

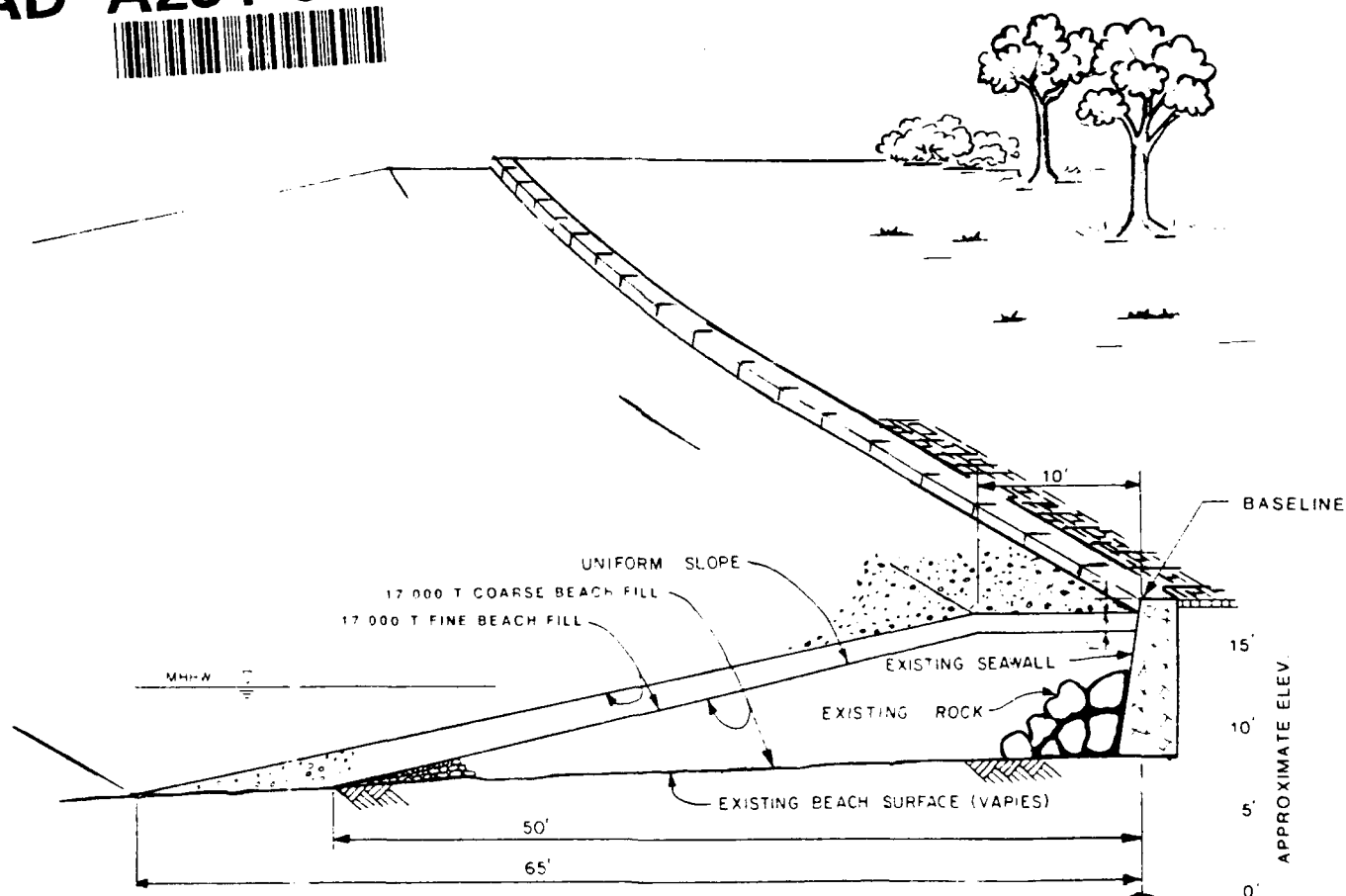
LINCOLN PARK

SHORELINE EROSION CONTROL PROJECT

SEATTLE, WA.

OPERATION AND MAINTENANCE MANUAL

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US Army Corps
of Engineers
Seattle District

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SEATTLE, WASHINGTON

OPERATION AND MAINTENANCE MANUAL

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LINCOLN PARK SHORELINE EROSION CONTROL PROJECT (E-90-1-3 SERIES)

Title

Drawing Index, Location (E-90-1-1)
Beach Fill and Rock Revetment (E-90-1-2)
Plan and Cross Section
Foundation Exploration (E-90-1-3)

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1. INTRODUCTION

1.01 Purpose. The purpose of this manual is to present information on project operation and maintenance (O&M) for compliance with Federal regulations.

1.02 Authorization. Shoreline erosion control features at Lincoln Park, Seattle, Washington, were constructed in 1988 under the Continuing Authority Program provided by Section 103 of the River and Harbor Act of 1962, as amended (appendix A) and as authorized by the city of Seattle voters in passage of the Seattle 123 Bond Issue of 1984.

1.03 Approval. A detailed project report (DPR) was approved by Headquarters United States Army Corps of Engineers (HQUSACE) 16 October 1987. Plans and specifications were approved by the Assistant Secretary of the Army for Civil Works (ASA(CW)) 12 May 1988.

1.04 Location. Lincoln Park is located within the city of Seattle at Williams Point, bordered by the East Passage of Puget Sound on the west and by Fauntleroy Way Southwest on the east. The 130-acre park is operated by the Seattle Department of Parks and Recreation.

1.05 Site Description and Formation.

a. Lincoln Park is a heavily wooded and intensely landscaped park consisting of three distinct geographic areas: flat uplands, steep bluffs, and gently sloping beaches. Park facilities include playfields, jogging and interpretive footpaths, picnic shelters, parking lots, restrooms, an outdoor 50-meter saltwater swimming pool, and a 1-mile-long saltwater beach accessible by a paved pedestrian promenade and footpaths. Located immediately behind the seawall along the southwest beach is a Municipality of Metropolitan Seattle (METRO) 30-inch sewer force main.

b. The 5,250-foot-long shoreline of Lincoln Park can be divided into three separate areas: a 2,700-foot-long northwest beach, the 250-foot-long beach at Williams Point, and a 2300-foot-long southwest beach. A concrete and cobblestone seawall extends the entire length of the shoreline. An asphalt-paved pedestrian promenade/service road extends northward from the south park boundary, extending along the shoreline landward of the seawall to Colman pool and bathhouse at Williams Point. Colman pool is the only public saltwater swimming pool in the city. The paved promenade/service road provides access to developments below the park bluff, including the swimming pool, bathhouse, caretaker residence, public restrooms, picnic shelters, and associated utility lines. Shoreline access to the northwest beach north of Colman Pool is possible by a footpath which originates near Colman Pool.

1.06. Protection Provided. The project is designed to provide long-term shoreline erosion protection at Lincoln Park in order to prevent damage to publicly owned property.

1.07 Project Description. The project extends from the south park boundary, north 2,550 feet, to the north end of the Williams Point beach. The project has two main components: beach nourishment and revetment.

a. Beach Nourishment. Beach nourishment was placed along 2,300 feet of the southwest beach, from the south park property line at station 0+00 to station 23+00. The beach nourishment was designed to provide effective protection for the toe of the existing seawall and eliminate scour and erosion potential at the seawall foundation, to provide resistance against overturning and breaching of the existing seawall due to excessive hydrostatic pressures on the landward side, to reduce the wave height that might reach the seawall by elevating the beach profile and causing the larger waves to break earlier on the beach, and to reestablish the shore processes (altered over 50 years ago when the original seawall was constructed along the southwest beach) which allow littoral drift to reach downdrift shores, including the northwest beach of Lincoln Park. Initial nourishment material consisted of 19,014 cubic yards (CY) of coarse beach fill placed as core material against the seawall and 16,656 CY of fine beach fill placed over the coarse beach fill to a level approximately one foot below the top of the existing seawall (elevation +16 feet MLLW). The beach fill material gradation as follows:

TABLE 1

BEACH FILL MATERIAL

U.S. Standard Sieve Size	<u>Percent Passing by Weight</u>	
	<u>Coarse</u>	<u>Fine</u>
12 inches	100	100
6 inches	85-100	85-100
3 inches	50-85	--
1½ inches	--	60-90
inches	0-40	--
3/8 inches	0-6	--
No. 4 --	40-70	
No. 40 --	15-45	
No. 200 0-3	0-3	

b. Revetment. The revetment was designed to protect the Williams Point area and prevent damage to the Colman pool, bathhouse, and caretaker residence. The revetment is located between stations 23+00 and 25+50. Construction of the toe and filter bedding material entailed placement of class C rock, each piece weighing 25 to 250 pounds, with 50 percent, by weight, of the pieces weighing greater than 100 pounds. Then class A armor rock was placed over the 2-foot-thick filter bed of class C rock. Armor rock specifications used in project construction required the placement of two layers of class A rock, to a total thickness of 5-feet thick; that each piece of rock weigh from 1,500 to 4,000 pounds; and that 50 percent of the rock pieces weigh greater than 2,500 pounds. In the outer layer of armor rock, 100 percent of the rock pieces were to weigh 2,500 pounds or greater. The revetment was constructed with a 1 vertical (V) on 1.5 horizontal (H) slope

and a top elevation (+18 feet MLLW) approximately 1 foot above the old seawall. The rock structure was fronted by coarse beach fill. The exposed upper 1½ feet of the revetment was chocked with quarry spalls (class C rock) and overtopped with coarse beach fill to improve appearance and reduce pedestrian hazard posed by voids in the armor rock.

