NATURAL RESOURCES RESTORATION PLAN

FOR DAMAGES ASSOCIATED WITH THE *PRESIDENTE RIVERA* OIL SPILL OF JUNE 1989

Office of Natural Resource Damages
New Jersey Department of Environmental Protection

August 1996

BACKGROUND

On 24 June 1989, the Uruguayan oil tanker M/V *Presidente Rivera* ran aground near Marcus Hook, Pennsylvania, spilling approximately 200-255,000 gallons of No. 6 fuel oil into the Delaware River. The oil spill resulted in injury to natural resources held in public trust by both federal and state governments (New Jersey and Delaware). The United States filed a claim under Section 311(f) of the Clean Water Act for natural resource damages and for recovery of costs of removal of the oil on behalf of the federal natural resource trustees, the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Department of the Interior (DOI). The state trustees, New Jersey and Delaware, also asserted claims for natural resource damages, removal costs, and penalties under the Clean Water Act and applicable state laws. Uruguay previously paid approximately $1.3 million to settle certain claims for removal costs and penalties with the United States, New Jersey, Delaware, Pennsylvania, and the city of Wilmington arising from the *Presidente Rivera* spill.

On 14 July 1993, the United States (through NOAA and DOI), the State of New Jersey, the State of Delaware and the Oriental Republic of Uruguay entered a Consent Decree with the United States District Court for the District of Delaware. Under the Consent Decree, the parties agreed to settle the governments' remaining claims for $2.65 million, plus interest that has accrued on that sum since Uruguay paid it into an escrow account pending finalization of the consent decree. The Consent Decree stipulated that $2,140,972.00, plus interest accrued in the escrow account, be designated as "natural resource damage recovery". This natural resource damage recovery was equally divided between the States of New Jersey and Delaware to be used for restoration projects agreed upon by these states, NOAA, and DOI. As of 29 February 1996, the funds from New Jersey's natural resource damage recovery were $1,157,633.61.

Summary of Natural Resource Injury

Natural resource injuries resulting from the oil spill included impact to blue crab and bird populations, and diminished recreational use

and enjoyment of the Delaware River and shoreline in areas adjacent to the oil spill during the summer of 1989.

RESTORATION ALTERNATIVES EVALUATION

Alternatives for Restoration of Injured Resources

The consent decree states that the recovery shall be used for (i) restoration, rehabilitation, and replacement activities to adress injuries to natural resources impacted or affected by the spill; (ii) acquisition of fee title of, or conservation easements on, lands or property in the area of the spill and related ecosystems constituting natural resources equivalent to any affected by the spill; and (iii) performance of studies and projects necessary and appropriate to (i) and (ii) above. Such expenditures will be made in accordance with applicable State and/or Federal fiscal management and appropriation laws.

Appendix B of the Consent Decree is more explicit in directing the use of the damage recovery. It states that the State of New Jersey will utilize funds for acquisition and restoration in the area of Alloways Creek which comprises approximately 1,800 acres of degraded marsh, 700 acres of natural marsh, and 500 acres of upland buffer. In addition to acquisition and restoration projects, the consent decree also states that public access enhancement projects may be undertaken.

In addition to the direction provided by the Consent Decree, the National Oceanic and Atmospheric Administration's Draft Final Report: Restoration Guidance Document for Natural Resource Injury as a Result of Discharges of Oil (1995) was also used to provide guidance for selecting alternatives and options for potential restoration projects.

Restoration activities can be divided into several broad categories termed "alternatives." This plan recognizes five types of restoration alternatives:

Natural Recovery - A "no-action" alternative shall always be considered in order to determine and discuss the expected natural restoration that could occur in the absence of active restoration.

Direct Restoration narrowly defined means actions performed at the location of the injury to return injured resources, habitats, or services to pre-release conditions.

Rehabilitation also refers to actions performed at the injury site, which bring natural resources, habitats, or services to a state different from baseline conditions, but still beneficial to the environment and public.

Replacement refers to actions taken at sites other than that of the impact, or to substitute another resource or service for an injured one. The resources or services that are substituted should be comparable to those injured. Replacement can include non-biological (e.g., recreational, commercial, cultural) services. Pollution control, public access and education, pilot and baseline studies are also forms of replacement.

Acquisition of equivalent resources means the purchase or protection of resources that are the same, or substantially similar to injured resources, or enhance the injured resources or services of such resources, in terms of ecological values, functions, or public uses.

Combinations of the above.

Restoration Options Criteria

The following factors are considered when selecting potential restoration options for impacted resources:

- What are the degree and extent of injury to natural resources or services as determined by the damage assessment or other means?

What is the potential for natural recovery?

Is the restoration alternative linked to injured natural resources or services?

Is the restoration alternative technically feasible?

Is the restoration alternative based upon a successful proven techniques?

Will the restoration alternative result in a net environmental benefit?

What does the restoration alternative cost?

What is the amount of money available for restoration?

Are the interests, needs, and priorities of the public served with regard to the impacted habitat?

What potential impacts will a restoration alternative have upon people living in or using the affected areas?

SELECTED RESTORATION PROJECTS

Using the guidance provided by the Consent Decree and that found in NOAA (1995), the New Jersey Office of Natural Resource Damages has identified potential projects utilizing the Presidente Rivera oil spill damage recovery:

1) Acquisition of lands in the in the coastal areas of Salem and Cumberland Counties in the area of the Alloways Creek drainage;

2) Restoration of degraded marshes occurring on acquired property;

3) Restoration of an historic pier at Fort Mott State Park to improve access to, and enhance enjoyment of Delaware Estuary resources.

Land Acquisition and Restoration

Much of the marshland in Salem and Cumberland Counties was impounded and diked in historic times for agricultural purposes and has now been largely taken over by the invasive common reed (*Phragmites australis*). Thus, many marshes have lost much of their former capacity for waterfowl and fishery production. After acquiring these degraded systems, projects will be conducted to eliminate the *Phragmites* and help restore marshes to their former productivity.

The New Jersey Office of Natural Resource Damages (ONRD) proposes to establish enumberances in the amount of $800,000 for land acquisition and marsh restoration work. The land acquisition projects will be handled by NJDEP's Green Acres Program. This program is staffed with a large group of appraisers, attorneys, planners, and other real estate professionals with considerable experience in appraising and negotiating land acquisitions. Marsh restoration will begin after the acquisition funds are exhausted in order to evaulate which areas would provide the most cost-effective restoration.

The Alloways Creek area (Figure 1) is located adjacent the northern boundary of Mad Horse Creek Wildlife Management Area and covers approximately 3.5 miles of shoreline that was affected by the *Presidente Rivera* oil spill.

Currently, ONRD is evaluating three acquisition/restoration projects in the Alloways Creek area, north of the Mad Horse Creek Wildlife Management Area: Mason Point, the Quasne property on Solters Creek, and The Trullender Property on Stowe Creek.

Mason Point - NJDEP's Division of Fish, Game & Wildlife has asked for

financial assistance in purchasing a 450 acre parcel presently owned by a Salem County meadow bank company. The site is isolated from tidal influence by a very old dike that is need of repair. Due to the condition of the dike and to general apathy on the part of the meadow bank company, water levels upstream of the dike have not been managed properly and the wetland and formerly impounded areas have been invaded by *Phragmites*. Mosquito breeding is also a major problem and the county has to spray the area frequently. Further detail regarding this project is presented in Appendix I.

ONRD proposes to allocate $200,000 towards purchase of the parcel and repair of the dike. This money will be combined with funding from Ducks Unlimited and the NJ Waterfowl Stamp Fund. The feasibility of repairing the Mason Point dike and installing a fish passage device is currently being explored by NJ Fish, Game & Wildlife. If acquisition and dike repair can be accomplished for under $400,000 then the $200,000 from the *Presidente Rivera* settlement fund will be utilized. If the estimated project costs are greater than $400,000 or the project is determined to be not feasible for other reasons, then the $200,000 will revert to the general *Presidente Rivera* account and be used for other wetland acquisition and restoration projects. An MOU between NJONRD and the NJ Division of Fish, Game & Wildlife establishes the conditions under which these monies will be used (Appendix II).

Trullender Property - The Trullender Family owns approximately 350 acres, some of which borders Stowe Creek in Stowe Creek Township, Cumberland County. Appraisals have been ordered for this property so the approximate area of wetland acreage has not yet been determined. However, a review of areal photography indicates that greater than half of the property is upland in cultivation. According to Fish, Game and Wildlife personnel, a portion of the property is used as a nesting site by a pair of bald eagles. According to Green Acres Program, the Trullenders are willing sellers. However, given the large area of developable upland and road frontage, it is likely that a fair market value of this property will be close to $1 million.

A portion of the *Presidente Rivera* settlement funds could be combined with other State funds and used for the purchase of this property. Some of the *Presidente Rivera* funds could also be set aside for wetland restoration on the property, but the areas suitable for wetland restoration are small and greater potential for restoration exists at other sites discussed in this plan. It is important to note that the Trullender property is likely to be developed in the future if it is not protected. ONRD proposes to contribute $100,000.00 toward the purchase of this property.

Quashne Property - Located in Lower Alloways Creek Township, this property consists of approximately 181 acres. According to Green Acres Program personnel, a large portion of the tract is state-owned riparian land. Therefore, the appraised value of the land only includes approximately 80 acres of non-riparian land, with the remaining 100 acres of land under tidal influence and dominated by *Spartina alterniflora*. The property is basically level, having approximately 1175 feet of frontage on the northern side of Alloways Creek Neck Road. The non-riparian portion of the property is divided into two designated land use zones. The frontage is RA-Residential Agriculture and the rear is FP-Flood Plain, which contain approximately 20 acres of *Phragmites* -dominated wetlands. Two appraisers have examined the property for the Green Acres Program and have concluded that highest and best use of the parcel would be future residential development. A fair purchase price for the parcel, based upon the two appraisal reports, is estimated to be approximately $100,000. Similar to the situation at the Trullender property, the Quashne property will probably be developed in the near future if it is not protected.

