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FINAL

ENVIRONMENTAL STATEMENT

BEACH EROSION CONTROL PROJECT

DUVAL COUNTY, FLORIDA

Prepared by
U. S. Army Engineer District Jacksonville
Jacksonville, Florida
August 1974

FINAL
ENVIRONMENTAL STATEMENT
BEACH EROSION CONTROL PROJECT
DUVAL COUNTY, FLORIDA

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SUMMARY

FINAL
ENVIRONMENTAL STATEMENT

BEACH EROSION CONTROL PROJECT
DUVAL COUNTY, FLORIDA

( ) Draft (X) Final Environmental Statement

Responsible Office. U. S. Army Engineer District, Jacksonville, Florida
P. O. Box 4970 - Area Code 904-791-2241

1. Name of Action. (X) Administrative ( ) Legislative

2. Description of Action. The project consists of placing about 3.3 million cubic yards of sand along 10 miles of Atlantic Ocean shoreline at Duval County, Florida. Periodic nourishment at the estimated rate of 260,000 cubic yards annually will be required to compensate for erosion losses throughout the 50-year life of the project.

3. a. Environmental Impacts. About 3.3 million cubic yards of material will be dredged from an offshore borrow area and placed on the project beach as initial fill. Periodic nourishment at the estimated rate of 260,000 cubic yards annually will be placed on the project beach to maintain required dimensions from scheduled maintenance dredging of the Jacksonville Harbor project, usually at 2-year intervals. Should this prove insufficient to maintain the beach, the necessary material will be obtained from offshore sites at intervals of 4 to 5 years. The project will restore a rapidly eroding stretch of beach to full public use and enjoyment and reduce or eliminate existing periodic public and private property losses due to erosion and storm-induced wave actions.

b. Adverse Environmental Effects. Dredging and fill placement will temporarily degrade water quality at the offshore borrow site and the project beach by increasing turbidity. Public use of the beach in the immediate area of the fill placement discharge pipe will be temporarily restricted. Benthic organisms in the borrow area will be destroyed by dredging and organisms in the beach fill area will be covered. The same adverse effects, temporary degradation of water quality, and loss of some benthic and beach community organisms can be expected during periodic beach nourishment activities. However, due to the lesser amount of material involved, the lesser time involved in accomplishing the work, and the fact that the primary source of nourishment material will be shoaled areas of the Jacksonville Harbor project subject to repeated dredging, the disturbance to the environment will be considerably less.

4. Alternatives. Several alternatives were considered including no action. This alternative would provide no relief from the continuing erosion-caused loss of public beach and periodic damage to shoreline structures. Consideration was given to providing a current deflector and the use of sunken barges or tanker ships to form a breakwater. The use of groins was also considered. Based on engineering and economic criteria, it was determined that the plan described in paragraph 1, Project Description, was considered to be a practical solution to existing problems.

5. Comments Received.

USDA - Forest Service
U. S. Department of Interior
Environmental Protection Agency
U. S. Department of Commerce
Bureau of Intergovernmental
Relations, Florida (Clearinghouse)

6. Draft statement to CEQ 14 June 74.
Final statement to CEQ _____.

FINAL
ENVIRONMENTAL STATEMENT
BEACH EROSION CONTROL PROJECT
DUVAL COUNTY, FLORIDA

1.00 Project Description. Duval County is located on the upper east coast of Florida within 20 miles of the Florida-Georgia state line. The county's northern boundary is the Nassau River and its eastern boundary is comprised of 16 miles of ocean shoreline.

1.01 The beach erosion control project for Duval County, Florida, shown on plate 1, is authorized by Section 301 of the Rivers and Harbors Act of 1965, Public Law 89-298, approved October 27, 1965. The authorization provides for the initial construction and future nourishment as needed throughout the 50-year project life of a protective and recreational beach along the 53,000 feet of ocean shore between the St. Johns River south jetties and the Duval-St. Johns County line, a distance of 10 miles. Federal participation is authorized for initial project construction and for periodic nourishment during the first 10 years of project life. The Federal share is 100 percent of initial construction costs applicable to the Federal shore, 70 percent of the cost applicable to Kathryn Abbey Hanna Park, and 50 percent of the cost applicable to the publicly owned beach.

1.02 The project includes the beaches at the Mayport Naval Station, Kathryn Abbey Hanna Park, Seminole Beach, Atlantic Beach, Neptune Beach, and Jacksonville Beach. The northern section, from Seminole Beach northward, is virtually undeveloped, except for the Mayport Naval Station. In this area the beach is bordered by a formation of sand dunes. The southern portion, which includes the incorporated communities of Atlantic Beach, Neptune Beach, and Jacksonville Beach, is highly developed with numerous seawalls protecting beachfront developments. In 1972, 1,668,000 cubic yards of sand obtained from maintenance dredging in the St. Johns River entrance channel was placed on the beach at the Mayport Naval Station. In 1974, about 400,000 cubic yards of sand from the entrance channel was placed on Kathryn Abbey Hanna Park beach.

1.03 The beach improvement would provide a beach with a level berm 60 feet wide at elevation 11 feet above mean low water. Typically, the expected seaward slopes, as shaped by wave action, would include an approximate 116-foot horizontal distance with a 1 on 20 slope from the seaward crest of the berm to mean high water, then about 156 horizontal feet with a 1 on 30 slope to mean low water, with the remaining nourishment sloped 1 on 45 to reach the existing bottom. An initial placement of 3.3 million cubic yards of material would be required. Placement of the initial fill will be staged over an estimated 2-year period so that only a small portion of the project beach is affected at any one time. Stability of the restored beach would be accomplished by

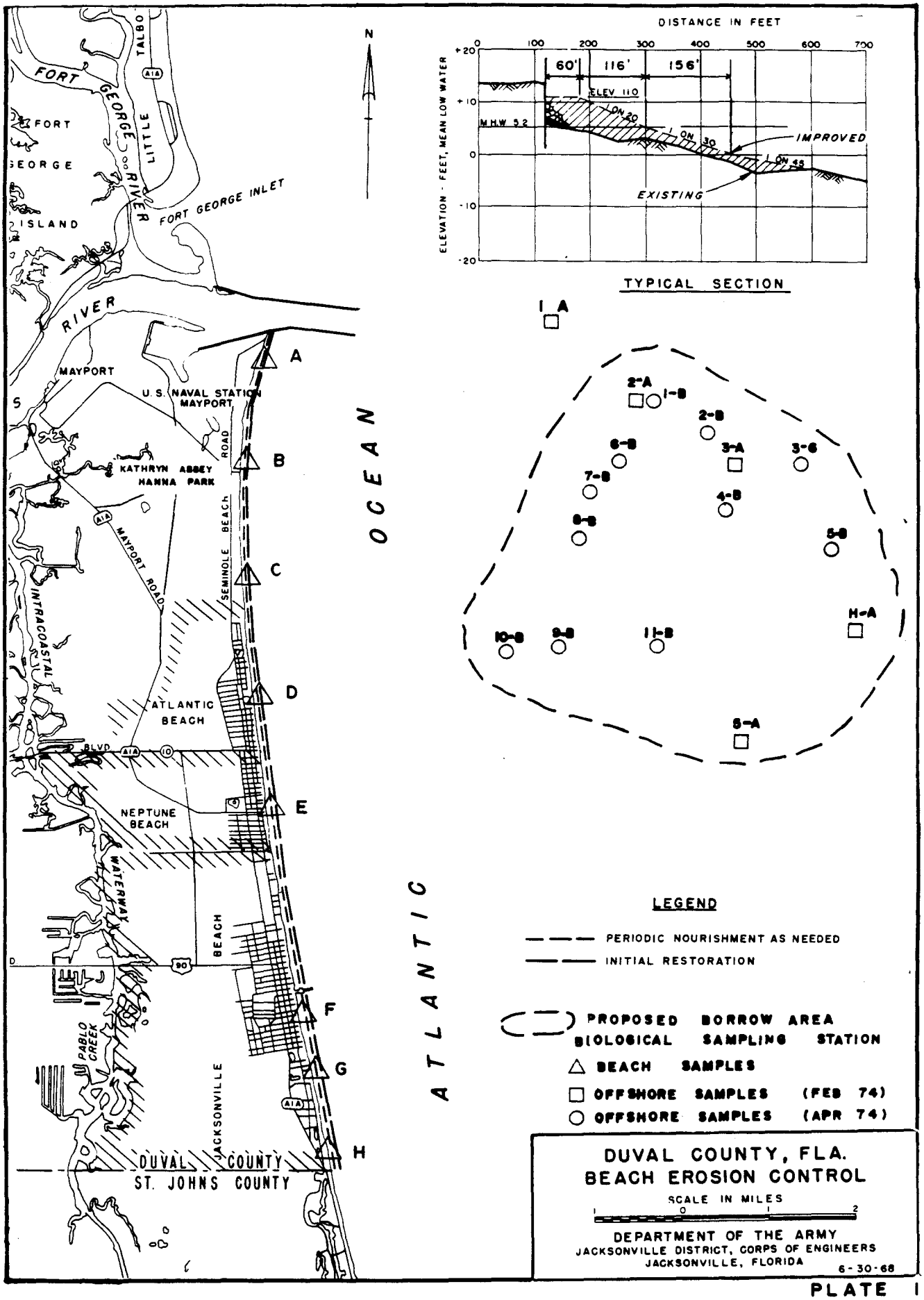
N
FORT GEORGE ISLAND
FORT GEORGE RIVER
TALBO
LITTLE
FORT GEORGE INLET
RIVER
MAYPORT
U.S. NAVAL STATION MAYPORT
KATHRYN ABBEY HANNA PARK
MAYPORT ROAD
SEMINOLE BEACH
INTRACOASTAL
ATLANTIC BEACH
BLVD
NEPTUNE BEACH
WATERWAY
BEACH
PABLO CREEK
JACKSONVILLE
DUVAL COUNTY
ST. JOHNS COUNTY
OCEAN
ATLANTIC
A
B
C
D
E
F
G
H
DISTANCE IN FEET
ELEVATION - FEET, MEAN LOW WATER
60'
116'
156'
ELEV. 11.0
MHW 5.2
1 ON 20
1 ON 30
1 ON 45
IMPROVED
EXISTING
TYPICAL SECTION
1-A
2-A
1-B
2-B
3-B
3-A
3-B
4-B
5-B
6-B
7-B
8-B
9-B
10-B
11-B
12-A
8-A
LEGEND
PERIODIC NOURISHMENT AS NEEDED
INITIAL RESTORATION
PROPOSED BORROW AREA
BIOLOGICAL SAMPLING STATION
BEACH SAMPLES
OFFSHORE SAMPLES (FEB 74)
OFFSHORE SAMPLES (APR 74)
DUVAL COUNTY, FLA.
BEACH EROSION CONTROL
SCALE IN MILES
DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA
6-30-68

PLATE 1

periodic replenishment of losses. The initial fill material will be obtained from selected offshore borrow areas. The periodic nourishment material would be obtained mostly from shoal areas in the Federal navigation project near the mouth of the St. Johns River and from offshore borrow areas when necessary. The nourishment would be accomplished generally at 2-year intervals when maintenance material from the harbor project is used. Should quantities prove insufficient to maintain required beach dimensions, material from the offshore borrow sites would be utilized at intervals of 4 to 5 years. The work will be accomplished through the use of a hopper dredge with pumpout capabilities or by a pipeline dredge.

1.04 Economic data.

Initial project cost	$13,595,000
Total Federal cost	7,650,000
Total non-Federal cost	5,965,000
Interest rate used	3-1/4 percent
Average annual charges	1,270,000
Average annual benefits	2,360,000
Benefit-cost ratio	1.9 to 1

2.00 Environmental Setting Without the Project. The Duval County beach project area is located in the Atlantic lowland region of Florida. Elevations range from near sea level along the Pablo Creek marsh and ocean to over 30 feet on the isolated sand ridges in the northern undeveloped area, with an average elevation of 10 feet mean low water for the entire area. The predominant drainage for the area is generally from the coastal ridge toward the Pablo Creek marsh. The mean tidal range along the Duval County shore is 5.2 feet.

2.01 Natural vegetation along the beaches varies from nonexistent along the developed shoreline areas to dune grasses, scrub palmetto, cabbage palm, and sand live oak along the dunes in the more undeveloped areas.

2.02 The silica sands composing northeast Florida beaches have been carried down to the sea by the Savannah, Altamaha, and other rivers of Georgia and the Carolinas. These sands have been gradually transported southward by shore currents and wave action and have created the Florida beaches and associated sand dunes.

2.03 The fight against erosion of the Duval County beaches has been a long, continuous battle; beach instability and erosion was reported as early as 1834. The problem is one of erosion and lowering of the beach profile where protected by seawalls, and recession of the dunes on unprotected beaches. Natural buildup of the beaches occurs during the summer months; however, erosion during the winter usually offsets

summer gains. Based upon 1923-1963 surveys, Neptune and Atlantic Beaches and the developed portion of Seminole Beach are receding at an estimated rate of approximately two feet per year, and the undeveloped portions of Seminole Beach and Kathryn Abbey Hanna Park's beachfront are receding at a rate of approximately one foot per year.

2.04 Erosion and damage to the beaches, seawalls, and oceanfront properties have been accelerated and greatly magnified during storms, especially the storms of 1925, 1932, 1947, and 1962, and the more recent severe storm of September 1964 (Hurricane Dora). These storms have caused severe damage or destruction to seawalls, vehicular access ramps, and valuable oceanfront properties, and they have impaired public use of the principal recreational beach as indicated in figure 1.

2.05 Corrective actions to alleviate erosion damage and to provide increased protection of property have been primarily limited to construction, maintenance, and replacement of seawalls and bulkheads. Until 1962, most destroyed or damaged seawalls were replaced by walls of the same type. After the November-December 1962 storm, granite revetments were installed, and limited amounts of artificial nourishment were provided with Office of Emergency Preparedness funds. More granite revetment was added after Hurricane Dora in September 1964. The city of Jacksonville has initiated a dune stabilization and regeneration program at Kathryn Abbey Hanna Park. This program provides for sand fill in blowout areas, placement of sand fences, installation of an irrigation system and the planting and fertilization of selected dune vegetation.

2.06 Except at Mayport and its adjacent southerly shore, very little protective beach remains throughout most of the project area. Recreational beach space is generally available only between low and high tides along the majority of the project shore. Existing beach conditions are indicated in figures 2 through 5. Improvement is needed to provide adequate erosion control and protection for upland development and to satisfy present and future recreational needs for both local residents and the many thousands of tourists annually visiting the area.

2.07 From 1970 estimates, about 57 percent of Duval County's residents actively participate annually in beach activities while about 15 percent of residents from adjacent counties and about 5 percent of tourists to Duval County also use the beaches on an annual basis.* Normal beach activities include swimming, sunning, picnicking, surfing,

*Florida Department of Natural Resources, "Comprehensive Outdoor Recreation Program for the State of Florida," January 1970.

JACKSONVILLE BEACH, FLORIDA
AFTER 1962 NORTHEASTERN STORM
December 1962

NEPTUNE BEACH, FLORIDA
AFTER HURRICANE DORA
September 1964

FIGURE 1

NORTH OF NCO CLUB
(1/2 Mile south of St. Johns River entrance)

SOUTH OF NCO CLUB
MAYPORT NAVAL STATION, FLORIDA

PROJECT BEACHES IN DUVAL COUNTY
11 February 1973

FIGURE 2

NORTH OF ATLANTIC BOULEVARD
ATLANTIC BEACH, FLORIDA

SOUTH OF ATLANTIC BOULEVARD
NEPTUNE BEACH, FLORIDA

PROJECT BEACHES IN DUVAL COUNTY
11 February 1973

FIGURE 3

NORTH OF BEACH BOULEVARD

SOUTH OF BEACH BOULEVARD
JACKSONVILLE BEACH, FLORIDA

PROJECT BEACHES IN DUVAL COUNTY
11 February 1973

FIGURE 4

NORTH OF 37TH AVENUE SOUTH
(1/2 Mile north of Duval - St. Johns County line)

SOUTH OF 37TH AVENUE SOUTH
JACKSONVILLE BEACH, FLORIDA

PROJECT BEACHES IN DUVAL COUNTY
11 February 1973

FIGURE 5

and fishing. From estimates of past beach usage, peak day attendance in 1973 was approximately 125,000* persons along Duval County beaches. As a result of beach restoration and population increase it is anticipated that beach usage will steadily increase annually into the foreseeable future.

2.08 All of the beaches in Duval County are open to the public at all times except for the 5,700-foot frontage of the United States Naval Station at Mayport. Jacksonville and Seminole Beaches permit motor vehicle access to the beach, while Atlantic Beach and Neptune Beach prohibit motor vehicles. All of the beach communities have numerous pedestrian walkways and street ends that open the beaches to the public. Kathryn Abbey Hanna beach will be completely closed to vehicular traffic by January 1975. At present, the 7,800-foot stretch of beach is blocked at both ends with only limited vehicular traffic at the center.

2.09 Access to the Duval County beaches area is predominantly by automobile. The major arteries of vehicular flow are State Road 10 (Atlantic Boulevard) and U. S. Highway 90 (Beach Boulevard) that lead from downtown Jacksonville and link with Interstate 95 and Interstate 10. State Road A1A runs parallel to the Atlantic coastline and provides access from the north and south.

2.10 The population of Duval County, as recorded by the U. S. Bureau of the Census in 1970, was 528,865 persons.** The 1974 population is estimated at 562,900 people. The county's 1980 population can be expected to fall between 606,000 and 611,000 people.***

2.11 The Duval County economy is highly diverse. Jacksonville is a major financial center in Florida. It is the home of three of the State's top 10 bank-holding companies. Seventeen insurance companies are headquartered in Jacksonville, and another eight companies have regional offices in the city. Four of Florida's top 10 mortgage banking firms are located in Jacksonville. In manufacturing, at least 58 plants have more than 100 employees each. There is no known mining activity in Duval County.

2.12 The Jacksonville area is a major transportation hub that is served by several railroads, an interstate highway network, general and commercial airport facilities, and waterway transportation into its port, the St. Johns River and the Atlantic Intracoastal Waterway.

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*From interviews with beach facilities custodians and local officials.

**Madelyn L. Kafoglis, "Predicting Florida's Population," University of Florida Population Studies, Bulletin No. 23, College of Business Administration, August 1972.

***The 1980 low projection used here is the OBERS estimated and the high projection was developed by the University of Florida.

Both the Mayport Naval Station and Jacksonville's port facilities provide harborage for deep-draft ocean vessels. Principal Jacksonville Port commodities include petroleum products, phosphates, and increasing volumes of containerized cargo and automobiles. The Westinghouse-Tenneco Offshore Power Systems (OPS) facilities are under construction on Blount Island in the St. Johns River. This combination shipyard and assembly line manufacturing facility will employ over 12,000 people and will produce floating nuclear-powered electrical generators.

2.13 Local climatological conditions are similar at the Duval County beaches and Jacksonville except that the diurnal temperature range is less at the beaches.* The mean annual temperature for Jacksonville is 69.5°: June, July, and August are the hottest months with temperatures averaging 80°; December, January, and February are the coolest months with mean temperatures in the middle 50's. Prevailing winds are northeasterly in the fall and winter months and southwesterly in spring and summer. The beaches are situated south of the usual path of winter storms and seldom experience severe frontal winds and cold waves. Exceptional weather is conditioned by infrequent "noreasters" along the coast that generally occur between the late summer and early winter months. These storms are marked by fairly strong winds that sometimes persist for several days at a time. Periodic hurricanes have also created severe winds and high tides in the area. The mean annual precipitation is 51.6 inches. The greatest rainfall, mostly in the form of local thundershowers, usually occurs in the afternoons throughout the summer months. These thundershowers disperse quickly and normally are followed by sunshine and clear skies.

2.14 The beaches area of Duval County is underlain by several water-bearing formations which vary as to water availability and quality. The Floridan Aquifer system in the area is composed of formations ranging in age from Paleocene to middle Miocene.** In ascending order, the formations that comprise the Floridan Aquifer are: the Cedar Keys Formation, Oldsmar limestone, Lake City limestone, Avon Park limestone, Ocala Group, and Hawthorne Formation. The lower formations of the Floridan Aquifer yield artesian water of poor quality along the coast due to the presence of high concentrations of chloride and other constituents. The Hawthorne Formation in the project area is tapped by wells 140 to 165 feet deep that yield water of good quality at a rate of at least 20 g.p.m. The top of the Hawthorne Formation is found 80-100 feet below sea level at the coastline.

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*Keith Butson, "Climate of the States, Florida," U. S. Weather Bureau, Climatography of the United States, No. 60-8, 1962.

**G. W. Lear, "The Floridan Aquifer in Northeast Florida," U. S. Geological Survey, 1968.

2.15 There are no known archeological sites in the immediate project area and the National Register of Historic Places, 1974, lists no historical sites in the immediate area. A magnetometer survey of the offshore borrow area to determine the location of shipwrecks will be conducted prior to start of construction.

2.16 The offshore waters associated with the Duval County shore provides an excellent sport fishery. This area is accessible from the St. Johns River and numerous party boats visit this offshore area daily. These fishing grounds yield Atlantic sailfish, dolphin, Spanish mackerel, king mackerel, permit, great barracuda, red snapper, several species of grouper, black sea bass, bluefish, little tunny, wahoo, greater amberjack, cobia, and crevalle jack. Inshore bays and surf provide sport fishing for tarpon, bluefish, Spanish mackerel, spotted seatrout, gray snapper, Florida pompano, crevalle jack, snook, sheepshead, ladyfish, red drum, black drum, gafftopsail catfish, sea catfish, flounder, croaker, northern kingfish, spadefish, lane snapper, and striped mullet. Other fishes which occur in the area are Atlantic bumper, Atlantic silverside, Atlantic herring, lookdown, pinfish, silver jenny, silver perch, spot, striped anchovy, striped burrfish, silver seatrout, sea robin, scrawled cowfish, harvestfish, scaled sardine, sand perch, and many others.[1] The offshore waters also support a fishery for shrimp which are important to the local economy from both the commercial and sport fishery standpoint.

2.17 As in most dredge and fill operations similar to that proposed for the Duval County Beaches, invertebrates in the offshore borrow and beach fill areas will be the most directly affected. To assess the impact on these organisms, a series of biological surveys of a proposed borrow area and the beaches were conducted. The results of these surveys are presented in Appendix 1.

2.18 Benthic animals associated with the offshore borrow area include amphipods, chaetognathids, cumaceans, decapods, gastropods, isopods, polychaetes, starfish, nematodes, ostracods, bivalves, polychaetes, brittle stars, sea cucumbers, sea anemones, and many others. Invertebrates associated with the beach fill area include large numbers of wedge shells and sand bugs, numerous types of polychaete worms, isopods, amphipods, and others.

2.19 The U.S. Bureau of Sport Fisheries and Wildlife latest edition of Threatened Wildlife of the United States, March 1973, lists species of animals found in the immediate project area. Those avion species considered endangered are: Eastern brown pelican, Southern bald eagle, and two transient species, the American and Arctic peregrine falcon. The green turtle is also listed as a threatened species.

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[1] Common and scientific names of these animals are presented in Appendix 1.

3.00 Relationship of Proposed Action to Land Use Plans. Portions of the proposed project area and immediate environs are designated under both long- and short-range programs of the Consolidated City of Jacksonville's Area Planning Board as Conservation Areas in cooperation with the Florida Coastal Coordinating Council's recommendations.

3.01 In 1970, the Florida Legislature created the Florida Coastal Coordinating Council which was given the responsibility of developing a comprehensive plan for the development, protection, and zoning of the coastal zones and to provide coordination of planning and management activities involved in the coastal zone. One of the Coordinating Council's initial programs was to develop a set of recommendations in recognition of the local and State responsibility to protect the interest of the general public. The purpose of these recommendations is to: (1) encourage the widest and best use of coastal resources, (2) to aid developers in taking advantage of state of the art techniques and in complying with State and Federal regulations concerning natural resources, and (3) to aid governmental agencies in developing plans compatible with the State coastal zone management effort. The approach taken by the Coordinating Council was to define three major categories or zones of land and water use. These categories are: preservation (no further modification), conservation (controlled modification), and development (few, if any, State-level controls).

3.02 Within Preservation Areas the Coastal Coordinating Council recommends that dredging in Class I (designated by the State of Florida as suitable for public water supplies) waters should be strongly discouraged, and that dredging in Class II (designated as suitable for shellfish harvesting) waters should be prohibited, except for approved maintenance dredging on existing navigation channels. For Conservation Areas, characterized by Class III (designated as suitable for recreation and the propagation of fish and wildlife) waters, the Council recommends that any development or subsequent use should insure that the water is not degraded. This includes strict control over activities such as dredging that might increase turbidity. The Council further recommends that modification of spoil islands should require a permit from the Trustees of the Internal Improvement Trust Fund. No specific recommendations for regulating dredging in Development Areas were made.

3.03 The coastal waters in the area of proposed work are designated by the State as Class III. The Conservation Areas in the project vicinity are Kathryn Abbey Hanna Park and the undeveloped section of land in the southwest portion of Jacksonville Beach near Pablo Creek. There is no conflict between the proposed project and current and projected land use plans by Federal, State, and local authorities.

3.04 The 10 miles of shoreline under consideration is undergoing varying degrees of land-use development. The first 5,700 feet south of the St. Johns River jetties is occupied by the U.S. Naval Station at Mayport. This Naval facility will be enlarged or modified as military needs develop; however, it is expected that there will be no major changes along the beach. The Kathryn Abbey Hanna Park extends 7,800 feet south of the Mayport Naval Station. Present development in the park, by the city of Jacksonville, consists of water and sewage systems, parking lots and activity plazas with additional parking lots and camping areas under construction. Long-range development plans assure that this seashore park will be reserved for future public recreation use. Seminole Beach is undeveloped in the northern half with sparse residential development in the southern half. Current trends indicate that this area will undergo high density urban development in the future. Atlantic and Neptune Beaches are predominantly residential communities with supporting community and recreational facilities along with apartments, motels, and hotels. These beaches are expected to remain residential with some influx of high density urban development. Jacksonville Beach is the principal recreational and commercial community in the beach area with its boardwalk and commercial entertainment of shows, rides, and games. The greatest concentration of resort motels and concession facilities is at Jacksonville Beach. High-rise residential developments are currently under construction along the shoreline within this community.

4.00 The Probable Impact of the Proposed Action on the Environment. The proposed project will provide for the initial placement of approximately 3.3 million cubic yards of material on the 10 miles of Duval County shoreline. The initial fill material will be obtained from offshore borrow areas. The proposed borrow area is estimated to contain about 485 acres. In addition, an estimated 260,000 cubic yards will be required annually to replenish losses. Material for annual nourishment will come from the maintenance dredging of shoals in Jacksonville Harbor navigation channels (usually performed at 2-year intervals) when conditions (i.e., compatible material and available equipment) are suitable and from the offshore borrow area if necess necessary at intervals of 4 to 5 years. This beach erosion control plan should serve two purposes: (1) protection against normal weather and to a partial degree against storms; and (2) provision of ample beach areas for present and future recreational needs. It will also provide an environmentally pleasing and acceptable way to utilize material from the periodic maintenance dredging.

4.01 Bottom materials located in the proposed borrow areas consist of varied proportions of sand, silt, and shell, depending upon the location. There will be temporary adverse effects caused by turbidity due to the initial filling. Turbidity created should be no

more than is characteristic along Duval County beaches during and following severe storms. Turbidity of localized waters will also occur during periodic replenishment operations. No polluted materials will be placed on the beach and all dredged material for beach nourishment will meet EPA criteria. (See Appendix 4 for Sedimentary Analyses of the Offshore Borrow Site.)

4.02 The animal life which will be most affected by this project will be the benthic invertebrates associated with offshore borrow and beach fill areas. The organisms displaced from the borrow area will probably be destroyed during dredging operations. Organisms similar to those destroyed will probably reestablish in the area within 6 to 18 months following the operation. Placement of fill material on the beaches will also result in the loss of large numbers of invertebrates. The dominant organisms on the beaches were the small wedge shell, Donax, sp. These organisms have a high population turnover and repopulation of the new beach should occur soon after project completion. Restoration of the severely eroded beaches, especially near the harbor entrance, will restore the habitat which was once available for those invertebrates associated with the beach surf zone.