1.08 Monitoring Programs. The Seattle District of the Corps of Engineers (COE) is responsible for conducting two monitoring programs at Lincoln Park.

a. One program consists of beach profile observations and/or surveys, of monitoring beach and nourishment material movement rates, and of evaluating revetment condition. The program is required for evaluating future project maintenance requirements, especially the requirements for periodic beach nourishment. (See paragraph 4.02 c).

b. The second program will include studies to document the recovery and recolonization patterns for three major benthic communities. These studies will be conducted 2 years after the initial beach nourishment. The three communities are: (1) eelgrass; (2) infaunal clams and macroalgae; and (3) juvenile salmon prey resources. Baseline information collected prior to project implementation will be compared with quantitative data obtained 2 years after beach nourishment to determine the effects of beach nourishment on the benthic community. At 1-year postnourishment, eelgrass, infaunal bivalves and selected macroalgae populations will be qualitatively sampled to provide an indication of the recovery rate of these populations. A committee of experts composed of representatives from the resource agencies, the scientific community, the COE, and the city of Seattle will be convened after the quantitative postnourishment study report is available. The committee will evaluate the study results to verify the extent of recovery of the benthic community. Any appropriate further action would follow the recommendations of the committee, subject to final approval of the COE and the city of Seattle. Further actions, if warranted, could include the use of different fill material and/or fill placement strategies for periodic beach nourishment, additional monitoring, and/or resource enhancement techniques (i.e., clam reseeding).

1.09 Construction History. Construction of the project was accomplished by contract to J-I-J Construction Company, Inc. (J-I-J), awarded in July 1988, and was substantially completed in December 1988. Initial nourishment material was obtained from the Lonestar Northwest quarry near Steilacoom, Washington and was brought to the site by a Pacific Sand and Gravel barge equipped with a conveyor. The barge was 248 feet by 63 feet with a draft of 14 feet loaded and 3 feet empty. The loaded barge was moved in close to shore at high tide. The beach nourishment material was off-loaded along the seawall and then graded into place at low tide by a dozer and front-end loader. An average load of approximately 4,000 tons was off-loaded at a rate of about 1,000 tons per hour. Class A and class C rock was obtained from the J-I-J quarry on Lummi Island. The project was completed for a total cost of \$492,364.00. Unit prices and quantities used are as follows:

<u>Description</u>	<u>Unit Price</u>	<u>Quantity and Unit</u>
Armor Rock (Class A)	\$22.00	2,023 tons
Quarry Spalls (Class C)	\$22.00	1,490 tons
Coarse Beach Fill	\$13.00	19,014 tons
Fine Beach Fill		
First 10,000 tons	\$ 8.50	10,000 tons
Over 10,000 tons	\$ 7.50	6,656 tons

2. LOCAL COOPERATION REQUIREMENTS

2.01 Responsibility of Non-Federal Interests. The responsibility of local interests is defined by Section 103 of the River and Harbor Act of 1962, as amended (Public Law 87-874), as modified by Section 103 of the Water Resources Development Act (WRDA) of 1986, (Public Law 99-662). The Local Cooperation Agreement (LCA) signed by the city of Seattle 15 June 1988 (appendix B) lists the following responsibilities of the city of Seattle:

a. Accomplish normal items of cooperation listed in the LCA Article II paragraphs a through c and e through h.

b. Assume full responsibility for all project costs in excess of Federal cost limitations of \$2 million as provided in Section 915 of the WRDA of 1986 (Public Law 99-662).

c. Comply with Civil Rights requirements as described in Article X and the Uniform Relocation Assistance, and Real Property Acquisition regulations as described in Article III c of the LCA.

d. Guarantee the Government reasonable access to the project for the purpose of inspection and, if necessary, for maintaining, operating, repairing, replacing, or rehabilitating the project.

2.02 Failure of Non-Federal Interests to Operate and Maintain. In accordance with Paragraph d. Section 221 of Public Law 91-661, "The Chief of Engineers may undertake performance of the project for its purposes, if he has first notified the non-Federal interest of its failure to perform the terms of its agreement and has given such interest a reasonable time (30 calendar days from receipt of notice) after such notification to so perform." All costs incurred by the Federal Government in performing O&M of the project that are the responsibility of the non-Federal interest will be reimbursed by the non-Federal interest. Provisions for this are included in Article VIII of the LCA.

3. OPERATION AND MAINTENANCE GENERAL PROCEDURES

3.01 General Rules and Procedures. The Corps of Engineers and the city of Seattle jointly share in renourishment costs at a 65 percent/35 percent ratio up until the time the Federal portion of the total project costs total \$2 million, at which time the city becomes responsible for renourishment costs. The city is responsible for maintenance of the Williams Point breakwater. The COE shall operate and maintain the beach nourishment aspects of the project, with the city of Seattle providing appropriate non-Federal cost sharing funds. The COE shall monitor the condition of the revetment and the nearshore beach to determine the need for revetment repair and the need for the addition of nourishment material. In addition, the COE will undertake such design, construction, and contract administration as is necessary to ensure that project objectives are maintained. The Seattle District's Engineering Division will have overall project management responsibility.

3.02 Responsibilities.

a. Designation of Project Superintendent. The city of Seattle shall appoint a permanent official, designated as the "Superintendent", who shall have charge of the city's duties in the O&M of the project. The Superintendent shall be aware of the city's obligations and of the projects maintenance status at all times. The Chief of Engineering Division, Corps of Engineers, Seattle, Washington, shall be kept advised of the name and telephone number of the Superintendent at all times. The Superintendent may be picked from within the existing governmental organization. The Superintendent's duties regarding the project are to:

- (1) Program and budget for maintenance work.
- (2) Act as liaison between the city and the Seattle District.
- (3) Keep books, records, documents and other evidence pertaining to costs and expenses incurred in relation to this project. These books, records, documents, and other evidence shall be maintained for a minimum of three (3) years after completion of the project and shall be made available for inspection, by the Chief of Engineering Division or his representative.
- (4) In the event that significant wave action damage to the revetment and/or significant erosion of the beach nourishment material is observable, the Superintendent shall immediately notify the Chief of Engineering Division of the COE by telephone and follow up with a letter stating when the action occurred, and appended with photographs of the damage. The city is responsible for carrying out any emergency repair of the revetment and for the costs incurred during such repair. Repair of damaged promenade/service road, utilities, and other park facilities will be borne by the city. Repair work of other non-Federal property shall be the responsibility of appropriate non-Federal interests.

(5) Provide and maintain necessary roads, parking areas, and other public use facilities open and available to all on equal terms.

(6) Inspect for any encroachments on the project by others and for changes in area land and water uses that affect the function of the project. The Seattle District shall be notified immediately and shall be provided photographs of any significant encroachments and any changes in land and water uses that affect the project.

(7) Ensure that the city's obligations are fulfilled.

b. Periodic Inspections. The Seattle District, Engineering Division, will be responsible for normal periodic inspections to determine revetment integrity and beach nourishment conditions.

