 5 tons each.
1958- 1959	Construction of an 850-ft-long detached rubble-mound breakwater (Figure 292) was completed. The crest el of the structure was +10 ft lwd, and its width was 8 ft. Slopes on the lakeside were <b>1V:1.5H</b> , and on the harbor side they were <b>1V:1.3H</b> (Figure 293). Cover stones weighed 7 tons each. This breakwater was model tested prior to construction (Fortson et al 1949).
1962	Rehabilitation of the west breakwater (Figures 292 and 293, Sections C and D) was completed. Repairs consisted of replacement of lost stone on the lake slope, placement of riprap stone on the harbor side, and replacement of portions on the concrete superstructure (over cracked and displaced sections). The weight of the cover stone used on the harbor side ranged from 1 to 3 tons.
1983- 1984	Rehabilitation of the breakwaters was performed. The timber crib structure was replenished with stone fill, and the concrete cap was repaired in various areas. Riprap on the lakeside and harbor side was replaced as needed. Missing armor stones on the rubble-mound sections of the breakwater were replaced as needed.
1986	The breakwaters presently are considered to be in very good condition. Minor repair work has been noted and will be accomplished during routine maintenance operations. An aerial view of the Oswego Harbor breakwater at the harbor entrance is shown in Figure 294.

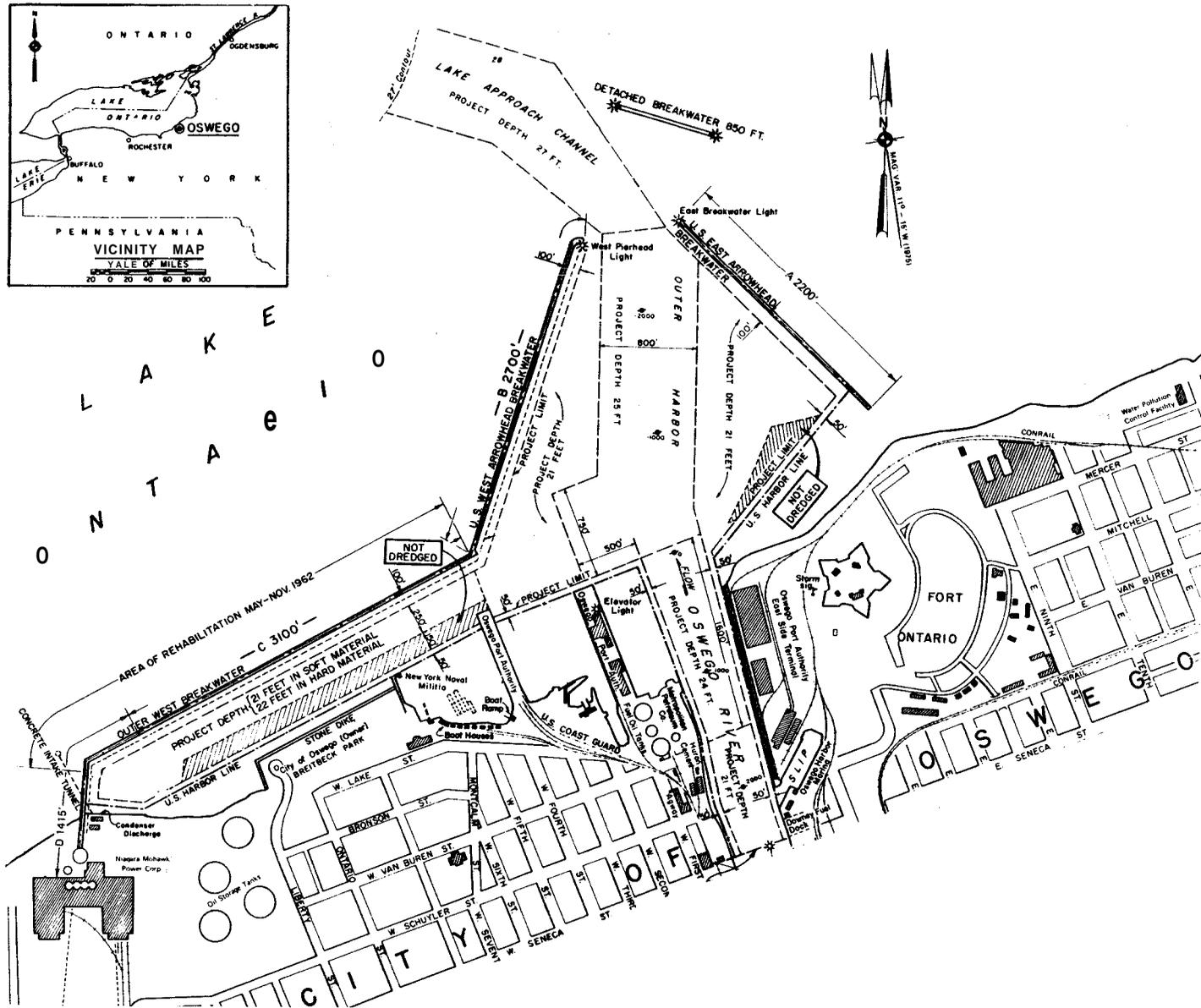


Figure 292. Oswego Harbor, New York

**DECK STONE** Minimum weight 10 tons.  
**COVERING STONE "A"** Minimum weight stone 3 tons, not less than 60% 6 tons or more.  
**COVERING STONE "B"** Minimum weight 100 pounds 50% by weight not less than 3 tons each.  
**CORE STONE "C"** Quarry run stone with not more than 3% in pieces of less than 1 pound in weight, and 50% in pieces weighing more than 100 Pounds.

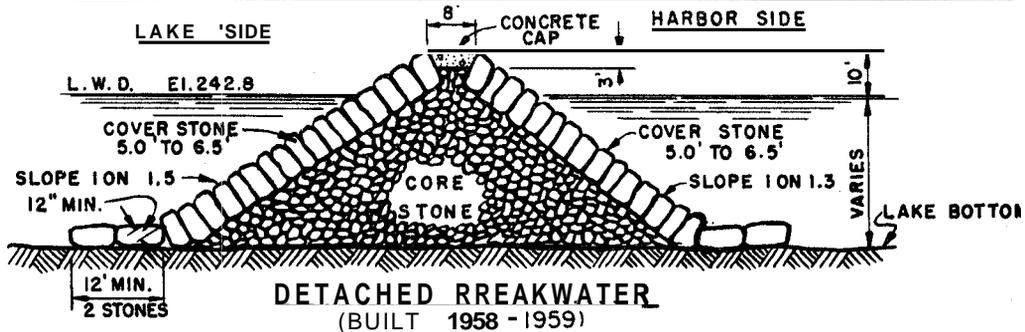
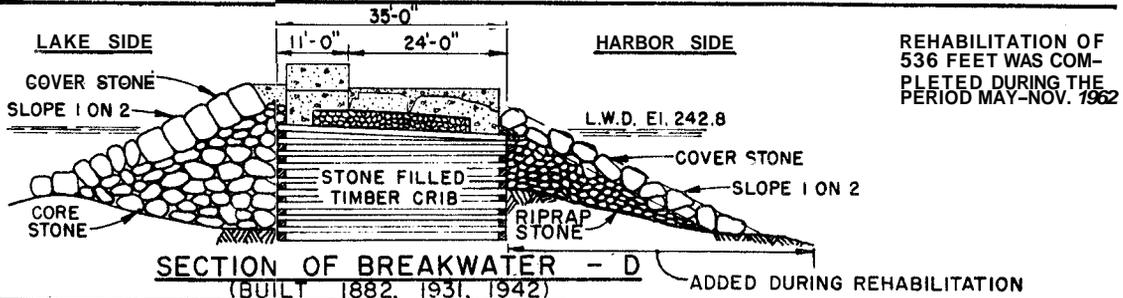
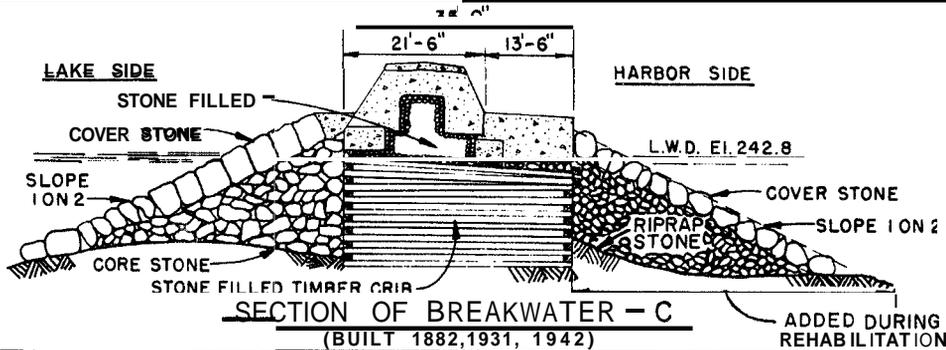
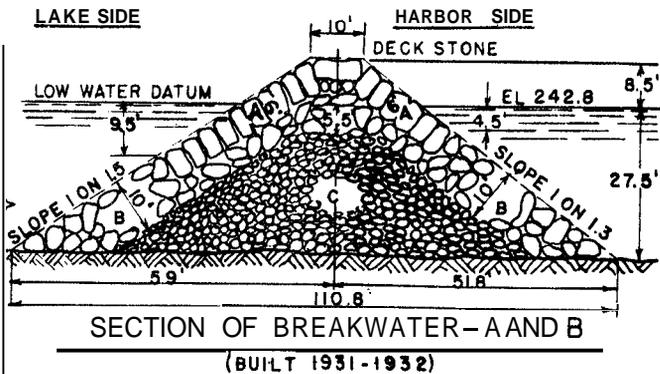


