PROPOSED REMEDIAL ACTION PLAN
Summary Sheet

Site No.: 5-10-017
Name of Site: CUMBERLAND BAY SLUDGE BED - WILCOX DOCK SITE

Town and County: Plattsburgh, Clinton County

PREPARED BY: The Division of Environmental Remediation, Bureau of Central Remedial Action under the State Superfund Program.

DESCRIPTION OF THE PROBLEM: The sludge bed located at the bottom of Cumberland Bay in Lake Champlain is contaminated with PCBs. Contaminated debris from the waste bed is currently washing up on the beaches of Cumberland Bay. The Department of Environmental Conservation has been removing this waste from the beaches for the past two seasons and is continuing the beach cleaning in 1997. Several species of fish within Cumberland Bay have elevated levels of PCBs and there is a health advisory in effect concerning the consumption of fish in Cumberland Bay. There is also a commercial fishing ban on yellow perch in Cumberland Bay.

DESCRIPTION OF THE REMEDY: The proposed remedy for the site includes isolating the sludge bed with temporary sheet piling and silt curtains, the removal of the sludge bed by a combination of hydraulic dredging and dry excavation, the construction and operation of a sludge dewatering facility and wastewater treatment facility, the transportation and off-site disposal of the dewatered sludge, confirmatory sampling, fish monitoring and the continuation of the beach cleaning IRM as needed.

COSTS: There would be no long term operation and maintenance costs with this alternative as all waste materials would be removed from the site. The total cost for the Proposed Alternative is $18,366,000. This does not include the cost of the beach cleaning IRM or post remedial fish monitoring. That cost is estimated at $150,000 per year.

ISSUES: Although the Proposed Alternative is more costly than other on-site alternatives, it eliminates the construction of a shoreline hazardous waste disposal cell on site and eliminates the requirement of long-term O&M.

CUMBERLAND BAY SLUDGE BED
WILCOX DOCK SITE

Plattsburgh, Clinton County, New York
Site No. 5-10-017

PROPOSED REMEDIAL ACTION PLAN
Operable Unit No. 1

June 1997

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

CUMBERLAND BAY SLUDGE BED - WILCOX DOCK SITE

Plattsburgh, Clinton County, New York
Site No. 5-10-017
Operable Unit #01
JUNE 1997

SECTION 1: PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) is proposing the removal and off-site disposal of the PCB contaminated sludge bed as the preferred remedy for the Cumberland Bay Sludge Bed - Wilcox Dock Site (Site # 5-10-017; Operable Unit #1). This remedy is proposed to address the threat to human health and the environment created by the presence of PCB's in the sludge bed and the debris washing ashore on the beaches of Cumberland Bay.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the rationale for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments submitted during the public comment period.

The NYSDEC has issued this PRAP as a component of the citizen participation plan developed pursuant to the New York State Environmental Conservation Law (ECL) and 6 NYCRR Part 375. This document summarizes the information that can be found in greater detail in the Site Characterization (SC) and Feasibility Study (FS) reports available at the document repositories.

The NYSDEC may modify the preferred alternative or select another alternative based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified herein.

To better understand the site, and the alternatives evaluated, the public is encouraged to review the project documents which are available at the following repositories:

Plattsburgh Public Library, Oak and Brinkerhoff St., Plattsburgh, N.Y. 12901

NYSDEC Region 5 Headquarters, Route 86, Ray Brook, N.Y. 12977

NYSDEC Central Office 50 Wolf Rd. Albany, N.Y. 12233

Project Manager Robert Edwards, 50 Wolf Road Albany, N.Y. 12233 (518) 457-5677

Written comments on the PRAP can be submitted to Mr. Edwards at the above address.

DATES TO REMEMBER:

_____, 1997 to _____, 1997 Public comment period on SC and FS Reports, PRAP, and preferred alternative.

_____ Public meeting at _____

SECTION 2: SITE LOCATION AND DESCRIPTION

The Cumberland Bay Sludge Bed is located in the Cumberland Bay of Lake Champlain within the City of Plattsburgh, N.Y. (see Figure #1). The bed is composed of wood pulp, wood chip debris and other processing wastes from local wood processing industries. Records show that these processing waste discharges occurred for several decades and the wastes either settled or were directly discharged into this area of Cumberland Bay. Untreated waste disposal to the Bay ended in the early 1970's when the City of Plattsburgh's wastewater treatment plant began treating wastes from the local industries. The site definition includes all underwater areas within and along the northwestern portion of Cumberland Bay that contain accumulations of contaminated sludge. The sludge bed occupies an area of the bay that is approximately 34 acres in size. The average thickness of the sludge bed is between one and two feet, however, the thickness of the bed by Wilcox Dock exceeds ten feet. The volume of the sludge bed is estimated at 93,000 cubic yards with PCB contamination detected throughout the bed. Concentrations of PCB's have been detected as great as 1,850 parts per million (ppm) in sludge samples.

Operable Unit No. 1, which is the subject of this PRAP, consists of the remediation of the sludge bed within Cumberland Bay. An Operable Unit represents a discrete portion of the remedy for a site which, for technical or administrative reasons, can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination.
The Operable Unit No. 2 for this site is described in Section 3.2 below.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

As described above, the sludge bed within Cumberland Bay is the result of years of disposal of local wood processing industrial wastes directly into Lake Champlain. By 1960, Vanity Fair was pulping secondary fiber (recycled waste paper) at the Plattsburgh facility. Reference materials reviewed during the Department's investigation indicate that certain PCB contaminated wastes are the byproduct of this process due to the high PCB content of carbonless copy paper, which was used in such manufacturing processes during that era. Carbonless copy paper containing PCBs was produced in the United States between 1957 and 1971 using PCB Aroclor 1242 exclusively as an ink carrier. Aroclor 1242 is the predominant PCB Aroclor found in the sludge bed. The paper making process which may have involved the pulping of recycled carbonless copy waste paper was continued at the Plattsburgh mill after Vanity Fair was purchased by and merged with Georgia Pacific in 1963. Georgia Pacific continued this process until 1966, when it stopped pulping secondary fibers at the Plattsburgh mill. In 1973, untreated discharge of wastes ended when the mills were connected to the city wastewater treatment plant. The Department's data also indicates that a wood processing and manufacturing facility adjacent to the Georgia Pacific facility also used the same outfall pipe to release process wastes to the site. This facility has had various operators since the 1950's and is currently owned and operated by the Tenneco Packaging Corporation. In addition, other parties may have released various wastes to the site over the years. Therefore, the Department's investigation regarding the

complete origins of the wastes and materials released to the site remains open.

3.2: Remedial History

The NYSDEC has conducted a monitoring program of contaminant levels in the fish of Lake Champlain since the 1970's. The results of this monitoring have shown that certain species of fish within Cumberland Bay have the highest PCB levels of any fish found in the lake. Environmental sampling performed between 1992 and 1994 confirmed the presence of high levels of PCBs in the sludge bed at the Wilcox Dock area. This sampling also detected PCBs in the woodchip debris washing ashore in the Bay. The site was added to the Registry of Inactive Hazardous Waste Sites in November, 1994.

The characterization of the sludge bed was initiated in July, 1995 and completed in September, 1995. The major objectives of the site characterization were to determine the extent of the sludge bed, the contaminant distribution within the bed, and a volume estimate of the sludge bed. This included the collection of data to evaluate the physical, chemical and geotechnical properties of the sludge bed and underlying sediments.