3.03 Improvements or Alterations. No improvement shall be constructed over, under, or through the beach fill or other protective feature of the project, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in the project without prior written approval of the District Engineer, U.S. Army Corps of Engineers, or an authorized representative. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction, acceptable under standard engineering practice, shall be obtained from the Chief of Engineering Division of the COE or, if otherwise obtained, shall be submitted for the Chief of Engineering Division's approval. After approval standard engineering drawings showing such improvements or alterations as finally constructed shall be furnished the Chief of Engineering Division not more than 90 days after completion of the work.

3.04 Seattle District and City of Seattle Coordination.

a. The Seattle District will notify the city, in writing, of projected future monitoring and maintenance plans and costs. For major rehabilitation or nourishment, the city shall be given as much advance notice of projected plans and costs as possible, usually at least 2 years advance notice, and be kept apprised of developments up through implementation and construction. In the event that emergency work is required, the city shall be notified as soon as possible of plans and costs.

b. The city of Seattle shall ensure that its cost sharing funds will be available at the start of the Federal fiscal year (FY) (1 October - 30 September) for planned work.

c. Upon determination of the forthcoming FY costs, Seattle District shall bill the city for the local share of planned costs, at which time the city shall promptly submit payment to the Seattle District. At the completion of the FY, and after final determination of the FY costs, including any emergency work, a final apportionment of costs will be made.

4. PROJECT OPERATION AND MAINTENANCE

4.01 Project Plans. As-built drawings showing location, sections, and details of the Lincoln Park Shoreline Erosion Control Project have been included in this manual (appendix D).

4.02 General Notes. Both revetment repair and beach nourishment can probably be scheduled for a few years into the future, although emergency maintenance may be required at any time. Major O&M components for the revetment, periodic beach nourishment, and project monitoring are discussed in the following paragraphs.

a. Revetment. The primary objective of the revetment is to absorb wave energy and reduce wave overtopping, thus protecting Williams Point from both frontal and wave wash erosion. Major rehabilitation of the revetment is anticipated in 2013. Rehabilitation will probably consist of replacement of lost armor rock cover material, the armor rock weighted toe, and the toe rock material. In general, repairs and major rehabilitation of the revetment will require rock similar to that used in project construction (see paragraph 1.07b). During regularly scheduled beach nourishment, consideration shall be given to repair work on the revetment. During the estimated 5-year periods between nourishments, damage can be expected along portions of the revetment. Generally, revetment repair at these times can be expected to be relatively minor, compared to the work required for nourishment. Such repair might consist of salvaging and resetting displaced rock or importing small quantities of new rock. Incorporating revetment repair within the required nourishment contract would result in substantial savings of engineering, administrative, and possibly contractor mobilization costs. The total cost of maintenance and repair of the revetment shall be borne by the city.

b. Beach Nourishment. The primary objective of nourishment is to maintain the nearshore beach profile (that zone from about +16' MLLW seaward to the limits of active wave influence on the bottom materials, which occurs at depths of 20 to 50 feet). Maintaining this nearshore zone accomplishes two important objectives: (1) inducing offshore wave breaking and thereby limiting the height of wave attack on the seawall and the revetment, and (2) preventing lowering (in the long term) of the foreshore, or tidal zone, beach profile, and thus preventing undercutting of the seawall and revetment structure. Beach nourishment is scheduled for FY 1993 and at subsequent 5-year periods. Engineering studies, design memorandum (DM) report, and preparation of plans and specifications should be accomplished in FY 1992 for FY 1993 nourishment. Data from beach observations and surveys and benthic monitoring will be utilized in engineering studies and results presented in the DM. Basis for the selected nourishment program will be derived from monitoring the initial nourishment and from studying the availability and cost of different types of materials. FY 1992 and subsequent year studies shall consider whether nourishment is in fact needed, whether placement can be made by land equipment or by barge, and locations along the beach where placement should take place. The above evaluations will be made during the course of

the yearly monitoring program and will be substantiated during detailed DM studies just prior to scheduled nourishment periods. The DM will provide the basis for preparation of plans and specifications for nourishment or for the recommendation that nourishment is not required. The cost of the periodic nourishment shall be cost shared between the city and the Federal government as set forth in the LCA.

c. Monitoring Program. The monitoring program is important to both the revetment and nourishment program. The monitoring will involve the following two major areas:

(1) Revetment Monitoring. An annual field inspection will be made jointly by the Seattle District and city of Seattle to ascertain armor and toe rock displacement, overtopping problems, and damaged or vulnerable portions of the revetment. This inspection will be combined with the Seattle District inspection of the beach nourishment portion of the project. Additional inspections may be deemed necessary after major storms or when the Seattle District is notified by the City of damage to the revetment (paragraph 3.02a.4). When the Seattle District determines that repair to the revetment is needed the city shall be notified in writing of that need.

(2) Nourishment Monitoring. An annual field inspection will be made jointly by the Seattle District and city of Seattle, during the spring (May-June), after the winter storms, at which time a visual observation of the beach will be made, at low tide, to observe and note the degree of erosion/accretion of the beach nourishment. When the beach nourishment has eroded to a level approximately 4-feet below the top of the seawall (elevation +13 feet), estimated to be at approximately 5-year intervals, the Seattle District will perform cross sectional surveys of the beach and revetment. The results of the inspections and surveys will be used to determine the frequency and extent of periodic beach nourishment and revetment repair.

APPENDIX A

Section 103 of the River and Harbor Act of 1962, as amended (Public Law 87-874), as modified by Section 915 of the Water Resources Development Act of 1986, (Public Law 99-662).

An Act to amend the Act entitled "An Act authorizing Federal participation in the cost of protecting the shores of publicly owned property", approved August 13, 1946.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That:

The Act entitled "An Act authorizing Federal participation in the cost of protecting the shores of publicly owned property", approved August 13, 1946, is hereby amended to read as follows: "That (a) with the purpose of preventing damage to the shores of the United States, its Territories and possessions and promoting and encouraging the healthful recreation of the people, it is hereby declared to be the policy of the United States, subject to the following provisions of this Act to assist in the construction, but not the maintenance, of works for the restoration and protection against erosion, by waves and currents, of the shores of the United States, its Territories and possessions.

"(b) The Federal contribution in the case of any project referred to in subsection (a) shall not exceed one-half of the cost of the project, and the remainder shall be paid by the State, municipality, or other political Subdivision in which the project is located, except that the costs allocated to the restoration and protection of Federal property shall be borne fully by the Federal Government, and, further, that Federal participation in the cost of a project for restoration and protection of State, county, and other publicly owned shore parks and conservation areas may be, in the discretion of the Chief of Engineers, not more than 70 per centum of the total cost exclusive of land costs, when such areas: Include a zone which excludes permanent human habitation; include but are not limited to recreational beaches; satisfy adequate criteria for conservation and development of the natural resources of the environment; extend landward a sufficient distance to include, where appropriate, protective dunes, bluffs, or other natural features which serve to protect the uplands from damage; and provide essentially full park facilities for appropriate public use, all of which shall meet with the approval of the Chief of Engineers";

"(c) When in the opinion of the Chief of Engineers the most suitable and economical remedial measures would be provided by periodic beach nourishment, the term 'construction' may be construed for the purposes of this Act to include the deposit of sand fill at suitable intervals of time to furnish sand supply to project shores for a length of time specified by the Chief of Engineers.

"(d) Shores other than public will be eligible for Federal assistance if there is benefit such as that arising from public use or from the protection of nearby public property or if the benefits to those shores are incidental to the project, and the Federal contribution to the project shall be adjusted in accordance with the degree of such benefits.

"(e) No Federal contribution shall be made with respect to a project under this Act unless the plan therefor shall have been specifically adopted and authorized by Congress after investigation and study by the Board of Engineers for Rivers and Harbors under provisions of section 3 of the River and Harbor Act approved June 13, 1902, as amended and supplemented, or in the case of a small project under section 3 of this Act, unless the plan therefor has been approved by the Chief of Engineers";

"Sec. 2. The Secretary of the Army is hereby authorized to reimburse local interests for work done by them, after initiation of the survey studies which individually do not exceed \$2,000,000 in total cost: Provided, That the work which may have been done on the projects is approved by the Chief of Engineers as being in accordance with the authorized projects: Provided further, That such reimbursement shall be subject to appropriations applicable thereto or funds available therefor and shall not take precedence over other pending projects of higher priority for improvements.

