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Y OUTER CONTINENTAL SHELF
OIL AND GAS DEVELOPMENT:
POTENTIAL IMPACTS

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New Jersey Dept. of Environmental Protection

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**COASTAL ZONE
INFORMATION CENTER**

OUTER CONTINENTAL SHELF OIL AND GAS DEVELOPMENT: POTENTIAL IMPACTS
ON UNION COUNTY, NEW JERSEY

JUN 9 1978

UNION COUNTY PLANNING DEPARTMENT

December, 1977

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U. S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
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New Jersey Dept. of Environmental Protection.

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TABLE OF CONTENTS

<u>Chapter</u>	<u>Page No.</u>
INTRODUCTION	1.
SUMMARY	3.
I. INVENTORY	5.
A. Land Use	5.
B. Population	5.
C. Employment	6.
D. Air and Water Resources	9.
1. Air Resources	
2. Water Resources	
E. Transportation Network	11.
1. Land Based Systems	
2. Air Transport	
3. Marine Transportation	
F. Environmentally Sensitive Land	14.
G. Energy Related Facilities in the Coastal Zone	15.
1. Refineries	
2. Marine Terminals	
3. Pipeline Terminals	
4. Pipelines	
5. Electrical Generating Stations	
6. Gas Plants	
7. Chemical Plants	
8. Oil and Gas Company Offices	
9. Other Related Industries	

Chapter

Page No.

II. TYPES OF OCS ENERGY RELATED FACILITIES AND THEIR POTENTIAL IMPACTS ON COASTAL SITES IN UNION COUNTY 20

 A. Offshore Exploration Supply Base 21.

 B. Offshore Production Supply Base 27.

 C. Oil and Gas Pipelines 31.

 D. Gas Processing Plants 35.

 E. Marine Terminals for Crude Oil 45.

 F. Refineries 50.

 G. Pipe Coating Yards 52.

 H. Platform Fabrication Yards 60

 I. Liquid Natural Gas (LNG) Marine Terminal 61

III. POSSIBLE SITES FOR ONSHORE FACILITIES RELATED TO OCS OIL AND GAS DEVELOPMENT 66

III-A. AREAS UNSUITABLE FOR OCS RELATED DEVELOPMENT . 76

IV. COUNTY VIEW OF NATIONAL, STATE AND LOCAL INTERESTS IN COASTAL ENERGY FACILITY SITING .. 77

 1. Federal

 2. State

 3. Local

BIBLIOGRAPHY 80

**COASTAL ZONE
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LIST OF EXHIBITS

<u>Letter</u>		<u>Following Page</u>
A.	Lease Sale No. 40 - Leasing Area	1.
B.	Location of Union County in the State of New Jersey .	5.
C.	Union County and Surrounding Area	5.
D.	Zoning Pattern 1967	5.
E.	Eastern Union County Vacant Land Zoning - 1976	5.
F.	Waterfront Property Ownership	5.
G.	Drainage Pattern - Union County	10.
H.	Major Railways in Union County	12.
I.	Union County Park System	14.
J.	Newspaper Clipping - Supply Bases for Oil, Gas Drillers?	26.
K.	Resolution on Supply Bases, City of Elizabeth	26.
L.	Major Pipeline Routes to Union County	31.
M.	Water Supply Systems, Location of Facilities	32.
N.	Possible Locations for Gas Processing Facilities	37.
O.	Proposed Distrigas LNG Terminal Location	61.
P.	Possible Sites for OCS Support Facilities	66.
Q.	Newspaper Clipping - Is the U. S. Pushing Linden Tank Farm?	68.

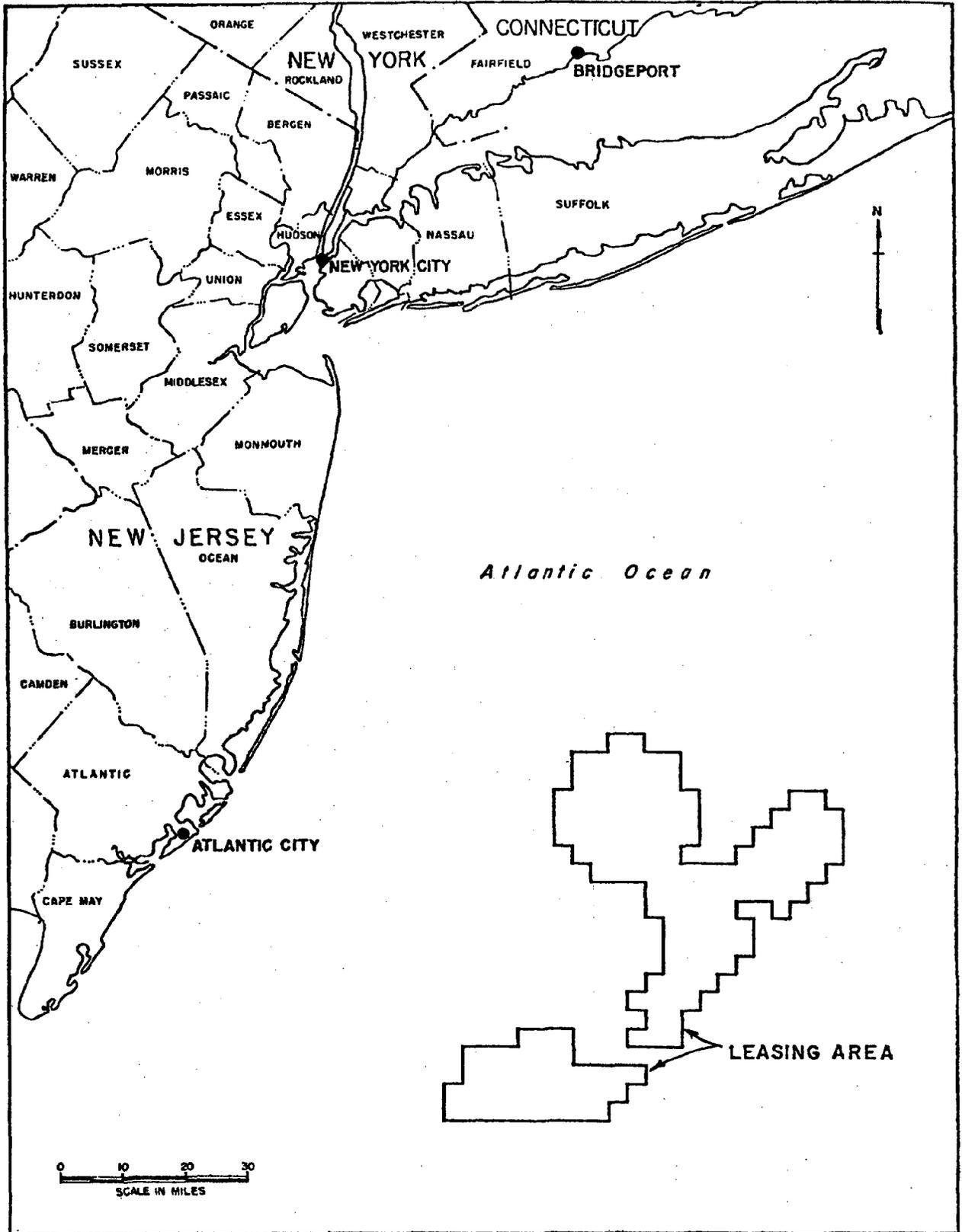
INTRODUCTION

Drilling for offshore oil is nothing new to the oil companies; but it is new to the northeastern United States. Offshore oil operations are capital intensive and consequently require a considerable amount of acreage onshore for the storage and transfer of goods to offshore operations. In the southern states, offshore drilling was a natural extension of onshore drilling activities. In the northeastern states, there is little existing infrastructure specifically geared for offshore oil and gas exploration. Therefore, the involved industries have to choose locations for all the basic facilities required to support offshore activities.

The offshore tracts in Lease Sale #40 are located closest to New Jersey, (Exhibit A) which makes this state the logical choice for the location of support activities. Although most attention is being focussed on the southern part of New Jersey, that area does not offer the oil and gas industries the industrial infrastructure and favorable political climate of the northern part of the state.

In an effort to come up with a statewide plan for energy related facilities in the coastal zone which would be consistent with local interests, the State of New Jersey Office of Coastal Zone Management asked the shoreline counties to study the local impacts of facilities related to offshore oil and gas. This report is the result of a one year program which was developed, coordinated, and funded by the Office of Coastal Zone Management, New Jersey Department of Environmental Protection, and in which eleven coastal counties, including Union County, participated.

LEASE SALE NO. 40 - LEASING AREA



In this report, we have tried to set forth the amenities and obstacles in choosing a Union County location for these facilities. After a brief description of the existing industrial infrastructure in Union County in Chapter I, each type of facility is discussed with its probable impacts in Chapter II. This includes a discussion of the proposed liquid natural gas terminal on Staten Island. In Chapter III, several sites which would be suitable locations for these facilities are discussed. Our opinions on the interests of each level of government in the facility siting process is the subject of Chapter IV.

SUMMARY

The support services required for outer continental shelf exploration, development and production are extremely diversified including such businesses as catering services, ship repair, suppliers of drilling muds and bits, platform construction, helicopter service, etc. Many of these services will be provided by existing companies, some of which need not have a coastal location. Of greater importance from a planning standpoint are those oil and gas operations which will require new sites taking up sizeable tracts of land.

Offshore support operations which have some potential for location in Union County include supply bases and pipe coating yards. Already existing in the county are a refinery, oil product storage, and tanker terminals. If new oil and gas related activities were to locate in the county it would be in Linden or Elizabeth due to the proximity to major shipping channels and available industrial land.

The channel depths necessary for outer continental shelf support activity are available, some vacant industrially zoned land exists, and the necessary infrastructure such as transportation, utilities, and labor are available. Since this area supports marine vessels of all sizes up to large tankers and freighters, facilities exist to maintain and supply such activity.

Facilities that could not easily be located in Union County are platform fabrication yards and gas processing plants. However, deck modules for the platforms could be built locally and if it were economical to bring unprocessed gas to Union County, then a local plant could be viable.

Not only is it physically acceptable to locate most offshore supporting facilities in Union County, but also the presence of these facilities would be of substantial economic benefit to the County's waterfront areas in terms of increased employment and demand for goods and services. Developers of these facilities are therefore encouraged to consider Union County in their siting decisions.

I. INVENTORY.

A. LAND USE.

Union County encompasses some 103.4 square miles, located in northeastern New Jersey, bounded on the east by the Arthur Kill and Newark Bay, on the north by Essex County, to the west by Morris and Somerset Counties and to the south by Middlesex County. Union County is primarily an urban/suburban county (Exhibits B and C). It is approximately 150 miles from the offshore tracts in Lease Sale #40.

Exhibit D summarizes the zoning pattern within Union County as of 1967. Industrialized areas are heavily concentrated in the eastern part of the county, primarily in Elizabeth and Linden.

In 1976 a vacant land inventory was conducted (Exhibit E), using as a criteria vacant parcels of at least one acre, including unused portions of developed properties. Four thousand forty acres of undeveloped land were found within the County and although much of this land is scattered, there are major parcels in Elizabeth and Linden which are zoned industrial and which lie adjacent, or in close proximity, to the Arthur Kill and Newark Bay.

Exhibit F shows waterfront property owners for most of the larger tracts along Newark Bay and the Arthur Kill. All of these properties are either in industrial use or zoned for it.

B. POPULATION.

Union County is developing most of the available vacant residential land, has experienced a slowing down of new housing construction,

LOCATION OF UNION COUNTY IN THE STATE OF NEW JERSEY

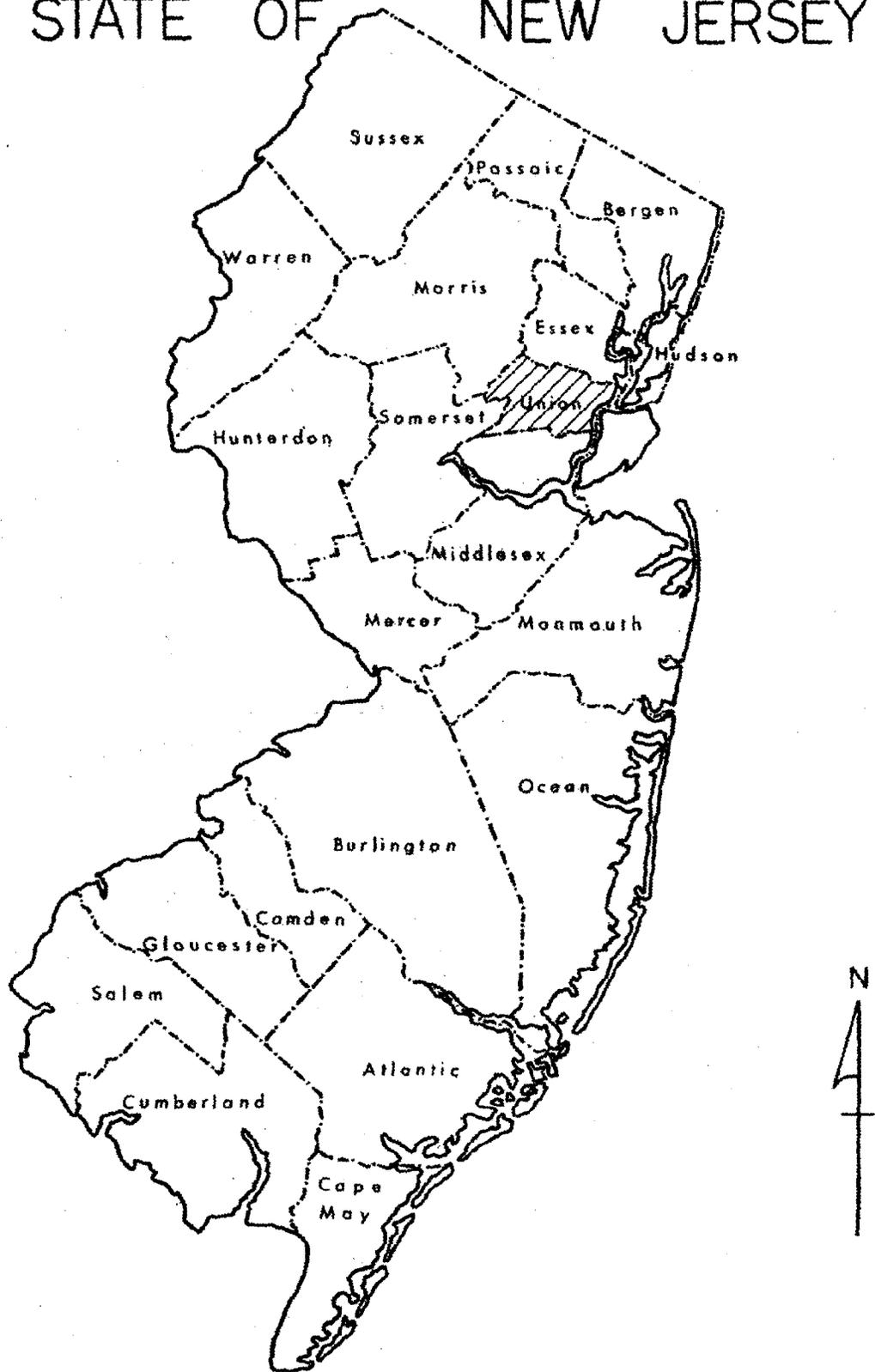
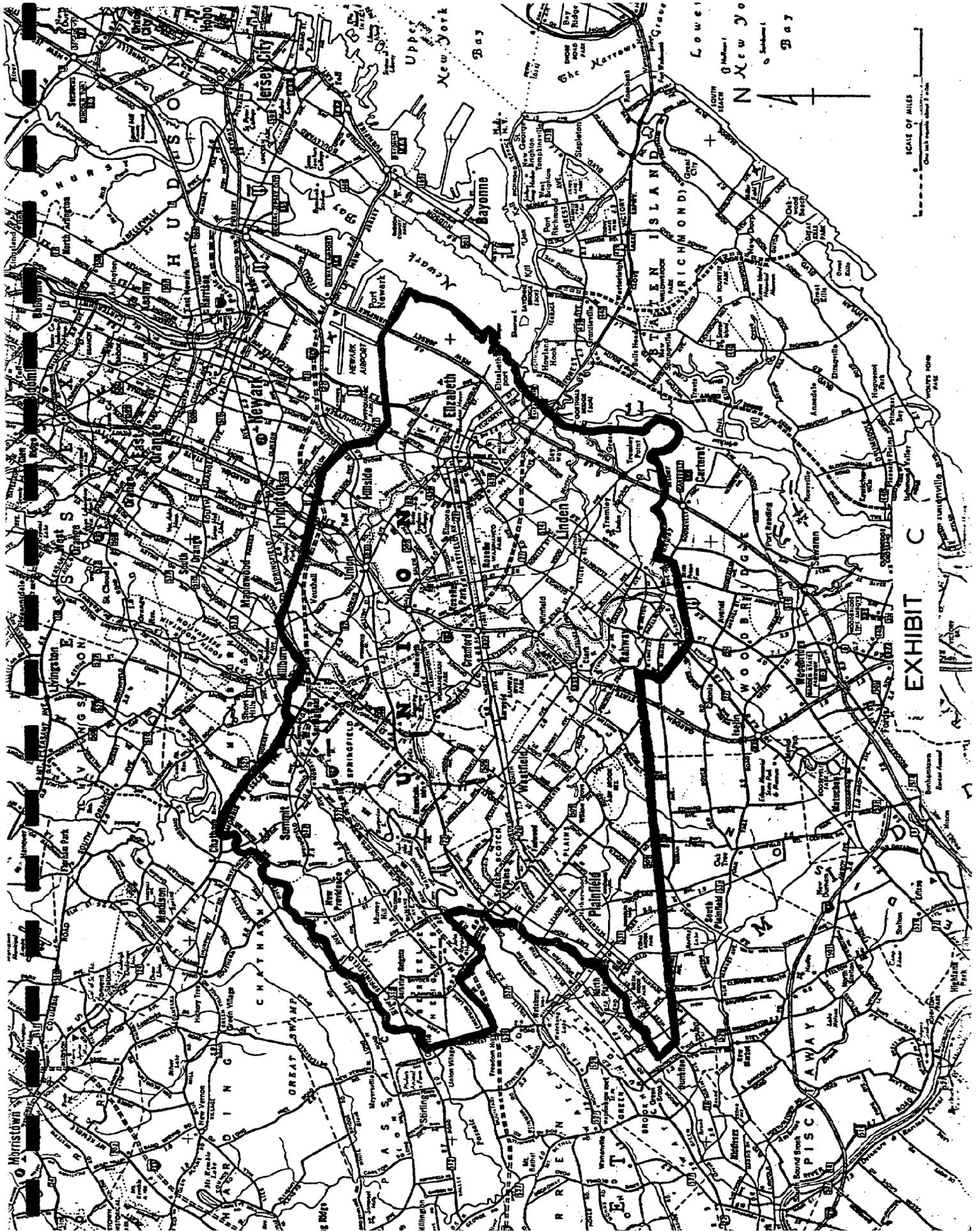


