Click here to return to previous section

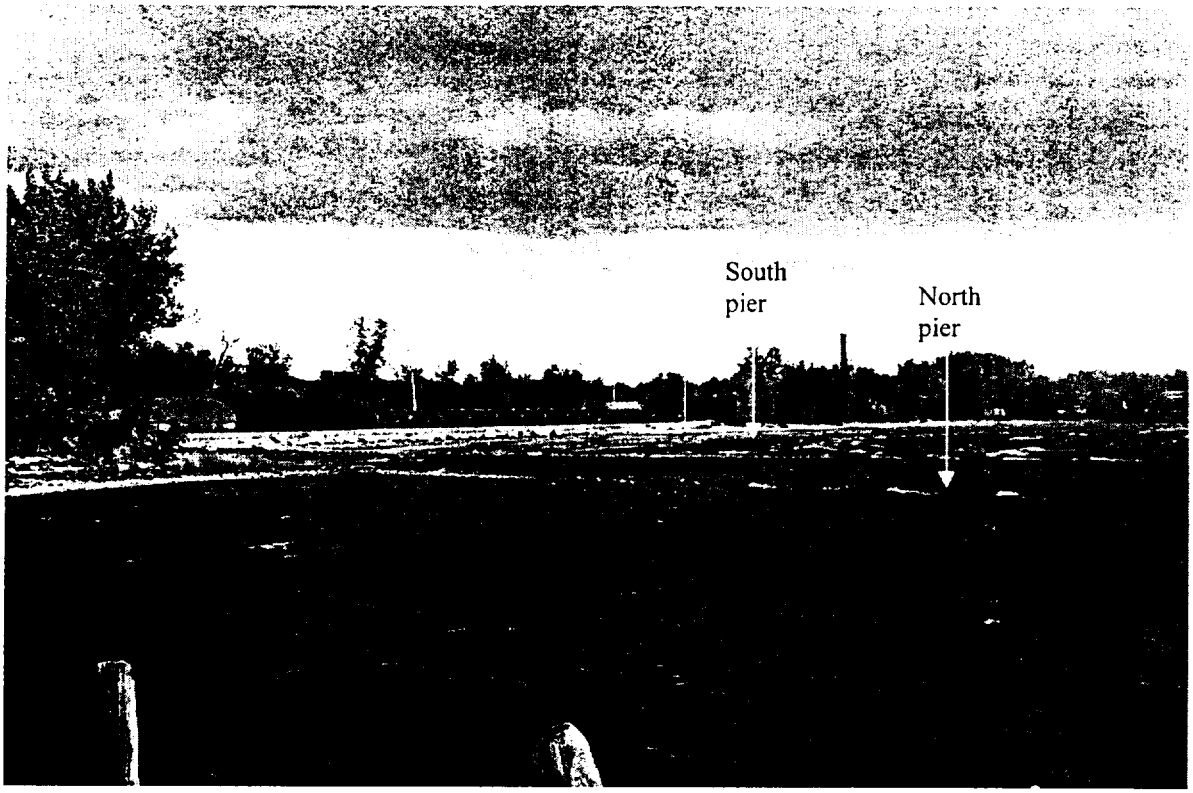

Figure 6. View of exposed canal pier ruins during unusually low lake levels, facing southwest.