The Quashne property is very amenable to wetland restoration work. Conversion of the Phragmites-dominated area to Spartina marsh could be accomplished by relatively minor earth-moving, as the area is cut off from tidal influence by a low dike. Access to the area with heavy equipment will not be difficult due to an existing road and approximately 80 acres of open field. A rigorous monitoring program will be established for the salt marsh restoration conducted at this site. ONRD proposes using at least $400,000.00 for salt marsh

restoration at this site.

Fort Mott State Park Public Access Project

This project involves increasing and enhancing public access to river resources through the restoration of the Fort Mott Pier. Fort Mott State Park was heavily impacted by *Presidnte Rivera* spill, and overall, the governments' damage assessment was largely based on the impact to the public's use of river resources (e.g., lost boating and fishing days due to river closure and impacts to shoreline use). Restoration of this historically significant pier will increase recreational access (e.g., fishing, picknicing) and will enable the Pea Patch Island ferry to dock at Fort Mott, thereby opening access for New Jersey and Delaware visitors to Pea Patch Island, Fort Mott, and Delaware City. Fort Mott is also a node on the Coastal Heritage Trail and the pier was originally constructed in Civil War times.

The NJ Division of Parks and Forestry and the Delaware river and Bay Authority (DRBA) have tentatively agreed to a cooperative funding arangement for restoration of the pier and maintenence of ferry service (Appendix III). This arrangement stipulates that DRBA funds 50% of the total cost or $400,000, whichever is greater of the actual cost. NJ Parks & Forestry will fund 50% of total cost or $600,000, whichever is lesser of actual costs. NJONRD proposes to contribute $300,000 of the *Presidente Rivera* settlement to NJ Parks & Forestry to use as part of their share of the restoration funding. *Presidente Rivera* funds can only be used for funding the pier restoration. If the pier restoration is accomplished with other funding sources or is not completed within the time frame stipulated in the MOU between NJONRD and the NJ Division of Parks & Forestry (Appendix IV), the monies will revert to the general *Presidente Rivera* account and be used for other public access projects or wetland acquisition and restoration.

This project is being coordinated with the New Jersey Division of Parks and Forestry. Details of the restoration and itemized costs are presented in Appendix III.

Estimated Allocation of the *Presidente Rivera* Natural Resource Damage Recovery for the Proposed Restoration Projects

Mason Point	$200,000
Trullender Property	$100,000
Qhashne Property	
Acquisition	$100,000
Wetland Restoration	$400,000
Fort Mott	$300,000
	$1,100,000

APPENDIX I

MARSH
PROJECT PROPOSAL

TIDEMARSH IMPOUNDMENT - SALEM RIVER WETLANDS
CONSERVATION PROJECT

SUBMITTED BY: New Jersey Division of Fish, Game and Wildlife
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CN 400
Trenton, New Jersey 08625
609-984-1409

PROJECT DESCRIPTION:

PURPOSE: To acquire a 450 acre Phragmites-dominated impoundment and restore it to a diverse, brackish system dominated by native submerged and emergent plant species through the refurbishment of the dike and water control structures, aerial herbicide application and appropriate water level management. This proposal is a part of the Salem River Project, a cooperative endeavor to protect and restore critical wetland habitat under the North American Wetlands Conservation Act. Ducks Unlimited, through the MARSH program, is a funding partner in the Salem River Project.

LOCATION: Elsinboro Township, Salem County, New Jersey
Latitude 30^{o} 30'N; Longitude 75^{o} 30' W

OWNERSHIP: The property is currently owned by the Tide-marsh Inc., a hunting club. It will be purchased in fee by the State of New Jersey and operated as part of the state's Wildlife Management Area System administered by the Division of Fish, Game and Wildlife. Approximately 15 acres surrounding the club's hunting cabin may be retained by the current owners but will be covered by an easement restricting any further development.

LAND USE/ MANAGEMENT HISTORY: The great majority of this tract is covered by the Tidemarsh impoundment located along the western edge of Salem County, New Jersey in the upper Delaware Estuary. This marshland, formerly flowed by the tides and dominated by salt marsh grasses, was first diked in the mid-1800's for agricultural production. Subsequent manipulation of the marsh resulted in the establishment of the exotic pest plant species Phragmites australis. This plant has taken over most of the formerly Spartina-dominated portions of the marsh, thereby decreasing its productivity and significantly reducing its habitat value for most species of wildlife.

Approximately 15 acres of this tract are covered by wooded upland edge. A one acre field within the upland is planted with wildlife food crops. A small hunting cabin is also located on this portion of the tract. The upland edge area will be retained by the current owners subject to a conservation easement.

NEED: The attached paper summarizes the major wildlife benefits resulting from the restoration of Phragmites-dominated marshes.

The marshes being restored in this project lie within one of the nation's most important habitat areas for shorebirds and waterfowl, the Delaware Bay Estuary.

Each spring literally millions of shorebirds descend on the Delaware Bay to rest and re-fuel on their long migration from South America to the Arctic. Major portions of the global populations of four shorebird species stop here.

The Tidemarsh property also represents an excellent opportunity to improve critical habitat for waterfowl. These marshes are located within the Salem River Focus Area of the Atlantic Coast Joint Venture of the North American Waterfowl Management Plan. The black duck, in particular, will be benefited by this project. Thirty-four percent of the Atlantic Flyway black duck population winters in New Jersey. Improving black duck wintering habitat is a primary goal of the Atlantic Coast Joint Venture.

In addition to the black duck, migrating and wintering pintails (from the Mississippi Flyway), widgeon, gadwall, mallards, wood ducks, blue-winged teal, green-winged teal, hooded mergansers, buffleheads, goldeneyes, ruddy ducks, scaup, snow geese, Canada geese and tundra swans will utilize the restored marsh, some in large numbers.

Large numbers of wading birds; herons, egrets, rails and gallinules, are expected to take advantage of the increased habitat heterogeneity, particularly the open water areas.

In its current state, the Tidemarsh impoundment is of relatively little value to wildlife. Once restored, it will likely host its former abundance of waterfowl and shorebirds, and a great variety of other wildlife species as well.

This project will significantly reduce the amount of insecticide sprayed on this marsh by eliminating the habitat of Culex salinarious and Aedes vexans, mosquito species which are a particular problem on this site. This will eliminate the need for numerous sprayings of adulticide-type insecticides each year thereby benefiting wildlife and the ecosystem in general.

MANAGEMENT PLANS:

The methodology utilized in this project will be to first draw the water in the impoundment down as much as possible once the dike and water control structures have been restored. The broad-spectrum herbicide "Rodeo" will then be aerially applied to the approximately 400 acre area dominated by Phragmites spp. in late August or early September at a rate of 4.7 l/ha. An endangered plant survey will be conducted prior to spraying to ensure that no state or federally listed plants would be impacted by the herbicide application. The water levels will remain drawn down all winter to enhance the effectiveness of the herbicide. At the beginning of the growing season, water levels will be allowed to rise on the marsh to a point where Phragmites spp. cannot germinate (18+"). This water level will then be manipulated to prevent the future re-establishment of pest plant species and to provide maximum wildlife habitat benefits.

Excellent opportunities for public wildlife-oriented recreation including hunting, fishing, birding and nature observation will be created by the project. The project area will be managed as a part of the Abbotts Meadow Wildlife Management Area.

MONITORING AND EVALUATION: Division of Fish, Game and Wildlife land managers will monitor the effectiveness of the initial spraying and evaluate where and if follow-up spot spraying should occur. Land managers will manipulate water levels in the impoundment as needed to discourage the re-growth of Phragmites spp. and provide optimum habitat conditions for waterfowl, waterbirds and anadromous fish. Success in eliminating Phragmites spp. and establishing native marsh vegetation in the impoundment will be evaluated annually.

ACTIVITY SCHEDULE AND ESTIMATED COSTS:

SCHEDULE:

June/July 1996	-	acquisition of Tidemarsh property completed
Fall/Winter 1996	-	restore dike and water control structures
Aug./Sept. 1996	-	spray Phragmites spp. in impoundment
August 1997	-	re-spray spot locations of Phragmites spp. re-growth if necessary

BUDGET:

Appraisal	$ 3,000
Land Acquisition	100,000
Permits/Project Mgmt.	2,000
Herbicide (Rodeo)	27,000
Application of Herbicide	4,000
Dike & Water Control Structure Restoration	250,000
Engineering	10,000
Sign	500
TOTAL	$396,500

FUNDING SOURCES:

DU MARSH	26,500
NAWCA (Salem River Project)	70,000
Presidente Rivera Oil Spill Mitigation Fund	200,000
NJ Waterfowl Stamp Fund	100,000
TOTAL	$ 396,500

TERM OF AGREEMENT: In Perpetuity

OTHER Enclosures:

Location Map 1 - State of New Jersey
Location Map 2 - Tax map of Alloway Creek portion of Salem River Project Area.
Location Map 3 - Topographic map of Alloway Creek portion of Salem River Project Area.
NJDFGW Report entitled "Wildlife benefits of restoration of Phragmites-dominated marshes"
NJDFGW Report entitled "Environmental Assessment of Rodeo for Marsh Restoration"
Engineering Report by L.Irelan performed for Tidemarsh, Inc.