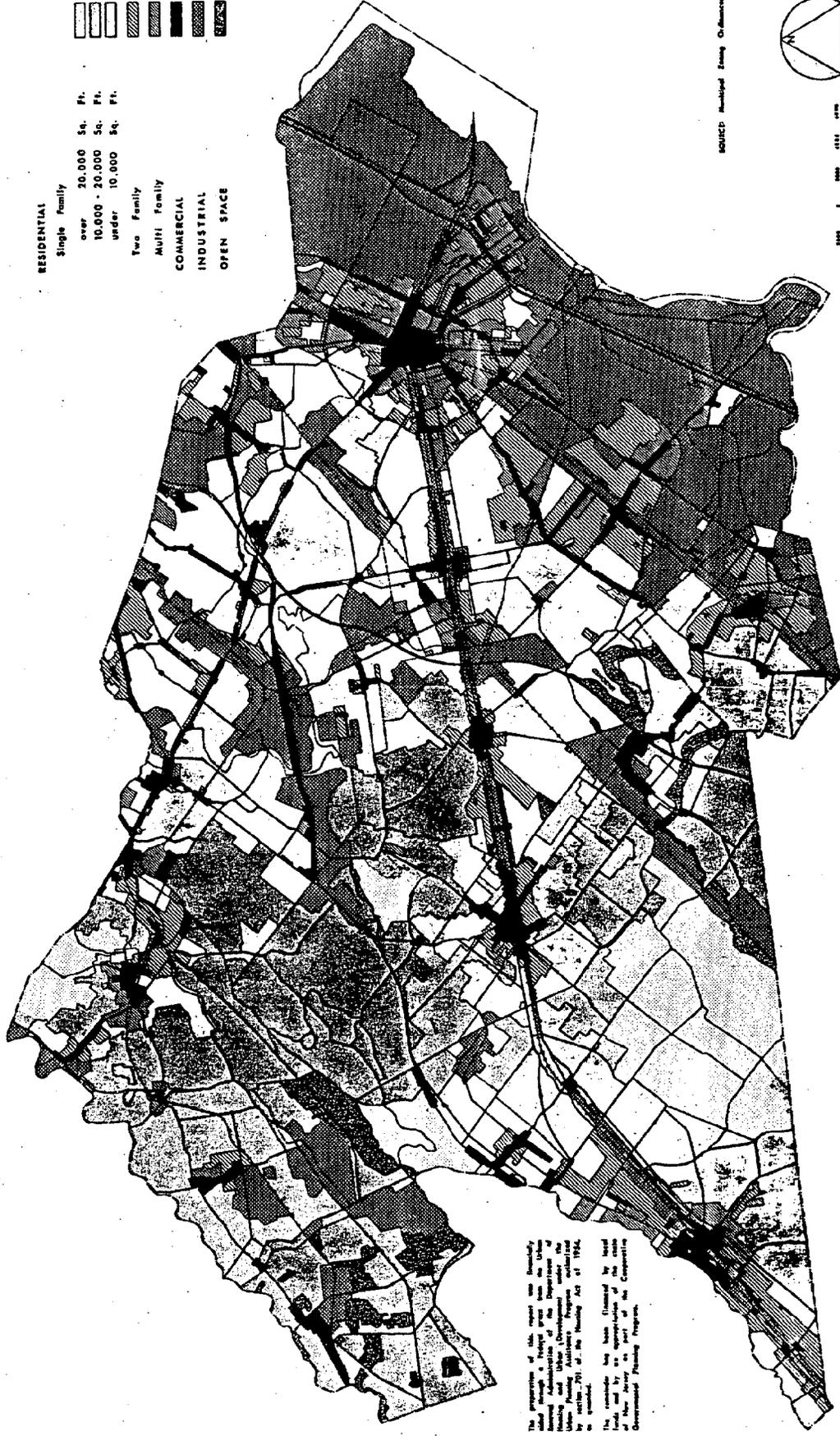
EXHIBIT B



SCALE OF MILES
One inch equals about 1 mile

EXHIBIT C

ZONING PATTERN 1967



The preparation of this report was financed by the State of North Carolina through the Housing and Urban Development Administration's Housing and Urban Development Program, authorized by Public Law 85-809, the Housing Act of 1966. The contents have been prepared by the staff of the County of Union, North Carolina, as part of the County's Comprehensive Planning Program.

UNION COUNTY PLANNING BOARD

EXHIBIT D

EASTERN UNION COUNTY VACANT LAND ZONING - 1976

RESIDENTIAL

Single Family

over	20,000	Sq. Ft.	
10,000 -	20,000	Sq. Ft.	
under	10,000	Sq. Ft.	

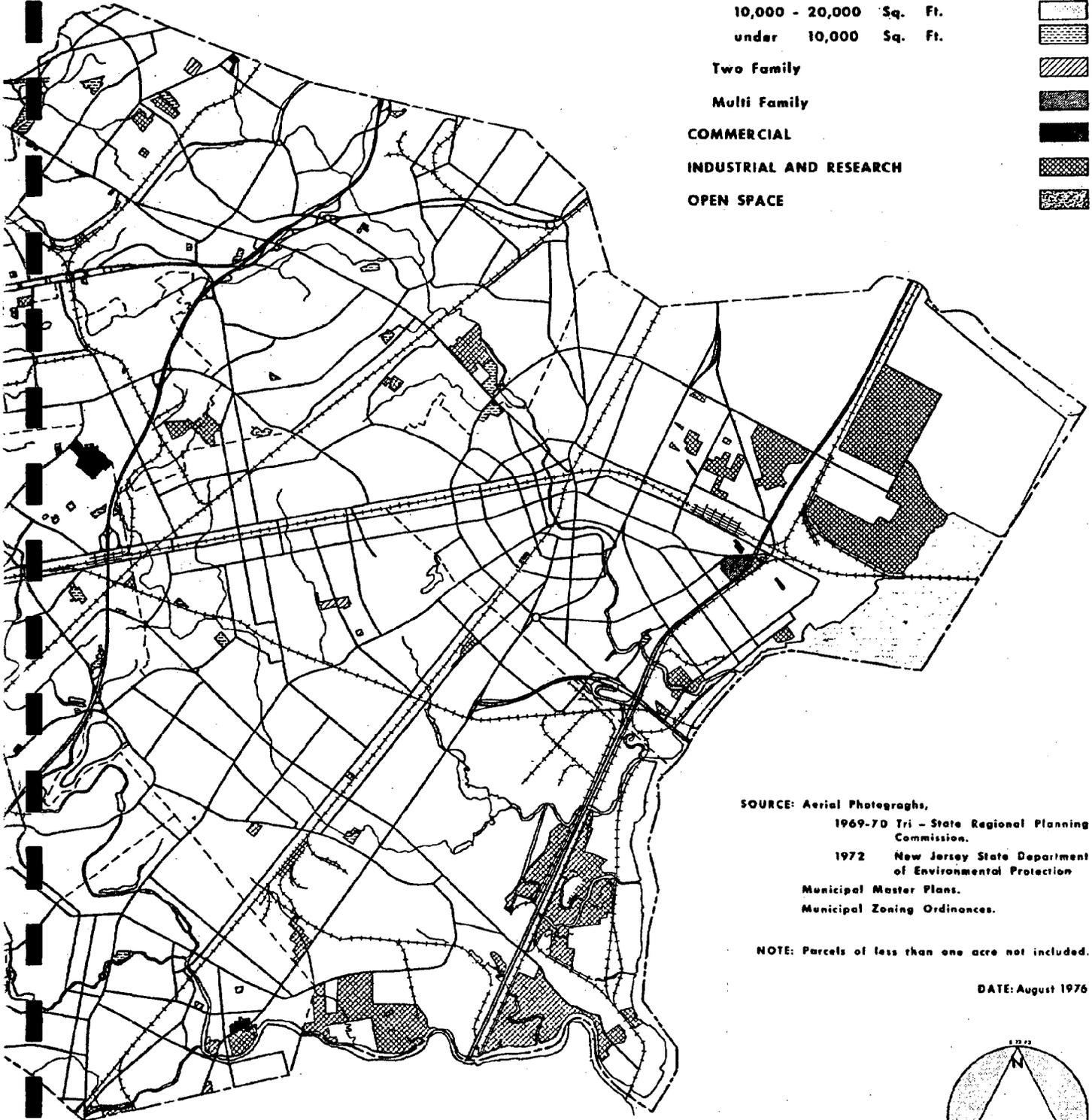
Two Family

Multi Family

COMMERCIAL

INDUSTRIAL AND RESEARCH

OPEN SPACE



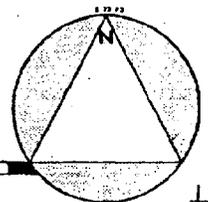
SOURCE: Aerial Photographs,
1969-70 Tri - State Regional Planning
Commission.
1972 New Jersey State Department
of Environmental Protection
Municipal Master Plans.
Municipal Zoning Ordinances.

NOTE: Parcels of less than one acre not included.

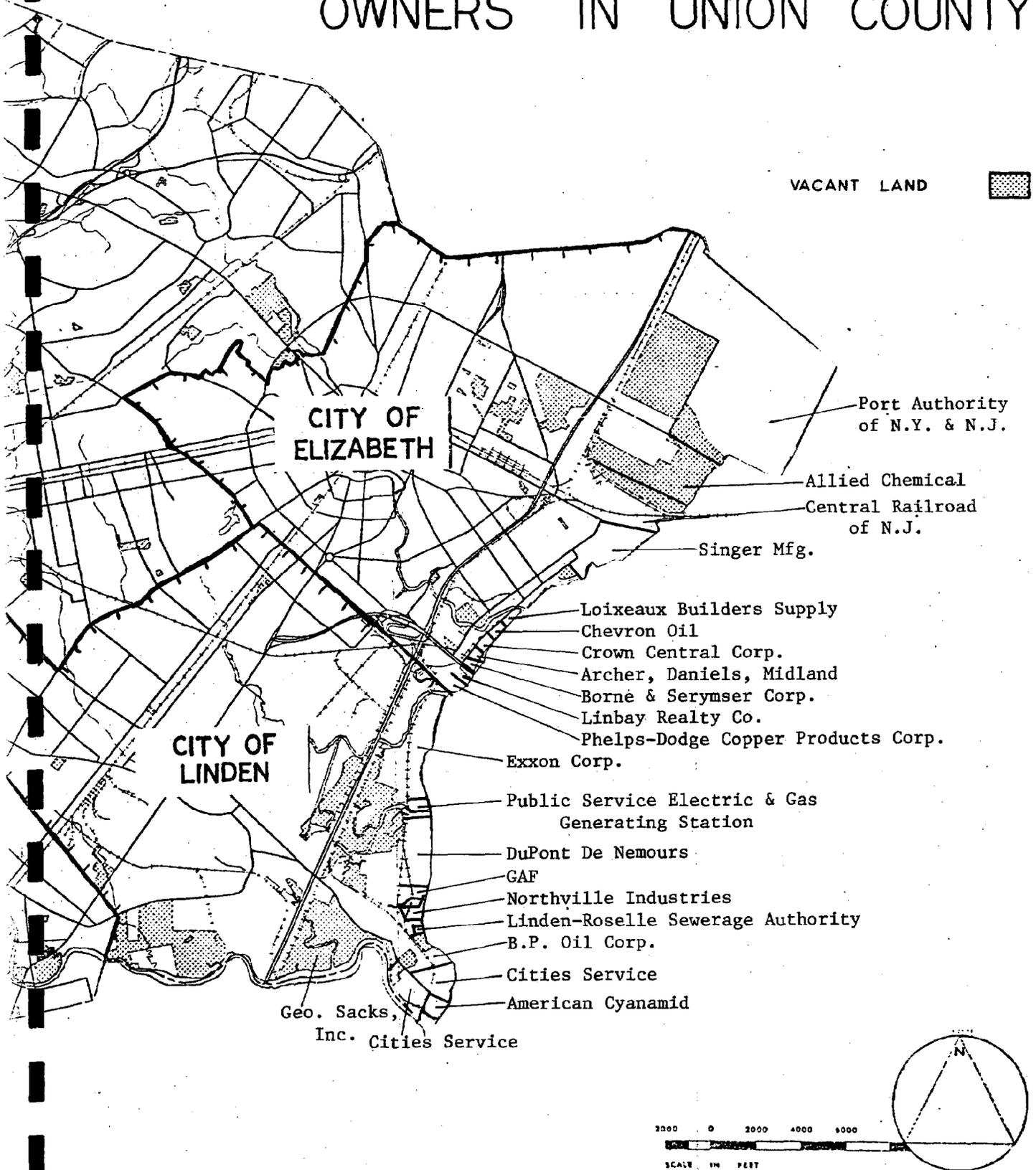
DATE: August 1976

EXHIBIT E

2000 0 2000 4000 6000
SCALE IN FEET



MAJOR WATERFRONT PROPERTY OWNERS IN UNION COUNTY



which, coupled to the declining birth rates, has led to a slight population decline in the county. This trend is expected to continue. Table 1, Summary of Community Population Forecasts, Union County, 1970 - 2000, shows present and projected population levels in the county.

C. EMPLOYMENT.

Table 2 outlines the employment breakdown in Union County. As can be seen from the table, the largest employer in the county is the manufacturing industry. Chemicals, metals, machinery and drug concerns account for the largest of the manufacturers.

The following table contains some statistics concerning Union County's employment situation:

LABOR FORCE DATA FOR UNION COUNTY

1976 ANNUAL AVERAGES

Labor Force	258,000*
Employment	233,100
Unemployment	25,000
Rate	9.7%

*State preferred method of calculation, as provided by the New Jersey Department of Labor and Industry.

Available data from the New Jersey Department of Labor and Industry for 1977 shows a drop in the unemployment rate to about 8.5 percent in Union County.

TABLE 1

SUMMARY OF COMMUNITY POPULATION FORECASTS,
UNION COUNTY, 1970-2000

	Actual		Projected		
	1960	1970	1980	1990	2000
Berkeley Heights	8,721	13,078	13,300	13,200	13,100
Clark	12,195	18,829	19,200	19,600	19,800
Cranford	26,424	27,391	26,500	26,100	25,400
Elizabeth	107,698	112,654	110,400	108,600	107,100
Fanwood	7,963	8,920	8,400	8,100	7,900
Garwood	5,426	5,260	5,100	4,900	4,800
Hillside	22,304	31,636	20,600	20,000	19,900
Kenilworth	8,379	9,165	9,000	8,900	8,800
Linden	39,931	41,409	40,300	40,200	40,600
Mountainside	6,325	7,520	7,400	7,300	7,200
New Providence	10,243	13,796	13,100	12,300	12,100
Plainfield	45,330	46,862	46,000	47,700	49,000
Rahway	27,699	29,114	29,100	29,500	31,000
Roselle	21,032	22,585	21,700	22,000	22,200
Roselle Park	12,546	14,277	14,100	14,300	14,500
Scotch Plains	18,491	22,279	22,400	23,000	23,200
Springfield	14,467	15,740	15,900	16,100	15,900
Summit	23,677	23,620	23,600	24,000	23,800
Union	51,499	53,077	51,200	51,000	50,200
Westfield	31,447	33,720	32,400	32,500	32,600
Winfield	2,458	2,184	1,900	1,800	1,800
Union County	504,255	543,116	531,600	531,100	530,900

Source: U.S. Census of Population, 1960 and 1970 and Hammer, Siler, George Associates.

Table 2

1973 Employment - Union County

		<u>Totals</u>	<u>% Employed in Industry</u>
Total Employment		227,154	
Agr.-Svcs.-For.-Fish.		358	< 1%
Mining		111	< 1%
Construction		10,902	5%
Manufacturing		95,948	42%
	<u>SIC</u>		
Food Products	20	3,578	
Textiles	22	1,438	
Apparel	23	4,001	
Lumber	24	577	
Furniture	25	2,113	
Paper	26	2,170	
Printing	27	4,316	
Chemicals	28	13,990	
Ind. Organics	281	3,211	
Plastics	282	520	
Drugs	283	7,596	
Cleaners	284	1,326	
Paints	285	408	
Other	289	915	
Petro. Ref.	29	887	
Rubber	30	4,826	
Leather	31	553	
Stone/Clay	32	681	
Prim. Metals	33	3,902	
Fabric. Metals	34	10,232	
Metal Svcs.	347	478	
Plating	3,471	424	
Machinery	35	10,454	
Elec. Mach.	36	10,765	
Trans. Equip.	37	5,814	
Instruments	38	1,503	
Other	39	3,057	
Trans. - P.U.		16,041	7%
Wholesale		24,363	11%
Retail		34,107	15%
Fin.-Ins.		11,626	5%
Services		33,146	15%

Source: U. S. Department of Commerce, County Business Patterns, 1973, N.J.

D. AIR AND WATER RESOURCES.

1. Air Resources.

The New Jersey Department of Environmental Protection, in the Annual Report for Fiscal Year 1976, listed the 20 locations used in the State's air index. Elizabeth, the only Union County community in the index, registered the "Unhealthful" air quality classification for 23 percent of the recording days in FY-76. The "Unsatisfactory" classification was registered 39 percent of the time and the "Satisfactory" classification 38 percent of the time. There were no days that registered the "Good" classification.*

One pollutant which is among the most concentrated in Union County is suspended particulate matter. Hydrocarbons are also a problem and these are caused mainly by the high concentration of traffic in the area. EPA is turning attention to these two types of pollution to prevent an increase of either one in the ambient air.

The Union County region now meets acceptable standards for sulfur dioxides because of enforcement of air pollution laws by State and Federal agencies. Sulfur dioxides once were a major problem in Union County. Another pollutant which is receiving increased attention but for which there is no standard is nitrogen oxides. These are a major component of smog. At the present time there is no control over nitrogen oxide emissions, however in the future, "new source" performance standards may be applied by the State. This means that machinery which emits nitrogen oxides would have to be the most modern available.