In addition, the NYSDEC has initiated a beach cleaning interim remedial measure (IRM) to remove the PCB-contaminated debris washing up on the Cumberland Bay beaches. The purpose of this IRM is to reduce the potential for exposure to this waste material.

Operable Unit No.2 consists of the identification and recommendations for the remediation of any off-site impacts of the sludge bed. The areas identified in OU-2 are the beach debris disposal area at the Cumberland Bay State Park and the public and private beaches on Cumberland Bay. An investigation of these off-site impacts is currently underway. Recommendations for the remediation of these areas will be determined upon the completion of these studies.

SECTION 4: CURRENT STATUS

In response to a determination that the presence of hazardous waste at the Site presents a significant threat to human health and the environment, the NYSDEC has recently completed a Site Characterization and Feasibility Study (SC and FS). In addition, a beach cleaning IRM is currently underway to reduce the public's exposure to the waste material washing onshore in Cumberland Bay.

4.1: Summary of the Site Characterization Study

The purpose of the Site Characterization Study was to define the nature and extent of sludge bed contamination, characterize the site and gather the data necessary to support the evaluation and selection of remedial alternatives for the site.

The SC was conducted in one phase with field work performed between June and September of 1995. A report entitled Site Characterization Report Sludge Bed - Wilcox Dock IRM Cumberland Bay November 1995 has been prepared describing the field activities and findings of the SC in detail.

The SC included the following activities:

Major Investigative Tasks

- Sediment coring survey to determine the horizontal and vertical extent of the sludge bed.
- Sampling and chemical analyses of sludge and sediments as well as physical properties of sludge and sediment. Geotechnical sampling was performed to determine geologic conditions.

- Coring and sample analyses of beach areas to determine extent of contamination.

To determine which media (soil, groundwater, etc.) contain contamination at levels of concern, the SC analytical data were compared to environmental Standards, Criteria, and Guidance (SCGs). Drinking water and surface water SCGs identified for the Cumberland Bay Sludge Bed - Wilcox Dock Site were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of the NYS Sanitary Code. Background conditions and the Division of Fish and Wildlife Technical Guidance for Screening Contaminated Sediments were used for surface water sediments.

Based upon the results of the site characterization in comparison to the SCGs and potential public health and environmental exposure routes, certain areas and media of the site require remediation. These are summarized below. More complete information can be found in the SC and FS Reports.

4.1.1: Nature of Contamination:

As described in the SC Report, a sampling grid was established across the site with nodes at 200 foot intervals. A total of sixty-six cores were taken within the sludge bed and along the beach. In addition, 5 borings of the lake bottom were taken to characterize the subsurface conditions. 183 chemical analyses were performed on samples from these cores. These samples were collected at the site to characterize the nature and extent of contamination.

4.1.2: Extent of Contamination

The Site Characterization Study concluded that the sludge bed occupies an area of the bay that is approximately 34 acres in size. The average thickness of the sludge bed is between one and two feet with the thickness of the bed by Wilcox Dock exceeding ten feet (see Figure #2). The volume of the sludge bed is estimated at 93,000 cubic yards. The waste materials within the sludge bed are contaminated with PCBs. PCB contamination has been detected throughout the bed (up to 1,850 ppm localized). However, the PCB concentrations within the waste materials are not uniformly distributed and there is no practical way to differentiate highly contaminated from lower or non-contaminated material without performing chemical analyses.

Sediments

The analytical results from the sampling performed during the Site Characterization and the previous investigations have shown that the sediments (underlying sands) within Cumberland Bay are for the most part not contaminated with PCBs. The sediment and beach sands that did contain detectable levels of PCBs also contained wood debris. Analytical tests indicate the PCBs are adsorbed on and contained within the wood debris.

Surface Water

The sampling of surface waters within Cumberland Bay did detect low levels of PCBs in the water column over the sludge bed. The water samples collected elsewhere in the Bay did not detect PCBs exceeding the NYS public drinking water standard.

Waste Bed Materials

The sludge bed materials contain levels of PCBs that are considered hazardous waste by legal definition (greater than 50 ppm). However, the distribution of contaminants within the bed is not uniform and most of the volume of the sludge bed may average under 50 ppm of PCB. There are other contaminants present within the sludge at levels much lower than the PCB levels. These chemicals include phthalates, polynuclear aromatic hydrocarbon (PAH) compounds

(common petroleum byproducts), polychlorinated dibenzodioxins and polychlorinated dibenzofurans (present at levels often found in paper sludge). These other contaminants are present at concentrations below current action levels. However, the remedial action chosen to remediate the sludge bed PCB's would also address these compounds.

4.2: Interim Remedial Measures:

Interim Remedial Measures (IRMs) are conducted at sites when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

An IRM consisting of removing contaminated woodchip debris from the beaches of Cumberland Bay started in May 1995. The IRM included an initial beach cleanup and subsequent cleanups were done on an "as needed" basis. Over 220 tons of contaminated material were removed from the Cumberland Bay beaches as a result of this IRM during 1995 and 1996. This IRM will be continued during the 1997 season and until it is determined that the beach cleanup is no longer required.

4.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in the fact sheet dated December 15, 1994 that was released by the NYSDOH and NYSDEC and the Site Characterization Report Addendum No. 1 Baseline Health Risk Assessment and Baseline Environmental Risk Assessment May, 1997.

The major contaminant of concern at the Cumberland Bay Sludge Bed - Wilcox Dock Site is polychlorinated biphenyl (PCB). PCBs cause cancer and non-carcinogenic adverse effects in laboratory animals exposed to high levels over their lifetimes. Whether PCBs cause cancer in humans is unknown. However, chemicals that cause cancer in laboratory animals may also increase the risk of cancer in humans exposed to lower levels over long periods of time. Chemicals that cause adverse health effects in humans and/or animals following high exposure may also increase the risk of adverse effects in humans exposed to lower levels over long periods of time.

Human health effects reported after exposure to PCBs include skin, eye, and respiratory tract irritation and less frequently effects on the liver, nervous and digestive systems. Maternal exposure to PCBs may produce developmental effects on the unborn child.

An exposure pathway is the process by which an individual comes into contact with a contaminant. The five elements of an exposure pathway are: 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Completed pathways which are known to or may exist at the site include:

- Ingestion

This includes ingestion of the PCB contaminated fish from Cumberland Bay. The NYSDOH has issued advisories concerning the consumption of fish from Cumberland Bay and has banned the commercial fishing for yellow perch in the Bay. Nevertheless, it has been documented that human consumption of Cumberland Bay fish continues to some extent and this is the most significant known source of human ingestion of PCB's in Cumberland Bay.

This exposure pathway also includes the incidental ingestion of the contaminated woodchips washing ashore in Cumberland Bay. The contaminated woodchips washing ashore are being addressed via the beach cleaning IRM.

- Direct contact

This includes direct contact with the woodchips washing ashore and contact with the waste bed itself. As noted before, these contaminated woodchips are being addressed via the beach cleaning IRM.

