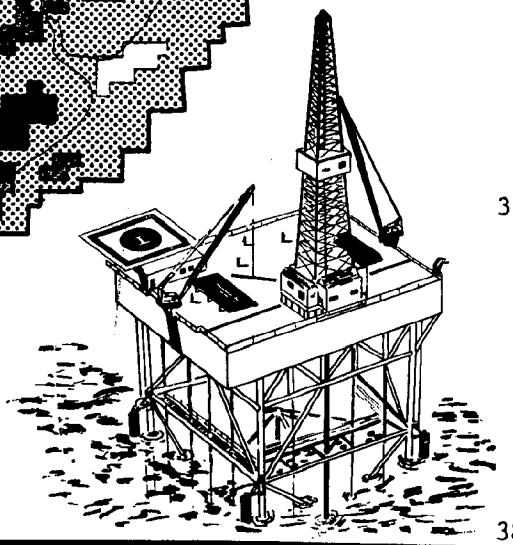

OCS & ENERGY FACILITY PLANNING PROJECT

CAMDEN COUNTY

PROPOSED OCS LEASE SALE #49/MID ATLANTIC

Industry Interest

- call area boundary
- high interest areas
- low interest areas
- leased areas (sale #40)

0 10 50 miles

GERALD A. LENNON

LAND USE CONSULTANT

FEBRUARY 1978

This study was conducted under a contract authorized by the Camden County Board of Chosen Freeholders. It was financed in part by monies made available to the Office of Coastal Zone Management, New Jersey Department of Environmental Protection under Section 305 of the 1972 Federal Coastal Zone Management Act. Supervision of the study effort was provided by Ms. Joan Batory, Director, Camden County Environmental Agency.

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I. INTRODUCTION

A. Background

The federal Coastal Zone Management (CZM) Act of 1972, 16 U.S.C. 1451 et seq., gives states federal financial assistance in preparing and administering management programs that will "preserve, protect, develop, and where possible . . . restore our coastal resources." In 1973 the New Jersey Legislature passed the Coastal Area Facility Review Act (CAFRA), N.J.S.A. 13: 19-1 et seq., which mandates that the State Department of Environmental Protection (DEP) regulate identified development activities in a specifically defined portion of the coastal zone. Moreover, the DEP is required by CAFRA to select a management strategy by 1977 for the portion of the coastal zone delimited in the Act. The Office of Coastal Zone Management (OCZM) was established in the N.J. DEP to carry out the planning and management functions of both CAFRA and the federal CZM Act.

During the last several years it has become increasingly evident that the search for and development of energy resources in and adjacent to New Jersey could have pronounced effects on the future of New Jersey's coastal zone. Such activities include: the search for oil and gas resources on the outercontinental shelf (OCS) approximately 60 miles offshore New Jersey; the construction of offshore nuclear power plants; proposals for liquified natural gas handling and storage facilities; and proposals for deepwater port development to offload imported crude oil from supertankers. In response to the 1973 oil embargo, Congress appropriated additional monies to enable states to participate in planning for energy independence. Subsequently, the NJ-OCZM requested and received from its federal counterpart agency additional financial assistance to address these problems as an adjunct to its ongoing CZM planning activities. In January 1977 the NJ-OCZM channeled some of this assistance to twelve coastal counties, including Camden, to facilitate local planning for the possible onshore effects of OCS oil and gas development and for other energy facility planning activities. It was anticipated that such local involvement would not only increase the capability of localities to deal with possible energy developments but also would provide local perspective input for NJ-OCZM's overall state OCS/CZM policy development.

B. Objectives

The primary function of the counties' study effort, under contract with the State, is to analyze the counties' ability to absorb the energy-related facilities that may be generated by the energy resource development activities enumerated above. Each of the participating counties was to undertake analyses and make findings and recommendations to the State regarding the following areas of concern:

1) Ways counties could or could not accommodate such energy-related facilities.
2) Ranking of facilities which could be sited in terms of feasibility and compatibility with existing land uses
3) Mitigating measures which could be implemented to limit possible adverse effects from facility siting
4) Political constraints which may exist to the siting of facilities
5) Areas unsuitable for the siting of facilities because of environmental or other concerns
6) Methods for providing local government and interest group involvement in the decision-making process during all phases of OCS oil and gas activity
7) Identification of alternative geographic areas within the County which could accommodate OCS-related facilities

The State will evaluate the findings and recommendations of the respective counties for incorporation into the energy and OCS-related development component of its overall State CZM plan.

C. Approach

The undertaking of this study required a coordinated effort by the counties involved, State agencies and various industry and other interest groups. The counties were given the freedom to structure their individual study efforts as they deemed most beneficial. In Camden County the Environmental Agency had overall responsibility for the conduct of the study with the detailed work being delegated to a land use consultant who had experience in OCS oil and gas planning activities.

The first task was to understand the workings and requirements of the energy resource development industries involved, particularly the oil and gas industries.[1] Significant amounts of information and data on the offshore oil and gas industry were collected, analyzed and hopefully absorbed. A series of group meetings with various industry elements were conducted to facilitate additional data exchange and verification.

The second task was to collect, analyze and, as appropriate, map county level land use, zoning, environmental and other information that was relevant to possible energy development activities. This information was collected from a variety of municipal, County, State and federal sources. The next task was to develop assumptions regarding the reasonable expectations as to the types and amounts of energy facilities which might be needed in the forseeable future. These assumptions were formulated by the NJ-OCZM in cooperation with the participating counties (see Assumptions Section).

Using these assumptions specific facility types were identified which, because of the interplay of their siting requirements with the assumptions and other factors, might be located in Camden County.[2] Lastly, analyses were conducted to determine where in the county, if anywhere, such facilities might compatibly be located. The results of those analyses are included in the Summary of Recommendations and the more detailed discussions which follow.

D. Study Focus in Camden County

Each of the participating counties was instructed to focus its efforts on those energy facility siting issues with which it was most immediately concerned. Consequently, this study has concentrated on the possible onshore effects of OCS oil and gas development because the other coastal energy facility siting issues, offshore nuclear power plants, liquified natural gas facilities and deep water ports, do not directly involve nor affect Camden County. During the course of these analyses it became apparent that possible OCS facility siting decisions might affect Camden in two somewhat distinctive ways -- waterfront development and pipeline corridors.

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1. See Appendix A for a brief synopsis of the various phases of OCS oil and gas activity.

2. See Appendix B for brief descriptions of these facilities and the various siting factors which were relevant to the determination of whether or not they could be compatibly sited in Camden County.

The Delaware River waterfront could conceivably provide a focus for some of the onshore port-related activities that are necessary to service offshore oil and gas exploration and development activities. Admittedly, the oil and gas industry has expressed a strong desire to locate such onshore support facilities along the Atlantic coast of New Jersey, possibly in the Atlantic City area. The Port of Camden is not looked upon by the industry favorably as a primary support base location because of its distance by water transportation to the offshore areas where the proposed exploration will take place. Nevertheless,the existing port and rail infrastructure along the Camden waterfront may make the area attractive for the location of ancillary support activities. Moreover, should the industry encounter difficulty in locating its primary support facilities along the coast because of environmental or economic conflicts (i.e. tourism and casino development), it may then view Camden's port facilities with a more favorable eye.

The various studies that have been undertaken regarding the onshore effects of the exploration for oil and gas off New Jersey's coast have uniformly assumed that if commercial quantities of oil were found it would be pipelined to shore. Furthermore, it has been assumed that the oil would be pipelined cross-country to refineries in the Philadelphia and/or North Jersey areas to replace the imported oil currently being refined there. Because the pipelining of crude oil is generally economically less expensive and environmentally sounder than alternative means, that assumption has been adopted for this study. Consequently, depending on where oil is discovered and where a pipeline landfall on the Atlantic Coast is located, Camden County could provide one of several alternative locations for such crude oil pipelines.

Analyses were undertakan, and this report was structured, to reflect this dichotomy of possible impacts (waterfront development and potential pipeline corridors). Discussions of land use, zoning and other relevant matters are organized in light of these specific areas. Several potential pipeline corridors were identified for further evaluation. Basically, these study corridors were selected to enable the analysis of impacts resulting from pipelining crude oil in three distinct types of areas: existing major highway corridors; existing railroad rights-of-way; and essentially vacant (some farm) land. The other counties participating in the overall study effort were consulted to assure reasonable continuity of study corridors.

II. ASSUMPTIONS

It was necessary, in undertaking this study and evaluation of energy facility siting matters, to formulate assumptions that would provide reasonable and manageable parameters to the scope of the effort. The assumptions which follow were adapted from findings, recommendations and policies of various private, local, state and Federal agencies. The assumptions are divided into two groups; those that are generally applicable to the statewide study effort and those that have specific applicability to Camden County.

A. General Assumptions

1. The quantity of oil and/or gas discovered on the outercontinental shelf (OCS) offshore New Jersey will fall within the range of estimates put forth by the petroleum industry and the Federal government. It has been stated many times, in a variety of reports, that it is impossible to predict with any degree of certainty how much, if any, oil and gas may be located off New Jersey's shores. If the discoveries are only minimal, or many times the generally accepted resource estimates, the estimates of the number, size and type of facilities that would be needed to develop such resources could vary drastically.

2. Crude oil produced on the Mid-Atlantic OCS will be used to replace the imported foreign crude oil presently processed at the Philadelphia-Camden and North Jersey refineries. A stated goal of the accelerated OCS leasing program is to discover and produce domestic crude oil resources so as to decrease the dependence on foreign supplies. The existing refineries in the Mid-Atlantic region process a variety of foreign crude oils with varying characteristics. Thus, their facilities could be used to refine any foreseeable type of crude oil that may be discovered in the Mid-Atlantic Region. Additionally, it has been projected that the production of OCS oil will not generate the need for new refineries in the Mid-Atlantic region because the region's refineries presently possess a capacity far in excess of the estimates of the recoverable resources that will be generated from the Mid-Atlantic OCS.

3. Pipelines will be used to transport oil and/or gas resources to processing and/or distribution facilities onshore. Pipelining of oil and gas is the most economically and environmentally sound method of bringing these resources to shore. The Federal government will require the oil companies to transport the oil from offshore in pipelines

wherever technologically and economically feasible. It is assumed, however, that crude oil will be pipelined to the existing refineries in the Camden-Philadelphia and North Jersey areas. Gas will be pipelined to the nearest existing segment of the interstate gas distribution system.

4. Federal and State agencies will exercise the full measure of their respective powers to assure that energy facility development activities are undertaken in as environmentally sound a manner as technologically and economically feasible. The Secretary of the U.S. Department of the Interior, the agency primarily responsible for resource development activities on the OCS, has publically stated that, henceforth, energy resource development under Federal jurisdiction will only proceed after there are reasonable assurances that the environment can be adequately protected. The Governor of the State of New Jersey has repeatedly stated that he intends to exercise the powers of the State so as to minimize adverse effects on the environment from OCS oil and gas activities. This would presumably include an aggressive pursuit of the State's responsibilities and prerogatives under the Wetlands Act, the Riparian Statutes and the Coastal Area Facility Review Act.

B. County-Specific Assumptions

5. There will be no deepwater ports, liquified natural gas facilities, or electrical generating plants constructed in, adjacent to, or significantly affecting, Camden County in the foreseeable future. The Corps of Engineers has observed that the proposed deepwater port facility in the mouth of the Delaware Bay has been abandoned, at least temporarily, by the private interests whose financial support is essential to its construction. Electric generating plants (nuclear) presently planned for construction are all located a significant distance from the County. Moreover, the slowdown in demand for electrical energy has even resulted in the postponement of construction dates for some proposed plants. Proposals for liquified natural gas facilities also involve areas removed from the County.

6. Camden County encourages socially, fiscally and environmentally sound economic development. Economic growth and revitalization is needed and desired in the County. Aggressive actions by the City of Camden to attract industry, and the Development Strategy formulated by the County Overall Economic Development Program Committee, are evidence of this desire. The unemployment rate in the County is all too vivid evidence of the need.

7. Actions that threaten the environment within the County will be carefully scrutinized by appropriate municipal and County agencies; special care will be exercised to protect the integrity of such especially significant resources as coastal (riverfront) wetlands, cedar swamps and Pine Barrens areas. The establishment of the Camden County Environmental Agency evidences the concern that both private individuals and public officials share for the environment. The Agency has publicly supported Pine Barrens preservation efforts and has encouraged State representatives to speed up the process necessary to legally protect those wetlands located along the Delaware River. Cedar swamps are a somewhat unique, and very limited, resource in the County that are very susceptible to degradation.

8. Camden County will, in concert with appropriate State and Federal agencies, take the actions necessary to protect and enhance the quality of its water resources. The County is presently in the process of consolidating numerous municipal sewage systems into a more efficient regional one. The final realization of this effort will hopefully result in improvement of surface water quality in the County. Of equal, if not greater, importance, however, is protection of the water quality of the aquifers from which the County draws its water supply. Potential intrusions of the Cohansey aquifer must be carefully scrutinized because, being a water table aquifer, it is very vulnerable to pollution.

III. SUMMARY OF RECOMMENDATIONS

A. Waterfront Onshore Support Facilities

1. Sites[1] G and M are desirable locations for the development of an onshore support base.

2. Sites B, D, E and O are marginally acceptable locations for the development of an onshore support base.

3. Sites A, C, F, H, I, J, K, L, N, P and Q are unacceptable locations for the development of an onshore support base.

4. Sites B, C, E, F, G, K, L and M are suitable for the development of a wide variety of OCS ancillary industries depending on the possible location of an onshore support base.

5. Sites G, L and M are suitable for the establishment of a pipecoating yard.

B. Potential Pipeline Corridors[2]

1. The Conrail-Ocean City Railroad Line is the most acceptable north-south corridor in the County, of those studied, for the possible location of oil and gas pipelines.

2. The Conrail-Atlantic City Railroad Line, the Atlantic City Expressway and the proposed Gloucester-Winslow Parkway are marginally acceptable as possible north-south pipeline corridors.

3. The New Jersey Turnpike/I-295 corridor through the northern part of the County is highly acceptable for pipeline placement.

4. The Central Railroad of New Jersey Line through the southern portion of the County is unacceptable for possible use as a pipeline corridor.

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1. See Figures 6 and 7 for site reference points and Section V.C. for more detailed discussions.
2. See Figure II for reference points and Section VI for further discussion.

C. Policy Alternatives [3]

The State should:

1. Promulgate regulations requiring use of the best available technology in the construction and operation of energy facilities to insure safety and limit possible environmental degradation.

2. Continue to secure financial assistance for the counties to enable their continued participation in the planning process initiated by this study effort.

3. Increase its capability to render technical assistance to county and local governments by retaining in-house staff with detailed expertise in such areas as pipeline and petroleum engineering.

4. Establish a formal mechanism to involve county and local governments in the State's decision-making processes regarding energy facility siting matters.

5. Formulate energy facility siting policies that give due consideration to the positive economic benefits that could accrue to a community from the siting of such facilities.

The County should:

6. Continue the coordinated multi-county planning effort initiated by this study effort by establishing a Delaware River and Bay Coastal Planning Group with other interested counties.

7. Act as a vehicle for the dissemination of information and technical assistance from the State to local governments on energy facility siting and other coastally-related issues.

8. Disseminate information to the general public on the State's continuing coastal zone planning and management activities.

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3. See Sections VII and VIII.

IV. EXISTING RESOURCES AND USES

A. Existing Land Use Patterns

Camden County's 37 municipalities occupy a land area of slightly less than 227 square miles. They vary in size from the 0.17 square mile Audubon Park to Winslow Township which occupies more than one-quarter of the County's land area. The existing developmental characteristics of the municipalities are equally varied. The County can be roughly subdivided into three generalized development zones: urban, suburban and rural.

The urban zone consists of the old towns in the inner core area closest to the Delaware River. These municipalities characteristically have little or no developable land available, a relatively high density aging housing stock and deteriorating commercial areas. The suburban zone experienced during the 60's, and continues to experience, intense development pressures characterized by large single family and apartment complex developments, shopping malls and a limited number of modern industrial park complexes. The rural zone has traditionally been one of the major truck-farming areas of the metropolitan region. Suburbanization has not yet supplanted the areas rural-agricultural image but the developmental pressures have begun to be felt.

Industrial

Existing land use has been a function of a number of factors including: the County's proximity to the Philadelphia urban core; Delaware River port activity; and its role as a transportation link between the metropolitan region and the ocean resort areas. Historically, the Delaware River waterfront has served as a focal point for industrial activity within the County. This accounts for Camden City's, Pennsauken Township's and Gloucester City's prominence as industrial municipalities. During the decade prior to the County's most recent land use survey in 1968, more than half of the industrial activity in the county occurred in or immediately adjacent to these municipalities. Increasingly, however, such activity is being located or relocated in the southern portion of the county adjacent to major rail and highway arteries. Industrial parks have played a major role in this redistribution of industrial activity. There are more than 20 industrial parks in the County with a combined area of more than 2,000 acres.

Commercial

The older communities in the County are characterized by linear commercial development located along the major transportation arteries which radiate from the Camden City area. These commercial areas originated as highway strip development but ultimately many became the Central Business Districts in the older portions of the County. In the last decade modern shopping malls have accounted for a large portion of new commercial activity. This has resulted in increased deterioration in many of the older areas.

Agricultural

The acreage in agricultural production in Camden County peaked more than half a century ago. Estimates of current farm acreage vary among several studies undertaken around 1970, most probably because of the different methodologies which they employed. Data developed in 1971 for the State's Report of the Blueprint Commission on the Future of New Jersey Agriculture (1973) indicates that there are somewhat less than 10,000 acres of farmland remaining in the County. The economics of farming, land speculation and the housing boom which began in the 60's, have combined to diminish agriculture's relative importance in the County. The growing urbanization/suburbanization of the County has relegated farming to the outlying townships, especially in the southeastern portion of the County. Winslow Township accounts for more than one half of the identified farm acreage. Cherry Hill, Gloucester and Voorhees Townships contribute the remaining bulk of the County's farmland.

Residential

The County's 1968 land use survey indicated that residential land use occupied almost two fifths of the developed land and one-fifth of its total land in the County. More than 43% of the housing was constructed prior to 1940 and approximately 23% was constructed during the decade of the 60's. During that decade almost 70% of the new units constructed were apartments. The most consistently active communities were Camden City, Cherry Hill Township, Gloucester Township and Lindenwold Borough. Voorhees and Winslow Townships have experienced significant residential construction activity since 1970. Although the

residential construction in the County has gradually increased the average age of the housing stock, the older communities located northwest of the New Jersey Turnpike still retain significant amounts of aged and deteriorating housing. Camden City has undertaken a number of projects to provide additional modern housing through its urban redevelopment effort, but much remains to be done.

B. Future Growth Patterns

The future development of Camden County will undoubtedly be influenced by a number of factors of both local and national significance. Some local factors may be: the economic health of Philadelphia, the redevelopment of the Camden waterfront, extension of the High Speed Line, casino gambling in Atlantic City, the State's farmland preservation program, and efforts to protect the integrity of ground water supplies. Many residents of the county's suburban zone work in Philadelphia and located where they did because of the generally less expensive housing. Significant growth in white collar jobs in Philadelphia could be translated into increased housing demand in Camden County. Extension of the High Speed Line would possibly place additional residential growth pressures on the lower part of the County. It has been suggested that some of the housing demand generated by casino gambling in Atlantic City may well focus on the southern portion of Camden County because of the developmental restrictions which could result from efforts to preserve and protect the Pine Barrens in Atlantic and Burlington Counties. Most of the rural municipalities have adopted building ordinances that encourage a wide variety of housing types and site designs, making this area even more attractive for development.

Much of the land suitable and available for residential development in the southern portion of the County is farmland. Portions of this land may be protected from development, however, if the State chooses to adequately fund and pursue its program of purchasing development rights to protect the agricultural section of the State's economy. Generally, it can be concluded that significant residential development pressures will focus on the southern portion of the County. Along with residential growth would come a measure of commercial development. It is unlikely, barring a very large population increase,

that major mall development would be stimulated. It is equally unlikely that major industrial growth will occur in this part of the County because of the availability of industrially zoned and developed land in the northern part of the County where transportation and other necessary utilities already exist.

C. Population

It is estimated that Camden County's 1977 population will approximate half a million residents, up from the 1970 census count of 456,291. In 1970 Camden was New Jersey's eighth most populous County with 6.4% of the State's total population. The County's population accounted for 9.5% of the Philadelphia Standard Metropolitan Statistical Area (SMSA). This percentage has increased steadily since the 1910 census when it represented 6.3% of the SMSA. Although the population grew 16.4% between 1960 and 1970, six of the county's 37 municipalities experienced a net loss in population.

Camden City, which experienced a 12.5% loss in population during the decade of the 60's, still ranked first in population count and density with more than 22% of the County's population (see Table I). It, combined with the Townships of Cherry Hill, Pennsauken and Gloucester, accounted for more than 50% of the County's population. The lower County townships of Winslow and Waterford occupy over two-fifths of the County's land area but contained only 3% of the County's population. Figure I, Population Density, graphically displays the distribution of population within the County. Note the heavier concentration of population in the older communities near the Delaware River and in a corridor along the center of the County in which the High Speed Line and Route 30 (White Horse Pike) are located.

The County's population is projected to increase by 38% totaling more than 630,000 residents by the year 2000. More than half of this growth is projected to occur in Gloucester, Winslow and Voorhees Townships. The current level of subdivision submissions and approvals would appear to support such a projected growth trend for these three municipalities.