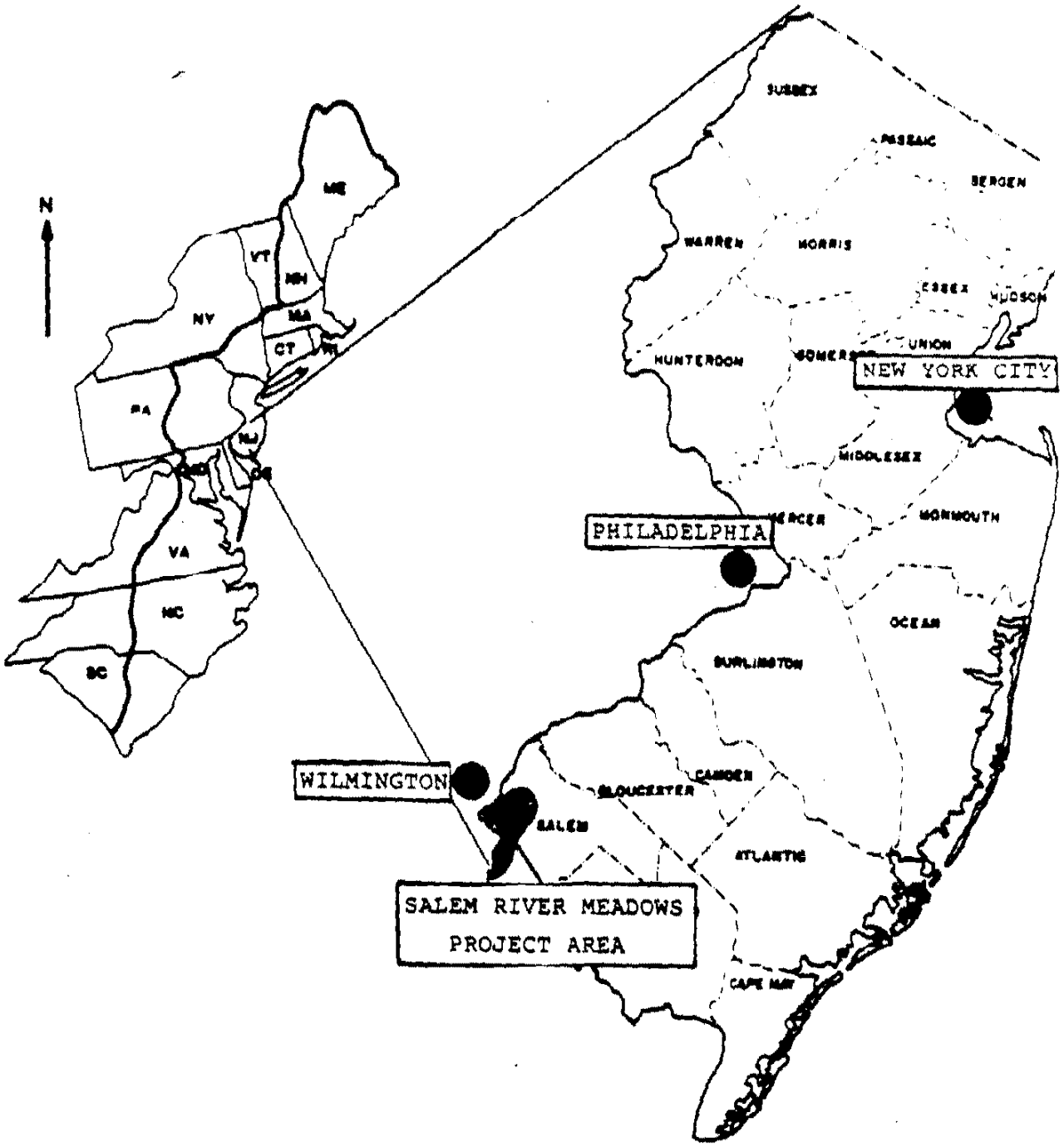
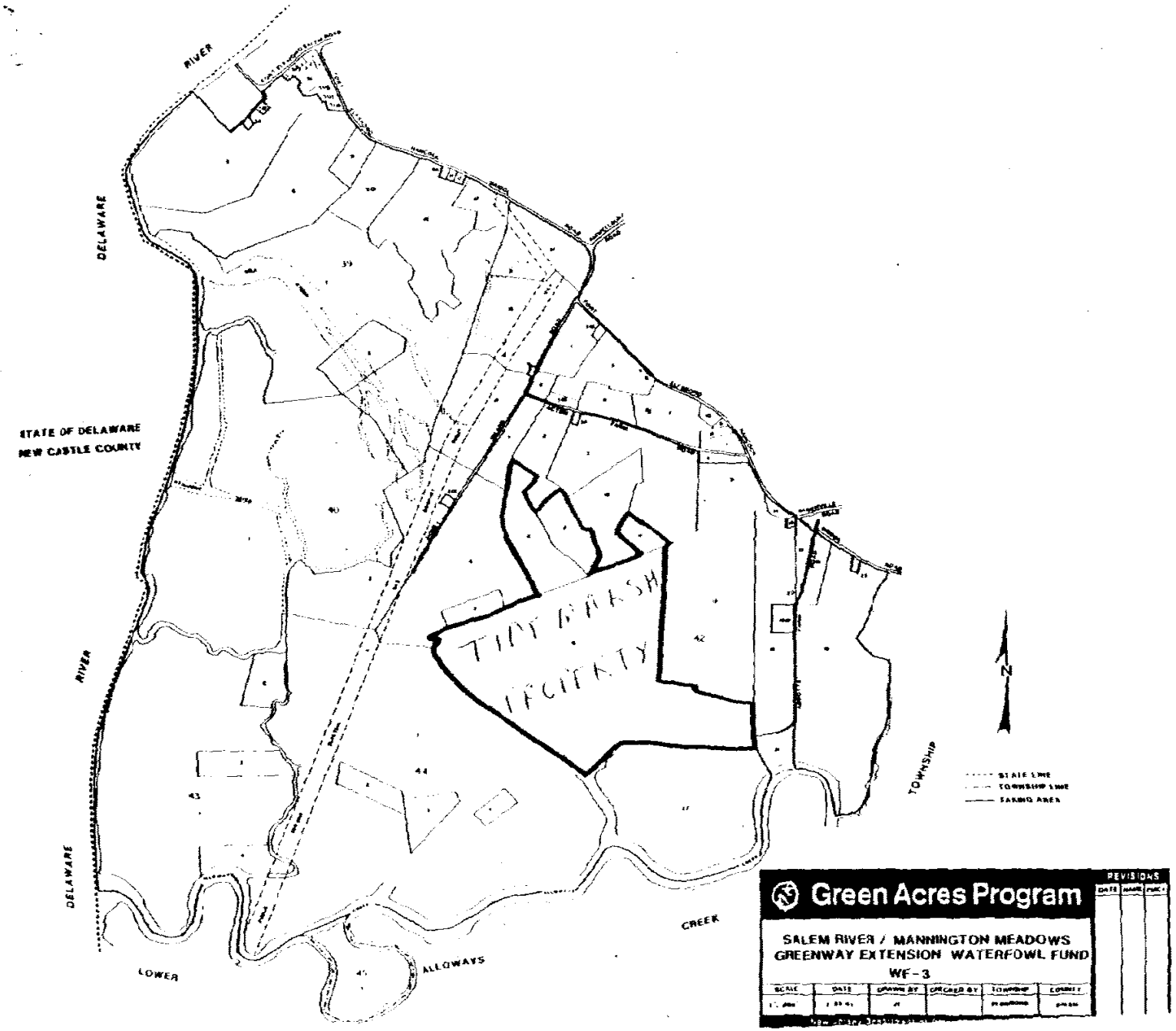


FIGURE 1: Location Map-Salem River Meadows Project Area within the Atlantic Coast Joint Venture.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Green Acres Program
SALEM RIVER / MANNINGTON MEADOWS
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Mill Creek
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NEW CASTLE CO
Eagle Island
Mooey Island
DELAWARE
NEW JERSEY
Elsinboro Point
Artificial Island

V E R

WILDLIFE BENEFITS OF RESTORATION OF PHRAGMITES-DOMINATED MARSHES

Phragmites australis is an introduced emergent plant which has a tendency to dominate a wetland area once it becomes established. While thin or newly established stands (<30 feet in depth) provide good cover for wildlife, dense stands are seldom used by wildlife except along the edge (Ward 1942, Curran et.al. 1989).

Phragmites australis usually becomes established when a wetland has been disturbed or, in the case of a tidal marsh, the water table lowered and the soil dried as a result of diking (Rozsa 1983). Once this exotic has become established, its aggressive nature enables it to out-compete native vegetation.

Deer, pheasants, and some waterfowl occasionally utilize Phragmites-dominated areas for cover, however, its seeds and foliage are seldom utilized in feeding (Dirschl 1969, Gilmer et. al. 1973). Muskrats will use the rhizomes in feeding but seldom venture more than 30 feet into the stand (Widjeskog, pers. comm. 1991).

Bontje (1988) compared a restored marsh in Seacaucus, New Jersey to a Phragmites-dominated control site and found two times the bird species on the restored marsh and seven times the bird numbers. Benthic invertebrate diversity was two times greater on the restored marsh while benthic invertebrate numbers tripled.

Invertebrate production in a Phragmites marsh is limited to the edge and by the amount of water present. Studies that compared a Spartina marsh with a similar water regime Phragmites marsh, found a greater number of taxa (12) on the Spartina marsh as compared to the Phragmites marsh (4) (Kraus & Kraus, 1986).

Due to the height of its aerial shoots (6'-15') and the density of the vegetation few birds or mammals utilize the interior of Phragmites stands. The fish and wildlife benefits of the restoration of such stands to natural marsh communities are well documented (Buttery and Lambert 1965, Vogl 1973, Jones and Lehman 1986). This includes the improvement of habitat for waterfowl, waterbirds, raptors and furbearers by increasing: 1) desirable food plant abundance, 2) habitat heterogeneity and 3) open water space.

The growth of Phragmites results in the deposition of extensive root and stem mats which, over time, elevate the plant above normal water levels. This in turn reduces the invertebrate production and decreases the wildlife value of a Phragmites-dominated marsh (Smith, pers. comm. 1991).

As a result of the establishment of extensive stands of Phragmites (>30' deep), productivity and overall wildlife use of an area is significantly reduced. In situations where observation of wildlife is desirable, Phragmites growth screens wildlife from view and takes the place of native vegetation that would normally attract animals. In most situations, control of Phragmites is desirable. Following its elimination, most wetlands will revert to habitat types favored by a variety of native fish, wildlife and plants.