"Sec. 3. The Secretary of the Army is hereby authorized to undertake construction of small shore and beach restoration and protection projects not specifically authorized by Congress, which otherwise comply with section 1 of this Act, when he finds that such work is advisable, and he is further authorized to allot from any appropriations hereafter made for civil works, not to exceed \$3,000,000 for any one fiscal year for the Federal share of the costs of construction of such projects: Provided, That not more than \$400,000 shall be allotted for this purpose for any single project under section 1(c) of this Act: Provided further, That the provisions of local cooperation specified in section 1 of this Act shall apply: And provided further, That the work shall be complete in itself and shall not commit the United States to any additional improvement to insure its successful operation, except for participation in periodic beach nourishment in accordance with section 1(c) of this Act, and as may result from normal procedure applying to projects authorized after submission of survey reports."

(b) All provisions of existing law relating to surveys of rivers and harbors shall apply to surveys relating to shore protection and section 2 of the River and Harbor Act approved July 3, 1930, as amended (33 U.S.C. 426), is modified to the extent inconsistent herewith.

(c) The cost-sharing provisions of this Act shall apply in determining the amounts of Federal participation in or payments toward the costs of authorized projects which have not been substantially completed prior to the date of approval of this Act, and the Chief of Engineers, through the Board of Engineers for Rivers and Harbors, is authorized and directed to recompute the amounts of Federal contribution toward the costs of such projects accordingly.

Revisions and Amendments.

(1) An Act of Congress approved 13 August 1946 (Public Law 79-727) established a policy of Federal aid in construction costs where projects protected publicly-owned shores.

(2) An Act of Congress approved 28 July 1956 (Public Law 84-826) amended that basic beach erosion legislation to authorize Federal participation in the protection of private property if such protection was incidental to the protection of publicly owned shores, or if such protection would result in public benefits.

(3) The River and Harbor Act of 1962 (Public Law 87-874) increased the portion of construction costs borne by the Federal government and made the total cost of studies a federal responsibility.

(4) An Act of Congress approved 7 November 1963 (Public Law 88-172) abolished the Beach Erosion Board, transferred its review functions to the Board of Engineers for Rivers and Harbors, and established the Coastal Engineering Research Center.

(5) The Water Resources Development Act of 1986 (Public Law 99-662) recognizes storm damage reduction and/or recreation as the primary purpose of beach erosion control projects, alters the proportion of construction costs that may be borne by the Federal Government to 65 percent Federal, 35 percent non-Federal for publicly-owned shoreline, and raises the Federal funding limit of an individual project from \$1,000,000 to \$2,000,000. The per project Federal funding limit includes all Corps of Engineers allocations for studies and project implementation, including construction, monitoring, and periodic nourishment.

APPENDIX B

Local Cooperation Agreement

1 March 88
Revised 3 March 88
Revised 7 March 88
Revised 8 April 88
Revised 21 April 88

AGREEMENT BETWEEN
THE DEPARTMENT OF THE ARMY
AND
THE CITY OF SEATTLE
FOR LOCAL COOPERATION FOR
SHORELINE EROSION CONTROL PROJECT AT LINCOLN PARK, SEATTLE, WASHINGTON

THIS AGREEMENT, entered into this 15th day of June, 1988, by and between the DEPARTMENT OF THE ARMY (hereinafter referred to as the "GOVERNMENT"), acting by and through the Contracting Officer, and the CITY OF SEATTLE, WASHINGTON (hereinafter referred to as the "CITY"), acting by and through the Mayor of Seattle,

WITNESSETH, THAT:

WHEREAS, the authority for construction of the shoreline erosion control project at Lincoln Park, Seattle, Washington (hereinafter called the "PROJECT") not specifically authorized by Congress is contained in Section 103 of the River and Harbor Act of 1962 (Public Law 87-874), as amended; and,

WHEREAS, construction of the PROJECT described in a report entitled "Lincoln Park Shoreline Erosion Control - Seattle, Washington", prepared by the District Engineer, U.S. Army Engineer District, Seattle, Washington, dated September 1986, and approved by the Chief of Engineers, U.S. Army Corps of Engineers, Washington, D. C. on the 19th day of MAY, 1988; and

WHEREAS, the Water Resources Development Act of 1986, Public Law 99-662, specifies the cost-sharing requirements applicable to the PROJECT; and

WHEREAS, Section 103 of the River and Harbor Act of 1962, as amended, limits the Federal expenditure on a single project to \$2,000,000; and

WHEREAS, the CITY has the authority and legal capability to furnish the non-Federal cooperation hereinafter set forth and is willing to participate in PROJECT cost sharing and financing in accordance with the terms of this Agreement; and

NOW THEREFORE, the parties agree as follows:

ARTICLE I - DEFINITIONS

For the purpose of this Agreement:

a. The term "PROJECT" shall mean the construction of 2,300 feet of sand and gravel beach nourishment on the southwest beach seaward along the existing seawall and 250 feet of rock revetment fronted by gravel and cobble beach nourishment to replace the failed seawall at Williams Point.

b. The term "total PROJECT costs" shall mean all costs incurred by the CITY and the GOVERNMENT directly related to construction of the PROJECT. Such total PROJECT costs shall include, but not necessarily be limited to, actual construction costs, benthos recovery study costs, costs of applicable engineering and design, supervision and administration costs, costs of preparation of contract plans and specifications, costs of relocations performed for the PROJECT, costs of PROJECT construction contract dispute settlements or awards, and the value of lands, easements, rights-of-way, relocations, and dredged material disposal areas provided for the PROJECT by the CITY, but shall not include any costs for betterments, operation, maintenance or rehabilitation, nor GOVERNMENT costs for preauthorization studies.

c. The term "period of construction" shall mean the time from the award of the first construction contract to the time of acceptance of the construction of the "PROJECT" as complete by the Contracting Officer.

d. The term "Contracting Officer" shall mean the District Engineer of the United States Army Engineer District, Seattle, or his designee.

e. The term "highway" shall mean any highway, thoroughfare, roadway, street, or other public or private road or way.

ARTICLE II - OBLIGATIONS OF PARTIES

a. The CITY shall provide, during the period of construction, an amount equal to thirty-five (35) percent of the total PROJECT costs. This amount may be reduced by the value of any lands, easements, rights-of-way or relocations provided by the CITY for the PROJECT.

b. As further specified in Article III hereof, the CITY shall provide all lands, easements, rights-of-way, and dredged material disposal areas, and perform all relocations and alterations of buildings, utilities, highways, railroads, bridges, sewers, and related and special facilities determined by the GOVERNMENT to be necessary for construction of the PROJECT.

c. In no instance shall the GOVERNMENT'S share of total PROJECT costs, including all preauthorization planning costs (currently estimated to be \$190,000), exceed \$2,000,000. The CITY shall assume full responsibility for all GOVERNMENT expenditures in excess of the Federal cost limitation of \$2,000,000.

d. The GOVERNMENT, subject to and using funds provided by the CITY and appropriated by Congress, shall expeditiously construct the PROJECT, applying those procedures usually followed or applied in Federal projects, pursuant to Federal laws, regulations, and policies. Award of Federal

contracts and performance of the work thereunder shall be exclusively within the control of the GOVERNMENT.

e. When the GOVERNMENT determines that the PROJECT, or functional element thereof, is complete, the GOVERNMENT shall turn the PROJECT or element over to the CITY, which shall be solely responsible for operating, maintaining, replacing and rehabilitating the PROJECT in accordance with Article VIII hereof.

f. The CITY will maintain continued public ownership of the non-Federal publicly owned shores and continued availability for public use thereof upon which the recommended Federal participation is based.

g. The CITY will provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms.

h. Any costs assigned to benefits to privately owned shores or to prevention of losses of private lands shall be borne by the CITY.