TABLE I CAMDEN COUNTY - 1970 POPULATION

Municipality	Population[1]	Rank	Land Area[2]	Density[3]	Rank
CITIES (OF)					
Camden	102,551	1	9.56	10,727	1
Gloucester	14,707	8	2.83	5,197	15
BOROUGHS (OF)					
Audubon	10,802	12	1.50	7,201	5
Audubon Park	1,492	33	0.17	8,776	3
Barrington	8,409	16	1.59	5,289	14
Bellmawr	15,618	7	3.12	5,006	17
Berlin	4,997	23	3.57	1,400	27
Brooklawn	2,870	29	0.54	5,315	13
Chesilhurst	801	35	1.72	466	33
Clementon	4,492	25	1.98	2,269	24
Collingswood	17,422	6	1.96	8,889	2
Gibbsboro	2,634	31	2.21	1,192	30
Haddonfield	13,118	9	2.82	4,652	20
Haddon Heights	9,365	15	1.58	5,927	11
Hi-Nella	1,195	34	0.23	5,196	15
Laurel Springs	2,566	32	0.46	5,578	12
Lawnside	2,757	30	1.43	1,928	25
Lindenwold	12,199	10	3.87	3,152	21
Magnolia	5,893	19	0.98	6,013	10
Merchantville	4,425	26	0.61	7,254	4
Mt. Ephraim	5,625	21	0.92	6,114	9
Oaklyn	4,626	24	0.68	6,803	6
Pine Hill	5,132	22	4.00	1,283	29
Pine Valley	23	36	0.95	24	37
Runnemede	10,475	13	2.10	4,988	18
Somerdale	6,510	17	1.36	4,787	19
Stratford	9,801	14	1.60	6,126	8
Tavistock	12	37	0.27	44	36
Woodlynne	3,101	28	0.23	1,348	28
TOWNSHIPS (OF)					
Berlin	5,692	20	3.27	1,741	26
Cherry Hill	64,395	2	24.26	2,654	23
Gloucester	26,511	4	23.25	1,140	31
Haddon	18,192	5	2.83	6,428	7
Pennsauken	36,394	3	12.27	2,966	22
Voorhees	6,214	18	11.68	532	32
Wateford	4,073	27	36.23	112	35
Winslow	11,202	11	58.26	192	34
CAMDEN COUNTY	456,291		226.89	2,011	
MEDIAN				4,787	

1. 1970 Final Census Bureau Count
2. Total Area in Square Miles
3. In Persons Per Square Mile

SOURCE: Camden County Planning Department

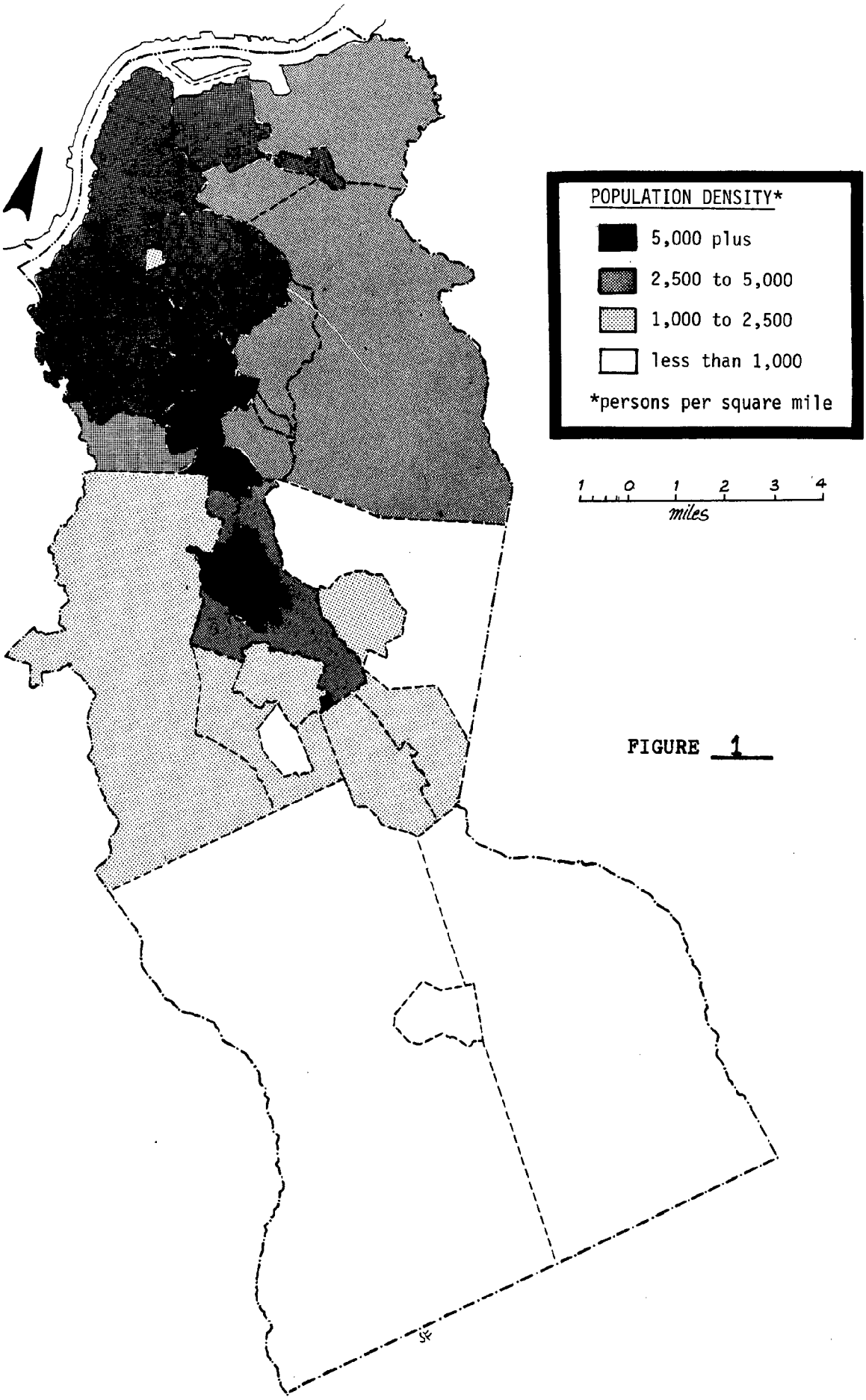

POPULATION DENSITY*
5,000 plus
2,500 to 5,000
1,000 to 2,500
less than 1,000
*persons per square mile
1 0 1 2 3 4
miles

FIGURE 1

D. Employment

Although Camden County accounts for 9.5% of the total population in the Philadelphia SMSA, it provides only 5.6% of the region's job opportunities. It is estimated that 25% of the County's employed residents commute to jobs in Philadelphia. From 1970 to 1975 the number of county residents employed grew from 173,125 to 187,789, an increase of 8.5%. During this same period, however, the labor force grew from 182,067 to 213,135, an increase of 17.1%. The number of unemployed almost tripled during this period, rising from 8,942 to 25,346; unemployment rates soared from 4.9% to 11.9%. Table II summarizes the U. S. Bureau of Labor Statistics data on employment in the County for the period 1970 through July, 1976.

Undoubtedly, some of the current unemployment results from the rapid growth in the number of persons entering the job market. It should be noted, however, the July 1976 estimates of employed persons is still almost 3,000 less than the 1973 pre-recession annual average.

As in the country as a whole, the urban areas of the County have suffered more severely from the unemployment problem. In Camden City, where almost one quarter of the County's labor force resides, the annual average unemployment rate rose from 7.6% in 1970 to 17.6% in 1975. The July 1976 unemployment rate remains above 10% in 13 of the County's municipalities in spite of the economic upturn in the nation as a whole. Increased unemployment rates have been caused not only by the growing gap between the numbers of new jobs and new entrants into the labor force, but also by the net loss of jobs. Census data indicates that the County lost almost 7,000 manufacturing jobs in the 1965-75 decade, many of which were located in Camden City. It should be noted, however, that the problem of lost manufacturing jobs is a serious problem that afflicts the entire State and is not symptomatic solely of Camden. In fact, during the period from 1969 to 1970, while the Camden labor area experienced a 17.1% decrease in manufacturing employment, the loss for the entire state was 18.3%. The pervasiveness of the problem undoubtedly accounted for its preeminence as an issue in the 1977 gubanatorial campaign. See the February 1977 Camden County Overall Economic Development Program report for a more detailed profile of the County employment situation.

TABLE II. COUNTY LABOR FORCE ESTIMATES

Annual Average	1970	1971	1972	1973
Labor Force	182,067	188,035	196,251	208,585
Employed	173,125	174,698	183,476	195,095
Unemployed	8,942	13,337	12,775	13,490
Rate	4.9%	7.1%	6.5%	6.5%

Annual Average	1974	1975	Jan. 1976*	July 1976*
Labor Force	206,917	213,135	218,221	213,964
Employed	187,789	187,789	190,545	191,959
Unemployed	14,359	25,346	27,676	22,005
Rate	6.9%	11.9%	12.7%	10.3%

*Annual Average estimates for 1976 not yet available. Data Source: U. S. Bureau of Labor Statistics.

SOURCE: Camden County Overall Economic Development Program, February, 1977.

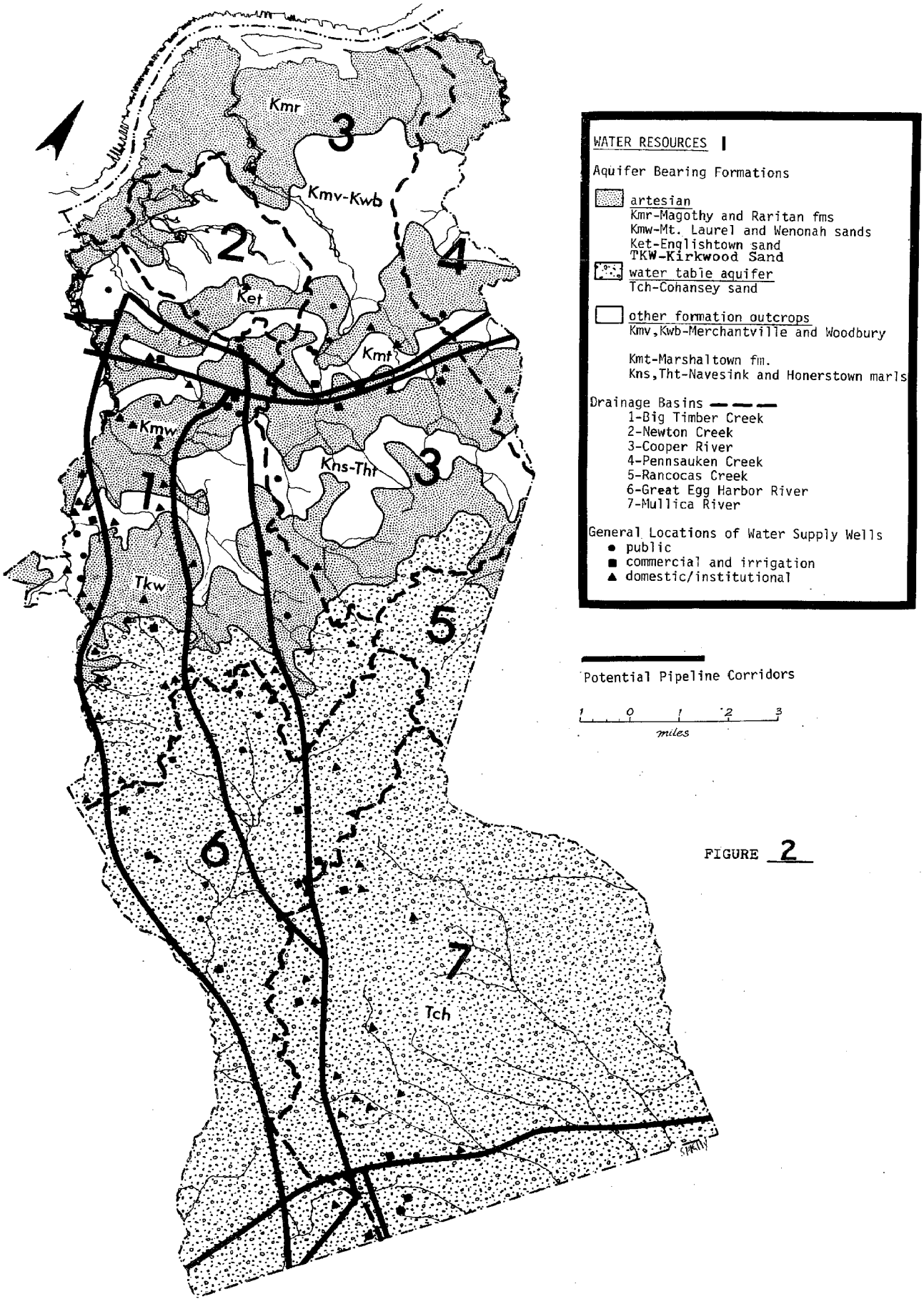
E. Air Quality

The densely populated areas of Camden County lie down-wind from the central core of the Philadelphia-Camden SMSA and consequently receive airborne pollutants from the industry and traffic of Philadelphia as well as those generated locally. This fact was accentuated during the second and third quarters of 1977 when numerous citizen complaints were lodged with the County Environmental Agency by residents of communities near the County waterfront. The Environmental Agency has made investigations into several possible serious polluters along the Philadelphia waterfront and is pursuing the matter with personnel of the New Jersey Department of Environmental Protection.

The eastern rural areas of the County, further down-wind of major pollution point sources, receive pollutants in much diluted form. Low local population densities contribute relatively little to degrade the general air quality. These rural areas in the lower part of the county are the areas of greatest potential population and traffic growth. Consequently, the air quality in these areas may be subject to increasing degradation in the coming decades. Future growth in these areas in turn will depend upon a number of factors: County wastewater treatment plans, State water quality standards, Pine Barrens preservation efforts, and extension of the High Speed Line, among others. Some indication of the air quality objectives that will be pursued in the County will hopefully be revealed in the Statewide Air Quality Maintenance Strategy. The Department of Environmental Protection is required by the U. S. Environmental Protection Agency to develop such a strategy, under the Air Quality Maintenance Program, by July 1978.

F. Water Resources

Surface water drainage in Camden County is distributed among seven major watersheds: Big Timber Creek, Newton Creek, Cooper River, Pennsauken Creek, Rancocas Creek, Great Egg Harbor River and Mullica River (see Figure 2). The latter two watersheds, which occupy almost half of the County, drain into the Atlantic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3
Kmv-Kwb
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Kns-Tht
1
3
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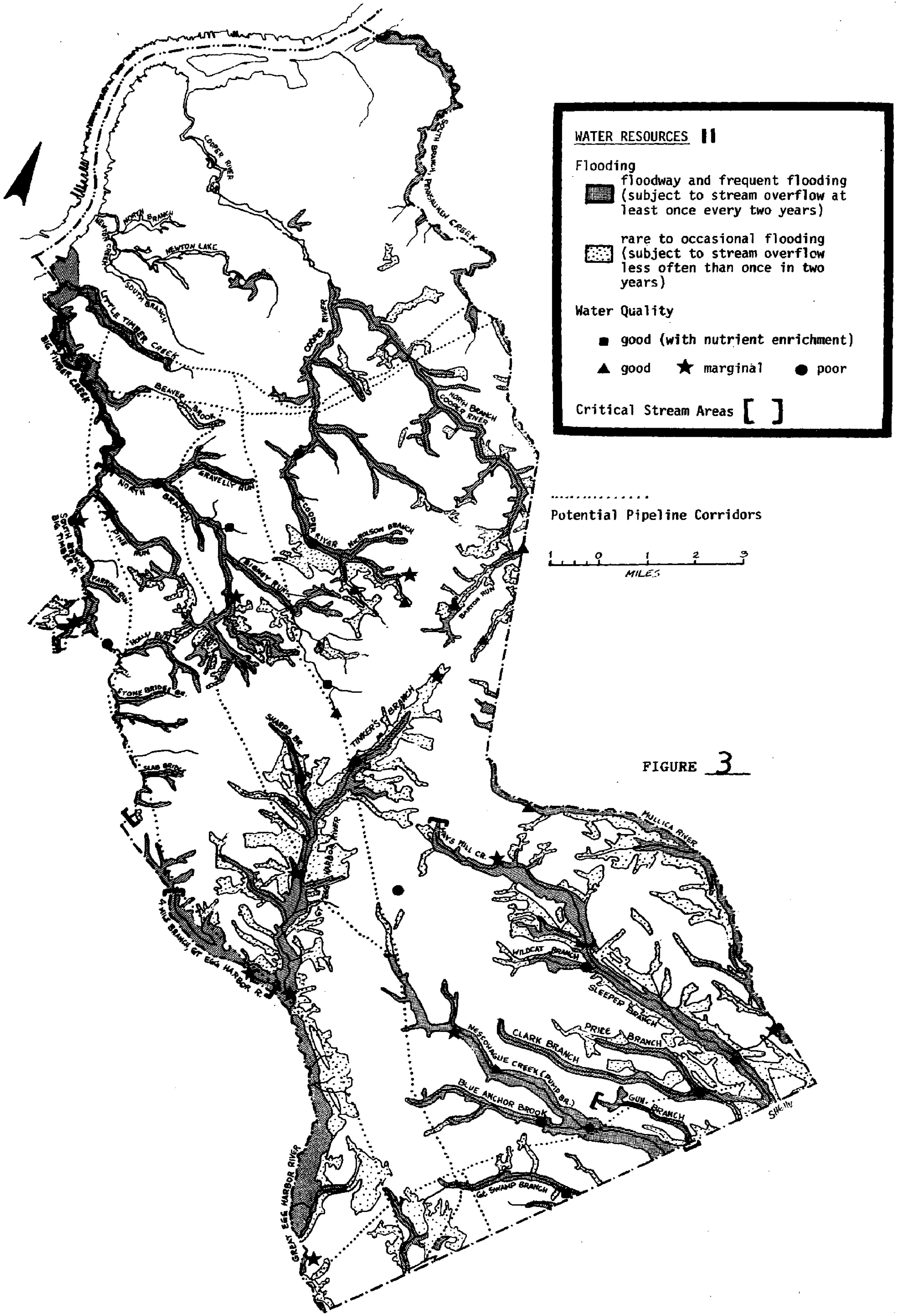
5
6
7
Tch
WATER RESOURCES I
Aquifer Bearing Formations
artesian
Kmr-Magothy and Raritan fms
Kmw-Mt. Laurel and Wenonah sands
Ket-Englishtown sand
TKW-Kirkwood Sand
water table aquifer
Tch-Cohansey sand
other formation outcrops
Kmv,Kwb-Merchantville and Woodbury
Kmt-Marshaltown fm.
Kns,Tht-Navesink and Honerstown marls
Drainage Basins
1-Big Timber Creek
2-Newton Creek
3-Cooper River
4-Pennsauken Creek
5-Rancocas Creek
6-Great Egg Harbor River
7-Mullica River
General Locations of Water Supply Wells
public
commercial and irrigation
domestic/institutional
Potential Pipeline Corridors
1 0 1 2 3
miles

FIGURE 2


WATER RESOURCES II
Flooding
floodway and frequent flooding (subject to stream overflow at least once every two years)
rare to occasional flooding (subject to stream overflow less often than once in two years)
Water Quality
good (with nutrient enrichment)
good
marginal
poor
Critical Stream Areas [ ]
Potential Pipeline Corridors
0 1 2 3
MILES
COOPER RIVER
NORTH BRANCH
NEWTON LAKE
SOUTH BRANCH
LITTLE TIMBER CREEK
BIG TIMBER CREEK
BEAVER BROOK
GRAVELLY RUN
NORTH BRANCH COOPER RIVER
SOUTH BRANCH PENNSAUKEN CREEK
TINKER'S BRANCH
SHARPS BR.
MULLICA RIVER
WILDCAT BRANCH
SLEEPER BRANCH
PRICE BRANCH
CLARK BRANCH
BLUE ANCHOR BROOK
GUN BRANCH
GREAT EGG HARBOR RIVER
STONE BRIDGE BR.
SLAB BRIDGE
FIGURE 3

Coastal Plain and finally the Atlantic Ocean. The remaining five watersheds drain into the Delaware River. Table III summarizes land area data on these watersheds.

All of the watersheds have some areas, primarily those immediately adjacent to the watercourses, that are in the floodway or are subject to frequent flooding. (See Figure 3, Water Resources II). The larger areas, however, are located along the Great Egg Harbor River and the major tributaries of the Mullica River. Additionally, there are significant adjacent acreages that are prone to occasional flooding in these two watersheds.

F. 1. Water Quality

Surface water quality varies significantly between those watersheds in the northwest portion of the County that drain into the Delaware River and those in the lower portion of the County that drain into the Atlantic Coastal Plain. The accompanying map, Current Surface Water Quality in New Jersey (Figure 4), taken from the 1976 Annual Report of the Department of Environmental Protection, graphically demonstrates this variance. The Delaware River Drainage area in Camden is the only location in the State, outside of the North Jersey urban complex, with the worst water quality rating of Poor to Fair. The lower portion of the County, essentially the Great Egg Harbor River and Mullica River Basins, fit within the best water quality category, Good to Excellent.

Whether a given stream segment is classified as "poor" or "excellent" may depend on a number of factors such as the water quality characteristics tested for, the parameters established for poor, good, etc., and the time of year of sampling. Each additional sampling, therefore, would tend to add to the overall picture of water quality in the County. With that in mind, the Camden County Environmental Agency commissioned the Environmental Assessment Council, Inc., to undertake a Water Quality Survey, as a part of its Lower Camden County Natural Resource Inventory. Water samples were taken at 37 points in March, 1977 and analyzed for 10 different water quality characteristics. Water quality classifications were established and mapped. The results of this effort are included on the Water Resources II map (Figure 3). Most of the samples in the Mullica River Basin were marginal to good while those in the Great Egg

TABLE III.

CAMDEN COUNTY DRAINAGE SYSTEM[1]

Watershed	Area (Sq. Mi.)	Percentage of County
Big Timber Creek	41.3	19.3
Newton Creek	10.6	5.0
Cooper River	53.9	25.2
Pennsauken Creek	8.4	3.9
Rancocas Creek	2.1	1.0
Delaware River Drainage	116.3	54.4
Great Egg Harbor River	37.2	17.4
Mullica River	60.3	28.2
Atlantic Coastal Plain Drainage	97.5	45.6
County Total	213.8	100.0

1. This data was compiled from County Planning Board file data in 1974 by Jack McCormick & Associates in its study for the Camden County Municipal Utilities Authority. The total area figure differs by a factor of 5.7% from the 226.89 square mile figure used by the Planning Board in its population density computations. Consequently, these figures are used here to establish the relative size of the respective watersheds and do not necessarily represent their actual size.