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Department of Environmental Protection
Division of Fish, Game and Wildlife
July 24, 1991

ENVIRONMENTAL ASSESSMENT OF RODEO FOR MARSH RESTORATION

Glyphosate (Rodeo) is registered by the U.S. Environmental Protection Agency for use in aquatic systems. It has been used successfully to restore Phragmites-dominated marshes by the U.S. Fish and Wildlife Service at Brigantine National Wildlife Refuge in New Jersey (Beall 1984) and Prime Hook National Wildlife Refuge in Delaware (Daly 1984), by the Delaware Division of Fish and Wildlife at Augustine Wildlife Management Area (Jones and Lehman 1986) and by the New Jersey Division of Fish, Game and Wildlife at Beaver Swamp Wildlife Management Area (R. Hall, pers. comm.). Extensive research has been conducted on its environmental impacts (Sullivan 1988) and it has been found to be extremely safe when properly applied. The Michigan Department of Agriculture (Kirkpatrick, 1986) concluded in its "Data Assessment for Rodeo" that:

"It is evident from data reviewed that glyphosate has low acute toxicity (Category III) for acute oral, acute dermal, and primary eye irritation and is in Category IV of primary skin irritation. It is not teratogenic to rats or rabbits and is not mutagenic. The oncongenic potential is not fully defined and repeat tests are required. Glyphosate is no more than slightly toxic to birds, aquatic invertebrates, and fish. Glyphosate is stable to hydrolysis and strongly adsorbed to soil, thus no potential to contaminate ground water. Glyphosate is foliar absorbed and translocated to all plant parts. It has no residual control and is not root absorbed. Its mechanism is inhibition of amino acid biosynthesis resulting in reduction of protein synthesis and inhibition of growth."

Rodeo has been found not to bioaccumulate and has been shown to breakdown in the environment rapidly and completely to natural products (Newton et.al. 1984, Chen et.al. 1989). Newton et.al. 1984 in extensive studies conducted in Oregon found the following:

"Glyphosate herbicide residues and metabolites were evaluated in forest brush field ecosystems in the Oregon coast range aerially treated with 3.3 kg/ha glyphosate. Deposits were recorded at various canopy depths to determine interception and residues in foliage, litter, soil, streamwater, sediments and wildlife for the the following 55 days. The half-life of glyphosate ranged from 10.4 to 26.6 days in the foliage and litter and twice as long in soil. The treated stream peaked at 0.27 mg/l and decreased rapidly; concentrations were higher in sediment than in water and persisted longer. Coho salmon fingerlings did not accumulate detectable amounts. Exposure to mammalian herbivores, carnivores and ominvores and retention of herbicide seemed to vary with food preference; however, all species had visceral and body contents at or below observed levels in ground

cover and litter, indicating that glyphosate will not accumulate in higher trophic levels. (Aminomethyl) phosphonic acid was found at low concentrations but degraded rapidly. n-Nitrosolglyphosate was nondetectable."

Glyphosate will not vaporize from a treated area and move to a non target area (Brandt 1983).

Rodeo treatments temporarily eliminate all vegetative cover from the marsh although submerged aquatic plants are not impacted (Forney and Davis 1981). This affords native species the opportunity to re-colonize these areas and to out-compete Phragmites spp.

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Department of Environmental Protection
Division of Fish, Game and Wildlife
July 24, 1991

APPENDIX II

MEMORANDUM OF UNDERSTANDING BETWEEN THE OFFICE OF NATURAL RESOURCE DAMAGES AND THE DIVISION OF FISH, GAME AND WILDLIFE

WHEREAS, the Oriental Republic of Uruguay, the United States, and the States of New Jersey and Delaware entered a Consent Decree with the United States District Court for the District of Delaware on 14 July 1993 that stipulated that $1,070,486.00 plus accrued interest be designated as "natural resource damage recovery" for restoration of New Jersey's natural resources that were damaged by the *Presidente Rivera* oil spill of 24 June 1989.

WHEREAS, The New Jersey Office of Natural Resource Damages (NJONRD), in conjunction with the federal natural resource trustees, the National Oceanic and Atmospheric Administration (NOAA) and the Department of the Interior (DOI), oversees the expenditure and use of the above referenced natural resource damage recovery funds.

WHEREAS, the above referenced Consent Decree authorizes the general use of the *Presidente Rivera* natural resource damage recovery for restoration projects to compensate the public for resources impacted by the *Presidente Rivera* oil spill.

WHEREAS, the New Jersey Division of Fish, Game, and Wildlife manages and administers public resources that were impacted by the *Presidente Rivera* oil spill.

WHEREAS, the New Jersey Division of Fish, Game, and Wildlife is actively pursuing funding sources for the acquisition and restoration of a 450 acre parcel of degraded wetlands known as Mason Point in Salem County.

NOW, THEREFORE, THE PARTIES HERETO AGREE AS FOLLOWS:

The Office of Natural Resource Damages will obtain the concurrence of NOAA and DOI, to specifically authorize the transfer of natural resource damage recovery funds from account No. XXXXXXXXX in the amount of $200,000 for the exclusive use of acquiring and/or restoring the Mason Point parcel. If these funds are not committed within two years, or it is determined that the project is not feasible for practical or other reasons, the $200,000 will revert back into Account No. XXXXXXXX for use in other restoration projects deemed appropriate under the Consent Decree.

The Division of Fish, Game, and Wildlife shall administer the expenditure of the $200,000 and oversee the progress and completion of the acquisition and restoration. The Division of Fish, Game, and Wildlife will prepare reports, as requested by the Office of Natural Resource Damages, regarding accounting of the $200,000 and the status of the Mason Point acquisition and restoration.

James F. Hall, Assistant Commissioner,
Natural and Historic Resources

Martin J. McHugh, Chief,
Office of Natural resource Damages

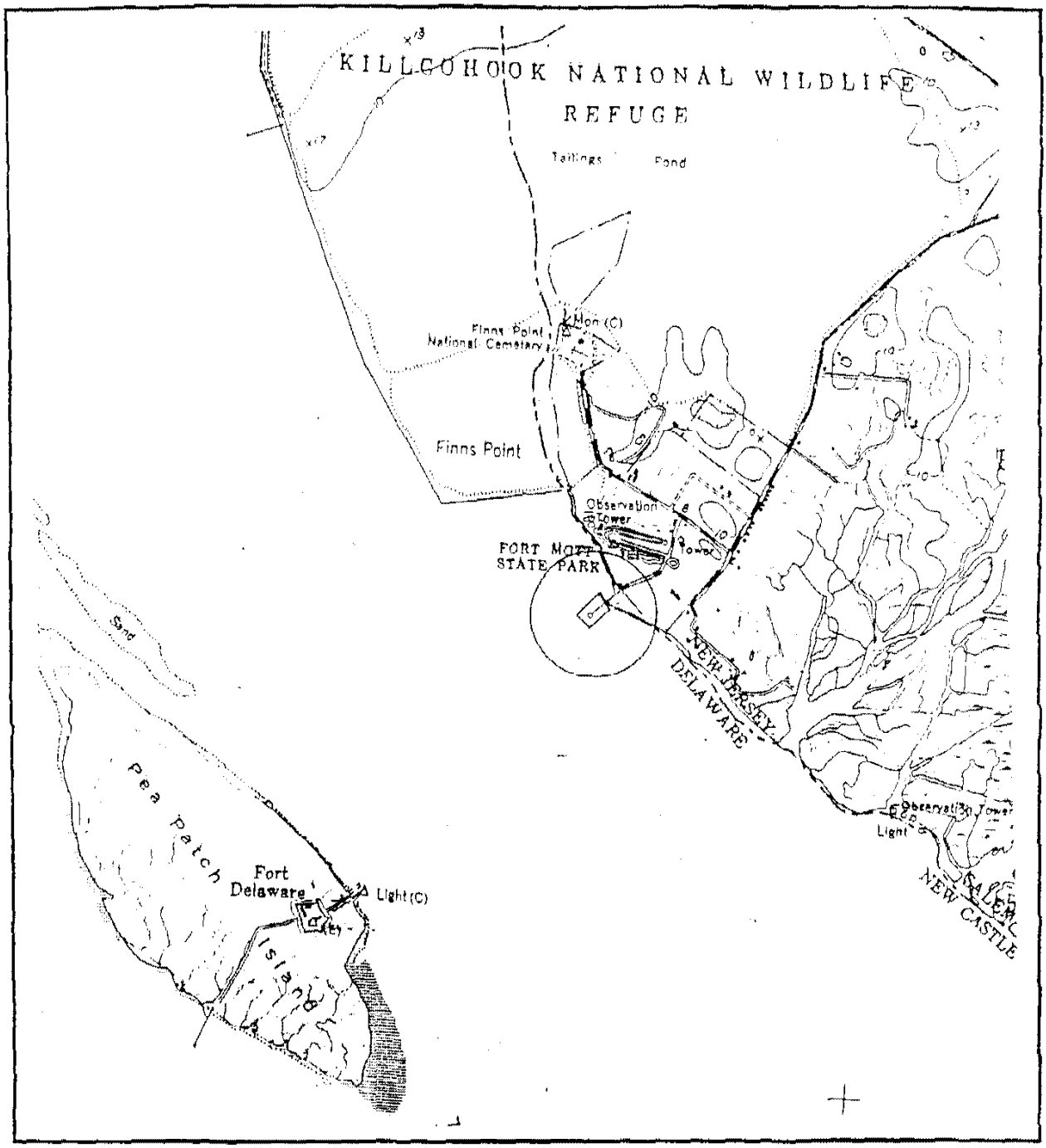
Robert McDowell, Director,
Division of Fish, Game and Wildlife

APPENDIX III

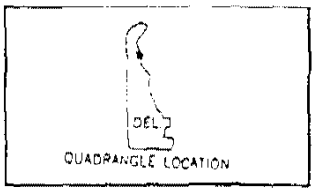
FORT MOTT STATE PARK

PIER REHABILITATION

Sections of draft report prepared by
S.T. Hudson Engineers, Inc.
Nov. 12, 1993
For the State of New Jersey



PROJECT AREA MAP



U.S.G.S. Quadrangle
DELAWARE CITY, DEL.-N.J.
1948 Photorevised 1970

Figure 1

SECTION 1

EXECUTIVE SUMMARY

The purpose of this study is to examine options for the rehabilitation of an historic pier at Ft. Mott State Park. Two objectives are to be met: the pier must be made suitable as a terminus for ferry service between Fort Mott and Fort Delaware on Pea Patch Island, and Fort DuPont on the Delaware shore, with provision for handicapped access. The rehabilitated pier must also be eligible for inclusion in the Fort Mott and Finn's Point National Cemetery Historic District, in accordance with Department of the Interior criteria.