4.4: Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures which may be presented by the site. The sampling performed by the NYSDEC since the 1970s has shown the presence of PCBs in certain species of fish within Lake Champlain. The studies also have shown that the highest levels of PCB found in Lake Champlain fish are found in the fish collected from Cumberland Bay. It is expected that Cumberland Bay PCB's are a significant source of PCB contamination of fish throughout the lake. Fish or wildlife that consume PCB contaminated fish have been shown to suffer a host of adverse toxicological effects.

The contaminated sludge bed is in the waters of Cumberland Bay on the lake bottom adjacent to the Wilcox Dock. High concentrations of PCBs have been detected in the sludge bed and PCBs have also been detected in low levels in the water column over the sludge bed itself. The woodchip debris in suspension in the water and washing ashore along the beaches of Cumberland Bay also contains PCBs. Ongoing studies of the sludge bed by the Department, confirm that the bed is being actively eroded and that the PCB contaminated materials found in the bed impact a large area of Cumberland Bay. The PCB congener patterns found in the sludge bed, water column, suspended material off Wilcox Dock, and in the fish taken from over the sludge bed are similar. This pattern differs from the PCB congener pattern found in the outer Bay and main Lake. Additional studies are planned to refine the Department's understanding of the extent of the sludge bed's impact upon Cumberland Bay and Lake Champlain.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination due to the release of hazardous waste as defined under 6 NYCRR Part 371 at a site. This may include past or present owners and operators, waste generators, and haulers.

The Potential Responsible Party (PRP) for the release of PCB to the site, documented to date, is Georgia Pacific Corporation on the basis of the firm being a generator and successor of former generators that discharged waste containing PCB into the bay.

In January 1995, Georgia Pacific denied any responsibility for the release of PCB to the site during a meeting with New York State. However, Georgia Pacific did present a large amount of information in response to the Department's information request. This information alleged that numerous other parties either contiguous to the site or along the Saranac River were site related PRPs for the release of PCB to the site.

To resolve this conflict, the Department retained a PRP search contractor who reviewed this information and gathered new information related to historic waste releases to the site. Based on the information gathered in this process, in September 1996 the Department has again concluded that Georgia Pacific is a PRP for the release of PCB as a hazardous waste to the site although other PRPs may exist for the site and the Department's inquiry in this matter remains

open. Georgia Pacific continues to maintain that it is not the source of PCBs at the site.

In December 1994, the NYSDEC and NYSDOH released a fact sheet for the site which confirmed the need to perform the beach cleaning IRM.

On July 6 1995, a referral to conduct an RI\FS using state monies was issued.

Upon issuance of the Record of Decision the NYSDEC will approach the PRPs identified up to that time to implement the selected remedy under an Order on Consent. If an agreement cannot be reached with the PRPs then identified, the NYSDEC will remediate the site under the State Superfund. The identified PRPs may be subject to legal actions by the State for recovery of all response costs the State has incurred.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria, and Guidance (SCGs) and be protective of human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- Mitigate the immediate threat to the environment posed by the PCB contaminated sludge bed;
- Rapidly and significantly reduce human health and environmental risks;
- Prevent further environmental degradation resulting from this known source of PCB contamination.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy should be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Cumberland Bay Sludge Bed - Wilcox Dock Site were identified, screened and evaluated in a Feasibility Study. This evaluation is presented in the report entitled Feasibility Study Report Cumberland Bay Sludge Bed - Wilcox Dock OU-1, May 1997.

A summary of the detailed analysis follows. As used in the following text, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

7.1: Description of Alternatives

The potential remedies are intended to address the contaminated sludge bed at the site.

The Site Characterization Study concluded that the waste materials within the sludge bed were contaminated with PCBs. The PCB concentrations within the waste materials are not uniformly distributed and there is no practical way to differentiate highly contaminated from lower or non-contaminated material without performing chemical analyses. Therefore, any attempts to perform a partial removal of selected portions of the sludge bed were screened out of consideration because it would be neither cost effective nor practical. The entire sludge bed

will be addressed as part of any remedial action. The waste material has very different physical characteristics than the surrounding and underlying natural sediments, therefore, several different removal technologies were evaluated during the FS. The specific site conditions including the depth of water, site location and the sludge bed's physical properties make it very amenable to hydraulic dredging techniques. It was determined that this technique would cause the least disruption of the lake bottom and keep resuspention of sediments to a minimum.

The Feasibility Study reviewed the data collected on the PCB concentrations within the sludge bed along with the results from the beach cleaning IRM and used a ratio of 90 % of the sludge bed volume as under 50 ppm (non-hazardous waste) to 10 % as greater than 50 ppm (hazardous waste) to be used as an estimate for the purpose of cost comparison.

ALTERNATIVE 1

No Action

The no action alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. Under this alternative, the site would remain in its present condition and human health and the environment would not be provided any additional protection. The existing beach cleaning program would have to remain in effect as long as contaminated debris continued to wash ashore. The existing health advisories on fish consumption would also remain in effect because nothing would be done to mitigate the effects that the sludge bed has on the lake's fauna. Human and wildlife exposure will continue.

ALTERNATIVE 2A

Removal and On-Site "WET CELL" Disposal

See Figure 3 for a conceptual drawing of this alternative. The sludge bed waste materials would be removed using a combination of hydraulic dredging (with measures taken to control resuspended sediments) and dewatering/dry excavation. The sludge would then be placed in a confined disposal facility (CDF) which would be constructed in an area adjacent to the northern portion of Wilcox Dock where the sludge bed is the thickest. The CDF construction would consist of a double-wall sheet pile cofferdam installed to a depth below the highly consolidated till unit underlying the natural bay sediments. However, TSCA has minimun requirements for disposal facilities which are designed to ensure protection of human health and the environment. Because this CDF design would not have a bottom liner, concerns regarding leachate migration associated with this CDF would need the approval from the USEPA Regional Administrator. This CDF would, when constructed, be about four acres in size and encompass approximately one half of the volume (46,000 cubic yards) of the sludge bed in place. This is due to the fact that the sludge bed is the thickest in this area. The remaining 30 acres of the sludge bed would be hydraulically dredged and/or dry excavated and contained within the CDF. Prior to dredging, 2,800 feet of temporary sheet pile would be installed along the perimeter of the dredge area to provide a lower energy environment in which to perform dredging. This would allow the dredge to be more stable in the water, enhancing the effectiveness of precision dredging techniques. If resuspension should occur, the sheet pile wall would limit the transport of suspended material to within the current work area. Upon completion of the sludge bed removal, the CDF would be covered with a low permeability cap consisting of synthetic membranes and soil. Structural surface features or solidification would be considered for

achieving the necessary bearing capacity for future use of the dock. The CDF proposed in this alternative would require long term operation, maintenance and monitoring to ensure its structural integrity and to maintain hydraulic gradients to prevent leakage from the CDF. All water generated during the dredging would be decanted from within the CDF and treated prior to discharge back to the bay. An on-site water treatment system would need to be constructed and operated as part of the remedial action. The beach cleaning IRM would be continued on an "as needed basis".