4.03 The Duval County shore is used for nesting by both the green and loggerhead turtles. Both species begin nesting in Duval County during the first full moon in May and continue to come ashore through most of July.* Most come in on the spring tides and nest about 75 yards beyond the mean high water mark. The eggs take approximately two months to hatch.

4.04 As a result of beach erosion, the only parts of the county shoreline still suitable for nesting are located from Seminole Beach northward and the area south of the city of Jacksonville Beach. The beach nourishment program will expand the potential nesting area of both the green and loggerhead turtles. However, due to the high recreational use of the area, it is not anticipated that the project will have any significant effect on the nesting of turtles.

4.05 Fishes will tend to be less affected by the project than the benthic organisms and sessile invertebrates. The overall impact will be minor since the offshore borrow area is not near productive fishing reefs. Furthermore, the temporary increases in turbidity which will occur will likely have only short-term effects since most fish can avoid areas of highest turbidity.

4.06 The area's bird population should also escape adverse effects resulting from dredging operations. Construction activities may initially frighten some species away; however, many birds will be attracted to the area to feed upon organisms disrupted during dredging operations.

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*Conversation with Stephen Rowell, Park Ranger, Kathryn Abbey Hanna Park, City of Jacksonville, 13 May 1974.

4.07 Recreational use of a very small area of the beach around the discharge pipe will be restricted during fill placement but the inconvenience will be temporary with a more stable beach available for public use upon project completion. The overall sport fishery resources of the area will not be significantly affected but surf fishermen will be inconvenienced to a small degree by temporary restrictions on use of portions of the beach. There will be no appreciable effects from noise as a result of project implementation since the hydraulic dredge will be located approximately four miles offshore.

4.08 It should be noted that the same temporary adverse effects at the fill sites will be repeated on those occasions when additional fill is required for periodic nourishment of the beaches. Since the periodic nourishment will involve considerably less material, the temporary adverse effects would be much less than those created by the initial project works.

4.09 There will be no damage to any historical markers and no known archeological sites would be involved or affected by the proposed project.

4.10 No foreseeable adverse impact on mineral resources will result from project implementation.

5.00 Any probable adverse environmental effects which cannot be avoided. Destruction of most benthic marine organisms in borrow and fill areas will occur during the placing of fill on the beaches. The disruption of normal marine habitat by turbidity is the other major adverse environmental effect which cannot be avoided. However, turbidity will be temporary and should be no greater than that which occurs during storm periods. Recreational use of a very small area of the beach around the discharge pipe will be restricted during fill placement.

6.00 Alternatives to the proposed action. The basic alternative is to take no action and leave the beaches in their present condition. This, however, would provide no relief from loss of valuable recreational resources at the rapidly eroding beach and the periodic and progressive damage to shoreline structures resulting from wave and wind action. Unless corrective actions are taken, increasingly serious damage is likely to occur to valuable beachfront properties, and the continued reduction of the beach is inevitable.

6.01 Local interests have requested that consideration be given to providing a current deflector at the seaward end of the south jetty, thereby returning to the shore southerly drifting sand which has been moved offshore by the jetties and the navigation channel. Local interests also requested that tanker ships, large barges or LST ships

be used to form the breakwater. However, experience has shown that storm currents follow different patterns when affected by a breakwater or deflection than do normal prevailing currents. While it is possible that the use of a number of LST's acting as a detached breakwater of the jetty would direct and deflect the prevailing littoral currents from shore, it is also possible that a breakwater in that position would deflect storm currents to increase the attack on the beaches immediately south of the St. Johns River jetties. The overall effect of such a breakwater might be to increase erosion rather than alleviate it. Furthermore, the use of tanker ships, large barges or LST ships as structures in the ocean near the harbor entrance would create dangerous navigation hazards.

6.02 The use of groins for beach erosion control was also considered as an alternative. Not only is the use of groins locally undesirable, but available data indicates that groins would not reduce periodic nourishment requirements sufficiently to justify their expense.

7.00 Relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity. The proposed work would have temporary minor adverse impact on the natural productivity of the area in terms of marine and terrestrial animals destroyed or disrupted. The long-term benefits of the project include the restoration of a major section of beach for public use and enjoyment and the partial stabilization of the area as a habitat for marine and shore life. The project would also assist in preventing periodic damage to shore structures from storms and erosion and avert impending serious damage to public and private property which could have a long-term, adverse impact on the area's economy.

8.00 Any irreversible or irretrievable commitments of resources which would be involved in the proposed action should it be implemented. The only irreversible or irretrievable loss involved in the implementation of the project would be to the individual marine and terrestrial organisms destroyed by dredging or covered by fill. However, no threat to any species inhabiting the project area is expected. Labor and financial resources used to carry out the beach erosion control program represent an expenditure of these resources. Expanded use of the beaches and protection of properties, as a result of the project, are expected to compensate for these expenditures.

9.00 Coordination and comment and response -- public participation. Contact has been maintained between representatives of the Corps of Engineers and local interests. A public meeting was conducted on 23 July 1963 at Jacksonville Beach at the beginning of the beach study. Beach erosion problems in Duval County were discussed and local interests presented their views relative to the need and feasibility of providing remedial improvements. About 80 persons were present. A brief digest of this meeting is included in Appendix A of House Document 273, 89th Congress, 1st Session, entitled "Duval County, Florida."

9.01 A public meeting was held on 26 August 1974 and the plan presented to and discussed by interested agencies, organizations, and the public. Approximately 80 persons attended including private citizens and representatives of Federal, State, and local governmental agencies. The concensus of the meeting was strongly in favor of the project. No opposition was presented.

9.02 Governmental coordination. The initial 1963 public meeting was also attended by representatives of the Duval County Commission, Atlantic Beach, Neptune Beach, and Jacksonville Beach. By a letter of 8 May 1964, intergovernmental coordination of the proposed project was begun. In response to this coordination, it was determined that the proposed project would have no adverse effects upon roads and bridges, urban renewal activities, agricultural interests, water supply, and waste disposal practices. Since 1963 numerous conferences, meetings, and field inspections have been held with various local representatives.

9.03 By a letter of 19 October 1964, the Board of County Commissioners of Duval County concurred in the need and desirability of the proposed plan of improvement, agreed to be the local sponsor, and expressed its intent to implement the project after congressional authorization. Subsequent to the consolidation of Duval County and the city of Jacksonville in 1967, the consolidated city of Jacksonville became the project's local sponsor.

9.04 On 12 June 1973, the City Council of Jacksonville, Florida, adopted resolution #73-192-151 which authorized the Mayor and Corporation Secretary, City of Jacksonville, Florida, to execute an agreement between the United States of America and the City of Jacksonville, Florida, for local cooperation in implementing the "Beach Erosion Control Project, Duval County, Florida." The agreement was executed on 22 August 1973 by the Mayor of the City of Jacksonville, Florida, and by the Secretary of the Army on 29 November 1973. By letter of 14 January 1974, the City Engineer was designated by the Mayor as his representative in charge of the project for the city. By letter of 19 April 1974 the Corps of Engineers was notified by the city of Jacksonville that all 435 riparian oceanfront property owners of record within the 10-mile reach of the Duval County Beach Erosion Control project were given notification of the proposed project. The form of this notification appears in Appendix III of this statement.

9.05 A meeting was held with officials of the Consolidated City Government of Jacksonville, the local sponsor, and a representative of the Department of Natural Resources, State of Florida, on 20 August 1974, where the finalized plan was presented by the Corps of Engineers.

a. Citizens' Groups. Upon conclusion of the 1963 and 1974 public meetings, the groups attending agreed that the beach was eroding and corrective measures should be provided as early as possible. Since that time, no adverse comments related to the proposed project have been received.

b. Government agencies.

1. USDA-Forest Service

Comment: No measureable impact on forest resources is anticipated from the proposed Beach Erosion Control Project, Duval County, Florida. Therefore, the Forest Service, Southeastern Area, State and Private Forestry has no comments on the draft environmental impact statement. We commend you on the quality and content of the good, concise draft statement and thank you for the opportunity to review it.

Response: None.

2. U. S. Department of the Interior

Comment: Within Section 2 it should be noted that there is no known current mineral production in Duval County. However, past production of ilmenite, rutile, zircon, monazite, and oyster shell has been recorded.

Response: This statement has been included in the final EIS under Section 2, Environmental setting without the project.

Comment: The statement omits mention of previous corrective actions such as the 1973 one million cubic yard and the 1974 six hundred thousand cubic yard deposits made on the lower portion of Mayport Beach and part of Kathryn Abbey Hanna Beach.

Response: This information has been included in the final EIS, Section 2, Environmental setting without the project.

Comment: This paragraph should be modified to indicate that Kathryn Abbey Hanna Beach will be closed to motor vehicular traffic by January 1975 and that presently the 7,800-foot beach is blocked at both ends with only limited vehicular traffic at the center to be eliminated by the above date.

Response: The final EIS under Section 2, Environmental setting without the project, has been revised to include this information.

Comment: In this section, it is stated that there are no known archeological sites in the immediate project area and that the National Register of Historic Places, 1972, lists no historical

sites in the immediate area. Additional coverage is needed. The fact that there are no known archeological sites may merely result from the fact that the area has not been studied to determine whether such sites are in existence; it is incumbent upon the agency carrying out the project to make this determination through an archeological survey carried out by a professional archeologist trained in the identification of such items. Also, the National Register of Historic Places is updated by publication in the Federal Register the second week of February of each calendar year, and is updated monthly. The National Register Listing reference should be the latest year and month. Also, since the National Register is in an early state of development and under Executive Order 11593 and the Procedures for Compliance with the Historic Preservation Act of 1966, as published in the Federal Register of January 25, 1974, each Federal agency is required to identify and to place in nomination to the National Register those sites that may be affected by its projects, it is incumbent upon you to carry out such a study. In addition, we suggest that you contact the State Historic Preservation Officer regarding any places that he may have in the process of nomination to the National Register of Historic Places.

We recently forwarded to you, with our comments on the draft environmental impact statement for the Tampa Harbor deepening project, a booklet entitled, "Preparation of Environmental Statements: Guidelines for Discussion of Cultural (Historic, Archeological, Architectural) Resources." We believe these guidelines will be helpful in the preparation of the final statement.

Response: The Corps fully realizes the historical significance of archeological sites and that is the purpose of coordinating the draft EIS with agencies which have expertise in this field. If the National Park Service has information to the effect that such sites exist, this information should be made available when comments are solicited on the draft statement. As was pointed out in the draft EIS, a magnetometer survey will be made of the offshore borrow area to determine if there are any shipwrecks in the area. The draft EIS was coordinated with the Division of Archives, History, and Records Management, State of Florida, and the following comment was offered, "We have reviewed the draft environmental statement for the project and find it adequate with respect to its consideration of archeological and historical resources."

Comment: Within this section it should be noted that no foreseeable adverse impact on mineral resources will result from an operation of this nature. A statement to this effect should be incorporated in the environmental impact statement.

Response: Section 4.00, The Probable Impact of the Proposed Action on the Environment has been enlarged to include this information.

Comment: We do not agree with the conclusion of Section 6.00 regarding the impact of the project on the natural productivity of the area since the destruction of so many benthic organisms will have a significant, though temporary effect on area productivity, instead of the insignificant impact as stated in your draft environmental impact statement.

Response: It is agreed that benthic organisms will be destroyed. However, it must be pointed out that this is a severely eroded beach and it is felt that the action would still be minor compared to the long-term benefits of providing a much larger habitat for benthic and beach community organisms and the fact that the areas suffering losses of benthic invertebrates will be quickly repopulated by organisms similar to those destroyed.

3. U. S. Environmental Protection Agency

Comment: We have reviewed the Draft Environmental Impact Statement for the Beach Erosion Control Project in Duval County, Florida, and have no objection to the proposed action if proper environmental precautions are taken.

Response. None.

Comment: The use of offshore dredged material, essentially native material similar to that of the beaches, should cause no unnatural alteration to the water or other environmental assets. Material from the St. Johns River, on the other hand, could contain excessive organic materials, which could cause degradation to the water. The city of Jacksonville adds many pounds of organic matter from its 92 raw sewage outfalls to the already organically rich river waters coursing through Jacksonville Harbor. This material plus toxins found in municipal wastewater and in urban runoff precipitates out in areas of Jacksonville Harbor. Should this river material be used, we recommend a monitoring system to insure detection of unsuitable materials at the earliest possible time so that an alternate supply--from an offshore site--could be used. The potential for noxious odor development upon exposure to air of the dredged material should also be evaluated prior to institution of its use on public beaches.

Response: Any materials dredged from the St. Johns River channel will be analyzed and tested and will meet all criteria for beach disposal prior to placement.

Comment: The Statement should also identify the borrow areas. If they are in the same general area yearly, the benthic community could be permanently damaged by siltation from dredging operations.

Response: Plate 1 of the draft statement shows the proposed offshore borrow area. Periodic beach nourishment material will come mainly from maintenance dredging of the Jacksonville Harbor project. The offshore borrow area would be utilized only if maintenance material is insufficient to maintain required beach profiles. In such case, the required material would be dredged at intervals of 4 to 5 years which would not pose a serious siltation problem.

Comment: The statement should also discuss the suitability of artificially filled beaches for sea turtle propagation and the effect that the several-year loss of the intertidal feeding zone is going to have on the food supply of resident and migrant avifauna.

Response: Acording to the U. S. Fish and Wildlife Service artificially restored beaches should be just as suitable for sea turtle propagation as natural beaches. There will be no several-year loss of the intertidal zone. Placement of the fill material will be accomplished in sections so that only a portion of the intertidal zone is affected at any one time. On completion of the project, the intertidal zone will be located seaward of the existing zone but there will be no lasting adverse effects on resident or migrant avifauna.

Comment: Finally, biological surveys should be conducted after project completion to determine whether or not recolonization on the beaches and borrow areas is being accomplished.

Response: After project completion, a biological survey of the beaches and borrow areas will be conducted.

4. U. S. Department of Commerce

Comment: The statement should mention the prospect of 600,000 cubic yards of material from channel maintenance dredging in Jacksonville Harbor being made available in 1974 for beach nourishment.

This section should also discuss in greater detail the type of dredging to be undertaken. For example, are shallow trenches or deep pits to be dug? Will excavations be alined with current flows or against them?

Response: Section 1.00, Project Description has been enlarged to include a discussion of the previous quantities of materials placed on the beach. Only 400,000 cubic yards of the 600,000 cubic yards dredged from the navigation project was suitable for beach fill. Borrow areas will generally follow the geologic alinement of the offshore sand deposits and will generally run in a north-south direction. Examination of the "Atlas for Surface Currents, North Atlantic Ocean," (H. O. Pub. No. 571) of the U. S. Navy Hydrographic Office showed that

the annual average resultant drift in the vicinity of the borrow area was south at approximately 4.5 miles per day. The depth of the borrow excavation will depend upon the type of equipment used for construction by the contractor. Judging from equipment generally in use today, the cuts probably would be shallow.

Comment: Measures of success or lack thereof of the dune stabilization and regeneration program should be given. If the program is successful, for example, then the possibility of incorporating a similar stabilization and regeneration program into the subject project could be considered as an alternative.

Response: The city has just initiated this pilot project and to date has not had too much success since adaptable grasses and legumes, such as European beach grass Vetch which adapts fairly well to the dunes at the coastal areas of South Carolina and northern Georgia are not adaptable to the south Georgia and Florida coastal dune areas.

Comment: The statement excludes mention of erosional rates at Mayport. Figure 2 gives the impression of accretion rather than loss; if this is correct, reasons should be stated for inclusion of the 5,700 feet of Mayport beach within the project.

Response: Page 3, paragraph 2.03, specifically states that this general area is receding at the rate of approximately one foot per year. During the deepening of the Jacksonville Harbor project an offshore disposal area just south of the south jetty was utilized and littoral drift took material from this area and deposited it at Mayport which accounts for the accretion.

Comment: A more accurate description is needed of the quantity and quality of beach replenishment material to be taken from Jacksonville Harbor. The harbor's "organic-rich" sediments may be undesirable for beach nourishment or for redistribution into the water column.

Response: All material which is proposed to be used on any Corps project is thoroughly analyzed and tested to determine suitability for beach nourishment prior to placement.

Comment: Sedimentary analyses describing the varied proportions of sand, silt, and shell at the borrow site should be appended and referenced.

Response: See Appendix 4 for sedimentary analysis.

Comment: Evidence to support the statement that organisms similar to those destroyed at the borrow area will reestablish themselves within 6 to 18 months should be presented. A study of offshore

borrow pits two to three years old showed that number and diversity of benthic fauna were lower in the borrow area than in unaltered adjacent areas.

Response: A study by Holland and Chambers, Corps of Engineers biologists, on Lido Key borrow areas in 1971 indicated that the area had repopulated with organisms similar to those destroyed. A survey by Taylor Biological Laboratories of navigation channels which had received maintenance in Tampa Harbor showed that organisms similar to those destroyed started repopulating the channel within 6 months.

Comment: In addition to the possibility that beach nourishment during the May-September period could bury sea turtle eggs, consideration should be given to the distinct possibility that females attempting to nest would be driven off by beach nourishment activities.

Response: Due to the high population density and recreational use of the proposed project area, it is not a prime nesting area for turtles. In fact, according to the U. S. Fish and Wildlife Service, turtles tend to avoid areas such as this. In any event, beach nourishment will be scheduled insofar as possible to not interfere with the period of nesting.

Comment: The statement should describe the location of productive fishing reefs. Fishing piers in the area should also be described, and the statement should address the potential adverse effects of dredging activities on these piers.

Response: There are no fishing reefs in the immediate project area. There is only one fishing pier which would be affected by project implementation. This effect would not be significant since this pier extends far enough into the ocean that fishing activities could be carried on at the same time beach restoration is being accomplished.

Comment: As noted in the statement, sea turtles utilize specific portions of the project area from May through September. The National Marine Fisheries Service recommends that the original nourishment and later replenishment activities take place from October through April in those areas utilized by sea turtles.

Response: See response above.

Comment: The impact statement does not address proper land use management as an effective tool to control beach erosion or to reduce its impact on human activities. For example, the data and photos (e.g. page 3) of developed and non-developed areas clearly show the impact

of improper land use controls in augmenting and exacerbating the beach erosion problem. Simply stated, beach erosion is increased where man's activities have affected the natural dynamic equilibrium along the shore. In addition, the impact of that erosion is greater where man's structures extend onto the beach.

There is, in general, an inadequate discussion of the alternatives to this action with relation to the preceding comment. More detailed discussion should be given to the potential for control of beach erosion through proper land use management. This discussion should include, as a minimum, the potential for land use controls governing the location, intensity and uses of development, structures and man's activities on the beach, the back dunes and near shore vegetation. The use and abuse of sea walls, groins and jetties, and their impacts on beach erosion and inducing construction near the beach should be examined. The issue of motor vehicle access and use on the beaches (now permitted) should also be addressed; it is suggested that such use be restricted or prohibited.

Response: The major purpose of the EIS is to examine the proposed action in relation to its environmental impacts. It is agreed that proper land use management is an effective tool in reducing the impacts of beach erosion on human activities and it can assist in providing some measure of control over continuing erosion. However, in the case addressed in the EIS the problem is that of restoring a recreational and protective beach that is experiencing continuing erosion due mainly to natural forces. Land use controls obviously cannot provide a solution. Once the objectives of the proposed work have been achieved, the proposed provision for continued nourishment coupled with restrictions on beach development will serve to preserve a vital recreational resource and reduce property losses. Land use controls are properly matters for resolution by local and State officials who are best equipped to evaluate the factors involved.

Construction of groins and jetties were discussed in the statement under alternatives since they appeared to offer a possible means of achieving project goals but were rejected for the reasons cited in the EIS. The issue of vehicle use on the beach is a matter of local concern.

Comment. In many areas this project would appear to be designed to create a new beach rather than simply restore old beaches, and as such, is questionable under this provision. Why should the public pay for new beaches to serve increasing high rises? Why should not those landowners who have created the erosion problems through improper land use pay for restoration of the beach? (Funding of this project should also be a subject for discussion under the alternatives section).

Response: Duval County was once famous for its wide beaches similar to resort beaches further to the south. Restoration of the beach will probably not create a beach as wide as once existed in some areas of the county. Economic data is contained in Section 1, Project Description. Public funding of the project would appear proper since the resulting beach will be public property.

Comment: Insofar as public funds are being used, how is public access guaranteed? Although public access may not have been a problem in the past, with the large-scale development of new high rises alluded to in this statement, how will public access be continued to be guaranteed in the future?

Response: There is 7,800 feet of public beach at Kathryn Abbey Hanna Park with future access assured. There are 101 street ends and walkways in the three beach communities. There are 13 vehicular access ramps throughout the project. Assurances have been provided by the local sponsor that existing and future public access will be maintained.

Comment: It appears that the last public meeting concerning this project was in 1963. Because the public knowledge, understanding and awareness of the overall problems concerned in beach restoration have advanced considerably in the last 11 years, it is suggested that a new public meeting be held prior to any decision on this project.

Response: A public meeting was held 26 August 1974 in City Council chambers, 2nd Floor of the Municipal Building in Jacksonville Beach. About 80 persons including private citizens and State, Federal, and local governmental representatives attended. Strong support for the proposed project was voiced at the meeting.

Comment: For your information, the most recent tabulated sea level observations and reductions show that sea level has been rising (relative to the land) at an average representative rate (least squares on annual means) of 2.69 millimeters per year (standard error $\pm$.39 millimeter per year) since 1929 at Mayport, Florida (the closest station).

Response: This information is appreciated.

Comment: The impact assessment is primarily restricted to addressing the impact on the beach proper. The discussion of the impact on deepwater organisms in the borrow area is inadequate. In view of the depressed and endangered population of turtles, it is recommended that a prohibition against restoration activities be provided for the months of May through July. Similar consideration should be made for the nesting season of the beach terns.

Response: As noted earlier, heavy use of the remaining beach for recreational activities has reduced its use as a nesting site. However, every effort will be made to schedule construction activities in a manner to avoid the nesting season.

5. State of Florida, Department of Administration, Division of State Planning

The above State agency has been designated by the Governor of the State of Florida as the Clearinghouse for environmental impact statements for the State of Florida. Response to the various State agency comments follows.

(a) Board of Trustees of the Internal Improvement Trust Fund

Comment: This agency is not in disagreement with the information in the statement; however, it should be noted that the photographs shown in the statement represent conditions of extreme high water during a northeaster in February of this year. This condition is not representative of normal water levels for Duval County Beaches. While it is true that northeasters are frequent occurrences, the construction of bulkheads, breakwaters, and other erosion control activities (including the proposed action) are only temporary solutions to the problem. Historical evidence shows that the natural accretion and erosion of a shoreline in this area is not successfully controlled.

Response: The proposed plan does not aim at control of natural processes but at restoration of previous losses. But it should be noted that because past efforts at shoreline control have been unsuccessful, it does not mean that all future attempts will be futile. In any event, the provision for periodic artificial nourishment contained in the proposed plan will insure that the restored beach will remain useful for the life of the project.

Comment: Past Corps of Engineers activities in this area include the discharge of maintenance dredging spoil on beaches in the vicinity of the Naval Station at Seminole Beach. This is the area shown in the photograph in figure 2. According to the photograph, disposal of this material has done nothing to restore the beach.

Response: Do not concur. Subsequent studies have clearly shown that maintenance dredging materials used for beach nourishment, particularly around Mayport Naval Station and Kathryn Abbey Hanna Park, have been very successful.

Comment: A study should be made to determine if materials dredged from offshore borrow areas or from channels are lighter than

ordinary beach sands, and to what extent these easily removed materials affect the overall maintenance dredging program of the Corps of Engineers at various inlets on the coastline of Florida.

Response: See Appendix 4 for sedimentary analysis.

Comment: This agency has no objection to the restoration of severely eroded beaches; however, we have recommended a study of the already used offshore borrow areas to determine the long-term impact of such areas on the marine environment. We are still awaiting results of such a study. The information in Appendix 1 is not adequate for such a determination.

Response: A study of the offshore borrow area will be made after completion of the initial fill portion of the project.

(b) Florida Department of Transportation

Comment: We have reviewed the transporation aspects of the subject project and have no adverse comments.

Response: None.

(c) Department of State, Division of Archives, History and Records Management

Comment: We have reviewed the draft environmental statement for the above project and find it adequate with respect to its consideration of archeological and historical resources. Page 9 of the statement reads: "A magnetometer survey of the offshore borrow area to determine the location of shipwrecks will be conducted prior to start of construction."

Upon review of the completed tapes, we will be able to address more fully the possible disturbance of submerged historic shipwreck sites.

Response: Upon completion of the magnetometer survey, the tapes will be furnished to the Department of State for evaluation.

(d) Department of Health and Rehabilitative Services

Comment: The project is consistent with the goals and objectives of the Department of Health and Rehabilitative Services. Favorable action is recommended.

Response: None.

(e) Bureau of Intergovernmental Relations

Comment: No comments.

Response: None.

(f) Department of Pollution Control

Comment: The statement contains no quantitative sedimentological data as to sediment density, particulate size ranges, and size distributions which could be used in defining sediment transport. Also, no quantitative physical data is given concerning current directions and velocities at the borrow site and adjacent waters. Therefore, no accurate estimates of the actual area to be affected by increased turbidities can be made, and future nourishment dredge areas are undefined.

Response: See Appendix 4 for sedimentary analysis. As stated in the EIS, future nourishment material will come from maintenance dredging of the Jacksonville Harbor project when the material is suitable and from the offshore borrow area if necessary.

Comment: The impact statement states that considerable initial damage will be incurred by benthic invertebrates at both dredge sites and dump areas but that these losses would be of a "temporary" nature. This is inaccurate as these losses will remain for the duration of the project at the dump site due to a continual winnowing of silt particles which had settled out over the borrow site and the continual turbidity and burial for an annual nourishment project.

Response: The assumption that the dump site will be continually disturbed due to annual nourishment is erroneous. For the sake of convenience, the amount of nourishment needed was given in the EIS as an annual average but, in fact, the nourishment will be performed at intervals of about 2 years when maintenance material is available and at intervals of 4 to 5 years if it is necessary to use the offshore borrow area.

Comment: The draft impact statement states that the turbidity during both dredge and fill operations will be no greater than that occurring during storm periods. This very level of turbidity has been found to cause suffocation of certain inshore fishes.

Response: The referenced comment still remains an accurate assessment of the dredge and fill operations.

Comment: The statement that ". . . the temporary increases in turbidity which will occur will have only short-term effects since fish will avoid areas of highest turbidity. . ." is misleading. The larval fishes and eggs affected by the turbidity cannot avoid turbid areas. Short-term repetitive exposure to low level turbidities above certain low threshold concentrations have been shown to adversely affect growth and development of larval fishes. Bull. Mar. Sci. Gulf and Carib. Vol. 7: 266-275, and to increase susceptibility of adult fishes to infection through intermittent abrasion of delicate respiratory structures. (Weber, 1969).

Response: Eggs and larval fishes in areas of high turbidity will be affected. The extent and duration of this damage will depend upon a number of factors, including currents, time of year and amount of turbidity. In regard to damage to respiratory structures, a report entitled "Gross Physical and Biological Effects of Overboard Spoil Disposal in Upper Chesapeake Bay," prepared by the University of Maryland for the Bureau of Sport Fisheries and Wildlife, concluded that "microscopic examination of 51 specimens of fish gill epithelial tissue from 11 species taken from the area of disposal did not show tissue damage from sediment resuspension."

Comment: The department also questions the accuracy of the following statements in the draft impact (p. 13 "...that fishes in the borrow sites would be 'less affected'"; (p. 14) that the effects from annual nourishment "...would be of even more minor nature than those created by the initial project work." The statement on p. 13 does not consider that benthic habitats in the vicinity would be smothered out of existence, the effects that the lower trophic level destruction would have on the higher trophic levels, and the potential effects the dredging activity would have on the Duval County sports fishery are not taken into account. The statement on p. 14 suggests that the initial dumping would only minimally affect the beach fauna and the annual nourishment even less whereas in both cases the beach fauna would undergo serious deletion or destruction and for an indeterminate period of time.