Several alternative configurations have been examined, as described herein, and the field narrowed down to four principal options.

Two of the options involve leaving the existing pier in more or less as-is condition, maximizing opportunities for studying its structure, and allowing access for future investigations. One of these options is to build a walkway parallel to the existing pier; the other is to support a walkway above it.

The other two options are to reconstruct the pier, or to encapsulate it in sheet piling, with timber sheathing to simulate its historic appearance.

The results thus far of comparing those options are summarized in the following table.

The entries under "Design Considerations" and "Estimated Cost" are subject to further investigation and refinement, but are unlikely to shift significantly relative to each other.

The entries under "Permitting Considerations" and "Environmental Considerations" remain to be confirmed by discussions with the appropriate agencies, but represent their expected reaction, based on previous experience.

Two estimated construction costs are given for each option: without - and with - the estimated $360,000 required for ferry pier facilities common to each option as discussed in Section 3. Each of the options includes a 600 s.f. passenger shelter with bulletin board, etc., and provision for future utilities as required. Each option also includes removal of a portion of the wooded dune at the inshore end of the pier, together with grading, landscaping and paving as required to connect the walkway to the existing sidewalk inshore of the dune.

The results thus far clearly favor options A or B: installation of an independent walkway adjacent to - or above - the existing pier.

FORT MOTT FERRY PIER REHABILITATION OPTIONS: SUMMARY ANALYSIS

OPTION	A	B	C	D
Configuration	Independent walkway on downriver side of existing pier.	Walkway supported above existing pier, with observation "wings" at putshore end.	Reconstruction of pier, building up crib structure from existing sound base.	Encapsulation of existing pier, using steel sheet piling - sheathed with timber for appearance - to enclose the existing structure.
Design Considerations	Relatively straightforward; ice resistance and compatible appearance will be major factors.	Somewhat more complex design that A: requires driving piles through bottom of crib structure. Must withstand ice loads at high water, and appearance should not detract from historic pier.	Significant removal of existing structure required to reach sound material. Also, remaining historic structures outside of "new" crib will give anachronistic appearance if left in place.	Will require removal of rip-rap banked against existing timber sheeting below MLW; also will require removal of some external timber structure (fender piles, etc.).
Est. cost (not including common items @ $360,000 additional)	$443,000 Thus project total $803,000	$600,000 Thus project total $960,000	$879,000 Thus project total $1,239,000	$895,000 Thus project total $1,255,000
Environmental Permitting Considerations	Relatively straightforward; no major problem expected.	Relatively straightforward; no major problem expected.	Could lead to problems, as pier is now technically wetlands. Also, proposed action could be interpreted as filling river (approx. 0.25 acre).	Could lead to problems, as pier is now technically wetlands. Also, proposed action could be interpreted as filling river (approx. 0.25 acre).
Historical Preservation Considerations	With interpretive graphics on parallel walkway railing, enables existing pier to be viewed as historic ruin, with unique engineering features fully visible (and accessible).	With interpretive graphics on parallel walkway railing, enables existing pier to be viewed as historic ruin, with unique engineering features fully visible (and accessible). Minimal damage to historic structure.	Visible structure would only superficially resemble historic structure, parts of which must be destroyed during construction. The remainder will be rendered inaccessible to future investigation, so mitigation (archival cataloging) may be required.	Visible structure would only superficially resemble historic structure, parts of which must be destroyed during construction. The remainder will be rendered inaccessible to future investigation, so mitigation (archival cataloging) may be required.

SECTION 2

INTRODUCTION

The purpose of this study is to examine options for the rehabilitation or reconstruction of an historic pier at Ft. Mott State Park. Two objectives are to be met: the pier must be made suitable as a terminus for ferry service between Ft. Mott at Forts Delaware and DuPont, on Pea Patch Island and on the Delaware shore respectively, with provision for handicapped access.

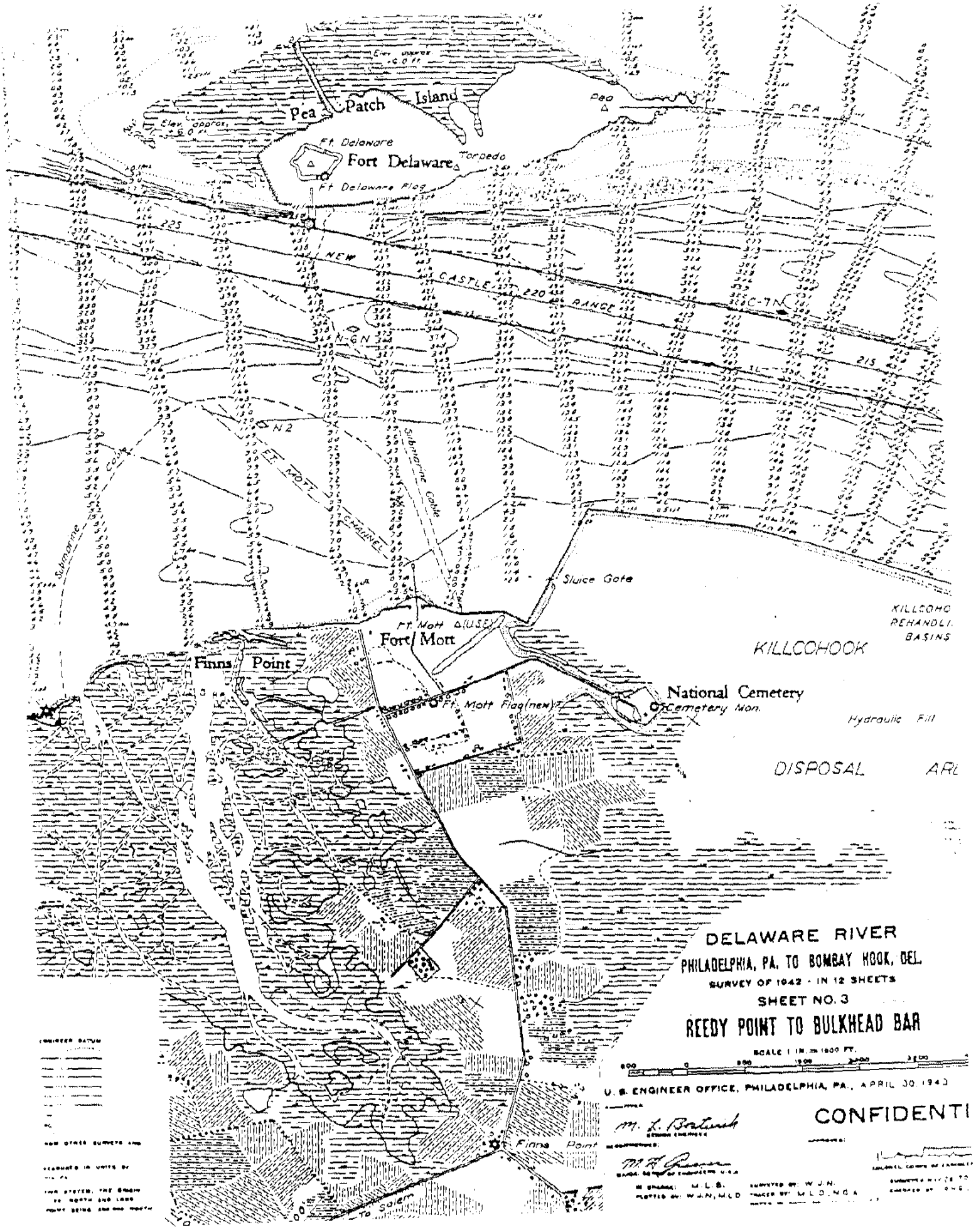
The rehabilitated or reconstructed pier must also be eligible for inclusion in the Ft. Mott and Finn's Point National Cemetery Historic District, in accordance with Department of the Interior criteria.

The completed study will include the results of all investigations and at least three recommended designs, together with outline specifications and cost estimates. The final report will also include all materials necessary to prepare environmental permit applications for the selected alternative, as well as an application for inclusion in the Historic District.

S. T. Hudson Engineers, Inc., together with our subconsultants R. Alan Mounier, Inc. and Dolan Research, have been engaged by the Division of Building and Construction to carry out this work. This Draft Report has been prepared at approximately the 50% point in the study.

The foldout following this page is excerpted from a U. S. Army Corps of Engineers soundings chart of the Delaware River prepared in 1943, and shows clearly the relative positions of Fort Mott, Fort Delaware and Fort DuPont. Note the designated "Fort Mott Channel", leading to the pierhead, suggesting that the pier was still in use at that time.

The Ft. Mott Pier was built in the last century as a crib structure - basically a series of boxes made of heavy interlocking timbers floated into position, then filled with stone to sink them to the prepared bottom and hold them in place. It is an early and now obsolete type of marine foundation that is of interest to students of engineering history. A number of such structures are still in use along the Delaware River, primarily at industrial facilities. Although the Ft. Mott Pier has been repaired a number of times, as discussed in Section 4, it is now in a state of advanced deterioration above the low water line.


