CHRISTINA RIVER RECREATION AREAS

SITE PLANS

NEWPORT

NEWARK

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1982

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CHRISTINA RIVER
RECREATION AREAS
SITE PLANS

PREPARED BY: WILLIAM J. COHEN AND ASSOCIATES, INC.

PREPARED FOR: DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

GV191.42 C47 1982

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In preparing this document, the Consultant staff was greatly assisted by William R. Jones, P.E., Kidde Consultants, who provided preliminary engineering analysis and cost estimates.

Staff members of William J. Cohen and Associates, Inc., who participated in this study included William J. Cohen, AICP, site planning; Frank R. Selby, research and suitability analysis; Andrew D. Zimmerman, cartography and design; Laura K. Newmarker, manuscript preparation; and Nancy Dean, visual analysis.

WILLIAM J. COHEN AND ASSOCIATES, INC.

PLANNING, GOVERNMENT AFFAIRS, RESEARCH, DESIGN

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November 1, 1982

Mr. David S. Hugg, III
Executive Assistant to the Secretary
Office of the Secretary
Department of Natural Resources
and Environmental Control
Tatnall Building
P.O. Box 1401
Dover, DE 19901

Dear Mr. Hugg:

This document is submitted with pleasure to the Department of Natural Resources and Environmental Control, as part of the implementation effort to provide greater opportunities for recreational activities on the Christina River in New Castle County, Delaware.

We are hopeful that the site plans and related analysis will encourage greater public use of this important urban river resource.

Sincerely yours,

William J. Cohen, AICP

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Enclosures

TABLE OF CONTENTS

	Page
LIST OF TABLES	ii
LIST OF FIGURES	iii
CHAPTER 1. RECREATION POTENTIAL: A SUMMARY PERSPECTIVE	1
INTRODUCTION	2
Recreational Potential of the Christina River: Summary of Findings	2
Site Planning Analyses	10
RECREATION SITE SUITABILITY FACTORS	12
CHAPTER 2. NEWPORT FISHING AND SMALL BOAT ACCESS AREA	13
RECREATION SITE SUITABILITY ANALYSIS	14
Soils	14
Flood Hazard Analysis	15
River Characteristics	15
Street System	16
Utilities	17
Visual Analysis	17
NEWPORT FISHING AND SMALL BOAT ACCESS AREA PLAN	21
Locational Importance	21
Proposed Activities	21
Planned Improvements	21
Phase I. Site Improvements and Fishing Area	22
Phase II. Continuation of Site Improvements and Small Boat Access	22
Implementation Costs	23

	Page
CHAPTER 3. PARK DRIVE RECREATION AREA	26
RECREATION SITE SUITABILITY ANALYSIS	27
Soils	27
Flood Hazard Analysis	29
Street System	30
Utilities	30
Visual Analysis	31
Mason-Dixon Trail	34
RECREATION SITE PLAN	35
Locational Importance	35
Proposed Activities	35
Planned Improvements and Implementation	35

LIST OF FIGURES

		Following Page
FIGURE 1.	CHRISTINA RIVER	2
FIGURE 2.	NEWPORT SITE LOCATION MAP	11
FIGURE 3.	PARK DRIVE SITE LOCATION MAP	11
FIGURE 4.	NEWPORT FISHING AND BOAT ACCESS AREA PHASE I SITE PLAN	22
FIGURE 5.	NEWPORT FISHING AND BOAT ACCESS AREA PHASE II SITE PLAN	22
FIGURE 6.	NEWPORT SITE IMPROVEMENT SCHEMATIC	22
FIGURE 7.	EXISTING SOILS PARK DRIVE SITE	28
FIGURE 8.	PARK DRIVE SITE PLAN	35
FIGURE 9.	PARK DRIVE SITE PUBLIC ROAD ACCESS DETAIL	36

LIST OF TABLES

	PAGE
TABLE 1. EXISTING PARK AND RECREATION AREAS	4
TABLE 2. RECREATIONAL USE POTENTIAL BY ACTIVITY AREA	8
TABLE 3. ELSINBORO-DELANCO-URBAN LAND COMPLEX SOIL CONDITIONS	14
TABLE 4. RECREATIONAL DEVELOPMENT LIMITATIONS FOR SOIL GROUPS, PARK DRIVE SITE	29

CHAPTER 1

RECREATION POTENTIAL: A SUMMARY PERSPECTIVE

INTRODUCTION

In March, 1981, in response to a growing interest concerning the unfulfilled potential of the Christina River as a recreation resource in New Castle County, a study was commissioned by the State of Delaware through the Coastal Management Program to undertake an evaluation of the Christina River and address the following tasks:

1. Identify publicly-owned property and access points along the River.

2. Analyze existing data regarding River characteristics.

3. Review land use and recreation plans as they relate to recreational development on the River.

4. Identify potential recreation uses and sites on both sides of the River.

5. Make recommendations for potential recreation area designations on the Christina.

This study was completed and presented to the State in July of 1981. The major findings are summarized in the following section.

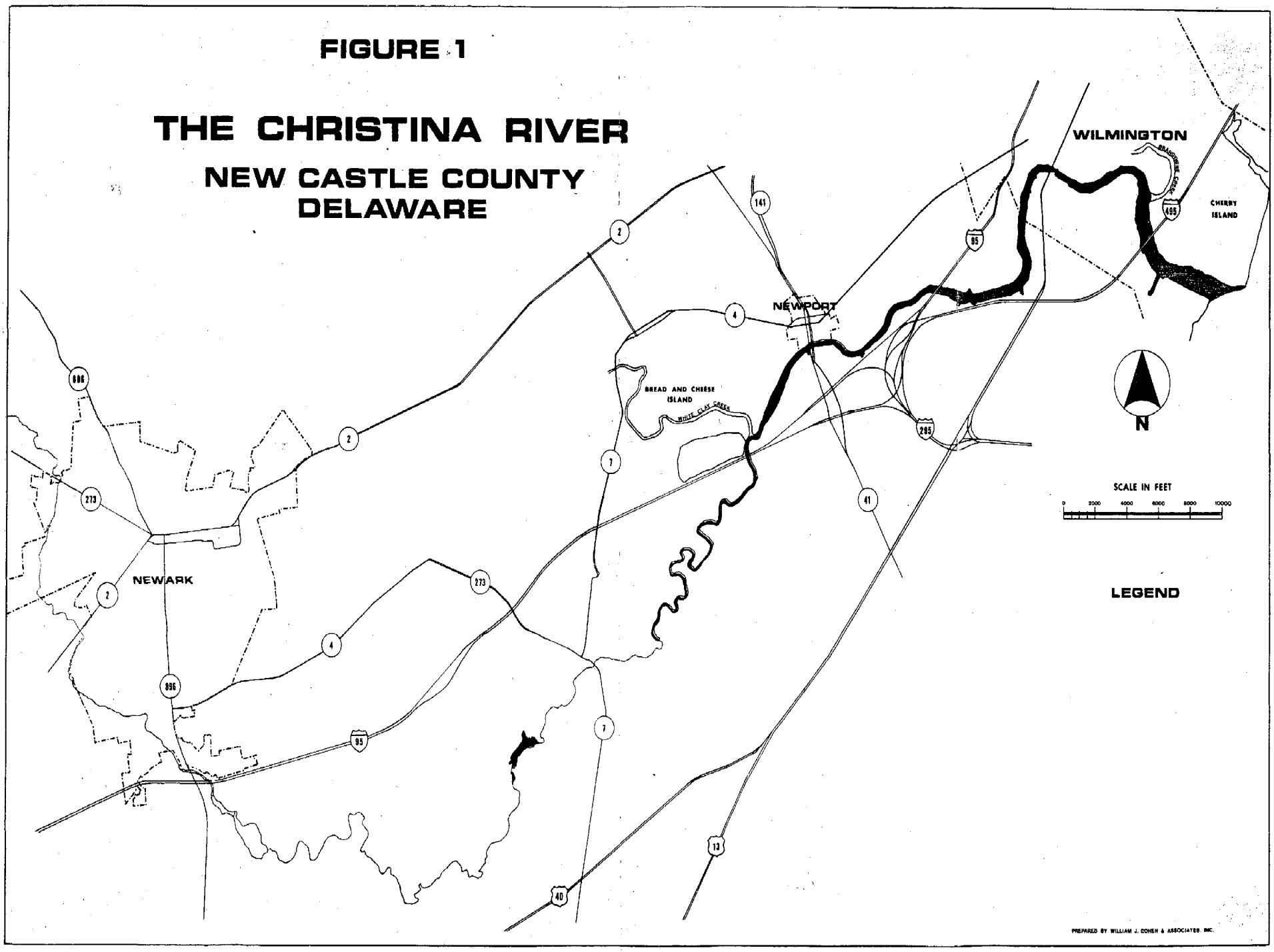
RECREATIONAL POTENTIAL OF THE CHRISTINA RIVER: SUMMARY OF FINDINGS

As depicted on Figure 1, the Christina River flows over a 30.3 mile course in New Castle County, from the Maryland state line to the confluence with the Delaware River. The densest areas of development contiguous to the Christina River occur within the City of Newark, the Village of Christiana, the Town of Newport, and the City of Wilmington.

FIGURE 1

THE CHRISTINA RIVER

NEW CASTLE COUNTY DELAWARE



Parcels of land on the Christina River shoreline which are in public ownership (i.e., owned by the Federal Government, State Government, New Castle County Government, or by a municipality) comprise 17.8 percent of all parcels of land along the Christina shoreline and also 17.8 percent of the acreage of all shoreline parcels. Most of the publicly-owned parcels (79.6 percent) are owned by the State of Delaware and three municipalities--the City of Newark, the City of Wilmington, and the Town of Newport.