*The City of Elizabeth Planning Dept. notes that these values are not typical of the city because the monitoring station is situated next to the New Jersey Turnpike.

2. Water Resources.

Major drainage basins in Union County are the Passaic River, Raritan River, Rahway River, Morses Creek, Elizabeth River, and Newark Bay/Arthur Kill Basins (see Exhibit G). The portions of the Passaic and Raritan Rivers which lie in Union County are entirely freshwater. The lower reaches of the Rahway River, Morses Creek and Elizabeth River flow partially fresh and partially brackish. The Arthur Kill and Newark Bay are brackish. State surface water classifications range from FW-2 to TW-3. The Passaic River, Raritan River, and Rahway River are used for potable water supply either in Union County or elsewhere. Additional supplies of potable water are piped into the county from the Upper Passaic Basin and the Upper Raritan Basin.

In addition to the surface water supplies mentioned above, the county is dotted with groundwater withdrawals, some of which, in the western portion of the county, are used for potable water purposes.

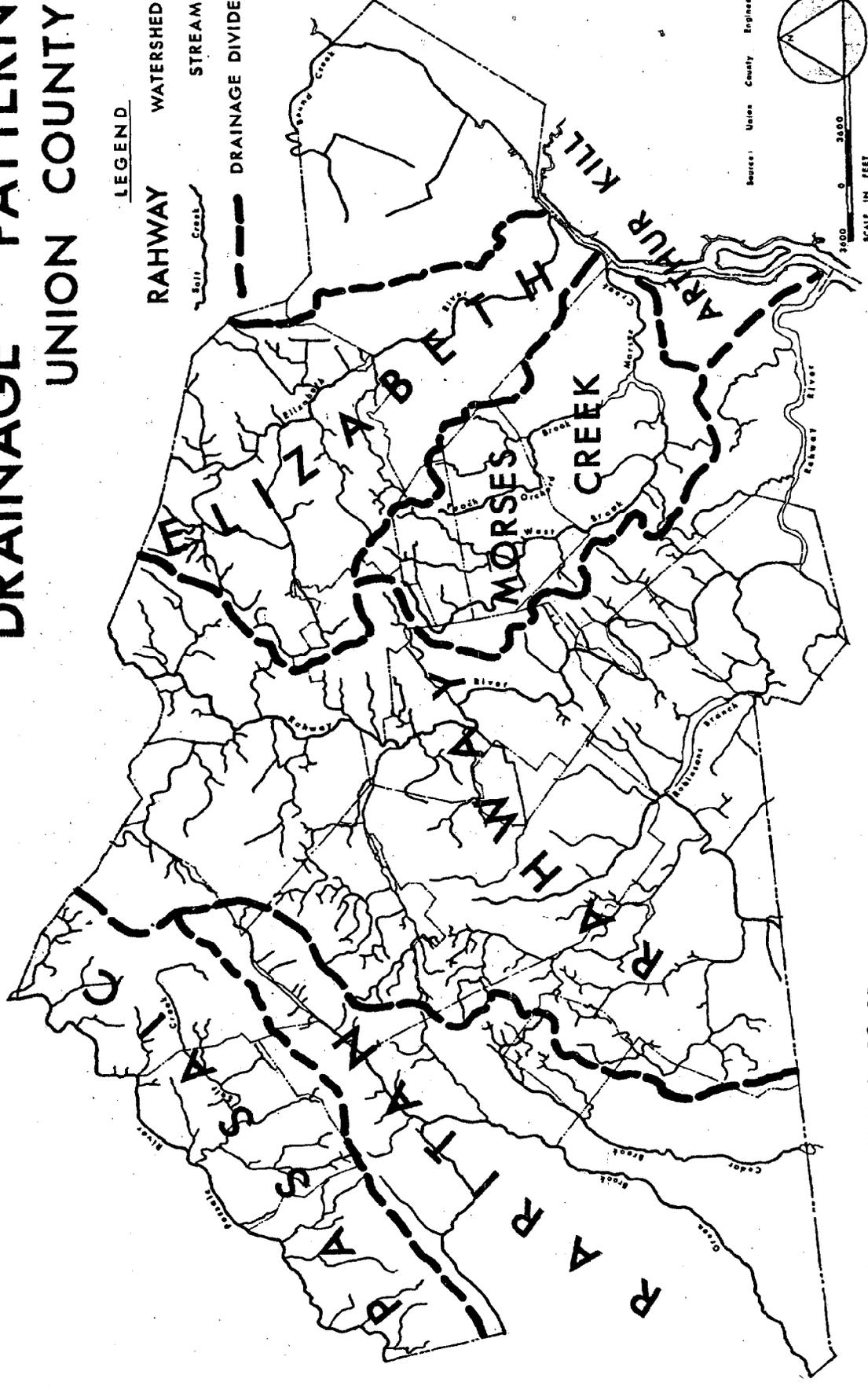
The surface and groundwater supplies in the county used for potable water purposes would be those waters which would require the highest degree of protection. Pipeline construction through these areas might require special measures to insure that these waters are not degraded. Of particular concern is the Middlesex Reservoir in Clark which serves as a reserve supply for the Middlesex Water Company.

The Arthur Kill and Newark Bay, which lie along the cities of Linden and Elizabeth, are used principally as an industrial waterway. The channels and ports along these waterways are among the busiest in

DRAINAGE PATTERN UNION COUNTY

LEGEND

-  **RAHWAY**
-  **WATERSHED**
-  **STREAM**
-  **DRAINAGE DIVIDE**



Source: Union County Engineer
 3000 0 3000
 SCALE IN FEET

UNION COUNTY PLANNING BOARD

EXHIBIT G

the world. If there is to be any major support facility in Union County for OCS exploration and development it would be located here.

Water quality in the Arthur Kill and Newark Bay is very poor due to inadequately treated municipal and industrial effluents, combined sewer overflows, storm water runoff, and miscellaneous pollution sources. Among the miscellaneous sources are chronic oil spills.

The Coast Guard has information on medium and major spills since 1972. This information includes the date of occurrence, location, source, probable reason for the spill and the type of material spilled. Human error remains a prominent cause of oil spills in the Arthur Kill and Newark Bay.

Any reduction in the frequency of these spills would be of benefit to Union County. Should outer continental shelf oil be piped to the Exxon refinery, causing a reduction of tanker traffic, fewer spills could be expected.

E. TRANSPORTATION NETWORK.

1. Land Based Systems.

Union County, being nearly fully developed, has comprehensive land based transportation systems. The county is traversed along its east - west axis by U. S. 22 and N. J. Route 28, and by partially completed I-78. Major links on the north - south axis are the Garden State Parkway, U. S. 1-9, the New Jersey Turnpike and N. J. Route 27. In addition to these major roadways the county and local roadway system completes the transportation network (see Exhibit B).

Major railways in the county are now run by ConRail, including the former Erie Lackawanna, Central Railroad of New Jersey, Lehigh Valley Railroad, and the Penn Central Railroad. These lines provide, in addition to commuter service, freight service with many terminal points along Newark Bay and the Arthur Kill. Exhibit H highlights the major railways in Union County.

2. Air Transport.

Newark International Airport lies in both Newark, in Essex County, and Elizabeth, in Union County. This airport provides complete services including facilities for commercial passenger service, private aircraft, freight, and helicopter service.

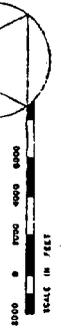
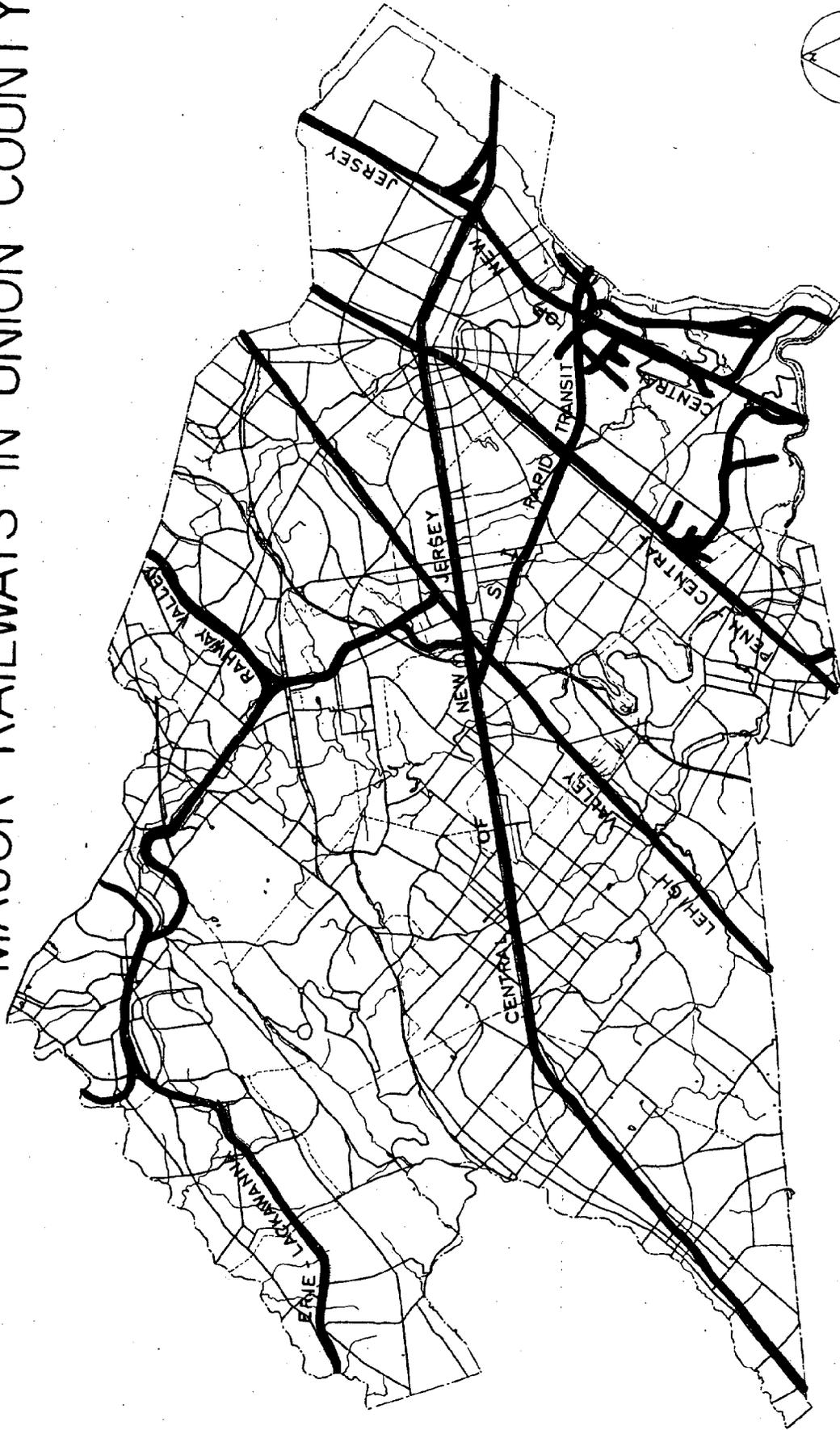
Linden Municipal Airport is a general service airport located on U. S. 1-9 in Linden.

3. Marine Transportation.

The major shipping channels adjacent to Union County lie in the Arthur Kill and Newark Bay. The depth of these channels are shown by the Corps of Engineers to be maintenance dredged to 35 feet. A depth of 40 feet is maintained along the Elizabeth - Port Authority Marine Terminal, a major containership port, and its access channels.

Minor channels in the Elizabeth River and the Rahway River have project depths of 12 and 8 feet respectively. These stretches have not, as yet, been dredged to the authorized depths.

MAJOR RAILWAYS IN UNION COUNTY



UNION COUNTY PLANNING BOARD

EXHIBIT H

The Coast Guard provides information relative to accidents involving vessels from July, 1968 to 1976 in the Arthur Kill and Newark Bay. This computerized data indicates case number, cause, whether the accident was preventable, location, date, time, type of cargo, damage estimate, types of vessels involved, and casualties. The data indicates over 300 recorded accidents in Newark Bay and the Arthur Kill in the reporting period. Vessels involved ranged from ferries to tankers, and cargoes included such things as garbage from scows, containers from freighters and flammable liquid from tankers, including oil.

Because New York Harbor is such a busy port, the Coast Guard is considering implementation of a Vessel Traffic Control System. This would help to control traffic flow in the port through the use of electronic gear which every vessel using the port would be required to install. It is hoped that this will eliminate accidents and improve shipping efficiency.

Both Newark Bay and the Arthur Kill are very heavily trafficked. According to the Coast Guard compilation of waterborne commerce, in 1975, Newark Bay experienced over 5,000 round trips, which does not include tugboats. The Arthur Kill experienced almost 30,000 round trips, not including tugboats.

In Newark Bay, over two-thirds (10,500,000 tons) of the cargo carried in 1975 was miscellaneous non-petroleum products. The other 5,000,000 tons were petroleum products. On the Arthur Kill, on the other hand, the bulk of the cargoes were petroleum products: 88,900,000 tons out of a total of 98,800,000 tons. This is due to the location of

numerous marine terminals along the Arthur Kill from Raritan Bay to Newark Bay.

F. ENVIRONMENTALLY SENSITIVE LAND.

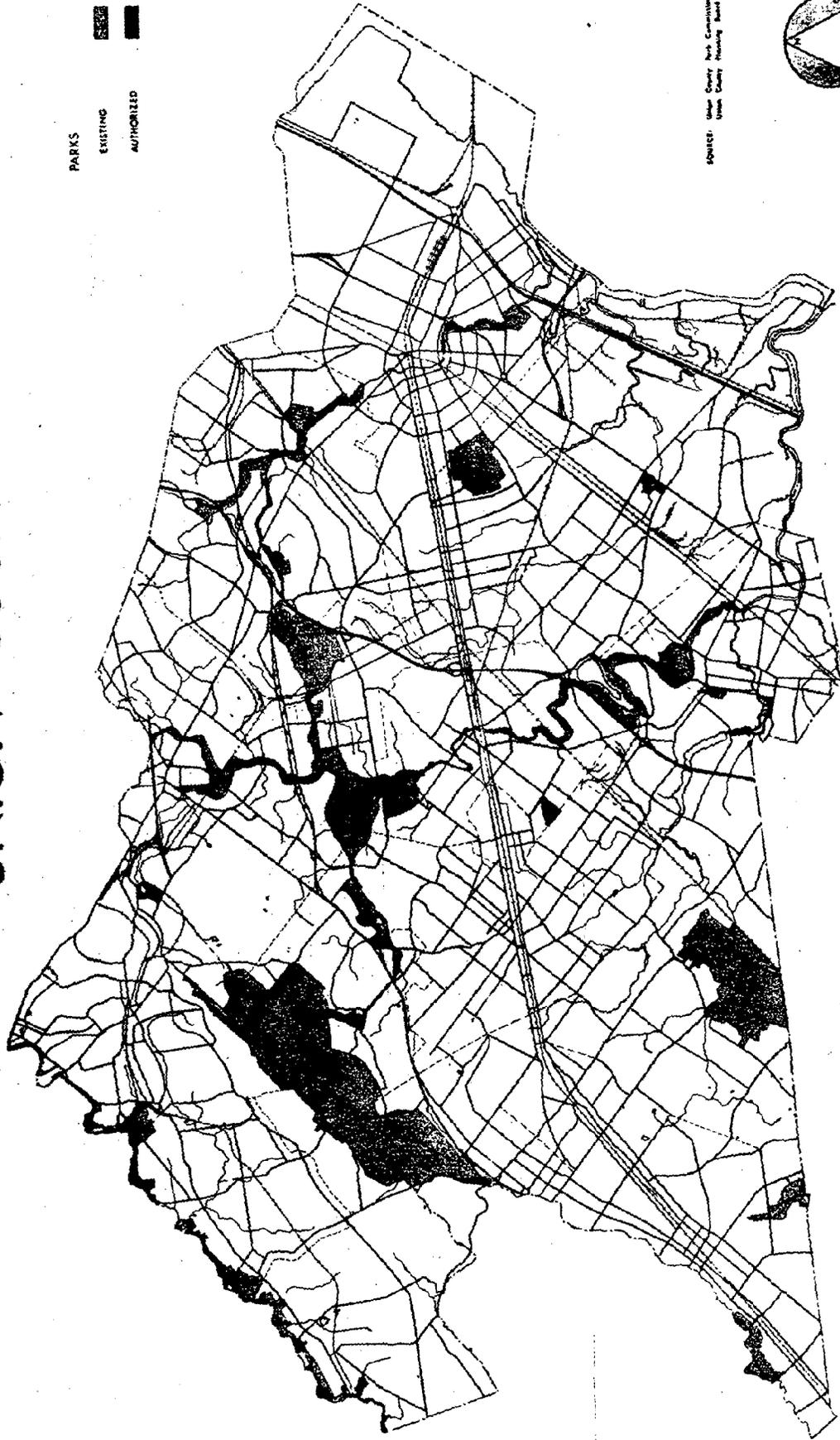
In view of Union County's highly developed state, established parkland and other dedicated open space must receive the highest degree of protection. This should apply to both county and municipal parkland (see Exhibit I).

Areas of steep slopes are another area of concern. In eastern Union County, however, there are very few areas with slopes over 7 percent, so this factor should not prove to be an impediment to development.

Many areas within the county experience flooding. In an effort to alleviate this problem the county has formulated a model Storm Water Control and Flood Plain Ordinance. Most of the municipalities within the county have adopted ordinances based on this model. Although they differ slightly they all require that any new development (with certain exceptions) contribute no more runoff than the site produced before the proposed new construction. This means, in most cases, that new development must provide for on-site detention of storm water. Any major development would be bound by these ordinances.

Most of Union County is within the study areas of two on-going 208 Water Quality Programs. These programs are the Northeast 208 and Lower Raritan/Middlesex County 208. It is expected that additional information on the identification of environmentally sensitive areas will be made available through these two programs.