NEW JERSEY

Current Surface Water Quality

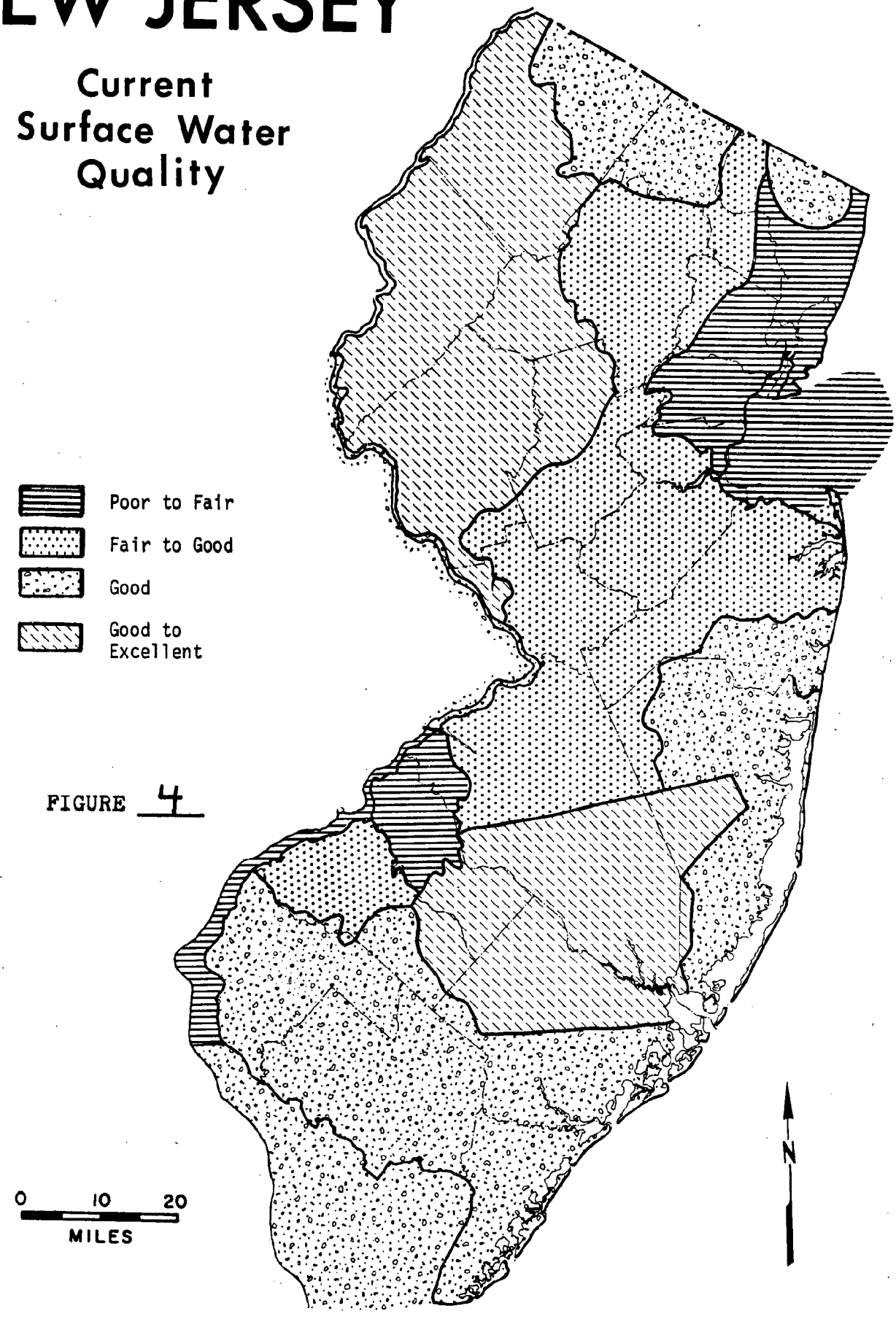


FIGURE 4

Harbor River Basin were either poor or marginal. Samples in other watersheds tended to be poor or marginal with selected good quality classifications in the very headwaters areas. Specific information on sample locations, test parameters, and results are included in the above referenced report.

Another source of water quality information is the 208 Water Quality Management Planning effort coordinated by the Delaware Valley Regional Planning Commission for Burlington, Camden and Gloucester Counties. Its September 1977 Report on Alternatives summarizes the existing water quality and problem areas of basins within the study region. The report contains detailed information on specific segments of streams in the respective watersheds. That information is summarized below, along with other pertinent data, for the portions of the respective watersheds that lie within Camden County.

Big Timber Creek Watershed

In the South Branch of the Big Timber, from its headwaters to its confluence with Farrows Run[1] moderate violations of dissolved oxygen (DO) and ammonia (NH_3-N) standards and severe violations in total phosphorus (TP)

1. See the Water Resources II map for reference points in these discussions. (FIG. 3).

and fecal coliform (FC) were found.[1] The remainder of the South Branch exhibits severe TP and DO problems. Pine Run suffers severe TP and moderate DO problems, presumably caused by agricultural runoff. The upstream reaches of the North Branch show severe violations of DO, TP, NH_3-N and FC standards violations caused primarily by treatment plant discharges. The lower reaches exhibit only severe TP and FC problems. In the main branch of the Big Timber severe violations of DO, TP, FC and NH_3-N standards occur.

Newton Creek Watershed

Sewage treatment plants discharge all along the north, south and main stem of Newton Creek. Severe violations of TP, NH_3-N and FC standards are observed throughout the entire creek.

---

1. Dissolved Oxygen (DO) - DO is a water quality constituent that, in appropriate concentrations, is essential to the existence and continued health of all aquatic wildlife.
Ammonia (NH_3-N) - Ammonia, originating from sewage treatment plant effluent, is decomposed into nitrate (NO_3) by bacteria present in the water. Nitrate stimulates algae blooms which are visually unaesthetic, odorous and tend to deplete DO levels thereby adversely affecting aquatic animals. Nitrate is not directly harmful to humans unless it is present in extremely large quantities.
Total Phosphorus (TP) - The element phosphorus does not occur freely in nature but is found in the form of phosphates in animals, plants and minerals. The major source of man-induced phosphates result from treated sewage wastes and detergents. TP is a measure of phosphorus present in one or more phosphates. Excessive quantities of TP will lead to unnaturally large blooms of aquatic vegetation, with associated adverse impacts.
Fecal Coliform (FC) - FC are bacteria contained in the waste products of humans and other animals. Although FCs are not themselves pathogens (disease causing organisms), they are normally found in conjunction with pathogens. Therefore, a high level of FC may indicate that a certain water course is unsafe for drinking or recreation purposes.

Cooper River Watershed

Water quality is generally good in the upper reaches of the North Branch of the Cooper River with TP being the only severe standards violation. Further downstream, to the confluence with the South Branch, severe violations of the NH_3-N and FC, as well as TP, standards occurs primarily as a result of sewage treatment plant discharges. Effluent from over ten treatment plants are discharged into the South Branch causing severe violations of TP, NH_3-N and FC standards throughout the branch. Similar violations persist in the main branch of the Cooper River.

Pennsauken Creek Watershed

Water quality in the headwaters of the South Branch of the Pennsauken Creek is generally good with TP being the only violation. Along the middle portion of the South Branch, to the confluence with the North Branch, moderate DO and severe TP, NH_3-N and FC violations exist with treatment plant effluent being the predominant cause for these problems. The main stem of the Pennsauken is entirely tidal. The TP, NH_3-N and DO problems present result from the residual water quality effects of the North and South Branches as well as leachate from a large landfill in the area.

Rancocas Creek Watershed

Only about .6% of the watershed lies within Camden County, essentially the headwaters areas of Barton Run, Kettle Run and Haynes Creek. Suburban development in Berlin and Voorhees Townships contribute, to some unmeasured extent, to the water quality problems that exist in the downstream portions of the watershed which lie in Burlington County.

Great Egg Harbor River Watershed

The northernmost headwaters of the Great Egg Harbor River to Fourmile Branch exhibit poor water quality. Severe violations of DO and FC standards, and moderate NH_3-N violations, result from sewage treatment plant effluent, malfunctioning septic tanks and runoff from the widespread agricultural activities that exist

in the area. The Fourmile branch suffers from moderate FC violations and somewhat more severe TP problems. Water quality in the main branch of the Great Egg Harbor is marginal with TP problems evident.

Mullica River Watershed

Water quality in the portion of the watershed located in Camden is generally good with the major concern being high phosphorus levels. Additionally, some of the streams are highly acidic because of the presence of natural organic acids generated by the white cedar swamps in the watershed. A significant portion of the watershed lies within the Pine Barrens Area where stringent non-degradation water quality standards have been proposed.

F. 2. Critical Stream Areas

The 1974 natural resources inventory study, conducted for the Municipal Utilities Authority by Jack McCormick and Associates, identifies four stream segments and two drainage basins (Figure 3) within Camden County as critical biological features in that they are unique or are particularly sensitive to degradation. It concluded that these areas deserve to receive priority in water-quality management planning to abate any existing pollutant source which may threaten them and to assure that no new sources of pollutants will be permitted to jeopardize them.

The areas are:

Great Egg Harbor River Basin
Mullica River Basin
South Branch, Big Timber Creek
Four Mile Branch, Great Egg Harbor River
Hays Mill Creek
Gun Branch

F. 3. Water Supply

Virtually all of the water used in the County is supplied by wells drilled into unconsolidated water-bearing formations. There are five aquifers in the County, four of which are artesian aquifers. The Water Resources I graphic (Figure 2) depicts the generalized outlines of the recharge areas for the respective artesian aquifers. The remaining water-bearing formation is the Cohansey whose recharge area occupies more than one-half the surface area of the County.

The Raritan-Magothy formation underlies all of Camden County and about four-fifths of the State of New Jersey. This formation is the primary source of the County's water supply. The recharge areas for the Raritan-Magothy outcrop in Philadelphia, upper Camden County, and beneath the Delaware River. The aquifer's recharge from this highly urbanized and industrialized area makes it particularly vulnerable to pollution. Historically, high concentrations of iron have been a problem with Raritan-Magothy water. Increasingly, the threat of salt water intrusion into the aquifer from the Delaware River and the Atlantic Ocean has been an additional concern. While iron content, and the threat of salt water intrusion remain problems, at present water quality is adequate and the supply is ample.

More than three-fourths of the water consumed in the County is supplied through municipal or private water systems. The remainder comes from the thousands of individual private wells scattered primarily in the lower part of the County. Camden City's Water Department is the largest of the 17 purveyors in the County supplying approximately 40% of the total output. The graphic, Water Resources I (Figure 2), depicts the general locations of water supply wells by major category of use for those areas along the pipeline study corridors. It should be noted, however, that the wells do not necessarily draw water from the aquifer whose recharge area they appear to be associated with in the graphic. Many wells located in the lower portion of the County, for instance, actually draw water from artesian formations instead of the Cohansey sand formation.

If the Raritan-Magothy represents the past and present for the County's water supply, the Cohansey formation is its future. It is estimated that this water rich area has a potential yield greater than all the other aquifers in the County combined. Care must be exercised, however, because being a water table aquifer the Cohansey is extremely vulnerable to pollution. Other actions, such as Pine Barrens preservation efforts and proposed water quality standards, will have a marked impact on whether or not the Cohansey will be available and/or suitable as Camden County's water supply of the future. Any action that would potentially pose a serious threat to the integrity of the Cohansey as a water supply resource should be scrutinized by the County in great detail.

G. Existing Energy Facilities

No energy is produced or generated in Camden County. Those energy facilities which are present are for the receipt, storage and distribution of energy resources produced elsewhere. The map (Figure 5) and table (Table IV) which follow display pertinent information regarding those facilities. Within the County there are more than seventeen miles of oil products pipeline, almost twenty-five miles of gas pipeline, approximately 125 miles of high tension electrical transmission corridors and almost four and one-half million barrels of petroleum products storage capacity. The overwhelming bulk of the petroleum products storage capacity is located along the Delaware River because the primary method of receipt is by barge or small tanker. The main portions of the oil products pipelines in the County parallel the New Jersey Turnpike as does the Transco gas pipeline. Except for areas where these pipelines actually cross the Turnpike, however, the pipelines are generally located outside the right-of-way owned by the Turnpike Authority.

V. DELAWARE RIVER WATERFRONT

A. Existing Land Use

Four communities, Brooklawn, Gloucester City, Camden City and Pennsauken Township, form the fourteen mile long Camden County waterfront.[1] Camden City occupies approximately half of the shoreline and Pennsauken Township more than a third.[2] As the following table and accompanying maps (Figures 6 and 7) depict, land use along the County shoreline is predominantly non-use.

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1. Including, for purposes of these discussions, the shoreline, beginning at the point where River Road crosses Pennsauken Creek to the mouth of Big Timber Creek and excluding Petty's Island.

2. Excluding Petty's Island which, located in Pennsauken Township, has a shoreline of approximately three miles. See the more detailed discussions of specific waterfront areas below for information on Petty's Island.

TABLE IV. MAJOR EXISTING ENERGY FACILITIES IN CAMDEN COUNTY

Facility	Location	Function	Capacity
S. Jersey Terminal Corp., Division of Amerada Hess; and Amerada Hess	On the Delaware River South of the Delaware River Railroad Bridge; and on River Road in Pennsauken Township	Receipt of Petroleum Products and Chemicals by Barge & Tanker. Storage & Distribution Center for Petroleum Products	33 storage tanks + 1,500,000 Barrels
Paragon Oil, Division of Texaco	Delaware River at Fisherman's Cove, Pennsauken Township	Receipt of Petroleum Products by Barge, Tanker and Pipeline. Fuel Oil Storage and Distribution Center	15 storage tanks 1,179,000 Barrels
Cities Service	Petty's Island, Pennsauken	Receipt of Petroleum Products by Barge, Tanker & Pipeline. Shipment of Packaged Petroleum Products. Fuel Oil Storage & Distribution Center.	+55 storage tanks 1,163,000 Barrels
Federal Oil	River Road at Cooper River, Camden	Receipt of Petroleum Products by Barge. Storage & Distribution of Fuel Oil	5 storage tanks 6,000 Barrels
Koch Fuels	Third Street & Delaware River, Gloucester City	Receipt of Petroleum Products by Barge & Tanker; Storage and Distribution of Fuel Oil.	5 storage tanks 450,400 Barrels

Facility	Location	Function	Capacity
Atlantic Richfield	Big Timber Creek at Water Street, Gloucester City	Receipt of Petroleum Products by Barge. Storage & Distribution of Fuel Oils.	9 storage tanks + 100,000 Barrels
Colonial Pipeline	Parallels N.J. Turnpike, Primarily Outside Right-of-Way; Spur to Petty's Island	Interstate shipment of Petroleum Products from refineries in the Gulf of Mexico region to various metropolitan areas in the Northeast. Spur provides products to Cities Service and Paragon Oil	Main Line-6.5 miles of 30" Dia. Pipeline. Spur-4 miles of 10" Dia. Pipeline
SOHIO Pipeline	Parallels Colonial Pipeline	Interstate shipment of Petroleum Products	6.5 miles of 16" Dia. Pipeline
Transco Pipeline	Generally parallels the corridor between the N.J. Turnpike & I-295	Interstate shipment of natural gas from areas in the Gulf of Mexico region to the Northeast	6.5 miles of 16" Dia. Pipeline
Lawnside Line, South Jersey Gas Company	From the Transco Line at Barrington to the Four Mile Branch of the Great Egg Harbor River South of Winslow Crossing	Intrastate shipment of gas to Atlantic City & Other areas in South Jersey	18 miles of 10" & 12" Dia. Pipeline
Overhead Electric Transmission Lines	Various Locations	Distribution of electricity within and through Camden County from generating facilities located elsewhere	+125 miles of Transmission Corridors

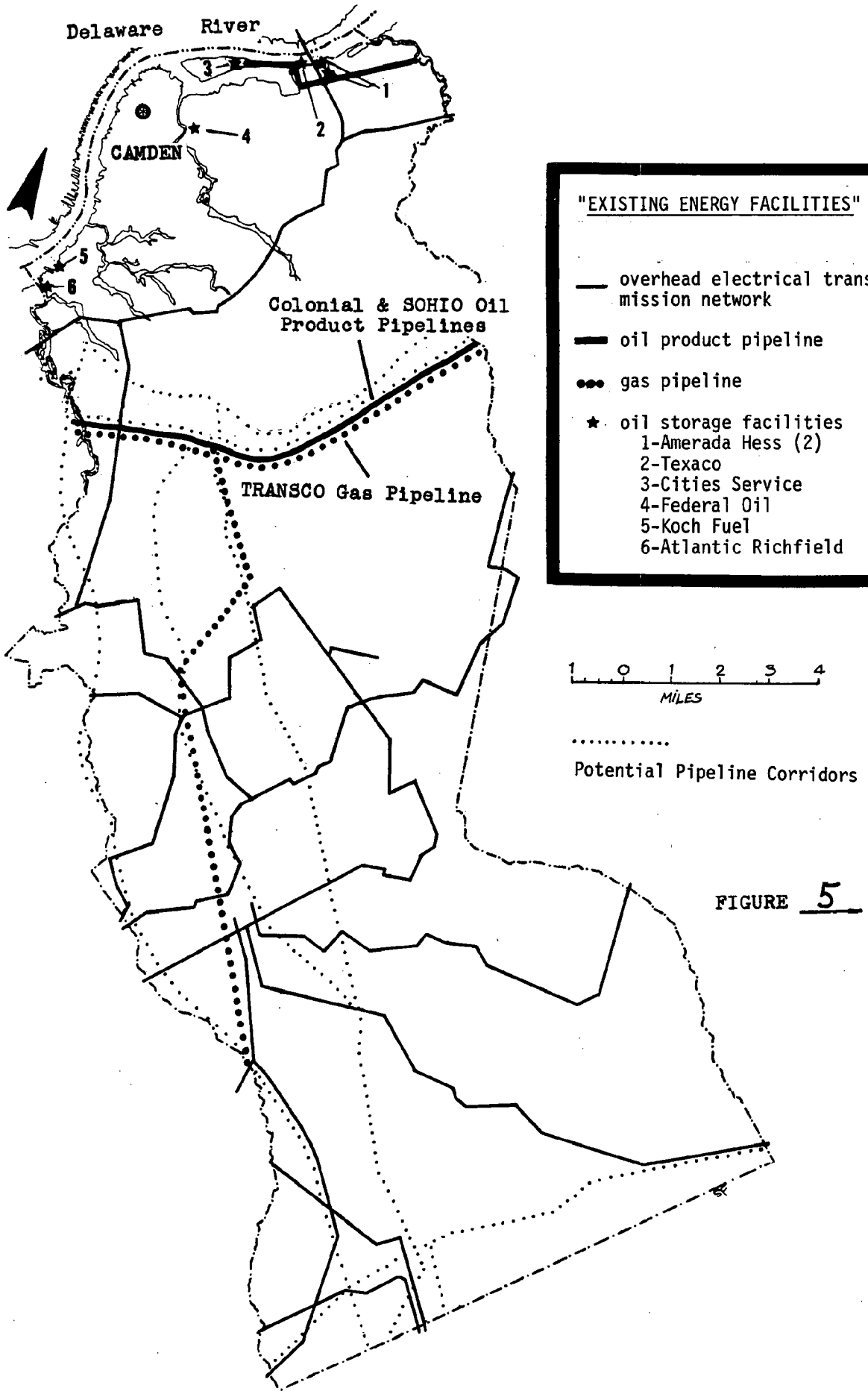
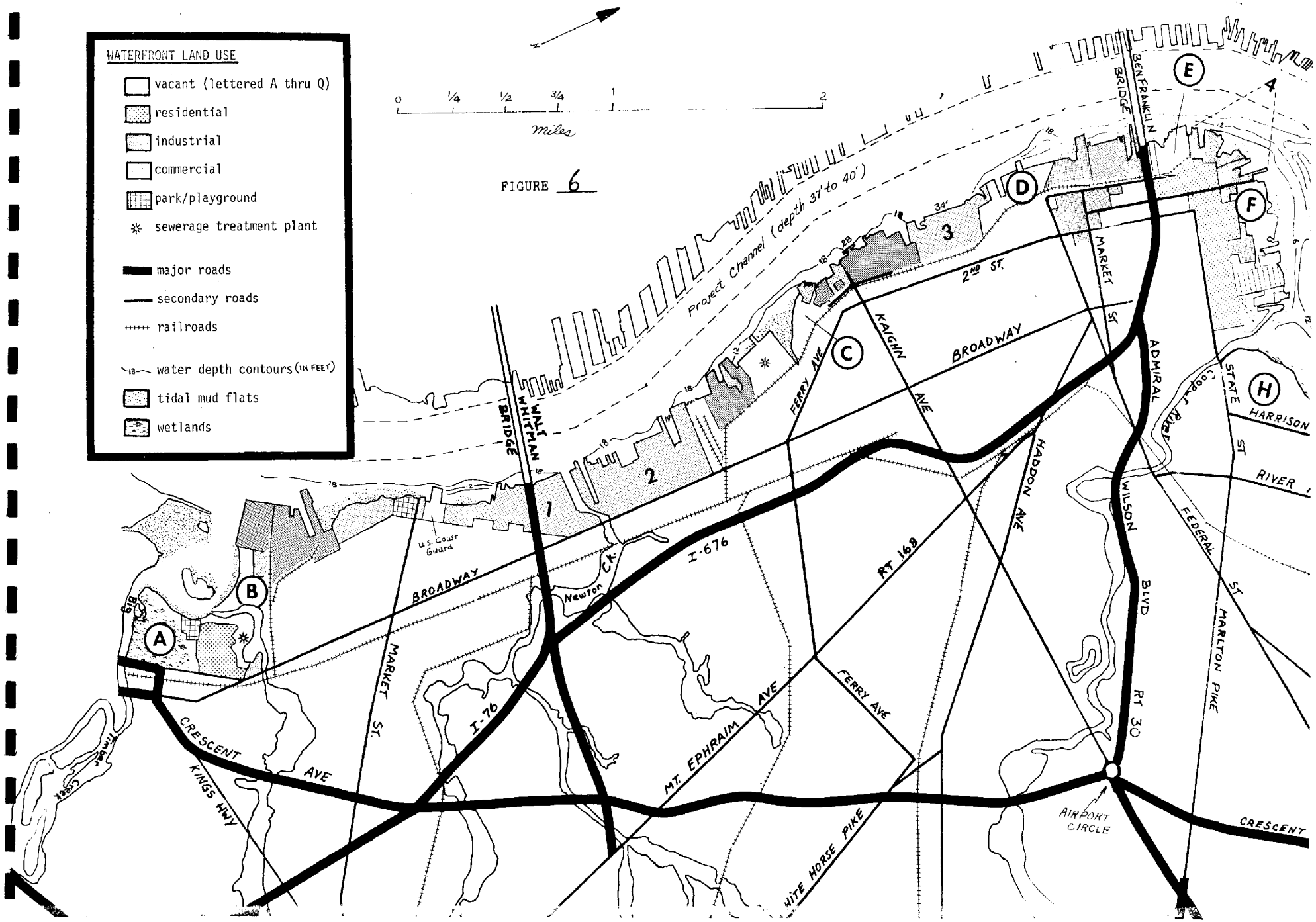
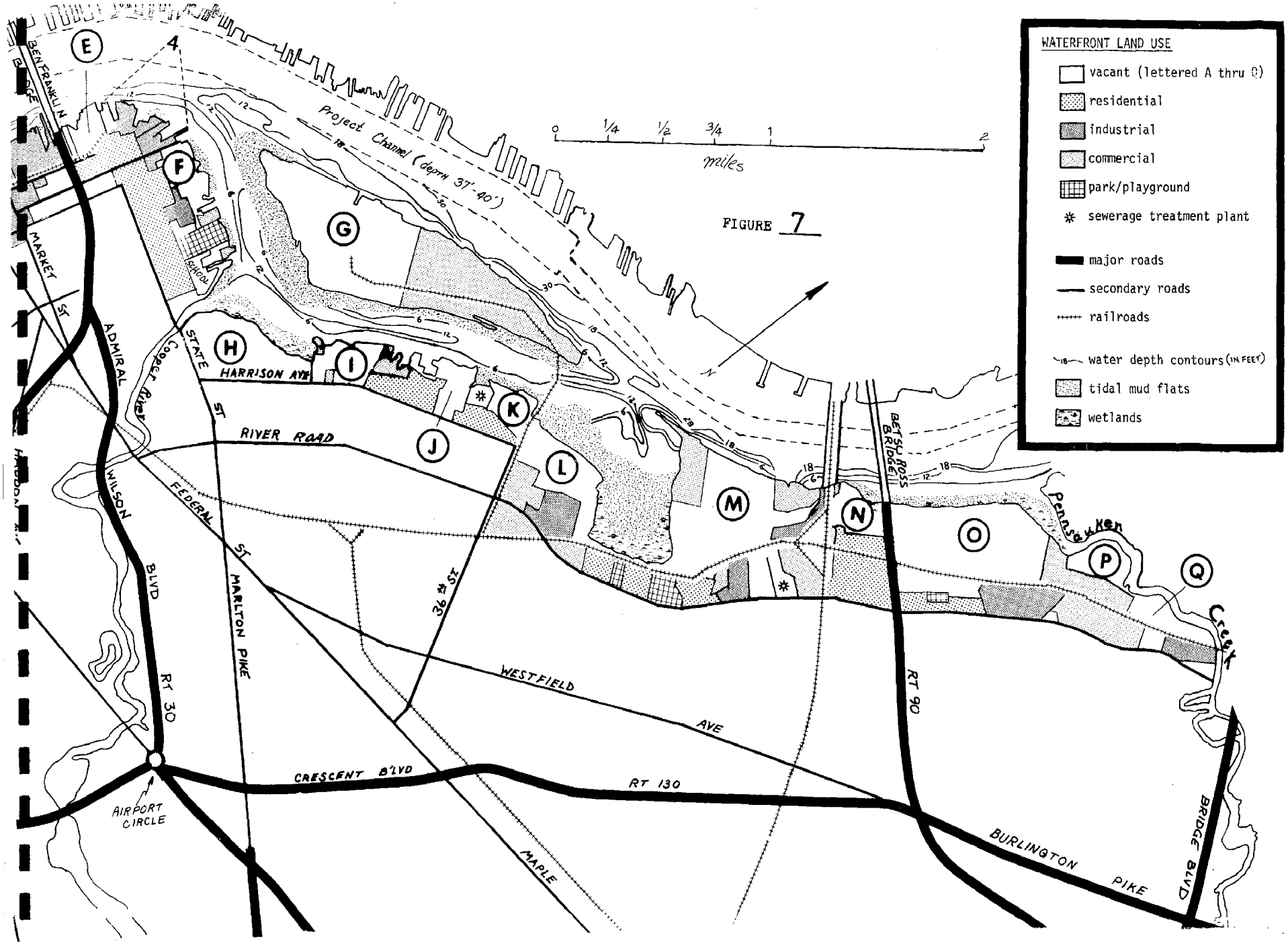