There are currently five park and recreation areas along the Christina River; two in Wilmington, two in Newark, and one near Christiana. The list of public park facilities on the Christina and their facilities are shown in Table 1.

Table 1

EXISTING PARK AND RECREATION AREAS

New Castle County, Wilmington, and Newark

Park	Ownership	Acreage	Current Facilities and Activities
East 7th Street Park	City of Wilmington	6.80	undeveloped--contains a parking area only; boat launch into Brandywine Creek
Christina Park	City of Wilmington	11.19	softball field, comfort station (closed), drinking fountain (inoperative), pavillion, other improvements planned (including parking)
Coventry Ridge/ Lewden Green Park	New Castle County	164.77	1 softball field 1 little league field 2 tennis courts 2 basketball courts playground equipment area swimming pool bath house parking for 30 cars
Rittenhouse Park	City of Newark	52.55	hiking and nature trails, picnic tables, shelter, and parking

Table 1 continued

Park	Ownership	Acreage	Current Facilities and Activities
Stream Valley Open Space	City of Newark	39.59	Undeveloped--left in natural state

Sources: New Castle County Department of Parks and Recreation

Newark Department of Parks and Recreation

Wilmington Department of Parks and Recreation

A range of plans and studies relating to the Christina River have indicated that there is an unmet demand for recreation facilities in New Castle County, and that there are sites along the Christina River that would be attractive for recreational development. Most of the studies identify sites in Wilmington, particularly between Market Street and the confluence with the Delaware River. The City of Newark Comprehensive Development Plan recommends the development of parkland in the southeast portions of the City, in the vicinity of Arbour Park.

Water quality analysis of the Christina River indicates that overall quality has been improving since 1972, although portions of the River, primarily the tidal portion (between Smalley's Dam and the mouth) are subject to intermittently high levels of fecal coliform bacteria and point source pollutants. The overall assessment of use potential of the Christina indicates that swimming is not feasible, given current water quality conditions. However, fishing, sailing, canoeing, and small craft boating may be undertaken with no restrictions due to water quality.

In view of the preceding summary, it was concluded that there is a need for additional land and water-based recreation facilities along the Christina River. Public access, land ownership, and use suitability factors define the areas of potential recreational use.

Public access to the Christina shoreline is fairly limited. Although there are 24 direct roadway crossings and two more planned, few of these crossings are at grade and none of them offer ramps or paths to the River. Pedestrian access is available via the street systems contiguous to the River in Wilmington, Newport, and Newark; and on private lands, notably the subdivisions which line the river from Newport to Newark. Therefore, one imperative site selection factor was to choose a site (or sites) where existing access could be employed or where a new access point could be created.

Land ownership was also a major consideration. It was agreed in advance to restrict recommendations for new recreation sites to sites already under public ownership. In so doing, the need for land acquisition by the State would be eliminated. However, much of the 17.8 percent of the Christina shoreline land which is in the public domain is either reserved for roadway access and maintenance facilities, or is otherwise inappropriate for recreational development. In the final analysis, very few sites fulfilled these requirements.

To analyze site suitability for land-based recreational uses, the county-wide computerized land use information network known as AERI (Automated Environmental Resource Information System) was utilized. The AERI system was programmed to incorporate data on land use, vegetation and soils limitations to determine whether land areas are suitable, conditionally suitable, or unsuitable for various activities. These suitability levels were mapped for the entire Christina River shoreline area for a variety of land-based recreational activities. Not surprisingly, the data evaluation indicated that the Christina shoreline areas which are most suitable for land-based recreation are primarily the undeveloped area between Newport and Newark and between Newark and the Maryland State line.

The Christina River has been divided into four distinct activity segments. In Table 2, the activity segments are presented according to their potential to support each land-based and river-based activity.

Table 2

RECREATIONAL USE POTENTIAL BY ACTIVITY AREA

Christina River

	Land Based						River Based				
Activity Area	Hiking	Nature Observation	Picnicking	Biking	Athletics	Camping	Canoeing	Sailing	Small Craft Boating	Swimming	Fishing
Mouth to Newport	O	O	O	O	O	O	HP	HP	HP	O	HP
Newport to Smalley's Dam	HP	HP	HP	HP	O	P	HP	O	P	O	P
Smalley's Dam to I-95	HP	HP	HP	HP	P	HP	O	O	O	O	P
I-95 to Stateline	P	P	P	HP	HP	P	O	O	O	O	HP

HP highest potential
P potential
O no potential

Source: William J. Cohen and Associates, Inc.

As shown in Table 2, the highest potential for land-based activities occurs between Newport and the State line. On the other hand, river-based activities have the greatest potential from Newport to the mouth, except for fishing, which may be enjoyed at nearly any location on the Christina, and swimming, which is not feasible in the main stem of the Christina River due to seasonal water quality problems. The reasons for attributing the highest potential for other water-based activities to this particular segment relate to factors such as river width and depth, tidal influence, and navigational obstructions. These factors are examined in greater detail in a subsequent section, River Characteristics.

In view of the findings concerning site suitability, land ownership, and public access, four sites were recommended as locations for potential recreational development. A further review of the four sites found that two had the greater potential for immediate implementation as recreational areas. A listing and description of these two sites follows:

1. Newport Site. A 0.5-acre state-owned parcel on the north shoreline of the Christina under the Route 41 Expressway, with public access from Water Street; recommended as an access area for canoes and small boats and fishing.

2. Park Drive Site. A 31.3-acre site south of the proposed Newark Connector roadway (which will connect Elkton Road and South College Avenue) that will become excess State land from the roadway acquisition, on the northern and southern shoreline of the Christina, with access onto existing Park Drive, which will be terminated south of the new connector; suitable for hiking, picnicking, athletics, camping, and fishing.

SITE PLANNING ANALYSES

One of the prominent recommendations of the first report was that the State should undertake site planning and design analysis for each of the selected sites to implement recreation facilities and public access improvements as required to enable these sites to fulfill the recreational potential that they represent. After further review and consultation with the Delaware Department of Natural Resources and Environmental Control (DNREC), the current project as represented by this report was commissioned in December of 1981.

The decision capitalizes upon certain inherent advantages of the Newport and Park Drive Sites which make them immediately attractive for recreation development.

AT NEWPORT

* The area beneath the Route 41 Viaduct (including the Newport Site) has been a target for development efforts by New Castle County.

* The Christina River shoreline at Newport is already a popular fishing site.

* The location of the Newport Site is shown in Figure 2.

AT PARK DRIVE

* The Park Drive Site is contiguous to Rittenhouse Park which could create a total park area of approximately 84 acres.

* The plans for the Newark Connector roadway (currently under construction) includes a bikeway outside of the shoulder on the eastbound lane. This bikeway could be adapted in such a way as to permit access to the Park Drive Site.

* The location of the Park Drive Site is shown in Figure 3.

This study represents the fulfillment of objectives and hopefully will facilitate new recreation sites for the enjoyment of northern Delawareans.