UNION COUNTY PARK SYSTEM



UNION COUNTY PLANNING BOARD

EXHIBIT I

G. ENERGY RELATED FACILITIES IN THE COASTAL ZONE.

1. Refineries.

(a) Exxon's Bayway Refinery, located in Linden near the New Jersey Turnpike, is the only oil refinery in Union County. It processes crude oil at the full plant capacity of 300,000 barrels per day. All of its crude oil supply is imported with approximately half coming from Venezuela and half from Saudi Arabia. The Saudi Arabian oil has a high sulfur content and through the refinery process, this impurity is reduced to its elemental state and marketed.

A crude oil reserve of 7-10 days is maintained to allow for tanker delays and other problems.

Refining emphasis is on gasoline in the summer and fuel oil in the winter.

Associated with the refinery are tanker receiving facilities, storage tanks, and a petrochemical plant. Exxon also keeps a private water reservoir on its Linden property for refinery processing and has sufficient reserve lands for expansion purposes if needed.

2. Marine Terminals.

(a) Exxon, in association with the Bayway Refinery in Linden, has a crude oil receiving facility which is capable of berthing two tankers and four tank barges simultaneously. Exxon has the only crude oil terminal in Union County. On a typical day there may be one ship and one or two barges. Dockside and channel depths are thirty-eight feet. The larger tankers that come from overseas must offload part of

their cargo onto barges before entering the New York Harbor Channels. The largest fully loaded vessel that can be received at Bayway Refinery, due to the limited depths, is 50,000 tons.

(b) Cities Service, on Tremley Point Road in Linden, has an active marine terminal which receives, stores and ships finished petroleum products such as gasoline, petroleum and kerosene. It deals in only domestic trade between the Middle Atlantic States and New England and can handle two barges at a time.

(c) B. P. Oil Co. is located north of Cities Service on Tremley Point Road in Linden. Like the Cities Service Terminal, B. P. receives, stores and ships finished petroleum products. Berthing capacity is approximately two barges.

(d) Northville Industries is located north of B. P. Oil Co. on Tremley Point Road in Linden. They receive, store, and ship #6 and #2 fuel oil and are primarily agents for Con Edison in New York. Northville Industries has about 9 storage tanks near the waterfront area and handles one or two barges at a time. It is not as large an operation as either B. P. or Cities Service.

(e) Archer, Daniels, Midland Corp. is located on Front Street in Elizabeth. They receive monthly shipments of fish oil and linseed oil.

(f) Crown Central Corp. is located north of Archer, Daniels Midland Corp. on Front Street in Elizabeth. They store and ship fuel oil and gasoline and can handle two barges at a time.

(g) Chevron Oil Corp.'s marine terminal is a transfer point for refined petroleum products, mainly oils and greases. They can handle one barge at a time. They are located north of Crown Central Corp. on Front Street in Elizabeth.

(h) Port Elizabeth, operated by the Port Authority of New York and New Jersey, is not a terminal for petroleum products but for containerized freight. It deals very heavily with international trade having experienced 1,446 ship arrivals during 1976, carrying almost 9 million long tons of cargo. The Port has 22 berths, most of which are reserved for containerships. Bulk cargoes of scrap lumber and fuel oil are also handled. The Port is approximately 2 square miles and is the largest containerport in the world. It faces into Newark Bay and access is through the Kill Van Kull. Dockside depths are 40 feet.

3. Pipeline Terminals.

(a) Mobil Oil has a storage and distribution facility on Tremley Point Road in Linden. The local market for Mobil gasoline is served from the nine storage tanks on the property through truck deliveries.

4. Pipelines.

Many major pipelines reach Union County, almost all from a southwest direction. These are the Sun Pipeline, Sohio Pipeline, Buckeye Pipeline, Exxon Pipeline, Shell Pipeline, Calso Pipeline, Texas-Eastern Pipeline, Colonial Pipeline, California - Shell Pipeline and the Hess - Shell Pipeline. There are many other local pipelines which connect marine terminals with storage tanks and storage tanks with refining operations.

5. Electrical Generating Stations.

(a) Graselli Generating Station in Linden is operated by Public Service Electric and Gas. It burns oil as fuel and is the major supplier of electricity in the region. The plant is not equipped to burn either coal or gas.

6. Gas Plants.

(a) Synthetic Natural Gas (SNG) is produced at a plant in Linden which is 90 percent owned by Public Service Electric and Gas and 10 percent owned by Elizabethtown Gas. SNG is used during peak use periods to supplement natural gas supplies. The SNG plant has been experiencing operational difficulties since its start up in December 1974 but is operating at the present time.

(b) Liquid Propane Gas (LPG) is mixed with air and then cut into natural gas supplies at a plant on Third Avenue in Elizabeth which is owned and operated by Elizabethtown Gas Company. LPG is used for peak shaving purposes only.

7. Chemical Plants.

There are four major chemical plants in Union County's coastal zone. These are all located directly on the Arthur Kill. They are American Cyanamid, E. I. duPont de Nemours, Exxon Chemical and Allied Chemical. The first three are in Linden and Allied Chemical is in Elizabeth, south of the containerport. They are all large industrial complexes.

8. Oil and Gas Company Offices.

(a) Elizabethtown Gas Company and its parent corporation, National Utilities Industries, are co-located in their headquarters building on West Jersey Street in Elizabeth. Elizabethtown Gas is the distributor of most of the natural gas consumed in Union County. It also owns 10 percent of the SNG plant in Linden and fully owns the LPG peak shaving facility on Third Avenue.

(b) Exxon Corporation has a large office facility in association with the Bayway Refinery and also has a large research complex, Esso Research, located to the north of the refinery on U. S. Route 1-9 in Linden.

9. Other Related Industries.

In addition to the aforementioned facilities there are numerous ancillary industries which may potentially support or be affected by outer continental shelf development. A number of firms which deal with ship repair, conversions, marine equipment manufacture, petroleum products, etc., are located near the Elizabeth Port Authority Marine Terminal.

II. TYPES OF OCS ENERGY RELATED FACILITIES AND THEIR POTENTIAL IMPACTS
ON COASTAL SITES IN UNION COUNTY.

The following are OCS related facilities which could have impacts on, or be located in, Union County:

- A. OFFSHORE EXPLORATION SUPPLY BASE.
- B. OFFSHORE PRODUCTION SUPPLY BASE.
- C. OIL AND GAS PIPELINE.
- D. GAS PROCESSING PLANT.
- E. MARINE TERMINALS FOR CRUDE OIL.
- F. REFINERIES.
- G. PIPE COATING YARDS.
- H. PLATFORM FABRICATION YARDS.
- I. LIQUID NATURAL GAS (LNG) MARINE TERMINAL.

Each facility will be described and then discussed in terms of their physical, environmental, economic, and where possible, political impacts. All facts and figures on the different facilities were taken from the New England River Basins Commission - Resource Land Investigation Program's Factbook - Onshore Facilities Related to Offshore Oil and Gas Development except where otherwise noted.

A. OFFSHORE EXPLORATION SUPPLY BASE.

1. Description:

The primary purpose of an exploration supply base is the transfer of goods and personnel to and from offshore operations.

- Five acres of land per drilling rig
- All weather harbor
- Flat vacant waterfront bounded on one side by at least
200 feet of marginal wharf
- Minimum depth of 15-20 feet at dockside
- Within 150 miles of drilling operations
- Accessibility by road, rail, air and sea
- Abundance of fresh water supply (5,200,000 gal/rig/yr.)
- Availability of hotels, motels and housing as well as
entertainment to meet the needs of personnel and
their families
- Availability of ancillary services like marine repair
yards, diesel mechanics and supply stores
- On-site storage of fuel for drilling operations of
250-1,000 tons/berth (26,000 bbl/rig/yr.)
- Warehousing, open storage, limited office facilities
for communications and paperwork and sometimes a
helipad
- 45 jobs/rig
- Area of low environmental sensitivity
- 24 hour operation of 2 or 3 supply boats and a crew boat
per rig

Sometimes when distances to the offshore rigs are great enough and the seas and weather tend to be rough, helicopters are relied upon for the transfer of personnel rather than crew boats.

2. Discussion of impacts:

(a) Physical and Environmental.

Because of the waterfront depth requirements of an offshore exploration supply base, the only waterways on which this type of facility could be located in Union County would be the Arthur Kill, an all weather channel with depths of 35 feet; or Newark Bay, south of Port Elizabeth. Although the Elizabeth River has an authorized depth of 12 feet according to the Corps of Engineers, the maintenance dredging required to sustain this depth is not done routinely. The Rahway River along the south border of Linden has a Corps authorized depth of 8 feet and is not maintenance dredged routinely either.

A supply base could conceivably be located on either river, near where they join the Arthur Kill, if the work boats could navigate the relatively shallow depths, or if the supply base developer wanted to deepen portions of these rivers to accommodate the work boats.

Waterfront development in Union County along the Arthur Kill and Newark Bay is highly industrialized, ranging from the containership Port of Elizabeth in the north to the tank farms and tanker receiving facilities to the south in Linden. There currently are available some sizeable vacant waterfront tracts as well as parcels of unused developed waterfront. Many of these sites are large enough to accommodate a supply base. (See map of specified sites in Section III.)

The terrain in these waterfront areas is very flat and close to sea level. In order to develop some of the vacant waterfront land into functional waterfront, dredging and filling may be required. Because there is no shell fishing industry or any known environmentally sensitive fish population in the immediate area of Union County, gaining permits to perform dredging along this section of the Arthur Kill and Newark Bay should not be difficult.

Some of the unused waterfront in Union County is owned by the oil companies. They may have plans for this land but to all appearances, it remains idle.

Crew boats and workboats are small vessels relative to the tankers, barges and containerships which frequent the Arthur Kill and Newark Bay. These should not add a significant load to waterborne traffic on these waterways and because of their relative maneuverability, should not present a hazard to normal commercial and industrial navigational operations. These vessels may also be required to participate in the Coast Guard's Vessel Traffic Service Program for New York Harbor.

It is preferred that any helicopter usage be based at existing airports, either Linden Municipal or Newark International. These airports are so close to the waterfront areas that it is better to have additional helicopter activity controlled from either of these airports to reduce the possibility of accidents.

All the waterfront areas are readily accessible by road, rail, air and sea. It is not anticipated that road traffic would

be noticeably impacted by the services required by an exploration supply base. Many of the supplies, such as mud, cement, and tubular goods may be delivered by rail. Union County has rail service along the entire waterfront. Some of the individual industries that are heavy users of rail shipments have connecting terminals at their dock facilities.

There are also many facilities along the waterfront which are suitable for receiving shipments by barge, in the event that the supply base chosen could not accommodate larger vessels.

A variety of ancillary services such as marine repair and engineering services operate near Port Elizabeth so that there services, if needed, would not be hard to obtain.

The major supplier of potable water to Union County is Elizabethtown Water Company. Arrangements would probably have to be made with them to supply water in the quantities needed since wells in the waterfront vicinity would produce brackish water. Exxon Corp. maintains a private reservoir of fresh water on its property in Linden by using dams on Morses Creek. This water is not potable but is used for refinery operations. The Rahway and Elizabeth Rivers are both brackish in the waterfront areas because they are tidal estuaries.

Since both Linden and Elizabeth are industrial centers, there are many hotels, motels and restaurants. Oil company personnel should have no problem finding accommodations. In addition, New York City is less than 20 miles away, affording as much a variety of entertainment as any of their personnel could possibly want.

(b) Economic.

The general assumption is that out of about 45 jobs created at a temporary supply base for each drilling rig served, three-fourths of these jobs could be filled by local personnel. The total impact on the surrounding cities in terms of increases in population would be very roughly 15 persons per rig and possibly their families. The existing infrastructure is so extensive in this area that there can be expected little, if any, impact. It is not expected that a base support more than four exploratory rigs drilling at any one time out of one base, so that the maximum number of new residents associated with exploration supply base operation remains quite small and would probably not exceed 100 total since some specialized personnel could perform their duties for more than one rig at a time.

Any jobs created by a supply base operating within the county, which could be filled by the local labor force, would supply some badly needed jobs. Unemployment in the county averages 8.5% (1977 first half) according to the New Jersey Department of Labor and Industry. Much of this labor pool are unskilled or semi-skilled labor. Some people may be attracted from their present jobs in the area to work at the supply base because of better salaries, thus creating vacancies in existing employment. In addition to direct employment impacts, ancillary services could be expected to show some increase in business, perhaps prompting them to increase hiring.

Depending on the leasing arrangement and the amount of construction necessary, the capital investment for a temporary base can range from \$150,000 to \$250,000. The construction of the service base site could also create several temporary jobs.

To date, oil and service companies have leased land at an existing supply base in Davisville, Rhode Island. These companies are expected to serve both the Georges Bank as well as the Baltimore Canyon Trough. Although Rhode Island may be conveniently located between the two, if drilling in the Baltimore Canyon is to be on a larger scale, considerable transportation costs may be saved by locating a base in New York Harbor. New York Harbor is close enough to the Georges Bank so that non-regular runs of supplies could be made, if needed, to rigs drilling there. These locational decisions, however, are entirely and justifiably left to the discrimination of the companies involved.

(c) Political.

The Union County Planning Department sees the location of an exploration supply base in either Linden or Elizabeth as being low in adverse impact and high in promise. If offshore oil is found and the support operations are running satisfactorily out of a base in Union County, then perhaps the production supply base would be located in Union County as well. A production supply base is a major, permanent operation which could make significant contributions to the local economy.

Neither Elizabeth nor Linden have expressed disinterest in the possibility of an exploration supply base locating in their cities. In fact, the Mayor of Elizabeth went on record (Exhibit J) on the front page of the local newspaper as encouraging this type of development. A resolution (Exhibit K), was received from Elizabeth regarding their position on exploration supply bases:

Supply base for oil, gas drillers?

A supply base to support offshore oil and gas drilling operations could be located in Elizabeth, and officials here are hoping to negotiate for the establishment of such a facility in Port Elizabeth, it was learned Tuesday night.

City council members were advised by Mayor Thomas G. Dunn that the Union County Planning Department has contracted with the state Department of Environmental Protection (DEP) to study the potential local impact of the proposed outer continental shelf exploration and development.

One energy-related facility required by such drilling is an onshore supply base to support the operations. Because of the constraints of the waterfront location and dockside depths, Elizabeth and Linden are the only cities in Union County where such a base could be located.

"Because Elizabeth is known as the 'Continental Capital' of the world, with excellent

port facilities at the mouth of the Newark Bay and the Arthur Kill, I believe the port facilities in Elizabeth should be utilized as support bases," the mayor said.

He said a supply base requires a minimum of five acres of waterfront land with approximately 200 feet of marginal wharf and dockside depths of 15 to 20 feet. A typical base would contain a warehouse facility, an open store, parking for employees and, perhaps, a helipad.

Materials stored are drilling muds, cement, fresh water, pipes, fuel, tools and food. Each base operates 24 hours a day with activities limited to several fuel and crew boats.

Council discussed Dunn's request to concur in a willingness to negotiate and backed the concept of a base location, but requested additional information on the proposed site or sites.

Councilman Ralph Froelich noted there are deepwater piers along the Phelps Dodge property

which have been lying dormant. Council was concerned about encroaching on an area along Front Street which is under consideration for a public marina and recreational space.

Dunn recommended the city's willingness be limited to temporary or a permanent service base, support bases for platform and pipeline installation and repair and maintenance yards.

Because of possible pollution problems, he said, pipe coating yards which could permit chemicals to be discharged into the atmosphere or sewerage system could be specifically excluded from any such installation.

Lastly, because of the proximity of the Newark International Airport, any such supply base in Port Elizabeth should be prohibited from creating a helipad, but should instead be using the existing helicopter facilities at the airport, said Dunn.

SOURCE: ELIZABETH DAILY JOURNAL
August 3, 1977

September 13, 1977

BY CITY COUNCIL AS A WHOLE:

WHEREAS, the Union County Planning Department has recommended in its letter dated July 21, 1977 the installation of on-shore supply bases within the corporate limits of the City of Elizabeth; and

WHEREAS, after reviewing said communication, this Governing Body deems it in the best interest of the City of Elizabeth to indicate that it has no objection to the said installation; now, therefore, be it

RESOLVED that City Council of the City of Elizabeth hereby gives its indication that it does not object to the installation of on-shore supply bases within the corporate limits of the City of Elizabeth, conditioned on the following:

1. That the area on Front Street between East Jersey Street and Port Avenue be reserved for development other than on-shore supply bases;
2. That pipe coating yards be excluded from any such installations;
3. That helipads be excluded from any such installation;
4. That such installations be limited to temporary service bases, permanent service bases, support bases for platform and pipeline installation repair and maintenance yards;
5. That such installations be in compliance with all ordinances of the City of Elizabeth; and
6. That the City of Elizabeth be given the opportunity to review the findings of the Union County Planning Board on this matter of on-shore supply bases before they are formally adopted.

I, JOHN J. DWYER, Clerk of the City of Elizabeth, New Jersey do hereby certify that the foregoing is a full, true and correct copy of a resolution adopted at a meeting of City Council of the City of Elizabeth, New Jersey, held September 13, 1977.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of the City of Elizabeth, New Jersey, this 15th day of September 1977.

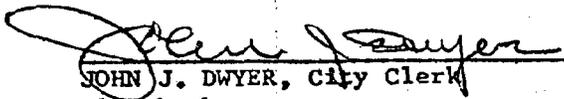

JOHN J. DWYER, City Clerk
Elizabeth, New Jersey

EXHIBIT K

B. OFFSHORE PRODUCTION SUPPLY BASE.

1. Description:

A production supply base is generally the same as an exploration supply base except it is larger and experiences an increased amount of activity. Production supply bases are established when oil or gas is found in quantities that make it feasible to invest time and money into developing the offshore field. Often the exploration supply base is expanded for use as the permanent production supply base.

- 50 - 75* acres near the water
- 400 feet marginal wharf
- 8,200,000 gal/platform/yr. fresh water during drilling
(unless salt water is used for drilling)
- On-site fuel storage of 250 - 1,000 tons/berth
(54,000 bbls/platform/yr. during drilling)
(19,200 bbls/platform/yr. during production)
- 4 supply boats and 1 crew boat/platform served
(if drilling platforms are close, supply boats
can service more than one at a time)
- 50 - 60 jobs generated at base, per platform during
drilling
- Capital investment for a permanent production support
base from 1 to 3 million dollars
- Payroll as much as 1 million dollars/platform/yr.