ALTERNATIVE 2B

Removal and On-Site "DRY CELL" Disposal

See Figure 4 for a conceptual drawing of this alternative. The sludge bed waste materials would be removed using a combination of hydraulic dredging (with measures taken to control resuspended sediments) and dewatering/dry excavation. Prior to dredging, 2,800 feet of temporary sheet pile would be installed along the perimeter of the dredge area to provide a lower energy environment in which to perform dredging. This would allow the dredge to be more stable in the water, enhancing the effectiveness of precision dredging techniques. If resuspension should occur, the sheet pile wall would limit the transport of suspended material to within the current work area. The sludge would be dewatered on shore and then placed in a confined disposal facility (CDF) which would be constructed in an area along the shoreline north of Wilcox Dock. This CDF would be constructed in accordance with TSCA landfill requirements, including liner and cover systems constructed above the lake high water level. This CDF would require long term operation, maintence and monitoring the ensure its structural integrity. All water generated during the dredging and dewatering operations would be treated prior to discharge back to the bay. An on-site water treatment system would be constructed and operated during the remedial action. The beach cleaning IRM would be continued on an "as needed basis".

ALTERNATIVE 3

Removal, Dewatering and Off-Site Disposal

See Figure 5 for a conceptual drawing of this alternative. The sludge bed waste materials would be removed using a combination of hydraulic dredging (with measures taken to control resuspended sediments) and dewatering/dry excavation. Prior to dredging, 2,800 feet of temporary sheet pile would be installed along the perimeter of the dredge area to provide a lower energy environment in which to perform dredging. This would allow the dredge to be more stable in the water, enhancing the effectiveness of precision dredging techniques. If resuspension should occur, the sheet pile wall would limit the transport of suspended material to within the current work area. The sludge would be dewatered on shore and then transported to a permitted landfill for disposal. The dewatering process for this alternative would be more extensive than the dewatering process for Alternative 2 because the dewatered sludge would have to meet all transportation requirements. All water generated during the dredging and dewatering operations would be treated prior to discharge back to the bay. An on-site water treatment system would be constructed and operated during the remedial action. This alternative would not require long term operation and maintenance because the waste would be removed from the site. The beach cleaning IRM would be continued on an "as needed basis".

OTHER ALTERNATIVES

One other alternative was carried through the initial screening process as being potentially applicable for the Cumberland Bay Sludge Bed site. This was the use of on-site treatment by

supercritical water oxidation. However, this alternative did not meet the necessary criteria to qualify to be carried through the entire evaluation process. The technology could not process the volume of sludge required to remediate the site in a timely and cost efficient manner. A more detailed description of this alternative is provided in the FS.

7.2: Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6NYCRR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is contained in the Feasibility Study.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs)

Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Alternative 1
This alternative would not comply with SCGs.

Alternative 2A
This alternative would be consistent with TSCA for disposal of PCB wastes in that the sludge would be confined in a manner that would be protective of human health and the environment. All sludge would be isolated on site by this alternative. However, this alternative would not be compliant with 6NYCRR Part 608 in that there would be an unacceptable loss of natural resources of the state, specifically a loss of approximately four acres of aquatic habitat that would result from the construction of the CDF.

Alternative 2B
This alternative would comply with the specific requirements of RCRA and TSCA for disposal of PCB wastes. All sludge would be removed from the lake bottom and disposed in a manner that would be protective of human health and the environment. A containment cell would be constructed on the shoreline of the site. However, this alternative would not be compliant with 6NYCRR Part 608 in that there would be a loss of natural resources of the state, specifically a loss of approximately five acres of wetland habitat along the shoreline.

Alternative 3
This alternative would comply with both TSCA and RCRA requirements for disposal of PCB wastes. All sludge would be removed from the site. There would be no long term loss of littoral habitat with this alternative.

2. Protection of Human Health and the Environment

This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective.

Alternative 1
This alternative would protect the public from the contaminated wood chip debris washing ashore only as long as the beach cleaning IRMs were continued, however, it would not protect the environment or reduce the health risks associated with the consumption of contaminated fish.

Alternative 2A
This alternative would effectively isolate the contaminated sludge and provide protection against migration of PCBs only as long as long term operation and maintenance of the CDF is provided. However, under this alternative there would be a loss of approximately 4 acres of lake

bottom adjacent to Wilcox Dock which would become dedicated for the construction of the CDF. The wetlands area along the shoreline would be restored following remediation. This alternative would result in the loss of littoral habitat and the natural resources of the state.

Alternative 2B
This alternative would effectively isolate the contaminated sludge, provide protection against migration of PCBs and greatly limit the potential for exposure. However, under this alternative approximately 5 acres of shoreline would become dedicated for the construction of the CDF. This alternative would result in the loss of littoral habitat and the natural resources of the state.

Alternative 3
This alternative would include the permanent removal of contaminated sludge from the site. The wetlands area along the shoreline would be restored following remediation. It would provide the highest level of overall long-term protection to human health and the environment.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

Alternative 1 (No Action) is included as a procedural requirement of the evaluation process. However, Alternative 1 does not meet the requirements of the first two threshold evaluation criteria as described above. Since it does not meet these criteria, it will not be evaluated under the follows balancing criteria.

Alternatives 2A and 2B were conditionally retained for the balancing analysis. These alternatives are inconsistant with ECL Article 15 and 6NYCRR Part 608 but are retained in the event that other options are not feasible.

3. Short-term Effectiveness
The potential short-term adverse impacts of the remedial action on the community, the workers, and the environment during the construction and implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared with the other alternatives.

Alternative 2A
This alternative would require the disturbance and removal of about one half of the sludge bed material. The potential for impact to the community, workers or the environment would be present during sludge removal activities. Supplying workers with the proper personal protective equipment, monitoring air and water quality during sludge removal, transport and disposal, water treatment and employing engineering controls, as necessary, would mitigate exposure risks. The time estimated to construct the CDF and remediate the sludge bed is currently estimated at two years.

Alternative 2B
This alternative would require the disturbance and removal of the sludge bed material. The potential for impact to the community, workers or the environment would be present during sludge removal activities. Supplying workers with the proper personal protective equipment, monitoring air and water quality during sludge removal, transport and disposal, water treatment and employing engineering controls, as necessary, would mitigate exposure risks. The time estimated to construct the CDF, dewatering and water treatment facility and remediate the sludge bed is currently estimated at two years.

Alternative 3
This alternative would require the disturbance and removal of the sludge bed material. The potential for impact to the community, workers or the environment would be present during sludge removal activities. Supplying workers with the proper personal protective equipment, monitoring air and water quality during sludge removal, transport, water treatment and employing engineering controls, as necessary,

would mitigate exposure risks. The time estimated to construct the dewatering and water treatment facility and remediate the sludge bed is currently estimated at two years.

4. Long-term Effectiveness and Permanence

This criterion evaluates the long-term effectiveness of alternatives after implementation of the response actions. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternative 2A

The long-term risk of exposure for this alternative is low, but not eliminated. The long-term effectiveness of this alternative is directly dependant upon the continued proper operation and maintenance of the CDF and land use restrictions. The sludge bed materials would be contained and isolated within the CDF. The migration of PCBs through the CDF would be negligible due to the low permeability of the CDF walls, floor and cap assuming hydraulic gradients are controlled through the proper operation of the CDF. The sludge bed materials would not be treated, therefore, a failure or breach of the CDF would result in a release of contaminants directly into the lake and a reoccurrence of the health-based and environmental risks.

A CDF should prevent direct contact and migration of the wastes. The implementation of a long-term maintenance plan and land use restrictions for the CDF would significantly reduce the potential for a CDF breach.