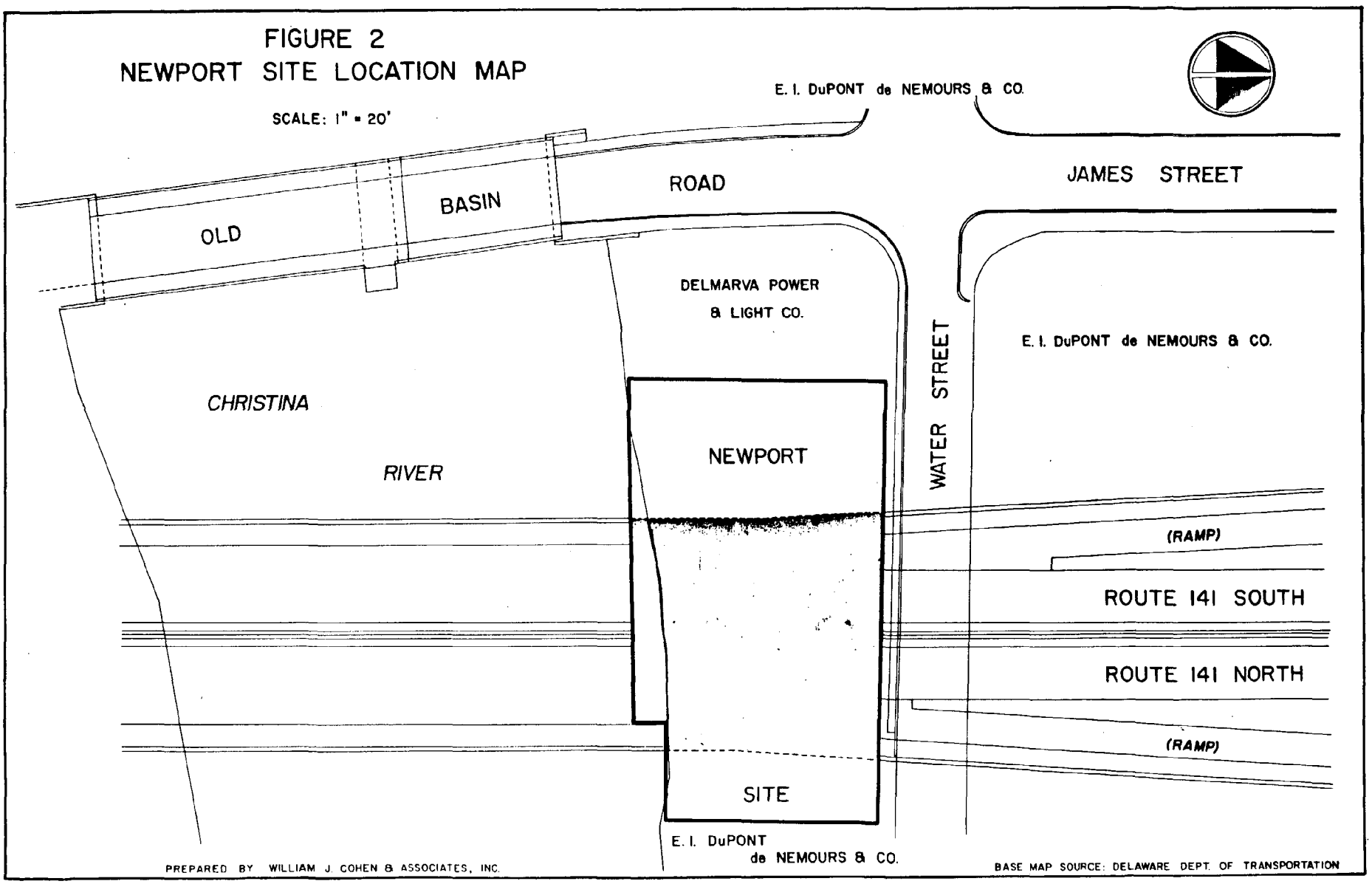
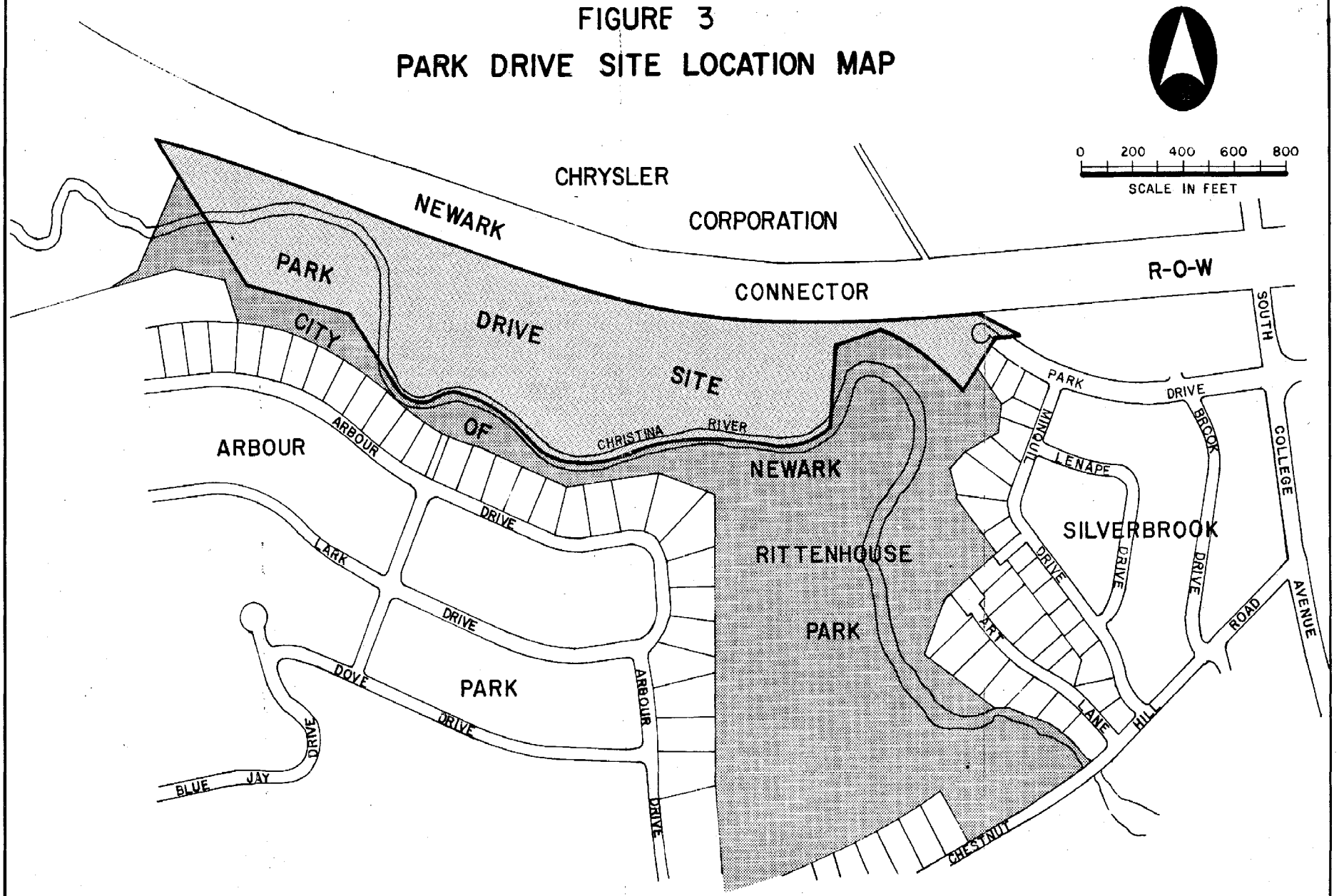


FIGURE 2
NEWPORT SITE LOCATION MAP
SCALE: 1" = 20'
E. I. DuPONT de NEMOURS & CO.
JAMES STREET
ROAD
OLD
BASIN
DELMARVA POWER
& LIGHT CO.
WATER STREET
E. I. DuPONT de NEMOURS & CO.
CHRISTINA
RIVER
NEWPORT
(RAMP)
ROUTE 141 SOUTH
ROUTE 141 NORTH
(RAMP)
SITE
E. I. DuPONT
de NEMOURS & CO.
PREPARED BY WILLIAM J. COHEN & ASSOCIATES, INC.
BASE MAP SOURCE: DELAWARE DEPT. OF TRANSPORTATION

FIGURE 3
PARK DRIVE SITE LOCATION MAP



PREPARED BY WILLIAM J. COHEN & ASSOCIATES, INC.

RECREATION SITE SUITABILITY FACTORS

For each of the two sites, a series of factors were analyzed in order to determine site suitability for recreational use. Specifically, the factors addressed were:

1. soils, principally regarding limitations to development inherent in specific soils types

2. flood hazard analysis.

3. river characteristics, including river depth, tidal influence, and water quality as they would affect river-based recreation. (These factors were analyzed for the Newport Site only, since, the Park Drive Site has been designated for land-based recreation).

4. street system, to assess public access availability

5. existing utilities, to determine whether any new connections are necessary, of if any proposed utility improvements may impinge upon recreational use of the site

6. visual analysis

7. Mason-Dixon Trail, at the Park Drive Site only

CHAPTER 2

NEWPORT FISHING AND SMALL BOAT ACCESS AREA

RECREATION SITE SUITABILITY ANALYSIS

SOILS

The Newport Site is characterized by only one major soil type, Elsinboro-Delanco-Urban Land Complex (EuB). This soil group consists of gently sloping Elsinboro and Delanco soils (0 - 8 percent slope), that have been used for residential or other community purposes. Two-thirds of the complex is represented by well-drained Elsinboro soils, and the remaining third consists of Delanco soils which are only moderately well-drained; impeded drainage and seasonal wetness limit their use. Much of the EuB soil complex has been disturbed by development. The breakdown of the condition of the EuB soil complex is shown in Table 3.

Table 3

ELSINBORO-DELANCO-URBAN LAND COMPLEX SOIL CONDITIONS

40 percent of the total acreage undisturbed

40 percent of the total acreage consists of land from which two-thirds of the original soil has been removed or covered with up to 18 inches of silty fill material

20 percent of the total acreage is covered with more than 18 inches of fill or soil profile has been almost entirely cut away

Source: Soil Survey--New Castle County, Delaware. (U. S. Department of Agriculture).

The Soil Conservation Service of the U. S. Department of Agriculture classifies soil limiations for development as slight, moderate, or severe.

For parking the EuB soil group is shown to have moderate limiations due to slope and moderately high water table in Delanco soils.[1]

FLOOD HAZARD AND ANALYSIS

The U. S. Army Corps of Engineers Flood Plain Information Study for the Christina River indicates that the Newport Site is situated within the intermediate regional flood district (100-year flood district). Therefore, no permanent buildings should be proposed for development at the Newport Site.

RIVER CHARACTERISTICS

The principal river characteristics affecting river-based recreation at the Newport Site are: water quality, tidal influence, mean low water depth, and river width. As noted previously, the Newport Site has been recommended as a site for a launch ramp to accommodate the following activities: small craft boating, canoeing and kayaking, sailing, and fishing. The water quality levels required to support these activities are less stringent that would be required to permit swimming. Swimming is not advisable at the Newport Site, or at any other location on the Christina River, due to seasonal water quality problems. During the swimming season months, levels of fecal coliform bacteria found in water quality samples taken from the Christina River at Newport in 1980 were substantially in excess of recommended levels. Coliform levels have been a perennial problem in the Christina River, and even though there has been improvement, swimming is not feasible at this time. Turbidity has also been a water quality problem at this location. Measurements of level of turbidity have been consistently high, occasionally exceeding the State standards. This

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[1] The Elsinboro-Delanco-Urban Land Complex is a soil type in which the soil mixture is inseparable due to urban land development including soil removal, cuts and covering with fill material. Therefore, the characteristics of the group may vary from site to site. (Source: Soil Survey Interpretations for Delaware, U. S. Department of Agriculture, 1968).

is a further impediment to swimming from an aesthetic and safety standpoint. Fishing is not restricted by existing water quality levels. Studies of the fish population of the Christina have yielded samples in the Newport vicinity including blueback herring and other species. Caution should be exercised in fishing, however, since ammonia nitrogen levels were in the unacceptable range at Newport during the summer sampling period in 1980. The water quality levels necessary to permit boating are, naturally, the least stringent of any of the river-based activities. The water quality level at Newport and the upper Christina is generally acceptable for boating, although periodic turbidity problems may detract from the appeal of the Christina as a boating locale.

