THE BULKHEAD BOOK

A Guide for Building a Bulkhead along Lagoons or Other Tidal Waters of New Jersey

December 1983

New Jersey Department of Environmental Protection

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Thomas H. Kean, *Governor* Robert E. Hughey, *Commissioner*

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Introduction

Each year hundreds of people apply for permits to build bulkheads at or below the mean high water line of tidal water bodies. These permit applications are reviewed by the Division of Coastal Resources in the New Jersey Department of Environmental Protection (DEP) under the Waterfront Development Law (N.J.S.A. 12:5-3). In deciding whether to approve, conditionally approve or deny these permit applications, Division staff have been guided by the Rules on Coastal Resource and Development Policies since September, 1978. These are found in Title 7, Chapter 7E of the New Jersey Administrative Code. Because rules and policies governing bulkheading have changed in the five years since the rules were first adopted and because the acceptability of bulkheading varies by location, the Division has prepared this booklet to make the present policy on bulkheading clear to all interested parties.

A Waterfront Development Permit is required for all bulkhead construction in tidal waterways, unless the construction occurs entirely landward of the mean high water line. The State of New Jersey owns all lands now or formerly flowed by the mean high tide, unless previously conveyed or unless the tidal waters were created by dredging privately owned lands and waters as is the case of most man-made lagoons. These submerged tide-flowed lands are called "tidelands" or "riparian lands." Before an application for a Waterfront Development Permit is accepted, the applicant must demonstrate that he or she holds a valid Tidelands conveyance (grant, lease or license) from the State or has submitted an application for a conveyance for the tidelands on which bulkhead construction is proposed. In man-made tidal water bodies, such as lagoons, a State tidelands conveyance is not required, unless that portion of the lagoon is State claimed tidelands.

Applications to build a bulkhead at the mean high water

line are more likely to be approved than are applications to build a bulkhead below the mean high water line and to fill behind the bulkhead. This is because DEP is committed to the protection of shallow water habitat. The New Jersey Legislature has found that the tidal and estuarine "near shore waters and intertidal areas together constitute an exceptional, unique, irreplaceable and delicately balanced physical, chemical, and biologically acting and interacting natural environmental resource" (N.J.S.A. 13:19-2, CAFRA). Conservation of as little as 250 square feet of unvegetated estuarine shallows, for its natural productivity, has been upheld by N.J. Administrative Law Judgment (*Swingle v. Division of Coastal Resources,* 1981).

Significance of Shallow Water Habitat

The shallow areas (generally water areas less than four feet in depth at low tide) of estuarine and tidal freshwater areas of New Jersey are prime habitat for a variety of fish and wildlife of direct or indirect recreational and commercial importance. A number of factors are responsible for the habitat value of shallow waters. Included among these are high oxygen content, depth of sunlight penetration, and accessibility of the bottom to birds.

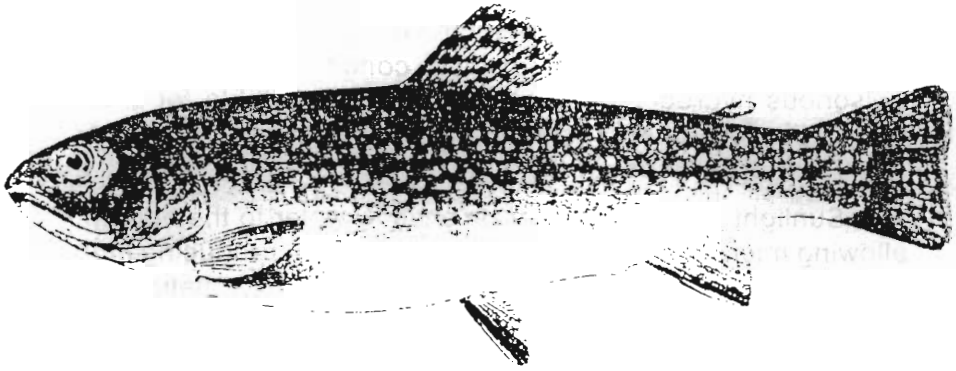
The dissolved oxygen content of shallow waters is usually greater than that of deeper waters because of wave action, atmospheric diffusion, circulation and photosynthesis. The entire water column is mixed and oxygenated in contrast to deeper waters where temperature differences established between surface and bottom waters in summer months can result in anoxic (devoid of oxygen) conditions and resultant poisonous hydrogen sulfide generation, unsuitable for most animal life. This phenomenon is particularly true in the deeper waters of artificial lagoons.