Alternative 2B

The long-term risk of exposure for this alternative is low, but not eliminated. The sludge bed materials would be contained and isolated within the CDF. The migration of PCBs through the CDF would be neglible due to the low permeability of the CDF walls, floor and cap. The sludge bed materials would not be treated, therefore, a failure or breach of the CDF would result in a reoccurrence of the health-based and environmental risks. Proper maintenance and land use restrictions would significantly reduce the potential for a CDF breach.

A CDF should prevent direct contact with and migration of the wastes. The implementation of a long-term operation/maintenance plan and land use restrictions for the CDF would significantly reduce the potential for a CDF breach.

Alternative 3

The long-term risk of exposure for this alternative would be eliminated. The disposal of the sludge in a permitted off-site facility effectively removes the PCB from any potential site receptors. Continued exposure of Cumberland Bay fish is eliminated to the maximum extent practicable, leading to the most certain recovery of the fishery resource.

Off-site, industrial, TSCA or RCRA facilities are designed to achieve the requirement of preventing direct contact and migration of wastes. There would be no long-term maintenance or land use restrictions at the Cumberland Bay site, since the sludge bed would be removed.

5. Reduction of Toxicity, Mobility or Volume

Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternative 2A

A reduction in contaminant mobility would be achieved by isolating the sludge in the CDF. The volume would be reduced by a small percentage due to the dewatering process, however, there would be no reduction in toxicity of the contaminants. The sludge bed materials would not be treated, therefore, a failure or breach of

the CDF would result in a release of contaminants directly into the lake and a reoccurrence of the health-based and environmental risks.

Alternative 2B
A reduction in contaminant mobility would be achieved by isolating the sludge in the CDF. The volume would be reduced by a small percentage due to the dewatering process, however, there would be no reduction in toxicity of the contaminants.

Alternative 3
A reduction in contaminant mobility would be achieved by removing the sludge from the site and transporting it to a disposal facility. The volume would be reduced by a small percentage due to the dewatering process, however, there would be no reduction in toxicity of the contaminants. However, the threat to the site posed by the waste would be eliminated with this alternative because the waste would be shipped off site.

6. Implementability
The technical and administrative feasibility of implementing each alternative is evaluated. Technical feasibility includes the difficulties associated with the construction, the reliability of the technology, and the ability to monitor the effectiveness of the remedy. Administrative feasibility includes the availability of the necessary personnel and material evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Alternative 2A
The technologies to be used in this alternative have been implemented at sediment removal sites. This alternative would require the approval by the USEPA Regional Administrator. The design of the CDF would need to be consistent with the requirements of TSCA Part 761.60(a)(5)(iii). Administratively this alternative would be difficult to implement. This alternative would not be compliant with 6NYCRR Part 608 in that there would be an unacceptable loss of natural resources of the state, specifically a loss of aquatic habitat. Also, Canal Law requires approval from the NYS Thruway Authory and/or the New York State Legislature to change or abandon a barge canal terminal.
The time required to meet the administrative obligations may also extend the remediation time of the project for this alternative. This could also increase the total cost of the remedial action.

Alternative 2B
This alternative is technically implementable. However, administratively this alternative would be difficult to implement. This alternative would not be compliant with 6NYCRR Part 608 in that there would be a loss of natural resources of the state, specifically a loss of the wetland and littoral zone habitat along the shoreline. In addition, gaining access or ownership of the shoreline properties for the construction of the CDF could be problematic and extend the remediation time of the project. The time required to meet the administrative obligations may also extend the remediation time of the project for this alternative. This could also increase the total cost of the remedial action.

Alternative 3
This alternative is both technically and administratively implementable. The potential delays associated with gaining property access and constructing the on-site CDF would be eliminated with this alternative because the waste would be shipped off site. There would also be no permanent loss of aquatic or shoreline habitat.

7. Cost
Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more

alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs associated with each of the alternatives are estimates based on the mean lake level for Lake Champlain, data collected during the site investigation and other assumptions discussed in the FS. Though the actual cost of the remedy will depend upon site conditions at the time of the remedial action, these feasibility level estimated costs are appropriate for the comparison of alternatives under this balancing criterion. The costs for each alternative are presented in detail in the attached Table 1 and summarized as follows:

Alternative 2A
The total present worth cost is $11,309,000

Alternative 2B
The total present worth cost is $12,932,000

Alternative 3
The total present worth cost is $18,366,000

8. Community Acceptance
This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is applied after public comments on the Proposed Remedial Action Plan have been received.

Concerns of the community regarding the SC and FS reports and the Proposed Remedial Action Plan are evaluated. A "Responsiveness Summary" will be prepared that describes public comments received and how the Department will address the concerns raised. If the final remedy selected differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

To date, a public meeting was held in Plattsburgh on March 17, 1996 to present the findings of the Site Characterization Study and to discuss the alternatives that passed the evaluation of alternatives in the Feasibility Study. A separate public meeting (as announced in Section 1 of this document) will be held to present the PRAP. However, the Department is also aware of more recent public comment regarding a CDF proposal developed by the Georgia Pacific Corporation. The Department will address these and any further comments received during the comment period and public meetings in the "Responsiveness Summary".

SECTION 8: SUMMARY OF THE PREFERRED REMEDY

Based on the results of the SC and the FS, and the evaluation presented in Section 7, the NYSDEC is proposing Alternative 3, Sludge Bed Removal with Off-site Disposal, as the remedy for this site. This selection is based on the following advantages that Alternative 3 has over Alternatives 2A and 2B:

- Removal and off-site disposal is the most permanent and effective remedy for restoring Cumberland Bay and the lake for unrestricted future use;
- This alternative is the most permanent and effective remedy for restoring the fishery;
- There would be no long-term on-site maintenance associated with sludge bed removal and off site disposal;
- The potential delays associated with acquiring property or administrative approvals for the on-site CDF are eliminated;
- Alternative 3 is administratively consistent with the Department's policies and State law (Article 15 and Article 24)

on wetland protection, shoreline and lake development;

- There would not be a loss of 5 acres of wetlands or four acres of lake bottom associated with this alternative;
- There would not be a hazardous waste landfill located within the City or along the shore of Lake Champlain;
- This alternative eliminates the potential of recontamination of the lake if a CDF were breached, leaked or otherwise failed;
- The complete removal of waste from the site would allow the potential for the site to be delisted as opposed to re-classified;
- This alternative would provide unrestricted recreational use of the lake in this area that would not be provided by the other alternatives;

The estimated cost to implement the remedy is $18,366,000.

This does not include the cost for the continuation of the beach cleaning IRM. The cost estimate for the IRM is $150,000 per year.