Delaware River
CAMDEN
1
2
3
4
5
6
Colonial & SOHIO Oil Product Pipelines
TRANSCO Gas Pipeline
"EXISTING ENERGY FACILITIES"
overhead electrical transmission network
oil product pipeline
gas pipeline
oil storage facilities
1-Amerada Hess (2)
2-Texaco
3-Cities Service
4-Federal Oil
5-Koch Fuel
6-Atlantic Richfield
1 0 1 2 3 4
MILES
Potential Pipeline Corridors

FIGURE 5


WATERFRONT LAND USE
vacant (lettered A thru Q)
residential
industrial
commercial
park/playground
sewerage treatment plant
major roads
secondary roads
railroads
water depth contours (IN FEET)
tidal mud flats
wetlands
0 1/4 1/2 3/4 1 2
Miles
FIGURE 6
Project Channel (depth 37' to 40')
BEN FRANKLIN BRIDGE
WALT WHITMAN BRIDGE
A
B
C
D
E
F
G
H
1
2
3
4
BROADWAY
2ND ST.
MARKET ST.
KAIGHN AVE
FERRY AVE
HADDON AVE
ADMIRAL WILSON BLVD
STATE HARRISON ST
FEDERAL ST
MARLTON PIKE
RT 30
RT 168
I-676
I-76
CRESCENT AVE
KINGS HWY
MT. EPHRAIM AVE
FERRY AVE
WHITE HORSE PIKE
AIRPORT CIRCLE
CRESCENT
U.S. Coast Guard
Newton Ck.
Big Timber Creek
Cooper River
RIVER


WATERFRONT LAND USE
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tidal mud flats
wetlands
0 1/4 1/2 3/4 1 2
miles
Project Channel (depth 37'-40')
BEN FRANKLIN BRIDGE
MARKET ST
ADMIRAL WILSON BLVD
RT 30
STATE ST
HARRISON AVE
Cooper River
RIVER ROAD
FEDERAL ST
MARLTON PIKE
36th ST
WESTFIELD AVE
CRESCENT BLVD
AIRPORT CIRCLE
MAPLE
RT 130
BETSY ROSS BRIDGE
RT 90
Pennsauken Creek
BURLINGTON PIKE
BRIDGE BLVD
SCHOOL
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q

FIGURE 7

Delaware River Shoreline Land Use — Table V

Land Use	Miles	% of Total
Commercial	3.4	24
Industrial	2.1	15
Other	1.0	7
Vacant	7.5	54

More than half of the land adjacent to the shoreline is vacant. Much of the commercial land use, approximately a fourth of the total shoreline, is accounted for by the two marine terminals of the South Jersey Port Corporation and the Holt Marine Terminal (Parcels numbered 2, 3 and 1, respectively, on the Waterfront Land Use Map, Figure 6). There are a number of different companies who account for the industrial land use. The larger of which include; New Jersey Zinc, GAF, McAndrews and Forbes, Flintkote, RCA, Campbell Soup, American Dredge and Camden Ship Repair. The remaining shoreline is occupied by a variety of uses including several sewage treatment plants and two park areas. Residential use of the waterfront, however, is virtually non-existent.

Most of the companies located along the waterfront were established there because of their dependence on waterborne transportation as the primary means for the receipt and shipment of materials and products. This dependence is not as pervasive today but the availability of waterborne transportation remains a significant factor in the economics of some of the companies' operations. Some of the uses of the shoreline, however, are quite obviously dependent on their waterfront locations - Camden Ship Repair, American Dredging, the Broadway and Beckett Street terminals of the South Jersey Port Corporation and Holt Marine Terminal. It is difficult, therefore, to determine with any degree of specificity the economic significance of port-oriented land use. The fact that it plays a major role in the economy of the County is, nevertheless, generally recognized. Although data is not available for Camden County alone, the Delaware River Port Authority estimates that more than 30,000 jobs were directly generated by port activity in the Camden-Paulsboro region in 1975 with a resulting economic impact of almost 140 million dollars.

Consequently, proposed new uses of available waterfront areas should complement, and not adversely affect, those uses that are an important element of the existing County economy.

B. Zoning and Future Land Use

Zoning is an indication, but not always the determinant, of future land use. Zoning classifications often are based on historical uses and/or the desire to secure tax ratables instead of a comprehensive and realistic appraisal of a land area's physical and economic capabilities. The 1974 Composite Zoning Map for Camden County, prepared by the County Planning Department, indicates that almost three-fourths of the County's waterfront is zoned industrial. In Pennsauken Township over 95% is zoned industrial. The figures below, and the graphic on the following page (Figure 8), clearly demonstrate that industry is welcome on the Camden County Waterfront.

Zoning Classification	Shoreline Miles	% of Total
Commercial	.5	4
Residential	3.5	25
Industrial	10.0	71

One-fourth of the County waterfront is zoned for high density residential use, primarily in Camden City from south of the Ben Franklin Bridge along the Back Channel to the Camden-Pennsauken border at 36th Street.

The 1972 County Comprehensive Plan, prepared by the County Planning Department, places a great deal of emphasis on industrial development. It also places very strong emphasis, however, on the dedication of significant stretches of the waterfront to recreation and open space purposes. It conceptualizes the extension of the Cooper River Park out the mouth of the Cooper River and north along the shore of the Back Channel to the Petty's Island bridge at 36th Street. Also included is the waterfront south of the mouth of the Cooper River to the Ben Franklin Bridge. Other areas visualized as being used for park and open space purposes include: the center city Camden waterfront just south of the Ben Franklin Bridge; the shoreline of the confluence of the Big and Little Timber Creeks in Brooklawn and Gloucester City; and the Pennsauken waterfront from south of the Betsy Ross Bridge running north along the Delaware River and the Pennsauken Creek. Some emphasis is placed on high density residential development near the waterfront in the Beckett Street Terminal area.

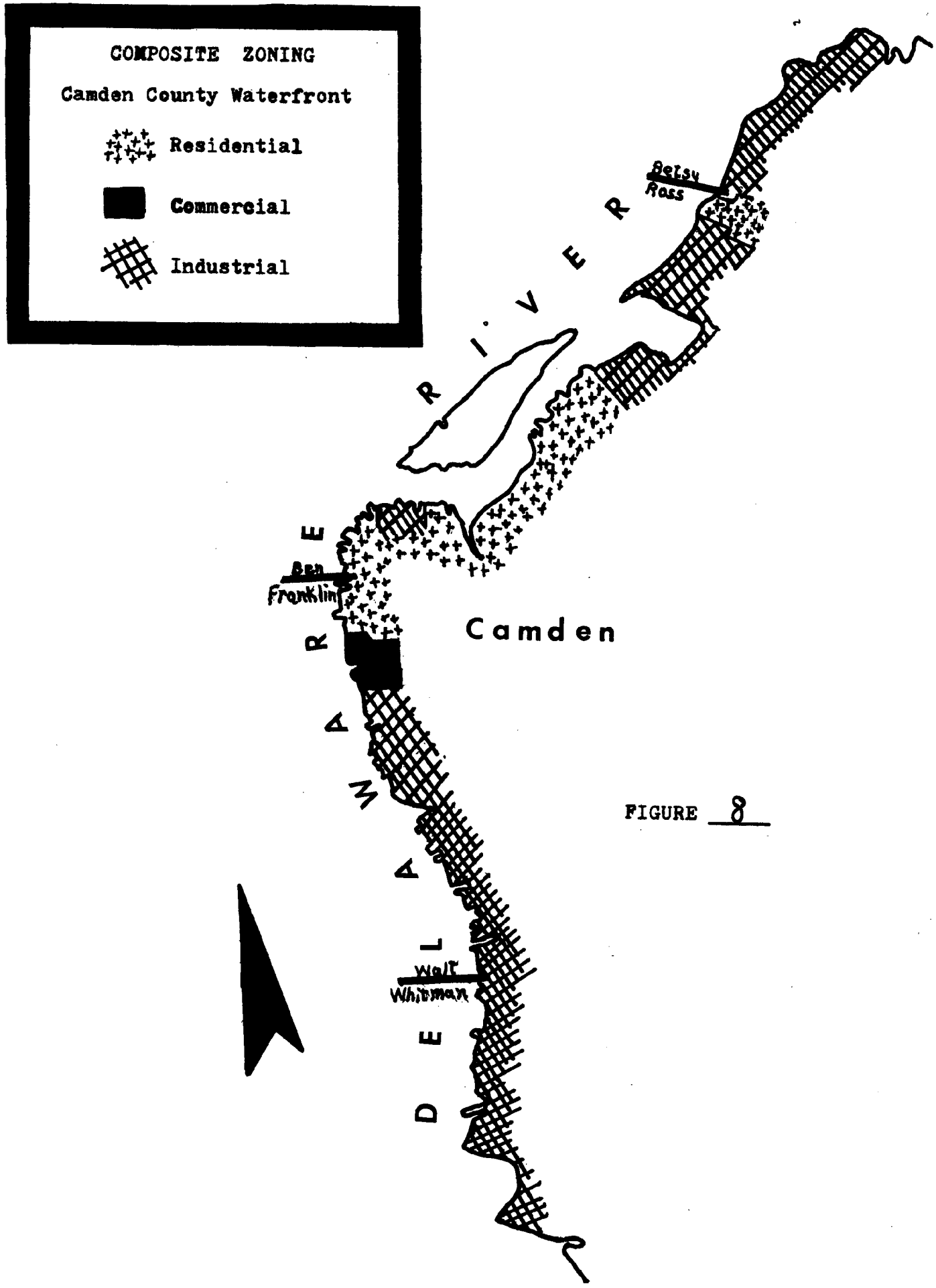
COMPOSITE ZONING
Camden County Waterfront
Residential
Commercial
Industrial
Betsy Ross
Ben Franklin
Walt Whitman
Camden
DELAWARE RIVER

FIGURE 8

The New Jersey Municipal Land Use Law of 1976 provides a detailed framework for the conduct of planning and zoning activities by the State's municipalities. Each municipality must complete at least the land use element of its master plan in 1978 in order to continue to legally exercise the zoning power. In accordance with the Land Use Law, Pennsauken Township is in the process of updating its land use plan. The Township Environmental Commission has expressed at least informally, its desire to have some of the Township waterfront protected for future use for park and open space purposes. The final outcome of this effort will obviously have some impact on the possible use of some areas for industrial or commercial activities.

The City of Camden has recently completed its Comprehensive Plan: 1977-1992. Most of the city's waterfront south of the Ben Franklin Bridge is recommended for continued manufacturing, wholesale and related uses. The notable exception is the City Centre Urban Renewal Area located just north of the Beckett Street Terminal and across the Delaware River from Philadelphia's Penn's Landing. The area is recommended for flexible development including medium and high density residential areas, offices and supporting commercial operations. A number of institutional and governmental centers will also be located in this area. Additionally, a narrow strip of land immediately adjacent to the river will be made into a waterfront park. Steady progress is being made in this development area. Some housing and governmental facilities have been completed and others are planned or under construction. The State and Federal governments have also made commitments for funding of development of the waterfront park.

The waterfront north of the Ben Franklin Bridge to Front Street is designated for continued industrial and related uses. The need to improve access to the area to increase its attractiveness for development is acknowledged. The waterfront between Front and Sixth Streets is viewed as a mixed use area of residences and manufacturing concerns. The remainder of the waterfront from Pyne Point Park up the mouth of the Cooper River is viewed as an extension of the present park and open space complex. Two-thirds of the Camden City waterfront north of the Cooper River has limited developmental potential because of uncompacted fill and flooding problems. The area was formerly used by the City as a landfill. The remainder of the City's waterfront is designated primarily as a residential-manufacturing mixed use area with some provision for a waterfront park area.

C. Description And Summary Evaluation Of The Developmental Potential Of Specific Waterfront Areas

The Waterfront Land Use Maps (Figures 6 and 7) depict 17 vacant areas (lettered A through Q) that were identified during the initial phases of this study as areas which might be able to accommodate the siting of OCS-related facilities. Additionally, several areas presently used for other purposes (numbered 1 through 4 on the Waterfront Land Use maps) were also considered to have such potential. In order to evaluate the actual development and use potential of these sites, however, it was necessary to gather and analyze the following information for each of these sites:[1]

(1) Location, size and ownership
(2) Present and/or adjacent land use
(3) Physical characteristics including shoreline configuration, soil suitability and vegetative cover
(4) Navigational access and wharfage
(5) Compatibility with zoning and land use plans
(6) Environmental resources, i.e. wetlands and beaches
(7) Rail and highway access
(8) Availability of fresh water supply, sewage disposal, solid waste disposal and electrical service.[2]

NOTE: In order to better evaluate and comprehend the relevance of the following information the reader should at this time review the siting requirements and considerations for selected OCS-related facilities contained in Appendix B.

---

1. This information was generated from various plans, maps, tax data, aerial photographs and other sources, not the least of which were the numerous site inspections that were made. Many areas were visited more than once. Some areas, however, were not inspected comprehensively or visited at all because of time constraints and their relative inaccessibility. Consequently, it should be remembered that the findings and recommendations resulting from this effort were intended to be general and preliminary in nature. Should any of these areas subsequently be actively considered as a site for OCS-related facilities a detailed development proposal and environmental assessment will be necessary.

2. All of the potential sites evaluated on the following pages have, or can reasonably acquire, access to these services. Therefore, it is assumed for purposes of evaluation, that each site has an equal access to such services.

SITE A: Description

This site of approximately 42 acres,[1] located at the mouth of Big Timber Creek in Brooklawn, is owned by the Borough. While the perimeter of the site is fastland, the major portion of the site is a tidal wetlands area. A significant amount of indiscriminate dumping has occurred at the site apparently over a sustained period of time. Some of the dumping has actually destroyed portions of the wetlands. This dumping is unfortunately facilitated by the absence of any means to limit or control access to the site. The shoreline of the site from the mouth of the Little Timber Creek to the mouth of the Big Timber Creek is characterized by a narrow beach and three to five foot high banks. Low tide exposes mud flats of 15 to 30 feet along most of the shoreline.

Water depth in the area at the mouths of the Big and Little Timber Creeks is generally very shallow. There is, however, a narrow 12 foot deep channel that comes out the mouth of the Big Timber Creek and travels along the Camden County shoreline to the Delaware River. This channel is used primarily by pleasure craft based along the Big Timber Creek. Existing street access would be through a residential area and connecting with Broadway and thereafter to Route 130. From that point access to I-76 and I-295 would be readily available. Rail access to the site could be provided by a construction of a spur from the existing line which parallels Broadway.

Immediately adjacent to the site is a ballfield/park owned by the Borough. The adjacent residential community consists predominately of well kept single family dwellings. On the east side the site is bordered by Broadway. The area is zoned industrial but the County Land Use Plan identifies the area's shoreline as an extension of a Big Timber Creek shoreline park.

SITE A: Summary Evaluation[2]

This site is unsuitable for the development of an onshore support base or other OCS-related facilities. Its use would require filling of significant quanity of wetlands which is unacceptable given the statutorily expressed

1. The size of this and other sites are intended to be reasonable approximations based on calculations made using tax roll data and aerial photographs.
2. The comparative suitability of this and other sites is depicted by the table which follows this section.

intent to protect and preserve wetlands. Additionally, what few wetlands areas do exist along the County's Delaware River waterfront must be jealously protected. Highway and rail access are only fair and navigational access is very poor. There is also potential for conflict with adjacent residential land uses.

SITE B: Description

This site of approximately 32 acres, located just north of the mouth of the Little Timber Creek in Gloucester City, is owned by New Jersey Zinc, Inc. The site is covered by a low shrub vegetation with some trees present. The shoreline exhibits a narrow beach with 15-30 foot mudflats exposed at low tide. A narrow 12-foot deep channel connecting the Delaware River with the Big Timber Creek passes close to the shoreline. Highway access would be to Broadway through an almost entirely commercial/industrial area. Rail access is provided by a rail spur adjoining the northeast boundary of the site.

The land is presently vacant except for a pipeline that carries petroleum products from a docking facility located at the northern most shoreline point of the property to the Atlantic Richfield storage facility immediately adjacent to the site. The site is bounded on the northwest by the New Jersey Zinc facility and on the east by the Gloucester City sewage plant. The area is zoned industrial; the County Comprehensive Plan visualizes the area as being used for industrial purposes generally, with the shoreline being dedicated for park and open space purposes.

SITE B: Summary Evaluation

This site is marginally suitable for an onshore support base. It may be more suitable, however, for the location of a variety of ancillary industries that service the main OCS operators. The area provides a sufficiently sized waterfront parcel and there would be no zoning or land use conflicts. There would also seem to be no major environmental constraints. To use the site as a support base, however, would require widening and deepening the present channel and extensive bulkheading and filling to create the marginal wharf necessary for such use. Minimal dredging and bulkheading, however, would appear to provide the waterfront access requirements of most of the ancillary industries. Therefore, the need for minimal site alteration, coupled with the good rail and highway access makes this a good prospective site for the co-location of a number of ancillary industries.

SITE C: Description

This privately owned site of roughly 15 acres is located along Ferry Street, adjacent to the City of Camden's main sewage plant. Large tidal mud flats exist along most of the shoreline of this basically flat, cleared piece of land. Surrounding land use is largely industrial as is the zoning. The City's Comprehensive Plan recommends that this general area continue to be used for manufacturing, wholesale and related uses. Highway access is adequate and rail access is excellent, a main spur being located on the site. Navigational access is poor but minimal access could be facilitated by either bulkheading a small area at the northernmost point of the site or by an arrangement for use of the adjacent facilities of Camden Lime.

SITE C: Summary Evaluation

This site is unsuitable for support base siting because of size limitations and the poor navigational access. A significant amount of dredging, bulkheading and filling would be required to make this site suitable. Such activities would raise serious environmental concerns. It does have good possibilities for the location of ancillary industries, however, because of their generally less stringent requirements for water access. (See Appendix C for relevant comments by the City of Camden).

SITE D: Description

This site of approximately 60 acres is located on the waterfront at the foot of Mickle Street in the City of Camden. It is owned by the City Housing Authority and is planned as part of the City Centre Urban Renewal Area. Planned uses include a residential-office - commercial mix along with a waterfront park. Rail and highway access is good. Navigational access is marginal but could be readily improved by minimal dredging and bulkheading.

SITE D: Summary Evaluation

This site is undesirable as a location for either a support base or ancillary industries. The physical attributes of the site, considered alone, would make this

a very suitable site. Given the ownership and intended use of the area, however, too many conflicts and objections to the use of this area would in all likelihood be raised. Additionally, it is of questionable legality as to whether or not this site could be converted to OCS-related purposes since its acquisition was with Federal housing and urban renewal monies.

SITE E: Description

This site of approximately 12 acres, owned by the City of Camden, is located just north of the Ben Franklin Bridge. The site is essentially clear and flat with a three and one-half million gallon water storage tank being the only current use of the property. A rail spur is located on the property; navigational access is marginal but could be readily improved. Highway access is also in need of improvement. Adjacent land use is mixed; the City's Comprehensive Plan indicates the area should be used for industrial purposes.