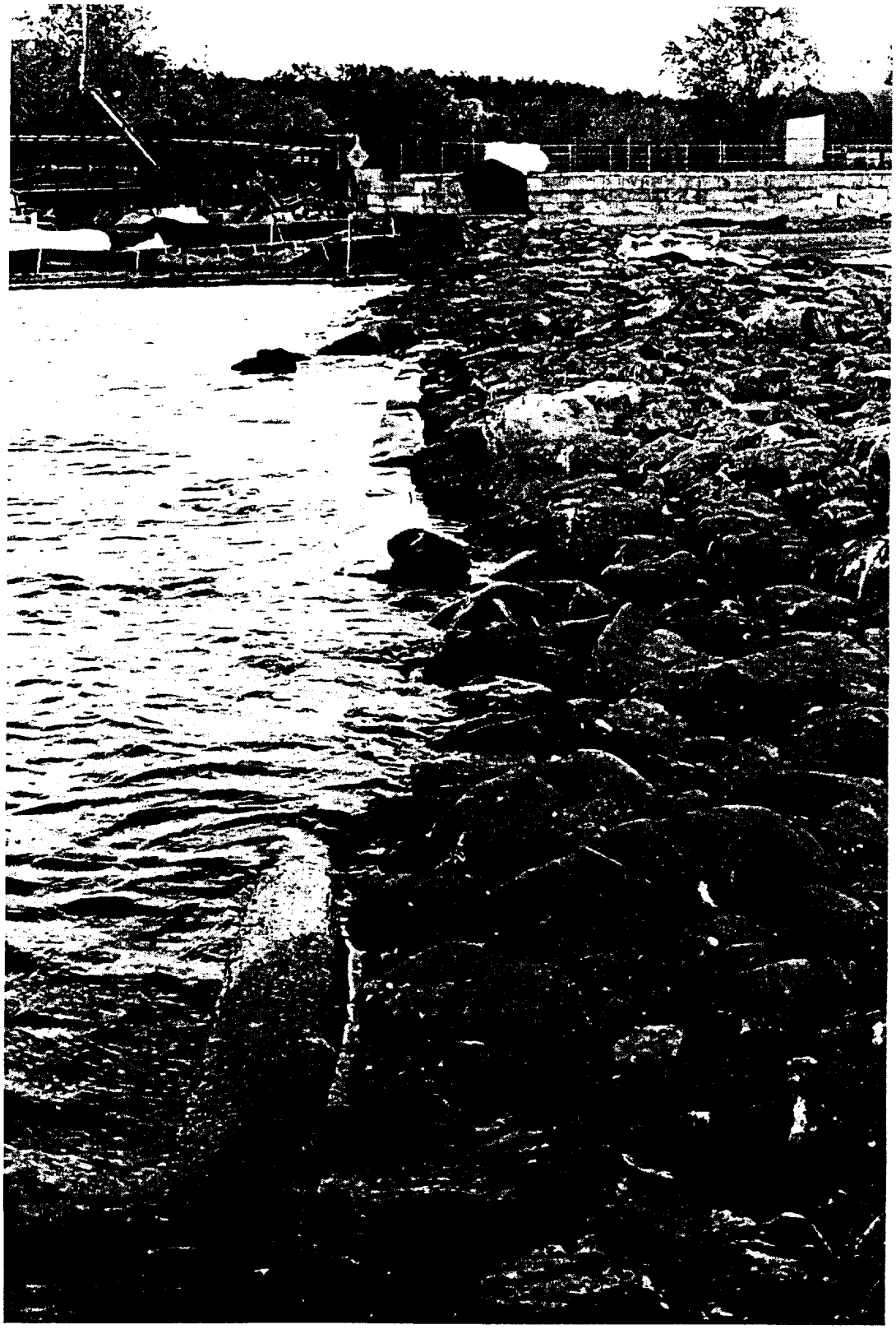

Figure 7. South pier facing west toward canal mouth. Note exposed interior wall cribbing.

93 ft) which fortuitously exposed the piers which are usually submerged (Figure 6) and wooden structural members within them (Figure 7).

Based on the exposed evidence, the cribwork retaining walls that formed the interior of the canal, the edge of the waterfront, and the borders of the piers, all were constructed using an edge fastening technique, much like that used in the construction of the canal boats themselves (e.g., see Kane et al. 2001). The vertical retaining walls were anchored by perpendicular "dead men" that extended back, away from the vertical walls (Figure 8). Exposures provided by the weir footing excavation and along the piers indicate that, around the canal mouth and along the piers, the perpendicular "dead men" were connected to interior retaining walls that ran parallel to exterior walls (Figure 9). The configuration of walls and cross member "dead men" formed individual compartments that were filled with boulders, large rocks and sediment. As first noted by *de maximis* personnel, exposures revealed that the cross members were often notched to interlock timbers (Figure 10). Most of the exposed cross members visible were round logs as opposed to the larger, 10-12 inch square timbers utilized for the exterior walls and some interior walls. Exposures also revealed that the edge fastening of square timbers was accomplished using 2 in diameter vertical wooden dowels (Figures 11 and 12) as well as iron fasteners (Figure 13). Iron fasteners were only identified in association with the north canal wall, however, perhaps indicative of the more recent construction and renovation dates for the north pier.

Summary and Conclusions

Inspection and photodocumentation of exposed architectural features associated with the historic Pine Street Barge Canal in Burlington, Vermont, revealed evidence of cribwork along the original canal mouth and and pier/breakwaters that once extended westward from the canal mouth into Lake Champlain. The exposures resulting from the construction disturbance, combined with rare low lake levels provided a unique opportunity to study canal and pier construction (Figure 14). The exposed features at the mouth and along the south pier were originally constructed in 1868, those around the north pier were constructed in 1869 and apparently enhanced in the decade that followed. Construction of wooden retaining walls involved edge-fastened exterior walls of square timbers (likely hemlock), tied into parallel interior walls with round log "dead man" cross members. This configuration produced compartments measuring roughly 6 feet square that were then filled with large boulders and rocks. Both wooded peg dowels and iron rod fasters were employed, with the latter likely associated with more recently constructed sections. Several exposed vertical fasteners tilted outward toward the canal channel, indicating back pressure and some degree of wall failure (see Figure 12). Such failure may have contributed to the demise of waterfront cribwork just north of the canal sometime between 1877 and 1886 (see Figures 4 and 5).