Pea Patch Island
Elev. approx. +60 ft.
Ft. Delaware
Fort Delaware
Torpedo
Ft. Delaware Flag
Pea
PEA
225
NEW CASTLE 220 RANGE
C-7N
N-6N
215
N2
Ft. Mott Channel
Submarine Cable
Submarine
Sluice Gate
Ft. Mott
Fort Mott
Finns Point
National Cemetery
Cemetery Mon.
Ft. Mott Flag(new)
KILLCOHOOK
KILLCOHO
PEHANDLI
BASINS
Hydraulic Fill
DISPOSAL
ARE
DELAWARE RIVER
PHILADELPHIA, PA. TO BOMBAY HOOK, DEL.
SURVEY OF 1942 - IN 12 SHEETS
SHEET NO. 3
REEDY POINT TO BULKHEAD BAR
SCALE 1 IN. = 1600 FT.
U. S. ENGINEER OFFICE, PHILADELPHIA, PA., APRIL 30, 1943
CONFIDENTI
To Salem

Photos 1 and 2 show essentially the same view of the upriver side of the pier at low and high water, respectively. Pea Patch Island is in the background. Note that at high water the remains of the pier are essentially inundated; the pier is also overgrown with Phragmites and Spartina, "signature" wetlands species of reeds and marsh grass, respectively. The pier is thus now technically wetlands habitat, which may present a permitting problem.

Photo 3 shows on the right-hand side the interlocking notched timbers characteristic of crib structures. On the left can be seen two types of timber sheeting subsequently added to repair and/or protect the original crib structure - see Section 4 for discussion.

Photo 4 is another view of the remaining notched timbers and external sheeting.

Investigative work performed to date includes the following:

A. A site topographic survey has been carried out, with preliminary results shown on Drawing No. 1 (rear pocket). Additional data will be added. The general elevation of the terrain immediately inshore of the pier is about 10 ft. above Mean Low Water (MLW); the remaining portion of the pier is about 4 ft. above MLW.

   Drawing No. 1 includes a plan of the pier. Note that the pier extends about 350 ft. out from the existing shore.

   We have not yet been able to determine exactly where the Delaware/New Jersey state line falls on the pier structure, but from existing maps it appears to lie about 300 ft. in from the outshore end, so that portions of the pier are in both states. This will require parallel permitting for any rehabilitation/ reconstruction scheme.

B. A hydrographic survey was also performed, and the results are included on Drawing No. 1. Again, additional soundings have been taken both upriver and downriver of those shown, and will be added to No. 1. The additional soundings show no significant change in water depth north or south of the pier; in general the results indicate adequate depth for the proposed ferry (the "Dela Fort") with no dredging required.

C. R. Alan Mounier, Inc. has carried out a background historical investigation of the Ft. Mott Pier, and their draft report is included as Appendix A. It will be expanded to include additional background material, some graphics, and a bibliography. In general, their findings are consistent with information already available to NJDEPE's Division of Parks and Forestry.

PHOTO 1:
Pier at low water
(Up river side)

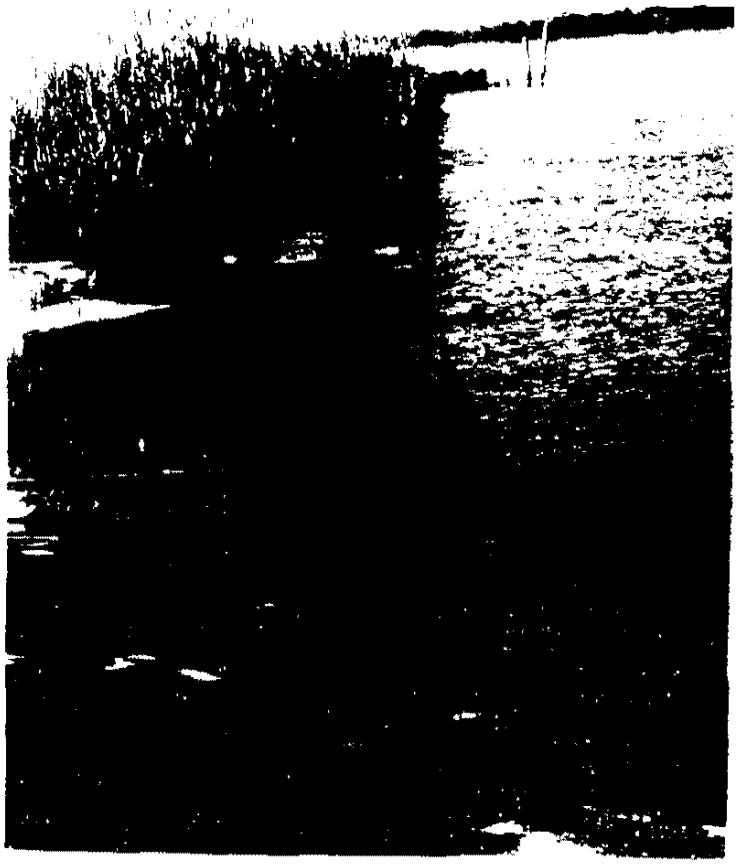


PHOTO 2:
Pier at high water

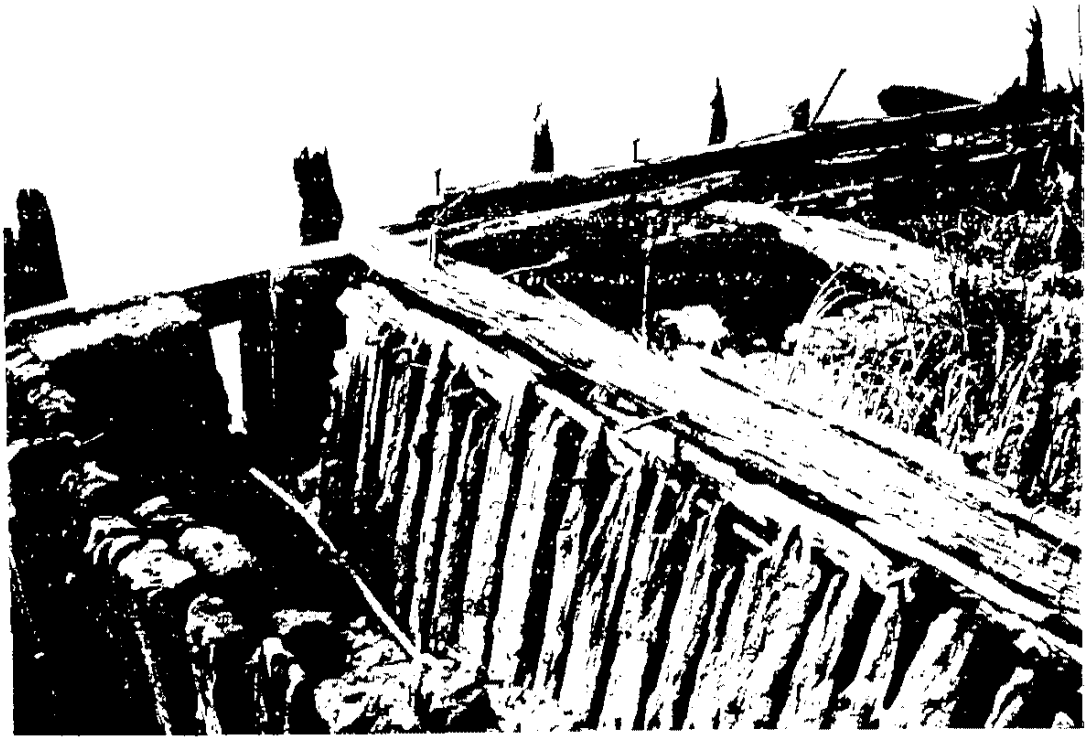


PHOTO 3: Outshore ("T") End of pier, from downriver, showing notched timber construction.

PHOTO 4: View of structure showing notched and spiked longitudinal cribbing timbers and external sheeting.

D. R. Alan Mounier, Inc. also carried out an inshore archeological investigation. The results are summarized in Appendix B - a formal report will follow. No archeological impediment to the proposed pier rehabilitation or reconstruction was found.