SITE E: Summary Evaluation

The size of the property, coupled with its marginal water and highway access, removes this site from serious consideration as a possible support base. The site is almost ideally suited, however, for the location of ancillary industries. Navigational access could be improved or arrangements could be made to use the docking facilities of the American Dredge Company, located just north of the site.

SITE F: Description

There are several private owners of this site which totals approximately 30 acres. The shoreline is unarticulated and characterized generally by large tidal mud flats. Surrounding land use is mixed and the City's Comprehensive Plan calls for continuation of these mixed uses. Both navigational and rail access are very poor with highway access marginal at best. A large amount of dredging and filling would be required, with its concommitant environmental considerations, to provide adequate water access. Plans have been submitted requesting permission to raise the level of this site by filling to facilitate development of an industrial park development.

SITE F: Summary Evaluation

This site is unsuitable for development as a support base primarily because of poor access. The area may be marginally suitable for ancillary industry development depending on whether or not arrangements could be made to use docking facilities at the adjacent Camden Ship Repair facility. Use of the site by ancillary industries would also depend on approval and timing of the proposed land fill.

SITE G: Description

This area of approximately 175 acres is owned by Cities Service Corporation whose petroleum products receipt and distribution terminal occupies the remaining third of Petty's Island. The area was formerly used extensively as a dredging spoil disposal area. It is still used, on a much reduced basis, by Cities Service as a disposal area for its own maintenance dredging purposes. Navigational access is fair to excellent with the southwestern portion of the island in need of additional dredging to increase access and facilitate use of the bulkheaded areas as marginal wharfage. Rail and highway access is by a narrow bridge located at 36th Street in Pennsauken. This bridge access would have to be upgraded if it were to sustain the increased levels of traffic that would result from the development of a support base.

SITE G: Summary Evaluation

This site is desirable as a location for a support base because of its location, size and generally good access. Moreover, because of its size it may also be able to accommodate ancillary industries and/or a pipecoating yard.

SITES H AND I: Description

These sites, totaling in excess of 100 acres, are located on the Back Channel from the mouth of the Cooper River north to 27th Street. Site H is owned by the City of Camden and was formerly used as a sanitary

landfill. The site is approximately 30 feet high at the water's edge sloping back to grade at Harrison Street. Wetlands and tidal mudflats characterize the shoreline from the State Street Bridge north to the Farragut Yacht Club, located on the western tip of Site I. Site I is owned predominantly by the City with some small parcels held in private ownership. The water along Site I is generally shallow, with the exception of 6 to 8 feet water depth near the yacht club facility. Rail access is non-existent and highway access to both sites is poor. The area is zoned residential but the City's Comprehensive Plan recognizes that this area has severe development limitations and flooding problems.

SITES H AND I: Summary Evaluation

These sites are unsuitable for the location of support base facilities. It is also very questionable as to whether or not ancillary industries could be attracted to this area. Navigational and rail access are poor with highway access minimal at best. Soil instability, coupled with the environmental concerns brought about by the prospect of dredging, filling and possible wetlands destruction, add to the undesirability of these sites. (See Appendix C for relevant comments by the City of Camden).

SITES J AND K: Description

These sites, each approximately 25 acres in size, are located on the Back Channel on either side of the Baldwin Run Sewage Treatment Plant, just south of 36th Street. Navigational access is poor because of the general shallow water conditions that exist in the Back Channel. Additionally, the shoreline of Site K is characterized by tidal mud flats. Highway access is just marginal but rail access is excellent for Site K because of the rail spur to Petty's Island adjoining the northeast side of the site. These areas are zoned residential but the City's Comprehensive Plan indicates that they should be viewed as an area of manufacturing - residential interface.

SITES J AND K: Summary Evaluation

The sites are unsuitable for the development of a support base because of their size and access limitations. Particularly navigational access. These sites, particularly K, might become very attractive for ancillary industrial development if a support base were to be established at Site G on Petty's Island.

SITE L: Description

This site of approximately 75 acres is owned primarily by two private parties. The site is basically flat and covered with brush except in the northeastern part of the site which borders Fisherman's Cove and is characterized by marsh vegetation. The shoreline consists of a very narrow beach backed by a narrow strip of trees. Extensive tidal flats exist along the entire shoreline. Most of the shoreline of the Cove is characterized by wetlands that, among other things, provide a feeding stop for migratory Canadian Geese. It was this concern for protection of the Cove, along with others, that has been primarily responsible for the defeat of several proposals to use much of this site for a sanitary landfill and subsequent industrial park. The area is zoned industrial and the County Comprehensive Plan envisions the area being dedicated to industrial use.

SITE L: Summary Evaluation

Site L, as with Site K, might be attractive for the location of ancillary industries if Site G were to have located on it a support base. Site L is not suitable, however, for a support base primarily because of the significant amount of dredging that would be necessary to provide navigational access. Although this site is not as large as a "standard" pipe coating yard (see Appendix B) it might be able to accommodate such a facility on conjunction with the operation of a support base at Petty's Island. Public opposition may surface to use of this site for either a pipe coating yard or ancillary industries, however, in the same manner as it has for other proposed uses in the past.

SITE M: Description

This site of 100 acres is located in Pennsauken Township just north of Fisherman's Cove. The land is generally flat with brush and some tree coverage. Highway access to River Road is fair and a rail spur adjoins the property. Navigational access is limited by shallow waters but the distance to deeper waters is small, particularly near the northern portion of the property where it borders the South Jersey Terminal Corporation facility. The land is zoned industrial and the County Comprehensive Plan calls for its dedication to industrial purposes. The land is held by several owners, including Paragon Oil, the operators of the oil storage and distribution facility located on Fisherman's Cove.

SITE M: Summary Evaluation

This site is suitable for the development of an onshore support base complex. It appears that navigational access can be facilitated with bulkheading and relatively small amounts of dredging. The dredge spoil could even be disposed of on site. The area is large enough to also accommodate, concurrently, the establishment of ancillary industries. Alternatively, the site is a prime candidate for the development of a pipe coating yard in the event it is not used as a support base.

SITE N: Description

This site of approximately 20 acres is located in Pennsauken Township between the Delaware River Railroad and Betsy Ross Bridge. The shoreline is characterized by a narrow beach and tidal mud flats. The area is heavily wooded and a significant wetlands area is located at what was the mouth of the relocated Pochak Run. Highway access is fair and navigational access could be made satisfactory by minimum dredging. Rail access is not as available as would appear from the Waterfront Land Use Map because the rail line is significantly above the grade of the surrounding property. The area is zoned residential and the County Comprehensive Plan calls for such use.

SITE N: Summary Evaluation

This site is unsuitable for use for support base development because of its size, poor access and the environmental concerns brought about by the presence of wetlands and waterfront forested areas. This area is also unsuitable for other related uses for primarily the same reasons.

SITE O: Description

This site of approximately 140 acres is located in Pennsauken Township from the Betsy Ross Bridge north to the mouth of the Pennsauken Creek. Water supply wells of the City of Camden are located at various points on the property. A small parcel of the property has also been

set aside for use as a police firing range. The ownership of this area is in dispute. The City claims ownership but the State challenges that ownership under the Riparian Statutes. Much of the site is a former tidal inlet area that has been filled over the years with spoil from dredge operations. The site is still used periodically for such purposes. The site is primarily flat with areas of rolling hills and ridges. Scrub brush is characteristic of much of the site but there are also stands of trees. The shoreline is characterized by a narrow clean sand/pebble beach. The near shore water depth is relatively shallow and mud flats are exposed at low tide. Highway access is fair and excellent rail access could be provided by a rail line which adjoins the property. The area is zoned industrial but the County Comprehensive Plan views the area's use as residential with a waterfront park.

SITE O: Summary Evaluation

This site is only marginally suitable for the location of a support base. The primary deterrent is the need for dredging and bulkheading to facilitate navigational access to the site. The question of ownership possibly presents an even more difficult problem. Potential use of the site would have to await resolution of the ownership issues. This site might also serve as an area for the establishment of a pipe coating yard. Such use would also depend, however, on the development of increased navigational access. Some conflict over use of this area could result because the Pennsauken Environmental Commission has expressed an interest, at least informally, in having at least portions of this property preserved for recreation and open space purposes. The possible conflicts over ownership and use of this site would in all likelihood discourage private development of the area at this time.

SITES P AND Q: Description

These sites of less than 20 acres are located along the shoreline of Pennsauken Creek. Rail and highway access to Site P is poor. The adjacent rail line could provide access to Site Q. Navigational access to both sites is poor. Shoreline areas are characterized by the presence of wetlands. The County Comprehensive Plan indicates that the area should be preserved for park and recreation use. The areas are zoned industrial and most of the surrounding uses are either industrial or large commercial operations.

TABLE VI. COMPARATIVE SUITABILITY OF WATERFRONT SITES FOR THE DEVELOPMENT OF OCS RELATED FACILITIES - ONSHORE SUPPORT BASE[1]

Evaluation Parameter	S			I			T				E			S			
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Location, size and ownership	-	0	-	-	-	0	+	0	0	-	-	0	+	-	+	-	-
Physical characteristics	-	0	0	+	0	-	+	-	-	-	-	0	+	-	0	0	0
Compatability with zoning and land use	0	+	+	-	+	+	0	0	0	0	0	+	+	0	0	0	0
Access: highway, rail and navigation	-	0	-	+	0	-	+	-	-	-	-	-	0	0	0	-	-
Environmental considerations	-	0	-	0	0	-	0	-	-	-	-	-	0	-	0	-	-
SUMMARY VALUE[2]	-4	+1	-2	0	0	-2	+3	-3	-3	-4	-4	-1	+3	-3	+1	-3	-3

1. +, - and 0 are equal to +1, -1 and 0 respectively.
2. Areas with values less than 0 are deemed unsuitable for onshore support base siting; sites with values of 0 to 2 are marginally acceptable and sites with values of 3 or more are desirable.

SITES P AND Q: Summary Evaluation

These areas are unsuitable for use as support bases or other related uses primarily because of access limitations. Environmental concerns are also important considerations in making this determination of unsuitability.

VI. POTENTIAL PIPELINE CORRIDORS

A. Identification of Study Corridors

As indicated in the introduction, one of the major thrusts of this study effort is to identify the types of OCS-related facilities which may be sited in the County and, where possible, identify alternative sites for such facilities. Assumptions two (2) and three (3) at the beginning of this report state that oil and gas from the Mid-Atlantic OCS will be pipelined to shore. Moreover, crude oil will be pipelined to existing refineries in the Camden-Philadelphia and North Jersey areas. Natural gas, it is assumed, will be pipelined to the nearest segment of the interstate gas system. In order to understand the interrelationships between these factors, and the possibility of oil and gas pipelines being located in Camden County, it is necessary to visualize the larger locational framework.

Figure 9 is an area locational map demonstrating the spatial relationships between Camden County, as well as other reference points, and the areas on the OCS where leases have been sold to explore for oil and gas resources. On a gross scale, it can be seen from this map that pipelines transporting crude oil to refineries in the Camden-Philadelphia area might conceivably pass through Camden County. With that possibility in mind, existing rights-of-way[1] from coastal points to the two refinery areas were identified (See Figure 10). As can be seen on the Existing Right-of-Way Corridors map there are a number of potential corridors that would pass through the County depending on where a pipeline landfall might take place (Atlantic City, Cape May, etc.).

The Potential Pipeline Corridors map (Figure 11) provides a more detailed view of these study corridors

1. This portion of the study operated under the premise that co-location of pipelines in existing utility corridors would tend to minimize their cumulative impacts.

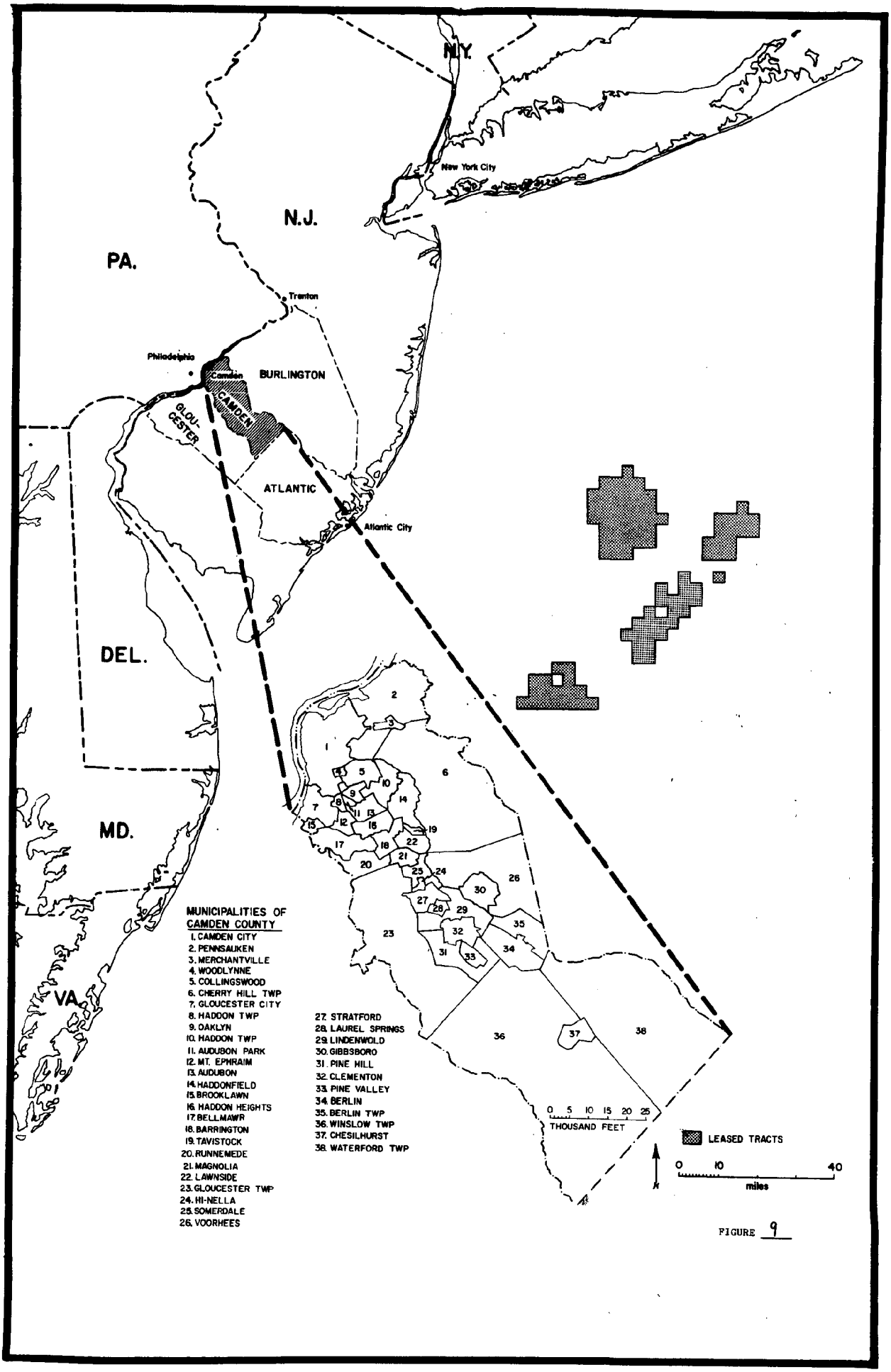
N.Y.
New York City
N.J.
PA.
Trenton
Philadelphia
Camden
BURLINGTON
CAMDEN
GLOU-CESTER
ATLANTIC
Atlantic City
DEL.
MD.
VA.
MUNICIPALITIES OF CAMDEN COUNTY
1. CAMDEN CITY
2. PENNSAUKEN
3. MERCHANTVILLE
4. WOODLYNNE
5. COLLINGSWOOD
6. CHERRY HILL TWP
7. GLOUCESTER CITY
8. HADDON TWP
9. OAKLYN
10. HADDON TWP
11. AUDUBON PARK
12. MT. EPHRAIM
13. AUDUBON
14. HADDONFIELD
15. BROOKLAWN
16. HADDON HEIGHTS
17. BELLMAWR
18. BARRINGTON
19. TAVISTOCK
20. RUNNEMEDE
21. MAGNOLIA
22. LAWNSIDE
23. GLOUCESTER TWP
24. HI-NELLA
25. SOMERDALE
26. VOORHEES
27. STRATFORD
28. LAUREL SPRINGS
29. LINDENWOLD
30. GIBBSBORO
31. PINE HILL
32. CLEMENTON
33. PINE VALLEY
34. BERLIN
35. BERLIN TWP
36. WINSLOW TWP
37. CHESILHURST
38. WATERFORD TWP
0 5 10 15 20 25
THOUSAND FEET
LEASED TRACTS
0 10 40
miles
N

FIGURE 9

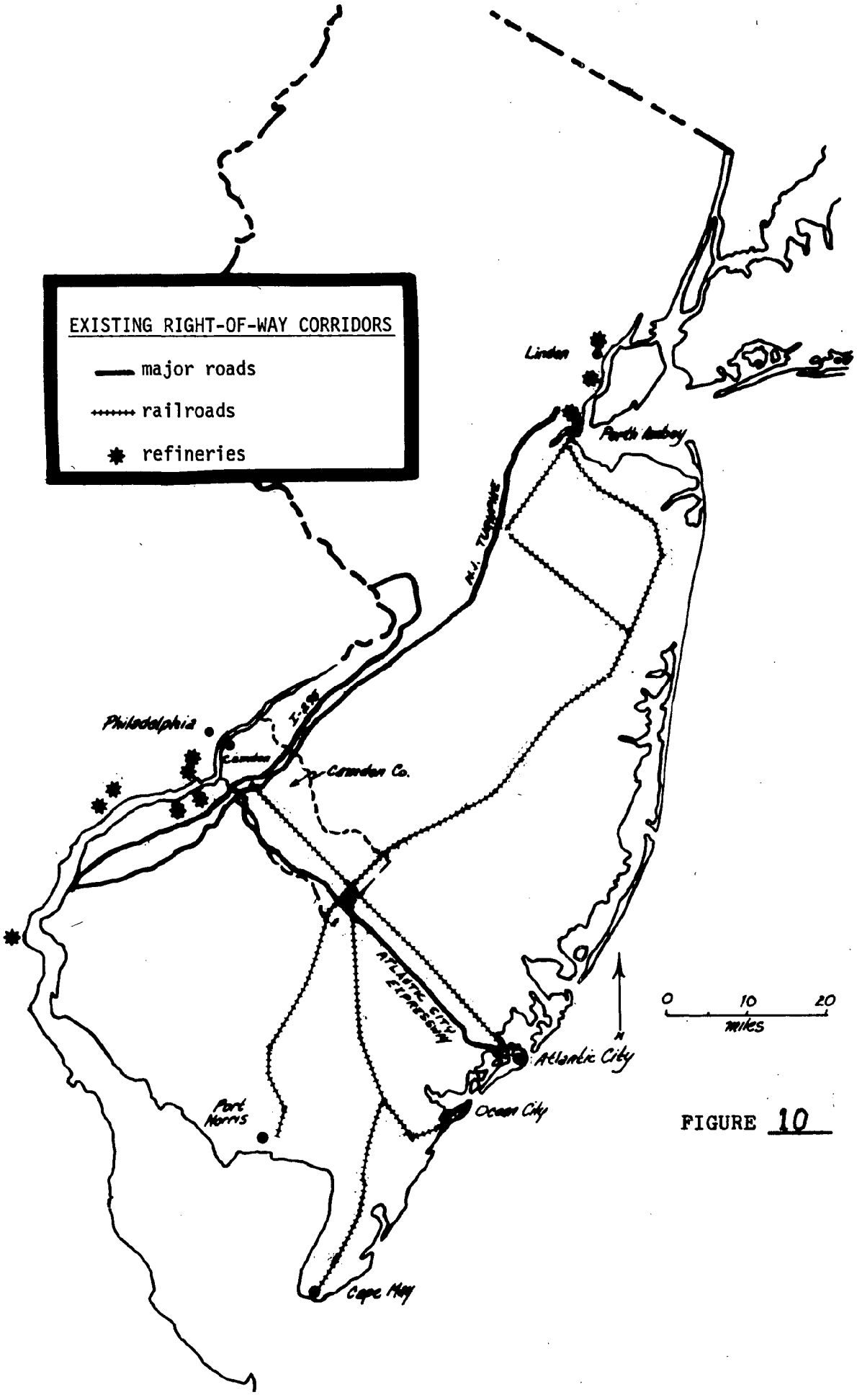
EXISTING RIGHT-OF-WAY CORRIDORS
major roads
railroads
refineries
Linden
Perth Amboy
N.J. Turnpike
I-295
Philadelphia
Camden
Camden Co.
Atlantic City Expressway
Atlantic City
Ocean City
Port Norris
Cape May
0
10
20
miles
N

FIGURE 10

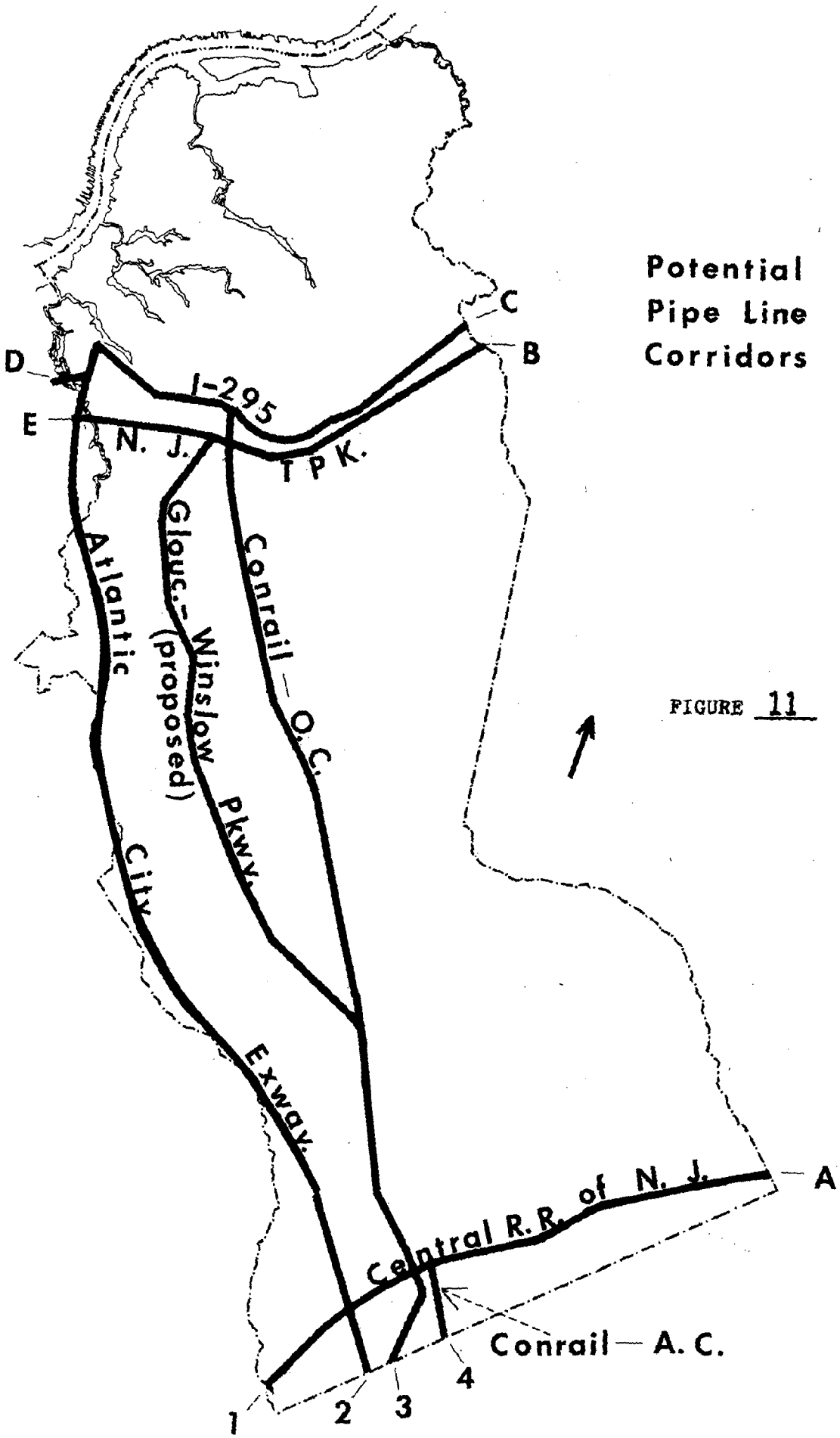
Potential
Pipe Line
Corridors
C
B
D
I-295
E
N. J. TPK.
Atlantic City Exway.
Gloucs.-Winslow Pkwy. (proposed)
Conrail — O.C.
A
Central R.R. of N. J.
Conrail — A. C.
1
2
3
4

FIGURE 11

within Camden County. The following seven segments of potential pipeline corridors are displayed on the map:[1]

(1) The Central Railroad of New Jersey, which, originating in Cumberland County, enters Camden County at point one and leaves the County at point A heading for North Jersey,
(2) The Conrail-Atlantic City Railroad line which enters the County at point four and then connects with the Central Railroad of New Jersey,
(3) The Conrail-Ocean City Railroad line from where it enters the County at point three to where it intersects I-295,
(4) The Atlantic City Expressway from where it enters the southern portion of the County at point two, to its intersection with I-295,[2]
(5) The entire stretch of I-295 in the County from point C to point D,
(6) The entire stretch of the New Jersey Turnpike in the County from point B to point E, and
(7) The hypothetical right-of-way of the proposed Gloucester Winslow Parkway as depicted in the County Highway Master Plan.[3]

These seven areas represent three somewhat distinct types of corridors for the possible location of pipelines, major highways, railroads and, in the case of the proposed parkway, essentially vacant land.