ARTICLE III - LANDS, FACILITIES, AND RELOCATION ASSISTANCE

a. The CITY shall provide without cost to the GOVERNMENT all lands, easements, and rights-of-way, including suitable borrow and dredged material disposal areas, as may be determined by the GOVERNMENT to be necessary for construction of the PROJECT. Prior to the advertisement of any construction contract, the CITY shall furnish to the GOVERNMENT rights-of-entry to all lands required for the PROJECT, together with evidence supporting the CITY'S legal authority to grant such rights-of-entry.

b. Upon notification from the GOVERNMENT, the CITY shall accomplish or arrange for accomplishment at no cost to the GOVERNMENT all alterations and relocations of buildings, highways, railroads, bridges, storm drains, utilities, cemeteries, and other facilities, structures, and improvements determined by the GOVERNMENT to be necessary for construction of the PROJECT.

c. The CITY shall comply with the applicable provisions of the Uniform Relocations Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, approved January 2, 1971, as amended, in acquiring lands, easements, and rights-of-way for construction and subsequent operation and maintenance of the PROJECT and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

ARTICLE IV - VALUATION OF LANDS AND FACILITIES

a. The value of the lands, easements, and rights-of-way to be included in total PROJECT costs and credited toward the CITY share of total PROJECT costs will be determined in accordance with the following procedures:

1. If the lands, easements, or rights-of-way are owned by the CITY as of the date this Agreement is signed, the credit shall be the fair market

value of the interest at the time such interest is made available to the GOVERNMENT for construction of the PROJECT. The fair market value shall be determined by an appraisal, to be obtained by the CITY, which has been prepared by an independent and qualified appraiser who is acceptable to both the CITY and the GOVERNMENT. The appraisal shall be reviewed and approved by the GOVERNMENT.

2. If the lands, easements, or rights-of-way are to be acquired by the CITY after the date this Agreement is signed, the credit shall be the fair market value of the interest at the time such interest is made available to the GOVERNMENT for construction of the PROJECT. The fair market value shall be determined as specified in subparagraph 1. above. If the CITY pays an amount in excess of the appraised fair market value, it may be entitled to a credit for the excess if the CITY has secured prior written approval from the GOVERNMENT of its offer to purchase such interest.

3. If the CITY acquires more lands, easements, or rights-of-way than are necessary for PROJECT purposes, as determined by the GOVERNMENT, then only the value of such portions of those acquisitions as are necessary for PROJECT purposes shall be included in total PROJECT costs and credited to the CITY'S share.

4. Credit for lands, easements, and rights-of-way in the case of involuntary acquisitions which occur within a one-year period preceding the date this Agreement is signed or which occur after the date this Agreement is signed will be based on court awards, or on stipulated settlements that have received prior GOVERNMENT approval.

5. For lands, easements, or rights-of-way acquired by the CITY within a five-year period preceding the date this Agreement is signed, or any time after this Agreement is signed, credits provided under this paragraph will also include the actual incidental costs of acquiring the interest, e. g., closing and title costs, appraisal costs, survey costs, attorney's fees, plat maps, and mapping costs, as well as the actual amounts expended for any relocation assistance provided in accordance with the obligations under this Agreement.

b. The costs of relocations or modifications of utilities or facilities that will be included in total PROJECT costs and credited towards the CITY'S share of total PROJECT costs shall be that portion of the actual costs incurred by the CITY as set forth below:

1. Highways and Highway Bridges: Only that portion of the cost as would be necessary to construct substitute bridges and highways to the design standard that the State of Washington would use in constructing a new bridge or highway under similar conditions of geography and traffic loads.

2. Utilities and Facilities (Including Railroads): Actual relocation costs, less depreciation, less salvage value, plus the cost of removal, less the cost of betterments. With respect to betterments, new materials shall not be used in any relocation or alteration if materials of value and usability equal to those in the existing facility are available or

an be obtained as salvage from the existing facility or otherwise, unless the provision of new material is more economical. If, despite the availability of used material, new material is used, where the use of such new material represents an additional cost, such cost will not be included in total PROJECT costs.

ARTICLE V - CONSTRUCTION PHASING AND MANAGEMENT

a. To provide for consistent and effective communication between the CITY and the GOVERNMENT, the CITY and the GOVERNMENT shall appoint representatives to coordinate on scheduling, plans, specifications, modifications, contract costs, and other matters relating to the PROJECT.

b. The representatives appointed above shall meet as necessary as the PROJECT is implemented and shall make such recommendations as they deem warranted to the Contracting Officer.

c. The Contracting Officer shall consider the recommendations of the representatives in all matters relating to the PROJECT, but the Contracting Officer, having ultimate responsibility for construction of the PROJECT, has complete discretion to accept, reject, or modify the recommendations of the representatives.

ARTICLE VI - METHOD OF PAYMENT

a. The CITY shall provide, during the period of construction, the amounts required under Article II a. and II c. Total PROJECT costs are presently estimated to be \$ 770,000. In order to meet its share, the CITY must provide during the period of construction a cash contribution presently estimated to be \$269,500.

b. The CITY shall provide its required cash contribution in proportion to the rate of Federal expenditures during the period of construction in accordance with the following provisions:

1. For purposes of budget planning, by August 1 of each year in which construction will occur, the GOVERNMENT shall notify the CITY of the estimated funds that will be required from the CITY to meet its share of PROJECT costs for the corresponding GOVERNMENT fiscal year.

2. Thirty days prior to the award of the first construction contract, the GOVERNMENT shall notify the CITY of its share of PROJECT costs, including costs attributable to the PROJECT incurred prior to the initiation of construction, for the first fiscal year of construction. Within 15 days thereafter, the CITY shall provide the requisite amount to the GOVERNMENT in cash by delivering a check payable to "FAO, USAID, Portland (Seattle)" to the Contracting Officer.

3. For the second and subsequent fiscal years of PROJECT construction, the GOVERNMENT shall, 60 days prior to the beginning of the GOVERNMENT'S fiscal year, notify the CITY of its share of PROJECT costs for that fiscal year. No later than 30 days prior to the beginning of the

fiscal year, the CITY shall make the necessary funds available to the GOVERNMENT through the funding mechanism specified above. As construction of the PROJECT proceeds, the GOVERNMENT may adjust the amounts required to be provided under this paragraph to reflect actual PROJECT costs.

4. If at any time during the period of construction the GOVERNMENT determines that additional funds will be needed from the CITY to meet its required share of PROJECT costs, the GOVERNMENT shall so notify the CITY and the CITY within 30 days from receipt of notice, shall make the necessary funds available through the funding mechanism specified above.

c. The GOVERNMENT will draw on the funds provided by the CITY such sums as it deems necessary to cover contractual and in-house fiscal obligations attributable to the PROJECT as they are incurred as well as PROJECT costs incurred by the GOVERNMENT prior to the initiation of construction.

d. Upon completion of the PROJECT and resolution of all relevant contract claims and appeals arising therefrom, the GOVERNMENT shall compute the total PROJECT costs and tender to the CITY a final accounting of its share of total PROJECT costs. In the event the total contribution by the CITY is less than its required share of total PROJECT costs at the time of the final accounting, the CITY shall pay within ninety (90) calendar days after receipt of written notice whatever sum is required to meet its share of total PROJECT costs. In the event the CITY has made excess cash contributions which result in the CITY'S having provided more than its required share of total PROJECT costs, the GOVERNMENT shall, subject to the availability of appropriations, and subject to the Federal statutory cost limitation set forth in Article II c., return to the CITY within ninety (90) calendar days such cash contributions which exceed the CITY'S required share of total PROJECT costs.

ARTICLE VII - DISPUTES

Before any party to this Agreement may bring suit in any court concerning an issue relating to this Agreement, such party must first seek in good faith to resolve the issue through negotiation or through other forms of non-binding alternative dispute resolution.

ARTICLE VIII - OPERATION, MAINTENANCE, AND REHABILITATION

a. After it is turned over by the GOVERNMENT, the CITY will maintain, operate, replace, and rehabilitate the PROJECT or functional elements thereof in accordance with regulations or directions prescribed by the GOVERNMENT.

b. The CITY hereby gives the GOVERNMENT a right to enter, at reasonable times and in a reasonable manner, upon land which it owns or controls for access to the PROJECT for the purpose of inspection, and, if necessary for the purpose of maintaining, operating, completing, repairing, replacing or rehabilitating the PROJECT. If an inspection shows that the CITY for any reason is failing to fulfill its obligations under this

Agreement without written prior approval from the GOVERNMENT, the GOVERNMENT will send a written notice to the CITY. If the CITY persists in such failure for thirty (30) calendar days after receipt of the notice, then the GOVERNMENT shall have a right to enter, at reasonable times and in a reasonable manner, upon lands the CITY owns or controls for access to the PROJECT for the purpose of completing, maintaining, operating, repairing, replacing, or rehabilitating the PROJECT. No maintenance, operation, completion, repair, replacement, or rehabilitation by the GOVERNMENT shall operate to relieve the CITY of responsibility to meet its obligations as set forth in this Agreement, or to preclude the GOVERNMENT from pursuing any other remedy at law or equity to assure faithful performance pursuant to this Agreement.