Response: The EIS has been revised to clarify the points raised. Periodic nourishment will not be performed on an annual basis but generally at 2-year intervals when maintenance dredging of the shoaled portions of the Jacksonville Harbor project is required. If this should prove inadequate to maintain required beach dimensions, the offshore borrow area would be utilized at intervals of 4 to 5 years to make up the necessary amounts. This will minimize stress on beach and benthic fauna.

(g) Department of Community Affairs

Comment: The project is consistent with the goals and objectives of the Department of Community Affairs. Favorable action recommended.

Response: None.

(h) Department of Community Affairs, Div. of Technical Assistance

Comment: This department supports the proposal.

Response: None.

9.06 No comments were received from the following agencies:

USDA - Soil Conservation Service
Health, Education and Welfare
Federal Highway Administration
Housing and Urban Development
Office of the Governor
Office of the Mayor (Jacksonville)
Jacksonville Area Planning Board
National Audubon Society
Florida Audubon Society

APPENDIX 1

Biological Assessment of the Duval County Beach Restoration and Erosion Control Plan

APPENDIX 1

Biological Assessment of the Duval County Beach Restoration and Erosion Control Plan

1. Introduction.

This Appendix presents the results of biological surveys conducted in conjunction with the Duval County Beach Erosion Control Project. Beach surveys were conducted in September 1973 and January 1974 and the offshore borrow area surveys were conducted in January and April, 1974.

2. Methods.

These surveys were limited to the collection and analysis of benthic micro-invertebrate populations inhabiting the areas affected by construction activities. Benthic organisms were selected for this survey because: (1) they are a significant factor in the food chain which supports the commercial and sport fisheries of the area, (2) benthics are directly affected by dredging operations, (3) benthics are relatively immobile and cannot avoid construction activities, and (4) analysis of benthic populations provides an indication of the relative productivity of project areas.

The beach samples were collected at eight locations along the Duval County shore from St. Johns County Point at the Mayport Naval Station to the south county line (See plate 1). All samples were collected with an Ekman grab sampler which samples a constant area of 225cm^2. At each station two grabs were taken in the wash zone and two grabs were taken in the break zone. Sample depths were approximately six inches in the wash zone and two to three feet in the break zone. Bottom materials consisted of fine to medium sand and shell.

Three sets of benthic samples were collected from two proposed borrow areas. All samples were collected with a Pomar grab sampler which samples a constant 529cm^2. One set was collected on 9 January 1974 from an area approximately 4,000 feet off the Duval County shoreline. Bottom materials consisted of varying proportions of sand, shell, and silt; however, this material was determined to be unsuitable for beach nourishment. Two sets (22 February and 30 April 1974) of benthic samples were collected from the borrow area presently under consideration (plate 1). The February survey was preliminary in nature and consisted of five benthic grabs. The April survey was more extensive and included samples from eleven stations. The substrate in this area is also composed of varying proportions of sand, shell and silt. However, the proportion of sand appears to be much greater in this area and represents a suitable source of sand for beach nourishment.

After collection all samples were washed through a U. S. Standard No. 30 sieve, preserved with 5-10% formalin, and stained with rose bengal, a biological stain. In the laboratory, all organisms were removed from the sample, identified to the lowest taxon practical, and enumerated to determine the density per square meter.

3. Results.

Beach population densities (Table 1-1) varied from station to station and between the two sampling periods. The lowest density (346 organisms/m^2 observed was at Station A, January 1974; the highest density (19,385 organisms/m^2 observed was at Station C, January 1974. Average densities for the September samples was 3,234 organisms/m^2 and 5,472 organisms/m^2 for the January samples. This deviates from the expected seasonal population densities since larger populations are expected during the summer due to warmer water temperatures and higher productivity. However, it appears that the average number of taxa collected does indicate the effects of the warmer temperatures and varying productivity. September samples averaged 10.6 taxa per station while January samples averaged 5.9 taxa per station. The dominant invertebrate in the beaches area was the small bivalve Donax, sp., which made up 71.9 percent of the total population.

Borrow area population densities (Tables 1-2 and 1-3) varied from 663 organisms/m^2 at Stations 5-B and 11-B to 13,892 organisms/m^2 at Station 2. The average density for the February samples was 4,015 organisms/m^2 and 2,834 organisms/m^2 for the April samples. The dominant organisms in the borrow area were polychaetes, composing 75.5 percent of the total population in February and 56.7 percent in April. The number of taxa identified did not vary significantly between the February and April sampling programs, averaging 14.8 and 14.5, respectively.

Animals observed during the surveys included Atlantic bottlenosed dolphin, brown pelican, mullet, various jelly fishes, sandpipers, gulls, terns, and black skimmer. Appendix 2 provides a more complete listing of animals mentioned in this statement or known to occur in the area.

TABLE 1-1

Density (expressed in number/m^2) of benthic macro-invertebrates collected 17 September 1973 and 22 January 1974 along the Duval County, Florida, shoreline

Station	A				B				C				D				E				F				G				H			
Location																																
Date	17 Sep 73		22 Jan 74		17 Sep 73		22 Jan 74		17 Sep 73		22 Jan 74		17 Sep 73		22 Jan 74		17 Sep 73		22 Jan 74		17 Sep 73		22 Jan 74		17 Sep 73		22 Jan 74		17 Sep 73		22 Jan 74	
Zone	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break	Wash	Break
Taxa																																
Cnidaria																																
Colony																		22										22				
Renilla reniformis						22																										
Nemertea						22																										
Nematoda															22					22												
Annelida																																
Polychaeta																																
Errant	22	65		22	65	129			108	603			65	366	22		65	108			22	151			43	86			22	130	22	
Sedentary																											22			22		
Arthropoda																																
Copepoda																		43														
Calanoid						22			22	22			43													22			22	43		
Amphipoda																																
Errant		22			151	1960			194	22	129	108	65	108	430	215	173	86		108	65	22	258	86	43	22	43					22
Sedentary						926																										
Isopoda																																
Cassidiscus lunifrons																				22			22									
Mysidacea	43	86				237				280			108	323	22	108		129	22	43										173		
Decapoda																																
Penaeidea																																
Lucifer faxoni						43												194														
Unidentified						22							43	22																		
Hippoidea																																
Emerita talpoida	43		280	22	2197	280	581	86			1045		65				22	43	108				22		3447	22	43		151			452
Brachyura																																
Adult	86					493			43	22																				43		
Zoea																		22				22										
Mollusca																																
Bivalvia																																
Donax sp.	43	172		22	237	1120			733	410	16813	1290	3554	1745	1140	3247	1142	194	1570	1054	710	776	3827	430	43		2774	2322	43		1053	3741
Unidentified	22																															
Echinodermata																																
Ophiuroidea						108																										
Chaetognatha																											22	43			43	
Number of Taxa collected	6	4	1	3	4	13	1	1	5	6	3	2	7	5	5	3	4	8	3	5	3	4	3	3	4	4	5	3	4	5	3	3
Subtotal	259	345	280	66	2650	5404	581	86	1100	1359	17987	1398	3943	2564	1636	3570	1402	819	1700	1249	797	971	4129	538	3576	152	2904	2344	238	411	1096	4215
TOTAL	604		346		8054		667		2459		19385		6507		5206		2221		2949		1768		4667		3728		5248		649		5311	

TABLE 1-2

Density (expressed in number/m^2) of benthic macro-invertebrates collected 22 February 1974 near the mouth of the St. Johns River off the Duval County, Florida, shore line

Station	1		2		3		4		5	
Substrate	silt and shell		silt and sand		fine sand		fine sand and shell		silt and shell	
Depth (feet)	53		58		52		52		49	
Number of Grabs	2		1		1		1		1	
Density	No/m^2	%	No/m^2	%	No/m^2	%	No/m^2	%	No/m^2	%
TAXA										
Porifera					present				present	
Cnidaria										
colony									19	1.5
medusa			19	0.1						
Turbellaria			38	0.3			38	3.5		
Nemotoda			95	0.7	76	3.4	57	5.3	76	6.1
Polychaeta	903	54.9	12,323	88.6	1,134	51.2	434	40.3	360	28.8
Copepoda										
Calanoid			624	4.5	132	6.0	38	3.5	113	9.0
Harpacticoid					57	2.6				
Cumacea										
Oxyurostylis smithi	29	1.8	132	0.9	19	0.9	19	1.8	38	3.0
Isopoda	10	0.6			19	0.9				
Amphipoda										
Gammaridae			38	0.3			132	12.2	76	6.1
Corophiidae			57	0.4						
Haustoriidae							132	12.2	19	1.5
Caprellidae										
Aeginina longicornis					19	0.9			38	3.0
Brachyura			38	0.3						
Mollusca										
Gastropoda										
Opistobranchia										
Thecosomata	67	4.1	76	0.5						
Lamellaridae			19	0.1						
Pulmonata										
Type B	29	1.8	190	1.4	170	7.7				
Type D			19	0.1						
Bivalvia										
Donax sp.	228	13.9	38	0.3	38	1.7	95	8.8	95	7.6
Type B	285	17.3	95	0.7	340	15.4	76	7.1	265	21.2
Type C			19	0.1					38	3.0
Type D			19	0.1						
Echinodermata										
Echinoidea					38	1.7	19	1.8	19	1.5
Ophiuroidea	95	5.8	38	0.3	95	4.3	19	1.8	57	4.6
Chaetognatha			38	0.3	76	3.4	19	1.8	19	1.5
Amphioxus									19	1.5
Number of Taxa	9		20		15		13		17	
Total No/m^2	1,646		13,915		2,213		1,078		1,251	

TABLE 1-3

Density (expressed in number/m^2) of benthic macro-invertebrates collected 30 April 1974 near the mouth of the St. Johns River Duval County, Florida, shoreline

Station	1-B		2-B		3-B		4-B		5-B		6-B		7-B		8-B		9-B		10-B		11-B	
Substrate	sand & shell		coarse sand and shell		sand & shell		silt, sand and shell		silt, sand and shell		silt & sand		silt & sand		silt & sand		silt & sand		silt & sand		sand	
Depth (in feet)	55.0		52.0		55.6		52.6		47.5		58.0		53.8		52.8		50.6		43.4		50.4	
Density	No/m^2	%	No/m^2	%	No/m^2	%	No/m^2	%	No/m^2	%	No/m^2	%	No/m^2	%	No/m^2	%	No/m^2	%	No/m^2	%	No/m^2	%
TAXA																						
Porifera	189	9.1																				
Cnidaria																						
medusae	19	0.9							57	8.6												
polyps							colony															
Nematoda			189	17.8			189	9.4	38	5.7												
Nemertea (fragments)							94	4.7	94	14.1			586	20.7	851	9.8	170	2.5	246	15.0		
Sipunculida	38	1.8			57	2.6			19	2.9	19	0.7			189	2.2			170	10.3		
Annelida																						
Polychaeta	1,134	55.0	208	19.6	1,040	48.2	132	6.6	189	28.5	1,569	60.5	1,096	38.6	5,651	65.0	5,235	76.9	454	27.6	265	40.0
Arthropoda																						
Pycnogonidae															19	0.2						
Crustacea																						
Ostracoda					19	0.9	19	0.9			57	2.2			38	0.4	57	0.8				
Copepoda																						
Calanoida			38	3.6			57	2.8			38	1.5	151	5.3	57	0.7	132	1.9	132	8.0	19	2.9
Harpacticoida			19	1.8																		
Cumacea																						
Cyclaspis variana			19	1.8											38	0.4						
Oxyurostylis smithi	76	3.7			76	3.5	151	7.5	19	2.9	57	2.2	113	4.0	57	0.7	38	0.6	19	1.2		
Isopoda																						
Chirodotea caeca															19	0.2			19	1.2		
Amphipoda																						
Gammaridae	57	2.8	38	3.6	57	2.6	151	7.5	19	2.9	19	0.7	113	4.0			38	0.6			151	22.8
Corophiidae	151	7.3			38	1.8							38	1.3	529	6.1	113	1.7	170	10.3		
Mysidacea																						
Mysis mixta			208	19.6	38	1.8	661	33.0									19	0.3			76	11.5
Mysidopsis bigelowi																			19	1.2		
Decapoda																						
Penaeidea																						
Penaeus sp.	19	0.9					19	0.9													19	2.9
Lucifer faxoni	19	0.9																				
Anomura																						
Hippoidea	19	0.9			19	0.9			19	2.9	19	0.7			19	0.2			19	1.2		
Paguroidea							38	1.9									57	0.8				
Brachyura	113	5.5	38	3.6	132	6.1	57	2.8	19	2.9	151	5.8	208	7.3	132	1.5	208	3.1	57	3.5	38	5.8
zoea							94	4.7			113	4.4			57	0.7	38	0.6	19	1.2	19	2.9
Mollusca																						
Gastropoda																						
Thecosomata					208	9.6					76	2.9	19	0.7	510	5.9	265	3.9				
Pulmonata																						
Type A															38	0.4	19	0.3				
Type B					38	1.8	19	0.9			19	0.7	38	1.3	57	0.7	38	0.6				
Type C															19	0.2						
Type D					113	5.2	57	2.8	76	11.5	57	2.2	76	2.7			19	0.3				
Type E	19	0.9							19	2.9	38	1.5	38	1.3								
Bivalvia																						
Donax sp.			76	7.2	227	10.5					94	3.6	132	4.7	151	1.7	132	1.9			76	11.5
Type A			227	21.4	132	6.1			76	11.5	57	2.2	170	6.0			57	0.8	94	5.7		
Type B							170	8.5			38	1.5										
Type C							19	0.9														
Chaetognatha							19	0.9											38	2.3		
Echinodermata																						
Asteroidea	38	1.8															19	0.3				
Ophiuroidea	170	8.2					38	1.9	19	2.9	170	6.6	57	2.0	284	3.3	132	1.9	189	11.5		
Amphioxus							38	1.9														
Number of Taxa	14		10		14		20		13		17		14		19		19		14		8	
Total No/m^2	2,061		1,060		2,156		2,022		663		2,591		2,835		8,715		6,805		1,645		663	

APPENDIX 2

List of Common and Scientific Names of Animals Mentioned in this Statement or Known to Occur in the Area

Common Name	Scientific Name
Invertebrata	
Mollusca	
Bivalvia	
Wedge shell	*Donax* sp.
Arthropoda	
Crustacea	
Ghost crab	*Ocypode albicans*
Hermit crabs	*Paguridae*
Spider crabs	*Majidae*
Shrimp	*Decapoda*
Sandbugs	*Emerita talpoida*
Mantis shrimp	*Squilla empursa*
Echinodermata	
Starfish	*Asteroidea*
Brittle-stars	*Ophiuroida*
Sand dollars	*Exocycloida*
Pisces	
Chondrichthyes	
Squaliformes	
Nurse shark	*Ginglymostoma cirratum*
Sand tiger	*Odontaspis taurus*
Finetooth shark	*Aprionodon isodon*
Blacknose shark	*Carcharhinus acronotus*
Blacktip shark	*Carcharhinus limbatus*
Smooth dogfish	*Mustelus canis*
Atlantic sharpnose shark	*Rhizoprinodon terraenovae*
Bonnethead	*Sphyrna tiburo*
Smooth hammerhead	*Sphyrna zygaena*
Rajiformes	
Smalltooth sawfish	*Pristis pectinata*
Atlantic guitarfish	*Rhinobatos lentiginosus*
Lesser electric ray	*Narcine brasiliensis*
Atlantic torpedo	*Torpedo nobiliana*
Clearnose skate	*Raja eglanteria*
Southern stingray	*Dasyatis americana*
Atlantic stingray	*Dasyatis sabina*
Bluntnose stingray	*Dasyatis sayi*
Spotted eagle ray	*Aetobatus narinari*
Southern eagle ray	*Myliobatis goodei*
Cownose ray	*Rhinoptera bonasus*
Atlantic manta	*Manta birostris*

Common Name	Scientific Name
Osteichthyes	
Elopiformes	
Ladyfish	*Elops saurus*
Tarpon	*Megalops atlantica*
Clupeiformes	
American shad	*Alosa sapidissima*
Atlantic menhaden	*Brevoortia tyrannus*
Scaled sardine	*Harengula pensacolae*
Atlantic thread herring	*Opisthonema oglinum*
Striped anchovy	*Anchoa hepsetus*
Bay anchovy	*Anchoa mitchilli*
Flat anchovy	*Anchoviella perfasciata*
Myctophiformes	
Inshore lizardfish	*Synodus foetens*
Sand diver	*Synodus intermedius*
Siluriformes	
Sea catfish	*Arius felis*
Gafftopsail	*Bagre marinus*
Batrachoidiformes	
Atlantic midshipman	*Porichthys porosissimus*
Lophiiformes	
Batfish	*Ogcocephalus* sp.
Atheriniformes	
Atlantic flyingfish	*Cypselurus heterurus*
Ballyhoo	*Hemiramphus brasiliensis*
Halfbeak	*Hyporhamphus unifasciatus*
Flat needlefish	*Ablennes hians*
Atlantic needlefish	*Strongylura marina*
Redfin needlefish	*Strongylura notata*
Houndfish	*Tylosurus crocodilus*
Atlantic saury	*Scomberesox saurus*
Sheepshead minnow	*Cyprinodon variegatus*
Mummichog	*Fundulus heteroclitus*
Striped killifish	*Fundulus majalis*
Longnose killifish	*Fundulus similis*
Rainwater killifish	*Lucania parva*
Atlantic silverside	*Menidia menidia*
Gasterosteiformes	
Dusky pipefish	*Syngnathus floridae*
Chain pipefish	*Syngnathus louisianae*

Common Name	Scientific Name
Perciformes	
Striped bass	Morone saxatilis
Black sea bass	Centropristis striata
Sand perch	Diplectrum formosum
Bluefish	Pomatomus saltatrix
Cobia	Rachycentron canadum
Remora	Remora remora
Blue runner	Caranx crysos
Crevalle jack	Caranx hippos
Horse-eye jack	Caranx latus
Atlantic bumper	Chloroscombrus chrysurus
Rainbow runner	Elagatis bipinnulata
Lookdown	Selene vomer
Greater amberjack	Seriola dumerili
Lesser amberjack	Seriola fasciata
Banded rudderfish	Seriola zonata
Florida pompano	Trachinotus carolinus
Permit .	Trachinotus falcatus
Atlantic moonfish	Vomer setapinnis
Dolphin	Coryphaena hippurus
Mutton snapper	Lutjanus analis
Schoolmaster	Lutjanus apodes
Red snapper	Lutjanus campechanus
Gray snapper	Lutjanus griseus
Lane snapper	Lutjanus synagris
Vermilion snapper	Rhomboplites aurorubens
Tripletail	Lobotes surinamensis
Silver jenny	Eucinostomus gula
Porkfish	Anisotremus virginicus
White grunt	Haemulon plumieri
Bluestriped grunt	Haemulon sciurus
Pigfish	Orthopristis chrysoptera
Sheepshead	Archosargus probatocephalus
Spottail pinfish	Diplodus holbrooki
Pinfish	Lagodon rhomboides
Longspine porgy	Stenotomus caprinus
Silver perch	Bairdiella chrysura
Spotted seatrout	Cynoscion nebulosus
Weakfish	Cynoscion regalis
High-hat	Equetus acuminatus
Banded drum	Larimus fasciatus
Spot	Leiostomus xanthurus
Southern kingfish	Menticirrhus americanus

Common Name	Scientific Name
Perciformes (cont'd.)	
Gulf kingfish	Menticirrhus littoralis
Atlantic croaker	Micropogon undulatus
Black drum	Pogonias cromis
Red drum	Sciaenops ocellata
Star drum	Stellifer lanceolatus
Atlantic spadefish	Chaetodipterus faber
Striped mullet	Mugil cephalus
White mullet	Mugil curema
Great barracuda	Sphyraena barracuda
Atlantic threadfin	Polydactylus octonemus
Goby	Gobiidae
Atlantic bonito	Sarda sarda
Atlantic mackerel	Scomber scombrus
King mackerel	Scomberomorus cavalla
Spanish mackerel	Scomberomorus maculatus
Sea robin	Triglidae
Pleuronectiformes	
Three-eyed flounder	Ancylopsetta dilecta
Ocellated flounder	Ancylopsetta quadrocellata
Peacock flounder	Bothus lunatus
Eyed flounder	Bothus ocellatus
Gulf stream flounder	Citharichthys arctifrons
Horned whiff	Citharichthys cornutus
Spotted whiff	Citharichthys macrops
Bay whiff	Citharichthys spilopterus
Spotfin flounder	Cyclopsetta fimbriata
Fringed flounder	Etropus crossotus
Smallmouth flounder	Etropus microstomus
Gray flounder	Etropus rimosus
Shrimp flounder	Gastropsetta frontalis
Slim flounder	Monolene antillarum
Gulf flounder	Paralichthys albigutta
Summer flounder	Paralichthys dentatus
Southern flounder	Paralichthys lethostigma
Broad flounder	Paralichthys squamilentus
Windowpane	Scophthalmus aquosus
Shoal flounder	Syacium gunteri
Channel flounder	Syacium micrurum
Dusky flounder	Syacium papillosum
Hogchoker	Trinectes maculatus
Tonguefish	Symphurus sp.

Common Name	Scientific Name
Tetraodontiformes	
Orange filefish	Aluterus schoepfi
Scrawled filefish	Aluterus scriptus
Gray triggerfish	Balistes capriscus
Planehead filefish	Monacanthus hispidus
Scrawled cowfish	Lactophrys quadricornis
Trunkfish	Lactophrys trigonus
Puffers	Tetraodontidae
Striped burrfish	Chilomycterus schoepfi
Reptilia	
Chelonia	
Loggerhead turtle	Caretta caretta
Green turtle	Chelonia mydas
Aves	
Pelecaniformes	
Brown pelican	Pelecanus occidentalis
Accipitriformes	
American peregrine falcon	Falco peregrinus
Charadriiformes	
Ruddy turnstone	Arenaria interpres morinella
Sandpipers	Scolopacidae
Ring-billed gull	Larus delawarensis
Great black-backed gull	Larus marinus
Bonaparte's gull	Larus philadelphia
Common tern	Sterna hirundo hirundo
Royal tern	Thalasseus maximus maximus
Black skimmer	Rynchops nigra nigra
Mammalia	
Delphinidae	
Atlantic bottle-nosed dolphin	Tursiops truncatus

APPENDIX 3

Notices to Oceanfront Landowners

DEPARTMENT OF PUBLIC WORKS
Engineering Division

April 19, 1974

District Engineer
U. S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32201

Dear Sir:

As information, the enclosed material-, as appropriate, has now been mailed to all riparian oceanfront property owners of record within the ten-mile reach of the Duval County Beach Erosion Control project of the Corps of Engineers.

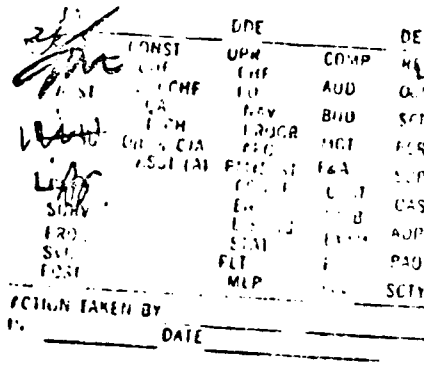
There are some 435 separate addressees involved. The frontage involved extends from the St. Johns County line northward to the St. Johns River jetties.

Very truly yours,

Oscar G. Rawls, P. E.
City Engineer

OGR/mp

Encls. (3) 1) Notice dated 4/19/74 for Jax Beach, Neptune Bch. & Atlantic Bch.
2) Notice dated 4/19/74 for N. of Atlantic Bch. to Jetties.
3) Agreement form.



Area Code 904 / 355-0411 / 220 E. Bay Street / Jacksonville, Florida 32202

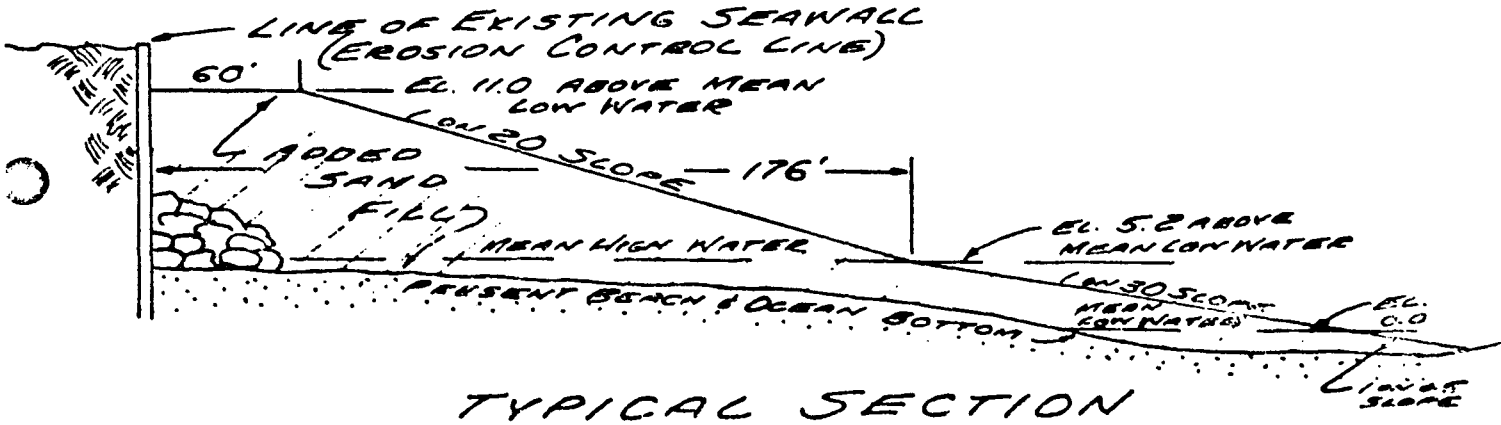
APRIL 19, 1974

DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
901 CITY HALL
JACKSONVILLE, FLA. 32202

NOTICE TO OCEANFRONT LANDOWNERS WITHIN CITIES OF
JACKSONVILLE BEACH, NEPTUNE BEACH & ATLANTIC BEACH

The Jacksonville District, U. S. Army Corps of Engineers has announced that pre-construction planning has begun on the Federal project for beach erosion control in Duval County. The City of Jacksonville is the local sponsor of the project, and as such is charged with obtaining certain elements of local cooperation.

The project includes the renourishment of the beach frontage by adding suitable sand to the 10-mile reach from the St. Johns River south jetty to the St. Johns County line. As planned, the sand would be pumped to the beach by hydraulic dredge from locations well off-shore. A typical section of the beach is shown below indicating how the added sand would be placed seaward of the line of existing seawalls.



TYPICAL SECTION
BEACH RESTORATION
NOT TO SCALE

It should be noted that the erosion control line for the beach frontages in Jacksonville Beach, Neptune Beach, and Atlantic Beach would be the existing concrete seawall where it exists and along straight-line connections between adjacent reaches of wall where it does not exist. The erosion control line would mark the boundary separating upland private property from the public property comprising the beach.

It should also be noted that the top of the fill at the seaward edge of the existing seawalls would be lower than the top of the seawalls, thus providing no obstruction to the seaward view.

(OVER)

NOTICE TO OCEANFRONT LANDOWNERS WITHIN CITIES OF
JACKSONVILLE BEACH, NEPTUNE BEACH & ATLANTIC BEACH.(cont.)

In order to establish the erosion control line, we must obtain the agreement of a majority of the frontage ownership within the 10-mile reach of improvement. You are therefore requested to execute one of the two papers enclosed and return it to the City Engineer (address on letterhead). The other copy is for your records.

Please note that if you are a married male, the law for the action to be valid requires that both husband and wife sign. If title to the property is vested in a married female, the signature of the husband is desired, but is not required for validity.