The tidal influence of the Christina extends from the mouth to Smalley's Pond Dam, thereby including the Newport Site. The Newport area, then, would be conducive to good sailing, motorboating, and because the tidal influence is less severe at Newport than at the mouth, it would be especially conducive to canoeing, kayaking, and other small non-motorized boats. In addition, flat bottom boats can navigate upstream at least to Christiana at all but the lowest tide.

The mean low tide depth of the Christina River at Newport is eight feet, according to the U. S. Coast and Geodetic Survey topographic map. The depth increases to 25 feet at the mouth and decreases to two feet near White Clay Creek and less thereafter. The river is approximately 225 feet wide at Newport. Therefore, the river is capable of supporting all types of small pleasure craft for access at the Newport Site.

STREET SYSTEM

Direct access to the Newport Site is provided on Water Street, a local street which parallels the Newport waterfront. Access to the site from the major roadway system of New Castle County is very convenient. The Newport

exit from the recently constructed Route 141 Expressway is only two blocks from the site, via James and Water Streets. The Route 141 Expressway serves through traffic from New Castle and the Kirkwood Highway (Route 2) and it connects with Interstate 95 (the Delaware Turnpike) only two miles from the Newport exit. In addition, Route 4 (Market and Justice Streets, the main throughfares in the Town of Newport) serves through traffic from nearby communities such as Stanton, Ogletown, and southwest Wilmington.

UTILITIES

The availability of utility infrastructure at the Newport Site has been investigated in anticipation of any facilities which may be installed in conjunction with the recreational uses of the site, which would require electricity, water, or connection to a sanitary sewer system. It can be assumed that any such uses would make minimal demands upon the infrastructure systems. At the Newport Site, all three utilities are available. The Town of Newport provides water and sewer services, water and sewer service mains are located adjacent to the site beneath Water Street. Electrical service, supplied by Delmarva Power and Light, is available to the site. An underground power line lies contiguous to the northeast corner of the site.

In conclusion, the existing infrastructure is capable of supporting any utility needs which may eventuate.

VISUAL ANALYSIS

A visual analysis of the Newport Site revealed that there is a major urban influence on the site as well as its surrounding area. The Route 141 viaduct is located directly over the site shading approximately three-fourths of its area, as shown in photographs 1, 2, and 3. Six large cement substructure columns loom upwards supporting the viaduct. Their placement on the site divides

the parcel into two potential activity areas: Between Water Street and the columns (see Photograph 1) and between the columns and the river (see photograph 3).

Water Street defines the northern perimeter of the site. The view beyond is of six or more columns and a cyclone fence that closes off the area under the viaduct for use as a parking lot. The Conrail Railroad Line is beyond, running parallel to Water Street, followed by a strip of commercial land use.

East of the site is a plot of land improved with a small vacant residential structure owned by the Du Pont Company, as shown in photograph 2. Beyond are residential and commercial land uses. The western perimeter of the site is paralleled by a thin strip of land owned by Delmarva Power and Light Company. Located on the property are the remains of a deteriorating cement launch ramp and a utility pole. The parcel of land is bounded by James Street which parallels Route 141. The Du Pont Company's Newport Pigment Plant is the dominant visual feature west of James Street, as shown in photograph 3.

On the southern perimeter of the site is the Christina River, as shown in photograph 1. It is the most important visual amenity to be noted. The value of the River is lessened in this location by the presence of the Route 141 viaduct's substructure rising out of the water. The view beyond is of marshlands and a far distant tree line. Visually it is an attractive natural open space, although the view is partially obstructed by the viaduct.

The topography of the site slopes gradually downward from Water Street to the steeper River banks and is visually affected by severe tidal fluctuations.

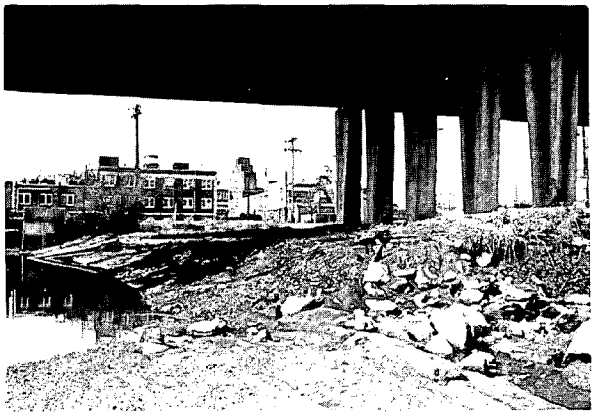
At present, the bank is littered with rotting wood and other debris. A cement storm sewer drainage swale exists along the eastern boundary of the site that transports storm water emerging from pipes under Water Street and flows into the Christina River. A build-up of sedimentation occurring below the

VISUAL HIGHLIGHTS

NEWPORT SITE

Photograph 1

Photograph 2



Photograph 3

outfall of this swale has created a beach in the River that is only observable at extreme low tide. Large rocks, rotting wood, and broken pieces of cement are strewn around the vicinity of the outfall. Soil is exposed over most of the site punctuated by gullies where erosion is occurring due to a lack of protective ground cover. A minimum of vegetation cover is found along the periphery of the site where more sunlight reaches the ground. Existing vegetation consists of assorted weeds, a few saplings, and one medium-aged tree; otherwise, the site is lacking significant natural features or amenities.

The visual analysis of the Newport Site and its surroundings reveal positive and negative features. The views from the site are obstructed on all four perimeters by development, with the exception of the Christina River and the marshlands beyond the viaduct. The site is devoid of attractive natural amenities as a result of the viaduct overhead. There is a lack of upkeep on the site resulting in accumulations of litter and soil erosion.

NEWPORT FISHING AND SMALL BOAT ACCESS AREA PLAN

LOCATIONAL IMPORTANCE

The Newport Site,as discussed earlier in the plan report, is currently an underutilized parcel of land on the Christina directly beneath the 141 viaduct. In effect, this excess land would provide for the only recreational facility on the River in the Town of Newport. Town residents as well as the general public would, therefore, have a new area to enjoy recreational opportunities.

PROPOSED ACTIVITIES

It is recognized that the site has limited use potential--since it is only half-an-acre in size and located beneath a major roadway. The site has been identified in the previous study, The Recreational Potential of the Christina River (1981) as an access area for canoes and small boats. Moreover, fishing which can and does occur at almost any point on the River, has been observed to be a popular pastime in this vicinity.

PLANNED IMPROVEMENTS

By combining these two activities--boat launching and fishing, improvements are proposed for the Newport Site that can be divided into two phases. Since the bank is heavily eroded due to water runoff and the severe fluctuations in tidal activity,it will be necessary to enter into a bank stabilization program if the site is to be usable. Due to this necessity and considering the extent of the stabilization needed (the entire river frontage of the site) it is more advantageous to first provide for the fishing area which can be combined with the bank stabilization (as shown in Figure 4), followed by the small boat access area and additional improvements (as shown in Figure 5). The planned improvements, therefore, can be described as follows:

PHASE I. SITE IMPROVEMENTS AND FISHING AREA

This area can be described as including several elements:

* Site Improvements involving driveway access; grading of the site; preparation of the parking area with paving; striping the parking stalls; provision of a berm along the drainage swale and landscaped as a safety barrier; handicapped access from the parking area to a wooden fishing pier; railroad ties to delineate vehicle parking; finished grading and top soil of area other than parking.

* Fishing Area including bank stabilization with gabion terrace for fishing from shoreline; wooden handicapped fishing pier with safety rail; trash containers and signs.

* Additional Improvements which could be incorporated into the site plan at some time in the future, if desired or determined necessary, including restrooms for public use; and the utilization of the adjacent corner lot under ownership of Delmarva Power Company which could serve as overflow of parking; a picnic area with benches could also be provided along the shoreline for fishing on the Delmarva lot.

PHASE II. CONTINUATION OF SITE IMPROVEMENTS AND SMALL BOAT ACCESS AREA

* Site Improvements including a continuation of the parking area and bank stabilization effort undertaken in Phase I.

* Boat Access Ramp would be constructed as a concrete slope or possibly a step-down facility to provide access for small boats, canoes, and rowboats.

A conceptual site improvement schematic is provided in Figure 6 to illustrate the graphic relationships among the viaduct, the fishing area, and boat launch.