B. Evaluation Parameters and Methodology

These seven corridors were visited, wherever possible, to make an initial visual determination of their physical suitability as a pipeline corridor, and to become

1. Points 1, 2, 3 and 4 on the Potential Pipeline Corridors graphic (Figure 11) represent locations where crude oil and/or natural gas pipelines might enter Camden County, depending on where the pipelines were brought onshore. Points A, B, C, D and E represent locations where these pipelines might exit the County depending on their destination(s).
2. The corridor mileage studied excluded approximately three miles of the Expressway actually located in Gloucester County.
3. The proposed parkway was studied only as a possible pipeline corridor. This study does not pass judgment, however, on the merits of the highway proposal itself.

basically familiar with the resources in the immediate area of the corridors. Then, given the general siting requirements and effects of pipelines (see Appendix B), the more important evaluation parameters were identified. Information on each evaluation parameter was collected and graphically displayed for all seven of the study corridors enumerated above. A weighted rating system was then developed and applied to the seven study corridors. The results of that application are displayed in Table VII.[1]

There are essentially nine evaluation parameters that were applied to each of the study corridors:

(1) Floodway and Frequent Flooding,
(2) Stream Crossings,
(3) Aquifer Recharge Areas,
(4) Drainage Basins,
(5) Soils Corrosive to Steel,
(6) Soils with Seasonably High Water Table≤ Four (4) Feet,
(7) Forested Areas, and
(8) Selected Environmental Resources.

The discussion which follows explains the rationale for the evaluation parameters and the rating factors applied.

Floodway and Frequent Flooding:[2]

In recent years the significance of floodplains has been recognized and, consequently, development in

1. It is recognized that the values assigned to various resources and developmental factors in the rating system are rather arbitrary. They are based on the subjective determination of the relative importance of certain types of resources in Camden County. Its applicability elsewhere is neither intended nor necessarily desirable. It is a sincere attempt, however, to put into an objective format what otherwise might be a totally subjective evaluation. The rating system and its results should be viewed in that light. The rating was designed to evaluate primarily oil pipelines because, generally, they pose a greater threat to the environment than gas pipelines.
2. See Water Resources I map, Figure 2.

them has been discouraged. Pipelines onshore are buried and covered with at least three feet of soil. Nevertheless, pipelines located in a floodplain could be exposed by floodwaters and possibly damaged resulting in spillage of oil directly into the surface water system. This possible result could be lessened by burying pipelines deeper in floodplains. Realistically, however, it is unlikely that there are many floodplain areas in the study corridors where "raging floodwaters" would likely cause such a pipeline rupture. Nevertheless, this is a valid concern in weighing the relative desirability of the alternative corridors. Therefore, one point was counted against a corridor for each mile of it located in the floodway or area subject to frequent flooding.

Stream Crossings:[1]

Stream crossings are vulnerable points where pipeline failure, either through rupture or leakage, would result in the introduction of oil directly into the surface water system of the County. The probabilities of such an occurrance can be lessened by x-ray inspection of all of the seam welds in stream crossings and by burying pipelines deeper and coating them with concrete to protect them from the possible undermining of their structural ability by the errosive effects of water. Because of the magnitude of potential impacts, each time a stream is initially crossed counts three points against that corridor. Each additional crossing of the same stream results in the addition of one point.

Aquifer Recharge Areas:[2]

Oil pipelines that cross aquifer recharge areas pose a threat to groundwater supplies. Leakage from, or rupture of, a pipeline would result in the introduction of oil into the groundwater supply. This is of very serious concern because virtually all of the water supply for human consumption and other purposes in Camden County comes from groundwater supplies. The threat to the Cohansey Formation is more serious because, being a water table aquifer, it would be subject to immediate contamination from an oil spill. Consequently, a corridor received two points for each mile in the Cohansey aquifer and one point for each mile in the other aquifer recharge areas.

1. See Water Resources I map, Figure 2.
2. See Water Resources II map, Figure 3.

Drainage Basins:[1]

Surface water quality is of constant concern. Water quality in the basins which drain into the Delaware is generally poor. Water quality in the Mullica and Great Egg Harbor Basins tends to be good to marginal with better water quality being exhibited in the Mullica because of its relatively less developed character. Both basins have been identified as critical areas from a water quality perspective. Introduction of oil into either of these two basins would have serious detrimental effects. Because of its relatively better water quality, the Mullica Basin would be impacted more significantly. Consequently, two points were alloted for each mile a corridor was in the Mullica Basin and one point for each mile in the Great Egg Harbor Basin.

Soils Corrosive to Steel:[2]

Certain soils have chemical properties that act to rapidly corrode steel. Since steel pipe is used for both oil and gas pipelines, the location of these soils is a factor to be taken into consideration in the evaluation of the potential pipeline corridors. External corrosion has been the largest single contributing factor to oil pipeline failure. Most instances of failure, however, occur in pipelines installed prior to 1960. The industry has since developed and used pipecoating techniques that significantly lessen the consideration of this factor in pipeline location. Consequently, only one point is allocated against a corridor for each mile located in soils having this factor of corrosivity.

Soils With Seasonally High Water Table $\leq$ 4 Feet:[3]

Soils with high water tables would be subject to direct introduction of oil into the water table and, thereafter, into the surface water system or aquifer recharge hydrological system, from leakage or spills. As has been previously noted (see also Appendix B), the oil pipeline industry has developed and implemented construction, operation and maintenance procedures to

1. See Water Resources Map II, Figure 3.
2. See Soils I map, Figure 12.
3. See Soils II map, Figure 13.

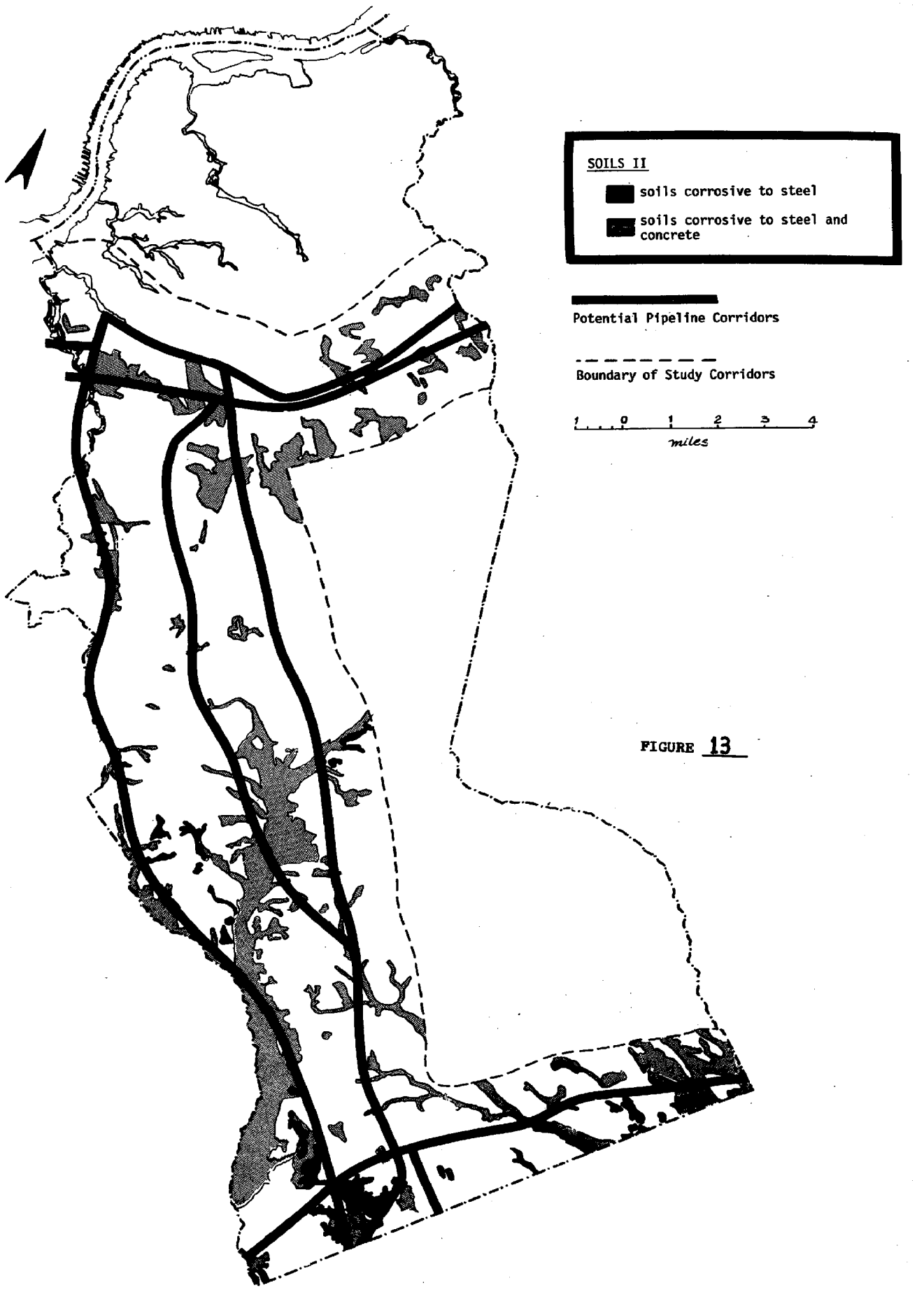
SOILS II
soils corrosive to steel
soils corrosive to steel and concrete
Potential Pipeline Corridors
Boundary of Study Corridors
1 0 1 2 3 4
miles

FIGURE 13

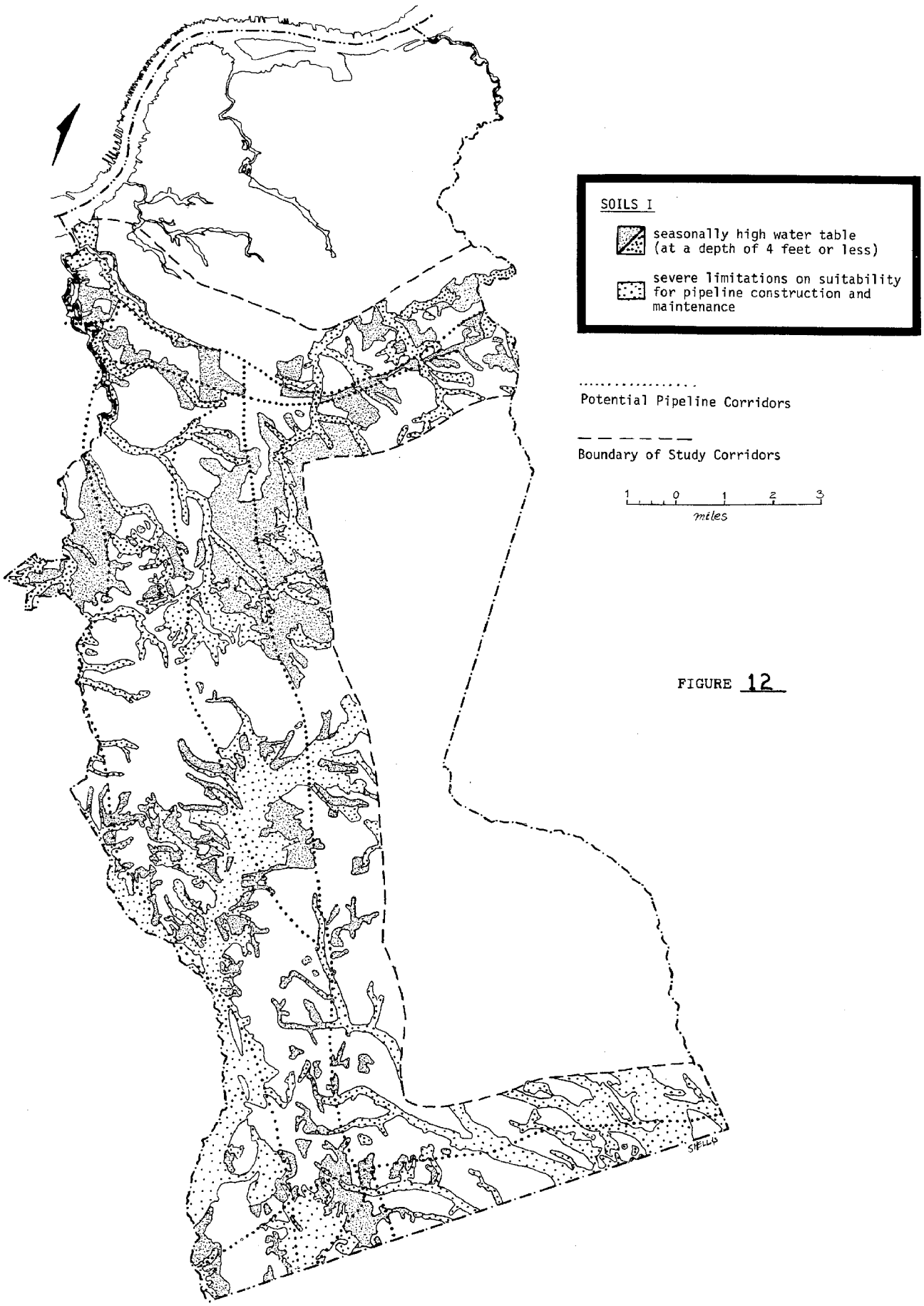
SOILS I
seasonally high water table (at a depth of 4 feet or less)
severe limitations on suitability for pipeline construction and maintenance
Potential Pipeline Corridors
Boundary of Study Corridors
1 0 1 2 3
miles
STELLA

FIGURE 12

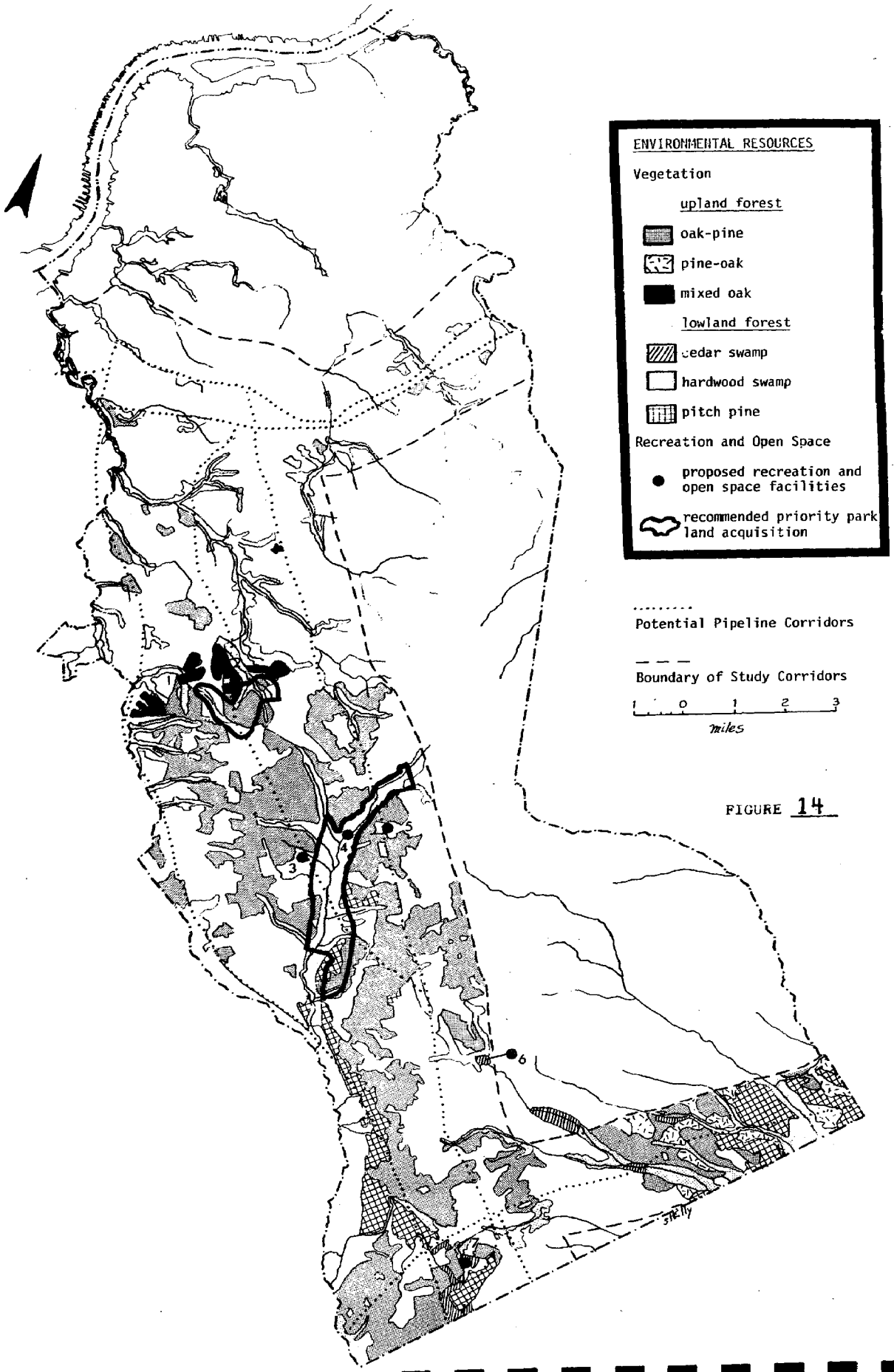
ENVIRONMENTAL RESOURCES
Vegetation
upland forest
oak-pine
pine-oak
mixed oak
lowland forest
cedar swamp
hardwood swamp
pitch pine
Recreation and Open Space
proposed recreation and open space facilities
recommended priority park land acquisition
Potential Pipeline Corridors
Boundary of Study Corridors
1 0 1 2 3
miles
3
4
5
6

FIGURE 14

minimize the possibility of oil being released into the environment. The possibility of such an incident remains and, consequently, one point is allocated against a corridor for every mile located in such a high water table area.

Soils With Severe Limitations on Pipeline Construction:[1]

The soils represented on the Soils II map as having severe limitations on pipeline construction are basically unstable soil. Many of these soil areas, so classified by the U. S. Soil Conservation Service, are located, not surprisingly, in areas of high water table. Pipelines have been built in virtually all types of soil environments. The concern is not whether a pipeline can be constructed in a given soil environment, but rather what are the design specifications necessary to assure that a pipeline can be safely constructed and operated. Nevertheless, adverse soil conditions should be avoided where possible and, consequently, one point is allocated against a corridor for each mile exhibiting these severe soil conditions.

Forested Areas:[2]

Large amounts of forested areas in Camden County have been lost over the last century because land was cleared for farming and because of the large suburban residential development in the County. Many of the forested areas which remain were spared only because they were unsuitable for such development. Pipeline rights-of-way, because they require the clearing of the land, pose an additional threat to these already dwindling resources. Three points have been allocated against a corridor for each mile of forested area traversed.[3]

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1. See Soils II map, Figure 13.
2. See Environmental Resources map, Figure 14.
3. It was assumed, for purposes of calculating this rating factor, that the pipeline corridor would be constructed immediately adjacent to the existing corridor thereby necessitating clearing of the land for pipeline construction.

Selected Environmental Resources:

There are certain types of resources that were deemed worthy of recognition and whose impingement should be taken into consideration in evaluating alternative corridors. Cedar swamps and mixed oak forests are very limited resources in Camden County. Pipeline corridors should be planned so as to avoid intrusions of these resources. Park and recreation areas, both existing and proposed, are resources the intrusion upon which could have serious negative effects. Pipelines should avoid these areas where possible. It was difficult to determine a readily measurable rating factor which would adequately reflect the concern for these resources. Consequently, it was decided to allocate against a study corridor five points for each instance where the corridor intruded upon the selected resource.