*NOTE: These figures seem high in that Alaska Consultants Inc. site the example of the BP service base in Dundee, Scotland, which supplies 4 platforms with 10 supply boats from 3 berths. Total land area is 2.5 acres at quayside, 11.5 acres in a remote casing yard and 2.5 acres for miscellaneous outside storage as required.

2. Discussion of Impacts:

(a) Physical.

A production supply base would be limited to the same locations in Union County as an exploration supply base, namely along the Arthur Kill or Newark Bay. Depending on the scale of production, certain sites deemed suitable for exploration supply bases may not be suitable because of their size limitations. Since there is an abundance of available warehousing near the waterfront areas, it would be possible to supplement dockside storage with accessory storage not immediately on the water.

(b) Environmental.

If the supply base is managed properly, the possibilities for environmental damage will be minimized. The most frequent occurrences of pollution are caused by human error. These include spillage of fuel during transfer operations, discharge of oil and heavy metals from bilge and ballast water, and other accidental spills and breakage. Some fumes from stored fuel and dust particles from cement and dried mud can be expected to enter the air. Wherever possible, measures should be taken to keep the amount of dust particles released during normal operations to a minimum. Exhaust emissions from working vessels and other trucks and machinery at the site will also be present but these impacts are inherent to most industrial operations and will not significantly impact the overall air quality of the region.

(c) Economic.

Economically, the location of a production supply base in Elizabeth or Linden would be very beneficial to these areas.

It would make jobs available, put idle waterfront areas to use, and would increase the demand for local services and goods.

Increases in population could be greater for a production supply base than for an exploration supply base because of the increased scale of activities. Also, specialized services unique to offshore platform operations may open offices and work places near the supply base, bringing in some experienced personnel from the Gulf of Mexico. Even so, the Union County area can absorb this influx since the county has been experiencing a population decline. Typically, at least half of the jobs generated at a production supply base can be filled by local personnel, and since the local labor supply includes many skilled workers, perhaps even more of these jobs could be filled locally.

The location of a production supply base would be especially good for local ancillary services, such as marine repair yards. The scale of activity which occurs at a production supply base could generate enough work to require these local companies to hire additional people.

A production supply base is not as transient an operation as the exploration supply base. Although activity at the base may scale down after several years when drilling discontinues and the wells are at full production, the base remains operative for many years to come. If the offshore platforms are staggered in installation, then the base could remain operative for more than 25 years. Because of the relative permanency of the production supply base, more expenses would be incurred in building the facility since the warehousing and offices

would have to last a longer period of time and be of a better quality than may be acceptable for a temporary situation. Considerable amounts of money could be spent on construction, thereby creating temporary construction jobs.

(d) Political.

The people of Elizabeth and Linden would probably not be hostile toward the location of a production supply base in their cities because the adverse environmental and economic impacts are minimal. There are no residential areas within view of the waterfront sites which would be suitable except along Front Street between Fulton Street and Port Avenue in Elizabeth. At the present time, Elizabeth is considering the development of a recreation park in this area and any request to establish a supply base here would be unfavorably met. (See the Elizabeth Resolution in the preceding section on exploration supply bases.)

C. OIL AND GAS PIPELINES.

1. Description:

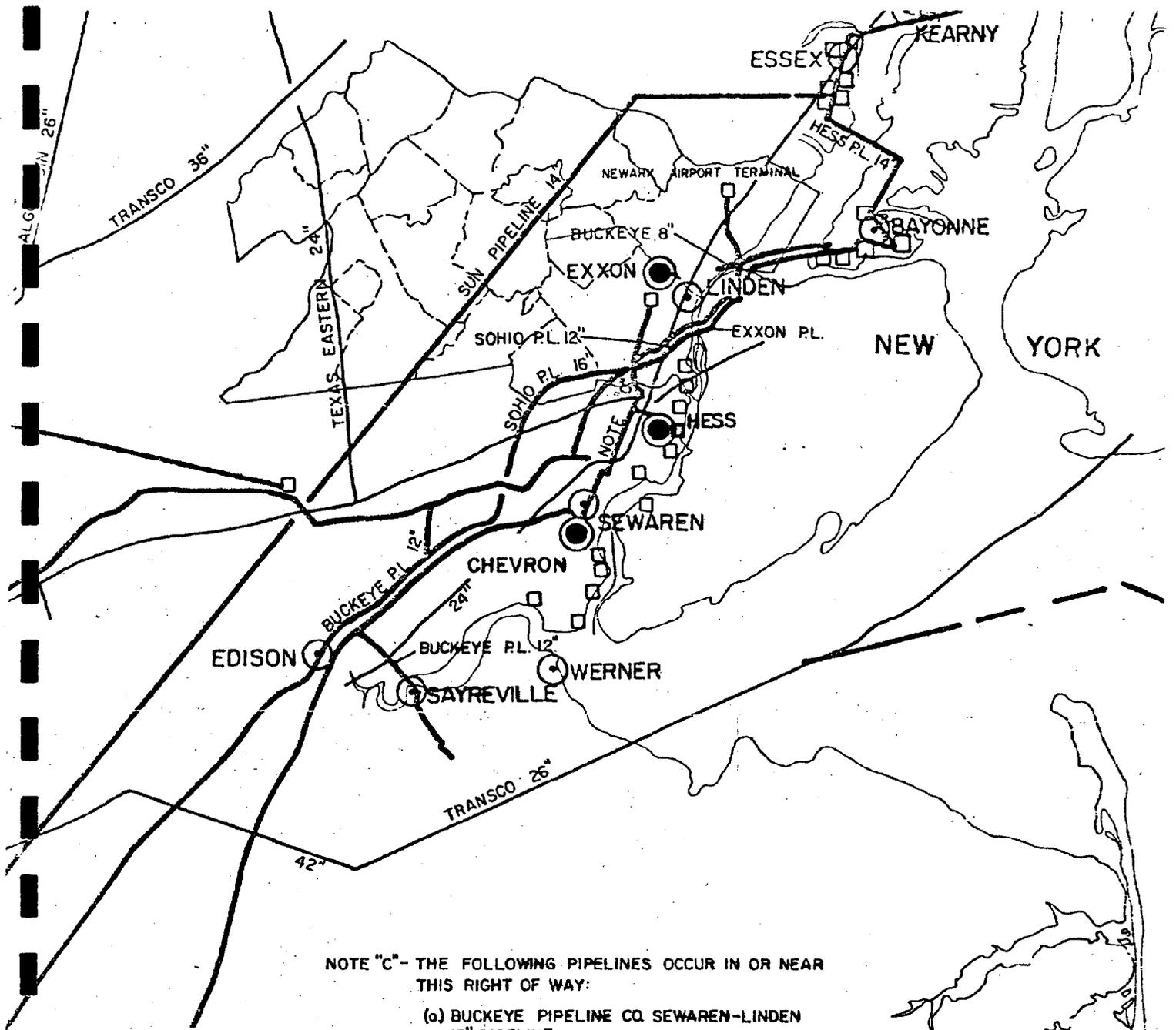
If sufficient amounts of oil and/or gas are found and produced offshore, the products would be piped from the production site to the closest possible onshore point the developers can obtain permission to use as a landfall. This is because it is more than twice as expensive to lay submarine pipeline than to install pipe on land, especially when rough seas and adverse weather conditions can be expected for much of the year. In the case of Lease Sale #40, the closest land to the offshore tracts would be in Southern New Jersey, near Atlantic City. From there, the gas pipeline would follow a land route to a gas processing facility, yet to be located in the region. The crude oil pipeline would follow a land route as well to existing refineries in either the Philadelphia - Camden area of the Union County - Middlesex County area. In the case of an extremely large find, the oil pipeline may branch and deliver crude to both regions.

2. Discussion.

If any oil or gas is piped to Union County, it is expected that the pipeline would come across the Middlesex County border into Linden or Rahway. Since Exxon succeeded in gaining a large portion of the tracts in Lease Sale #40, it is very likely that crude oil would be piped to their refinery in Linden.

(a) Physical.

Exhibit L shows the major oil and gas pipelines in the County. Rights-of-way (ROW) along these lines may have sufficient



NOTE "c" - THE FOLLOWING PIPELINES OCCUR IN OR NEAR THIS RIGHT OF WAY:

- (a) BUCKEYE PIPELINE CO SEWAREN-LINDEN 12" PIPELINE
- (b) SHELL, 10" PIPELINE
- (c) CALSO, 8" PIPELINE
- (d) COLONIAL 30" PIPELINE
- (e) CALIFORNIA-SHELL 8" PIPELINE
- (f) HESS-SHELL, 10" PIPELINE

LEGEND



OIL TERMINALS
 OIL REFINERIES
 OIL PRODUCT PIPELINES
 GAS PIPELINES
 ELECTRIC GENERATING STATIONS



EXHIBIT L
MAJOR PIPELINE ROUTES TO UNION COUNTY

(TAKEN FROM NJDEP "ENVIRONMENTAL MAP OF N.J. ENERGY")

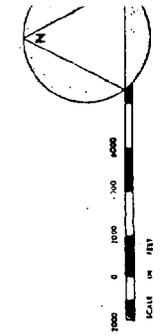
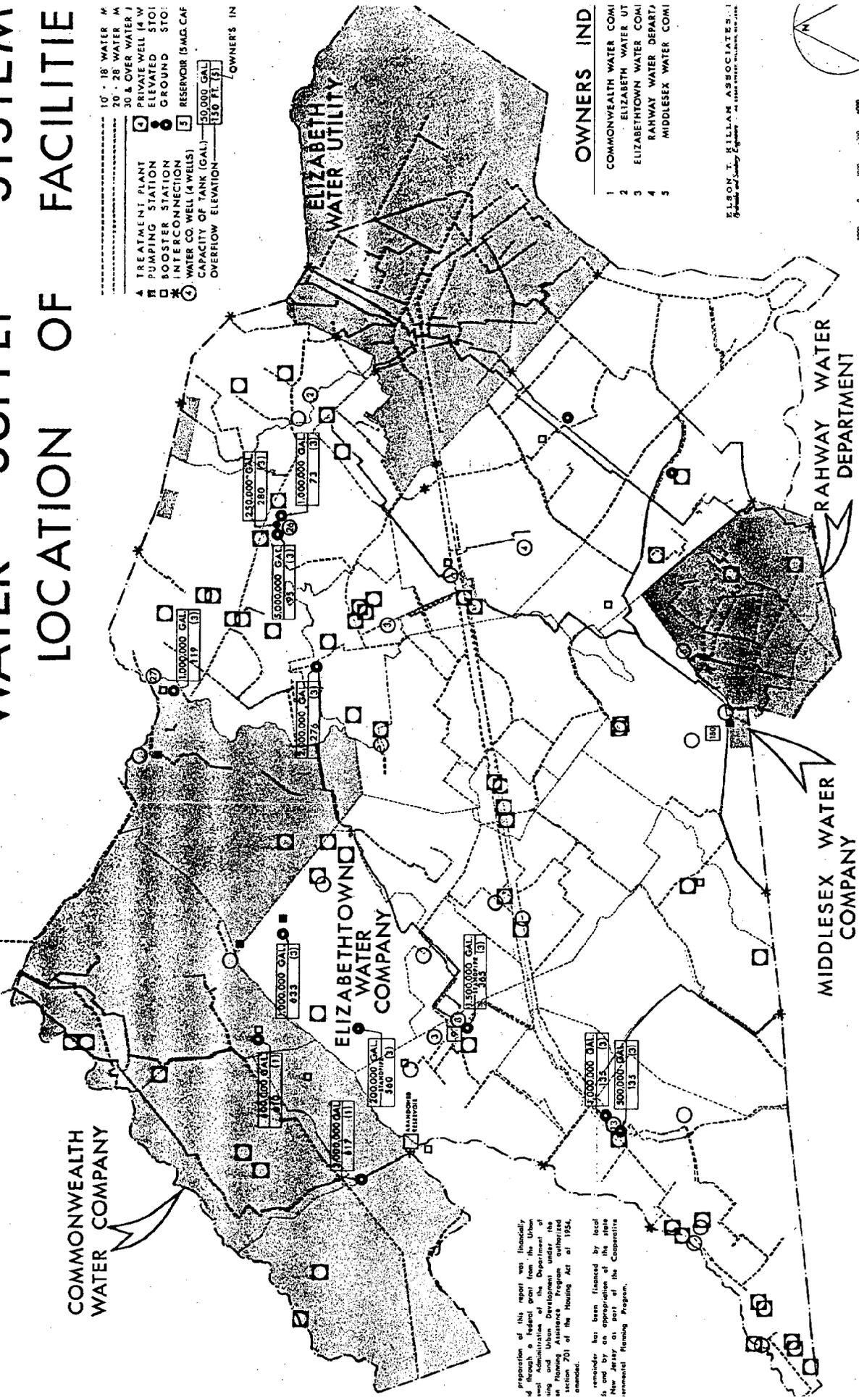
additional capacity to accommodate a crude oil pipeline. These and other oil and gas pipelines which are located in Union County are owned by: Exxon, Transcon, Texas Eastern, Buckeye, Sohio, Shell, Calso, Colonial, California Shell, Hess, Sun, Elizabethtown Gas, Tidewater Oil Co., Sinclair (B.P.), Tuscarora, Long Island Pipe Co., Cities Service, and Northville - Con Edison. These pipelines form an extensive underground network, especially in Linden. Many of the pipelines are used to interconnect waterfront receiving facilities to storage tanks, and tank farms to plants, factories or refineries.

These usually follow major roads and railroads but other types of ROW's may also be used. Water pipelines in the area are owned by Elizabethtown Water Company and the Rahway Water Department. Sewer pipelines are controlled by the Linden - Roselle Sewerage Authority and the Rahway Valley Sewerage Authority. Power lines are owned by Jersey Central Power and Light and Public Service Electric and Gas. Major roadways are administered by the New Jersey Highway Authority (Garden State Parkway), the New Jersey Turnpike Authority, and the New Jersey Department of Transportation (U. S. 1-9). Major railways are controlled by ConRail.

(b) Environmental.

In laying the crude oil or gas pipeline, measures to minimize construction impacts would be required as well as the avoidance of environmentally sensitive areas such as reservoirs and wellfields (Exhibit M). By following existing rights-of-way, dedication of new land for rights-of-way can be avoided and negative impacts minimized.

WATER SUPPLY SYSTEM LOCATION OF FACILITIES



Preparation of this report was financed by local funds through a Federal grant from the Urban Planning and Urban Development Program authorized in section 701 of the Housing Act of 1954, amended.

Remainder has been financed by local funds and by an appropriation of the State of New Jersey as part of the Cooperative Remedial Planning Program.

ELSON T. HILLAM ASSOCIATES, INC.
 Engineers and Surveyors - 24 Broad Street, Newark, N.J.

(c) Economic.

Exxon has indicated that if oil is found in sufficient quantities offshore, it may use this oil to back out some of its foreign imports since the domestic source would be a more secure supply. If domestic oil is piped to the refinery, then fewer tankers would have to make deliveries. This would mean fewer chances for oil spills in the Arthur Kill and less congestion of waterborne traffic in the vicinity of the refinery.

For a new pipeline to be economically feasible, oil must be pumped at a minimum rate of 50,000 barrels/day. Bayway refinery processes 300,000 barrels/day, so if the minimum amount of oil is piped to the refinery, the result would be the elimination of one-sixth of the total tanker shipments. It is estimated by the Federal Bureau of Land Management that peak production could range from 90,000 to 320,000 barrels/day. Not all of this oil would be going to Exxon, but Exxon's imports could conceivably be cut in half, depending on the size of the find.

If sufficient amounts of gas are found to be economically produced, the gas would be separated from any oil in the gas stream and dehydrated at the offshore platform, piped to shore, processed to recover propane and butane and delivered to a commercial gas transmission line at a specified pressure and quality. Unprocessed gas will be piped to Union County only if a gas processing plant were to be located here. This is a remote possibility because of the expense incurred in bringing unprocessed gas to Union County from the South Jersey area since unprocessed gas can not be mixed with commercial pipeline gas and a new

pipeline would have to be laid. If the gas is processed closer to the offshore pipeline landfall, the Union County area would only get the final refined product and this would be received through the existing distribution network.

(d) Political.

The exact route of any new pipelines would depend on the size of the proposed pipe, the size of the ROW, and the ability of the ROW to handle an additional pipeline. Because of the many existing ROW's, the Union County Planning Department encourages that these be followed.

Local opposition to the laying of pipelines would be minimized as well if existing Rights-of-Way, preferably through industrial areas, are followed.

D. GAS PROCESSING PLANT.

1. Description:

Gas processing plants separate heavy liquid hydrocarbons from the natural gas stream (methane). If there is a large amount of heavy hydrocarbons, then a fractionation plant is normally associated with the processing plant to separate them into ethane, propane, butane, and natural gasoline. These compounds have a high market value, especially as feedstocks to petrochemical companies, of which there are quite a few in the Union County area.

The following statistics are for a 1 billion cubic feet/day plant:

- 20 acres for buildings and tanks
- 30 acres for buffer zone to isolate flammable products from ignition sources
- 200,000 gallons/day water
- 45-55 operation and maintenance jobs
- Capital investment \$85 million
- Possible emission of hydrogen sulfides, sulfur oxides, various hydrocarbons, carbon monoxide, nitrogen oxide and particulates
- Wastewater:

Cooling Water -----	sulfuric acid		
	chromium	30	ppm
	zinc	3	ppm
	chlorine	0.2	ppm
Boiler Water -----	phosphates	20-60	ppm
	bases		
	sulfite	20	ppm

2. Discussion:

It is not clear whether or not a Union County location for a gas processing plant would be desirable to the oil companies. There are several positive and negative factors involved.

The reasons why a gas processing plant and fractionation plant would be located in the Union County area are the proximity to the natural gas market and petrochemical companies, availability of labor, capital goods, and utilities, and a strong industrial infrastructure.

The reasons why a Union County location may not be desirable, or even possible, from the industry's point of view are the distance of the county from the most likely pipeline landfall sites and the already high level of air pollutants in the region.

Many of the steps involved in processing gas can be done right on the offshore platform. This would involve oil and gas separation, water separation and the removal of particulates and hydrogen sulfides. Once the gas has gone through the offshore separators it can be piped to shore with a minimum of liquids forming in the line. These liquids form because the gas cools down in its passage through the line and they reduce the efficiency with which the gas can be transported. The first most operationally desirable site to upgrade the gas to single phase flow is near the coastal landfall. However, the gas could be transported an indefinite distance over land through the use of traps or drips at intervals to take the liquids out and compressor stations which would be placed at points where the pressure naturally falls off.