Figure 293. Typical breakwater cross sections, Oswego Harbor, New York

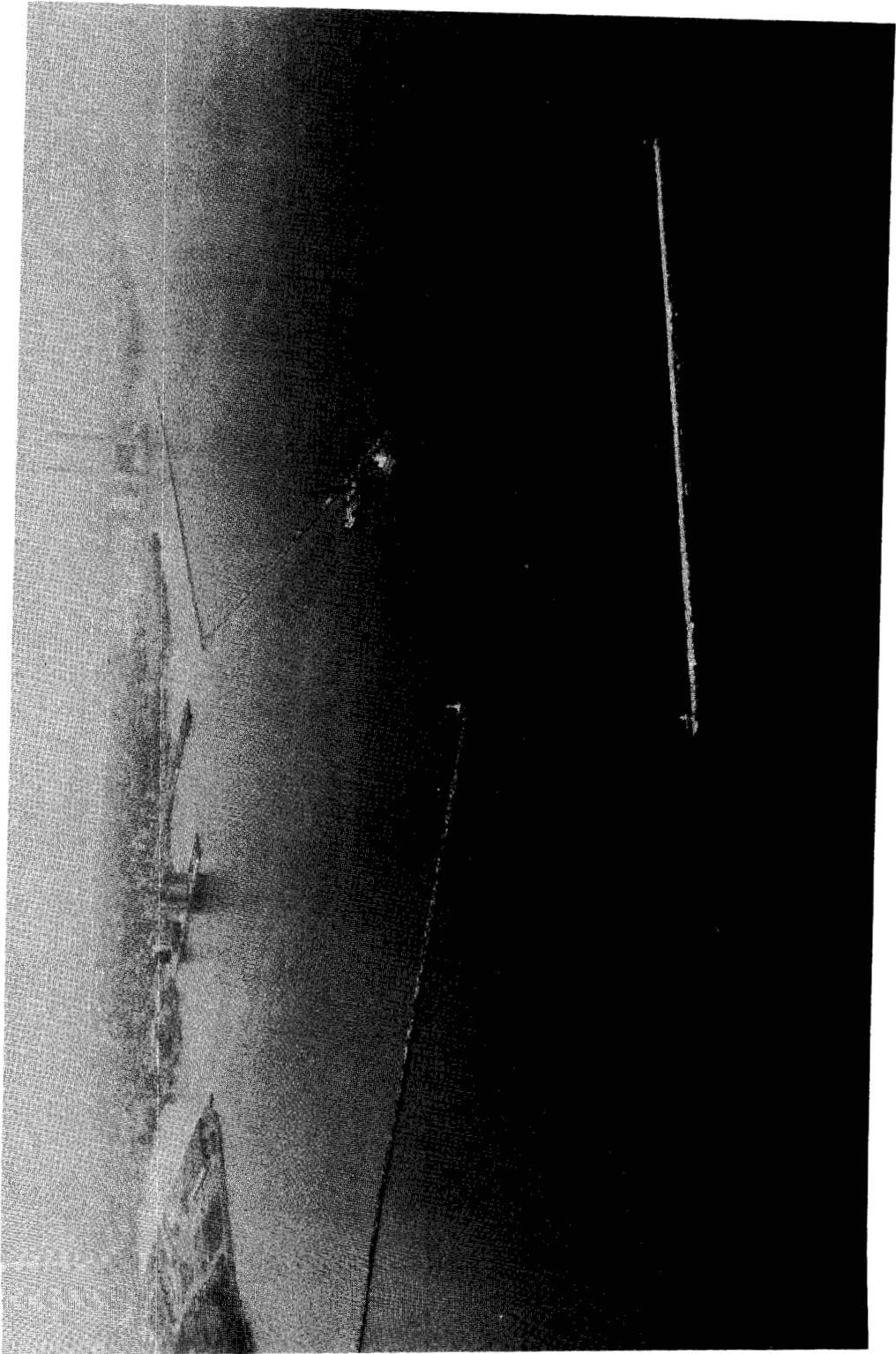


Figure 294. Aerial view of New York Harbor, New York

Table 106

Sackets Harbor Jetty  
Black River Bay, New York

Date(s)	Construction and Rehabilitation History
1888	Construction of a 164-ft-long jetty (Figure 295) was completed. The jetty consisted of stone and wood piles and had an el of +4.0 ft lwd and a width of about 11 ft (Figure 295).
1986	There are no records of repairs to the jetty, and it appears the shoreline has progressed beyond the jetty yielding it nonfunctional.

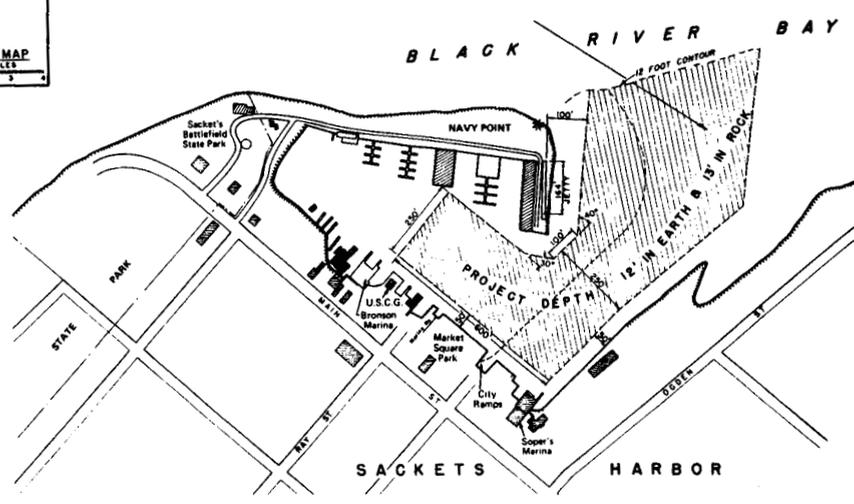
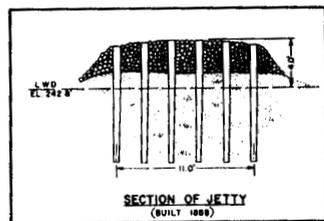
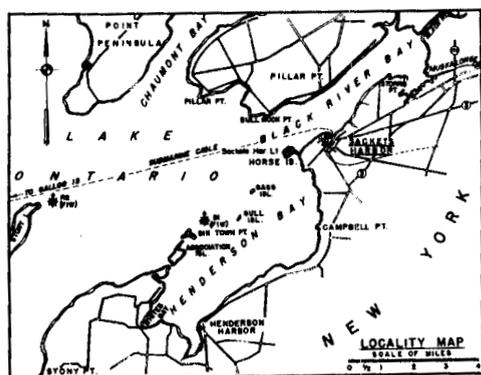


Figure 295. Sackets Harbor, New York

Table 107  
Cape Vincent Harbor Breakwater  
Cape Vincent, New York

Date(s)	Construction and Rehabilitation History
1915	Construction of a 1,381-ft-long offshore breakwater parallel to the shoreline (Figure 296) was completed. The structure was comprised of 27-ft-wide stone-filled timber cribs with a concrete and stone superstructure (Figure 296). The el of the structure was about +7.5 ft lwd.
1981	Because of deterioration, the existing superstructure was recapped with concrete to an el of +8.0 ft lwd (Figure 296).
1986	The structure is presently in good condition. An aerial photograph of the Cape Vincent Harbor breakwater is shown in Figure 297.