Sunlight is able to penetrate shallow water to the bottom, allowing microscopic and larger algae to grow, producing high levels of primary biological productivity (photosynthetic conversion of sunlight energy into organic hydrocarbons). This production continues into winter months, even after emergent wetlands plants (e.g., smooth cordgrass) and submerged vegetation (e.g., eelgrass) are dormant.

The energy flow (movement of the chemical energy in foods between producer-plants and consumer-animals), or trophic system, in estuarine systems is complex. Invertebrate animals, although not often visible, form diverse and abundant communities on and in sediments of oxygenated waters. Composition and richness depend on a variety of factors including substrate particle size, salinity, temperature and current.

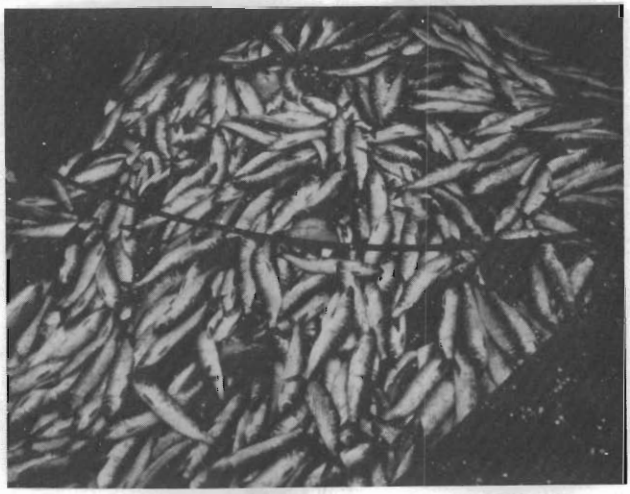
Bacteria and protozoans are particularly important in converting dead plant and animal material (detritus) into animal protein. Polychaete and nematode worms, crustaceans, and mollusks in turn feed on bacteria and protozoans associated with detritus and on living plants and invertebrates, converting these foods into animal protein with which people are more familiar. In addition, many of these species are of direct value to humans (e.g., blue crabs, soft clams, hard clams, oysters).

In the water above the bottom, single cell plants (phytoplankton) are found. Microscopic animals (zooplankton) feed on the phytoplankton and detritus. These organisms are critical to the natural energy flow, serving as prey through a complex food web which eventually leads to large estuarine finfish, blue crabs, aquatic birds, marine animals and humans.



The most abundant fish found in shallow estuarine and tidal fresh waters are the forage fish (those fed upon by larger predatory fish) and juvenile stages of recreational and commerical species. The dominant forage fish in these waters are Atlantic and tidewater silverside, Atlantic menhaden, bay anchovy, mummichog, striped and banded killifish, blueback herring, alewife and silvery minnow. These species feed primarily on plankton and benthic (bottom dwelling) in-

vertebrates and algae. Young bluefish, weakfish, winter flounder, spot, northern puffer, striped bass, white perch and shad are common juvenile stage predators which are directly harvested by man. These species feed on the forage fish and benthic invertebrates. A total of seventy-six species of finfishes have been found to inhabit the State's shallow estuarine waters.



A good example of the interrelationship of shallow estuarine species involves the bluefish, New Jersey's top saltwater sport fish and an important commerical species. Bluefish range from Florida to Maine. Their young use shallow estuaries as nursery grounds. In New Jersey, young bluefish are known to feed on 14 species of forage fish and shellfish. One of these, the sand shrimp, is known in the diets of 25 other species of finfish and many species of birds. Sand shrimp are abundantly found in shallow estuarine waters.