The cribwork, though an arguably minor feature of the historic Barge Canal Complex, represents a significant aspect of the land reclamation along the waterfront and the development of the lumber industry in late nineteenth century Burlington, Vermont. This documentation project serves to mitigate the negative effects of construction disturbance by preserving previously unrecorded information regarding the cribwork associated with the Barge canal and pier/breakwaters at its entrance.

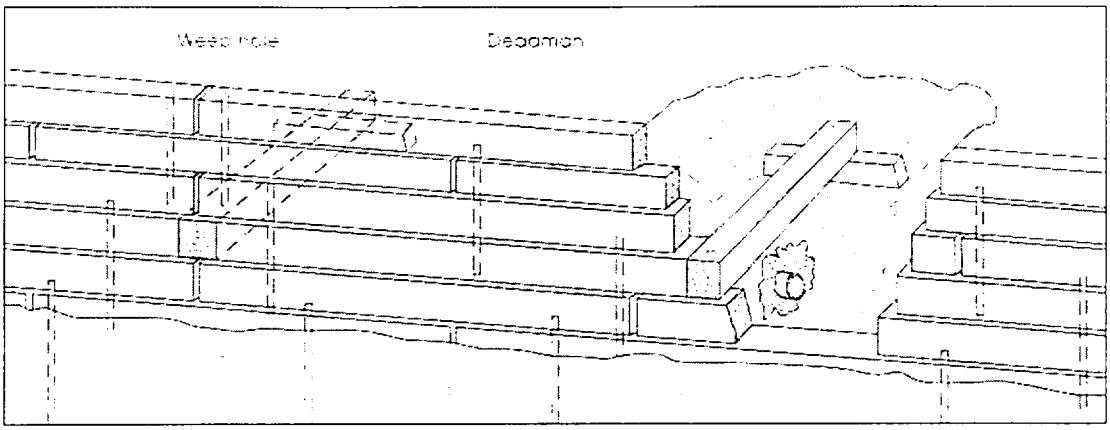

Figure 8. Schematic sketch showing a standard edge fastened retaining wall with perpendicular "dead man" anchors (Hufnagel 2000:403).

Figure 9. South pier facing west. Note exposed timbers representing interior wall into which outer walls were tied.

Figure 10. View of interior north wall, north of original canal mouth, facing north. Note notched log and stacked round logs forming interior wall cribbing.

Figure 11. View of 2 inch diameter bore hole drilled to accommodate vertical wooden dowel fasteners.

Figure 12. Northern side of canal mouth, facing northeast. Note vertical wooden dowels used to fasten horizontal cribbing and slight angling of dowels toward camera evidencing an outward bulge to the original northern canal wall

Figure 13. View of inside corner of northwest canal mouth. Note interlocking timbers and vertical iron rod used to fasten horizontal timbers.