ARTICLE IX - MAINTENANCE OF RECORDS

The GOVERNMENT and the CITY shall keep books, records, documents and other evidence pertaining to costs and expenses incurred pursuant to this Agreement to the extent and in such detail as will properly reflect total PROJECT costs. The GOVERNMENT and the CITY shall maintain such books, records, documents, and other evidence for a minimum of three (3) years after completion of construction of the PROJECT and resolution of all claims arising therefrom and shall make available at their offices at reasonable times, such books, records, documents, and other evidence for inspection and audit by authorized representatives of the parties to this Agreement.

ARTICLE X - FEDERAL AND STATE LAWS

In acting under its rights and obligations hereunder, the CITY agrees to comply with all applicable Federal and State laws and regulations, including Section 601 of Title VI of the Civil Rights Act of 1964 (Public Law 88-352) and Department of Defense Directive 5500.II issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army".

ARTICLE XI - TERMINATION OR SUSPENSION

a. If at any time the CITY fails to make the payments required under this Agreement, the Secretary of the Army shall terminate or suspend work on the PROJECT until the CITY is no longer in arrears or unless the Secretary of the Army determines that continuation of work on the PROJECT is in the best interest of the United States. Any delinquent payment shall be charged interest at a rate to be determined by the Secretary of the Treasury, equal to 150 per centum of the average bond equivalent rate of the 13-week Treasury bills auctioned immediately prior to the date on which such payment became delinquent, or auctioned immediately prior to the beginning of each additional 3-month period if the period of delinquency exceeds 3 months.

b. If the GOVERNMENT fails to receive annual appropriations in amounts sufficient to meet expenditures for the then-current or upcoming fiscal year, the GOVERNMENT shall notify the CITY. After sixty (60) days either

party may elect without penalty to terminate the Agreement or to suspend performance thereunder, and the parties shall proceed to conclude their activities relating to the PROJECT and proceed to a final accounting in accordance with Article VI d.

c. Notwithstanding any other provision of this Agreement, if the award of any contract would result in total obligations and expenditures for the PROJECT exceeding \$662,500. the award of that contract shall be deferred until both parties to this Agreement mutually agree upon a course of action, which may involve award of the contract, readvertisement of the contract, or redesign.

ARTICLE XIII - RELEASE OF CLAIMS

The CITY will hold and save the GOVERNMENT free from all damages arising from the construction, operation, and maintenance of the completed PROJECT except for damages due to the fault or negligence of the GOVERNMENT or its contractors.

ARTICLE XIII - RELATIONSHIP OF PARTIES

The parties to this Agreement act in an independent capacity in the performance of their respective functions under this Agreement, and neither party is to be considered the officer, agent, or employee of the other.

ARTICLE XIV - OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, or resident commissioner, shall be admitted to any share of part of this Agreement or to any benefit that may arise therefrom.

ARTICLE XV - COVENANT AGAINST CONTINGENT FEES

The CITY warrants that no person or selling agency has been employed or retained to solicit or secure this Agreement upon agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the CITY for the purpose of securing business. For breach or violation of this warranty, the GOVERNMENT shall have the right to annul this Agreement without liability, or, in its discretion, to add to the Agreement or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE XVI - NOTICES

a. All notices, requests, demands, and other communications required or permitted to be given under this Agreement shall be deemed to have been duly given if in writing and delivered personally, given by prepaid telegram, or mailed by first-class (postage-prepaid), registered, or certified mail, as follows:

If to the CITY:

Mayor
City of Seattle
1200 Municipal Building
Seattle, Washington 98104

If to the GOVERNMENT:

Commander
Seattle District, U. S. Army Corps of Engineers
Post Office Box C-3755
Seattle, Washington 98124-2255

b. A party may change the address to which such communications are to be directed by giving written notice to the other in the manner provided in this section.

c. Any notice, request, demand, or other communication made pursuant to this Article shall be deemed to have been received by the addressee at such time as it is personally delivered or on the third business day after it is mailed, as the case may be.

ARTICLE XVII - CONFIDENTIALITY

To the extent permitted by the law governing each party, the parties agree to maintain the confidentiality of exchanged information when requested to do so by the providing party.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

THE DEPARTMENT OF THE ARMY

THE CITY OF SEATTLE, WASHINGTON

BY: *Philip L. Hall*

PHILIP L. HALL
Colonel, Corps of Engineers
District Engineer, Seattle
Contracting Officer

BY: *Charles Royer*

CHARLES ROYER
Mayor

DATE: 6/15/88

DATE: 6/13/88

CERTIFICATE OF AUTHORITY

I, DOUGLAS D. JEWELL, do hereby certify that I am the City Attorney of the City of Seattle, that the City of Seattle is a legally constituted public body with full authority and legal capability to perform the terms of the Agreement between the Department of the Army and City of Seattle in connection with the Shoreline Erosion Control Project at Lincoln Park, Seattle, Washington, and to pay damages, if necessary, in the event of failure to perform, in accordance with Section 221 of Public Law 91-611, and that the person who has executed the Agreement on behalf of the City of Seattle has acted within his statutory authority.

IN WITNESS WHEREOF, I have made and executed this Certificate this 13th day of JUNE 1988.


City Attorney

ORDINANCE 113937

AN ORDINANCE relating to the Department of Parks and Recreation; authorizing a Local Cooperation Agreement with the U.S. Government for assistance for the erosion control project at Lincoln Park; and making an appropriation from the Park Renovation and Improvement Fund.

BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:

Section 1. As requested by the Mayor and the Superintendent of Parks and Recreation in this ordinance file, the Mayor is hereby authorized to execute for and on behalf of The City of Seattle, an agreement with the U.S. Government, Department of the Army, substantially in the form of the attachment hereto for in-kind assistance for the shoreline erosion control project at Lincoln Park.

Section 2. To carry out the agreement authorized in Section 1 hereof, including payments to the Department of the Army contemplated therein, and for the design and construction of related renovations at Lincoln Park, in addition to the appropriation authorized by Ordinance 108730 and 112331, the sum of Seven Hundred Sixty-Seven Thousand Dollars (\$767,000), or so much thereof as may be necessary, is hereby appropriated from the Park Renovation and Improvement Fund and the City Comptroller is authorized to draw and the City Treasurer to pay the necessary warrants and make any necessary transfers.

Section 3. Any act consistent with the authority and prior to the effective date of this ordinance is hereby ratified and confirmed.

Section 4 . This ordinance shall take effect and be in force thirty days from and after its passage and approval, if approved by the Mayor; otherwise it shall take effect at the time it shall become a law under the provisions of the city charter.

Passed by the City Council the 25th day of April, 19 88
and signed by me in open session in authentication of its passage this 26th day of April, 19 88.

Approved by me this 29th day of April, 19 88
Filed by me this 3rd day of May, 19 88

Attest: Norward J. Brooks
City Comptroller and City Clerk.

(SEAL)

Published

By Margaret Ceder
Deputy Clerk.