The most obvious and beautiful wildlife users of shallow tidal waters and natural shorelines are the aquatic birds. These include migratory waterfowl, shorebirds, wading birds, gulls and terns, which use shallow areas to forage, rest and congregate. While the type of food each species uses varies,

each species is limited by its anatomy—length of leg, body, neck, bill or diving ability—to seek food on exposed intertidal or shallow subtidal bottoms.

Small shorebirds are particularly abundant in New Jersey at specific times of the year, and utilize animal and algal food originating in tidal shallows. These small shorebird users include sandpipers, plovers, dowitchers, ruddy turnstone, red knot, yellowlegs, and willet. An example of use of estuarine shallows by shorebirds is the annual hosting of the bulk of the entire population of red knots (over 25,000) on the New Jersey shoreline of Delaware Bay. This coincides with the spawning of the horseshoe crabs upon whose eggs the red knots feed.

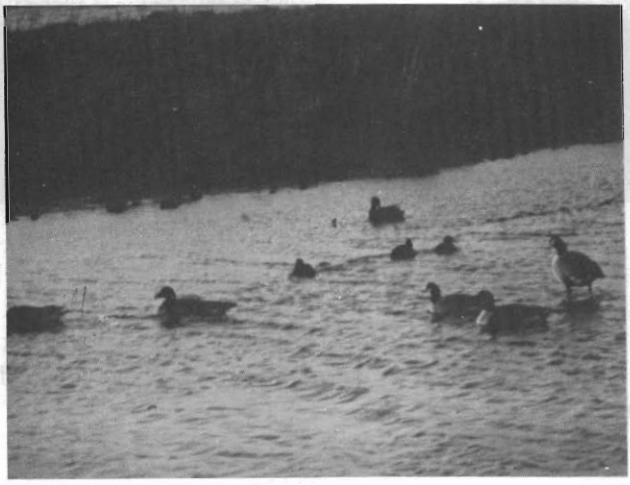
Common wintering waterfowl in New Jersey using exposed intertidal and subtidal areas as prime habitat include the brant, black duck, mallard and teal. Scaup, canvasback,

mergansers, and double-crested cormorant feed on small forage fishes and shellfish in the shallows and deeper waters.

The wading bird users include the herons and egrets which feed extensively on forage fish as do the herring, laughing, great black-back and ringbill gulls, terns and black skimmers. Other birds using natural tidal shorelines and exposed intertidal areas include common and fish crow, belted kingfisher and common grackel.

Policy in Natural Water Areas

If you are planning to undertake construction at or below the mean high water line, you must first obtain a Waterfront Development Permit from the Division of Coastal Resources. Division permit decisions are based on the Rules on Coastal Resource and Development Policies, especially the Structural Shore Protection Policy (N.J.A.C. 7:7E-7.11e), while filling of water areas is addressed principally by the Filling Policy (N.J.A.C. 7:7E-4.11i).



Bulkheading and filling of tidal shallows remove the area's natural contribution to coastal ecology, and eliminates virtually all remaining natural habitat value, replacing it with a less productive artificial habitat. Therefore, DEP has established the following policies to regulate these activities.

Structural Shore Protection Policy

(i) The construction of new shore protection structures including jetties, groins, seawalls, bulkheads, and other retaining structures to retard longshore transport and/or to prevent tidal waters from reacing erodible

material is acceptable only if it meets all of the following seven conditions:

(1) The structure is essential to protect water dependent uses or heavily used public recreation beach areas in danger from tidal waters or erosion, or the structure is essential to protect existing structures and infrastructure in developed shorefront areas in danger from erosion, or the structure is essential to mitigate, through, for example, the construction of a retained earthen berm, the projected erosion in an Erosion Hazard Area along a headland and provide erosion protection for a development that is otherwise acceptable under the Coastal Resource and Development Policies.

(2) The structure will not cause significant adverse impacts on local shoreline sand supply.

(3) The structure will not create net adverse shoreline sand movement conditions downdrift, including erosion or shoalings.