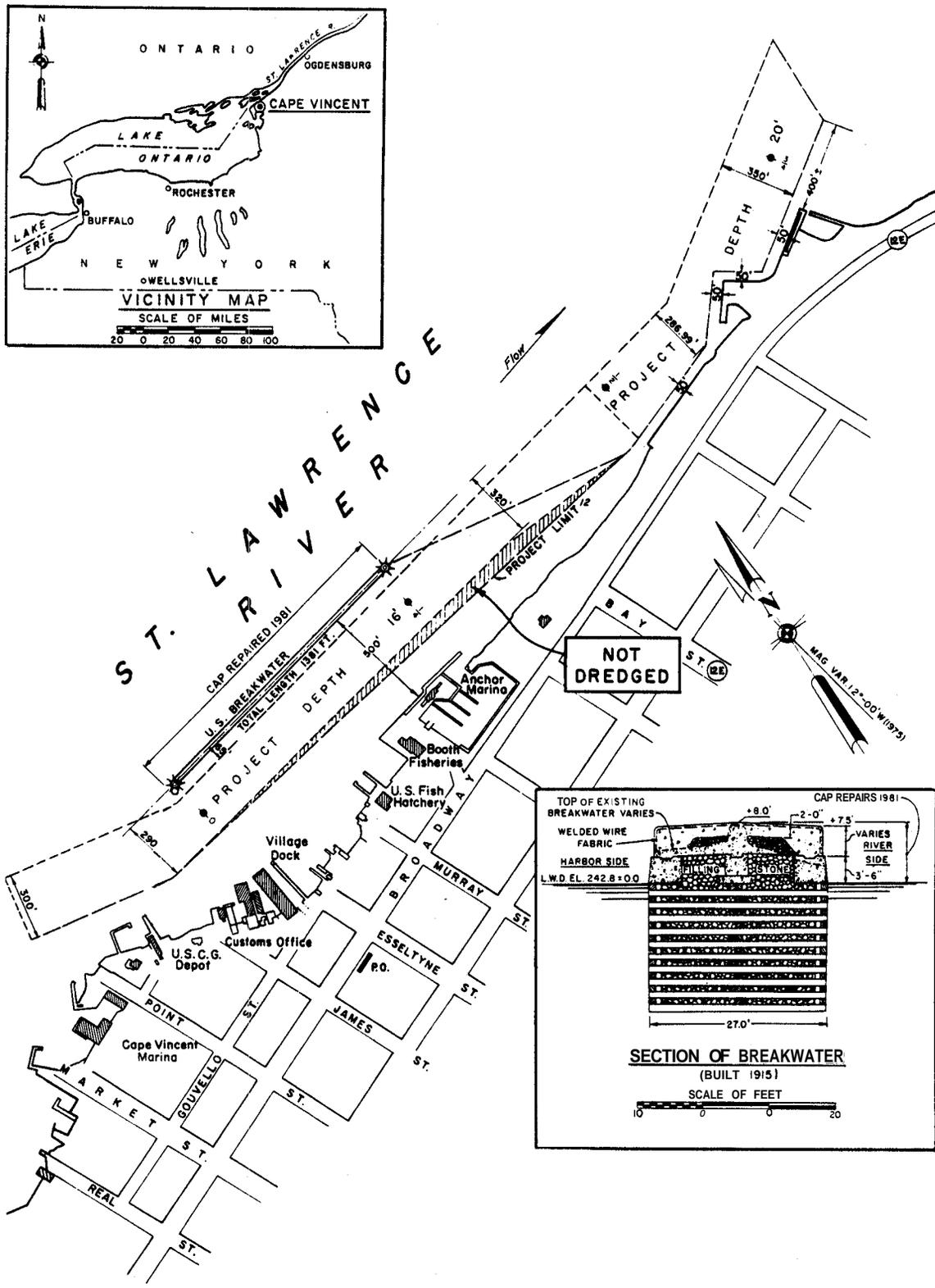


Figure 296. Cape Vincent Harbor, New York

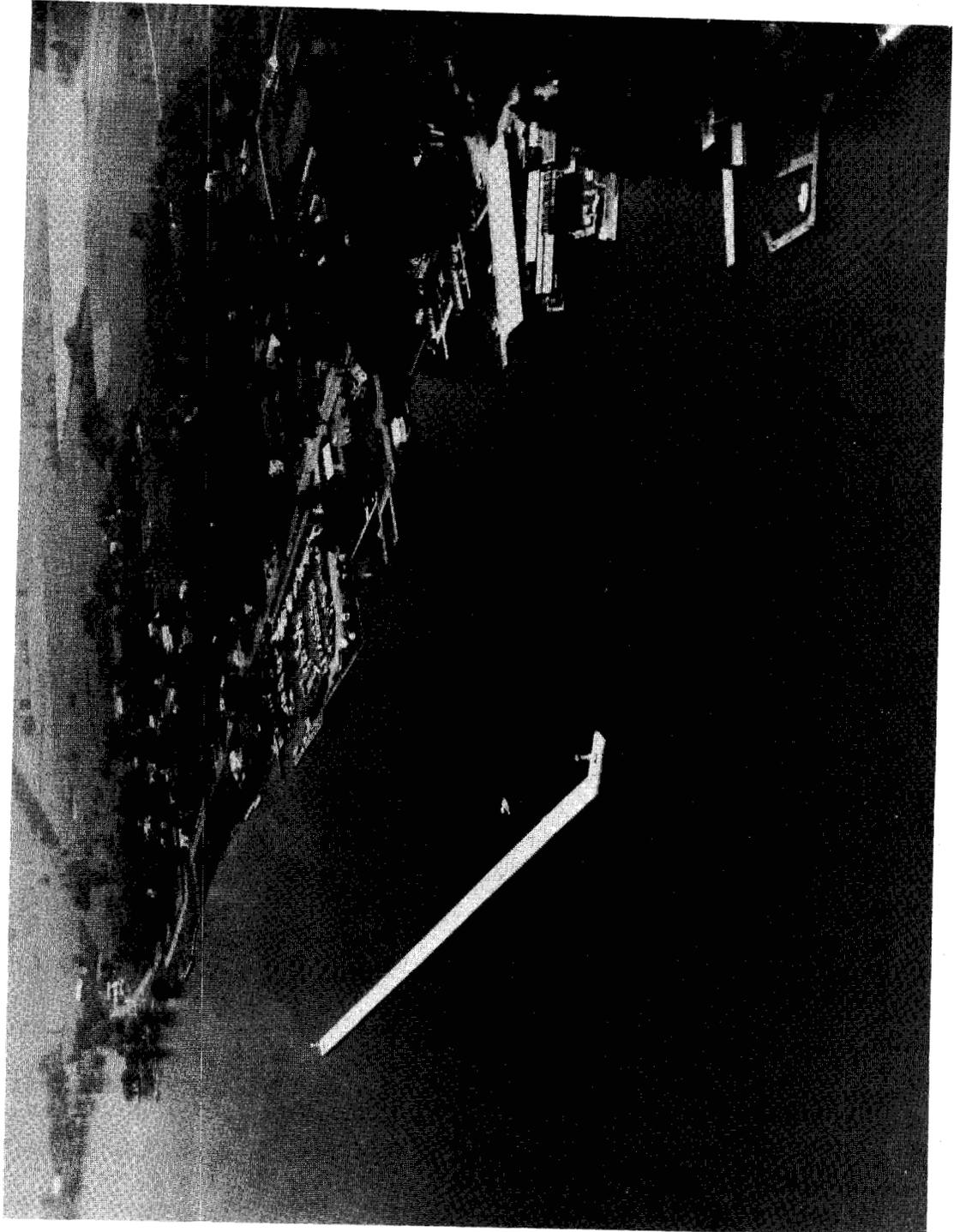


Figure 297 Cape Vincent Harbor, New York

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