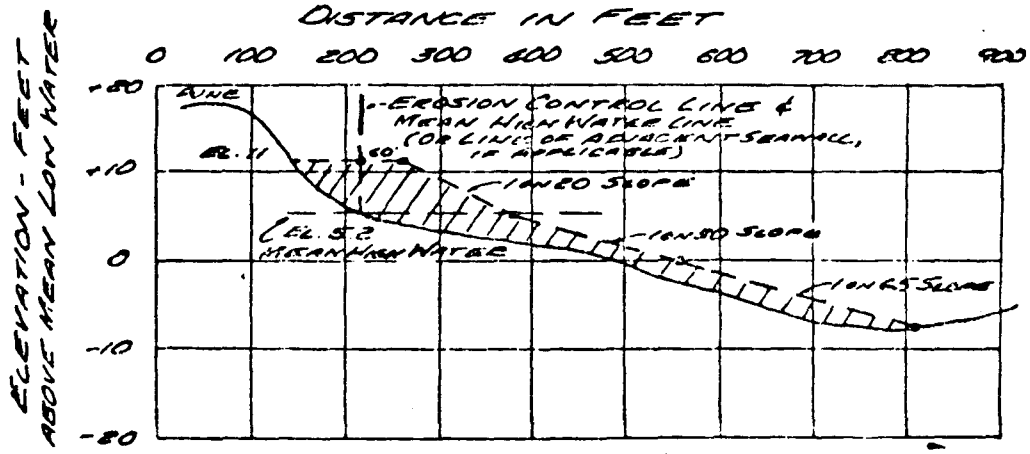
Your cooperation in returning the executed document by MAY 20, 1974 is requested, in order that the benefits of the project can be realized as soon as practicable.

Oscar G. Rawls, P.E., City Engineer

OGR/mp

Encl. (1) Agreement form (in duplicate)

THE SKETCH BELOW IS APPLICABLE TO PROPERTY HAVING NO EXISTING SEAWALL.



TYPICAL SECTION
BEACH RESTORATION

EXISTING SECTION
APPROVED SECTION
AREA TO BE FILLED WITH SAND

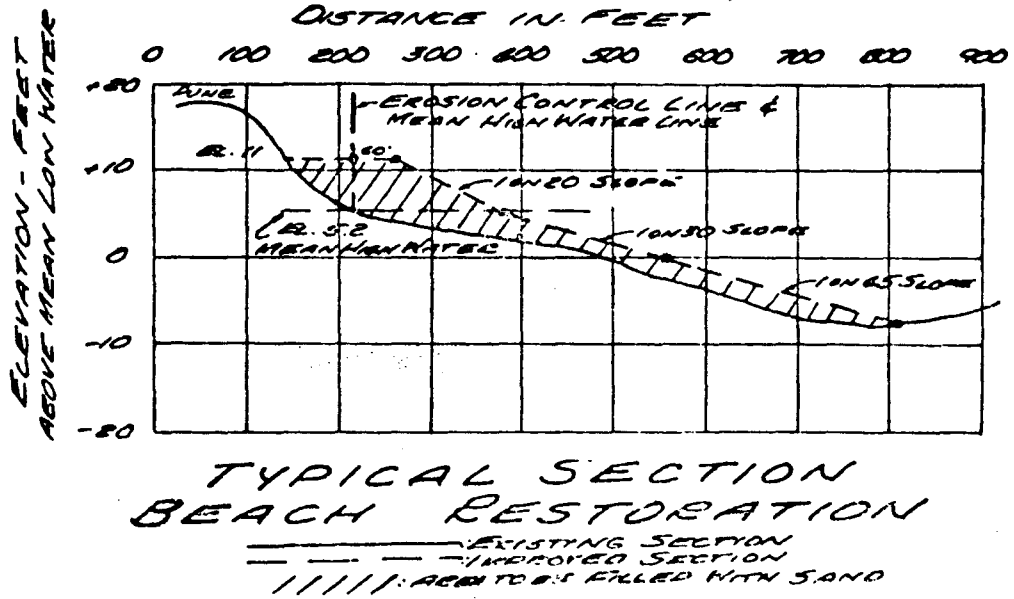
APRIL 19, 1974

DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
901 CITY HALL
JACKSONVILLE, FLA. 32202

NOTICE TO OCEANFRONT LANDOWNERS BETWEEN ST. JOHNS RIVER SOUTH JETTY AND NORTH LIMIT OF ATLANTIC BEACH.

The Jacksonville District, U. S. Army Corps of Engineers has announced that pre-construction planning has begun on the Federal project for beach erosion control in Duval County. The City of Jacksonville is the local sponsor of the project, and as such is charged with obtaining certain elements of local cooperation.

The project includes the renourishment of the beach frontage by adding suitable sand to the 10-mile reach from the St. Johns River south jetty to the St. Johns County line. As planned, the sand would be pumped to the beach by hydraulic dredge from locations well off-shore. A typical section of the beach is shown below indicating how the added sand would be placed seaward of the existing dunes.



TYPICAL SECTION
BEACH RESTORATION

EXISTING SECTION
IMPROVED SECTION
AREA TO BE FILLED WITH SAND

It should be noted that the erosion control line for the beach frontages in reach north of Atlantic Beach would be a northward extension of the line of the existing Atlantic Beach seawall , in that near vicinity, and thence northerly along the line of mean high water to the south jetty. The erosion control line would mark the boundary separating upland private property from the public property comprising the beach.

It should also be noted that the top of the fill at the seaward edge of the existing dunes would be lower than the top of the dunes, thus providing no obstruction to the seaward view.

(OVER)

NOTICE TO OCEANFRONT LANDOWNERS BETWEEN ST. JOHNS RIVER SOUTH JETTY & NORTH LIMIT OF ATLANTIC BEACH (cont.

In order to establish the erosion control line, we must obtain the agreement of a majority of the frontage ownership within the 10-mile reach of improvement. You are therefore requested to execute one of the two papers enclosed and return it to the City Engineer (address on letterhead). The other copy is for your records.

Please note that if you, as a property owner, are a married male, the law for the action to be valid, requires that both husband and wife sign. If title to the property is vested in a married female, the signature of the husband is desired, but is not required for validity.

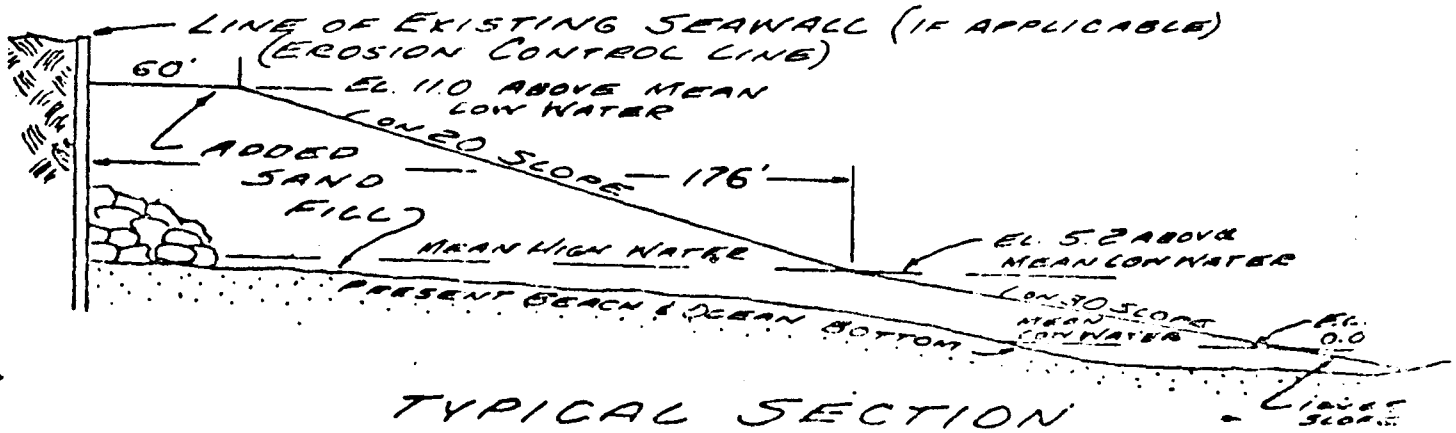
Your cooperation in returning the executed document by MAY 20, 1974 is requested, in order that the benefits of the project can be realized as soon as practicable.

Oscar G. Rawls, P. E., City Engineer

OGR/mp

Encl. (1) Agreement form (in duplicate)

THE SKETCH BELOW IS APPLICABLE TO PROPERTY HAVING EXISTING SEAWALLS.



TYPICAL SECTION
BEACH RESTORATION
NOT TO SCALE

Re: Establishment of Beach Erosion Control Line

Know all men by these presents:

That whereas the City of Jacksonville, Florida, in coordination with the governments of the State of Florida and the United States, is embarking upon a beach erosion control program; and

Whereas, such program requires the cooperation of owners of property abutting the mean high water line along the beaches involved; and

Whereas, Chapter 161, Florida Statutes, empowers the Trustees of the Internal Improvement Trust Fund to establish an erosion control line at the request of the county or city, provided the owners of more than 50% of the number of linear feet of property abutting the proposed line consent thereto in writing; and

Whereas, the establishment of such a line and the restoration or creation of public beaches seaward of said line will be of considerable benefit to the owners of upland property as well as to the public.

Now therefore, the premises considered, the undersigned, as owner of the following described land abutting the proposed erosion control line, to-wit:

acknowledges that he has been advised and understands that the erosion control line, if established, will be the seaward boundary of his property; that he will not gain any lands resulting from the beach nourishment program or from natural accretion seaward of said line; and that he will not lose any of his land which may erode by natural or other actions of the wind and waters. He also understands that if the erosion control line is placed at any point seaward of mean high tide abutting his property, as extended to such line, then such submerged land becomes his as upland owner and he will not be required to pay any compensation for same. In full knowledge of the above conclusions of law, the undersigned hereby consents to and authorizes the establishment of the erosion control line as recommended by the City of Jacksonville to be established by the Board of Trustees of the Internal Improvement Trust Fund.

This instrument shall constitute the consent in writing of the undersigned, as owner of the land herein described above, and abutting the erosion control line, to the location and establishment of the erosion control line by the said Trustees of the Internal Improvement Trust Fund.

Witness my hand at Duval County, Florida, this _____ day of _____, 1974.

_____
Owner

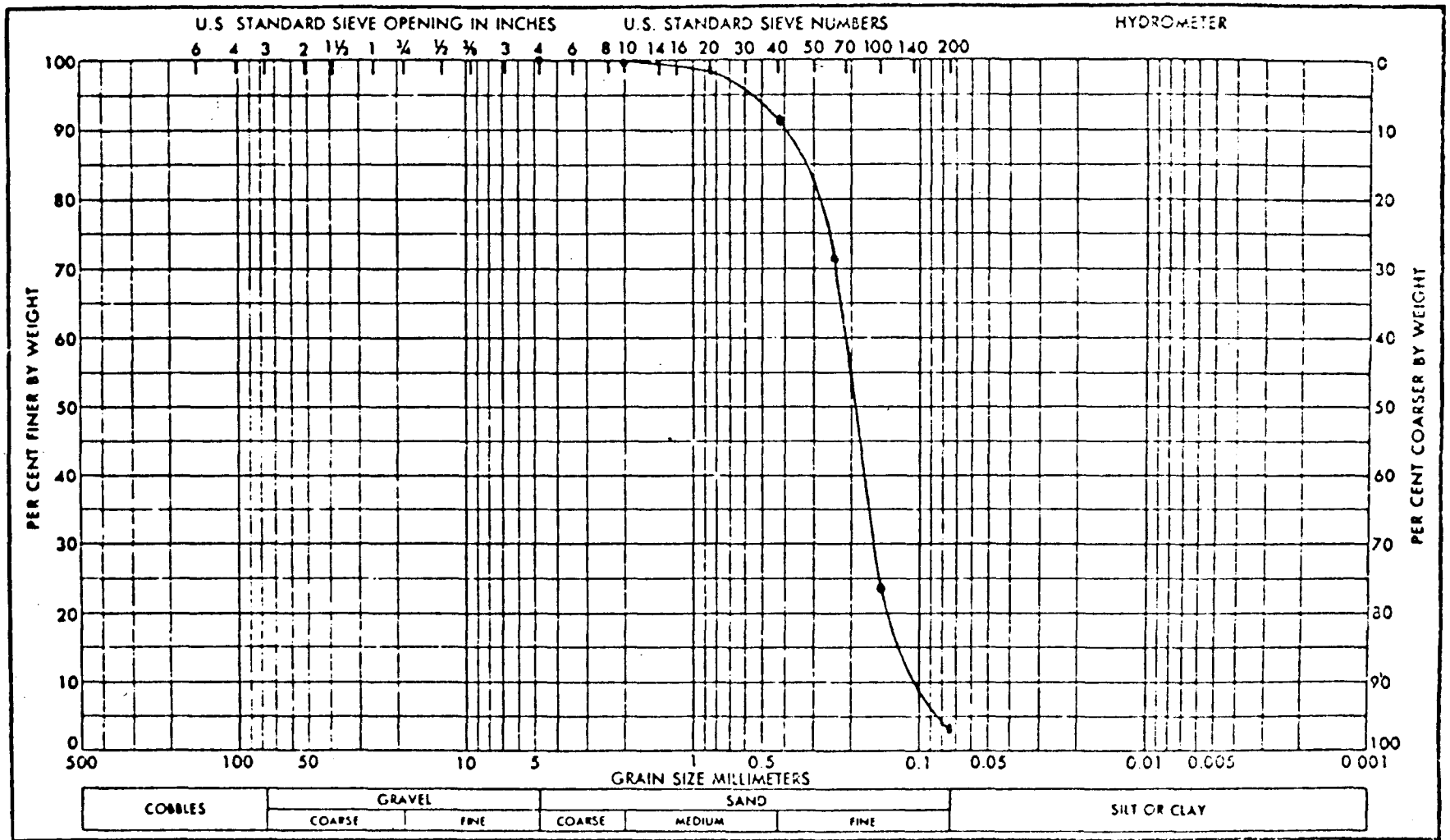
_____
Owner

APPENDIX 4

Sedimentary Analyses of Borrow Site

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, .. 30061

WORK ORDER NO. 8716
REQ. NO. 08-123-E 238-74



SAMPLE NO	DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-10.0'	Gray poorly graded sand (SP) with a trace of coarse & medium sand size shell. Shell approximately 5%	-	-	-	-

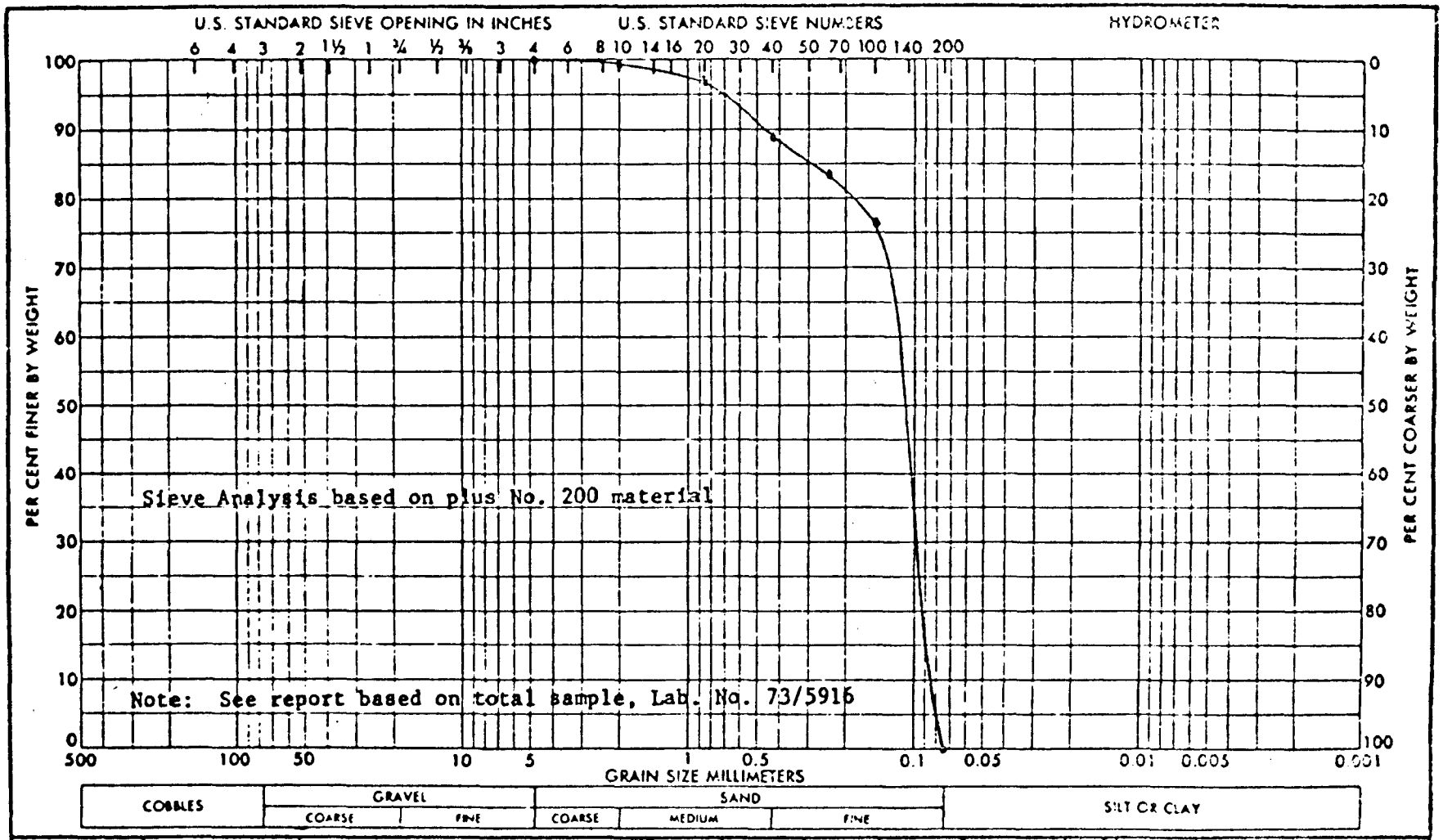
GRADATION CURVES

PROJECT JACKSONVILLE DISTRICT
Duval County Beach Restoration
Lab. No. 73/5914
AREA
BOEING NO CB-DUC-23,
DATE 7 June 1974

ENG FORM 2087 REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE.

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 6716
REQ. NO. 08-123-ENG-238-74



SAMPLE NO	XXXXX DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-10.0'	Washed gradation; Gray poorly graded sand (SP) with a trace of shell fragments.	-	-	-	-
		Shell approximately 3%				

GRADATION CURVES

PROJECT JACKSONVILLE DISTRICT
Duval County Beach Restoration

Lab. No. 73/5893

AREA

BORING NO CB-DUC-26

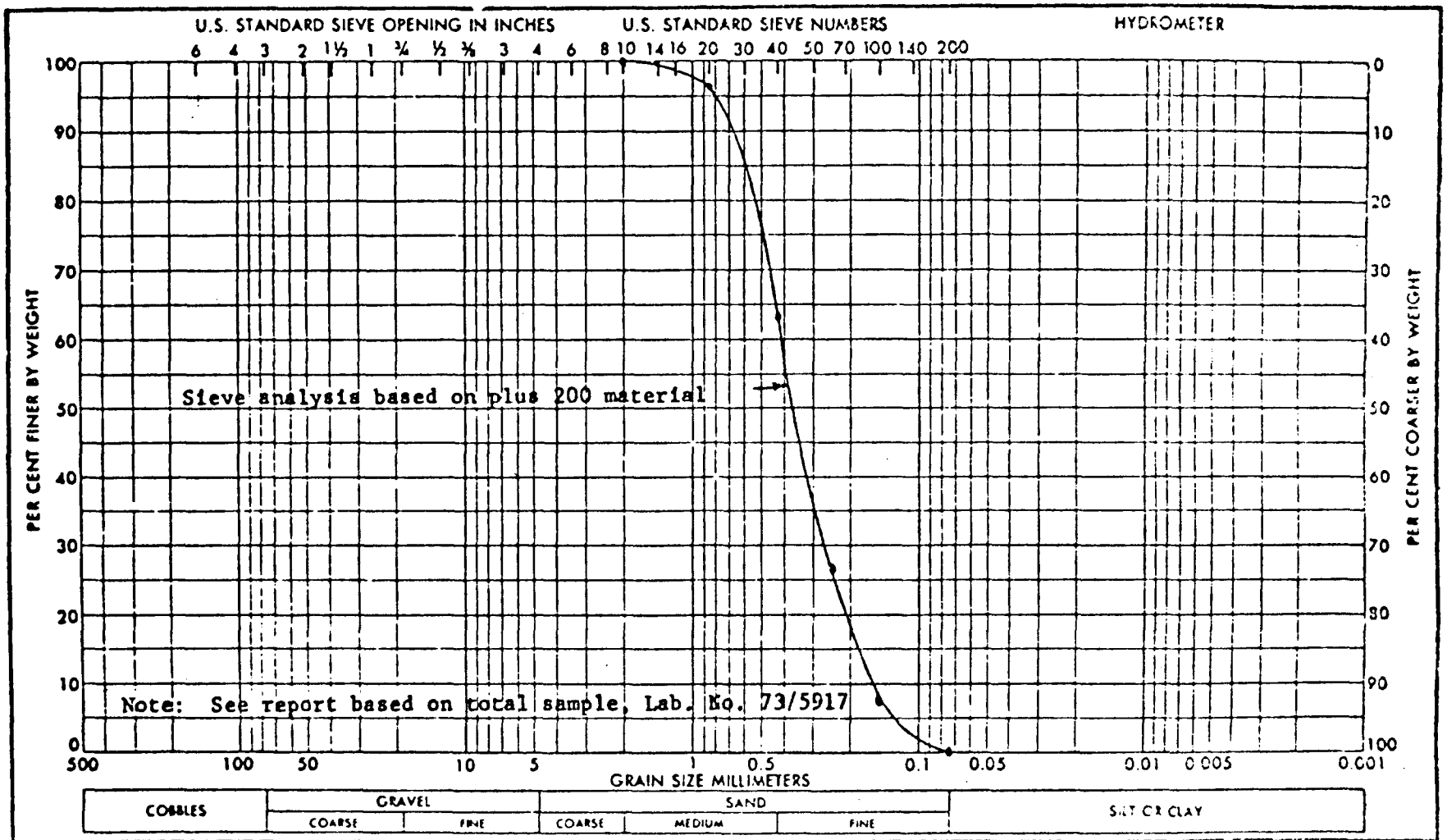
DATE 7 June 1974

ENG FORM 2087 REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE.

(Washed sieve analysis)

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CO. , OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, G 30061

REQ. NO. 06 .23-ENG-238-7
WORK ORDER NO. ' 6



SAMPLE NO	BORING DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	10.0-19.8'	Washed gradation: Gray poorly graded sand (SP)	-	--	-	-

GRADATION CURVES

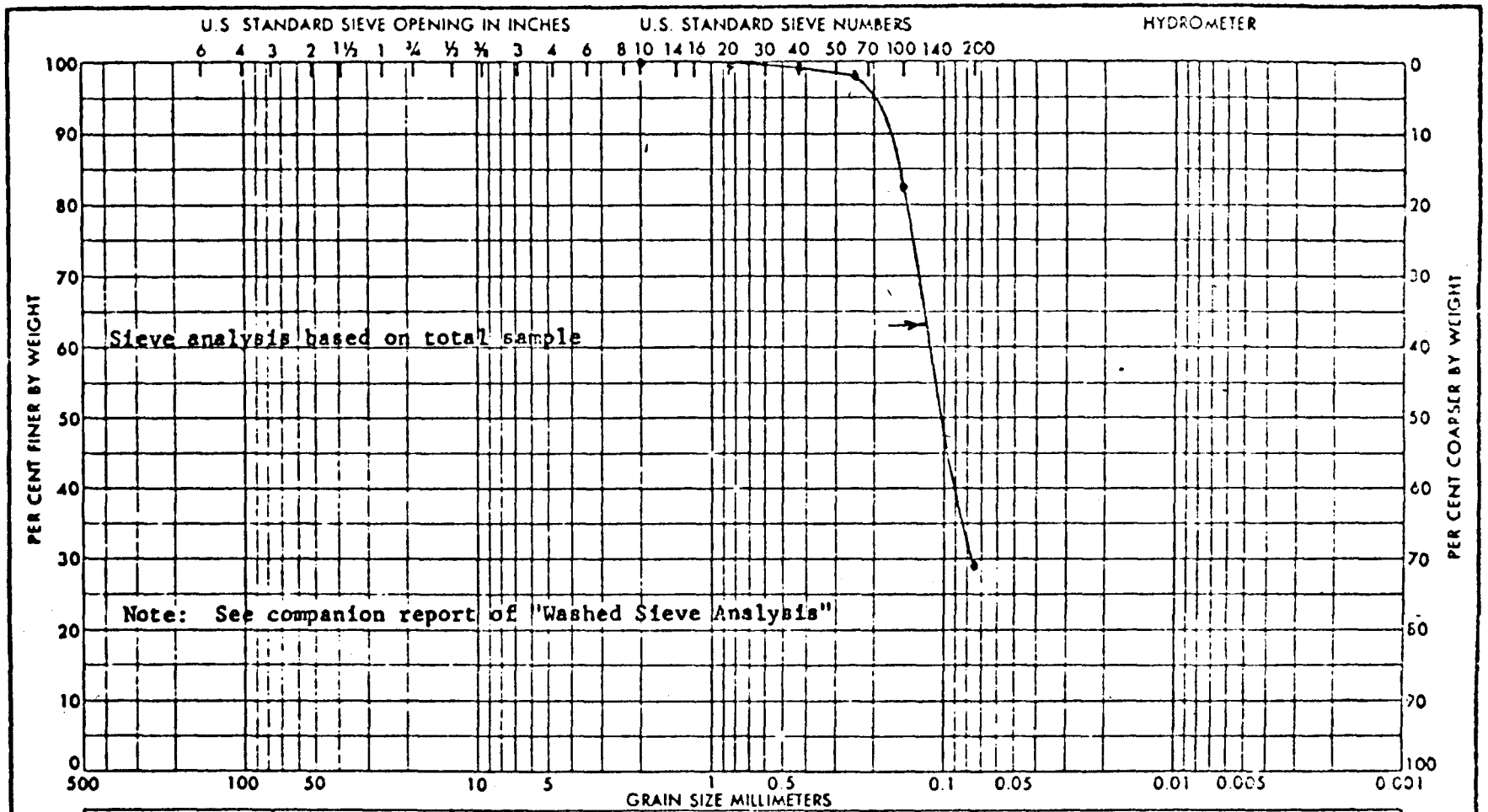
PROJECT JACKSONVILLE DISTRICT Duval County Beach Restoration
Lab. No. 73/5894
AREA
BORING NO CB-DUC-26
DATE 7 June 1974

ENG FORM 2087 REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE

(Washed Sieve Analysis)

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 6716
REQ. NO. 08-123-ENG-236-74



SAMPLE NO	BORING OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-19.8'	Gray silty sand (SM)	-	-	-	-