(4) The structure will cause minimum feasible adverse impact to living marine resources.

(5) The structure is consistent with the State Shore Protection Master Plan.

(6) If the proposed project requires filling of a Water Area it must also be consistent with the General Water Area Policy for Filling (7:7E-4.11(i)).

(7) The structure is designed, and will be maintained, for at least a 50-year period of intended use.

(ii) A new, short retaining structure that connects two existing lawful retaining structures is normally acceptable provided that extensive filling is not involved.

(iii) Maintenance or reconstruction of an existing retaining structure is conditionally acceptable, provided it does

not result in extension of the structure by more than 18 inches in any direction. Maintenance or reconstruction of an existing retaining structure which results in extension by more than 18 inches shall be considered new construction.

(iv) Rip-rap is a preferred construction material for retaining structures as it provides a habitat for aquatic life and helps absorb wave energy.

Filling Policy

(i) filling is prohibited in lakes, ponds, reservoirs, and open bay areas at depths greater than 18 feet.

(ii) In all other water areas, filling is discouraged, but limited filling may be considered for acceptability provided that:

(a) the use that requires the fill is water dependent,

(b) there is a demonstrated need that cannot be satisfied by existing facilities,

(c) there is no feasible or practical alternative site on an existing Water's Edge,

(d) the minimum practical area is filled,

(e) the adverse environmental impacts are minimized, e.g., by compensating for the loss of aquatic habitat by creation of an area of equivalent or greater environmental value elsewhere in the same estuary,

(f) minimal feasible interference is caused to Special Areas, and

(g) pilings and columnar support or floating structures are unsuitable for engineering or environmental reasons.

(iii) filling using clean sediment of suitable particle size and composition is acceptable for beach nourishment projects (see the Coastal Engineering Use Policies,

7:7E-7.11), and conditionally acceptable for the creation of new wetlands.

(iv) Filling is acceptable at the landward end of lagoons when flushing is poor, and water quality is signficantly degraded. This usually pertains only to the deep water in the lagoon. Shallow areas will not, in general, have low oxygen concentrations.

Policy Discussion

The filling policy is strictly interpreted in all naturally tidal water bodies. Where shoreline stabilization is required, vegetation, rip-rap or sloped revetments is preferred over bulkheading. This is because bulkheading increases reflected wave turbulence and erosion in adjacent waters, acts as a barrier to restoring of diamondback terrapin and horseshoe crabs and produces a sharply defined land water interface instead of a wide intertidal zone. Housing is not considered a water dependent use and, therefore, bulkheading beyond the mean high water line and backfilling is not acceptable to create or expand a residential lot. Bulkheading beyond the mean high water line is not permitted for the purpose of eliminating traps where vegetation and debris collect. These

trapped materials can easily be removed with a net by the property owner.

When filling behind a bulkhead is for a water dependent use, and meets the other policy requirements, it may be permitted only if mitigation is provided in the form of the creation of equivalent aquatic habitat elsewhere in the same estuary. If there are vegetated wetlands in the area to be filled, the applicant must meet the stricter requirements of the Wetlands Policy (N.J.A.C. 7:7E-3.26).