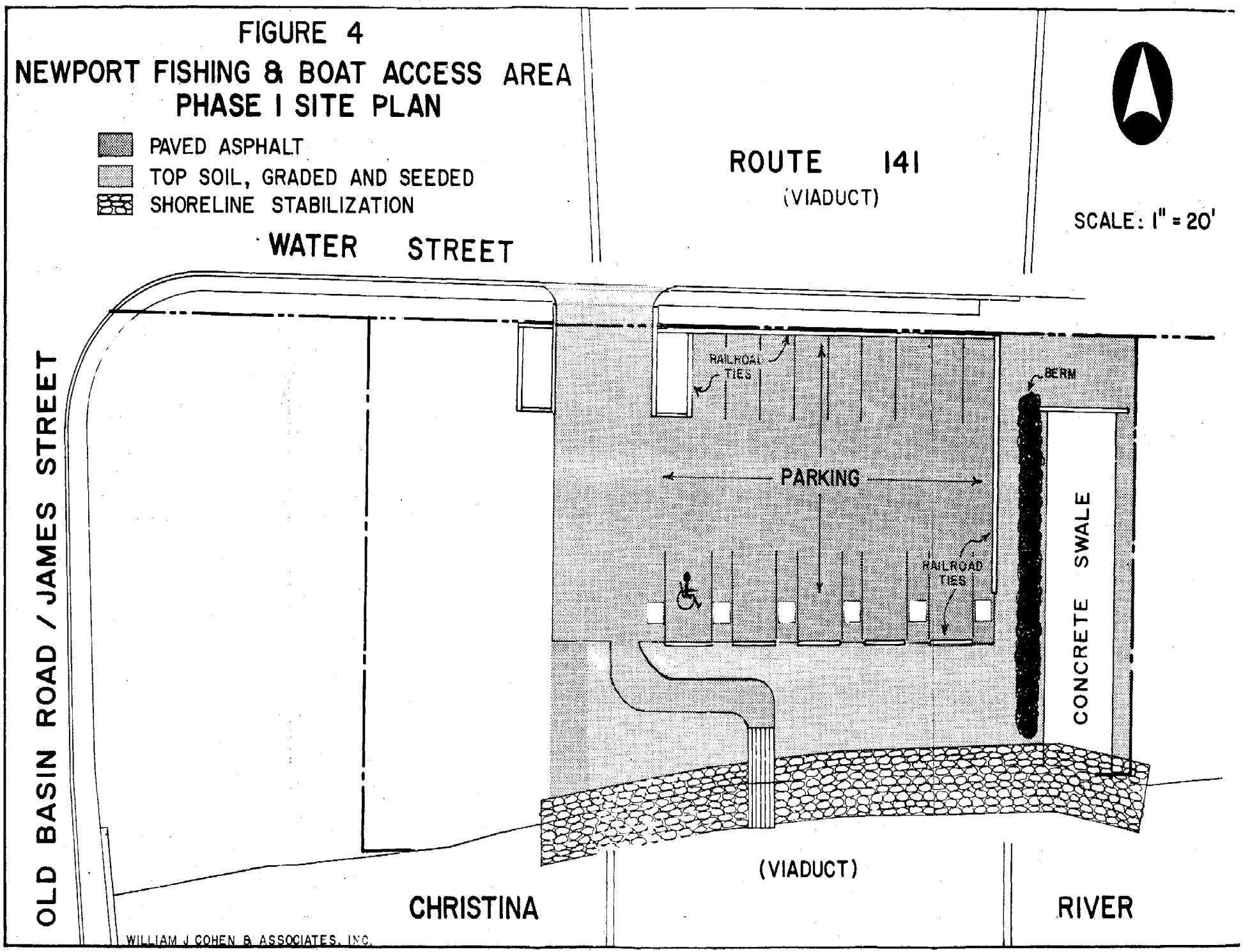
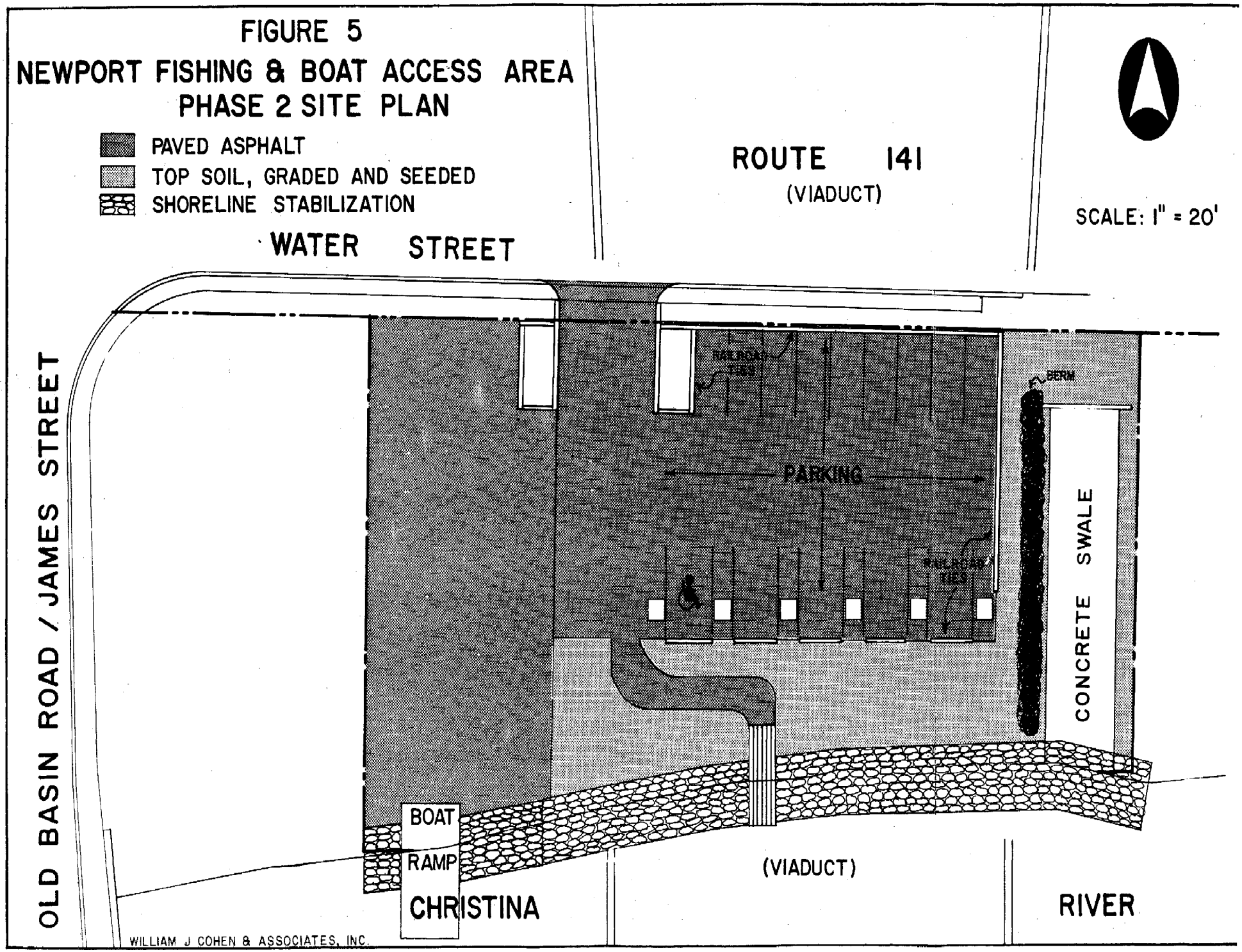


FIGURE 4
NEWPORT FISHING & BOAT ACCESS AREA
PHASE I SITE PLAN
PAVED ASPHALT
TOP SOIL, GRADED AND SEEDED
SHORELINE STABILIZATION
WATER STREET
ROUTE 141
(VIADUCT)
SCALE: 1" = 20'
OLD BASIN ROAD / JAMES STREET
RAILROAD TIES
BERM
PARKING
RAILROAD TIES
CONCRETE SWALE
(VIADUCT)
CHRISTINA
RIVER
WILLIAM J COHEN & ASSOCIATES, INC.