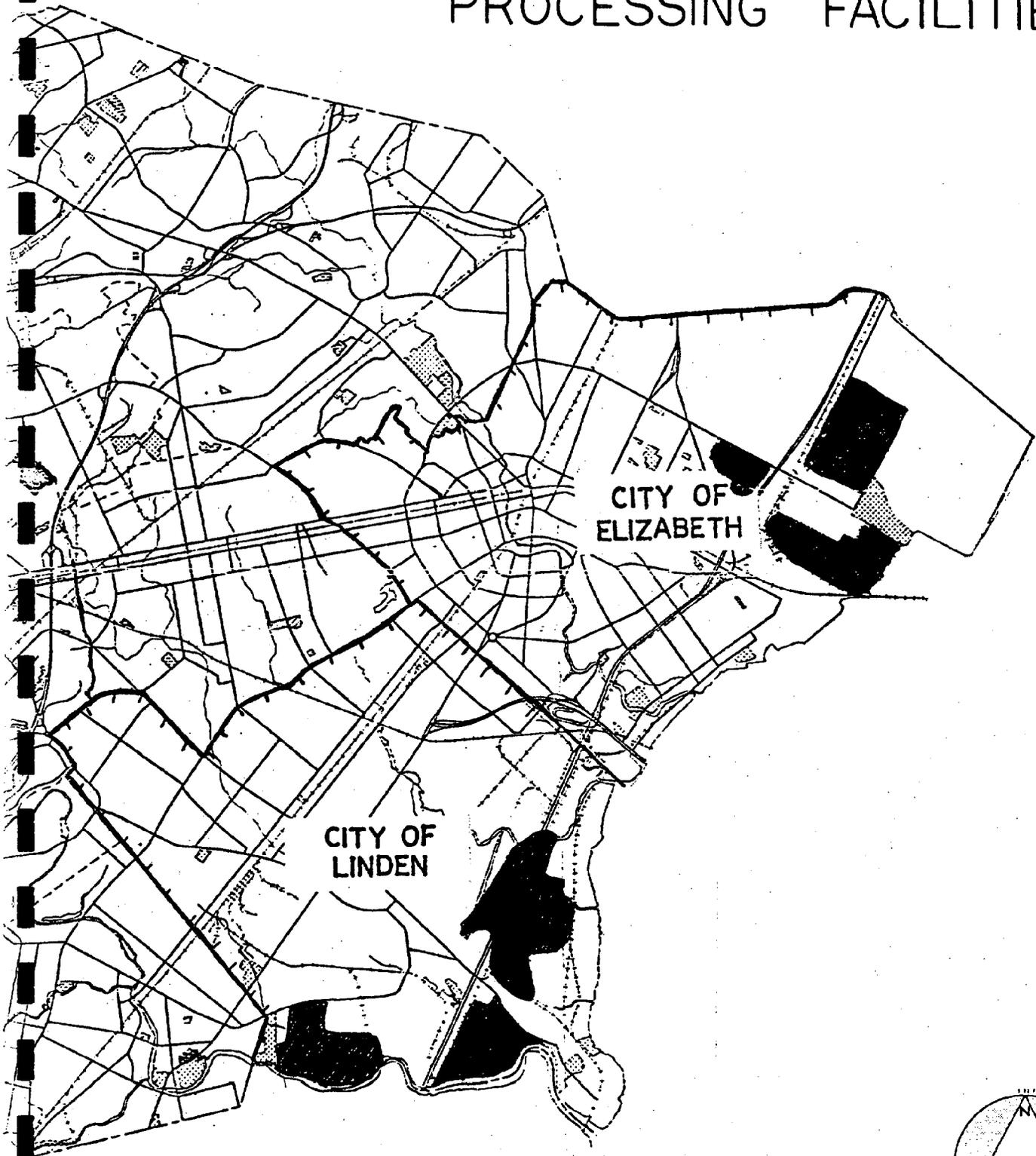
So physically, it is possible that the unprocessed and unfractionated gas would be brought to Union County for treatment. Economically, this would require the laying of an overland pipeline for this gas because it could not be mixed in with commercial pipeline gas in the existing transmission network. This would represent a tremendous cost increase to the gas companies and would greatly reduce the possibility that OCS gas would be processed in northern New Jersey. However, because it is possible that residents of South Jersey may object to locating gas processing plants there, possible siting in Union County is hereinafter discussed in detail.

(a) Physical.

There are presently no gas processing facilities located in the northeastern United States. New Jersey, and Union County in particular, plays host to a number of operations which are similar in nature to gas processing plants. These are facilities such as oil refineries, synthetic natural gas plants, peak shaving plants and pipeline terminals. These types of facilities are located in or near the industrialized sections of both Linden and Elizabeth. Each city has a few large vacant tracts which could be potential sites for gas processing facilities. These are highlighted on Exhibit N , and are discussed in detail in Section III. A gas processing plant needs many acres but does not have to be directly on the waterfront.

In Linden, all the large, suitable tracts are zoned Heavy Industrial. The Linden Zoning Ordinance provides certain restrictions that could preclude the location of a gas processing plant in that city. The Ordinance permits the following uses in a Heavy Industrial zone:

POSSIBLE LOCATIONS FOR GAS PROCESSING FACILITIES



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SCALE IN FEET

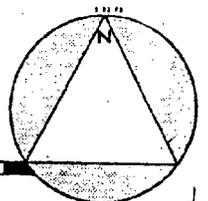


EXHIBIT N

"Manufacturing, processing, fabrication and assembly of products and materials and not including explosives as defined in the State Explosives Act of fertilizer or liquified natural gas production or storage."

A variance would have to be obtained if natural gas were to be stored in its liquid state.

The Elizabeth Zoning Ordinance implicitly permits this type of development on tracts which are zoned M-2 and M-3 (manufacturing).

Principal permitted uses in M-2 and M-3 zones are:

- (1) Any manufacturing use involving primary production from raw materials; and
- (2) Bulk storage of petroleum and similar fluids.

Because the M-2 and M-3 areas are characterized by this type of industrial development, a building permit for a gas processing plant probably could be obtained if it could be demonstrated that the plant would be an asset to the City.

In addition, there may be some height restrictions on the tracts directly south of Newark Airport because of clearance requirements.

(b) Environmental.

Gas processing plants are potential contributors to air pollution and, although techniques exist to abate harmful levels of

emissions, the Federal Government is presently enforcing a program where pollution in some part of the region would have to be reduced before a new source of pollutants could be added. This factor alone could be a deterrent to the siting of a future plant in Union County.

Because of the poor regional air quality, the best available technology would be required by the State of New Jersey for air pollution control equipment in order to absolutely minimize any further pollution. Sulphur in the gas would have to be reduced to the elemental state. At the present time, the Exxon Bayway Refinery has a sulphur recovery plant in operation because of State and Federal regulations, not because there is a market for elemental sulphur.

Sometimes during processing it is necessary to burn off some of the gas due to pressure build-up. This is called flaring and it usually takes place on the top of tall stacks so that pollution and impurities become dispersed by the time they reach ground level. Many pollutants are released during flaring and if gas has a high amount of sulphur compounds, the released products can be quite odorous. When sulphur is found in low amounts in the raw gas stream, it is sometimes disposed of along with other impurities by flaring. Because of the highly impacted air quality in Union County, flaring must be reserved for emergency measures only and the impurities should be recovered and disposed of through other less polluting methods.

Union County is included in the New York - New Jersey - Connecticut Interstate Air Quality Control Region. EPA reviews all applications for new plants or emission sources of at least 100 tons/year

of pollutants and must subsequently approve or disapprove these applications depending on their impact on the ambient air quality. If the proposed emissions will, in EPA's determination, impact air quality, then the applicant may take it upon himself to reduce pollution from other sources in the area to lessen the impact of his own emissions. Union County has very high particulate and hydrocarbon pollution levels and EPA would strictly enforce emissions of these pollutants. Sulphur dioxide once was a problem here but is now under control through strict enforcement of regulations.

Negligible concentrations of nitrogen oxides, particulate matter (521 R.F.B.) and hydrocarbons are found in incineration emissions of gas processing plants. There are more hydrocarbons released through evaporative losses (10.50 tons/day for a throughput of 100 million cu.ft./day). These evaporative emissions can be recovered with controls placed at the sources of leaks. Since the total of evaporative hydrocarbons could be more than 100 tons/year, EPA may require the plant to have a loss control plan before going into operation.

Wastewater is produced in three ways at a gas processing plant: cooling water, process water and boiler wastewater.

If water is used as a coolant instead of air, then there is a sizeable amount of wastewater to be dealt with. Cooling water can represent more than 70 percent of the plant's wastewater. Two methods exist for cycling cooling water; once through cooling and the closed cooling tower system. The former method has problems with thermal loads while the latter contains relatively high concentrations of chemicals.

Once through cooling systems require a greater amount of water since they do not reuse the heated water. Exxon uses this method at the Bayway Refinery, drawing water from the Arthur Kill and then discharging water back to the Arthur Kill after use. In once through cooling, intake water does not have to be of a high quality because it is only used once and chemicals are therefore not concentrated in it from repeated use. Because of the de-oxygenating stresses on the Arthur Kill, the thermal loads of once through cooling water are considered more of a hazard than the amount of chemicals in the discharged water. The possibility of environmental hazards would require an Environmental Impact Statement to be performed before this method could be used.

Closed cooling tower systems use less water because the same water can be used as much as five times. This water must initially be very clean because each time the water passes through the cooling tower there are evaporative losses of vapor and the amount of dissolved or suspended particles become increasingly concentrated. By the fifth time, the water must be replaced.

Techniques exist to reduce the concentrations of the chemical additives to Federal Water Quality Standards and these would necessarily be employed since the water quality is already so highly degraded in the Arthur Kill. Chromate, zinc and chlorine are among the additives to cooling water. Toxicity to marine life would be a concern if there were a healthy flourishing of marine populations but since there is not at the present time, the concern is not to degrade the water any more than it already is. If it is economical, it will be encouraged that the additives be recovered and disposed of in a landfill.

Process water, the second kind of wastewater mentioned, is water which is contaminated from contact with gas, oil or other substances. Sometimes process water includes formation water which is very salty. The oil, gas and other substances can usually be completely removed before the water is discharged but because of the briny nature of the water itself, it can not be discharged into a fresh water system. The Arthur Kill would be a suitable receiving body since it is brackish. There might be negative impacts if this water were to be discharged into the Rahway or Elizabeth Rivers at a sufficient distance upstream from the Arthur Kill.

Boiler wastewater, condensed from the steam which is used for power and heat transfer, often contains such chemicals as phosphate, sulfite, sludge conditioners and enough bases to maintain a pH of 10.2 to 10.6. If this water were to be discharged, the chemicals contained would have to be reduced to the Federal Water Quality Standards.

In summary, gas processing plants can have an adverse environmental impact, however, techniques exist to abate these impacts. These techniques must be applied if governmental regulations require them.

(c) Economic.

If a gas processing and fractionation plant were to locate in Union County, it can be expected to have only a mild effect on the region's economic picture. Having a local supply of natural gas and petrochemical feedstocks may provide some stability. Any resultant economic growth which may have once been associated with such an increase in the supply of natural gas will probably be countered with an increased

scarcity of the overall national fuel supply, thus checking any large scale economic growth. It is hoped that even if new finds of gas were processed in South Jersey, that some of the gas would contribute to the local supply by coming to the Union County area through the present transmission network.

In terms of the number of jobs provided per acre of land required for the facility, employment generated by the gas processing - fractionation plant, aside from construction, is low, on the order of one job per acre. This is because a sizeable buffer is required to isolate the plant from ignition sources.

Although the capital expenditure for a gas processing plant is high, much of the equipment is highly specialized and therefore a large portion of this equipment may be purchased from outside of the county. Specialized construction workers may be brought in from other areas as well.

(d) Political.

If a siting were being considered in Union County, there are several factors of importance which should be brought to the attention of the municipal governing bodies when they are making their siting decisions. First, development of a gas processing plant on any of the specified tracts in the last part of this report, would not be incongruous with other development to date in those industrial areas. Secondly, because it can be assumed that if gas is being brought all the way to Union County to be processed that it is destined for the local market, the development of a gas processing facility can be considered

to be very beneficial to the local area in that the supply would be relatively secure and would also tend to reduce local gas shortages. This could be a very big economic concern in just a few years from now. Thirdly, the governing bodies must consider the amount of land that a gas processing plant uses, the relatively low utilization of labor and the extent to which environmental recovery systems would be used.

All these factors will have to be weighed in view of the economic and political picture at the time of the decision as an argument at this point in time would be very speculative, even in its most basic assumptions since it is not known how the problem of diminishing fossil fuel supplies will be handled in northeastern New Jersey.

E. MARINE TERMINALS FOR CRUDE OIL.

1. Description:

If oil is found offshore in quantities which are either not great enough (50,000 bbls/day or less) or are too scattered so as not to justify the laying of a submarine pipeline, then the crude oil will be brought to shore by means of tankers or ocean-going tank barges. The shoreside receiving area for these vessels is called a marine terminal and it is usually associated with a refinery.

- Very deep draft (35 feet or more)
- Shoreside fixed piers
- Proximity to a tank farm for crude storage
- Control buildings
- Pumping stations
- Pipelines
- Fire fighting equipment
- Spill control equipment

Tank storage areas are part of the marine terminal facility, however, they are not always located immediately adjacent to the waterfront area.

Discussion:

(a) Physical.

Since the ultimate destination of the crude oil is a refinery, it can be assumed that any oil brought by tanker to Union County would be destined for the Exxon Bayway Refinery. Exxon has indicated that new finds of oil from the Baltimore Canyon Trough would be used to replace

imported oil. The tankers then would use Exxon's existing steamer docks on the Arthur Kill and construction of a new marine terminal would not be required.

Since the refinery now operates at full capacity, it is assumed that the tankers of domestic oil would substitute one for one for those carrying foreign oil, provided there is no refinery expansion. Even if market conditions indicate a need for refinery expansion, Exxon can increase their tanker receiving capability by either closer scheduling or expansion of the steamer docks.

The largest tanker which can be handled at the Bayway Refinery without being off-loaded before entrance into the New York - New Jersey Channels is 50,000 dead weight tons. This would be the limiting size of shuttle tankers. Because many of its imports come in tankers which draft too much water to navigate the channels, Exxon also has facilities for receiving barges. The large tankers off-load onto barges in the Sandy Hook area until the draft conforms with the channel depths. Four barges can be berthed, but usually there are less than four at any one time. If ocean-going barges are used to bring offshore oil to the refinery then the barge piers at Exxon would be used.

(b) Environmental.

For shipping to be feasible, the field must be producing less than 50,000 barrels/day. Fifty thousand bbls. is the minimum rate of production that can cover the cost of a pipeline from the field. Since Exxon's full refinery capacity is 300,000 bbls., shipments would amount to 1/6 or less of the total supply needed by the

refinery. Therefore, roughly the same amount of vessels would be arriving and departing and additional environmental impacts from domestic shipping is not foreseen.

Exxon has an oil spill control boat on call in case there are any oil spills. Since domestic oil would substitute for foreign oil barrel by barrel, there would be no added risk of spill. Accordingly, the present spill control safeguard system will serve just as adequately as it does now.

(c) Economic.

It is difficult to predict the local impact of shipping domestic oil to the refinery as opposed to importing foreign oil. The additional number of jobs would depend heavily upon the rate of production, the size tanker or ocean going tank barges used to shuttle the oil, and the size of the oil importing vessels which would be replaced. The main difference in number of people employed would be in the number of crews required to carry out the operations. The shoreside personnel should remain the same. There may be a shift to American crews from the foreign crews on the replacement vessels. This can not be certain until more is known about the production rates.

Having a local supply of oil would provide a more secure source and consequently a steadier operation at times of embargoes of foreign curtailments. However, if the domestic oil only accounts for 1/6 or less of the total refinery production, the benefits to economic stability can be only minimal.

The major economic benefit of bringing offshore oil to port by tanker would be to the oil companies themselves. Some oil may be better than no oil and tankering may be a less expensive transportation mode than laying a submarine and overland pipeline.

(d) Political.

The nature of the Linden - Elizabeth waterfront is twofold. There are large manufacturing plants and refineries which are large users of water, and there are marine terminals. Exxon has one of the larger privately owned terminals and the only terminal which receives shipments of crude oil. The area's economy has depended in part on waterfront commerce for many centuries. Marine terminals are regarded in this area as being good for the economic picture. There are many encouragements for companies to come in and put idle waterfront to use. The marine terminals that exist now are not considered to be social, environmental or economic problems. Therefore the change in Exxon's operations by substituting shipments of domestic oil for shipments of foreign oil should meet no resistance from the public. Even if the refinery were to expand, the one facet that would receive the least opposition would be expansion in the marine operations. The opening of marine terminals has always been a good economic sign.

One aspect associated with marine terminals that has met some political friction is the proposition of using some of the remaining large vacant tracts in Linden and Elizabeth for expansive tank farms, which by themselves generate very little employment. However, since the crude oil would not be brought to this area except if it was going to the

Exxon Bayway Refinery, and since Exxon has ample tank farm capacity, both existing and potential, to handle this oil, there are no obvious reasons why a tank farm for crude oil should need to be built anywhere except perhaps on Exxon's property if needed in the future. Their need can certainly not be determined at this early point (pre-exploration) and guesses are made even more difficult by market conditions and the small amount of oil we are talking about: an assumed total field production of less than 50,000 bbls/day.

F. REFINERIES.

A word should be mentioned at this point about refinery expansion and/or new refineries.

Increases in the supply of oil alone would not warrant adding refinery capacity. If the supplies of refined products on the market need to be increased, then after the full consideration of many factors, such as the national crude oil supply and refinery and distribution systems, a company may decide to expand its refinery.

There are two reasons behind a major push for new domestic supplies of oil. The first is to postpone a forthcoming worldwide fossil fuel shortage and the second is to reduce our dependance on foreign imports of crude. In an attempt to assist these two goals, there are efforts to curb the growing market demand through energy conservation methods and the use of alternate fuels. It is unlikely that refinery expansion would occur in such an economic and political climate, and that Exxon would substitute new domestic supplies of crude oil for foreign imports rather than risk investing in expansion and then experiencing foreign cutbacks.*

It is also doubtful that any new refineries would go up as a result of finds of oil in the Baltimore Canyon because there is additional refinery capacity available in the New Jersey - Pennsylvania - Delaware region. For example, in Middlesex County, the Amerada Hess refinery lies idle.