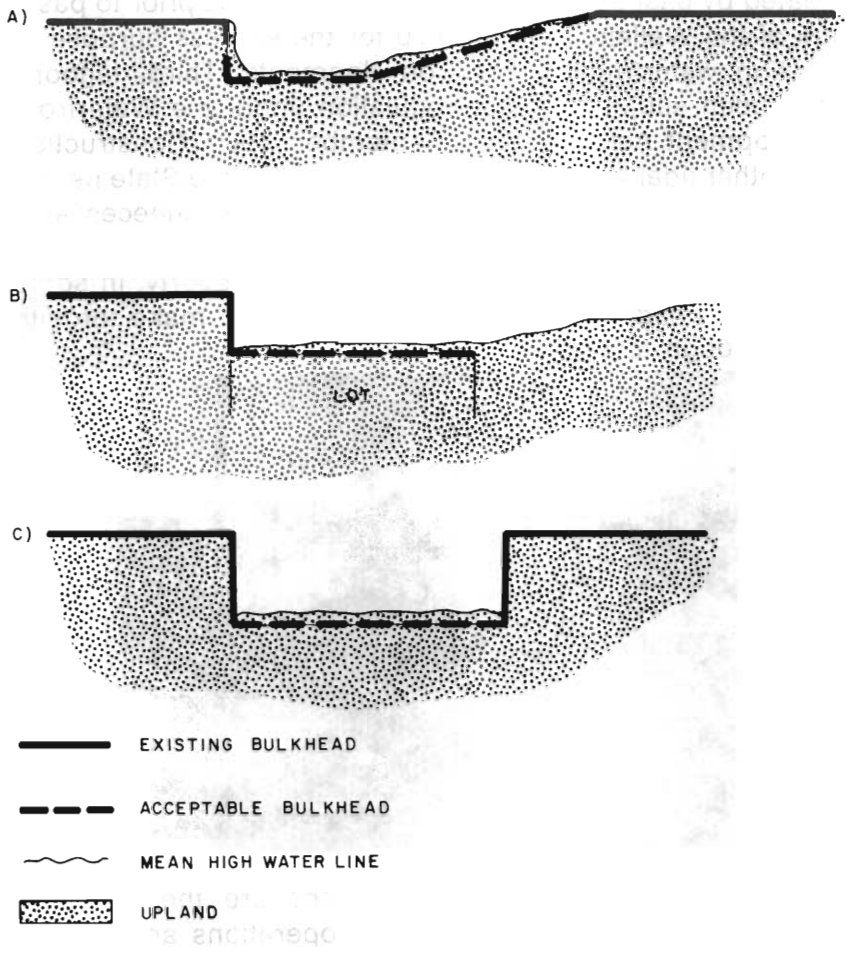
Policy in Man-Made Lagoons

DEP differentiates between bulkheading in man-made lagoons and in other water bodies for four reasons. First, man-made lagoons are less valuable as habitat than natural water bodies because their steep sides limit shallow water habitat and because their angular pattern limits tidal flushing action, especially at the upper ends of lagoons several turns away from open tidal water. Second, man-made lagoons were created by past dredging and filling of wetlands prior to passage of the Wetlands Act of 1970 for the express purpose of creating waterfront housing developments. Third, lagoons have been subject to State regulation under the Waterfront Development Act only since September, 1980. Construction in all other tidal water bodies has been subject to State permit review since 1914. Fourth, DEP does not want to unnecessarily place a hardship upon individual lagoon front property owners by preventing them from developing their property. In some cases,bulkheading and filling is necessary to make the site large enough to build upon.

Although most man-made lagoons are the result of previous destructive dredge and fill operations and are no

FIGURE 1

EXAMPLES OF ACCEPTABLE BULKHEADS WHERE EXISTING BULKHEADS ARE MORE THAN 75 FEET APART



longer permitted in New Jersey or most other states, their remaining shallow water habitats are valuable. A current study by the Division of Coastal Resources staff, which involves sampling of the shallow water edges of lagoons, has found significant numbers and variety of finfish, crustaceans and juvenile commercial and sport fish.