The elements of the selected remedy are as follows:

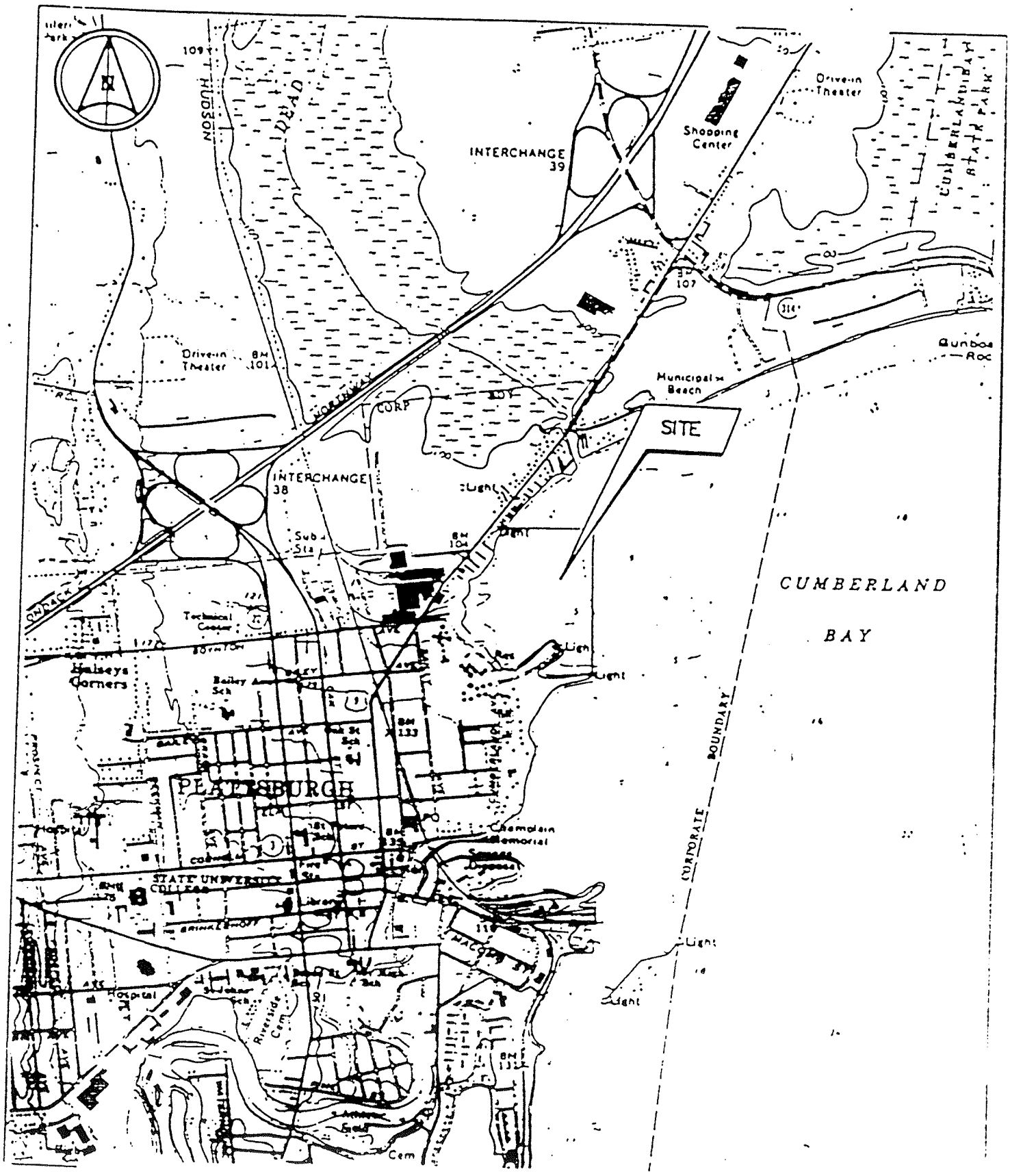
- A Remedial Design to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Uncertainties identified during the SC and FS will be addressed;
- Isolating the sludge bed with temporary sheet piling and silt curtains;
- The sludge bed waste materials would be removed using a combination of hydraulic dredging and dewatering/dry excavation;
- Construction and operation of a temporary sludge dewatering facility on site;
- Construction and operation of a temporary waste water treatment facility on site;
- The transportation and off-site disposal of the dewatered sludge;
- Restoration of site wetlands;
- Confirmatory sampling and use of mitigative measures, if required;
- Continuation of the beach cleaning IRM as needed.

Table 1

Task	ALTERNATIVE 2A WET CDF	ALTERNATIVE 2B DRY CDF	ALTERNATIVE 3 OFF-SITE DISPOSAL
hydralic dredging	$564,000	$1,116,000	$1,116,000
shoreline sludge removal	$474,000	$ 474,000	$474,000
sheetpiling/siltcurtain resuspension control	$672,000	$672,000	$672,000
monitoring	$166,000	$222,000	$222,000
CDF construction	$3,526,000	$2,421,000	
sludge dewatering		$1,860,000	$3,255,000
water treatment system	$1,199,000	$1,199,000	$1,199,000
off-site disposal			$6,270,000
wetlands restoration	$160,000	$160,000	$160,000
total direct costs:	$6,761,000	$8,124,000	$13,368,000
engineering (25%)	$1,690,000	$2,031,000	$1,774,000
contingency (20%)	$1,352,000	$1,625,000	$2,674,000
bottom restoration (sand)	$550,000	$550,000	$550,000
total indirect costs:	$3,592,000	$4,205,000	$4,998,000
annual O&M costs:	$62,000	$39,000	
present worth O&M costs:	$956,000	$602,000	
present worth costs: (direct, indirect & O&M)	$11,309,000	$12,932,000	$18,366,000