FIGURE 5
NEWPORT FISHING & BOAT ACCESS AREA
PHASE 2 SITE PLAN



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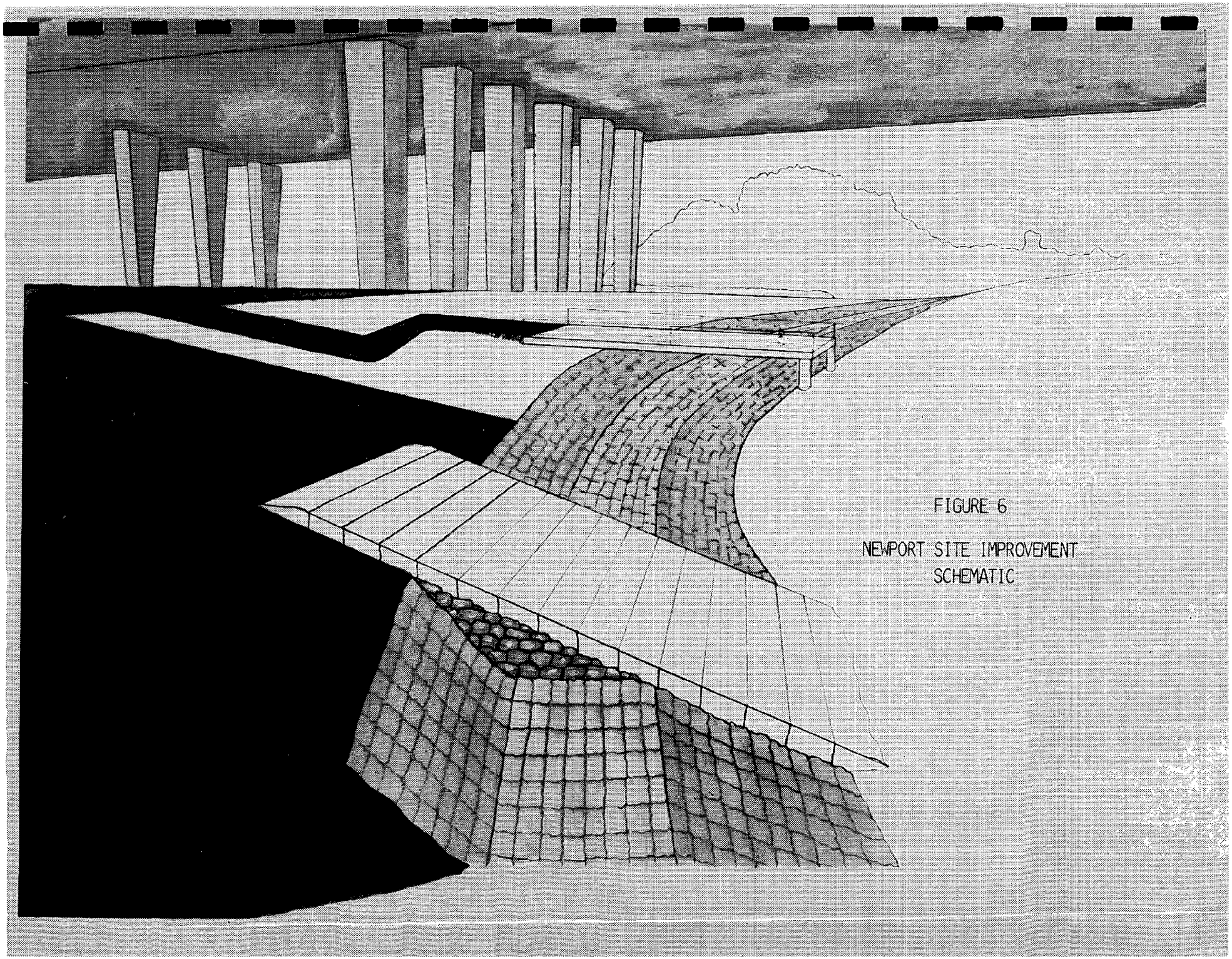

FIGURE 6

NEWPORT SITE IMPROVEMENT
SCHEMATIC

IMPLEMENTATION COSTS

The following represents an estimate (as of April, 1982) of construction costs for the Newport Fishing and Small Boat Access Area. The total estimate to complete the fishing area (Phase I) is $68,000, and for the access area (Phase II) is $56,700. The total estimated cost for improving the Newport Site is $125,300.

PHASE I. FISHING AREA

1.	Curb Cut		
	40 L.F. @ $17.00/L.F.	=	$ 680.00
2.	Depressed Driveway		
	25' W x 10' L = 250 sf @ $3.50	=	875.00
3.	Site Grading (Parking)		
	A. 130 x 70 = 1011 sy = 170 cy @ $3.00	=	510.00
	B. Crusher Run (6") = 895 sy @ $4.50	=	4,028.00
	C. 2" Asphalt 910 sy ÷ 9 = 101 tons @ $40.00	=	4,040.00
4.	Site Grading (Fishing Area)		
	A. 50' x 135' = 750 sy @ $3.00	=	2,250.00
	B. Select Fill 130 cy @ $15.00	=	1,950.00
5.	Berm		
	A. Grading 5' x 75' = 14 cy @ $40.00	=	560.00
	B. Bushes 75 L.F. @ $4.00	=	300.00
6.	Landscaping		
	A. Topsoil and Seed 590 sy + 150 sy = 750 sy @ $2.00	=	1,500.00
7.	Asphalt Walk		
	2" asp and 4" gravel 50 sy @ $10.00	=	500.00
8.	Gabions		
	20' x 165' = 370 sy @ $50.00	=	18,500.00
9.	Wooden Pier (8' x 20')		
	A. 6 x 15 V.F. x $12.00/VF	=	1,080.00
	B. 1,000 B.F. @ $4.00	=	4,000.00
10.	Railroad Ties		
	280 L.F. @ $6.00	=	1,680.00
11.	Park Type Trash Containers	=	120.00

12. Painting Parking Lot Stripes 17' x 20' = 340 L.F. @ $1.00	=	$ 340.00
13. Signs 4 Ea @ $100.00	=	400.00
Subtotal	=	$43,313.00
Total Construction Cost (including contracts overhead and profit)		54,790.00
Engineering		6,000.00
10 percent Contingencies		6,300.00
Total Cost		$67,090.00

PHASE II. BOAT ACCESS AREA

1. Site Grading 50 ' x 120' = 6,000 s.f. @ 8" depth = 150 cy @ $3.00	=	450.00
2. Crusher-Run (6" depth) 50' x 120' = 667 sy @ $4.50	=	3,002.00
3. 2" Asphalt Pavement 670 sy + 9 = 75 tons @ $45.00	=	3,375.00
4. Gabions 65' x 20 ' - 145 sy @ $50.00	=	7,250.00
5. Railroad Ties 40 L.F. @ $7.00	=	280.00
6. Lighting (existing poles) 3 overhead lights @ $500.00	-	1,500.00
7. Boat Ramp		
A. Mob. and Demob. Pile Rig	=	2,000.00
B. Cofferdam 20' x 30' = 1,600 sf @ $8.00	=	12,800.00
C. Pumping 14 days @ $200.00	=	2,800.00
D. Stone 17 cy @ $15.00	=	255.00
E. Excavation 10 cy @ $20.00	=	200.00
F. Concrete 17 cy @ $150.00	=	2,550.00
8. Signs 4 Ea @ $100.00	=	400.00
Subtotal		$36,862.00
Total Construction Cost		46,630.00

Engineering	5,000.00
10 percent Contingencies	5,200.00
Total Cost	$56,830.00

CHAPTER 3

PARK DRIVE RECREATION AREA

RECREATION SITE SUITABILITY ANALYSIS

SOILS

There are seven primary soil types found on the Park Drive Site. Codorous silt loan and comus silt loam are the two dominant soil types, while the other five are found in isolated areas. The general characteristics of each of these soil types are described below and shown graphically on Figure 7.

--Codorous silt loam (Co)--nearly level with a smooth surface, gently sloping in some areas, and in other areas has a somewhat irregular or wavy surface showing outlines of old stream channels; impeded drainage is a limitation according to the severity of the risk of floodwaters.

--Comus silt loam (Cu)--nearly level in most places, gently or moderately sloping elsewhere, flooding is the only limitation; primarily an agricultural soil.

--Matapeake silt loam (MeC_3)--five to ten percent slopes, severely eroded, most of the original surface layer has been washed away leaving a layer containing sticky material which was once subsoil, which puddles when wet and crusts when dry; also, many gullies and spots of firm, brittle subsoil which are not as well drained are evident.

--Matapeake silt loam (MeB_2)--two to five percent slopes moderately eroded, has lost a significant amount of its original surface layer through erosion; includes some areas that have been gullied and a few areas covered with trees.

--Keyport silt loam (KeB_2)--two to five percent slopes, moderately eroded; some shallow gullies and some deep ones have formed, as well as some gravelly spots.

--Sassafras-Matapeake (SmE)--15 to 30 percent slopes, silt to sandy in texture and thinner than normal above the sandy material; wooded areas show little erosion, cleared areas are severely eroded; some spots are seasonally wet.

--Sassafras sandy loam (SaC_3)--five to ten percent slopes severely eroded, has a plow layer consisting of subsoil material which is brighter brown and more sticky than the original layer; many gullies have formed and a few spots are gravelly.

The Soil Conservation Service limitations for development on various soil types are classified as slight, moderate, or severe. Table 4 shows the limitations for each soil type for three recreational land uses.