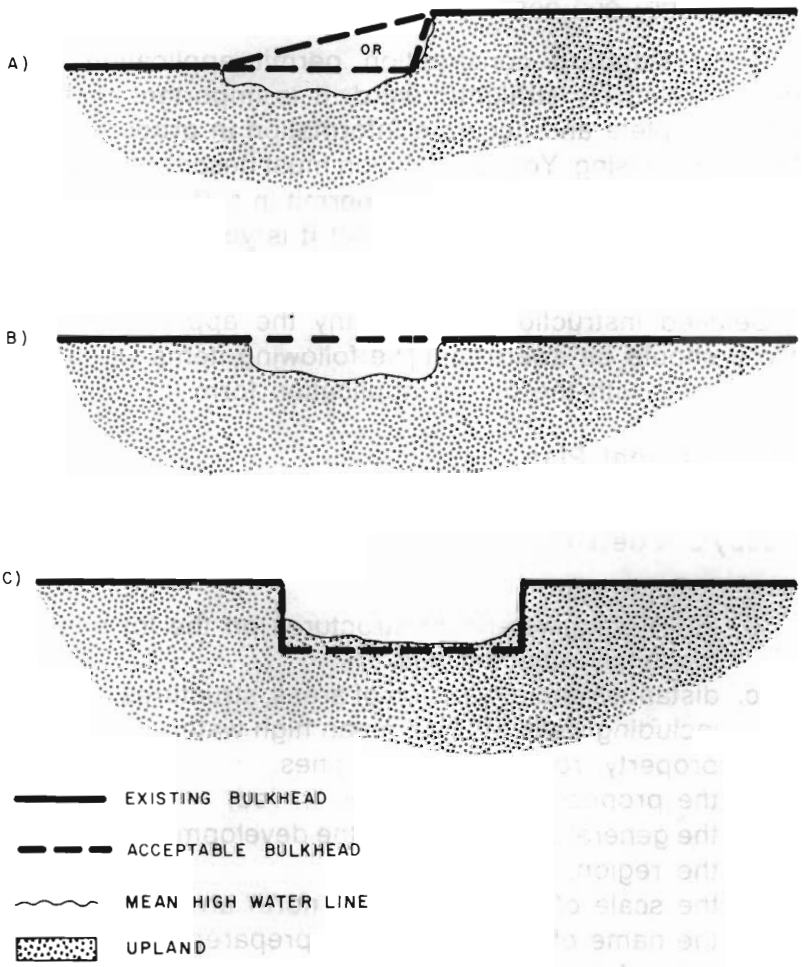
For this reason, the Division seeks to preserve shallow water habitat along the edge of lagoons, and will permit bulkheading only at or behind the mean high water line (Figure 1). However, stabilization of banks through vegetation, sloped revetments, rip-rap or other non-vertical means of stabilization would be preferred over bulkheading.

The one exception to this policy involves construction of a bulkhead of 75 feet or less between two existing lawful bulkheads. Here, DEP will allow a connecting bulkhead to extend beyond the mean high water line, provided that it does not extend outward of a straight line connecting the bulkheads (Figure 2). This exception will ensure that owners of small lagoon edge building lots will be able to develop them and will result in a shoreline without small indentations. Mitigation will not be required for filling in lagoons, when connecting two bulkheads which are less than 75 feet apart.

As in other water bodies, filling of wetlands vegetation must be reviewed for consistency with the Wetlands Policy (N.J.A.C. 7:7E-3.26).

FIGURE 2

EXAMPLES OF ACCEPTABLE BULKHEADS WHERE EXISTING BULKHEADS ARE NO MORE THAN 75 FEET APART



Applying For A Waterfront Development Permit

To apply for a Waterfront Development Permit, contact:

Bureau of Coastal Project Review
CN 401
Trenton, New Jersey 08625
(609) 292-0060

DEP's standard construction permit application form (CP-1) is relatively straightforward. It is important that you submit complete and accurate information in order to avoid delay in processing. Your application must describe the activity for which you are requesting a permit in sufficient detail to allow a reviewer to understand what it is you are proposing to do and how you propose to do it.

Detailed instructions accompany the application form, but you should be aware that the following items will be required along with the permit application form.

1. Development Plan

Fifteen copies and one reproducible transparent copy of a development plan on 8½″ x 11″ paper, showing:

a. The lot,
b. all existing waterfront structures on the lot and immediately adjacent lots,
c. distances and dimension of areas, structures and lots, including wetlands and mean high water line, upland property, roads and utility lines,
d. the proposed work outlined in red,
e. the general site location of the development depicting the region,
f. the scale of the plan and a north arrow,
g. the name of the person who prepared the plan and date of preparation, and

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State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

STANDARD APPLICATION FORM (CP # 1)
CONSTRUCTION AND DISCHARGE PERMITS

READ REQUIREMENTS
PLEASE TYPE OR PRINT

1. Applicant/Owner* _____ Telephone ( ) _____
   Permanent Legal Address _____
   City or Town _____ State _____ Zip Code _____