SITE LOCATION MAP

FIGURE 1



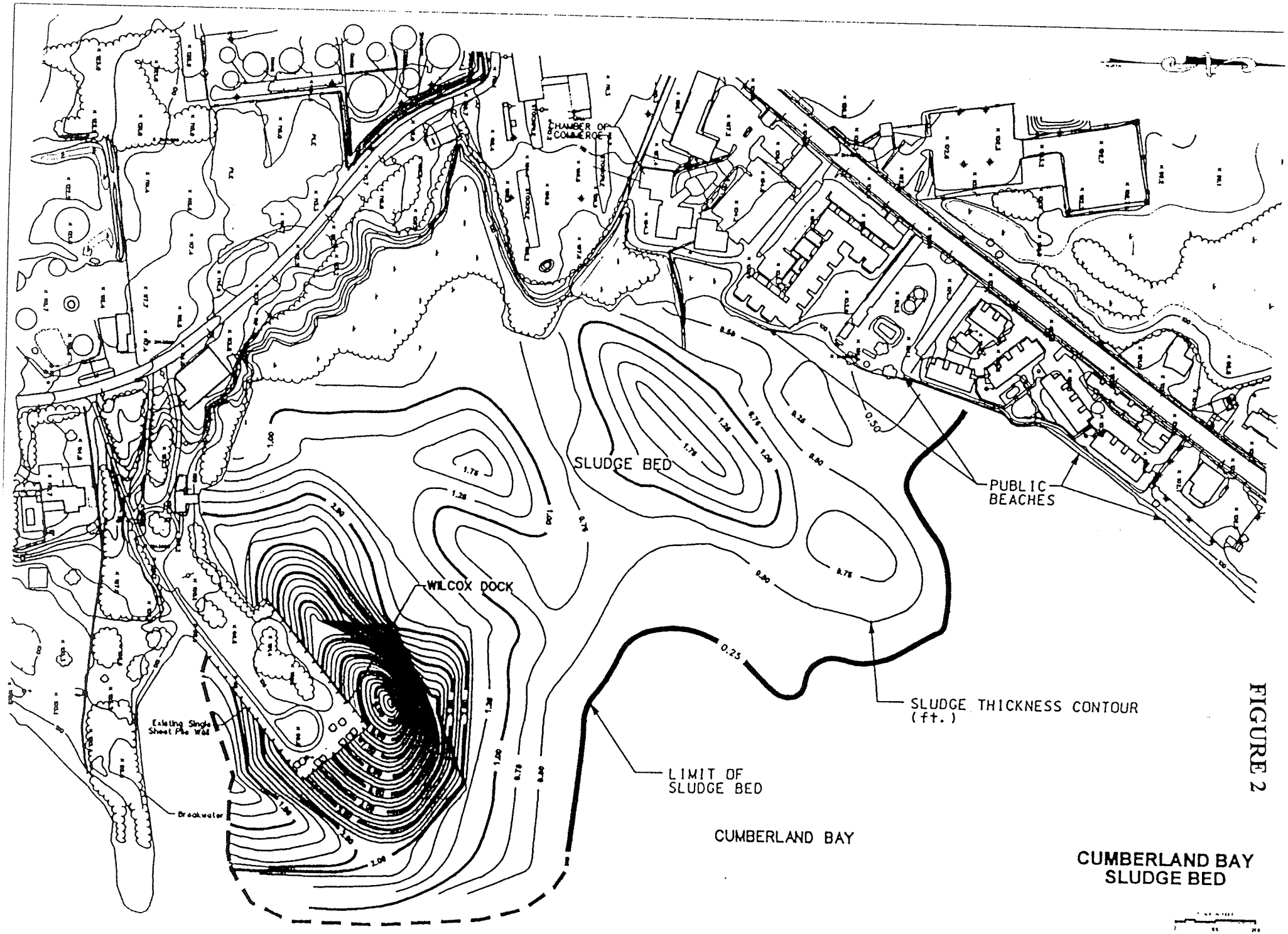


FIGURE 2

CUMBERLAND BAY
SLUDGE BED

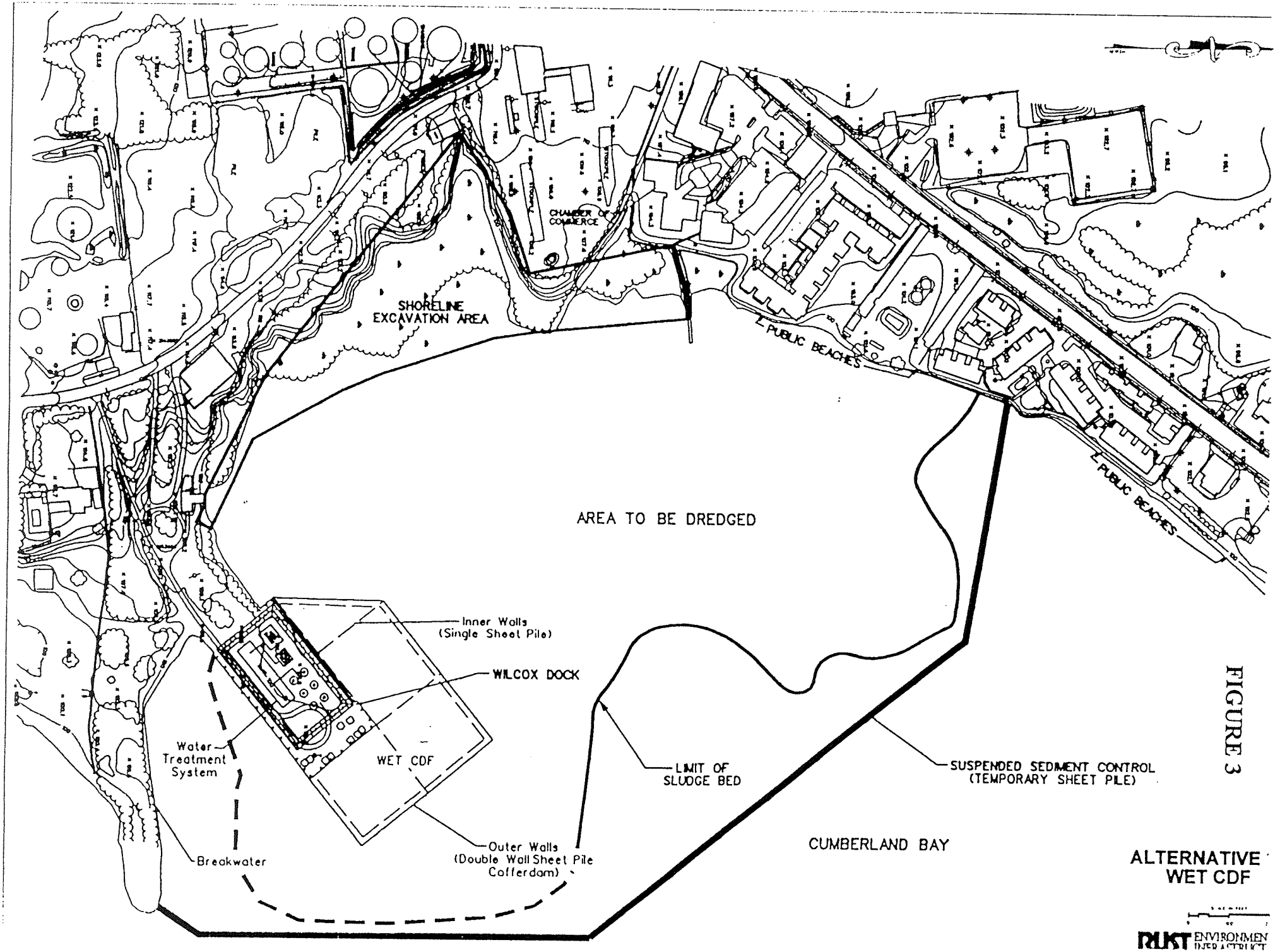

SHORELINE
EXCAVATION AREA
CHAMBER OF COMMERCE
PUBLIC BEACHES
PUBLIC BEACHES
AREA TO BE DREDGED
Inner Walls
(Single Sheet Pile)
WILCOX DOCK
Water
Treatment
System
WET CDF
LIMIT OF
SLUDGE BED
SUSPENDED SEDIMENT CONTROL
(TEMPORARY SHEET PILE)
Breakwater
Outer Walls
(Double Wall Sheet Pile
Cofferdam)
CUMBERLAND BAY
ALTERNATIVE
WET CDF