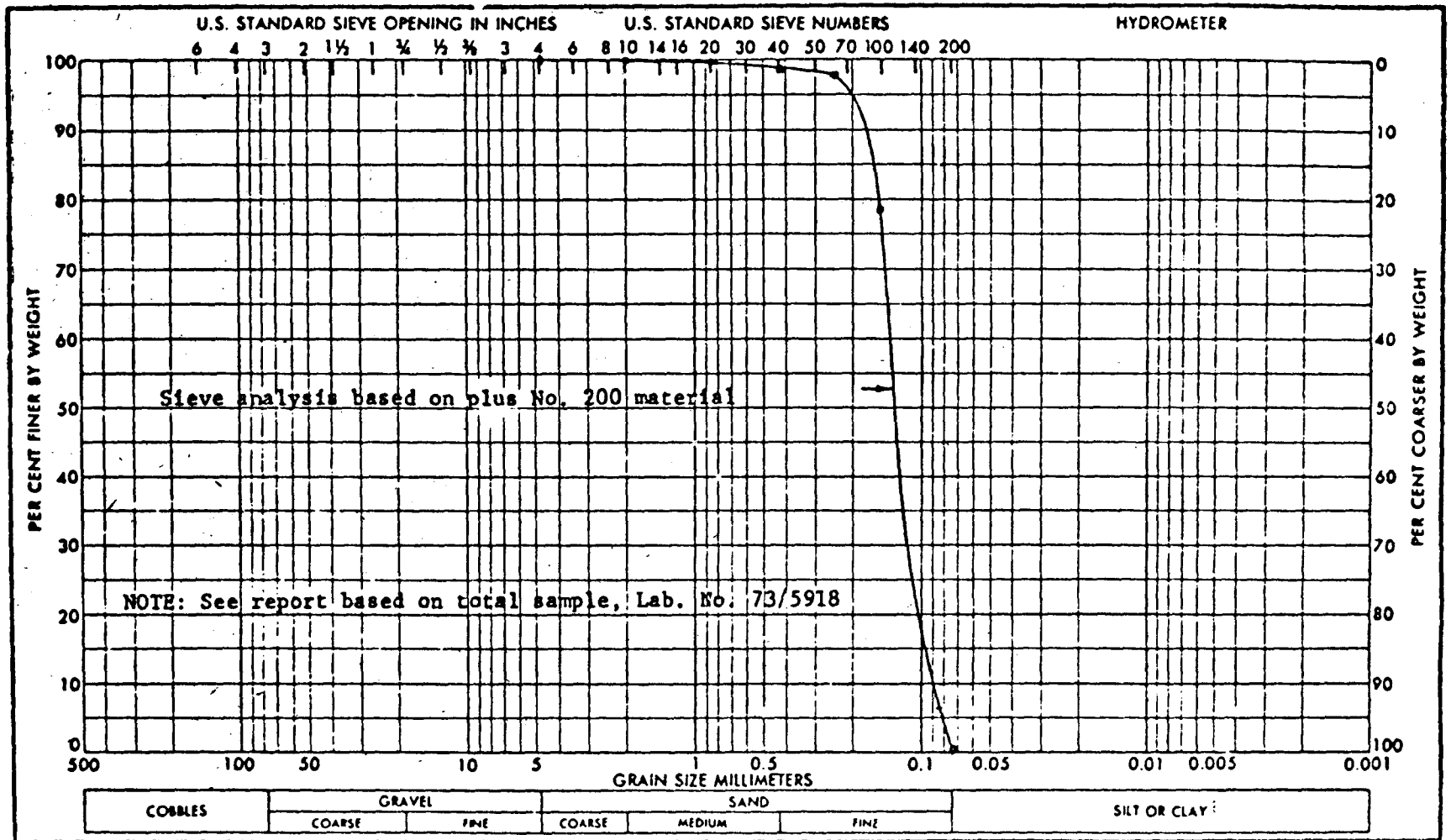
GRADATION CURVES

JACKSONVILLE DISTRICT
PROJECT Duval County Beach Restoration
Lab. No. 73/5918
AREA
BORING NO CB-DUC-27
DATE 7 June 1974

E FORM 2087 REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE

DEPAR NT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATOP
CORPS of ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 3oo6l

REQ. NO. 08-123-E) 38-74
WORK ORDER NO. 8716



SAMPLE NO	DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-19.8'	Washed gradation: Gray	-	-	-	-
		poorly graded sand (SP)				
		with a trace of shell				
		Shell approximately < 1%				

GRADATION CURVES

PROJECT JACKSONVILLE DISTRICT Duval County Beach Restoration

Lab. No. 73/5895

AREA

BORING NO CB-DUC-27

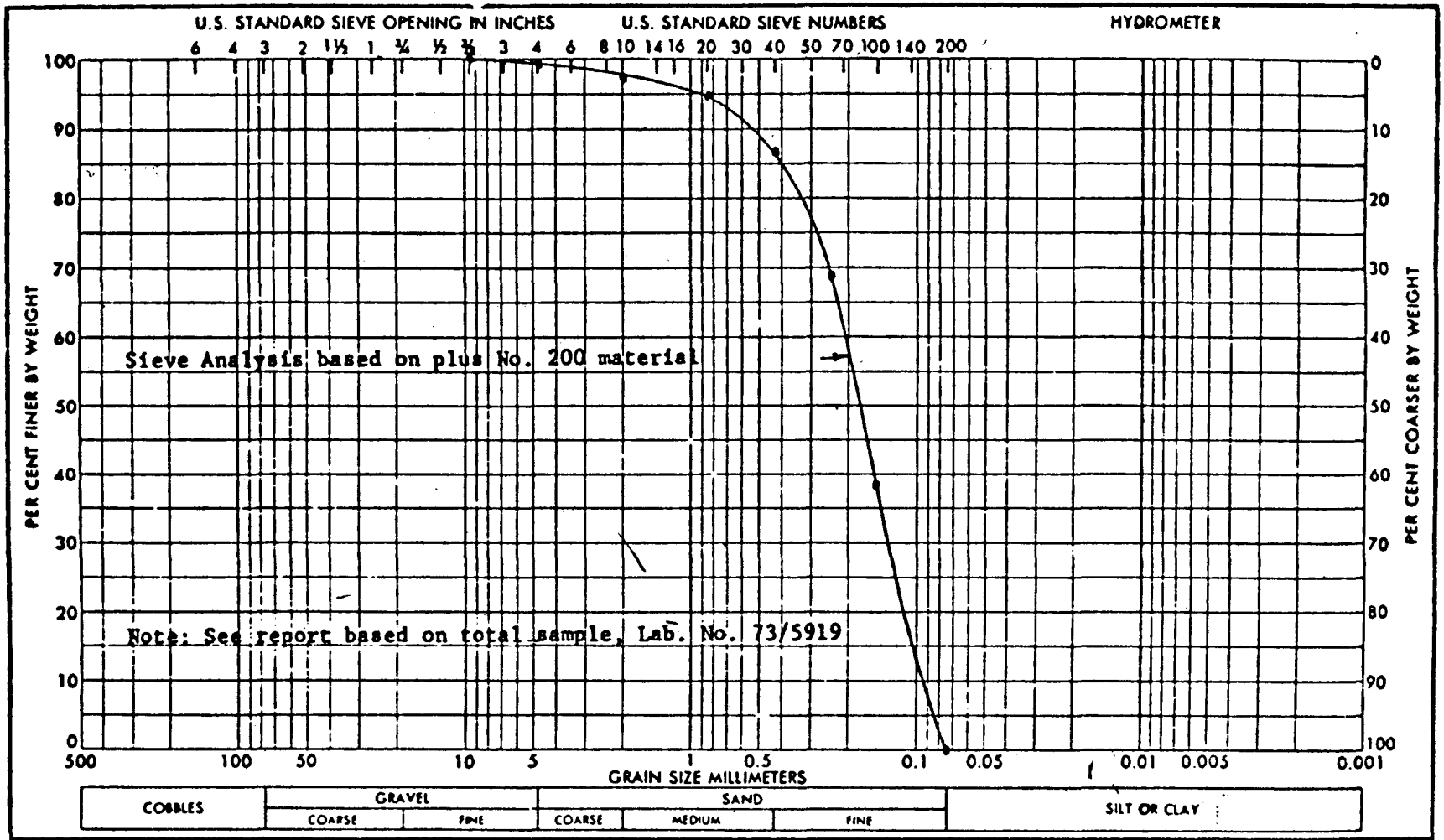
DATE 7 June 1974

ENG FORM 2087 REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE.

(Washed Sieve Analysis)

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

REQ. NO. 08-123-ENG-238-74
WORK ORDER NO. 8716



SAMPLE NO	XXXX DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-10.0'	Washed gradation: Gray	-	-	-	-
		poorly graded sand (SP)				
		with a trace of coarse & medium				
		sand size shell.				
		Shell approximately 5%				

GRADATION CURVES

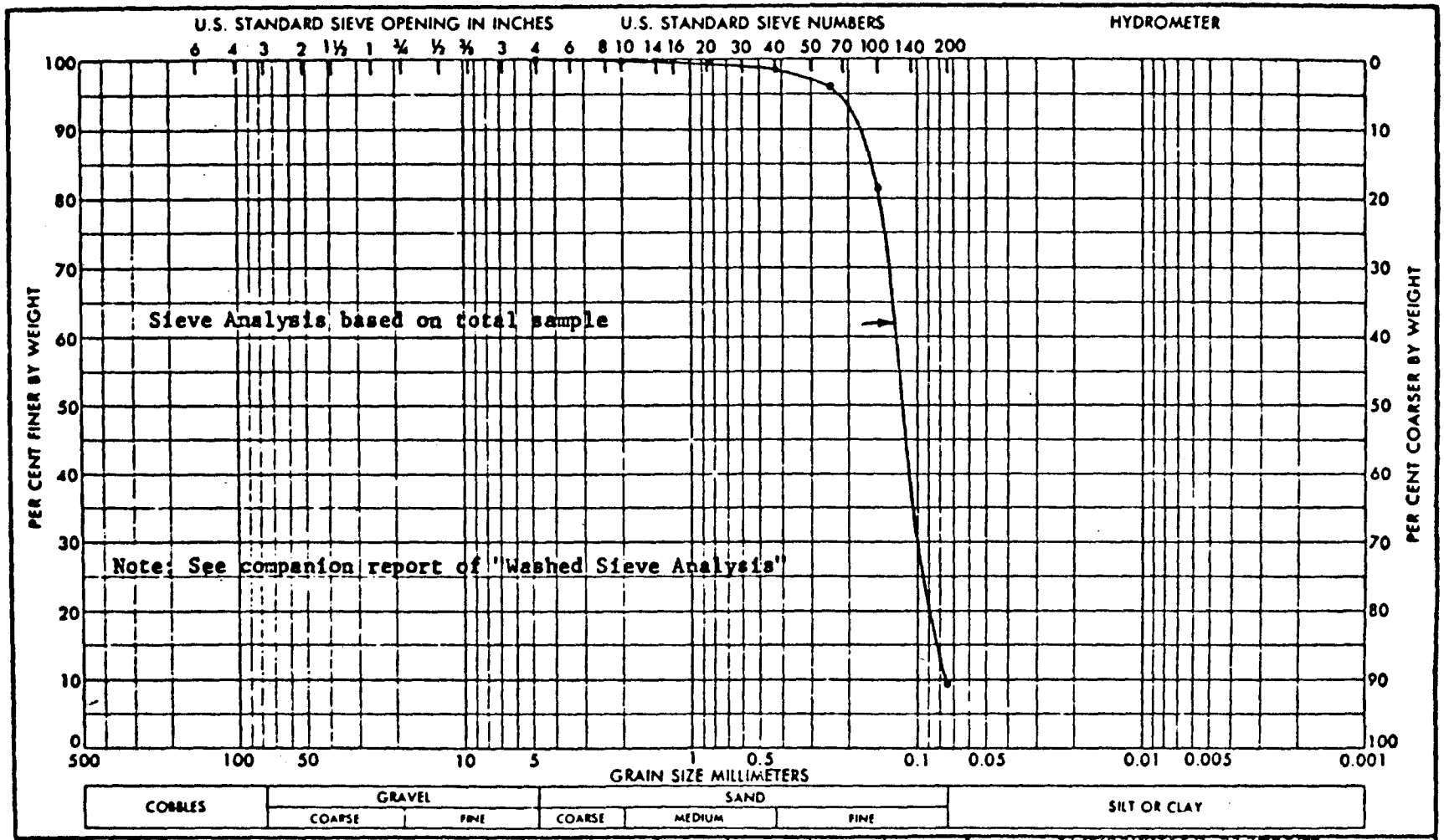
PROJECT JACKSONVILLE DISTRICT
Duval County Beach Restoration
Lab. No. 73/5896
AREA
BORING NO CB-DUC-28
DATE 7 June 1974

ENG FORM 2087 1 MAY REPLACES WES FORM NO 1261, SEP 1962, WHICH IS OBSOLETE.

(Washed Sieve Analysis)

DEPAR ENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATOR ,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 8716
REQ. NO. 08-123-ENG-238-74



SAMPLE NO	DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
	0.0-11.0'	Gray poorly graded silty sand (SP-SM) with a trace of coarse & medium sand size shell	-	-	-	-
		Shell approximately 1%				

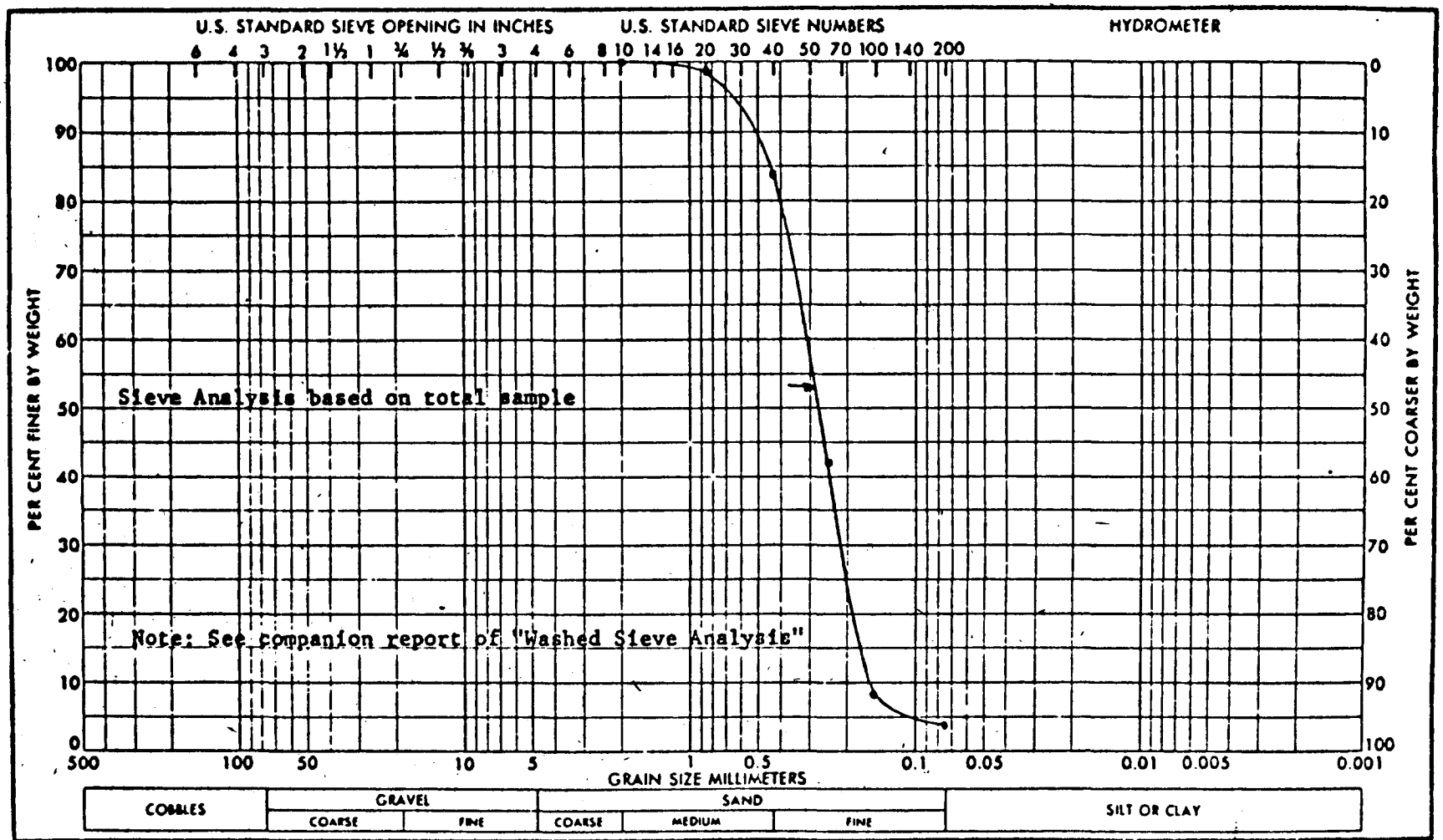
GRADATION CURVES

JACKSONVILLE DISTRICT
PROJECT Duval County Beach Restoration
Lab. No. 73/5921
AREA
BORING NO CB-DUC-31
DATE 7 June 1974

ENG FORM 2087 REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 8716
REQ. NO. 08-123-ENG-238-74



SAMPLE NO	DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
	10.0'-20.0'	Gray poorly graded sand (SP)	-	-	-	-

GRADATION CURVES

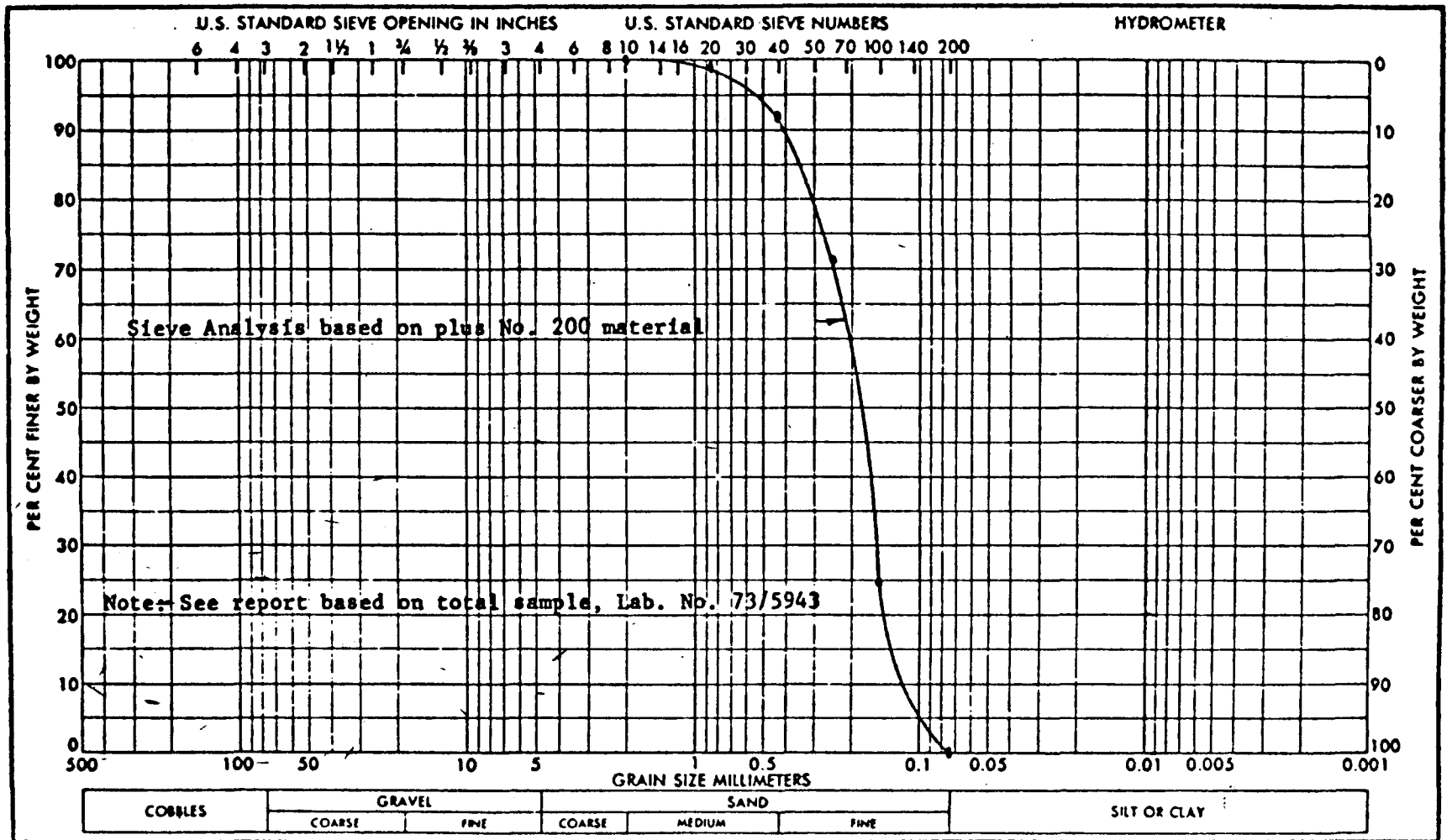
JACKSONVILLE DISTRICT
PROJECT Duval County Beach Restoration
Lab. No. 73/5923
AREA
BORING NO CB-DUC-32
DATE 7 June 1974

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE.

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

REQ. NO. 08-123-ENG- -74
WORK ORDER NO. 8716



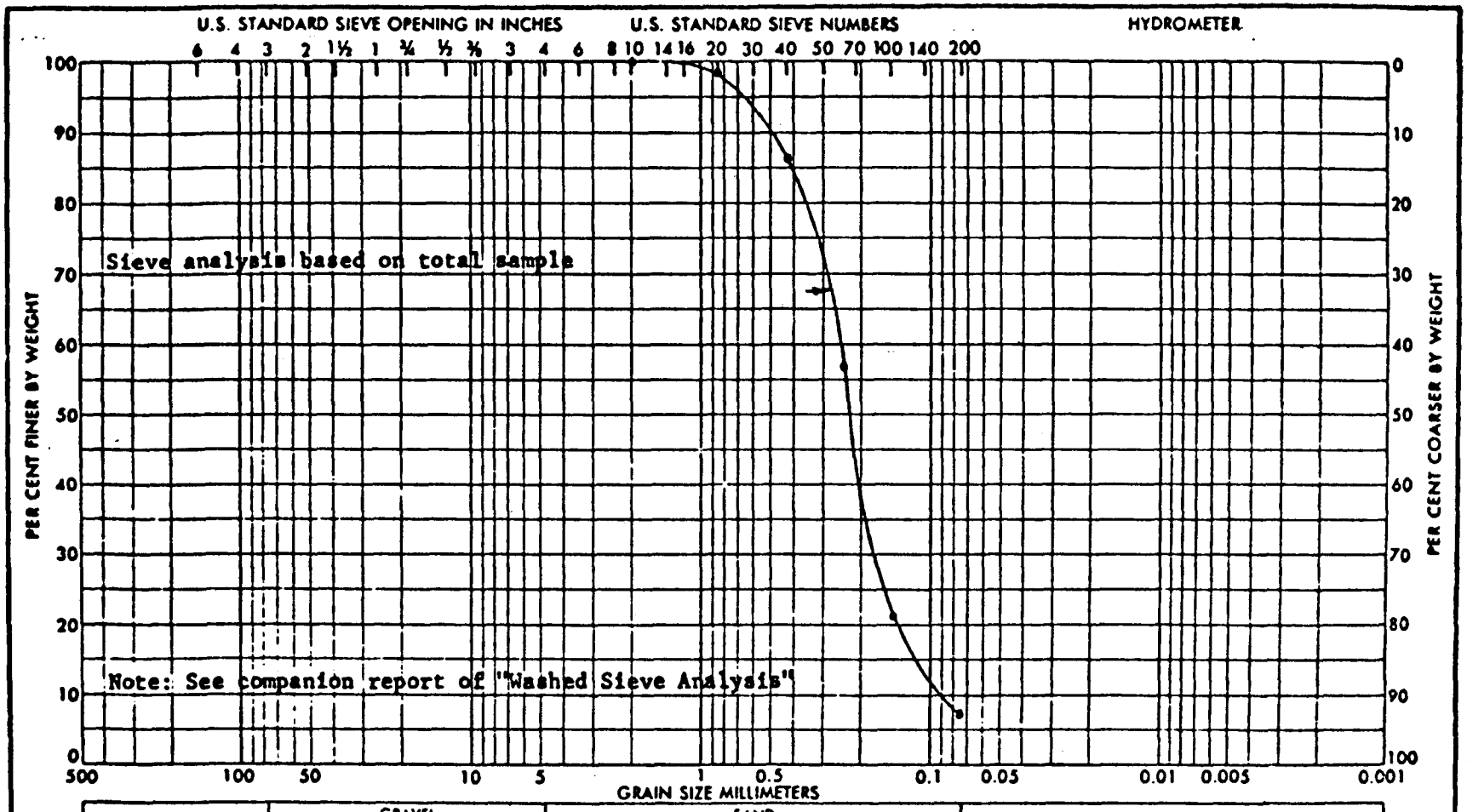
SAMPLE NO	DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	15.0-20.0'	Washed Gradation: Gray poorly graded sand (SP)	-	-	-	-

GRADATION CURVES

PROJECT JACKSONVILLE DISTRICT
Duval County Beach Restoration
Lab. No. 73/5909
AREA -
BORING NO. CB-DUC-49
DATE 7 June 1974

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 8716
REQ. NO. 08-123-ENG-238-74



SAMPLE NO	EXPLORATION DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-11.0'	Gray poorly graded silty sand (SP-SM)	-	-	-	-

JACKSONVILLE DISTRICT
PROJECT Duval County Beach Restoration
Lab. No. 73/5946
AREA
BORING NO CB-DUC-50A
DATE 7 June 1974

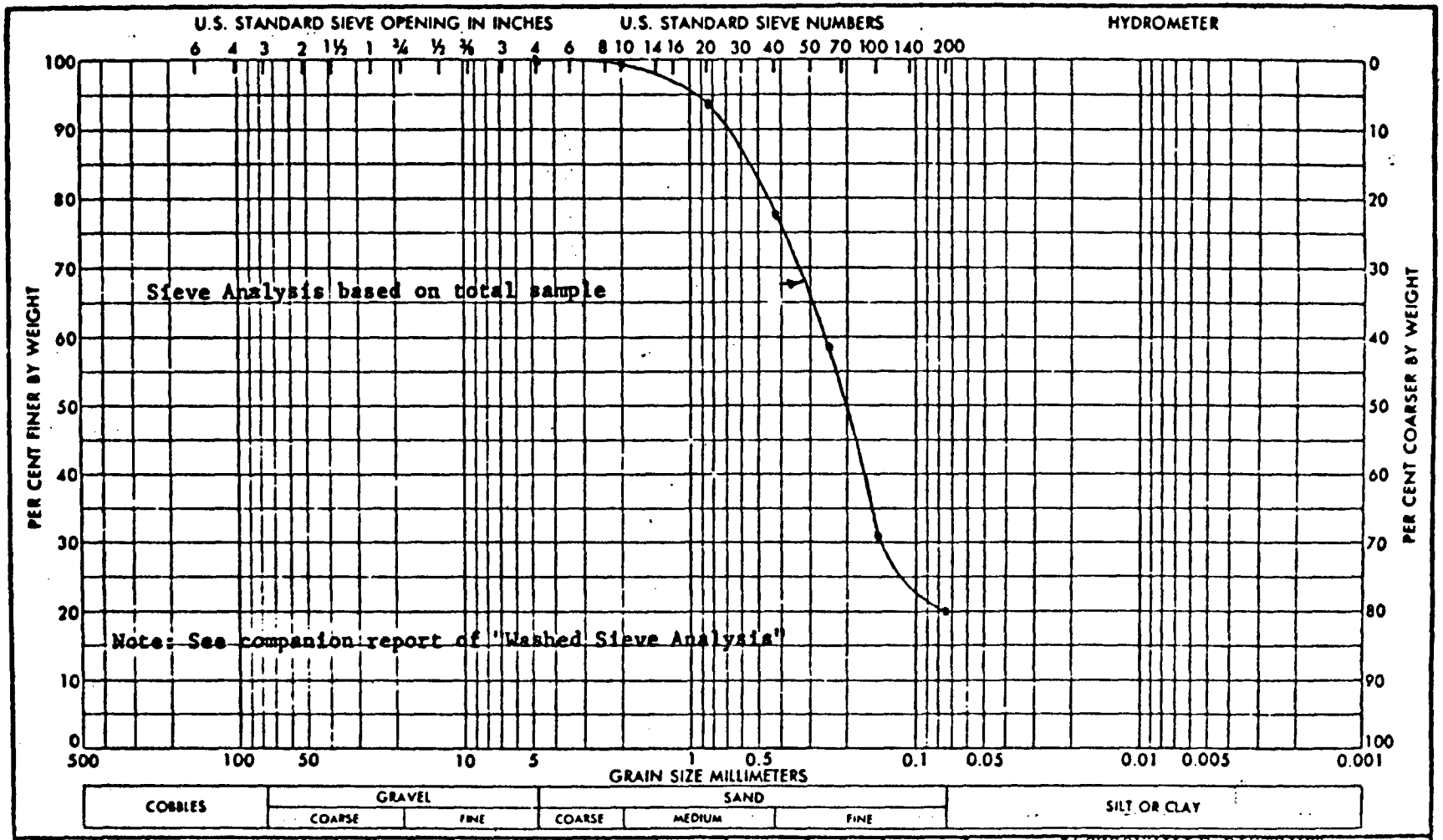
GRADATION CURVES

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

DEPAR NT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATOR
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 8716
REQ. NO. 08-123-ENG-238-74