2. Location of Work Site _____
   Name of Facility, if applicable _____
   Street/Road _____
   Lot No. _____ Block No. _____
   City or Town _____ State _____ Zip Code _____
   Municipality _____ County _____

3. If applicable, give name of: Engineer/Surveyor/Well Driller/Geologist/Soil Scientist *(Specify).*
   Name _____ N.J. License No. _____
   Name of Firm, if employee _____
   Address _____ County _____
   Municipality _____ State _____ Zip Code _____
   Telephone ( ) _____

4. This is an application for _____ Permit
   (Name of permit, certification, approval or exemption. See Item 9. Next Page.)
   _____

5. Fee is attached (If applicable). $ _____
   (Provide explanation of how fee was calculated. Read Requirements Section of Standard Application booklet.)

6. Estimated construction cost of project:
   a. $ _____ total cost of the project.
   b. $ _____ portion for which this permit is requested.

7. I have included certifications of any public notifications. Yes _____ No _____

8. If applicable:
   (For Waterfront Development and Stream Encroachment applications, 8c. must be completed.)
   a. Source of Water Supply _____
   b. For Treatment at (Water Treatment Plant) _____
   c. Stream, Waterway, Pond or Lake _____
   d. Wastewater Treatment Facility _____

* *Applicant/Owner must be the individual or municipality, public agency, utility, company, industry who will be the eventual owner and operator of said facility (sewer extension or treatment works) when completed.*

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FOLLOW INSTRUCTIONS CAREFULLY

h. the name of the applicant and, municipal lot and block number.

Development plans for activities in an area subject to a Tidelands (or "riparian") conveyance (grant, lease or license) must be prepared by a professional engineer, and must depict the limits of the conveyance (see below). Generally, all activities in areas except man-made tidal lagoons will be subject to this requirement. Development plans for activities in man-made tidal lagoons do not have to be prepared by a professional engineer.

2. Evidence of Tidelands Ownership

Persons proposing development in areas now or formerly flowed by the tide must possess a valid tidelands (or "riparian") conveyance (in the form of a grant, lease or license) from the State of New Jersey or its successor in interest. A Waterfront Development Permit cannot be issued in tidal waters or illegally filled formerly tide-flowed areas where the applicant does not have a valid conveyance. This evidence can be in the form of a deed, or a copy of a valid tidelands grant, lease, or license. This information supplements Endorsement A of Form CP-1 and, is available at your county clerk's office, or from the Bureau of Tidelands, Division of Coastal Resources, CN 401, Trenton, New Jersey 08625, (609) 292-2573. Evidence of a tidelands grant, lease or license is not required for structures in man-made lagoons where the lagoon bottom is located on lands that were formerly upland, and were never in state ownership. A statement to this effect is required if this is the case.

3. Photographs

Submit at least two recent color photographs of the area to be bulkheaded. Date the photographs. Explain the views shown.

4. Fees

Submit the required permit application fee (Items 5 and 6 of CP-1 Form) by check payable to "Treasurer, State of New Jersey—Environmental Services Fund." The fee for *minor maintenance, repair, or replacement* of legal existing structures is one percent of the construction cost, or a minimum of $15. The fee for *new construction* is one percent or a minimum of $100. (This is the fee schedule established by N.J.A.C. 7:1C-1.5.) Submit an affidavit estimating the cost of the work. (See Item Number 6, page 6 of the CP-1 Form instructions.)

5. Evidence of notification

For a new work in natural waterways, evidence that the municipal clerk, environmental commission and planning board have received a copy of the CP-1 form. The county environmental commission shall be notified when there is no municipal environmental commission.

General Permits

Applications for new bulkheads in man-made tidal lagoons are eligible for a simplified review process, provided they do not exceed 200 feet in length and are constructed at or above the mean high water line and landward of any aquatic vegetation.