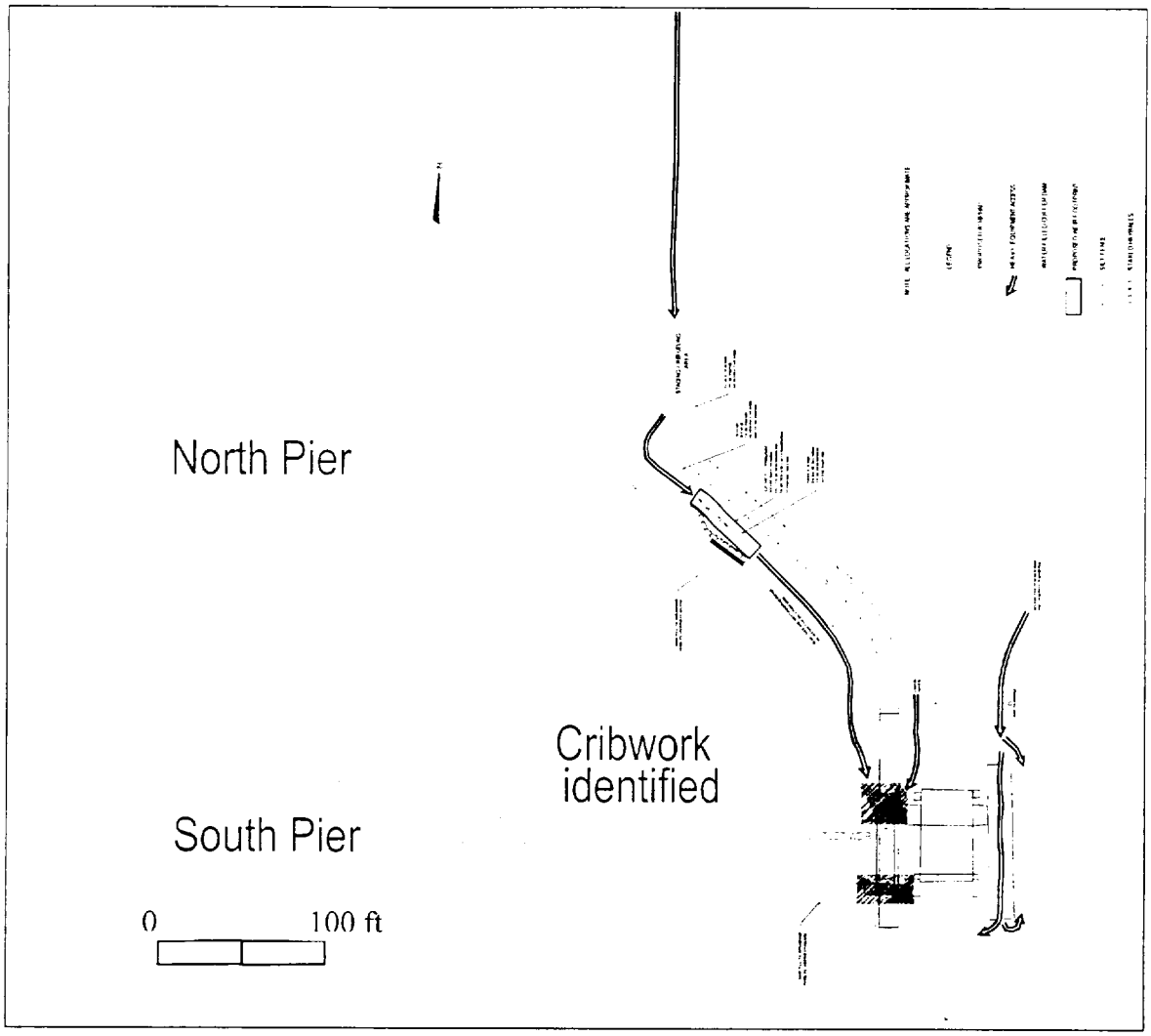

Figure 14. Project map showing the areas where cribwork was exposed at the mouth of the Pine Street Canal and the orientation and size of pier ruins. Piers drawn based on overlay of project map on a 1999 orthophoto showing extent of submerged pier ruins.

References Cited

Anonymous

1968 Down at the Lake Shore. *The Free Press*. July 20, 1968.

Beers, F.W.

1869 *Atlas of Chittenden County, Vermont*. F.W. Beers, A.D. Ellis and G.G. Soule, New York.

Hopkins, G. M.

1890 *Map of the City of Burlington, Vermont from Official Records, Private Plans and Actual Surveys*. Philadelphia. On file at University of Vermont, Wilbur Collection, Burlington.

Hufnagel, J. A.

2000 *The Stanley Complete Step-by-Step Revised Book of Home Repair and Improvement*. Simon and Schuster, New York.

Kane, Adam, ed.

2001 *Underwater Barge Documentation for the Alburg-Swanton Bridge Replacement Project, BRF 036-1(1), Alburg, Grand Isle County, Vermont.* Report prepared by the Lake Champlain Maritime Museum for the Vermont Agency of Transportation.

McVarish, D. C., J. I. Klein, and J. L. Cox

2001 *Pine Street Canal Superfund Site Burlington, Chittenden County, Vermont Historic Resources Study*. John Milner and Associates, Inc., Croton-on-Hudson, New York, in association with Dolan Research, Inc., Philadelphia, Pennsylvania. Report prepared for *de maximis, inc.*, Waltham Massachusetts.

Meilbek, E.

1877 *Birds Eye View of Burlington and Winooski, Vt.* Shober and Carqueville Lithographers, Chicago. On file at University of Vermont, Wilbur Collection, Burlington.

Pichot, H.

1872 *Plan of the Lumber District, Burlington, Vt.* Vermont Historical Society, Montpelier.

Presdee and Edwards

1853 *Map of Burlington, Vermont*. Sarony and Major, New York. On file at University of Vermont, Wilbur Collection, Burlington.

Sanborn Map Company

1894 *Insurance Maps of Burlington, Vermont*. New York.

1900 *Insurance Maps of Burlington, Vermont*. New York.

1926 *Insurance Maps of Burlington, Vermont.* New York.

University of Vermont , Class of 1888

1886 *Map of Dock Line, Lumber Yards and Breakwater, Burlington Harbor, Surveyed by Class of '88.* On file at University of Vermont, Wilbur Collection, Burlington.