FIGURE 7

EXISTING SOILS
PARK DRIVE SITE

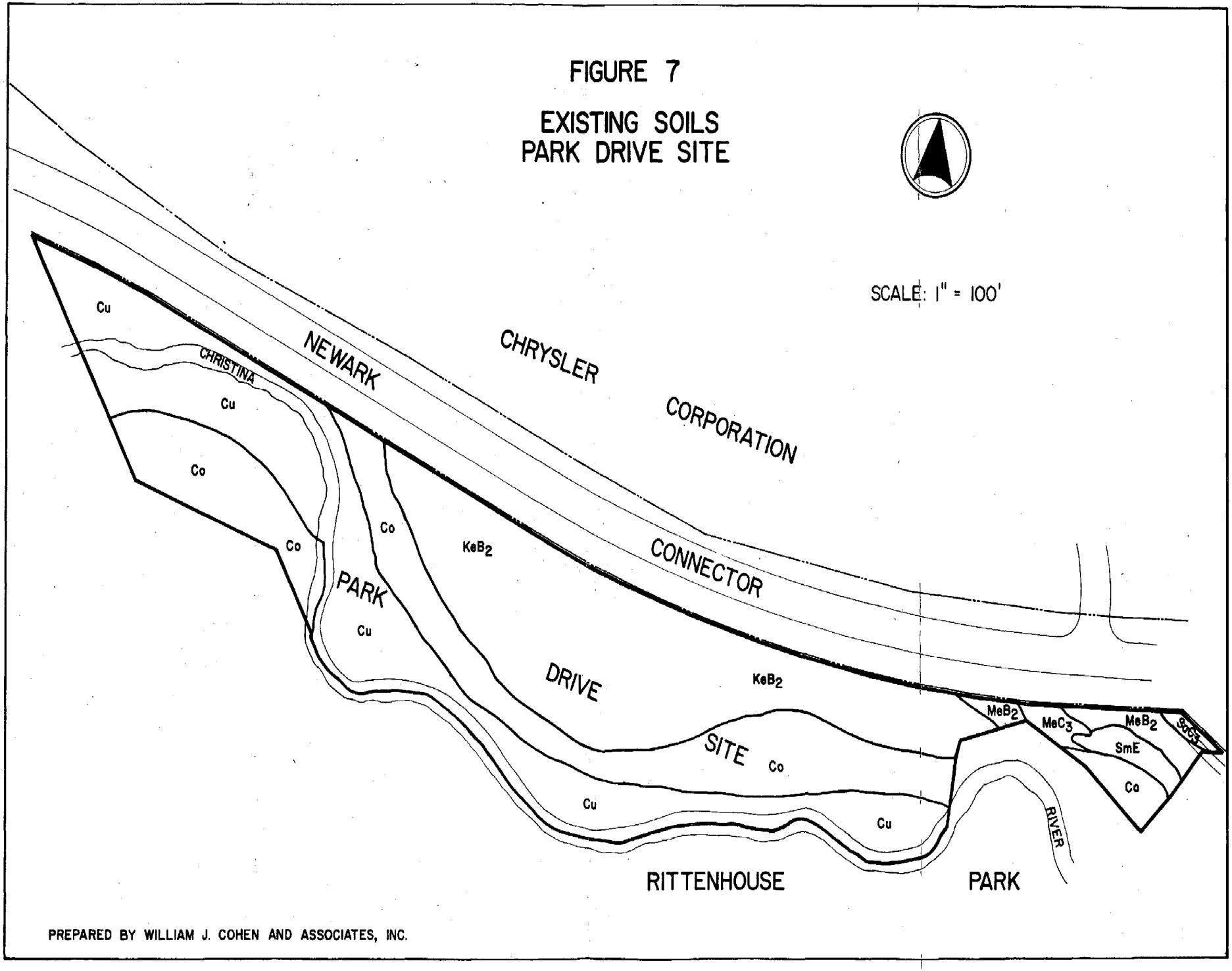

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Table 4

RECREATIONAL DEVELOPMENT LIMITATIONS FOR SOIL GROUPS, PARK DRIVE SITE

Soil Type	Athletic Fields and Intensive Play Areas	Extensive Play and Picnic Areas	Paths and Trails
Co	severe-flood hazard	severe-flood hazard	severe-flood hazard
Cu	severe-flood hazard	severe-flood hazard	severe-flood hazard
MeB_2	moderate-slope	slight	slight
MeC_3	severe-slope	slight	slight
KeB_2	severe-slow permeability	slight	slight
SaC_3	severe-slope	slight	slight
SmE	severe-slope	severe-slope	moderate; severe on slopes over 25 percent

Source: Soil Survey Interpretations for Delaware. (U. S. Department of Agriculture, 1968).

FLOOD HAZARD ANALYSIS

The Flood Plain Information Study prepared by the U. S. Army Corps of Engineers in 1969 indicates that the entire Park Drive Site falls in either the intermediate regional flood plain of the Christina River, defined as an area subject to flooding on the average of once in 100 years, or the standard project flood plain (500-year flood). However, this may not be the most reliable information concerning flooding potential due to the natural changes which would have occurred since 1969 and also due to the changes to the flood plain

created by the construction of the Newark Connector roadway. In addition, since no buildings will be planned for the Park Drive Site, the flood hazard area is of less than usual significance. In general, the soils characteristics can be used as a gauge of flood potential. As shown by Table 4 and Figure 7, the Codorus and Comus soils which line the Christina River during its entire meander across the Park Drive Site, are the only seriously flood-prone soils types.

STREET SYSTEM

The Park Drive Site will have direct access to the Newark roadway system via Park Drive, which intersects with South College Avenue a short distance from the site. South College Avenue, a major Newark thoroughfare, connects downtown Newark and the University of Delaware campus to the north with Interstate 95 and the communities of Glasgow and Middletown to the south. Interstate 95 (The Delaware Turnpike) is located less than one mile south of the intersection between Park Drive and South College Avenue. The new Newark Connector although passing immediately north of the Park Drive Site, will not offer direct ingress and egress for the Park Drive Site.

UTILITIES

In the event that any facility is provided at the Park Drive Site which would require utility service, water and sewer service could be provided easily, since there are water and sanitary sewer lines at various points on the site. The City of Newark maintains the entire sanitary sewer line which crosses the western portion of the Park Drive Site and connects with the Chestnut Hill Interceptor. The line consists of a 36-inch pipe with ample capacity, according to the City of Newark Department of Public Works. A 12-inch water main, maintained by the Artesian Water Company, extends the length

of the Park Drive Site, thereby insuring the availability of water service. There are currently no electric lines on the site. According to the City of Newark Electric Department, the only way of providing electrical service on the site would be to extend a connection to the closest City of Newark electrical line, which terminates on Park Drive, east of the Park Drive Site.

VISUAL ANALYSIS

There is a dominant presence of natural features on the Park Drive Site and a large proportion of the site is wooded. The Christina River runs the length of the site. The City of Newark's Rittenhouse Park abutts the site on the south and along the Christina, which is heavily wooded and adds visual depth to the Park Drive Site (Photograph 5). The land north of the site is under construction for the Route 4 Newark Connector and is in sharp contrast to the natural amenities of the area as shown in Photographs 4 and 6.

Deciduous woodland covers approximately two-thirds of the site and provides a visual buffer to the connector. The major tree types are maple, sweetgum, sycamore, and ash. There is a large triangular clearing along the northern perimeter of the site that lacks vegetation and is low in elevation. A swath 40 to 50 feet wide cuts across the woods from the outer edge of the site to the Christina River and continues to the large clearing. It is an easement for a 12-inch water line. There are cement posts intermittently placed, locating the easement. The only other areas devoid of trees are the western and eastern edge of the property. A narrow footpath follows through the woods along the north side of the Christina River.

The site is low in elevation and is subject to flooding. After rain, drainage is a problem in the lowest areas especially the cleared portion of the site between the woods and the Connector Roadway. Three drainage catch-

VISUAL HIGHLIGHTS

PARK DRIVE SITE

Photograph 4

Photograph 5

Photograph 6

ments built under the connector empty water onto the site into swales that flow toward the Christina River. The largest of the swales has banks up to three feet high.

The Christina River enters the site from the west and meanders southwest to the perimeter of the site and forms a natural boundary between the site and Rittenhouse Park. The River varies in width from approximately 30 to 60 feet wide. The water is remarkably clear with banks ranging from three to six feet in height and lined with large trees extending over the water. An interesting effect is created by the interplay of the eroded stream banks and the exposed tree roots. The River bed depth varies from deep pools to shallow rapids and is strewn with large rocks. A sandy beach has formed along one bend of the River and seems a natural location for activity.

Rittenhouse Park borders the southern perimeter of the site. It is an attractive and wooded park which has been improved with recreation equipment such as swings and slides. There is direct access to the park from the eastern portion of the site. Directly south of the park is the subdivision of Arbour Park. Well-kept houses are visible from the River bank through the narrower portions of Rittenhouse Park. Manor Real Estate Company owns the property that abutts the western tip of the site, while the Silverbrook subdivision and Park Drive abutt the eastern portion of the site.

North of the site is a 200-foot wide right-of-way where the Route 4 Newark Connector is under construction, for two-directional traffic with shoulders. In addition,there will be a separate bike path on the south side of the roadway. The width of the roadway and bike path will be approximately 100 feet. In the proximity of the low elevation clearing, the connector and bike path are built on a high escarpment. The road will be at eye level here and

dominates the visual space. The Chrysler Assembly Plant is located directly north of the right-of-way. Two large one-story buildings, parking lots, and cleared storage space are visible from the site. There are more woods in the distance.

The visual analysis revealed an attractive wooded stream valley which has not been degraded to a great extent by man. The exception is the northern boundary where a disharmony is created by the presence of the connector and the Chrysler Assembly Plant.

MASON-DIXON TRAIL

The Mason-Dixon Trail is a hiking trail organized by trail clubs in the region. The intent was to create a 250-mile trail from Havre de Grace, Maryland, to York County, Pennsylvania, with a branch to Chadds Ford, Pennsylvania, through Newark, to link the Appalachian Trail with the Horseshoe Trail. The trail joins the Christina River at its junction with Persimmon Creek and proceeds eastward, across the Park Drive Site, eventually entering Rittenhouse Park south of the Park Drive Site. The trail follows the south bank of the Christina. The Mason-Dixon Trail, therefore, crosses the nature trail proposed for the Park Drive Site. Any persons following the Mason Dixon Trail could cross the proposed footbridge onto the Park Drive Site on the north side of the Christina.

RECREATION SITE PLAN

LOCATIONAL IMPORTANCE

The Park Drive Site can logically serve as an extension of Rittenhouse Park (see Figure 3) and should only be improved to the extent that complementary passive recreational and park opportunities can be realized. Therefore, the Park Drive Site is proposed to be incorporated into the Newark Park System.

PROPOSED ACTIVITIES

Following from the previous site suitability analysis, the Park Drive Site has limited potential for development as an active or intensive recreation, athletic, or play area. Moreover, the subsequent plan has been designed to keep annual operation and maintenance costs to an absolute minimum.