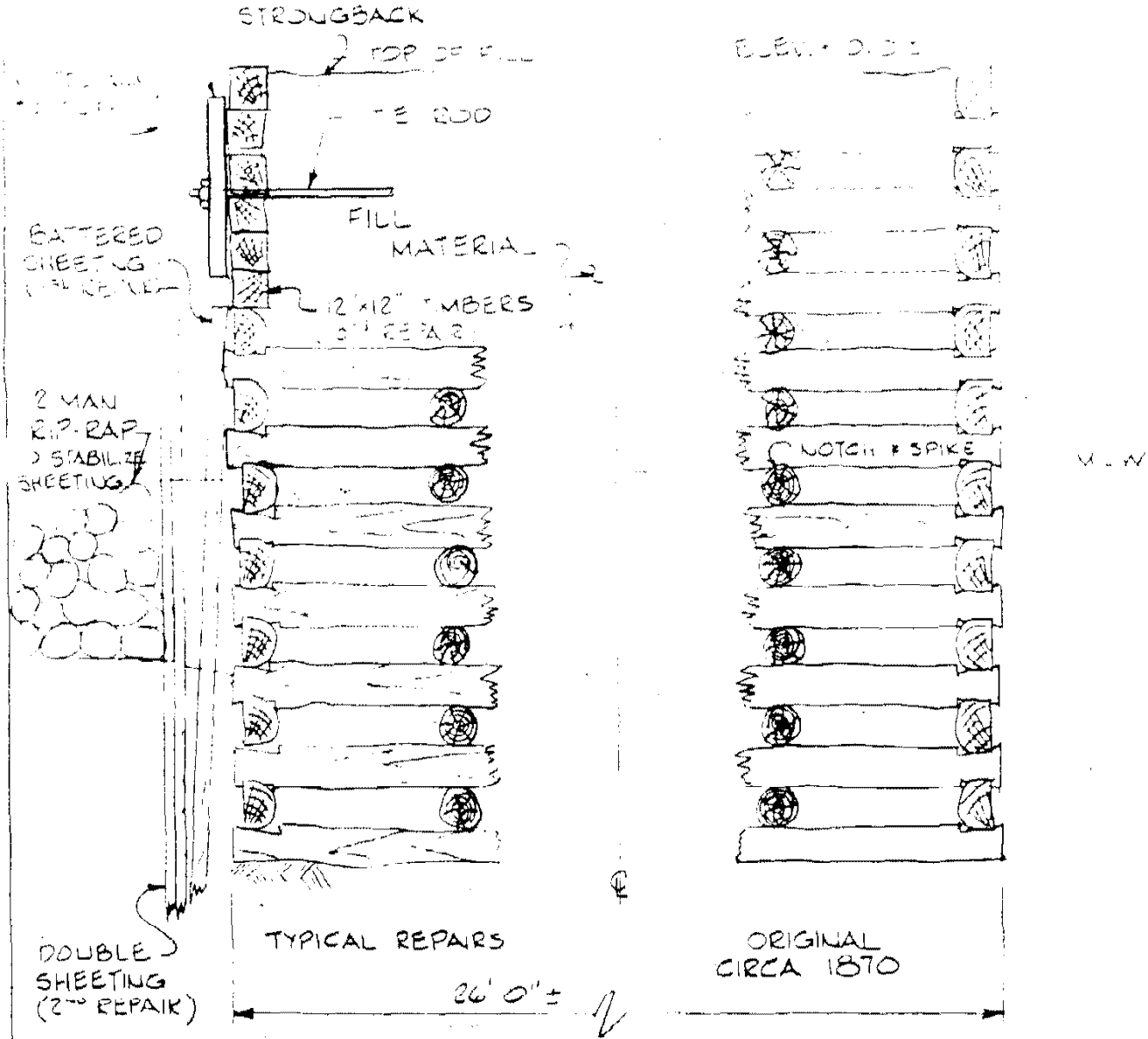
E. A magnetometer survey of the waters surrounding the pier was conducted by Dolan Research. The purpose of this survey was to detect, by disturbances in the earth's magnetic field, the presence of possible archeological artifacts on the river bottom. The results are plotted on Drawing No. 2 (rear pocket), and show a significant "target" at the outermost upriver corner of the pier, together with some lesser targets. A follow-up diver investigation showed these to be debris from the superstructure of the pier; again, no archeological impediment to the proposed pier rehabilitation or reconstruction was found. A draft report on this work, which includes additional historic background on the Ft. Mott Pier, will be found in Appendix C.

F. An underwater condition survey of the pier structure was also carried out by a diver/engineer - a formal report will follow as Appendix D. The external sheeting prevented access to the crib structure itself, but the sheeting itself is sound below MLW. Timber fender piling outshore of the end of the pier was also sound below water, and no signs of marine borers were found in either piles or sheeting. From this evidence it is likely that the timbers of the crib structure which are below MLW are sound. Stone riprap has been piled against the sheeting out to a distance of 20 feet from the pier - this is discussed further in Section 4, Pier Rehabilitation Alternatives.

Investigations still to be performed include an exploratory excavation of one or more of the cells of the crib structure, discussed further in Section 4. Offshore soil borings will also be conducted by a subcontractor: it is anticipated that three borings will be required, spaced from approximately MLW to a point approximately 100 ft. off the outshore end of the pier, taken to a minimum depth of 80 ft.

Most importantly, meetings with the appropriate regulatory agencies of both New Jersey and Delaware, and the Federal Government, remain to be held.

Section 3 following discusses those elements, common to all rehabilitation/reconstruction options, which will be required to accommodate modern ferry service with handicapped access. Section 4 is a description and discussion of the various rehabilitation and/or reconstruction options being investigated. Conclusions and recommendations are in Section 5.

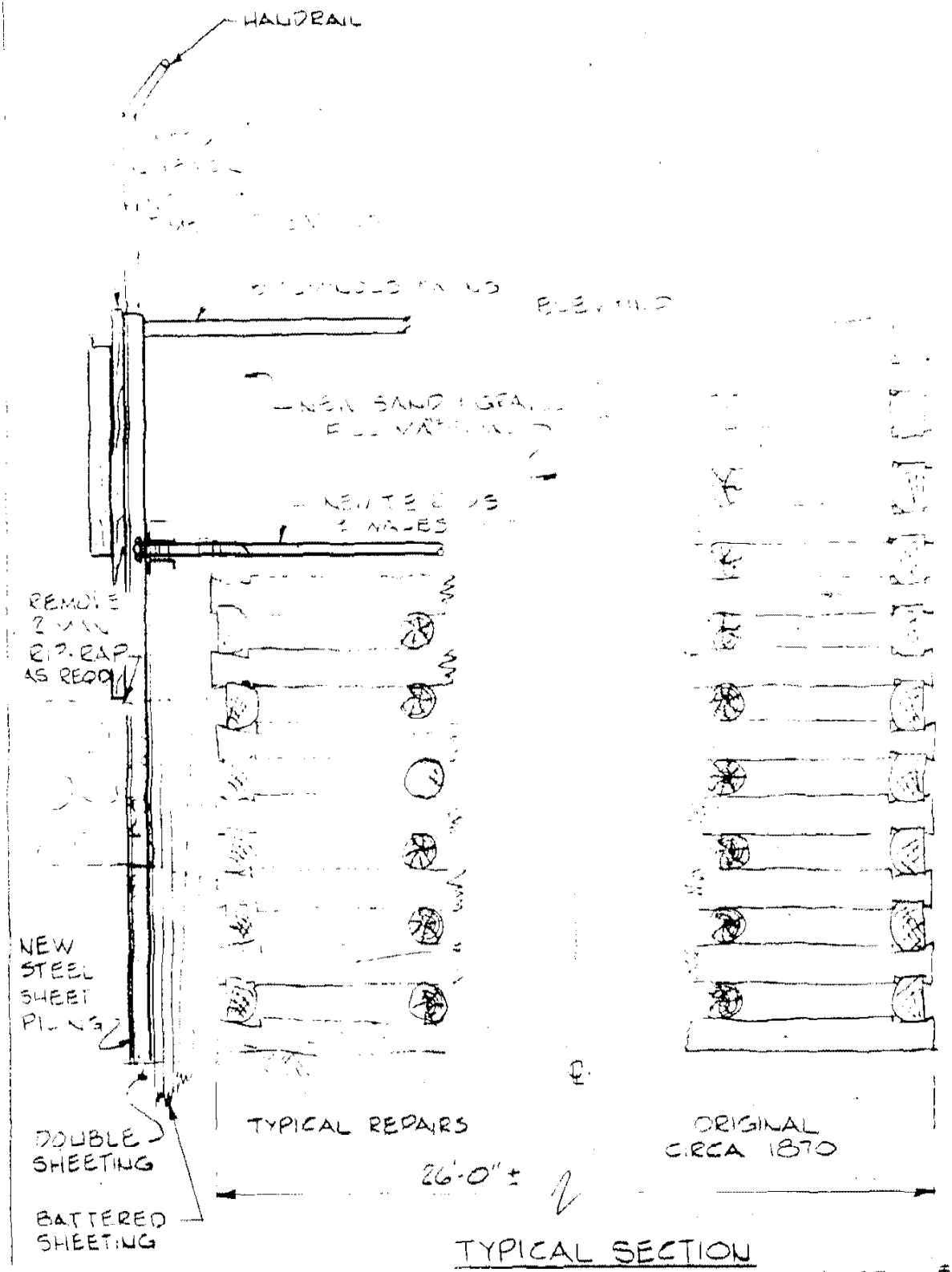


TYPICAL SECTION

SCALE 1/4"=1'-0"

SKETCH #6

S.T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS
800 Hudson Square
P.O. Box 8108
Camden, N.J. 08102
609-342-6383
609-342-6000