FIGURE 3

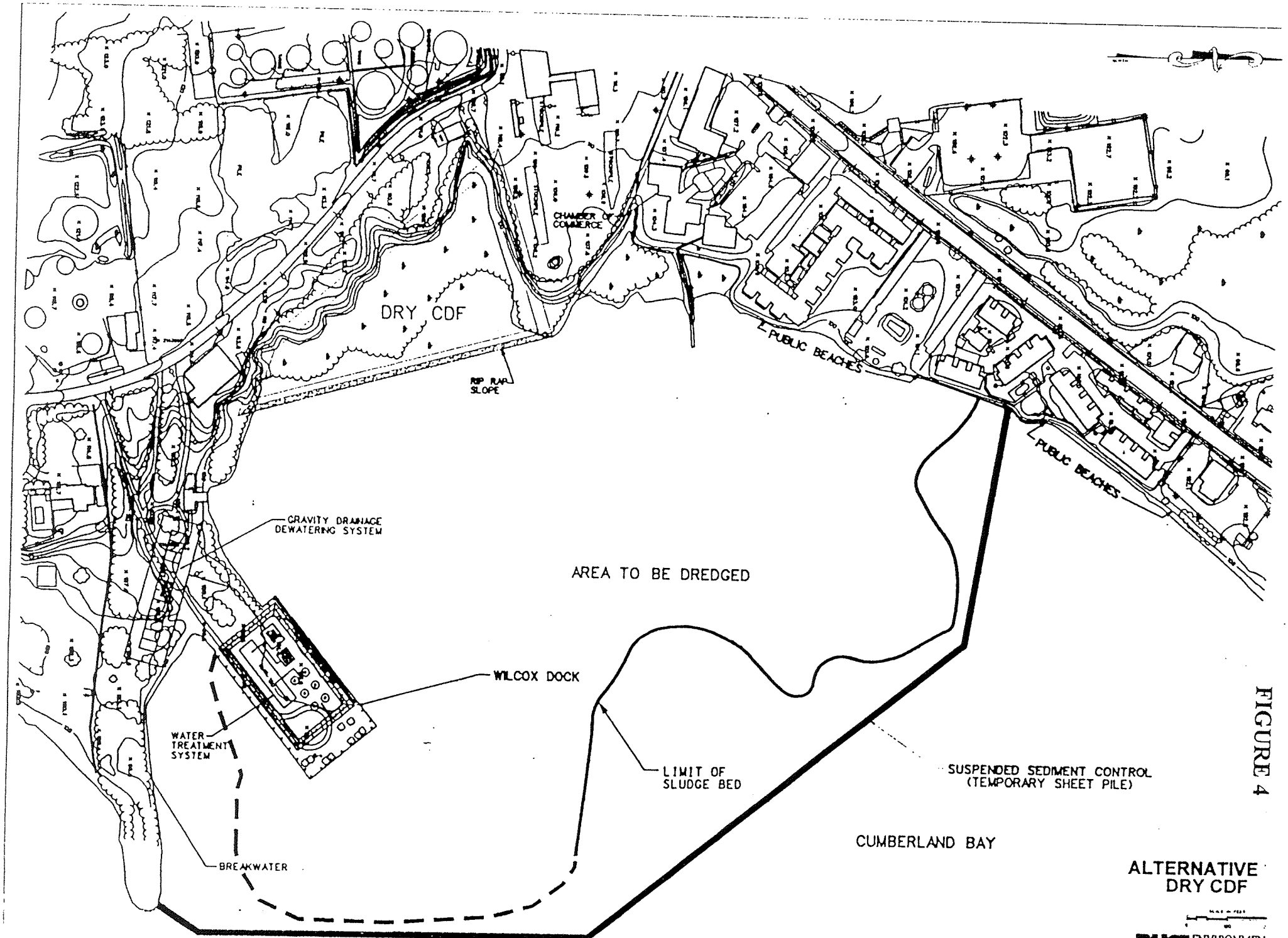

DRY CDF
CHAMBER OF COMMERCE
PUBLIC BEACHES
PUBLIC BEACHES
RIP RAP SLOPE
GRAVITY DRAINAGE DEWATERING SYSTEM
AREA TO BE DREDGED
WILCOX DOCK
WATER TREATMENT SYSTEM
LIMIT OF SLUDGE BED
SUSPENDED SEDIMENT CONTROL (TEMPORARY SHEET PILE)
CUMBERLAND BAY
BREAKWATER
ALTERNATIVE DRY CDF

FIGURE 4

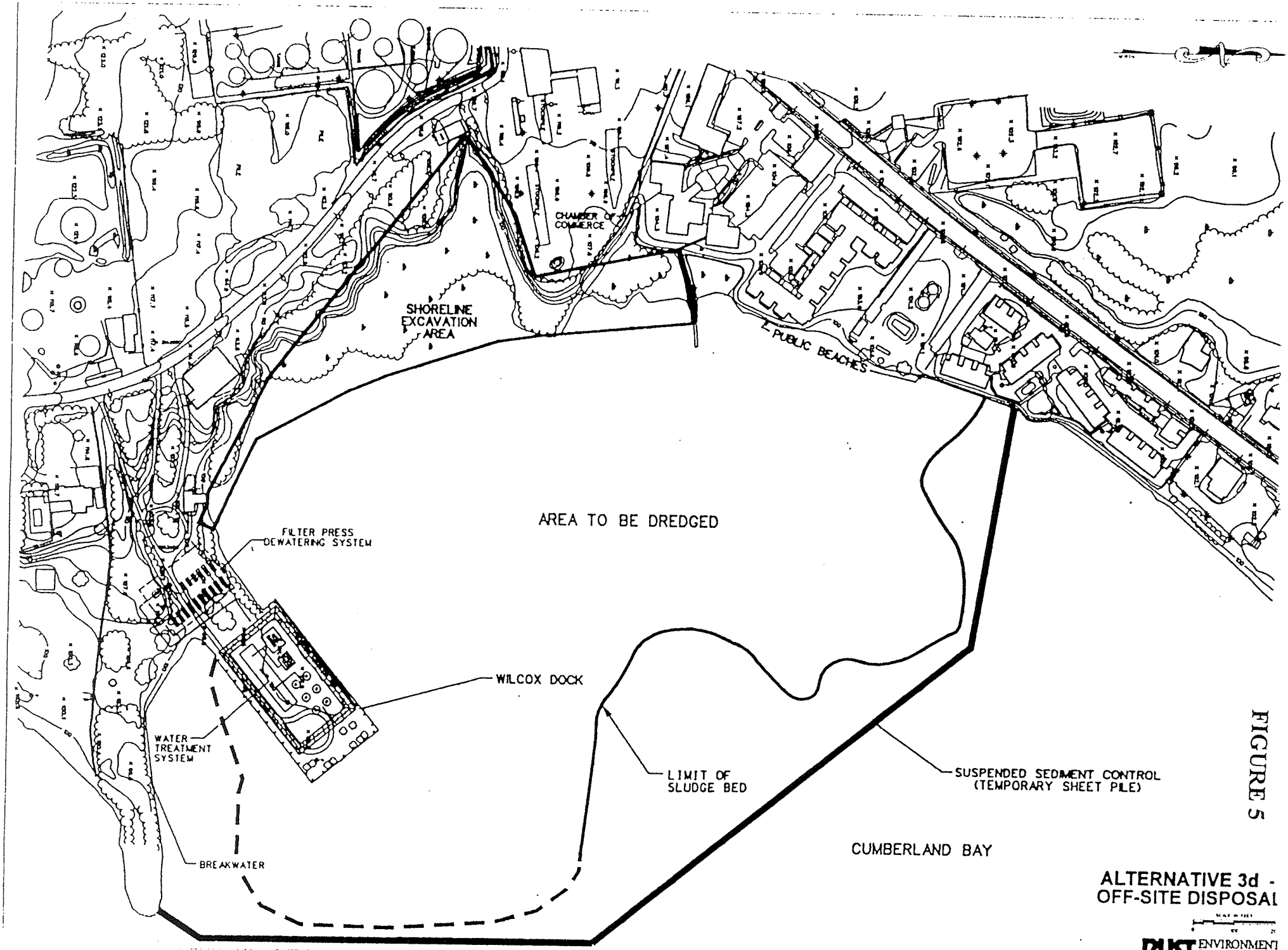


FIGURE 5

ALTERNATIVE 3d -
OFF-SITE DISPOSAL

RUST ENVIRONMENT INFRASTRUCTU