*So stated in interviews with representatives of Exxon.

If, however, more capacity were needed, the Exxon Refinery has additional land if it should desire to expand its facilities. There are two factors which must be considered in any expansion plans. Eastern Union County has significant air pollution problems and any refinery expansion should consider this problem and be consistent with regional air quality goals. The second consideration is thermal pollution in the Arthur Kill. Warm water discharges to this waterway from many sources have raised ambient temperatures, thereby reducing the amount of oxygen the water can hold. Exxon presently utilizes once-through cooling. An expansion of refinery capacity leading to increased cooling water requirements could lead to State requirements for cooling towers or ponds to lower effluent temperatures before discharge.

Increased refinery capacity, if accomplished through additional equipment rather than by replacing old equipment with more efficient systems could lead to increased employment and increased taxes to the local community.

G. PIPE COATING YARDS.

1. Description:

A pipe coating yard is a facility for preparing sections of pipe for installation underwater to connect the oil field with land.

- 30 - 100 acres preferably along the water
- Good rail and road access
- 750 feet of marginal wharf with dockside depths of at least 10 feet but preferably 20 - 30 feet deep
- 100 - 200 employees during production season (March - September)
- \$8 - \$10 million capital investment (\$1 million for a portable plant)
- Air emissions: Particulate matter, nitrogen oxides, sulfur oxides, carbon monoxide, hydrocarbons
- Wastewater contaminants: hydrocarbons, alkaline substances, particulates, metal fragments
- Noise: 90 - 100 decibels when uncontrolled
- Solid waste: metal scraps, concrete, some contaminated debris
- 95 percent of land used for outdoor storage of 40 foot lengths of pipe
- Roads for yard machinery run between the stacked rows of pipe
- 5 percent of land for processing buildings - usually low and sprawling

If a permanent plant is not required then a temporary facility, often called a "railhead operation" or "portable plant" is set up. These railhead operations will employ about the same number of people as the permanent facilities during the peak season, however, they use much less land than a permanent facility (about 30 acres). Railhead operations take about 3 months to set up and the coated pipe is produced in a single season. If the work is steady, the railhead operation may be converted into a permanent plant.

Types of raw materials stored at the site are: iron ore, 2,000 - 3,000 tons of sand, 20 tons of fiberglass wrapping material, 400 tons of lime and 1,000 tons of wire mesh.

Various sized fork lifts, tractor trucks and cranes are used at the site.

The activities at a pipe coating yard are the receipt of the pipe, shot-blasting the pipe to roughen the surface, coating with mastic (a tar-like substance), coating with lime, storage of the pipe until the mastic becomes hard, coating the pipe with concrete, letting the concrete cure, and shipping the pipe to the pipe laying barge which is offshore. Also, each pipe is periodically inspected for flaws.

2. Discussion:

(a) Physical.

The major limitation in the location of a pipe coating yard is the size of the tract and its proximity to the water. Since 750 feet of marginal wharf is required for on and off loading of barges,

considerable dredging may be required to upgrade existing vacant waterfront since most tracts with the open space and waterfront qualifications for a pipe coating yard are heavily silted between the waterfront and the channel.

A pipe coating yard would be restricted to those tracts which are 30 acres or more. Some of the more spacious vacant properties are not on the Arthur Kill but are within a short distance of smaller tracts which are. An arrangement where pipes must be transported to a loading facility is possible but may cause the costs to rise to a point where it would not be economical. These transportation costs are directly related to the distance between the storage and loading sites and the size of the pipe being transported. A 40 foot length of 14" diameter pipe, fully coated, weighs approximately 3,000 lbs., while a 42" diameter pipe weighs about 40,000 lbs. If the distance and diameters are small, then this arrangement could be economically feasible.

(b) Environmental.

Pipe coating yards can have an adverse environmental impact if measures are not taken to control the various sources of pollutants. Most of the pollutants consist of particulate emissions from the shotblasting operation and from escaping dry ingredients which are used during the coating process.

Dust collectors, either cyclone collectors, wet scrubbers, or fabric collectors, can reduce emissions up to 99.7 percent. The size, shape, density and surface characteristics of the particles determine the type of dust collectors to be used.

Depending on the individual operations of the pipe coating yard, there may be points in the process at which particles are released because of the transfer or mixing of dry materials such as sand, cement or lime. It would be beneficial to put in dust collectors at these points of the operation to keep overall emissions to a minimum. This is especially important in the Union County area where particulates comprise a relatively high percentage of the air pollutants.

Particles of shot and heavy metals are normally reclaimed from the shotblasting process and reused until worn out and replaced. Dust collectors must be used to recover these particles.

Certain equipment used in the coating process, particularly compressors and boilers, emit nitrogen oxide. Air quality standards have not been established by the State of New Jersey for nitrogen oxides. However, of the annual averages measured in the State, Elizabeth, with .150 ppm, had one of the highest average readings. This could be because the readings were taken adjacent to the New Jersey Turnpike. Because of the general indication for the surrounding industrial area seems high, any new sources of nitrogen oxides may be subject to the Federal New Source Performance Standards which the State is beginning to enforce. This means that boilers and compressors brought into the area would have to be of a modern design with lower emissions than older ones. Nitrogen oxides contribute to smog and are not usually considered to be a serious enough pollutant to curtail development.

Because a pipe coating yard takes up so much area, a drainage plan would have to be implemented to control the amount of

stormwater runoff generated by the site and reduce the possibility of flooding adjacent properties. If material spills are cleaned up quickly and without the use of environmentally degrading solvents or chemical cleaning agents, contamination from runoff water should not result in major environmental deterioration in the receiving waters.

The major source of polluted water at a pipe coating yard is process water, which includes effluent from the whitewash and sand and gravel washing. This water contains hydrocarbons, alkaline substances, and suspended and dissolved substances. Most pipe coating yards collect and re-use the whitewash which runs off the pipe, thereby greatly reducing the alkaline content of the wastewater. Suspended particles can be minimized by passage through a series of settling basins prior to discharge.

Local and State governments will have to work cooperatively with the developers of a potential pipe coating yard to determine whether the process used to handle wastes, such as air emissions, water discharges and solid waste, will be adequate to minimize impacts to the prevailing environmental conditions of the site and area chosen.

(c) Economic.

Perhaps the most striking feature of a pipe coating yard would be its temporary nature. With the notable exception of a permanent facility which would accompany extremely large finds offshore, most pipecoating yards can finish their production within a few years. A pipe coating yard can put many unused acres to use and then vacate the

premises just as fast, opening up the property for a new tenant. Thus any economic impact provided by a pipe coating yard would be very temporary as well.

To offset the short-term benefits are the scale of the yard operations. A pipe coating yard may go to considerable lengths to upgrade a large expanse of waterfront property in order to begin operations. This would include dredging, filling and bulkheading. The property would then be in a more favorable condition to attract industry after the pipe coating operations were vacated.

Employment at a pipecoating yard is also on a very large scale. Both permanent and railhead operations employ about 150 people. Ninety percent of these people can be drawn from the local labor force since most of the jobs do not require special skills. These jobs do not provide year-round employment but tend to be seasonal, generally from March to September. The average annual wage, however, is good: \$11,500. In an area without an extensive industrial infrastructure, unlike Union County's, the seasonal effects could provide quite a jolt to the local economy. In Union County, the employment rate remains relatively high year round and, presumably, these jobs, since they require little skill, could be filled by the unemployed sector of the labor force, thereby providing at least some temporary unemployment relief. This would be the full extent of the employment benefits since most of the jobs are seasonal and the pipe coating yard may only be in operation for 1 - 3 years.

The exceptional circumstances would be if a very large find of oil was found on several of the leased tracts. Then the development activity could go on for several years. If oil and gas were found in other Lease Areas (49 & 42), then it is possible that the pipelines for those areas would be fabricated at the established pipe coating yard for Lease Area 40, provided the timing of development is right. In this case, a pipe coating yard could make a very significant contribution to the local economy since upwards of 150 unskilled workers could be employed.

(d) Political.

One of the deterrants to industry of locating such a facility in the New York - New Jersey Metropolitan Area is the strong possibility of unionization. Labor costs as typically contracted by the unions could go sky high, making it unfeasible to produce the pipe locally. Also, there is pressure on the pipe coating yard to produce a given amount of pipe per season and the owners are not likely to welcome the risk of strikes.

Another deterrent may be the amount of upgrading which may have to be performed at local sites to make them suitable for operations. This may include dredging, bulkheading or backfilling.

The City of Elizabeth, in a Resolution dated September 13, 1977 (see Exhibit J in an Exploration Supply Bases) stated that the City had no objection to onshore supply bases locating within their corporate limits provided that pipe coating yards be excluded from any such installation. The reasons for this were not made

obvious, however, in the newspaper article in Exhibit J, it is indicated that the objection would be because of possible pollution problems. As previously discussed, possible environmental impacts can be averted by using proper control measures.

Linden has a few large tracts that are vacant, none of which are directly on deep water. However, one is on the tidal reach of the Rahway River and the others are less than a mile from the waterfront. All of them are zoned heavy industrial and unless Linden states otherwise, the use would be compatible with the zoning.

H. PLATFORM FABRICATION YARDS.

The location for a platform fabrication yard requires vertical clearances of greater than 210 feet for transporting the completed platforms to the offshore field. Sea access from Union County is restricted by the Bayonne Bridge, which has a vertical clearance of 137 feet and the Outerbridge Crossing, which has a vertical clearance of 142 feet. This precludes the location of a platform fabrication yard in Union County.

It is possible that if the deck sections of the platform were not to be fabricated at the same yard as the platform bases, then the deck module fabricating facility could be located in Union County. This would be in the industrialized areas of Linden and Elizabeth close to the Arthur Kill or Newark Bay for the convenience of transporting the finished products. There is no special reason why the deck sections would be fabricated at a separate yard unless the primary yard had space limitations or if it were thought that costs could be saved by building the deck modules closer to the offshore tracts, e.g. New Jersey instead of in Virginia.

A satellite operation of deck fabrication would be typified by heavy construction and steel fabrication equipment, a large open warehouse in which the modules would be built and heavy industrial cranes. Raw materials would be received by barge or train. The pollutants emitted are those typical of heavy industrial construction operations and should not impact the environment significantly as long as the usual precautionary pollution control measures are taken. Total land area needed would probably be close to 30 or 40 acres.

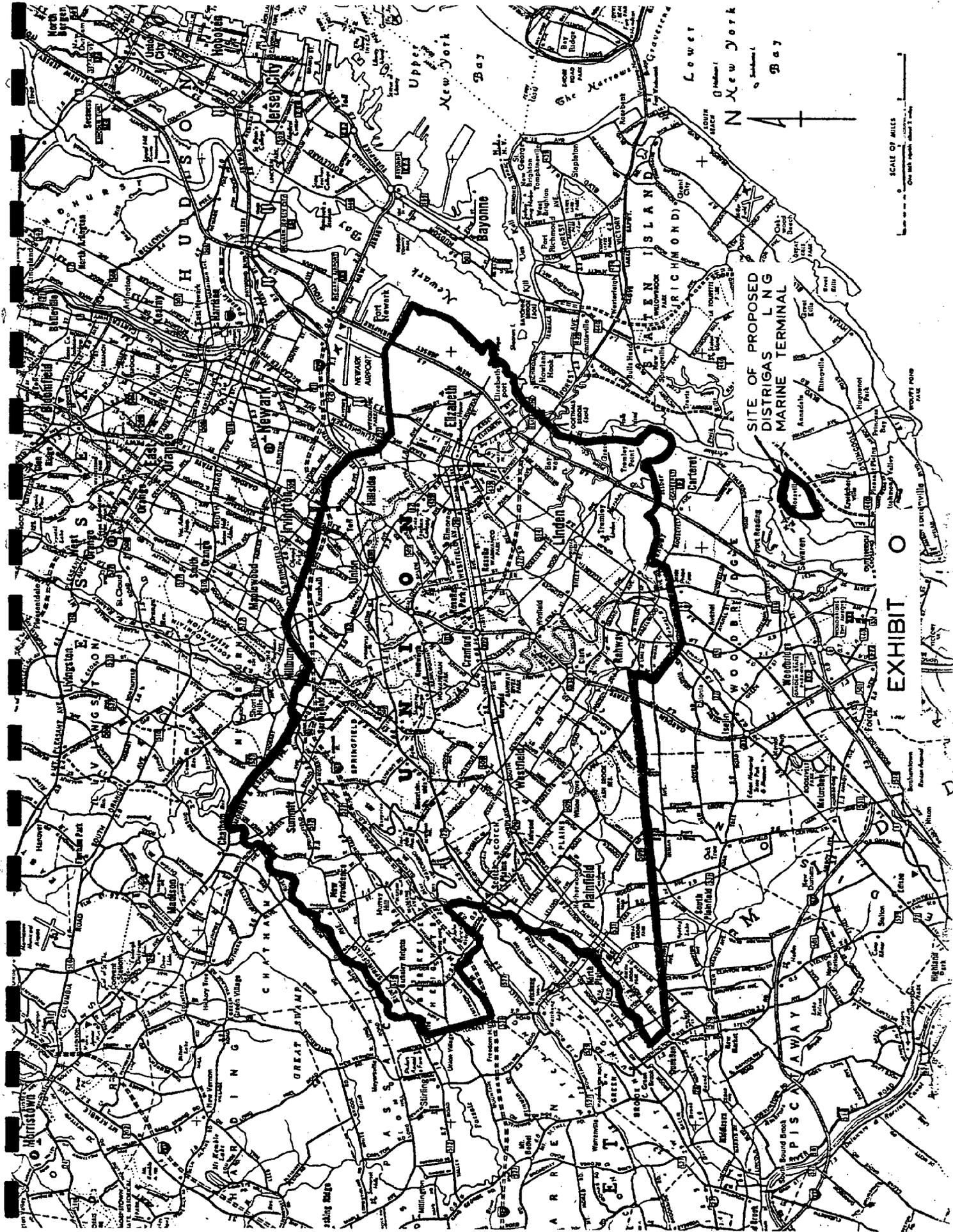
I. IMPACTS ON UNION COUNTY FROM THE PROPOSED LIQUID NATURAL GAS (LNG) MARINE TERMINAL ON STATEN ISLAND.

1. Description:

PSE & G has an application before the Federal Power Commission to operate a liquid natural gas (LNG) facility in Rossville, Staten Island. These plans are of interest to Union County because the 97 acre LNG site is less than 3 miles from the Union County border. This application is being made by Eascogas LNG, Inc., which is owned by Algonquin and PSE & G and would operate LNG facilities located in Providence, R. I. and Rossville, Staten Island. This proposal calls for Algerian liquified natural gas to be tankered to the U. S. with approximately 70 percent going to Staten Island, and 30 percent to Providence, Rhode Island. There are, presently built and standing empty, two 900,000 barrel tanks at the Rossville, S. I. site. Plans call for operation of the storage tanks, loading docks, vaporization facilities, and pipelines going to both New Jersey and New York. Approximately 60 shipments/year of about 125,000 cubic meters each would be made. Part of the shipments would be off-loaded at Rossville onto barges and sent to the Union Electric generating station in Brooklyn, and the rest stored at Rossville.

- Docks to receive ocean-going cryogenic LNG tankers, in deep water with a turning basin, located in Rossville, Staten Island, approximately 3 miles south of the lower Union County border.

- Transport of LNG in tankers up the Arthur Kill from Sandy Hook in quantities of up to 125,000 cubic meters.



SITE OF PROPOSED
DISTRIGAS LNG
MARINE TERMINAL

EXHIBIT O

SCALE OF MILES
One inch equals about 1 mile

- Storage of LNG at the Rossville Terminal in large concrete storage tanks, typically with a capacity of 900,000 barrels LNG (or 143,000 m³).

2. Discussion:

Many things have been said about the proposed Distrigas of New York LNG import terminal; both good and bad. On the favorable side of the argument, imports of natural gas could supply the area at a time when national supplies are faltering and demand is growing. This would protect our accustomed standard of living and also the steady production of local manufacturing concerns which greatly support the health of our economy. On the other side of the argument are serious concerns about the safety of handling such a hazardous material in an area of dense population and the risks of bringing loaded LNG tankers through a heavily used port.

Nearly everyone can agree with the favorable side of the argument, that we do need imported gas, but practically no one can agree on the level of risk involved in bringing LNG into New York Harbor and storing LNG near population centers.

If LNG is spilled on land, the ground underneath freezes and the spill can be cleaned up. When LNG is spilled on water, the water does not freeze but heats the liquid gas into a vapor cloud which is heavier than air. The cloud hugs the ground or water surface and is not only smothering but is also flammable until it is dispersed by winds or diffusion. On days which are not very windy, this cloud can travel and still maintain a concentration that is flammable.

The major safety concern is that through some means, either catastrophic or human, LNG will be spilled in the port and form a flammable vapor cloud which, because of weather conditions, does not disperse and may ignite. Firefighting equipment is not designed to cope with the type of disaster which could evolve.

A further fear is that the flammable cloud may float over either oil and gas storage areas or population centers before it ignites.

There is, at the present time, no conclusive evidence concerning the distance which the vapor cloud can travel. Because of varying assumptions which researchers have made about weather conditions, the results have ranged from less than one mile to more than fifty miles. In addition to the uncertain scientific facts, lack of experience in LNG operations has thrown doubts on the risk of analyses used by the Federal Power Commission to determine whether LNG facilities are safe.

The considerations which led to the selection of the Rossville, Staten Island site were technical and economic ones. The Federal Government's role is strictly reactive in that it must approve or disapprove industry's choice. Most local governmental participation is only indirect especially in this case where the facilities in one state have potential effects on coastal communities in another state. The hearings on the facility have already progressed to the point where the ultimate coordination of the accepted State Coastal Zone Management plans for New Jersey and New York will have little or no bearing on the decision. The Coastal Zone Management Plans are one mechanism which exists

for combining local preferences with national interests since the Coastal Zone Management Act of 1972 requires that facilities which require Federal licenses and permits comply with the State plan unless exempted by the Secretary of Commerce.