The following items are required for submission of a complete Waterfront Development General Permit application:

1. Completed Standard Application Form CP-1. Answer all items and complete endorsement A and B.
2. Permit review fee payable to: Treasurer, State of New Jersey, Environmental Services Fund, as described in the previous section. "Construction cost" is the projected cost of that portion of the project requiring the permit.

3. Two recent color photographs of the structure to be repaired or the area of the proposed project with dates of when the photographs were taken.
4. Six copies of a development plan on 8½" x 11" paper as described in the previous section.

Timetable for Permit Decision

Once a permit application for waterfront development activity has been submitted to the Division of Coastal Resources, the Division has 20 working days in which to review the application for completeness. Once the application is accepted as complete for filing, the Division must make a permit decision within 90 days, under the 90 Day Construction Permit Law (P.L. 1975, c.232, N.J.S.A. 13:1D-29 et seq.). A Waterfront Development Permit application is not complete until the applicant has a legal document setting forth his/her right to use or occupy the riparian land, i.e., a tidelands conveyance. Applications for general permits and for most other bulkheading will be processed in far less time than the 90 day maximum. If a decision is not rendered within the 90 day period, the application is automatically approved. (Note: These requirements are explained in detail in the 90 Day Construction Permit Rules, N.J.A.C. 7:1C-1 et seq. Copies are available from the Bureau of Coastal Project Review.)

Other Permits Needed to Bulkhead

If bulkheading is to take place in a river, creek or stream, a Stream Encroachment Permit may be required from DEP's Division of Water Resources (see last page for address).

The principal concern of the Stream Encroachment Program is to ensure that construction in a riverine floodplain will not exacerbate flooding.

Bulkheading in tidal water bodies also requires a permit from the U.S. Department of the Army Corps of Engineers under Section 10 of the Rivers and Harbors Act of 1899.

However, bulkheading in man-made lagoons is subject to an Army Corps of Engineers General Permit which is issued by DEP when it issues a Waterfront Development Permit. Persons seeking to bulkhead who are not covered by this General Permit must apply for a Section 10 permit to the Army Corps of Engineers.

If filling is proposed, then an Army Corps of Engineers Section 404 Permit is needed. A DEP Water Quality Certificate is also needed for proposed filling. However, the Water Quality Certificate is issued simultaneously with the Waterfront Development Permit, and there is no additional application fee.

Many municipalities require a building permit for docks, piers and bulkheads. Check with your local building inspector.

IMPORTANT ADDRESSES

To determine the need for a tidelands conveyance or coastal permit, contact the Division of Coastal Resources, Bureau of Coastal Enforcement and Field Services Office in your region:

NORTH SHORE: Monmouth and Ocean County, Old Bridge Township (Middlesex County), Washington Township, Bass River Township (Burlington County)	1433 Hooper Avenue Toms River, N.J. 08753 (201) 341-3977
SOUTH SHORE: Atlantic Cape May and Cumberland Counties, and in Salem County South of Pennsville	P.O. Box 188 Pomona, N.J. 08240 (609) 652-0004
ALL OTHER COASTAL AREAS	CN 401 Trenton, N.J. 08625 (609) 292-8203

To apply for tidelands conveyance, contact:

Division of Coastal Resources
Bureau of Tidelands
CN 401
Trenton, N.J. 08625
(609) 292-0061

To arrange a pre-application conference, or to apply for a Waterfront Development permit, contact:

Division of Coastal Resources
Bureau of Coastal Project Review
CN 401
Trenton, N.J. 08625
(609) 292-2895

To apply for an Army Corps of Engineers permit, contact:

North of the Manasquan River

Permits Branch,
U.S. Army Corps of Engineers
26 Federal Plaza
New York, N.Y. 10007
(212) 264-0184

South of the Manasquan River

Permits Branch,
U.S. Army Corps of Engineers
Customs House—2nd & Chestnut
Philadelphia, PA 19102
(215) 597-4723

For information on a Stream Encroachment permit, contact:
Division of Water Resources
Bureau of Floodplain Management
CN 029
Trenton, N.J. 08625
(609) 292-2373

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