SAMPLE NO	BORING DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	8.0-19.8'	Gray silty sand (SM)	-	-	-	-

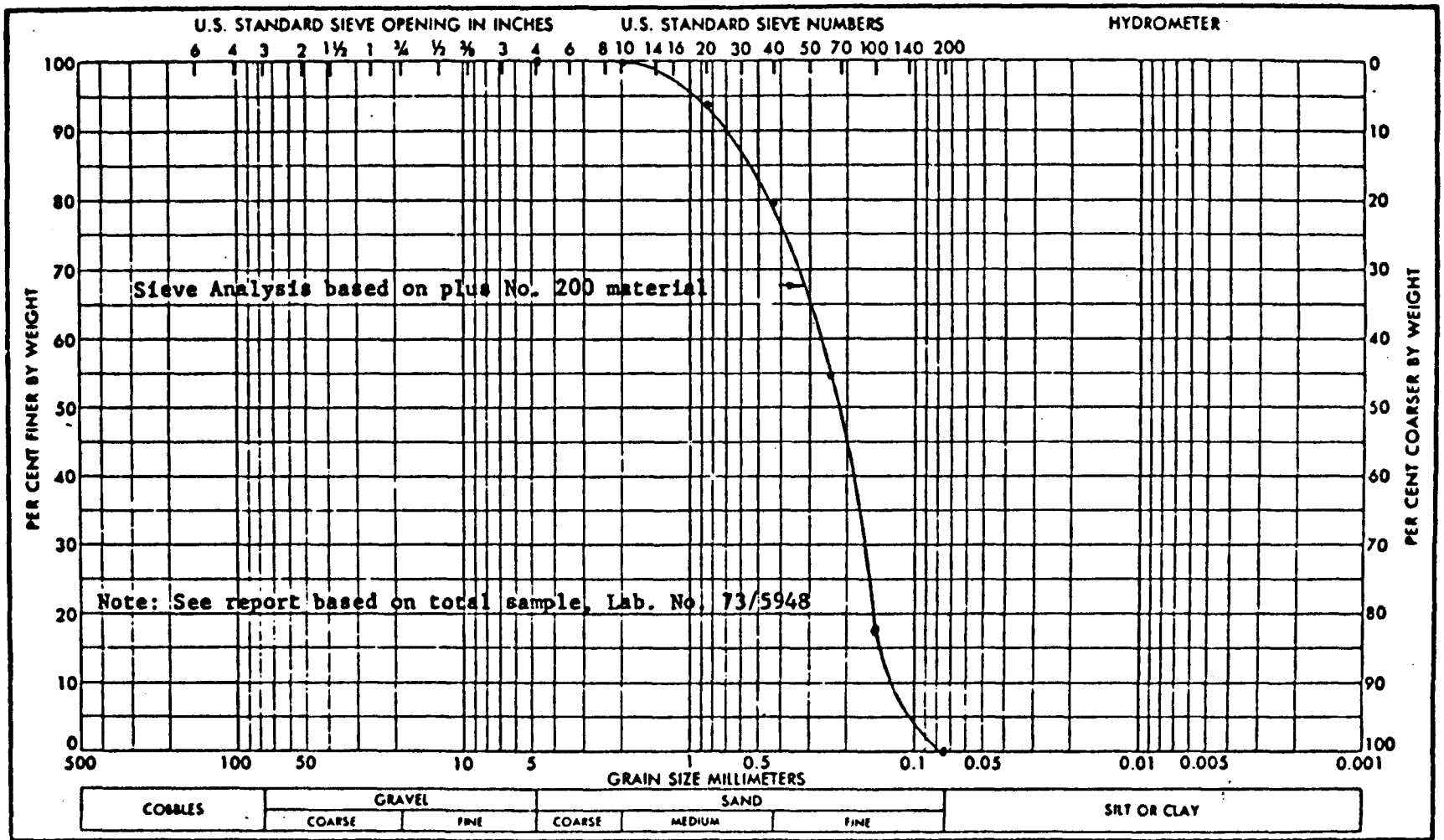
GRADATION CURVES

JACKSONVILLE DISTRICT
PROJECT Duval County Beach Restoration
Lab. No. 73/5948
AREA
BORING NO. CB-DUC-52
DATE 7 June 1974

ENG FORM 2087 REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

REQ. NO. 08-123-ENG-238-74
WORK ORDER NO. 8716



SAMPLE NO	DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	8.0'-19.8'	Washed gradation: Gray poorly graded sand (SP)	-	-	-	-

GRADATION CURVES

PROJECT JACKSONVILLE DISTRICT
Duval County Beach Restoration

Lab. No. 73/5913

AREA

BORING NO. CB-DUC-52

DATE 7 June 1974

ENG [illegible]

(Washed Sieve Analysis)

APPENDIX 5

Letters received by the District Engineer as a result of Coordination of the Draft Environmental Statement

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Southeastern Area, State and Private Forestry
Atlanta, Georgia 30309

July 11, 1974

Mr. James E. Garland
Chief, Engineering Division
Jacksonville District
Corps of Engineers
Jacksonville, Florida 32201

Dear Mr. Garland:

No measurable impact on forest resources is anticipated from the proposed Beach Erosion Control Project, Duval County, Florida. Therefore, the Forest Service, Southeastern Area, State and Private Forestry has no comments on the draft environmental impact statement.

We commend you on the quality and content of the good, concise draft statement and thank you for the opportunity to review it.

Sincerely,

PAUL E. BUFFAM
Group Leader
Environmental Quality Evaluation

United States Department of the Interior

OFFICE OF THE SECRETARY

Southeast Region / 148 Cain St., N.E. / Atlanta, Ga. 30303

EA		DDE		DE
[illegible]	CONST	OPR	COMP	RE
VE	CHF	CHF	AID	OofC
ASST	S&I CHF	FO	DED	SFT
VE	CA	NAV	MGT	PER
DESG	TECH	Prog Sta	F&A	EOP
CD	O/EQC/A	A-E	COST	OAS
CHIEF	ASST(A)	REAL PR	DISB	ADP
SURV		PERM	EXAM	PAO
PROG	SUP	FMF	PROP	SCTY
SVC	CONT ADM	PLT	FIN	EEO
	PROC BR	EMC		
	DD	ELEC		
		MVS		

ACTION TAKEN BY_____

DATE_____

ER-74/746

August 6, 1974

District Engineer
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32201

Dear Sir:

As requested in your letter to the Assistant Secretary, Program Policy, we have reviewed the draft environmental statement for the proposed Duval County, Florida, Beach Erosion Control project for project effects on national park areas and historic sites, outdoor recreation, hydrology, geology, mineral, and fish and wildlife resources.

We offer the following comments for your consideration:

General

Your draft environmental impact statement, for the most part, adequately assesses the impact of the proposed work on the marine environment.

Specific

Within Section 2 it should be noted that there is no known current mineral production in Duval County. However, past production of ilmenite, rutile, zircon, monazite, and oyster shell has been recorded.

Significant adverse environmental impacts related to the geology of the area of the proposed project are not anticipated.

Page 4. (2.05) - The statement omits mention of previous corrective actions such as the 1973 1 million cubic yard and the 1974 600,000 cubic yard deposits made on the lower portion of Mayport Beach and part of Kathryn Abbey Hannah Beach.

Page 5. (2.08) - This paragraph should be modified to indicate that Kathryn Abbey Hannah Beach will be closed to motor vehicular traffic by January 1975 and that presently the 7,800-foot beach is blocked at both ends with only limited vehicular traffic at the center to be eliminated by the above date.

Page 9. (2.16) - In this section it is stated that there are no known archeological sites in the immediate project area and that the National Register of Historic Places, 1972, lists no historical sites in the immediate area. Additional coverage is needed. The fact that there are no known archeological sites may merely result from the fact that the area has not been studied to determine whether such sites are in existence; it is incumbent upon the agency carrying out the project to make this determination through an archeological survey carried out by a professional archeologist trained in the identification of such items. Also the National Register of Historic Places is updated by publication in the Federal Register the second week in February of each calendar year, and is updated monthly. The National Register Listing reference should be the latest year and month. Also, since the National Register is in an early state of development and under Executive Order 11593 and the Procedures for Compliance with the Historic Preservation Act of 1966, as published in the Federal Register of January 25, 1974, each federal agency is required to identify and to place in nomination to the National Register those sites that may be affected by its projects, it is incumbent upon you to carry out such a study. In addition, we suggest that you contact the State Historic Preservation Officer regarding any places that he may have in the process of nomination to the National Register of Historic Places.

We recently forwarded to you, with our comments on the draft environmental impact statement for the Tampa Harbor deepening project, a booklet entitled, "Preparation of Environmental Statements: Guidelines for Discussion of Cultural (Historic, Archeological, Architectural) Resources." We believe these guidelines will be helpful in the preparation of the final statement.

Pages 11-15. (3.0) - Within this section it should be noted that no foreseeable adverse impact on mineral resources will result from an operation of this nature. A statement to this effect should be incorporated in the environmental impact statement.

Page 16. (6.0) - We do not agree with the conclusion of Section 6.0 regarding the impact of the project on the natural productivity of the area since the destruction of so many benthic organisms will have a significant, though temporary effect on area productivity, instead of the insignificant impact as stated in your draft environmental impact statement.

We appreciate the opportunity to comment on this draft statement.

Sincerely yours,

June Whelan

(Miss) June Whelan
Special Assistant to the Secretary
Southeast Region

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
1421 PEACHTREE ST., N. E.
ATLANTA, GEORGIA 30309

July 15, 1974

Mr. James L. Garland
Chief, Engineering Division
Jacksonville District
Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32201

Dear Mr. Garland:

We have reviewed the Draft Environmental Impact Statement for the Beach Erosion Control Project in Duval County, Florida and have no objection to the proposed action if proper environmental precautions are taken.

The use of offshore dredged material, essentially native material similar to that of the beaches, should cause no unnatural alteration to the water or other environmental assets. Material from the St. Johns River, on the other hand, could contain excessive organic materials, which could cause degradation to the water. The city of Jacksonville adds many pounds of organic matter from its 92 raw sewage outfalls to the already organically rich river waters coursing through Jacksonville Harbor. This material plus toxins found in municipal wastewater and in urban run-off percipitates out in areas of Jacksonville Harbor. Should this river material be used, we recommend a monitoring system to insure detection of unsuitable materials at the earliest possible time so that an alternate supply -- from an offshore site -- could be used. The potential for noxious odor development upon exposure to air of the dredged material should also be evaluated prior to institution of its use on public beaches.

The Statement should also identify the borrow areas. If they are in the same general area yearly, the benthic community could be permanently damaged by siltation from dredging operations.

The Statement should also discuss the suitability of artificially filled beaches for seat turtle propagation and the effect that the several-year loss of the intertidal feeding zone is going to have on the food supply of resident and migrant avifauna.

Finally, biological surveys should be conducted after project completion to determine whether or not recolonization on the beaches and borrow areas is being accomplished.

We would like to have five copies of the final environmental impact statement when it is available. If we can be of further assistance in any way, please let us know.

Sincerely,

David R. Hopkins

David R. Hopkins
Chief, EIS Branch

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230

July 18, 1974

Mr. James L. Garland
Chief, Engineering Division
Jacksonville District, Corps of Engineers
Department of the Army
P. O. Box 4970
Jacksonville, Florida 32201

Dear Mr. Garland:

The draft environmental impact statement for the proposed "Beach Erosion Control Project, Duval County, Florida," which accompanied your letter of June 4, 1974, has been received by the Department of Commerce for review and comment.

The statement has been reviewed and the following comments are offered for your consideration.

1.0 Project Description

Page 2, paragraph 1.02. The statement should mention the prospect of 600,000 cubic yards of material from channel maintenance dredging in Jacksonville Harbor being made available in 1974 for beach nourishment.1/

This section should also discuss in greater detail the type of dredging to be undertaken. For example, are shallow trenches or deep pits to be dug? Will excavations be aligned with current flows or against them?

2.0 Environmental Setting Without the Project

Page 3, paragraph 2.03. The statement excludes mention of erosional rates at Mayport. Figure 2 gives the impression of accretion rather than loss; if this is correct, reasons should be stated for inclusion of the 5700 ft. of Mayport beach within the project.

Page 4, paragraph 2.05. Measures of success or lack thereof of the dune stabilization and regeneration program should be given. If the program is successful, for example, then the possibility of incorporating a similar stabilization and regeneration program into the subject project could be considered as an alternative.

3.0 The Probable Impact of the Proposed Action on the Environment

Page 11. A more accurate description is needed of the quantity and quality of beach replenishment material to be taken from Jacksonville Harbor. The Harbor's "organic-rich" sediments[1] may be undesirable for beach nourishment or for redistribution into the water column.

Page 12, paragraph 3.01. Sedimentary analyses describing the varied proportions of sand, silt, and shell at the borrow site should be appended and referenced.

Page 12, paragraph 3.02. Evidence to support the statement that organisms similar to those destroyed at the borrow area will re-establish themselves within 6 to 18 months should be presented. A study of offshore borrow pits two to three years old showed that number and diversity of benthic fauna were lower in the borrow area then in unaltered adjacent areas.[2]

Page 13, paragraph 3.03. In addition to the possibility that beach nourishment during the May - September period could bury sea turtle eggs, consideration should be given to the distinct possibility that females attempting to nest would be driven off by beach nourishment activities.

Page 14, paragraph 3.04. The statement should describe the location of productive fishing reefs. Fishing piers in the area should also be described, and the statement should address the potential adverse effects of dredging activities on these piers.

5.0 Alternatives to the Proposed Action

Pages 15-16. As noted in the statement, sea turtles utilize specific portions of the project area from May through September. The National Marine Fisheries Service recommends that the original nourishment and later replenishment activities take place from October through April in those areas utilized by sea turtles.

The impact statement does not address proper land use management as an effective tool to control beach erosion or to reduce its impact on human activities. For example, the data and photos (e.g. page 3) of developed and non-developed areas clearly show the impact of improper land use controls in augmenting and exacerbating the beach erosion problem. Simply stated, beach erosion is increased where man's activities have affected the natural dynamic equilibrium along the shore. In addition, the impact of that erosion is greater where man's structures extend onto the beach.

There is in general an inadequate discussion of the alternatives to this action with relation to the preceding comment. More detailed discussion should be given to the potential for control of beach erosion through proper land use management. This discussion should include, as a minimum, the potential for land use controls governing the location, intensity and uses of development, structures and man's activities on the beach, the back dunes and near shore vegetation. The use and abuse of sea walls, groins and jetties, and their impacts on beach erosion and inducing construction near the beach should be examined. The issue of motor vehicle access and use on the beaches (now permitted) should also be addressed; it is suggested that such use be restricted or prohibited.

In many areas this project would appear to be designed to create a new beach rather than simply restore old beaches and, as such, is questionable under this provision. Why should the public pay for new beaches to serve increasing high rises? Why should not those land owners who have created the erosion problems through improper land use pay for restoration of the beach? (Funding of this project should also be a subject for discussion under the alternatives section.)

Insofar as public funds are being used, how is public access guaranteed? Although public access may not have been a problem in the past, with the large-scale development of new high rises alluded to in this statement, how will public access be continued to be guaranteed in the future?

It appears that the last public hearing concerning this project was in 1963. Because the public knowledge, understanding and awareness of the overall problems concerned in beach restoration have advanced considerably in the last 11 years, it is suggested that a new public hearing be held prior to any decision on this project.

For your information, the most recent tabulated sea level observations and reductions show that sea level has been rising (relative to the land) at an average representative rate (least squares on annual means) of 2.69 millimeters per year (standard error ± .39 millimeter per year) since 1929 at Mayport, Florida (the closest station).

The impact assessment is primarily restricted to addressing the impact on the beach proper. The discussion of the impact on deepwater organisms in the borrow area is inadequate. In view of the depressed and endangered population of turtles, it is recommended that a prohibition against restoration activities be provided for the months of May through July. Similar consideration should be made for the nesting season of the beach terns.

Thank you for giving us an opportunity to provide these comments which we hope will be of assistance to you. We would appreciate receiving a copy of the final statement.

Sincerely,

Sidney R. Galler

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Attachment - Footnotes

Footnotes

1. Draft Environmental Impact Statement --Jacksonville Harbor (Maintenance Dredging), U.S. Army Engineer District, Jacksonville, Florida. April, 1974.

1. Ibid

2. Saloman, C.H. 1974. Physical, chemical, and biological characteristics of the nearshore zone of Sand Key, Florida, prior to beach restoration. U.S. Army Corps of Engineers, Interservice Support Agreement No. CERC 73-27.

STATE OF FLORIDA

Department of Administration

Division of State Planning

660 Apalachee Parkway - IBM Building

TALLAHASSEE

32304

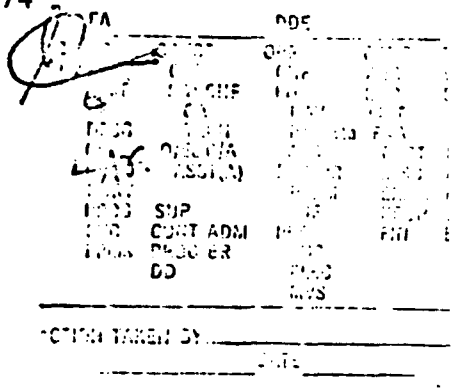
(904) 488-2401

Reubin O'D. As
GOVERNOR

Earl M. Starnes
STATE PLANNING DIRECTOR

L. K. Ireland
SECRETARY OF ADMINIST

July 31, 1974



Mr. James L. Garland
Chief, Engineering Division
U.S. Army Corps of Engineers
P. O. Box 4970
Jacksonville, Florida 32201

Dear Mr. Garland:

Functioning as the state planning and development clearinghouse contemplated in U.S. Office of Management and Budget Circular A-95, we have reviewed the following draft environmental impact statement:

U. S. Army Corps of Engineers: Duval County Beach Erosion Control Project SAI No. 74-1333E

During our review, we referred the environmental impact statement to the following agencies which we identified as interested: Department of Agriculture and Consumer Services; Board of Trustees of the Internal Improvement Trust Fund; Department of Community Affairs; Game and Fresh Water Fish Commission; Department of Health and Rehabilitative Services; Department of Natural Resources; Department of Pollution Control; Department of State - Division of Archives, History and Records Management; Department of Transportation and the Environmental Information Center. Agencies were requested to review the statement and comment on possible effects that actions contemplated could have on matters of their concern. Letters of comment on the statement are enclosed from the Board of Trustees of the Internal Improvement Trust Fund; Department of Community Affairs; Department of Health and Rehabilitative Services; Department of Natural Resources; Department of Pollution Control; Department of State - Division of Archives, History and Records Management and Department of Transportation. The Department of Agriculture and Consumer Services reported "no adverse comments" by telephone. No further responses were received.

In accordance with the Council on Environmental Quality guidelines concerning statements on proposed federal actions affecting the environment, as required by the National Environmental Policy Act of 1969, and U. S. Office of Management and Budget Circular A-95, this letter, with attachments, should be appended to the final environmental impact statement on this project. Comments regarding this statement and project contained herein or attached hereto should be addressed in the statement.

We request that you forward us copies of the final environmental impact statement prepared on this project.

Sincerely,

Ed Maroney

E. E. Maroney, Chief
Bureau of Intergovernmental Relations

EEM:Wlc
Enclosures

cc: Mr. John Bethea
Mr. O. J. Keller
Mr. Jay Landers
Mr. John Lisle
Mr. W. N. Lofroos
Mr. William Partington
Mr. R. Charles Shepherd
Mr. Harmon Shields
Mr. H. E. Wallace
Mr. Robert Williams

STATE OF FLORIDA

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

ELLIOT BUILDING — TALLAHASSEE, FLORIDA 32304

Joel Kuperberg
Executive Director

TELEPHONE 488-8123

JULY 3, 1974

Mr. E. E. Maroney, Chief
Bureau of Intergovernmental Relations
Department of Administration
660 Apalachee Parkway
Tallahassee, Florida 32304

Dear Mr. Maroney:

Department of the Army, Jacksonville District Corps of Engineers, Draft Environmental Impact Statement on Duval County Beach Erosion Control Project. SAI Project Number 74-1333-E.

The Trustees' staff has reviewed the draft environmental impact statement prepared by the Corps of Engineers for beach erosion control activities along the Atlantic Coast in Jacksonville, Neptune and Atlantic Beaches, Florida. The following comments are submitted:

1. This agency is not in disagreement with the information in the statement; however, it should be noted that the photographs shown in the statement represent conditions of extreme high water during a northeaster in February of this year. This condition is not representative of normal water levels for Duval County Beaches. While it is true that Northeasters are frequent occurance, the construction of bulkheads, breakwaters and other erosion control activities (including the proposed action) are only temporary solutions to the problem. Historical evidence shows that the natural accretion and erosion of a shoreline in this area is not successfully controlled.

2. Past Corps of Engineers activities in this area include the discharge of maintenance dredging spoil on beaches in the vicinity of the Naval Station at Seminole Beach. This is the area shown in the photograph in Figure 2. According to the photograph, disposal of this material has done nothing to restore the beach.

A study should be made to determine if materials dredged from offshore borrow areas or from channels are lighter than ordinary beach sands, and to what extent these easily removed materials affect the overall maintenance dredging program of the Corps of Engineers at various inlets on the coastline of Florida.

This agency has no objection to the restoration of severely eroded beaches; however, we have recommended a study of the already used offshore borrow areas to determine the long-term impact of such areas on the marine environment. We are still awaiting results of such a study. The information in Appendix 1 is not adequate for such a determination.

We appreciate the opportunity to review this statement and would like to review the final environmental impact statement.

Sincerely,

Joel Kuperberg
Executive Director

JK/wjp

Florida Department of Transportation

Haydon Burns Building, 605 Suwannee Street, Tallahassee, Florida 32304, Telephone (904) 488-8

REUBIN O'D. ASKEW
GOVERNOR

WALTER E. HEVELL
SECRETARY

June 24, 1974

Mr. E. E. Maroney
Chief, Bureau of Intergovern-
mental Relations
Division of State Planning
660 Apalachee Parkway
Tallahassee, Florida 32304

Dear Mr. Maroney:

Subject: SAI 74-1333
Draft Environmental Statement
Beach Erosion Control Project
Duval County

We have reviewed the transportation aspects of the subject project and have no adverse comments.

We appreciate the opportunity to comment at this early date.

Very truly yours,

RAY G. L'AMOREAUX, DIRECTOR
DIVISION OF PLANNING & PROGRAMMING

for W. N. Lofroos, P.E.

WNL:RFK:rh

cc: Mr. J. D. Ward

STATE OF FLORIDA

Department of State

THE CAPITOL
TALLAHASSEE 32304

RICHARD (DICK) STONE
SECRETARY OF STATE

ROBERT WILLIAMS, DIRECTOR
DIVISION OF ARCHIVES, HISTORY, AND
RECORDS MANAGEMENT

July 3, 1974

Mr. E. E. Maroney, Chief,
Bureau of Intergovernmental Relations
Division of State Planning
660 Apalachee Parkway
Tallahassee, Florida 32304

Re: SAI 74-1333E Beach Erosion Control Project, Duval County

Dear Mr. Maroney:

We have reviewed the draft environmental statement for the above project and find it adequate with respect to its consideration of archaeological and historical resources. Page 9 of the statement reads: "A magnetometer survey of the offshore borrow area to determine the location of shipwrecks will be conducted prior to start of construction."

Upon review of the completed tapes, we will be able to address more fully the possible disturbance of submerged historic shipwreck sites.

The opportunity to comment is appreciated.

Sincerely,

L. Ross Morrell
State Archaeologist & Chief,
Bureau of Historic Sites & Properties

LRM/Msrh

STATE OF FLORIDA

DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

Prior Notification and Review System

O. J. KELLER
[redacted]
Secretary

Date: June 20, 1974

MEMORANDUM

REF. NO: DHRS _____ SPDC (SAI) 74-1333E

TITLE Draft Environmental Impact Statement

APPLICANT Department of Army

TO: Kenneth Ireland, Secretary
Department of Administration
E. E. Maroney
Attn: ~~Donald Spicer~~ Chief
Bureau of Intergovernmental Relations
O. J. KELLER

DIVISION OF STATE PLANNING,
Bureau Of
Intergovernmental Relations
JUN 21 1974
RECEIVED
SAI NO. _____

FROM: [redacted] Secretary
Department of Health and Rehabilitative Services

By: Division of Planning and Evaluation

SUBJ: NOTIFICATION OF INTENT TO APPLY FOR FEDERAL FUNDS

The project identified above has been reviewed in accordance with O.M.B. Circular A-95. Action recommended:

[X] The project is consistent with the goals and objectives of the Department of Health and Rehabilitative Services. Favorable action is recommended.

[ ] Substantive comments have been received and are summarized in the attached.

[ ] Conference with applicant is requested.

[ ] The project is not consistent with the goals and objectives of the Department of Health and Rehabilitative Services. Approval is not recommended for reasons described in the attached.

Attachment (s)

Recommendation

STATE OF FLORIDA

Department of Administration

Division of State Planning

660 Apalachee Parkway · IBM Building

TALLAHASSEE

32304

(904) 488-2371

Reuben O'D. Askew
Governor

Earl M. Starnes
STATE PLANNING DIRECTOR

L. K. Rowland
SECRETARY OF ADMINISTRATION

TO: Mr. Harmon Shields, Ex. Dir.
Department of Natural Resources
Larson Building
Tallahassee, Florida 32304

DATE: JUN 7 1974

DUE DATE: ASAP

FROM: Bureau of Intergovernmental Relations

SUBJECT: SAI: 74-1353E

Please review and comment to us on the above draft environmental impact statement, copy attached. In reviewing the statement, you should consider possible effects that actions contemplated could have on matters of concern to your agency.

If you feel that a conference is needed for discussion of the project or resolution of conflicts, or if you have questions concerning the statement, please call Mr. Estus Whitfield at (904) 488-2401. Please check the appropriate box below, attach any comments on your agency's stationery and return to IGR or telephone "no adverse comments" by the above due date.

On that date, we intend to consider all review comments received and develop a state position on the project. In both telephone and written correspondence please refer to the above SAI number.

Sincerely,

Earl M. Starnes
Chief
Bureau of Intergovernmental Relations

Enclosure cc: Mr. William Beckham

****

TO: Bureau of Intergovernmental Relations

FROM: Department of Natural Resources

SUBJECT: DEIS Review and Comments

[X] No Comments

[ ] Comments Attached

Reviewing Agency:

Signature: Thomas A. Linton Date: 6/26/74

TITLE: Administrative Assistant

STATE OF FLORIDA

DEPARTMENT OF POLLUTION CONTROL

2562 EXECUTIVE CENTER CIRCLE, EAST
MONTGOMERY BUILDING, TALLAHASSEE, FLORIDA 32301

PETER P. BALJET
EXECUTIVE DIRECTOR

June 26, 1974

DAVID H. LEV
CHAIRMAN

RE: SAI: 74-1333E
Draft Environmental
Impact Statement
Beach Erosion Control
Project, Duval County
Florida

Mr. E. E. Maroney
Bureau of Intergovernmental Relations
Division of State Planning
Department of Administration
660 Apalachee Parkway
Tallahassee, Florida 32304

Dear Mr. Maroney:

The Department of Pollution Control has reviewed the above referenced DEIS prepared by the Jacksonville District Corps of Engineers. The impact statement contains some deficiencies and several misleading or inaccurate statements.