The potential activities that could be accommodated on the site include:

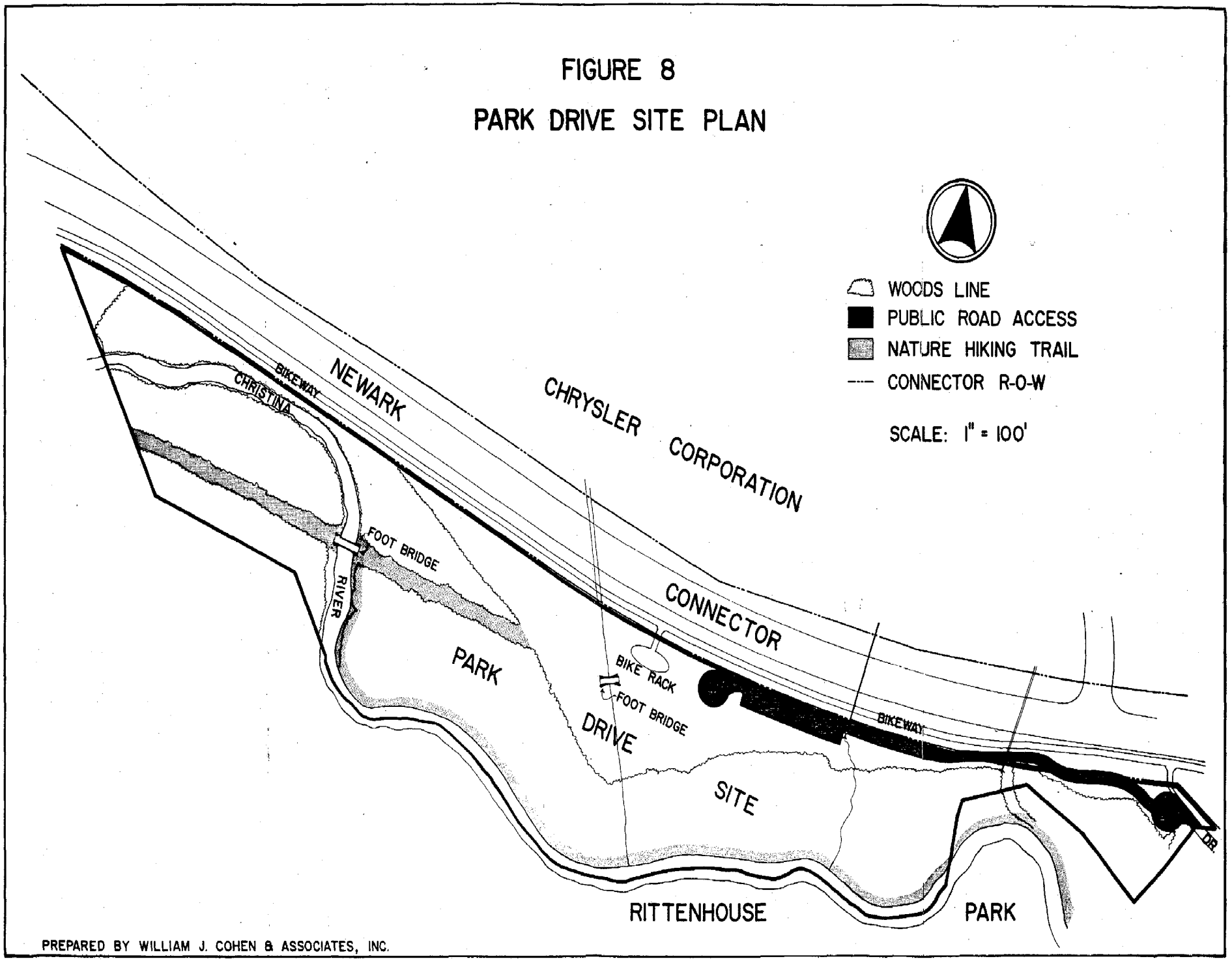
1. walking, hiking, jogging, and backpacking
2. bird watching, nature observation, and fishing
3. bicycling (on the contiguous connector bikeway)
4. leisure time activities such as resting and picnicking

PLANNED IMPROVEMENTS AND IMPLEMENTATION

Improvements for the Park Drive Site are suggested to coincide with the completion of the Newark Connector to the extent of the site work necessary to make the area accessible to the public. As a result, the following are suggested to be undertaken by the Delaware Department of Transportation, with approval of the Federal Highway Administration and the Delaware Department of Natural Resources and Environmental Control. The planned improvements are graphically shown on the site plan (Figure 8). It is assumed that with appropriate governmental approval, the implementation costs could be subsumed as part of the construction of the Newark Connector, thereby not requiring any additional

FIGURE 8

PARK DRIVE SITE PLAN



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funding. Essentially, specific improvements would consist of the following as part of the Newark Connector project:

* Redesign roadway access from Park Drive cul-de-sac to allow for interior access as desired by the Newark Parks Department (a detail of this improvement is shown on Figure 9)

* Stone/gravel base for interior roadway to connector with cul-de-sac

* regrade for access from bikeway at start of grade separation (of connector and bikeway)

The site plan (Figure 7) shows additional improvements that are presented as elements that could be implemented if the anticipated operations and maintenance costs can be assumed by the jurisdiction taking ultimate control of the park. These improvements are estimated to cost approximately $15-20,000 and include:

* Railroad ties to demark parking on interior road

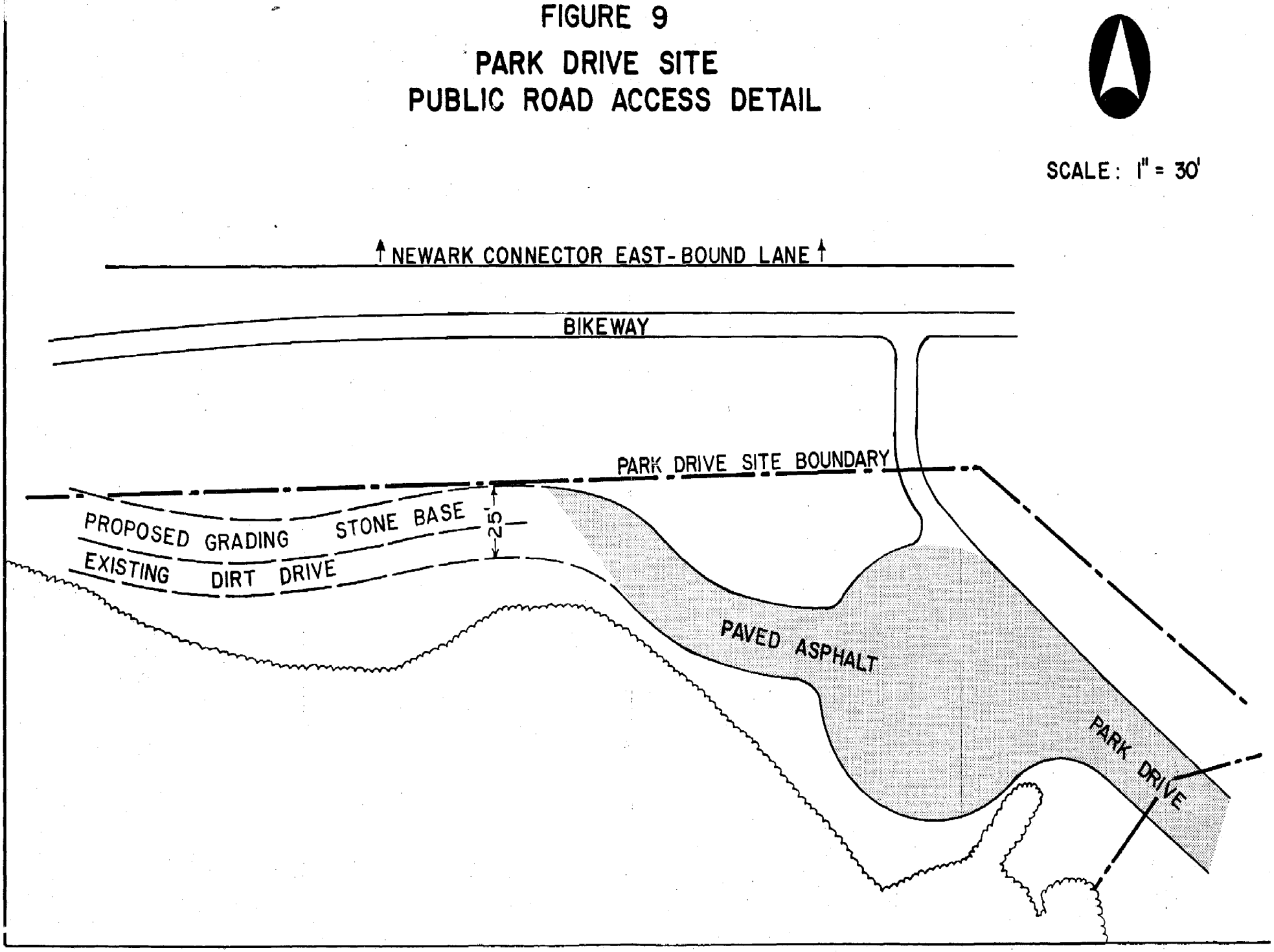
* bike racks

* signs for nature hiking trail

* footbridge for crossing of drainage swale

* footbridge crossing of Christina River

FIGURE 9
PARK DRIVE SITE
PUBLIC ROAD ACCESS DETAIL



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