APPENDIX C

Drawings

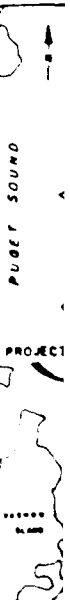


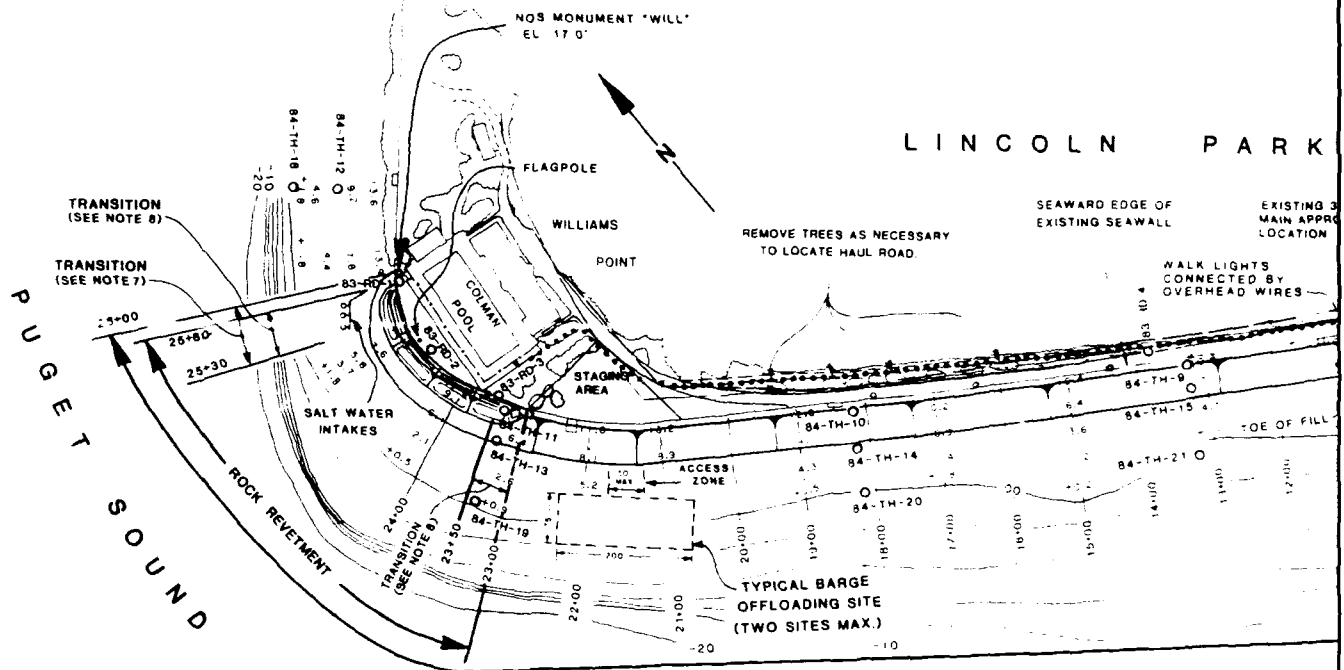
US Army Corps
of Engineers
Seattle District

LINCOLN PARK SHORELINE EROSION CON

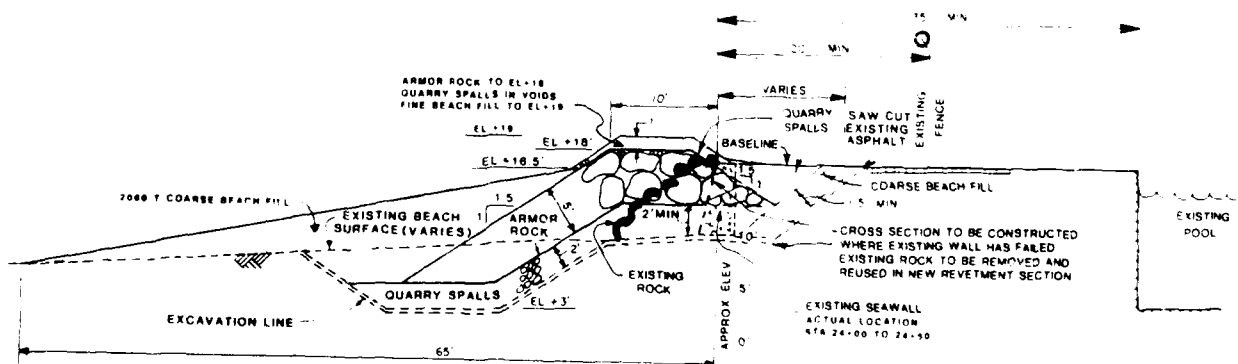
SEATTLE, WASHINGTON

DRAWING INDEX		
FILE NO.	SHEET NO.	TITLE
E-90-1-3	1	DRAWING INDEX, LOCATION
E-90-1-3	2	BEACH FILL AND ROCK RETEMENT PLAN AND CROSS SECTIONS
E-90-1-3	3	FOUNDATION EXPLORATION





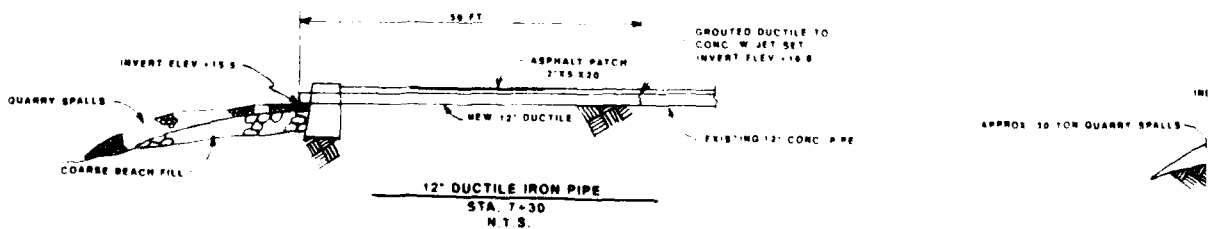
Datum Plane	Elevation in Feet Referred to NOAA MLLW Datum	Elevation in Feet Referred to COE Datum
Highest Estimated Tide (15 Dec 77)	14.80	15.68
Mean Higher High Water	11.32	12.20
Mean High Water	10.47	11.35
Mean (Hart) Tide Level	6.65	7.53
National Geodetic Vertical Datum (NGVD)	6.25	7.13
Mean Low Water	2.82	3.70
Mean Lower Low Water (NOAA)	0.00	0.86
Corps of Engineers Datum	-0.88	0.00
Lowest Tide (20 Jun 51)	-4.60	-3.72