The statement contains no quantitative sedimentological data as to sediment density, particulate size ranges, and size distributions which could be used in defining sediment transport. Also, no quantitative physical data is given concerning current directions and velocities at the Borrow site and adjacent waters. Therefore, no accurate estimates of the actual area to be affected by increased turbidities can be made, and future nourishment dredge areas are undefined.

The impact statement states that considerable initial damage will be incurred by benthic invertebrates at both dredge sites and dump areas but that these losses would be of a "temporary" nature. This is inaccurate as these losses will remain for the duration of the project at the dump site due to a continual winnowing of silt particles which had settled out over the Borrow site and the continual turbidity and burial for an annual nourishment project.

The draft impact statement states that the turbidity during both dredge and fill operations will be no greater than that occurring during storm periods. This very level of turbidity has been found to cause suffocation of certain inshore fishes (Robins*, 1957).

The statement that "... the temporary increases in turbidity which will occur will have only short term effects since fish will avoid areas of highest turbidity is misleading. The larval fishes and eggs affected by the turbidity cannot avoid turbid areas. Short term repetitive exposure to low level turbidities above certain low threshold concentrations have been shown to adversely affect growth and development of Carval fishes, * Bull. Mar. Sci. Gulf and Carib. Vol. 7: 266-275, and to increase susceptability of adult fishes to infection through intermittent abrasion of delicate respiratory structures. (Weber**, 1969).

The Department also questions the accuracy of the following statements in the draft impact (p. 13) "... that fishes in the Borrow site would be "less affected"; (p. 14) that the effects from annual nourishment "... would be of even more minor nature than those created by the initial project work. The statement on p. 13 does not consider that benthic habitats in the vicinity would be smothered out of existence, the effects that the lower trophic level destruction would have on the higher trophic levels, and the potential effects the dredging activity would have on the Duval County sports fishery are not taken into account. The statement on page 14 suggests that the initial dumping would only minimally effect the beach fauna and the annual nourishment even less whereas in both cases the beach fauna would undergo serious deletion or destruction and for an indeterminate period of time.

The impact report also states that an increase in bird populations could be expected as "numerous species will be attracted to the area to feed upon organisms disrupted during dredging operations. This may not be so as many of the disrupted organisms would probably be buried before they could be utilized by the avifauna.

Sincerely yours,

Tim S. Stuart

Tim S. Stuart, Ph.D.
Chief
Bureau of Environmental Programs

TSS:sll

STATE OF FLORIDA

DEPARTMENT OF COMMUNITY AFFAIRS

REUBIN O'D. ASKEW, GOVERNOR — EDWARD J. TROMBETTA, SECRETARY

EMERGENCY GOVERNMENT · TECHNICAL ASSISTANCE · TRAINING AND PROFESSIONAL DEVELOPMENT · MIGRANT LABOR · ECONOMIC OPPORTUNITY · VETERANS AFFAIRS

PRIOR NOTIFICATION AND REVIEW SYSTEM

M E M O R A N D U M

TO: L. K. Ireland, Jr., Secretary of Administration

ATTN: Ed Maroney, Chief, Bureau of Intergovernmental Relations

FROM: Edward J. Trombetta, Secretary of Community Affairs

BY: R. Charles Shepherd RCS

SUBJECT: Notification of Intent to Apply for Federal Funds

DATE: June 18, 1974

RE: REF. NO. (DCA)_____ SPDC (SAI) 74-1333E

Title: Beach Erosion Control Project, Duval County -Florida.

Applicant: U.S. Army Engineer District, Jacksonville, Fla.

The project identified above has been reviewed in accordance with O.M.B. Circular A-95. Action recommended:

[x] The project is consistent with the goals and objectives of the Department of Community Affairs. Favorable action recommended.

[ ] Substantive comments have been received and are summarized in the attached.

[ ] Conference with applicant is requested.

[ ] The project is not consistent with the goals and objectives of the Department of Community Affairs. Approval is not recommended for reasons described in the attached.

Attachment(s)

DIVISION OF STATE PLANNING
JUN 20 1974
RECEIVED
SAI NO. _____

State of Florida
Department of Community Affairs
DIVISION OF TECHNICAL ASSISTANCE
Reubin O'D. Askew, Governor Edward J. Trombetta, Secretary R. Charles Shepherd, Directo

PRIOR NOTIFICATION AND REVIEW SYSTEM

MEMORANDUM

DATE: June 17, 1974

FROM: Harry Schmertmann
Chief, Bureau of Local Assistance

TO: R. Charles Shepherd

SUBJ: Review of Application for Federal Funds

RE: REF. NO: (DCA)_____ SPDC (SAI) 74-1333E

Title: Beach Erosion Control Project, Duval County, Florida

Applicant: U.S. Army Engineer District Jacksonville, Fla.

Reviewer's Name & Title James H. Saves, CDS II

Reviewer's Comments (Attach additional sheets if necessary):

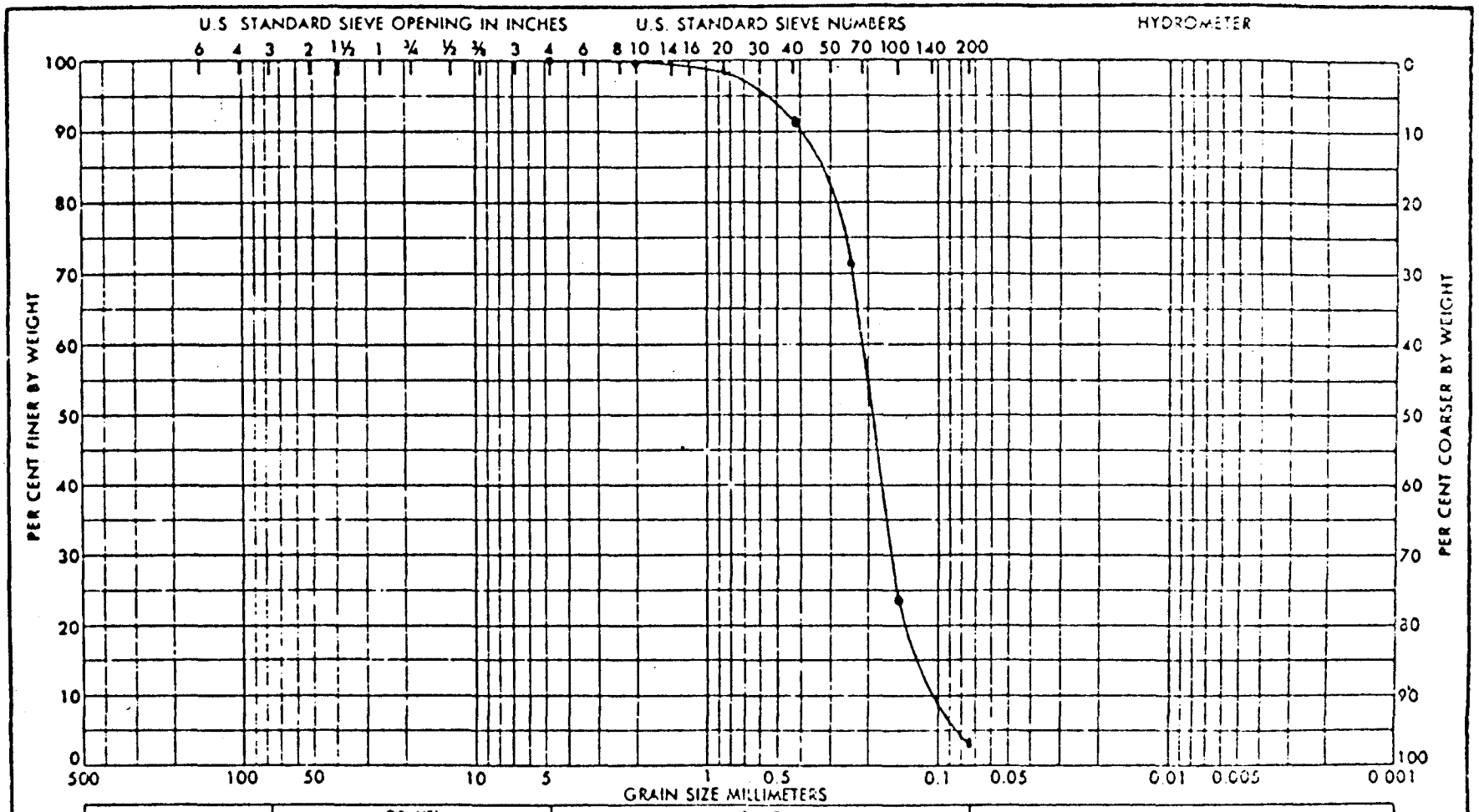
This department supports the proposal.

APPENDIX 4

Sedimentary Analyses of Borrow Site

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, .. 30061

WORK ORDER NO. 8716
REQ. NO. 08-123-E 238-74



SAMPLE NO	BOX OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-10.0'	Gray poorly graded sand (SP) with a trace of coarse & medium sand size shell. Shell approximately 5%	-	-	-	-

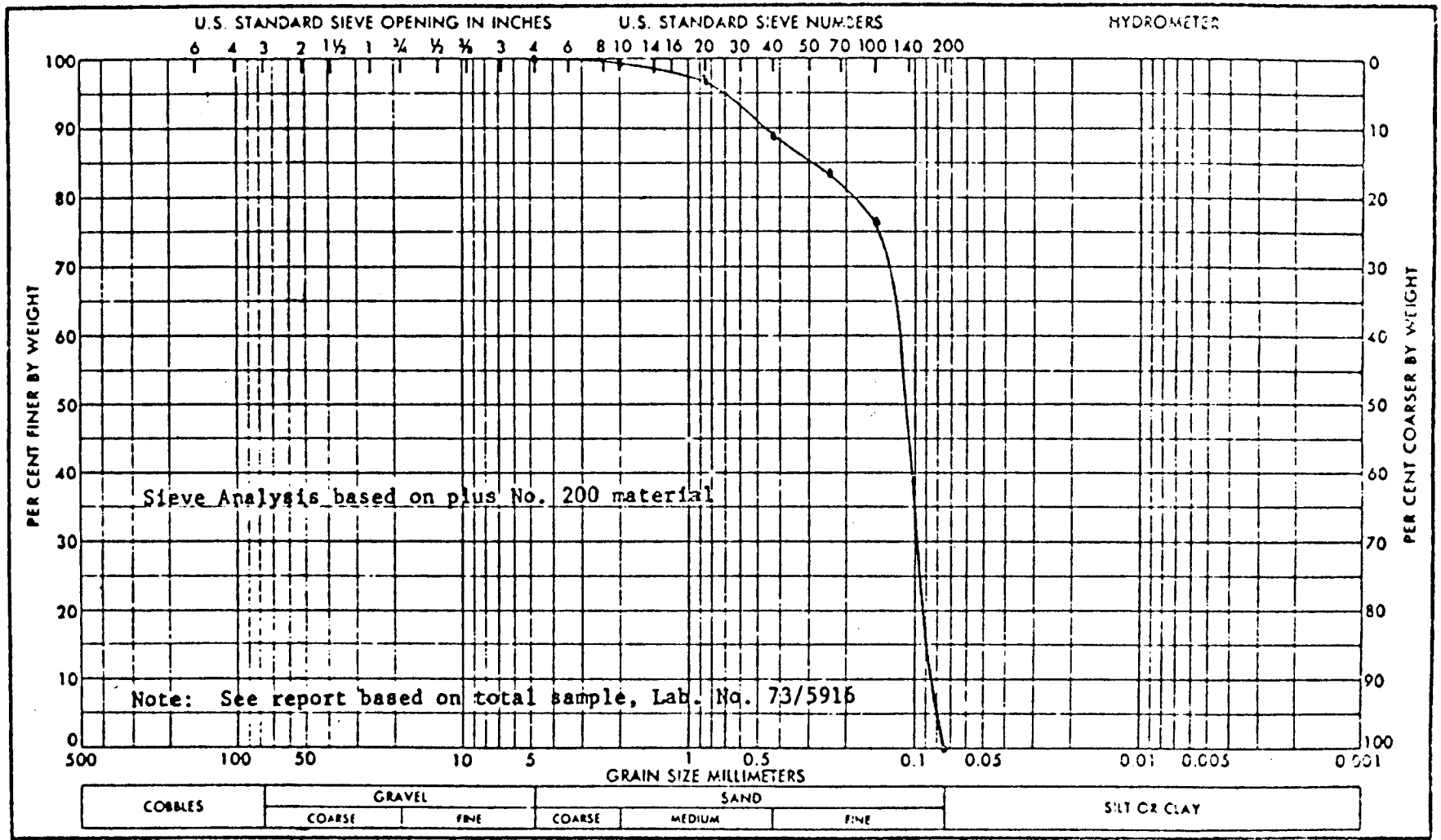
GRADATION CURVES

JACKSONVILLE DISTRICT
PROJECT Duval County Beach Restoration
Lab. No. 73/5914
AREA
BORING NO CB-DUC-23,
DATE 7 June 1974

ENG FORM 2087 REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE.

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 6716
REQ. NO. 08-123-ENG-238-74



SAMPLE NO	XXXXX DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-10.0'	Washed gradation: Gray poorly graded sand (SP) with a trace of shell fragments. Shell approximately 3%	-	-	-	-

GRADATION CURVES

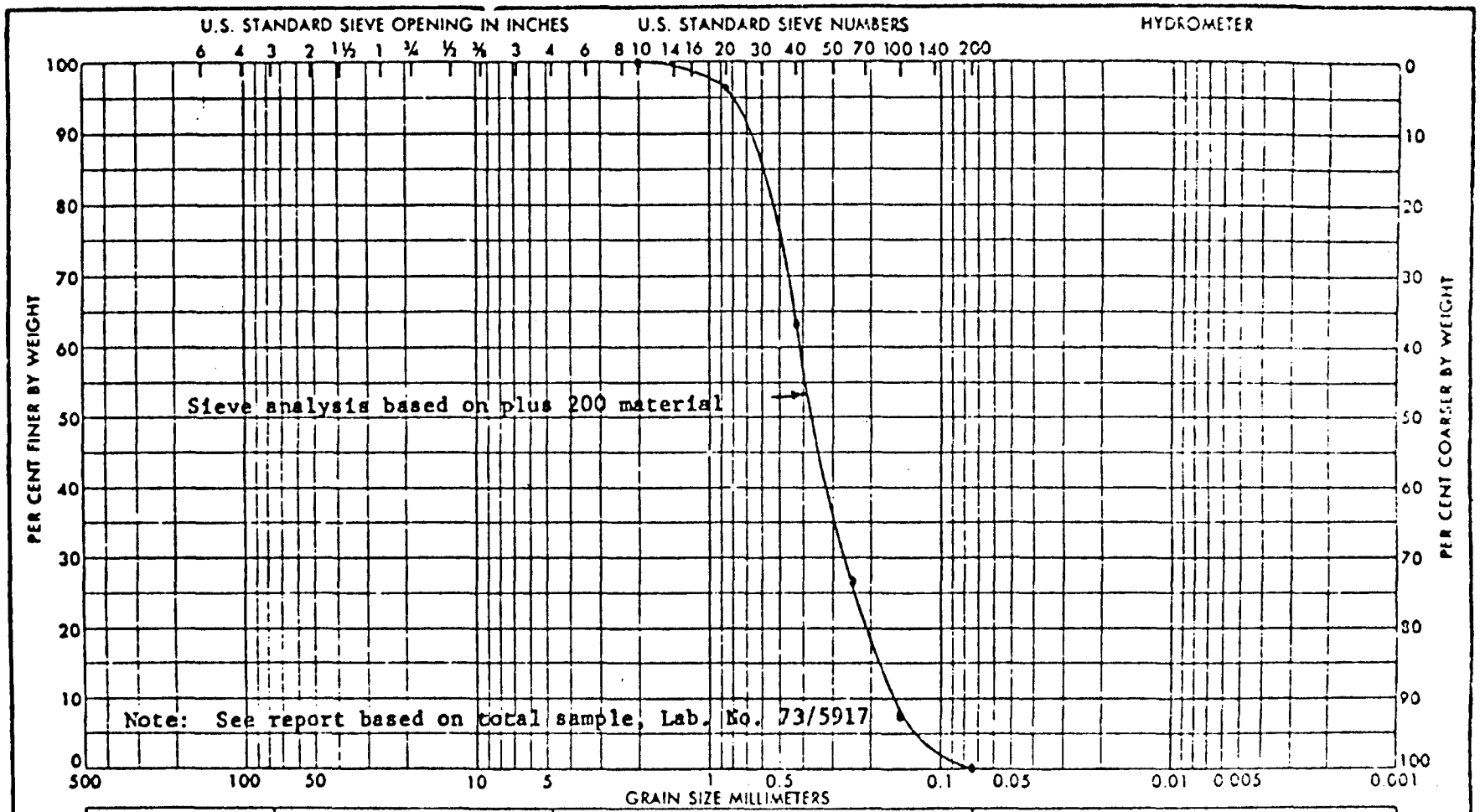
PROJECT: JACKSONVILLE DISTRICT Duval County Beach Restoration
Lab. No. 73/5893
AREA
BORING NO: CB-DUC-26
DATE: 7 June 1974

ENG FORM 2087 REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE.

(Washed sieve analysis)

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CO. , OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, G 30061

REQ. NO. 0[illegible]-23-ENG-238-7
WORK ORDER NO. ' 6



SAMPLE NO	BORING OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	10.0-19.8'	Washed gradation: Gray poorly graded sand (SP)	-	--	-	-

GRADATION CURVES

PROJECT JACKSONVILLE DISTRICT
Duval County Beach Restoration

Lab. No. 73/5894

AREA

BORING NO CB-DUC-26

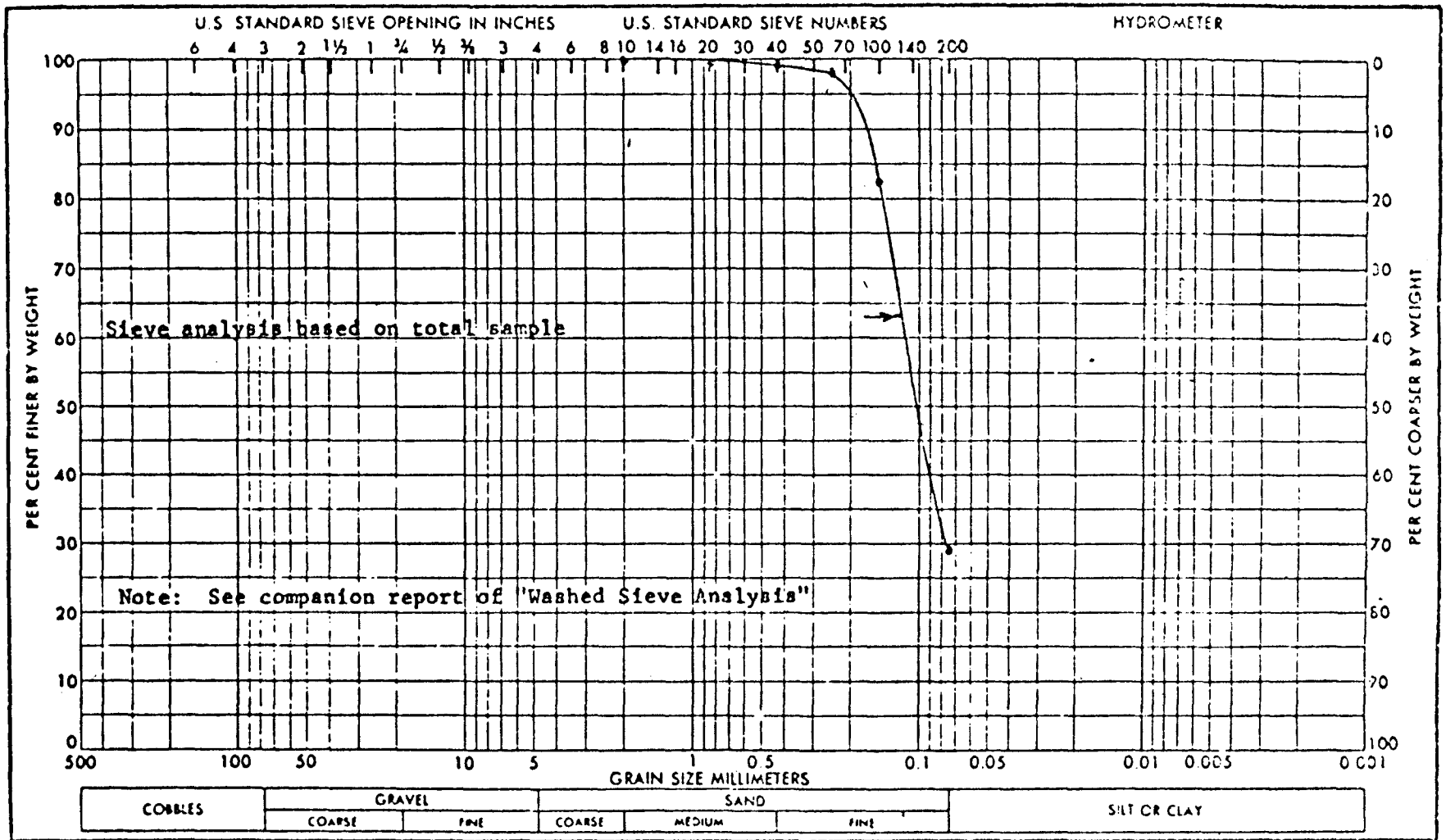
DATE 7 June 1974

ENG FORM 2087 REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE

(Washed Sieve Analysis)

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. [illegible]
REQ. NO. 08-123-ENG-236-74



SAMPLE NO	BORING DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-19.8'	Gray silty sand (SM)	-	-	-	-

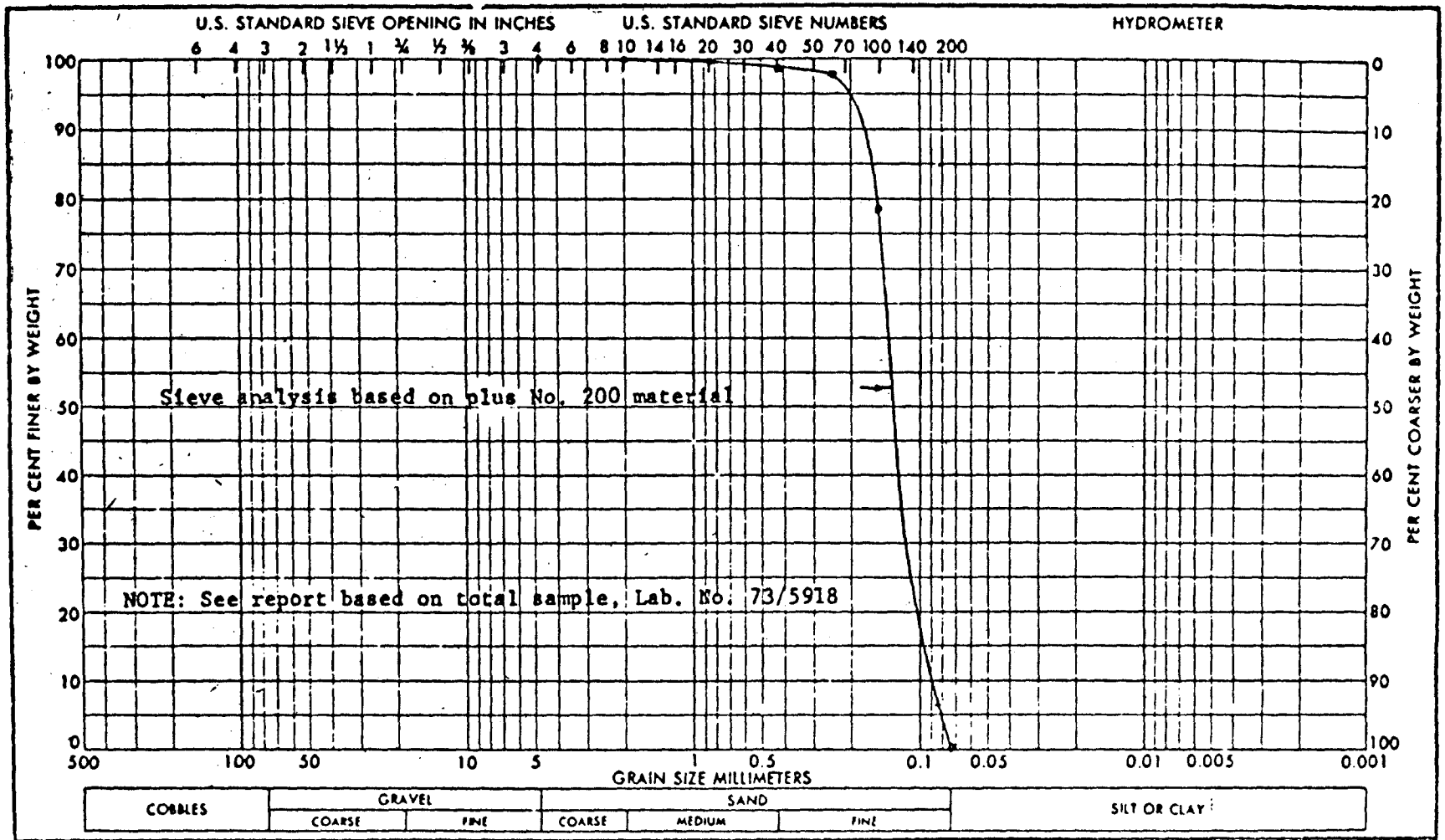
GRADATION CURVES

JACKSONVILLE DISTRICT
PROJECT Duval County Beach Restoration
Lab. No. 73/5918
AREA
BORING NO CB-DUC-27
DATE 7 June 1974

E FORM 2087 REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE

DEPAR ENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATOP
CORPS of ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

REQ. NO. 06-123-EN 33-74
WORK ORDER NO. 8716



SAMPLE NO	BORING DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-19.8'	Washed gradation: Gray	-	-	-	-
		poorly graded sand (SP)				
		with a trace of shell				
		Shell approximately < 1%				

GRADATION CURVES

PROJECT JACKSONVILLE DISTRICT Duval County Beach Restoration

Lab. No. 73/5895

AREA

BORING NO CB-DUC-27

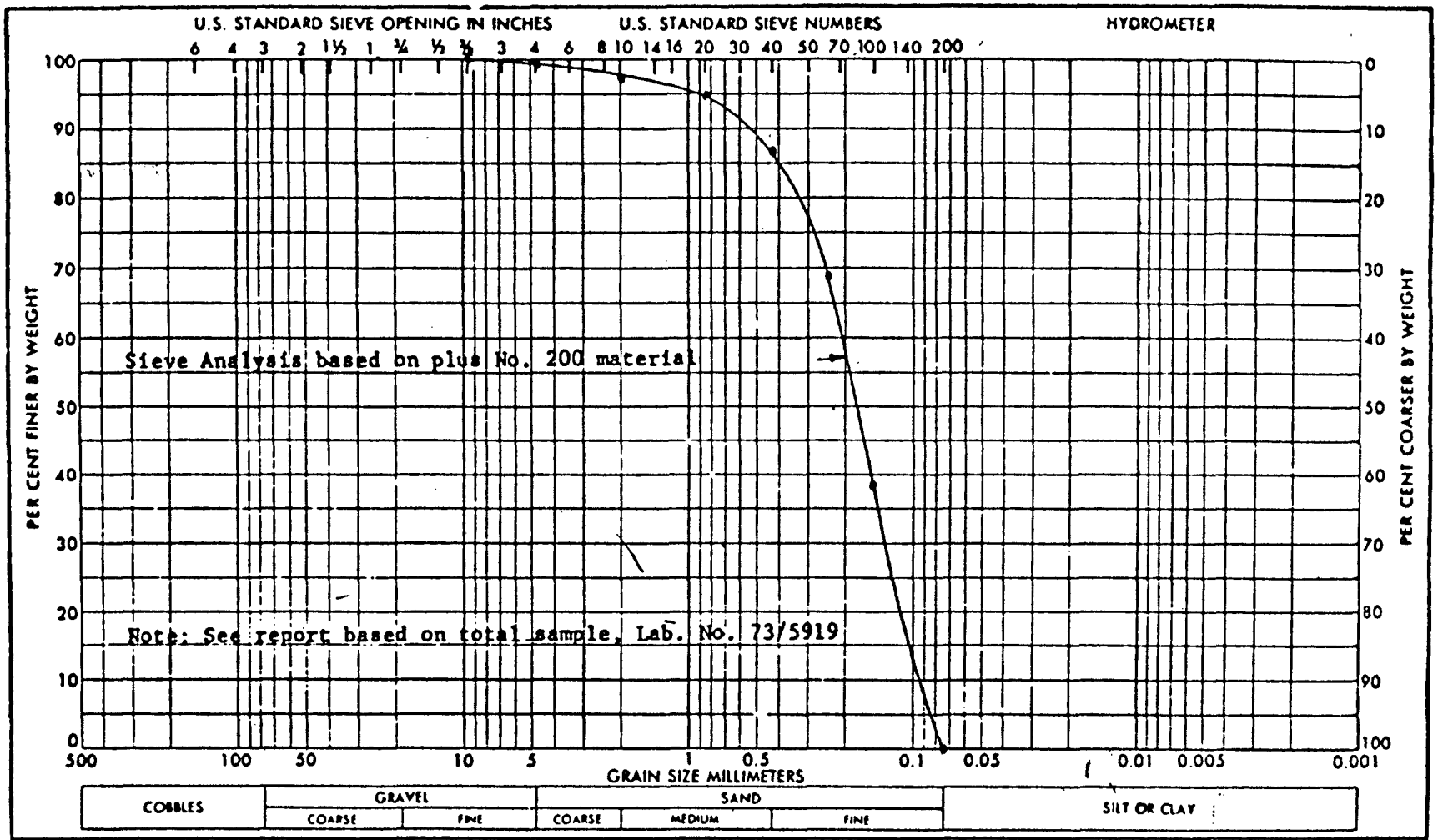
DATE 7 June 1974

ENG FORM 2087 1 MAY 62 REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE.