C. Summary Evaluation of Pipeline Study Corridors

Once the various rating factors were calculated for each study corridor the total points accumulated by each was tabulated. The data on how each corridor fared, by rating factor and totally, is included on the table on the following page. The rating system was designed so that the higher the point total scored the less desirable the corridor as a location for an oil pipeline. The number of average points per mile of corridor was used as a basis of comparing the desirability of the alternative corridors. The following recommendations were evolved using the above methodology coupled with a measure of professional (but admittedly subjective) planning judgment.

(1) The Central Railroad of New Jersey right-of-way through the southern portion of the County is unacceptable for use as a pipeline corridor because of the many significant resources present, particularly in the Mullica Basin area. It is undesirable and illogical to allow intrusions upon those resources at a time when so much effort is being expended at various levels of government to protect the Pine Barrens resources.

(2) The Conrail-Ocean City Line is the most acceptable north-south corridor in the county of the three studied.

(3) The New Jersey Turnpike and I-295 study corridors are both highly acceptable for pipeline placement through the northern part of the County. This is not particularly surprising, however, in light of the several existing pipelines in these general corridors.

(4) The Conrail-Atlantic City Line, the Atlantic City Expressway and the proposed Gloucester-Winslow Parkway are only marginally acceptable as pipeline corridors.

It should be realized that the relative suitability of each potential corridor could be altered somewhat by minor changes in its routing. Moreover, one of the important conclusions resulting from this study effort is the recognition that, in the final analysis, the design considerations built into a pipeline corridor are equally if not more important than corridor site selection. Therefore, the following recommendations address themselves to the general pipeline corridor design considerations that should be reflected in any pipeline corridor proposal in Camden County:

(1) Devegetation of forests should be absolutely minimized.
(2) Cedar swamps and mixed oak forests should not be traversed or impacted in any manner.
(3) Stream crossings should be minimized and, where they do occur, additional precautions, such as deeper burying, should be required.
(4) All seam welds of pipelines in the Cohansey aquifer or at stream crossings should be x-rayed to assure pipeline integrity.
(5) Shallow wells should be located at periodic spots along a pipeline corridor (especially downstream of stream crossings) to facilitate monitoring of groundwater quality.
(6) The highest and best technologies and management techniques should be required during all phases of construction, operation and management of a pipeline.

D. Gas Processing and Treatment Plants - Some Concerns And Recommendations

As Appendix B indicates, the range of siting requirements and possible impacts of gas plants varies greatly depending on the given design of a plant. It was, therefore, impractical to try to evaluate specific sites along the pipeline study corridors for gas plant location. Nevertheless, there are certain concerns that should be voiced here. Gas plants are potential sources

TABLE VII-1 COMPARATIVE EVALUATION OF PIPELINE STUDY CORRIDORS

Evaluation Parameter	Unit - - - Points	Central R.R. of New Jersey A	Conrail-Atlantic City Line B	Conrail-Ocean City Line C	Atlantic City Expressway D	I-295 E	New Jersey Turnpike F	Proposed Gloucester Winslow Parkway G
Floodway and Frequent Flooding (1 point/mile)	Miles	2.2	.2	2.2	4.7	2.5	.9	1.5
	- - - Points	2.2	.2	2.2	4.7	2.5	.9	1.5
Stream Crossings (3 points for each stream brook, river or tributary crossed - 1 point for each additional time the same stream is crossed)	Number*	7-0	1-0	5-3	6-5	4-3	4-2	9-1
	- - - Points	21.0	3.0	18.0	23.0	15.0	14.0	28.0
Aquifer Recharge Areas (2 points for each mile in the Cohansey Formation-all other formations 1 point)	Miles**	12.5-0	1.6-0	14.1-5.8	14.1-6.0	0-5.1	0-7.1	8.3-5.3
	- - - Points	25.0	3.2	34.0	34.2	5.1	7.1	21.9
Drainage Basins (2 points for each mile in the Mullica River Basin-1 point for each mile in the Great Egg Harbor River Basin)	Miles***	8.7-3.8	1.6-0	6.7-3.1	0-11.8	0-0	0-0	1.3-5.4
	- - - Points	21.2	3.2	16.5	11.8	0	0	8.0
Soils Corrosive to Steel (1 point for each mile)	Miles	2.5	0	5.3	11.4	.5	3.6	3.1
	- - - Points	2.5	0	5.3	11.4	.5	3.6	3.1
Soils with Seasonally High Water Table - 4 Feet (1 point per mile)	Miles	6.0	.7	10.2	15.2	6.2	6.2	6.2
	- - - Points	6.0	.7	10.2	15.2	6.2	6.2	6.2
Soils with severe limitations on pipeline construction (1 point per mile)	Miles	3.6	.5	3.6	7.8	2.2	1.8	4.0
	- - - Points	3.6	0	3.6	7.8	2.2	1.8	4.0
Forested Areas (3 points per mile)	Miles	7.3	.4	6.7	11.8	0	1.1	8.2
	- - - Points	21.9	1.2	20.1	35.4	0	3.3	24.6

TABLE VII-2

Evaluation Parameter	Units - - - Points	Central R.R. of New Jersey A	Conrail-Atlantic City Line B	Conrail-Ocean City Line C	Atlantic City Expressway D	I-295 E	New Jersey Turnpike F	Proposed Gloucester Winslow Parkway G
Selected Environmental Resources								
-Intrusions of Cedar Swamps or Mixed Oak Forests - 5 points each occurance	Occurrance - - - Points	2 10	0 0	1 5	1 5	0 0	0 0	1 5
-Intrusions of existing park/recreation resources-5 points each occurance		1 5	0 0	0 0	1 5	0 0	0 0	0 0
-Intrusion of proposed park/recreation resources - 5 points each occurance		0 0	0 0	0 0	0 0	0 0	0 0	2 10
Total Accumulated Points		118.4	11.5	114.9	153.5	31.5	36.9	112.3
Total Corridor Mileage		12.5	1.6	22.1	20.7	10.9	9.4	14.7
Average Points Per Corridor Mile		9.5	7.2	5.2	7.4	2.9	3.9	7.6

-All Computations Rounded to Nearest Tenth.
-Mileage Data are intended to be reasonable approximations.
*Number following dash indicates additional times same stream crossed.
**Number preceding dash indicates Cohansey Sand data and number; following dash is data for all other aquifer recharge formations.
***Number preceding the dash indicates data for the Mullica River Basin; number following the dash indicates data for the Great Egg Harbor River Basin.

of both air and water pollution. The technology purportedly exists to significantly reduce the levels of such pollutants. There are areas, however, where any level of pollution might be unacceptable. As discussed earlier, the air quality in the northern part of the County is at such a level that any additional sizeable emissions point source would be unacceptable. The proposed water quality standards for the Pine Barrens would appear to prohibit the location of a gas plant in a large portion of the Mullica River Basin.

Essentially, there is not sufficient data to evaluate alternative sites for gas plants. Moreover, even when the data does become available (in the form of a proposal for development) the County cannot reasonably be expected to have the in-house expertise to evaluate it. The state should accept the responsibility for such evaluations. To do so it must retain qualified staff itself to work with representatives of industry and local government in developing such proposals.

VII. ENERGY FACILITY SITING POLICY ALTERNATIVES

For the most part policies which affect the siting of energy facilities are promulgated by Federal and State agencies. Local entities most often deal with a proposed energy facility in the same manner as they would a proposal for any other industrial facility. Moreover, gas facilities that are part of the interstate gas system are approved and regulated exclusively by the Federal government. Consequently, the recommendations in this section will provide an opportunity for input into the formation of policy alternatives, particularly as they relate to OCS policies at the State level.

A. Location Considerations

In formulating policies which affect the spectrum of possible locations for the siting of OCS-related facilities a number of factors should be taken into consideration. Whenever possible policies should prohibit the location of facilities in areas which would result in the destruction or serious degradation of significant environmental resources such as cedar swamps and wetlands. The relative significance of environmental resources may vary from county to county. Therefore, it becomes necessary to provide for a procedure where each county could designate locations where energy facility development could be prohibited.

In formulating location policies due consideration should be given to the positive economic benefits which could accrue to a community from OCS facilities. Certain areas of the State are in greater need of induced economic activity than others. The State should formulate policies which would provide inducements to oil companies to locate in economically depressed areas.

B. Facility Design Requirements

The most important considerations in facility design are safety and environmental protection. Specifically, gas pipelines and other gas facilities should be constructed with the highest degree of quality control, particularly in populated areas. Pipelines and valve stations should be well marked to limit the possibility of accidental rupture of the pipeline. Above ground facilities, i.e., valve stations, should be safely secured to limit the possibilities of mischievous or otherwise intentional disruption of the integrity of the pipeline system.

Policies should be promulgated which would require the use of the best available technology in the construction and operation of energy facilities so as to limit environmental degradation. Specifically, all weld seams on oil pipelines should be x-rayed in areas such as the Cohansey Sand Formation, where pipeline failure would result in the introduction of oil directly into a water supply aquifer.

VIII. COUNTY ROLE IN ENERGY FACILITY SITING MATTERS

A. County - State Relationships

The County and State must interrelate on two distinct levels, planning and decision-making. The State has fostered OCS and energy facility siting planning during the past year by providing financial and technical assistance. Essentially, the State acted as an advocate for the County in securing this financial assistance from the Federal government. If this coastal planning is to be continued on an effective level, funding from outside the County must be secured. Consequently, the State should continue in its advocacy role on the County's behalf.

The technical assistance provided by the State Department of Environmental Protection, Office of Coastal Zone Management, has been an essential tool in the conduct of this planning project. State personnel secured documents

from a variety of sources and transmitted them to the counties. Of particular assistance were the many meetings and discussions between oil and gas industry personnel and county representatives. The coordination of both documentary and personal technical assistance by the State raised the counties' level of planning expertise regarding OCS matters significantly. This coordinative function should continue if the counties are to remain actively involved in coastal planning activities.

Currently, the counties become involved in the State decision-making processes regarding coastal matters on an advisory, "review and comment," basis. This appears to be sufficient for matters or issues of general concern. Where the matters being decided by the State apply specifically to one or more counties, a more formalized participation in the decision-making process should be formulated. For example, oil companies will have to submit their development plans to the State for approval. The counties which are specifically affected by individual development plans should have a formalized role in their review and State decisions regarding them.

B. County - County Relationships

The level of interaction among the counties involved in this study has been one of the more satisfying by-products of the effort. The manner in which the State organized the effort facilitated cooperative actions by the counties. Some of the counties, recognizing mutual interests, have cooperated on a level that surpassed what the State could have reasonably anticipated at the onset of the study. Data sharing among the counties was also a tangible benefit of the cooperative approach. It would be a continuing benefit to the respective counties in their planning activities if this coordination effort would continue even if not encouraged financially by the State and Federal government. This cooperative planning effort might more realistically be expected to continue, however, on a regional basis. Consequently, the Counties of Burlington, Camden, Glouçester, Salem and Cumberland should organize a Delaware River and Bay Coastal Planning Group. Such a group could function similarly to the organization formed by the New Jersey Atlantic Coastal counties.

It is unrealistic to expect that any individual county would be willing to share its decision-making powers with an adjacent county. Particularly because most of the local power resides in the municipalities. Nevertheless, many energy facility and OCS decisions made by one county will have spill-over effects into adjoining counties. A formalized notification procedure should be developed which would provide such adjoining counties sufficient notice of pending decisions with such spillover effects. Such a procedure should allow for sufficient time for a courtesy review and comment.

C. County - Municipal Relationships

The county can act as a vehicle for providing technical planning assistance to municipalities who are faced with energy facility siting and other coastal issues and decisions. The county can also act as a clearinghouse for information from the Federal and State governments, as well as various industry sources. Where an energy facility siting matter (or other coastally related issue) affects several of its constituent municipalities, the county can provide a vehicle for inter-municipal coordination in planning and decision-making processes.

D. County - Public Relationships

The county can be the vehicle for providing information to the general public on the many coastally related issues that will periodically be subject to increased public awareness and interest. The county can serve, to some extent, as an extension of the State's public involvement program. Additionally, increased public feedback on coastal zone management issues can be provided to the State by the county as a result of this county-public relationship. Public informational efforts by the county could take many forms including informational pamphlets, meetings and newsletters. In order for the county to carry out such a function, however, some form of financial assistance must be provided to it by the State or Federal government.

E. State - Municipal Relationships

At some point, municipalities who are directly affected by an energy facility siting, or other coastally oriented proposal, will benefit by looking to the State for detailed technical assistance. The level of assistance that will be needed by directly affected municipalities most likely will not be available at the county level. Expertise in the fields of oil and gas pipeline construction or the location of a deepwater port facility should be retained at the State level. This expertise should not only be drawn upon by the State to carry out its responsibility, but also should be provided to municipalities as needed. Such a program could entail more than the mere transmittal of documentary technical assistance and periodic visits. Personnel from the State with special expertise might be "detailed" to work with local officials for days or possibly weeks at a time.

Both State and local governments will at times be making decisions regarding the same proposed facilities. Coordination is needed to assure that local interests are effectively articulated at the State level and seriously evaluated in decision-making processes. Likewise, localities in their deliberations need to be fully informed of aspects of a given proposal which may transcend their municipal boundaries. A project notification system should be developed that would keep the respective parties appraised of the others decision-making activities on a monthly basis.

This study effort has underscored the realization that the general public is uninformed, and at times misinformed, regarding OCS oil and gas development and its possible effects on New Jersey. Municipal officials are equally uninformed and often uninterested. Some of this information gap can be filled at the County level, assuming the financial assistance for such an effort is forthcoming from the State. Some information projects are of such a magnitude or Statewide interest that they are more appropriately undertaken by the State. Consequently, the State could make its citizens more aware of and knowledgeable about a program that has great potential import for the State by undertaking the following:

(1) develop, and provide to the counties for public presentation, a slide presentation specifically oriented to the OCS program and its effects on the State;
(2) develop, and distribute to municipal officials, a primer on OCS development and the respective roles of the Federal, State and local governments in planning and decision-making activities regarding OCS-related development; and
(3) develop, and provide to the counties for distribution to the general public, a series of brief informational pamphlets on the OCS program and other coastal zone management issues in New Jersey.

IX. COUNTY VIEW OF STATE AND NATIONAL INTEREST IN COASTAL ENERGY (OCS) FACILITY SITING

The increasing reliance on imported crude oil, and the dwindling domestic supply of natural gas, makes the exploration and development of new oil and gas resources imperative. The OCS offshore New Jersey is a logical and

desirable location for such exploration and development. If natural gas is produced many of the industries in New Jersey whose operations were curtailed in the winter of 1976-77 would be assured of a reliable supply of fuel. This is predicated, of course, on the Federal government (Federal Power Commission) allocating the interstate gas from the OCS offshore New Jersey to the New Jersey market. Additionally, OCS-related development will bring much needed economic development to New Jersey. It continues to be in the national and state interest, however, to protect its significant natural coastal resources. Where conflict between these two interests occurs, deference should be paid to protection of the State's unique coastal resources.

X. COUNTY VIEW OF STATE AND FEDERAL ASSISTANCE IN COASTAL ENERGY (OCS) FACILITY SITING

The assistance provided to the counties by the State and Federal governments in this study effort during the past year has been an important first step. It is questionable as to what level of expertise on energy facility siting matters would have been developed at the local level without this assistance. The level of inter-county coordination and data exchange probably would not have attained the level that it has either. Such financial assistance continues to be needed if the localities are going to be equipped to comprehensively address the myriad of siting and related issues that will result from OCS exploration and development. The Federal government, through the Coastal Energy Impact Program, should also be a source of financial assistance to counties and municipalities for special studies related to energy facility siting matters in the coastal zone.

Even with State and Federal financial assistance, counties and localities cannot hire and retain in-house the wide spectrum of technical expertise that might be periodically needed to evaluate energy facility proposals. Such technical expertise should be retained at the State level to be drawn upon as needed by localities. The State should retain, for example, a pipeline and a petroleum engineer to help the localities in the evaluation of the development plans that oil companies are required to submit prior to developing and producing from an offshore oil and gas field.

APPENDIX A

PHASES OF OCS OIL AND GAS ACTIVITY

The process of offshore oil and gas activity is commonly divided into five phases: (1) leasing, (2) exploration, (3) development, (4) production, and (5) shutdown. For a given petroleum field, the phases may encompass a period ranging from 15 to 40 years. Figure 2 showed the phases in the life of a hypothetical oil and/or gas field and illustrated the fact that these phases may overlap considerably. For example, exploration activities continue after development activities have begun, and production will begin before development is completed. Continuation beyond the exploration phase, however, is entirely dependent upon the discovery of economically recoverable reserves of oil or gas.

The five phases of OCS oil and gas activity are described below as they relate to time involved, industry activities, federal government activities, state and local activities and potential onshore facilities.

1. Leasing

Time:

Approximately 19 months from "call for nominations" to the actual lease sale: geophysical exploration (by industry) may have begun many years before.

Industry Activities:

Preparation of internal market and capability analyses; preliminary geophysical exploration (under permit from USGS); nomination of tracts for consideration in the lease sale; preliminary location analysis for staging areas; and possibly onshore site acquisition.

Federal Government Activities:

The leasing process, managed by the Bureau of Land Management (BLM), includes: environmental baseline studies; "call for nominations" by the oil and gas industry of tracts it believes hold the greatest promise for oil and gas; draft (DES) and final environmental statements (FES) prepared by BLM in cooperation with USGS and the Fish and Wildlife Service (FWS); these are submitted to the Council on Environmental Quality (CEQ) and made available to the public; a decision to lease is made by the Secretary of the Interior based on the FES and an internal decision document; at the lease sale itself tracts of the OCS are offered to the "highest responsible qualified bidder," with or without stipulations. Any bid may be rejected.

State and Local Activities:

Participation in the call for nominations, in which state and local governments—and citizens—may identify tracts which should not be considered for leasing ("negative nominations") or upon which special conditions should be imposed; participation in tract selection meetings and review and comment on draft environmental statements (DES). Planning may begin for siting and providing public services in future phases.

Onshore Facilities:

Geophysical and geological exploration vessels will use existing ports.

2. Exploration Phase

Time:

One to seven years from lease sale: an average of two years for discovery of economically recoverable oil or gas reserves and five years or more for identification of size and area of the find; up to five years until lease abandonment if no discovery is made.

Industry Activities:

Additional geophysical surveys to locate geological structures favorable for oil and gas; exploration plans submitted to USGS and "notices" of support activities submitted to appropriate Governors; exploratory drilling by drilling companies (under contract to the oil companies which lease tracts); if discovery is made, intense supplementary exploration, possibly for many years, to establish the area and size of the field, and to ensure that all possible geological structures containing oil and gas have been located; preparation of internal development projections, preliminary field development plans and financial estimates. If no commercial discovery is made, industry will abandon the lease and onshore service bases.

Federal Government Activities:

USGS supervises operations: reviews, accepts and approves exploration plans, issues drilling permits, monitors the drilling procedures; Environmental Protection Agency (EPA) issues pollution control permits; the Corps of Engineers (COE) and U.S. Coast Guard (USCG) regulate navigation.

State and Local Activities:

Assume regulatory and permitting authority over the siting and operation of service bases and portions of operations within the limits of state waters; plan for siting of potential onshore facilities if discovery is made, mitigating employment and environmental impacts, and for providing and financing public services. (May be involved in planning and permits for anticipatory siting—see below).

SOURCE: Factbook-Onshore Facilities Related to Offshore Oil and Gas Development New England River Basins Commission Nov. 1976

Onshore Facilities:

Temporary service bases are established, generally located in existing developed harbors, with associated repair and maintenance yards and general shore support (heliports may be established at existing airports); as a rule no new facilities are constructed but industry may anticipate discovery and plan for and option land for permanent service bases; options for pipe coating yards and platform fabrication yards may also be taken; state and local government may be involved in permits for these facilities.

3. Development Phase

Time:

Four to nine years—starting with the discovery of economically recoverable resources and extending through initial pipeline installation or tanker operations.

Industry Activities:

Application to USGS and COE for development drilling permits; Field Development Plans submitted to adjacent states; development drilling and production platforms put in place.

Federal Government Activity:

USGS reviews and approves field development plans, and issues permits for development drilling and OCS gathering lines; COE issues permits for drilling structures and pipelines in navigable waters; BLM issues permits for pipeline rights-of-way on the OCS; the Office of Pipeline Safety (DOT), Federal Power Commission (FPC) and Interstate Commerce Commission (ICC) are involved in regulation of common carrier pipelines. EPA and the Occupational Safety and Health Administration (OSHA) issue permits and regulate operating activities.

State and Local Activities:

Issue permits for nearshore and onshore pipeline rights-of-way, land use, and construction of onshore and nearshore facilities; regulate water and other resource uses, hazards to the environment, and other activities; plan siting of service bases and other onshore facilities listed below (service bases generally are not federally regulated); provide public services for employees and induced population, many of them at a temporarily high level for the relatively short-term development phase.

Onshore Facilities:

Permanent service bases
Repair and maintenance yards
General shore support
Platform fabrication yards
Platform installation service bases
Pipelines and landfalls
Pipeline installation service bases
Pipe coating yards
Partial processing plants
Gas processing and treatment plants
Marine terminals

Essentially all major facilities for the production phase are installed during the development phase.

4. Production Phase

Time:

Ten to 25 or more years—from first petroleum landing onshore to field shutdown.

Industry Activities:

Operation of facilities constructed during the development phase; activities to maintain and improve the rate and volume of production: construction of additional production platforms, new wells and well "workover," additional pipelines, storage facilities; and regular servicing of wells and platforms.

Federal Government Activities:

Monitoring and regulating of routine operations, by USGS, COE, USCG, EPA, BLM, OSHA, FPC, DOT and ICC, and others; respond to oil spills; possible additional leasing.

State and Local Activities:

Provision of public services for onshore facilities and added population; monitoring onshore petroleum operations; anticipation of employment decline during production phase and eventual shutdown.

Onshore Facilities:

Additional pipelines (see Development Phase)

5. Shutdown Phase

Time:

One to three years from end of production phase; representative cumulative time from lease sale—25 years.

Industry Activities:

Dismantling offshore facilities and sealing all wells with cement 15 feet below the surface of the seabed; closing or reducing onshore facilities as production ceases.

Federal Government Activities:

Monitoring and enforcing abandonment regulations, by USGS.