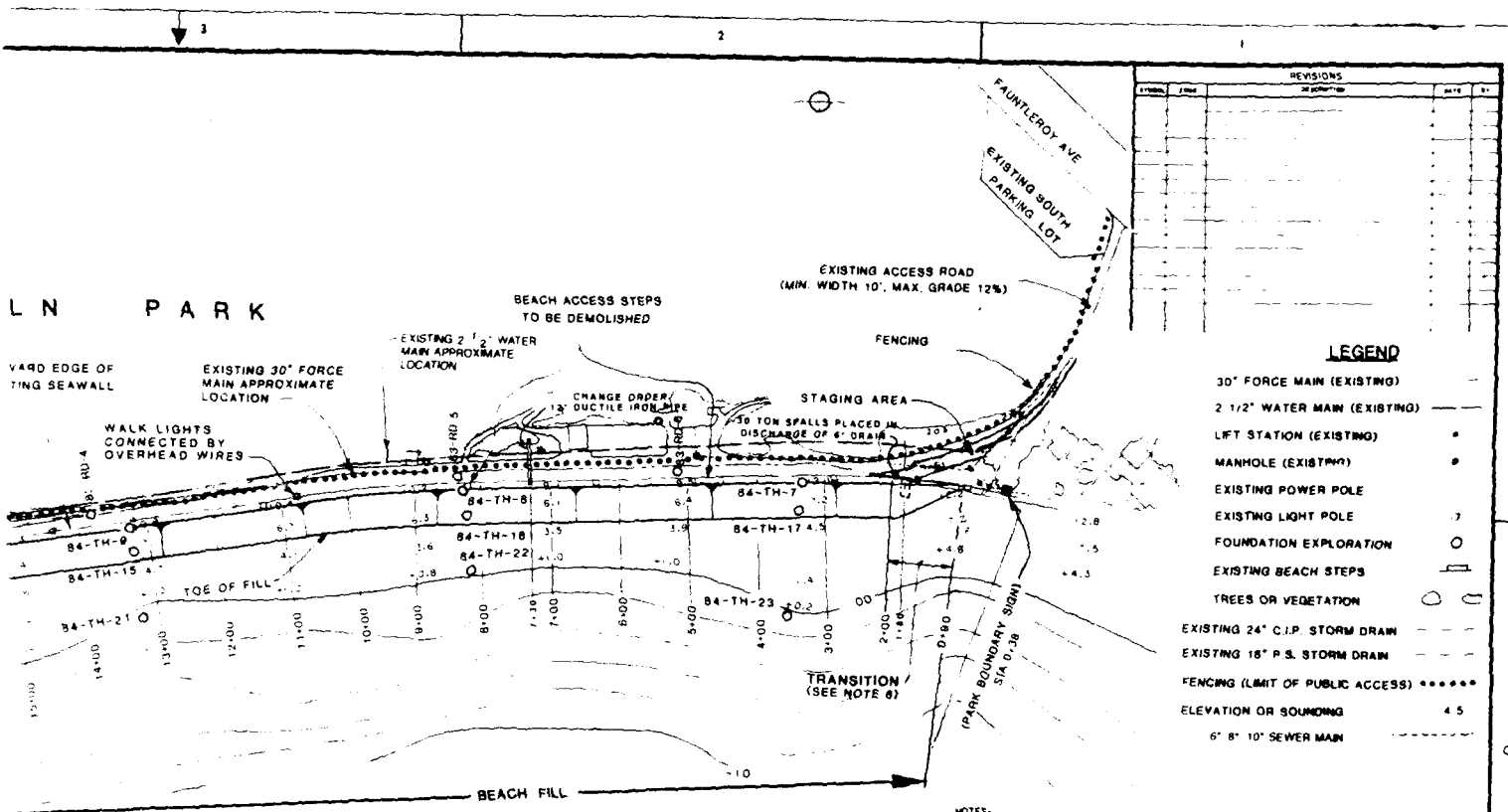


TYPICAL ROCK REVETMENT CROSS SECTION

STA. 23+50 TO 25+30

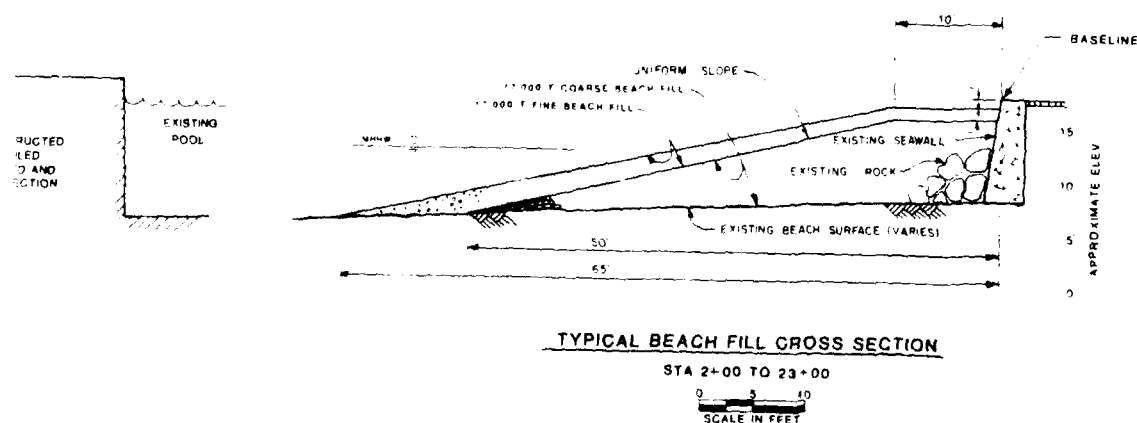
SCALE IN FEET





Station in Feet
to COE Datum

15.88
12.20
11.35
7.53
7.13
1.70
2.88
2.00
1.72



- FILL TRANSITION 0+00 TO 2+00 SHALL BE UNIFORM AND CONSTRUCTED ENTIRELY OF FINE FILL MATERIAL.
- FILL TRANSITION 25+00 TO 28+00 SHALL BE UNIFORM AND CONSTRUCTED ENTIRELY OF COARSE FILL MATERIAL.
- TRANSITION FROM END OF REVEMENT TO FILL REVEMENT SECTION SHALL OCCUR UNIFORMLY WITHIN DISTANCE OF 50' FROM EACH END. REVEMENT SECTION THROUGHOUT TRANSITION WILL BE AS SHOWN IN "TYPICAL SECTION", WITH UNIFORM ADJUSTMENTS MADE IN TOP WIDTH, DISTANCE TO TOE, AND TOE ELEVATION. ELEVATION OF QUARRY SPALL LAYER SHALL INCREASE UNIFORMLY AS THE STRUCTURE TOE APPROACHES THE BASE OF THE SEAWALL. FROM 23+00 TO 25+00, BEACH FILL SHALL TRANSITION UNIFORMLY FROM COARSE FILL AND FINE FILL TO ENTIRELY COARSE FILL.

AS-BUILT

U. S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
100 TALL, BRUNNEN ST.

LINCOLN PARK
SHORELINE EROSION CONTROL
BEACH FILL AND ROCK REVEMENT
PLAN AND CROSS SECTIONS

SEATTLE		WASHINGTON	
DATE	10/1/88	FILE NO.	E-90-1-3
BY	W. E. NELSON	CHKD.	A. B. SCHMIDT
DATE	APRIL 88	DATE	

REVIEWED
W. E. NELSON

30 TON QUARRY SPALLS
STA. 1+80
N.T.S.

HOLE NUMBER 67-02-1	
DEPTH FEET	DESCRIPTION OF MATERIALS
0	0 - 25
25	sp.-sh. sand (surface to base) of gravel (1"-) and silt, medium, med. dark gray.
25	
25	0 - 25
25	
25	
25	0 - 25
25	
25	Bottom @ 51.3

[illegible]

- NOTES
- 1 EXPLORATION WAS PERFORMED ON 8 NOV 1969 THRU 18 NOV 1969 BY SEATTLE DISTRICT, ARMY CORPS OF ENGINEERS, USING A TRUCK MOUNTED ROTARY DRILL.
 - 2 SOILS WERE VISUALLY CLASSIFIED ACCORDING TO THE "UNIFIED SOIL CLASSIFICATION SYSTEM".
 - 3 RELATIVE DENSITY AND CONSISTENCY:
 - a. RELATIVE DENSITY FOR SAND OR GRAVEL (STANDARD PENETRATION TEST-BLDS/FOOT)

0-4	VERY LOOSE	30-50	DENSE
4-10	LOOSE	GREATER THAN 50	VERY DENSE
10-30	MEDIUM		
 - b. RELATIONSHIP OF CONSISTENCY FOR FINES:

0-2	VERY SOFT	8-10	STIFF
2-4	SOFT	10-20	VERY STIFF
4-8	MEDIUM	GREATER THAN 20	HARD
 - 4 BORING LOCATIONS ARE SHOWN ON SHEET 2
 - 5 THE ELEVATIONS SHOWN ON THE BORING LOGS ARE TAKEN FROM TOPOGRAPHY GRADINGS BASED ON COE BULL 6 ARE APPROXIMATE
 - 6 HAND SHOVEL TEST HOLE LOGS AND LABORATORY GRADATION CURVES ARE CONTAINED IN THE TECHNICAL SECTION OF THE CONTRACT SPECIFICATION

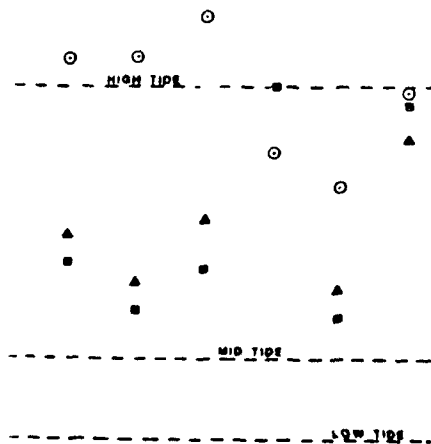
LEGEND

- | | |
|-------|--|
| CL | INORGANIC CLAYS, SANDY OR SILTY CLAYS OF LOW OR
MEDIUM PLASTICITY |
| SP | POORLY GRADED SAND |
| AC | ASPHALTIC CONCRETE |
| SP-SM | POORLY GRADED SAND W/SLT |
| SP-SM | POORLY GRADED GRAVEL W/SLT |
| GP | POORLY GRADED GRAVEL |

LOCATION OF 2 INCH SPLIT SPOON SAMPLE

- N = 13 NUMBER OF BLOWS TO DRIVE SAMPLER ONE FOOT USING
100-POUND HAMMER DROPPED 30 INCHES (STANDARD
PENETRATION TEST-BLCS/FOOT)

- 83-RD-1 ROTARY DRILL BORING NUMBER & LOCATION
0
- 84-TN-7 NUMBER AND LOCATION OF HAND SHOVEL TEST HOLE
0



RD-1	RD-2	RD-3	RD-4	RD-5	RD-6
BORING NUMBER					

LINCOLN PARK BULKHEAD
FOUNDATION EXPLORATION
GROUNDWATER READINGS
11/21 & 11/22 1965

U.S. ARMY ENGINEER DISTRICT, SEATTLE CORPS OF ENGINEERS SEATTLE, WASHINGTON	
LINCOLN PARK SHORELINE EROSION CONTROL FOUNDATION EXPLORATION	
SEATTLE	
WASH.	
DATE APRIL 08	TIME 10:00 A.M.
BY J. H. HARRIS	FOR J. H. HARRIS
TITLE ENGINEER	POSITION ENGINEER