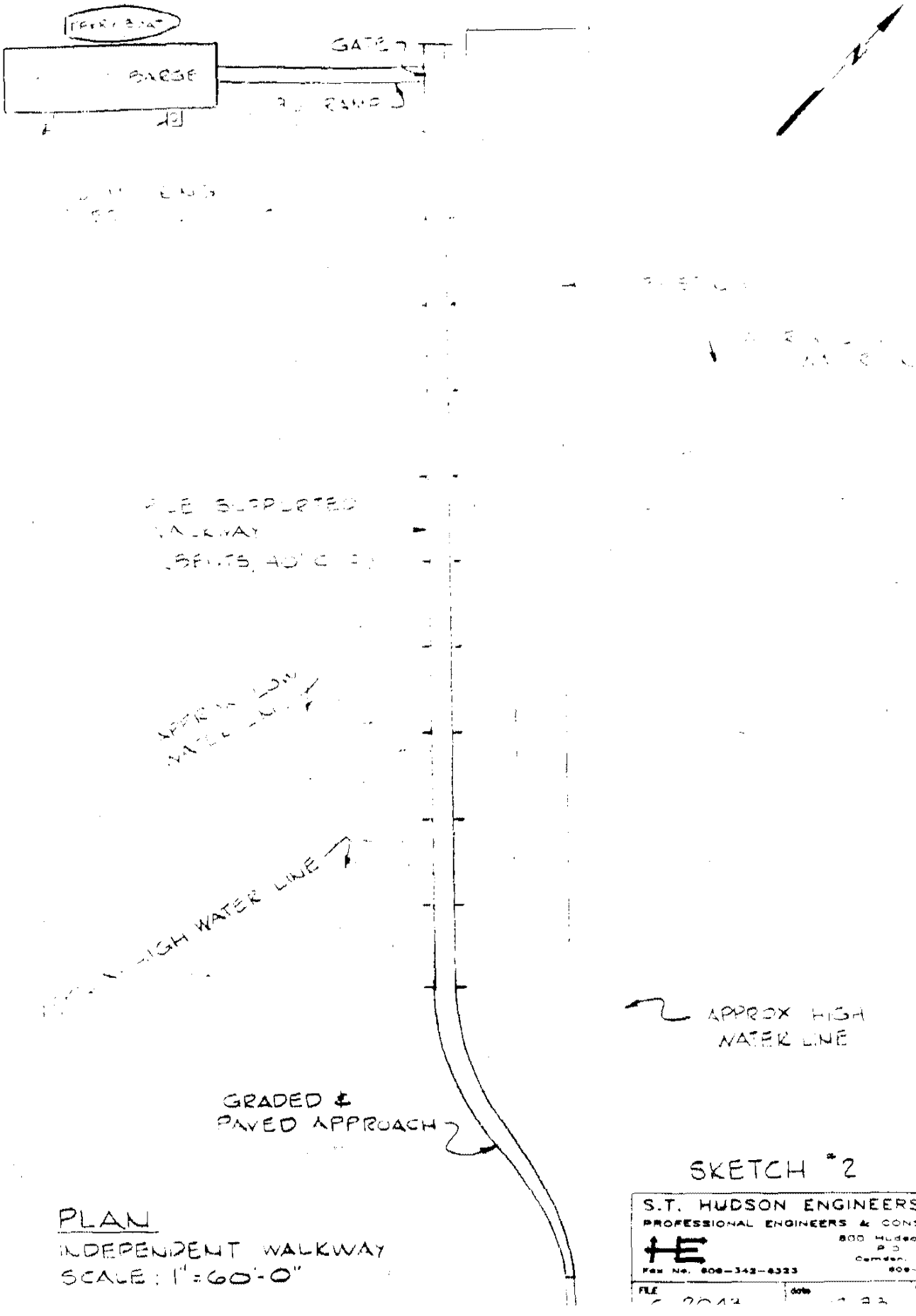


TYPICAL SECTION

SCALE: 1/4" = 1'-0"

SKETCH # 7

S.T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS
800 Hudson Square
P.O. Box 2108
Camden, N.J. 08102
609-342-6500
Fax No. 609-342-6323

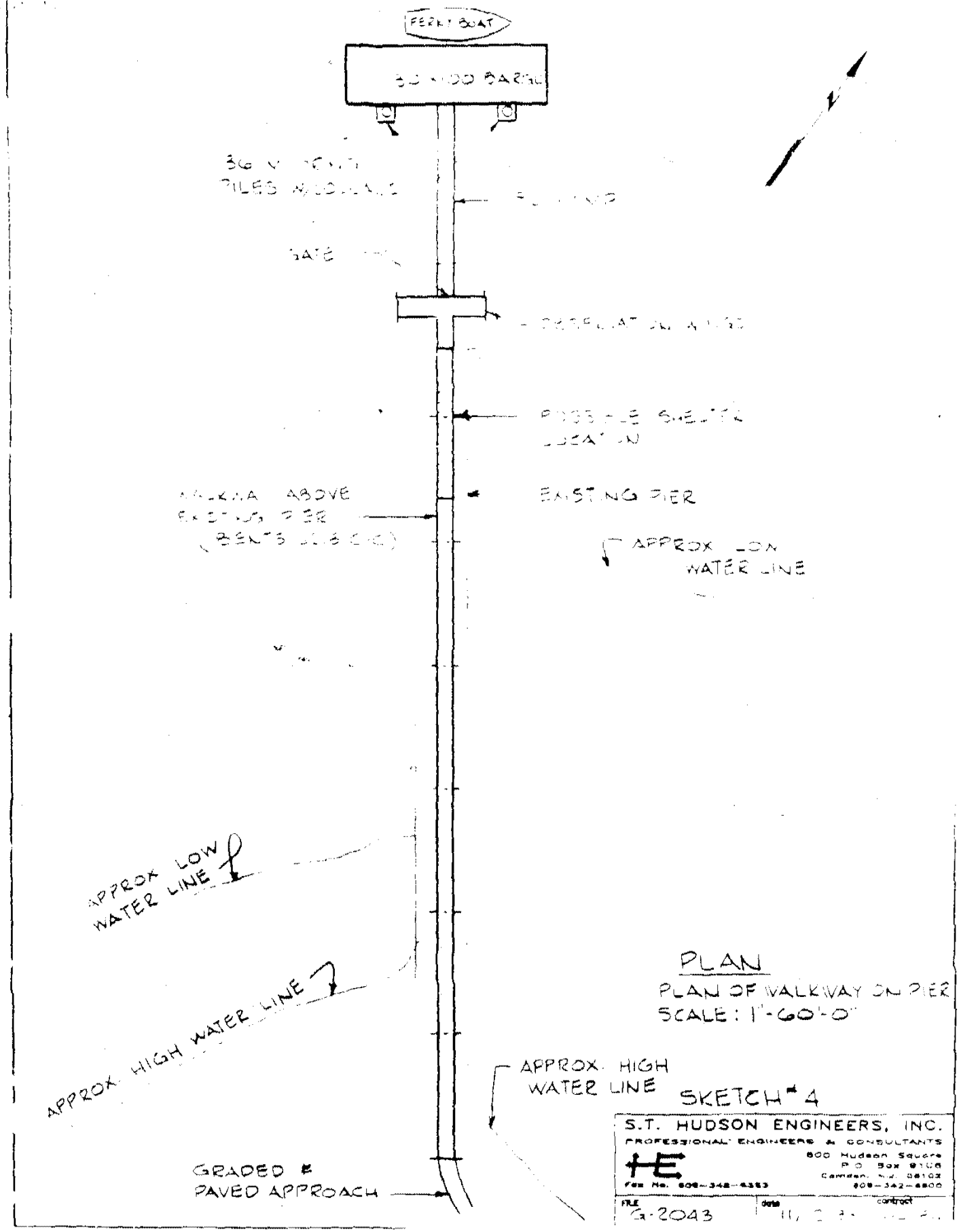


PLAN
INDEPENDENT WALKWAY
SCALE: 1"=60'-0"

SKETCH #2

S.T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS
800 Hudson Square
P.O. Box 9108
Camden, N.J. 08102
Fax No. 609-342-6323
609-342-6600

FILE | date | contract



PLAN

PLAN OF WALKWAY ON PIER
SCALE: 1"-60'-0"

SKETCH # 4

S.T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS
800 Hudson Square
P.O. Box 9108
Camden, N.J. 08103
609-342-6800
Fax No. 609-342-4363

FILE G-2043 | JOB | CONTRACT

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection
Division of Parks and Forestry
CN 404
Trenton, NJ 08625-0404
Tel #609-292-2733
Fax #609-984-0503

Robert C. Shinn, Jr.
Commissioner

March 7, 1996

David J. Hazelton
Project Assistant
Delaware River and Bay Authority
P.O. Box 71
New Castle, DE 19720

Dear Mr. Hazelton:

I am writing to you as a follow up to our meeting and discussions on February 27, 1996 at the Delaware River and Bay Authority's (DRBA) headquarters.

As we discussed, the Division of Parks and Forestry requests that the DRBA not only lease the pier from the Division of Parks and Forestry for its recreational ferry service, but also undertake the actual restoration of this pier through a cooperative agreement with our division.

It is the intent of the Division of Parks and Forestry to undertake the following initiatives in conjunction with the DRBA to complete this project.

New Jersey Division of Parks and Forestry Responsibilities:

1. Complete the design and permit phases of this project through our current consultant, Hudson Engineering.

2. Provide all plans and specifications to the DRBA for their contracting purposes.

3. Perform all mitigation measures which may be required for wetlands protection and enhancement.

4. Provide DRBA's contractor with a suitable staging area for restoration of pier structure within Fort Mott State Park.

5. Coordinate the reconstruction of pier with park functions and special events.

6. Purchase of suitable floating barge to be retrofitted by the DRBA's contractor and utilized for this project.

7. Lease to the DRBA in consideration of its investment in the restoration of the pier, the actual pier and floating barge for $1.00/per year. Proposed lease term is 10 years in duration with an option to renew for 10 additional years.

The DRBA's Responsibilities:

1. Restore the pier and retrofit barge to accommodate ferry service in accordance with the final plans, specifications and permit requirements.

2. Operate the ferry service and collect all fees for such in accordance with the pending agreement with the Delaware Division of Parks and Recreation.

3. Lease said pier from the Division of Parks and Forestry and maintain such for recreational ferry service use for the full term of the lease.

4. Provide appropriate insurance idemnification and coverage for the operation of this ferry service and name the State of New Jersey as additionally insured against all claims and legal actions.

5. Provide sufficient funding to accomplish the restoration and retrofitting project as described in number 1 above in accordance with the following formula:

   - DRBA - 50% of total cost or $400,000 whichever is greater of the actual cost.

   - NJ Division of Parks & Forestry - 50% of total cost or $600,000, whichever is lesser of the actual costs.

   The actual costs of the project would be the following elements:

   1. Contracts with fabricators and contractors for completion of pier restoration.

   2. All fees and costs associated with construction supervision and oversight.

I believe the above items set forth our intent to complete this project in accordance with our previous discussions. I am quite sure there are several operational and management issues yet to be addressed which will involve both the Delaware Division of Parks and Recreation and the New Jersey Division of Parks and Forestry.

Please review the above noted issues and if you have any questions or concerns in the interim, please give me a call at (609) 292-2734.

Thank you for your continuing cooperation and assistance on this most worthwhile project.

Sincerely,

Carl R. Nordstrom
Deputy Director

CRN/rm
c. Assistant Commissioner James Hall
Director Gregory A. Marshall
Richard Barker
James T. Rozmus
Scott Mauger
Alvin Payne
Charles Salkin, Director, DE Division of Recreation & Parks

APPENDIX IV