(Washed Sieve Analysis)

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

REQ. NO. 08-123-ENG-238-74
WORK ORDER NO. 8716



SAMPLE NO	XXXX DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-10.0'	Washed gradation: Gray	-	-	-	-
		poorly graded sand (SP)				
		with a trace of coarse & medium				
		sand size shell.				
		Shell approximately 5%				

GRADATION CURVES

PROJECT JACKSONVILLE DISTRICT
Duval County Beach Restoration

Lab. No. 73/5896

AREA

BORING NO CB-DUC-28

DATE 7 June 1974

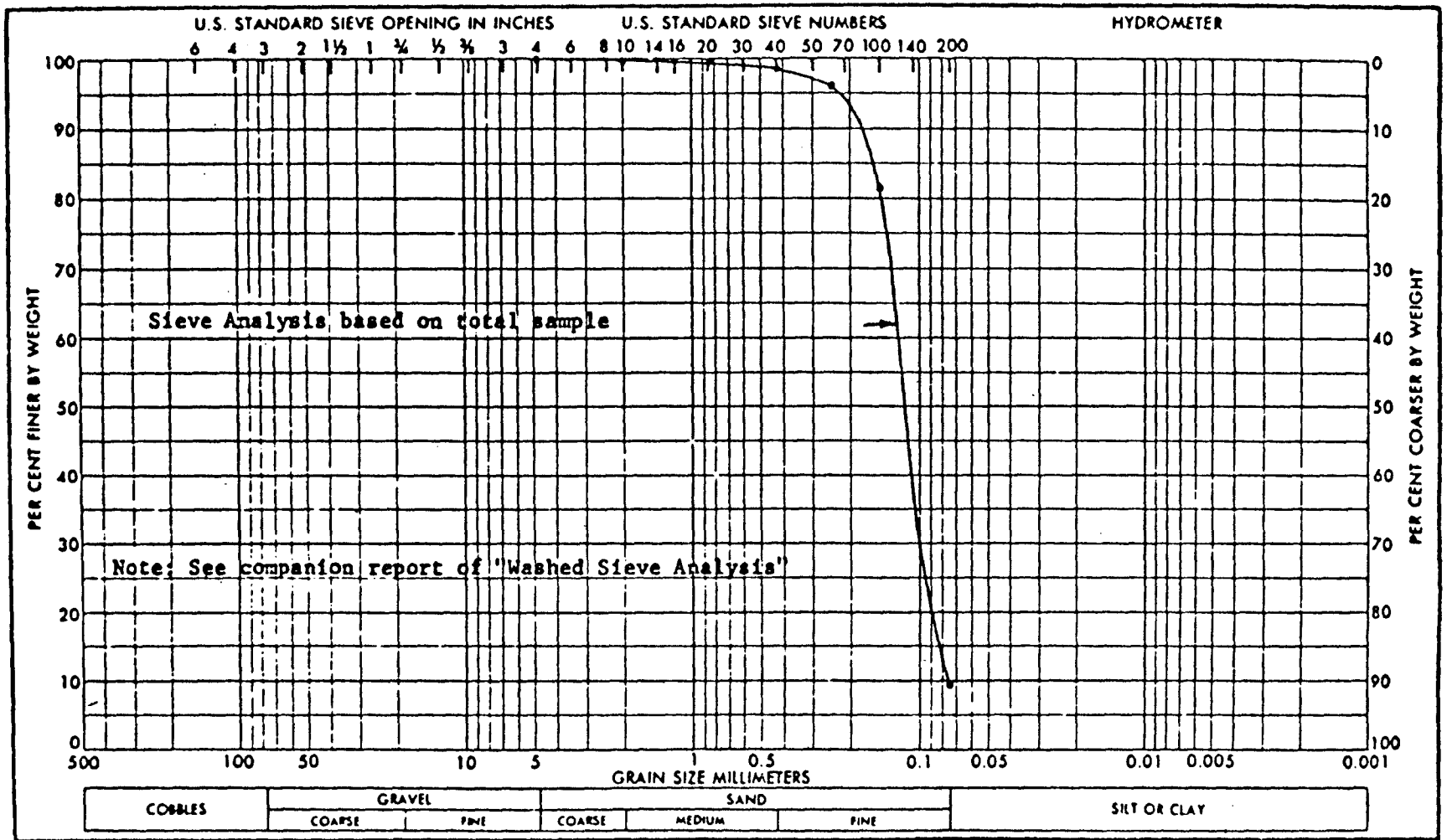
ENG FORM 2087 1 MAY

REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE.

(Washed Sieve Analysis)

DEPAR ENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATOR
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 8716
REQ. NO. 08-123-ENG-238-74



SAMPLE NO	DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
	0.0-11.0'	Gray poorly graded silty sand (SP-SM) with a trace of coarse & medium sand size shell	-	-	-	-
		Shell approximately 1%				

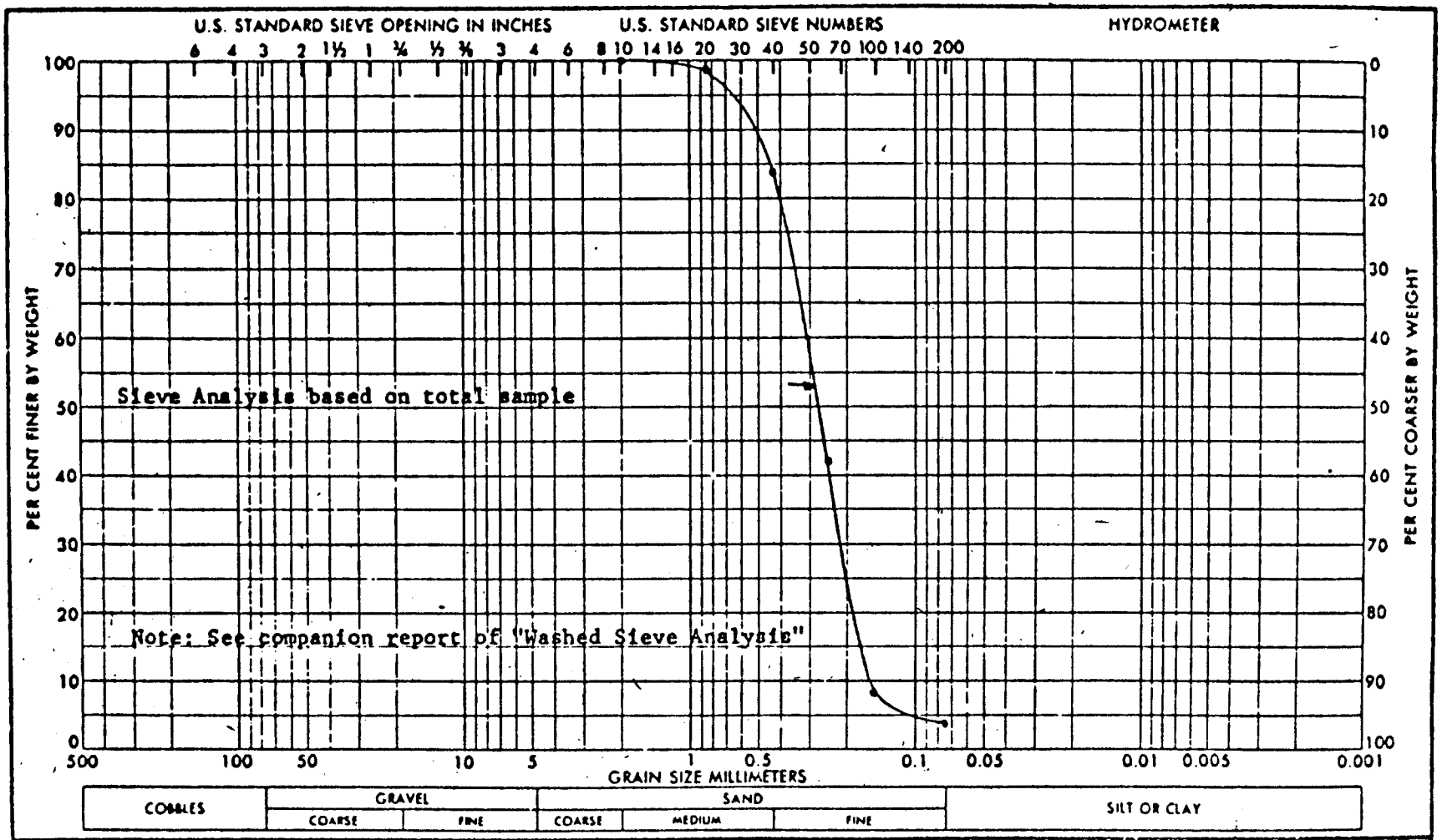
GRADATION CURVES

JACKSONVILLE DISTRICT
PROJECT Duval County Beach Restoration
Lab. No. 73/5921
AREA
BORING NO CB-DUC-31
DATE 7 June 1974

ENG FORM 2087
1 MAY 63
REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE.

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORIES,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 8716
REQ. NO. 08-123-ENG-238-74



SAMPLE NO	DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
	10.0'-20.0'	Gray poorly graded sand (SP)	-	-	-	-

GRADATION CURVES

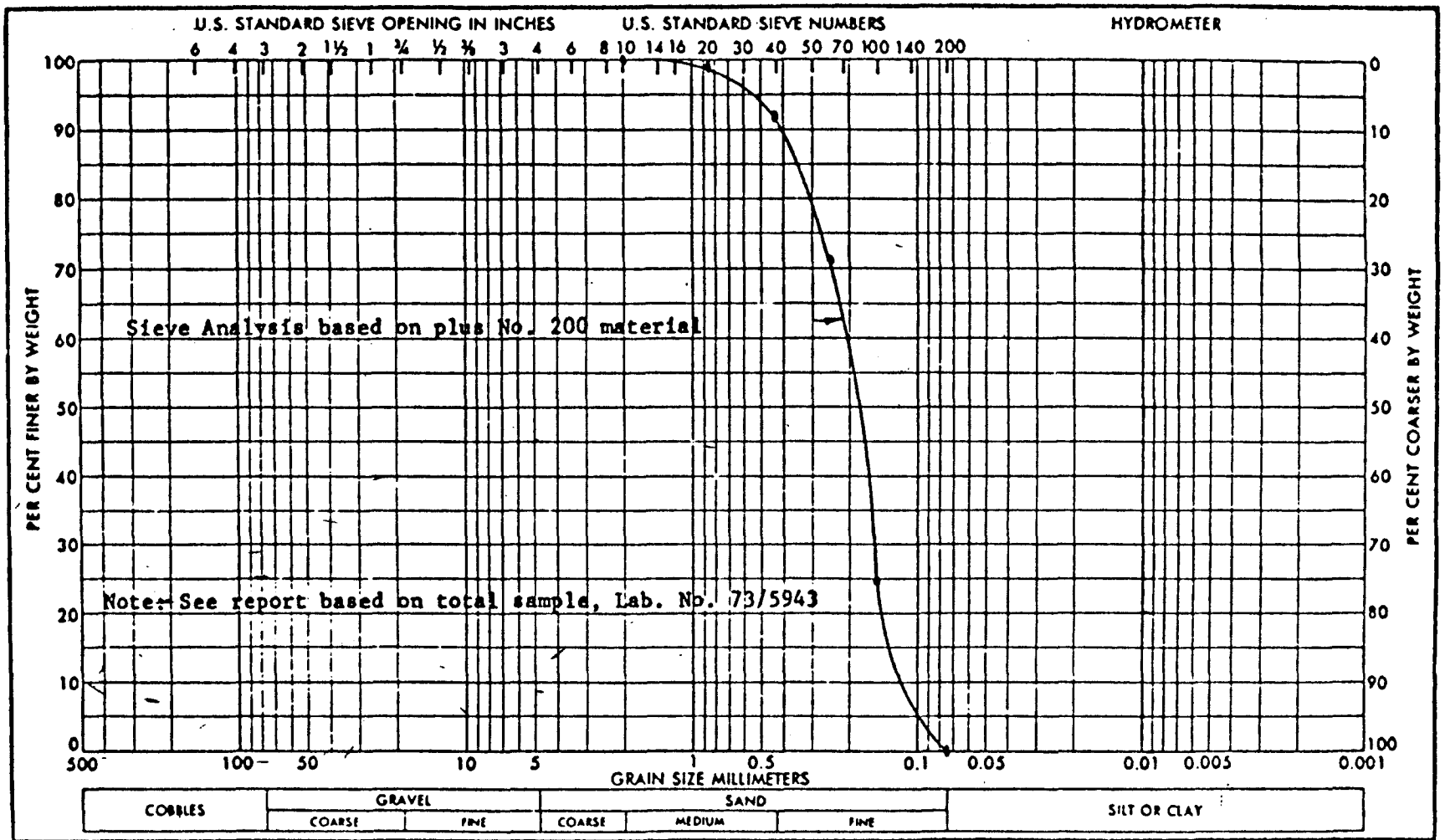
JACKSONVILLE DISTRICT
PROJECT Duval County Beach Restoration
Lab. No. 73/5923
AREA
BORING NO CB-DUC-32
DATE 7 June 1974

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO 1241, SEP 1962, WHICH IS OBSOLETE.

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

REQ. NO. 08-123-ENG- -74
WORK ORDER NO. 8716



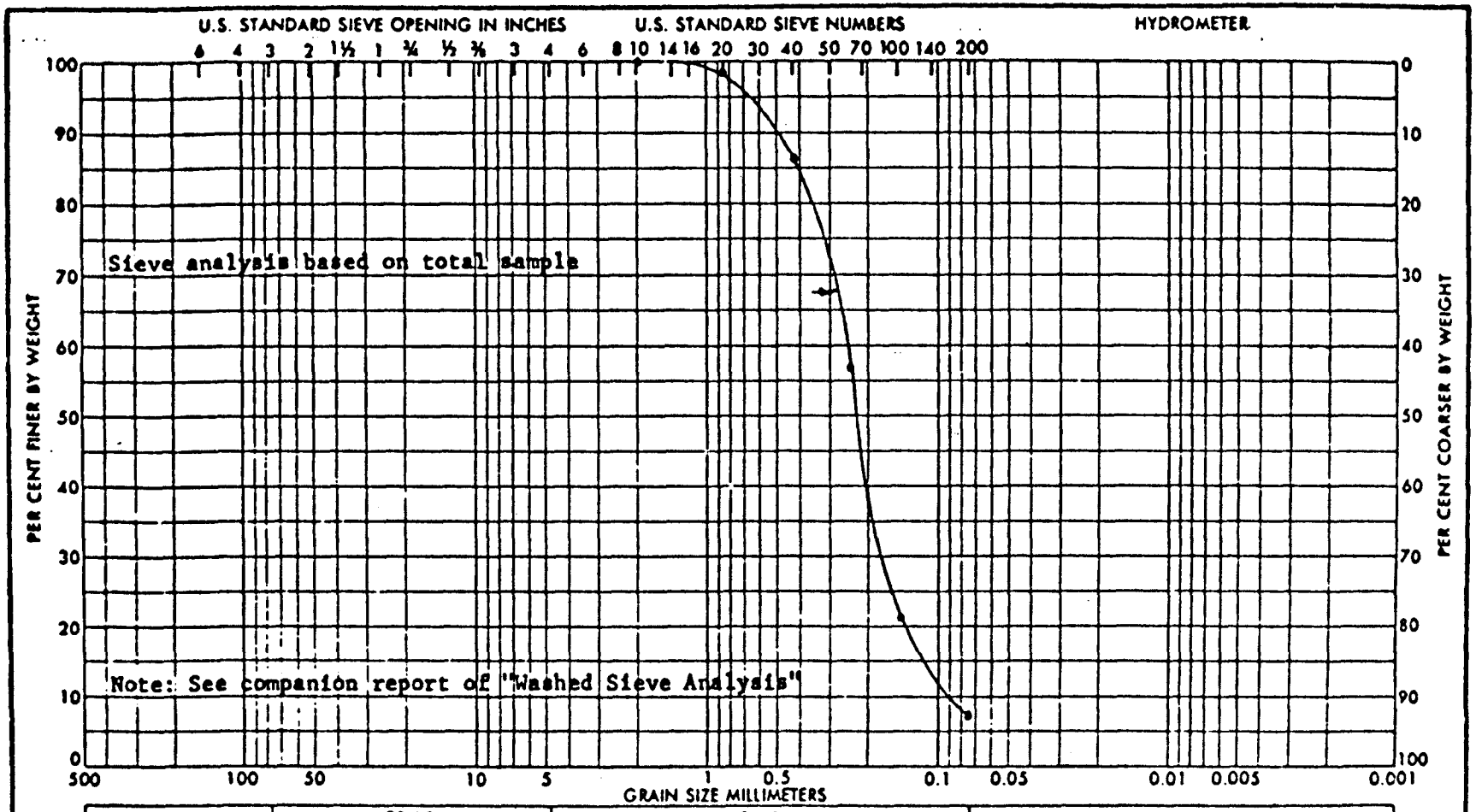
SAMPLE NO	DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	15.0-20.0'	Washed Gradation: Gray poorly graded sand (SP)	-	-	-	-

GRADATION CURVES

PROJECT JACKSONVILLE DISTRICT
Duval County Beach Restoration
Lab. No. 73/5909
AREA -
BORING NO CB-DUC-49
DATE 7 June 1974

L.. .RTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORA..ORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 8716
REQ. NO. 08-123-ENG-238-74



SAMPLE NO	XXXXXXX DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	0.0-11.0'	Gray poorly graded silty sand (SP-SM)	-	-	-	-

GRADATION CURVES

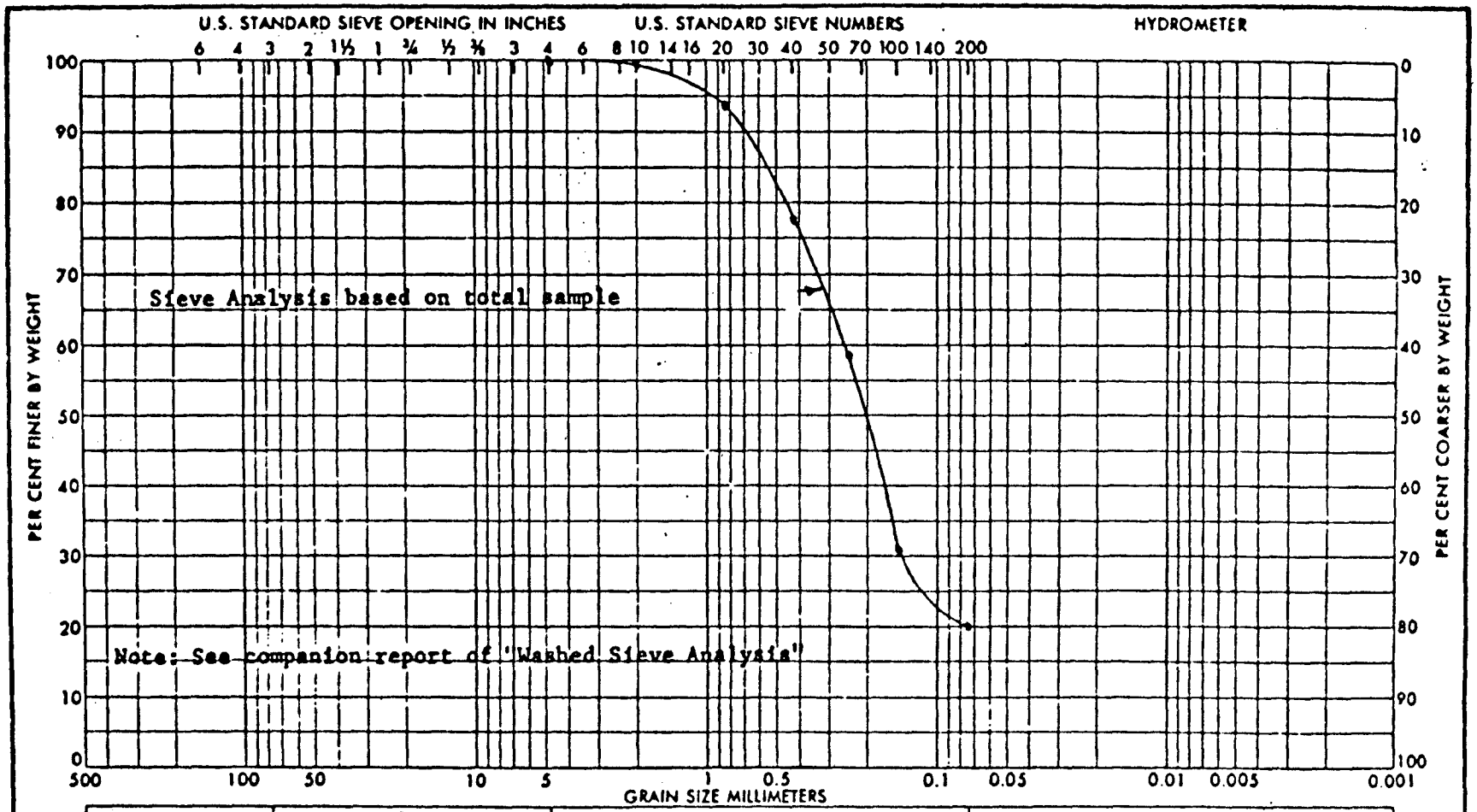
PROJECT JACKSONVILLE DISTRICT
Duval County Beach Restoration
Lab. No. 73/5946
AREA
BORING NO CB-DUC-50A
DATE 7 June 1974

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

DEPAR NT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATOR
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 8716
REQ. NO. 08-123-ENG-238-74



SAMPLE NO	BORING NO DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	8.0-19.8'	Gray silty sand (SM)	-	-	-	-

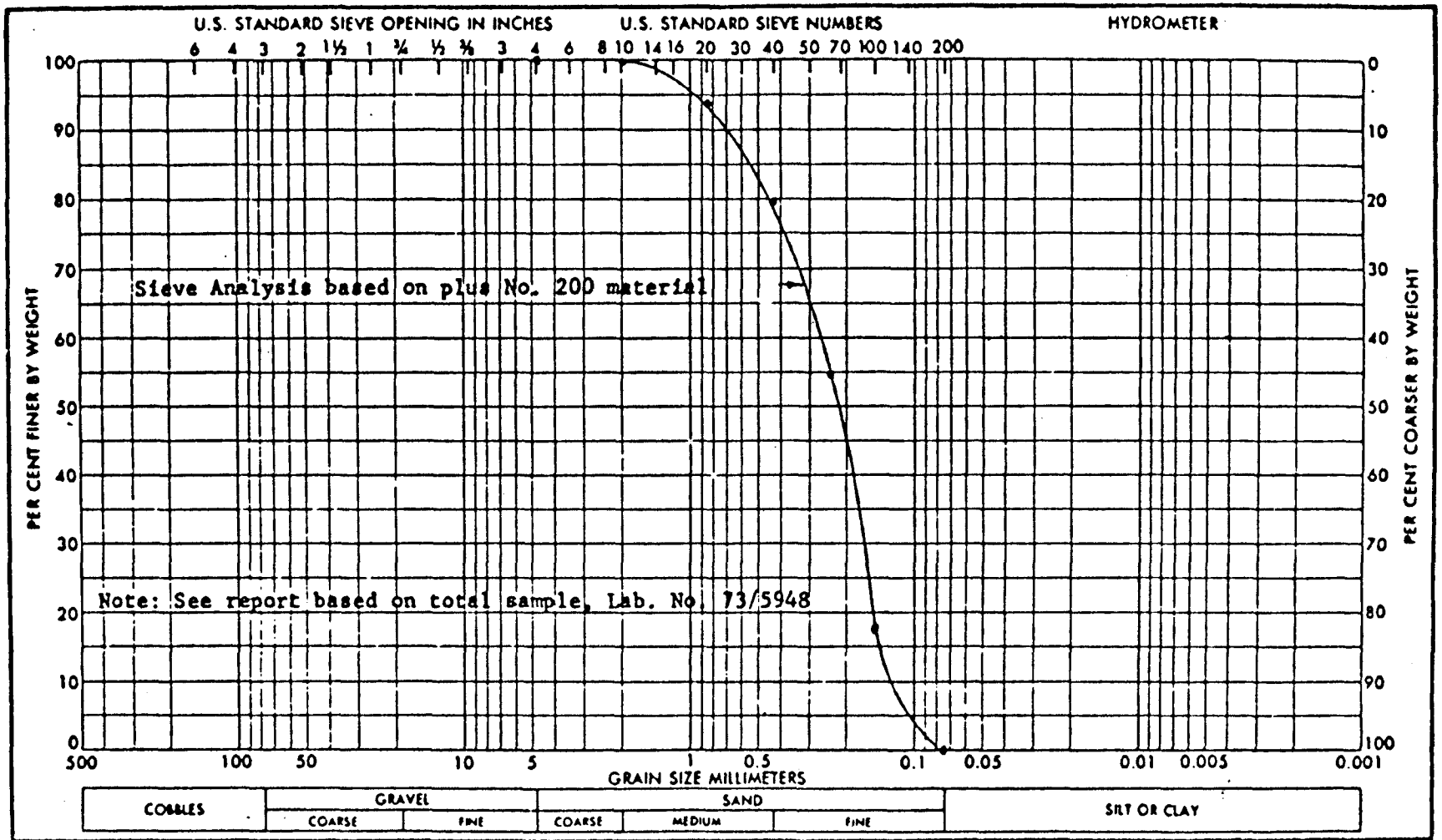
GRADATION CURVES

JACKSONVILLE DISTRICT
PROJECT Duval County Beach Restoration
Lab. No. 73/5948
AREA
BORING NO CB-DUC-52
DATE 7 June 1974

ENG FORM 2087 REPLACES WES FORM NO. 1241, SEP 1963, WHICH IS OBSOLETE

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

REQ. NO. 08-123-ENG-238-74
WORK ORDER NO. 8716



SAMPLE NO	BORING OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
--	8.0'-19.8'	Washed gradation: Gray poorly graded sand (SP)	-	-	-	-

GRADATION CURVES

PROJECT JACKSONVILLE DISTRICT
Duval County Beach Restoration

Lab. No. 73/5913

AREA

BORING NO. CB-DUC-52

DATE 7 June 1974

ENG [illegible]

(Washed Sieve Analysis)