State and Local Activities:

Mitigating past impacts, covering the loss of accustomed revenues, and efforts to maintain the economic base.

Onshore Facilities:

Facilities identified above are closed or shifted to other uses.

APPENDIX B

Description[1] of selected OCS oil and gas related facilities and factors relevant to their siting.

1. Onshore Support Base (or Service Base):

There are several types of support bases which provide the logistical link necessary to conduct OCS oil and gas activities:

Temporary bases, which support exploration and exploratory drilling;

Permanent bases, which are set up after a commercial find of oil and/or gas has been made and support exploration and development drilling and production; and

Pipeline and platform installation bases.

Given the distance from Camden to the offshore lease areas, and other factors, it would appear that permanent services bases would be the only type of onshore support base which might be located in the Camden area. Consequently, the information below, although it may have general applicability to several types of service bases, pertains most specifically to permanent service bases.

The main activity of a service base is the transfer of materials and workers between shore and offshore operations. Since service bases are primarily transfer points, their first priority is to ensure maximum efficiency in "vessel turnaround time," i.e., the amount of time needed for a boat to unload and reload before returning to the offshore site. Supply and crew boats and helicopters operate from the service base on a 24 hour, seven day a week basis.

Service base size and the amount of vessel activity are functions of the number and kinds of vessels, drilling rigs and platforms being served. A new service base is generally established on a flat piece of vacant waterfront land in an all-weather harbor. Most of the 25 to 50 acre site is used for open storage, primarily for pipe and tubular goods, and drilling supplies; fuel tanks are also necessary. Also included is berthage for supply and crew boats, dock space for loading and unloading, a helipad and space to house supervisory and communications personnel. Approximately 200 feet of marginal wharf, used for loading and unloading supplies and crew boards, is needed for each rig or platform being serviced. When several rigs and/or platforms are being serviced, however, economies of scale result in less marginal wharf space per rig or platform being required.

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1. The information in this section is drawn from the Factbook: Onshore Facilities Related to Offshore Oil and Gas Development. The Factbook was compiled by the New England River Basin Commission with funds provided by the U. S. Department of the Interior. See that publication for more detailed information.

Onshore Facilities:

Temporary service bases are established, generally located in existing developed harbors, with associated repair and maintenance yards and general shore support (heliports may be established at existing airports); as a rule no new facilities are constructed but industry may anticipate discovery and plan for and option land for permanent service bases; options for pipe coating yards and platform fabrication yards may also be taken; state and local government may be involved in permits for these facilities.

3. Development Phase

Time:

Four to nine years—starting with the discovery of economically recoverable resources and extending through initial pipeline installation or tanker operations.

Industry Activities:

Application to USGS and COE for development drilling permits; Field Development Plans submitted to adjacent states; development drilling and production platforms put in place.

Federal Government Activity:

USGS reviews and approves field development plans, and issues permits for development drilling and OCS gathering lines; COE issues permits for drilling structures and pipelines in navigable waters; BLM issues permits for pipeline rights-of-way on the OCS; the Office of Pipeline Safety (DOT), Federal Power Commission (FPC) and Interstate Commerce Commission (ICC) are involved in regulation of common carrier pipelines. EPA and the Occupational Safety and Health Administration (OSHA) issue permits and regulate operating activities.

State and Local Activities:

Issue permits for nearshore and onshore pipeline rights-of-way, land use, and construction of onshore and nearshore facilities; regulate water and other resource uses, hazards to the environment, and other activities; plan siting of service bases and other onshore facilities listed below (service bases generally are not federally regulated); provide public services for employees and induced population, many of them at a temporarily high level for the relatively short-term development phase.

Onshore Facilities:

Permanent service bases
Repair and maintenance yards
General shore support
Platform fabrication yards
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Partial processing plants
Gas processing and treatment plants
Marine terminals

Essentially all major facilities for the production phase are installed during the development phase.

4. Production Phase

Time:

Ten to 25 or more years—from first petroleum landing onshore to field shutdown.

Industry Activities:

Operation of facilities constructed during the development phase; activities to maintain and improve the rate and volume of production: construction of additional production platforms, new wells and well "workover," additional pipelines, storage facilities; and regular servicing of wells and platforms.

Federal Government Activities:

Monitoring and regulating of routine operations, by USGS, COE, USCG, EPA, BLM, OSHA, FPC, DOT and ICC, and others; respond to oil spills; possible additional leasing.

State and Local Activities:

Provision of public services for onshore facilities and added population; monitoring onshore petroleum operations; anticipation of employment decline during production phase and eventual shutdown.

Onshore Facilities:

Additional pipelines (see Development Phase)

5. Shutdown Phase

Time:

One to three years from end of production phase; representative cumulative time from lease sale—25 years.

Industry Activities:

Dismantling offshore facilities and sealing all wells with cement 15 feet below the surface of the seabed; closing or reducing onshore facilities as production ceases.

Federal Government Activities:

Monitoring and enforcing abandonment regulations, by USGS.

State and Local Activities:

Mitigating past impacts, covering the loss of accustomed revenues, and efforts to maintain the economic base.

Onshore Facilities:

Facilities identified above are closed or shifted to other uses.

APPENDIX B

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1. Onshore Support Base (or Service Base):

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Temporary bases, which support exploration and exploratory drilling;

Permanent bases, which are set up after a commercial find of oil and/or gas has been made and support exploration and development drilling and production; and

Pipeline and platform installation bases.

Given the distance from Camden to the offshore lease areas, and other factors, it would appear that permanent services bases would be the only type of onshore support base which might be located in the Camden area. Consequently, the information below, although it may have general applicability to several types of service bases, pertains most specifically to permanent service bases.

The main activity of a service base is the transfer of materials and workers between shore and offshore operations. Since service bases are primarily transfer points, their first priority is to ensure maximum efficiency in "vessel turnaround time," i.e., the amount of time needed for a boat to unload and reload before returning to the offshore site. Supply and crew boats and helicopters operate from the service base on a 24 hour, seven day a week basis.

Service base size and the amount of vessel activity are functions of the number and kinds of vessels, drilling rigs and platforms being served. A new service base is generally established on a flat piece of vacant waterfront land in an all-weather harbor. Most of the 25 to 50 acre site is used for open storage, primarily for pipe and tubular goods, and drilling supplies; fuel tanks are also necessary. Also included is berthage for supply and crew boats, dock space for loading and unloading, a helipad and space to house supervisory and communications personnel. Approximately 200 feet of marginal wharf, used for loading and unloading supplies and crew boards, is needed for each rig or platform being serviced. When several rigs and/or platforms are being serviced, however, economies of scale result in less marginal wharf space per rig or platform being required.

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1. The information in this section is drawn from the Factbook: Onshore Facilities Related to Offshore Oil and Gas Development. The Factbook was compiled by the New England River Basin Commission with funds provided by the U. S. Department of the Interior. See that publication for more detailed information.

Readily available access to the service base site is extremely important. A minimum water depth of 15-20 feet at dockside is required at all levels of tide to facilitate crew and supply boat access. Rail and/or highway access is essential for a service base since large quantities of materials must be brought into the base for transfer to offshore operating areas.

Service bases may be established by the oil companies or by service companies that specialize in providing onshore support services to oil companies. The major oil companies generally set up their own service bases, whereas the smaller ones tend to operate from service company bases. In either case, oil companies prefer to locate service bases as close as possible to their offshore operations since costs increase with distance. The maximum range desirable for a service base appears to be 150 miles from the offshore area being serviced.

The construction of a service base may involve considerable site alteration, or almost none at all, depending on the site chosen. At some areas grading, dredging, bulkheading and filling may be necessary to ready the site for use. The environmental impacts resulting from the operation of a service base will depend upon the volume of activity. Air emissions, result from evaporation and combustion of fuels. Wastewater is generated from a number of sources and is brought back to the service base for treatment prior to discharge. Noise is generated continually because a service base is in operation 24 hours a day.

2. Repair and Maintenance Yards:

Not strictly a facility as such, "repair and maintenance yards" consist of many firms of varying capabilities which provide services to the operators of vessels and equipment involved in OCS oil and gas development. Most of the vessels employed in OCS development range from 60 to 200 feet in length; tug boats, crew boats, supply boats, and a variety of barges. These boats are often equipped with specialized gear and generally are too large to be serviced in yards catering to pleasure craft. Consequently, these boats are usually serviced in shipyards that can accommodate larger fishing fleet type vessels. Larger OCS related vessels must be serviced at major shipyards. Vessel maintenance falls into three basic categories: hull, mechanical and electronic.

Fast, efficient, and available service and highly skilled labor are the primary requirements of the oil and service companies for repair and maintenance work. Depending on the vessel type, flotation barge, haul out, mobile

lift, or slideway facilities may be required. Accessibility to road, rail, and air transport is necessary for fast delivery of supplies and parts. Either 24-hour, seven day per week service or around the clock "call out" is required to reduce down time while vessels or equipment are in for repairs. Skills required may include certified welders, shipfitters, electricians, mechanics, machinists, riggers, carpenters, pipefitters, sandblasters, and painters. For underwater work, either nearshore or offshore, skilled divers may be required.

A repair and maintenance yard catering specifically to the needs of the petroleum industry is not likely to be sited in a frontier area. For the most part, these services already exist in ports where many of the OCS-related facilities requiring repair and maintenance capabilities are likely to be sited. The repair and maintenance industry presents what is perhaps one of the easiest ways for indigenous enterprises in a frontier area to capitalize on the activity resulting from OCS development. Repair and maintenance firms need only augment their existing capabilities to meet the needs of OCS-related vessels and equipment in order to participate in the onshore economic growth.

3. Pipe Coating Yards:

Pipes used in the offshore oil and gas operation are usually coated with mastic and weighted with concrete before they are installed in order to prevent corrosion and to overcome floatation. The coating process involves several intermediary stages and can take as long as eight months. The typical pipecoating yard would be located on an 100 to 150 acre site. The land at the site should be flat and the soil well drained. The load bearing capacity of the soil is also important because of the large volume of materials that are stored on site at any one time. Approximately 95% of the site is used for the storage of pipe, wire mesh, iron ore, sand and lime. The remaining area houses the coating, inspection and load out operations.

Pipe joints are delivered from the steel mills either by barge or railway, depending on the location of the site. Sand, cement, are aggregates and other bulk materials are usually delivered to the site by ship or barge. Consequently, a 20 to 30 foot channel depth is preferable to accommodate the large vessels which deliver such bulk materials. At minimum, a depth of 10 feet is required to accommodate barges. A minimum of 750 feet of marginal wharf is needed to load out two supply barges simultaneously. This is particularly necessary where a yard is supplying coated pipe to more than one client at a time.

The installation of a pipe coating yard may require site alteration and construction which could generate environmental impacts from dredging, filling, erosion and siltation. Air and wastewater emissions will result but can be minimized by appropriate controls. Noise levels generated by some of the processes at the yard would be high, but noise-reduction design features are available which would minimize such impacts.

4. Ancillary Industries:

While the oil companies have the responsibility for exploring and producing oil and gas, they typically contract with other firms for many of the specific operations, equipment, supplies and services needed in the process. This demand for goods and services has resulted in the formation of numerous specialized ancillary industries in currently established OCS-related regions. Some of these businesses exist specifically to service the oil and gas industry by offering oil and gas related services; others offer oil and gas related services as a portion of their overall business activity.

A wide spectrum of companies fall within the category of "ancillary industries." The locational and siting requirements may vary slightly among the individual companies. Generally, however, each of the companies requires a relatively small amount of primarily warehouse space. Waterfront access is desirable for many of the industries to facilitate provision of their services to the oil companies. Actual waterfront location is not a necessity, however. Readily available access to rail and highway transportation is also required.

Individually, the capital investment, land, labor and other requirements of each of the ancillary industries is small. Due to similar locational requirements, however, many of these industries are likely to cluster, generally near ports, producing local impacts comparable to a large-scale marine industry. Together, they are likely to generate significant economic activity including increased jobs, tax revenues, business opportunities and cash flow in the area developed. It must be remembered, however, that since the function of ancillary industries is to provide goods and services to the oil industry, the general location of these industries will be determined by where the oil companies and/or service supply companies choose to locate their onshore service bases.

5. Pipelines:

This section does not deal with marine pipelines but rather describes the requirements and possible effects of pipeline construction and operation in onshore areas. Oil and gas pipelines have essentially the same siting considerations and consequently, except where otherwise specifically noted, the following information applies to them equally.

The function of a crude oil pipeline is to transport the oil from areas where it is produced to refineries where it is processed for subsequent distribution and sale. Pipelines are used to transport gas from where it is produced to a gas processing and treatment plant (see number 6 below) and from there to the nearest point of the interstate gas distribution system. Oil and gas are usually piped separately because the flow mixtures of oil and gas in pipelines is significantly less efficient than the flow of pure gas or pure liquid. The design of a particular pipeline depends on a number of factors including well stream composition, temperature, pressure and distance from producing field to destination.

Pipelines do not require very much land. Normally, pipelines require a minimum right of way of 50 to 100 feet (about 6 to 12 acres per mile of pipeline right-of-way). Pipeline companies may purchase the land in fee or acquire easements for its use. To put a pipeline in place takes a number of steps. Once the right of way is delimited vegetation is cleared from the area to facilitate the use of the heavy equipment necessary to lay the pipe. A ditch is dug sufficiently deep so that three feet of soil will cover the completed pipeline at grade. This may be deeper in certain locations such as rail, highway and stream crossings. Pre-coated pipe sections are brought to the "ditch" and joined by welding. The quality of the welding (necessary to prevent ruptures and/or chronic leakage) is monitored by the x-raying of selected welds (about one out of every four welded joints). The pipe is lowered into the ditch and the ditch is filled and graded. When the entire pipeline is completed it is hydrostatically tested prior to being put into use. At this time the right of way is revegetated with grasses or ground cover. The right-of-way is kept denuded of larger vegetation during the life of the pipeline to facilitate access for maintenance and inspection purposes.

Environmental impacts resulting from the construction of pipelines can be minimized by employing special construction and restoration techniques. The most environmentally sensitive portions of the pipeline can be installed during periods of least vulnerability, avoiding spawning periods, rainy seasons and spring blooms. Oil pipelines pose the additional threat of releasing hydrocarbons into the environment either theough spills or chronic leakage. Chronic leakage can result from improper welding of pipeline seams. This problem can be minimized by a rigid inspection program. There are many different causes of oil spills, including, in order of most common occurrence, external corrosion, damage from equipment rupturing the line, defective pipe seams, internal corrosion and improper operation by personnel. Almost all of the spills resulting from external corrosion occurred in pipelines installed prior to 1960. Current pipecoating techniques significantly reduce the threat of spills caused by corrosion.

6. Gas Processing and Treatment Plants:

A gas treatment plant is designed to remove impurities (most significantly sulfur) from the gas. A gas processing plant is designed to recover valuable liquifiable hydrocarbons from the raw gas stream before it enters a commercial transmission line. Consequently, a gas plant must be located at some point between where the gas is brought ashore and where it is to enter the commercial transmission system. There are no standard gas plants; a plant is specifically designed for the particular gas stream that it processes. Gas plants have a life span of 10 to 20 years depending primarily upon the availability and duration of the natural gas supply.

Gas is usually sold to a gas transmission company at the field but the producing company retains the rights to any liquifiable hydrocarbons that may be recovered. These hydrocarbons, when present in a gas stream, are usually recovered and sold separately because of their high market value. Once recovered, the liquid hydrocarbon stream is separated into commercial products such as ethane, propane, butane and natural gasoline. Separation can occur at the same site as treatment and processing or, alternatively, a centralized separation plant could receive the outputs of several recovery plants.

Propane is usually sold to bottled gas distributors. Butane and heavier hydrocarbons are usually delivered to a refinery as a feedstock. Ethane is generally used as a petrochemical plant feedstock. Its recovery is very difficult, however, and it may not be recovered if no ready market for it exists. Extremely large amounts of gas with high ethane content would have to be produced to justify the establishment of a new petrochemical facility.

A "typical" plant might be located on a 50 to 75 acre site; less than a third of the site is used for the facility with the remainder acting as a buffer zone. The site would preferably be flat and well drained. Available data on water demand for gas plants reveal estimates of from zero to 750,000 gallons per day. The total water requirements for a gas plant vary depending on the cooling process used; an air cooled system obviously uses much less than a water-cooled system. A modern design would probably utilize an air cooled system with minimal water requirements.

Environmental impacts from site alteration and construction will vary with the characteristics of the site chosen for the plant and the size of the area disturbed for plant construction. Thermal pollution of water would be virtually eliminated by use of an air-cooled system. The magnitude of potential air emissions would depend on the volume and composition of the raw gas, the plant design and the installation of pollution control equipment. It is estimated that, using available technology, 99.9% of the sulfur content of the raw gas stream (usually present in the form of hydrogen sulfide) can be recovered in the form of elemental sulfur suitable for industrial marketing. Other possible air and water contaminants may be generated at a gas plant. Concentrations of these substances can be lowered to meet Federal Water Quality standards. It is unclear at this time, however, whether or not the proposed Pine Barrens non-degradation water quality standards can be met.

APPENDIX C

REVIEW AND COMMENT

A draft report embodying the findings and recommendations of this study effort was completed in November, 1977. In December a public hearing was held to provide a forum for review and comment on the draft report. The following is a brief summary of the major comments/concerns expressed at that meeting:

1. The City of Camden is actively seeking OCS-related support facilities as a means of boosting the City's economy.
2. The City of Camden disagrees with the report's findings as to the unsuitability of sites C and H for OCS-related development (see Section V. C).
3. Concern was expressed regarding the possibility of intrusion of the Wharton tract by a pipeline corridor (see Section VI. C. which recommends against this possible siting alternative).

Included on the following pages are copies of the letter of invitation to the public meeting and official comments on the report from the City of Camden's Division of Economic Development and the State's Office of Coastal Zone Management.

joan batory, director
AIP (affiliate)

AN INVITATION

WHAT: OUTER CONTINENTAL SHELF AND ENERGY FACILITIES PLANNING PROJECT - PUBLIC HEARING

WHERE: LINDENWOLD COMPLEX - LINDENWOLD, NEW JERSEY

WHEN: THURSDAY, DECEMBER 15, 1977 - 8:00 P.M.

In the summer of 1976 the Bureau of Land Management, U.S. Department of the Interior, sold the drilling rights for over one-half million acres of submerged lands on the outercontinental shelf off the coasts of New Jersey and Delaware for the purpose of oil and gas exploration. It is anticipated that initial exploratory drilling for oil and gas deposits will begin early in 1978. If commercial quantities of oil and/or gas are found, onshore facilities will be developed to accommodate production, transmission and processing of those resources. Under a federal grant funded through the Office of Coastal Zone Management, N.J. Department of Environmental Protection, twelve New Jersey coastal counties have been studying the potential for siting these and other energy-related facilities in their respective counties.

The County Environmental Agency, under the guidance of its Director, Joan Batory, has had the responsibility for the study effort in Camden County. A preliminary draft report has been completed which makes findings and recommendations regarding specific sites and alternative policy approaches to siting OCS-related facilities. Copies of the report are available for your review at the Clerk's Office in each of the County's municipalities and in area libraries. A copy is also available for public review at the Environmental Agency's offices during regular business hours.

This meeting will provide a forum for review and comment on the report's findings and recommendations. Additionally, written comments on the report may be submitted to this office for incorporation into the final report until the close of business on December 30, 1977.

CITY OF CAMDEN
DIVISION OF ECONOMIC DEVELOPMENT
CITY HALL
CAMDEN, NEW JERSEY 08101

JAN 4 '78

John R. Ober
Director
(609) 757-7488

DECEMBER 28, 1977

Ms. Joan Batory, Director
Camden County Environmental Agency
2276 N. 43rd Street
Pennsauken, New Jersey 08110

RE: OCS Energy Facility Planning Project for Camden County

Dear Joan:

It was a pleasure attending the public hearing, regarding the above project, on December 14.

I would like to put into formal fashion some of the comments that I voiced. It is the position of the City of Camden, that we are actively seeking oil drilling support activity for our City. We believe that an activity of this nature would have a beneficial effect on the economy of Camden, due to the jobs produced and the tax revenues obtained. The Atlantic coast is no place to establish industrial complexes with their resulting harm to that fragile environment. The City is the most logical place to establish these facilities, where there are existing facilities, structures and land which are now being underutilized. The resulted use would improve the City environment. We will take an active role in selling the advantages of the City's location to oil companies and their sub-contractors.

Some of the benefits that would acrue to support activity would be, a large skilled labor force with a reputation for productivity, the closeness of Camden to sources of supply of machinery, tools and raw materials necessary for offshore drilling, existing underutilized deep water port facilities, and existing small ship repair facilities.

Further, we disagree with your comments revelant to site C on page 54, where you state that this particular site is unsuitable because of size limitations, poor navigation access, and the need for dredging and bulkheading.

Please bear in mind that any site would require bulkheading and and dredging required for access for ships of 20 feet draft is very minimal. Also, take issue with comments regarding site eight on page 58. We have done test borings on this site in the last several weeks, and the 30-50 acres are particulary suited to heavy industrial construction

and the plans for connection of rail service to this area are underway, which, by the way, is not a major undertaking. We feel that both sites C and H are excellent locations for off-shore drilling activities.

I would like to commend you and your associate, Gerald Lennon, for your excellent report and please take these comments as constructive criticism.

I look forward to working with you and Gerry in the future, for the best interests of the City and County of Camden.

Very truly yours,

John R. Ober
Director

JRO/ss

cc: Mayor Angelo J. Errichetti
William Hankowsky
Howard Felt, Chairman

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL
PROTECTION
TRENTON

DIVISION OF MARINE SERVICES

PLEASE ADDRESS REPLY TO:
P. O. BOX 1889
TRENTON, N. J. 08625

December 16, 1977

Mr. Jerry Lenmon
550 State Route 52
Walden, New York 12586

Dear Jerry:

This acknowledges receipt of the draft OCS Energy Facility Planning Project Study which you prepared for the Camden County Environmental Agency.

I want to commend you on the excellent data gathering and analysis that you performed on "feasible and non-feasible sites" and on the ranking methodology you developed to evaluate potential pipeline corridors for OCS oil and/or gas. Your recommendations are well taken and will be useful to this office as it continues to work with local government on energy facility siting.

I look forward now to your final report with the revisions we discussed on the phone on December 12th.

In the meantime, my best wishes to you for a happy holiday season.

Sincerely,

Helga Busemann
Office of Coastal
Zone Management

HB/dy
cc: Ms. Joan Batry
Mr. David N. Kinsey