Other agencies with direct input into LNG terminal siting are the Office of Pipeline Safety Operations (OPSO) and the Coast Guard. The OPSO has certain design standards which a potential terminal site must meet, such as buffer requirements. The Coast Guard has the responsibility to determine if ships will be permitted access to a proposed site and to advise all concerned parties of operational constraints and safety criteria which would be applied to the marine portions of the project if it is approved.

The LNG Terminal in Everett, Massachusetts is similar to the proposed Rossville Terminal in that LNG ships must pass through a major harbor to reach the terminal. When an LNG ship arrives from Algeria, all traffic in Boston Harbor is halted and the ship is escorted by the Coast Guard to the terminal. This is their plan to avoid possible accidents while transporting LNG through a populated area. It does not seem feasible that large stretches of New York Harbor could be closed on and off to let LNG tankers pass through. In addition, New York is a busy port and collisions and groundings do occur. The Coast Guard is going to implement a Vessel Traffic Control Program in 1978 but its level of effectiveness in the port has yet to be proved. The system should reduce the possibility of collisions that could result in spills in the Port.

From Union County's standpoint, the question of risks has not been sufficiently answered. A better understanding of LNG operations, gained through experience and years of LNG tanker handling, should precede our acceptance of a man-made risk of such proportions. There must be absolute assurances on the safety of transporting LNG up the Arthur Kill and that in unloading the cargo a vapor cloud could not travel to nearby residential or storage areas of petroleum products which are within 3 miles in both Middlesex and Union Counties.

In addition, Union County must also be assured that LNG tankers or barges would not be operated in waters adjacent to Union County where residential areas and petrochemical plants are located directly on the waterfront. A collision or grounding adjacent to these areas could develop into a terrible disaster.

If the areas of doubt associated with operational risks can not be resolved satisfactorily, then alternative sites in more remote areas should be considered.

III. POSSIBLE SITES FOR ONSHORE FACILITIES RELATED TO
OCS OIL AND GAS DEVELOPMENT

Within Union County there are several large and moderately-sized tracts of land which could possibly serve as sites for the onshore facilities associated with offshore oil and gas development. These sites may not actually be available for development for the specified usages but they do satisfy the general physical requirements. Some of these tracts need more upgrading than others; some can be used in conjunction with other nearby or adjacent tracts to complement each other in satisfying the physical requirements for a specified use; and some may have environmental or social constraints which will not appear until the decision is made to develop.

The most suitable sites in the county are indexed on Exhibit P and are discussed below in numerical order.

SITE 1 is located in the City of Linden, near the Rahway city line and adjoining the Rahway River. Part is owned by Exxon and part by the City of Linden. Zoned for heavy industrial development, the total area is 255 acres, part of which is tidal and part of which is landfill. The site may be suitable for a gas processing plant or tank farm if considerable grading is performed. The site is isolated from residential units on the West by a buffer zoned for light industry and is accessible from Routes 1 and 9 via the Lower Road to Rahway.

Care would have to be taken in developing the site so that contaminated runoff would not flow into the Rahway River. Because of the relative proximity to residential areas in Rahway and Linden, air emissions

POSSIBLE SITES FOR OCS SUPPORT FACILITIES

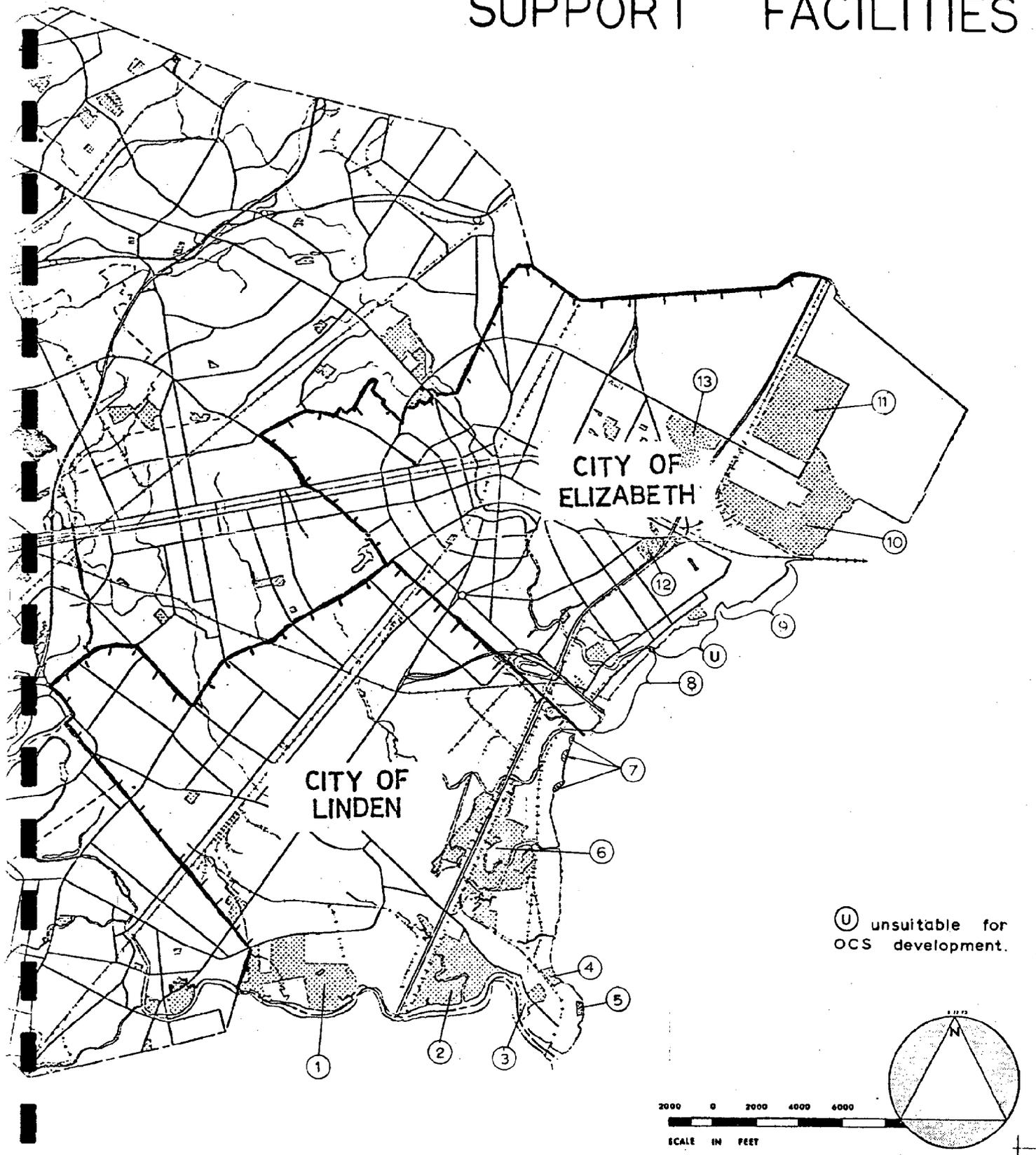


EXHIBIT P

should be held to a minimum in any new development on this site. Kings Creek drains a portion of the site and ocean access is limited by railroad and highway crossings over the Rahway River.

SITE 2 is owned by George Sacks, Inc. of Jersey City and is in the Tremley Point vicinity of Linden. It consists of 185 acres fronting the Rahway River and bounded by the Turnpike on the west, and Tremley Point Road (the lower extension of Wood Avenue) on the north. The site is suitable for building along Tremley Point Road but becomes marshland as it nears the Rahway River. Marshes Creek drains the site and development may require its elimination. Landfilling would be necessary to reclaim the low-lying portions of the site.

The Corps authorized depth for the Rahway River adjacent to the property is 8 feet. However, routine maintenance dredging has not been done and the depths are somewhat shallower. The river could be dredged to a greater depth if a private concern was willing to pay for the costs. Then the spoil could be used to fill in the low lying areas of the site. At the mouth of the river, where it joins the Arthur Kill, there is old piling which once served as a gate which could be taken out to widen the opening if it is too narrow. Also, there is a pipeline and cable area under the river bottom in this vicinity. These should be at least 10 feet below mean low water if the Corps authorized depth is 8 feet. If dredging to extra depths is desired, these pipelines and cables might have to be moved.

The zoning is heavy industrial for the entire 185 acres as well as for the lands surrounding it. There is considerable pressure by both

the owner and the City of Linden to get this tract developed (Exhibit Q). Linden, however, would like to see it developed in a way which would be most beneficial to the people of their city.

This site could be suitable for OCS related facilities if properly developed or if used in conjunction with a deep water site for handling deeper draft vessels on the Arthur Kill. Support bases could be established that have their offices, storage facilities and outdoor work spaces on Site 2 and receive and ship from Site 4 or 5. A pipe coating yard could be arranged in the same way with the work area a short distance inland from the shipping and receiving site.

The accessibility of Site 2 by road and rail is excellent with a possible New Jersey Turnpike entrance - exit proposed to be built next to the site and Conrail tracks running along the western perimeter of the property. Route 1 and 9 are only a short distance away. Additional traffic on Tremley Point Road would not adversely impact the road since it is lightly travelled at the present.

This property has been subdivided for real estate purposes and some of the lots could be used for warehousing and storage facilities with a minimum of site improvement.

SITE 3 is owned by Cities Service Corporation. It fronts the Rahway River and is zoned heavy industrial. It consists of about 10 acres with about 1,000 feet of riverfront. Citgo's tank farm for their marine terminal is adjacent to it. The site is divided by Tremley Point Road. Most of the property is suitable for development except for the tidal areas

Is the U.S. pushing Linden tank farm?

By WILLIAM KENNEDY
Journal Staff Writer

LINDEN.— Residents who oppose a proposal to put an oil tank farm on 170 acres of land in the Tremley Point section of the city might have to fight the federal government.

Mayor John T. Gregorio said Thursday the federal government, attempting to develop President Jimmy Carter's Strategic Petroleum Reserve Plan, approached the Sacks Realty Co. of Jersey City to obtain the land use as a tank farm.

Although the project is at least a year away, it was indicated by Gregorio that Robert G. Sacks informed city officials that the government finds the property "ideal because it meets all requirements." The site reportedly is the only one in the northeast part of the United States to meet the standards.

Second Ward City Councilman Louis Roberts, chairman of council's industrial development committee, said the President's plan is to build up a storage of

one billion drums of oil, approximately 50 million of which could be in the Linden site.

Roberts said it is up to his committee to begin work immediately to assist Sacks in selling the land for light industrial use.

"He has said he would build tomorrow if he had a buyer," Roberts said. "Linden has an excellent tax rate, which is a good incentive for locating here."

Roberts said plans to build an access road through the property, connecting Wood Avenue in Linden with Interchange 12 of the New Jersey Turnpike in Carteret, also should encourage industry to build in the area.

"We're going to get the tank farm if we don't act," Roberts said, "and we won't get the access road, either. What we have to do is start using that land, and if we don't, the government will decide to put the tanks there and we won't have a choice."

John Ziemian, city engineer, also met with Sacks on the tank farm proposal, and said, "If the federal government wants to come into Linden, who knows what we can do to stop it?"

SOURCE: ELIZABETH DAILY JOURNAL
April 29, 1977

along the Rahway River which would need filling before building could occur. Citgo has stated that they do not have immediate plans for this property

SITE 4 is an undeveloped tract of about 10 acres with 1000 feet of frontage along the Arthur Kill. It is owned by B. P. Oil Company which has expressed a desire to lease it or develop it to suit their lessee. Channel depths in the Arthur Kill are deep - 35 feet - and are sufficient for most barges and small tankers, not to mention the smaller vessels such as supply boats and workboats which are used to support offshore oil operations.

The site is presently marsh with filled and bulkheaded property on either side. It could be developed with slips, piers or marginal wharf, depending on the space requirements of the lessee. Rail service is along the western perimeter of the property and connections to Routes 1 and 9 and the Turnpike are via Tremley Point Road.

If 10 acres is not enough land, portions of Sites 1, 2, 3, 6 or other available warehousing in the area could be utilized.

An outstanding advantage of locating operations in the Tremley Point area is that the transportation systems are on the fringe of the New York Metropolitan Area and do not experience the typical level of congestion. Yet the site is easily accessible to major transportation networks

SITE 5 is part of the B. P. and Citgo properties and lies between the respective receiving and shipping berths of their marine terminals at Tremley Point. It is bulkheaded and improved with greater than 500

feet of water frontage along the Arthur Kill. There is some adjacent acreage which has no apparent use at the present. This land may not be available but it may possibly be used as a shipping/receiving area for a supply base which might be located inland on Sites 1, 2 or 3. Cities Service was successful in the OCS lease sale through its interests in a consortium so it may perhaps bring this land into use for OCS support purposes if necessary.

SITE 6 is a vast tract of marshland owned by Exxon and DuPont DeNemours in Linden. About 200 acres, it is zoned for heavy industry. Rail service is on the eastern perimeter and through the western part of the site near the Turnpike, which divides the property. There is no readily accessible deepwater, unless an arrangement could be made with DuPont whose factory is on the nearest waterfront. Out of the range of facilities associated with finds of offshore oil and gas, the site would be best suited for a gas processing plant or an extension of the Exxon tank farm.

SITE 7 consists of several presently unused portions of Exxon's property at the Bayway Refinery. There are three waterfront sites: one on either side of the present docking facilities and one south of the barge piers. These waterfront sites have ample frontage but are small in terms of adjacent acreage. Therefore, additional storage or work space might have to be used from nearby lands.

One site is south of the barge piers and fire fighting training grounds, and consists of at least 8 acres of swampy land with at least 700 feet of waterfront. Road and rail access are good and if the land

were developed to eliminate the low-lying ground and improve the dockside depths, this site could be used for a service base.

The other two sites are on either side of the steamer docks. Each has about 400 feet of water frontage and has about 3 acres of contiguous land. Both sites are fairly well suited for development but are sandwiched in between other waterfront uses. The northern site fronts Morses Creek and depths there may be quite shallow. The southern site lies between the No. 2 Steamer docks and the saltwater pumping station. There is some vacant property on the other side of Koeler Way which is near both sites, which could be developed into a storage area.

The roads throughout the Exxon property are gravel and dirt and may not be able to handle extra traffic. In addition it is not expected that a supply base would be considered for any of these three parcels except by Exxon.

SITE 8 is the lower Elizabeth waterfront and is characterized by a variety of industrial ownership and usages. The establishment of a small support base in this area would be compatible with the existing industrial neighborhood. Road and rail access are good as are waterfront depths. Many of the companies owning property on this stretch have unused portions of waterfront. Notably, the property under the Goethals Bridge crossing is partly owned by Borne and Srymser Corporation and Linbay Realty and is presently unused. The Borne and Srymser property alone has 750 feet of waterfront which is fully developed with docks.

The owners in Site 8, from south to north, are:

Phelps-Dodge Copper Products Corp.	- 1,440 ft.	waterfront
Linbay Realty	- 450 ft.	"
Borne & Srymser Corp.	- 730 ft.	"
Archer Daniels & Midland	- 300 ft.	"
Crown Central Corp.	- 1,020 ft.	"
Chevron Oil	- 720 ft.	"
Loizeaux Builders Supply	- 800 ft.	"

There may be limited availability of land for lease among the above properties. However, a service base siting here would meet no opposition if a lease (or sale) were obtained.

SITE 9 includes waterfront property from the Singer Company at Port Avenue to the abandoned Central Railroad of New Jersey tracks. Most of this waterfront is not being used and the upland areas are in developable condition. There are some empty buildings on the northern part of the site which could be used for warehousing. A supply base could perhaps be located here. At the present time, Singer has a small "yacht club" where employees can moor their boats offshore. Also, its foundry is very close to the waterfront. Dredging and bulkheading might be required. A Public Service Electric and Gas pipeline supposedly is in the area of the waterfront and might present some problems to development. If a supply base company thought an arrangement could be made here, it should negotiate with the Singer Company which is the major property owner. The Central Railroad of New Jersey (now Conrail) owns the northernmost part of the site. Martin Marietta Corporation owns the adjacent property to the south of Singer.

SITE 10 is entirely vacant, low-lying waterfront lands located north of the abandoned Central Railroad tracks and owned by the Central Railroad and Allied Chemical and Dye Corporation. It consists of 123 acres zoned M-3, which is heavy manufacturing. The southern part of the site was formerly used by the City of Elizabeth as a landfill and the northern part has been developed and filled by Allied Chemical. The actual waterfront has had no improvements made to it and dredging, bulkheading and backfilling would be needed to put the area into condition for OCS related facility use. There are no residential areas close to the site and road and rail access are excellent. The container cargo Port of Elizabeth is the adjacent property on the north. Proximity to the Port also places it near ancillary marine services, such as repair yards. Locating a service base here would place the operation in an area with an established marine heavy industrial infrastructure. In addition, a permanent supply base would have ample room for storage or expansion. There are over 1,500 feet of waterfront.

The site would also be good for a pipe coating yard, but the City of Elizabeth has stated in their resolution of September 13, 1977 (previously cited) that it does not want pipe coating yards within the city limits. The city, however, will further consider requests for such use of this tract.

The site may also be suitable for a gas processing plant, but this would be a wasteful use of valuable waterfront land if the property were not subdivided.

SITE 11 is a large vacant tract adjacent to the Elizabeth Port Authority Marine Terminal property, and is 286 acres in area. In the past this site served in part as a sanitary landfill. The Central Railroad of

New Jersey owns the property, much of which is still fairly low-lying. Roads, rail and air access are good but there is no waterfront access except through adjacent properties. The site could perhaps be used for a gas processing plant but any proposal like this would have to be considered by the City of Elizabeth because ideally, this site should be developed in some mode that would complement or be part of the adjacent Port complex.

SITE 12 is the New Point Road Redevelopment Area which is supposed to be undergoing development shortly. It is in the heart of the industrial area of Elizabeth. This could be an ideal location for support industries for OCS operations. This could include district offices/operations for such enterprises as drilling tools and equipment companies, wellhead equipment companies, logging and perforating companies, catering companies and other supplies and services. The location of these ancillary support industries in the area would be contingent upon a supply base being located in the area. This industrial park would also be a good place for the offices of a supply base. The property taxes on the tract have been deferred for several years as an additional incentive for development through a program sponsored by the State of New Jersey Economic Development Administration which should be implemented by September, 1978.

SITE 13 is located in Elizabeth on the west side of the New Jersey Turnpike, south of North Avenue. The site area is 89 acres of industrially zoned land. It is totally surrounded by industry, Newark Airport and the Turnpike. The site elevation is fairly low and the soil is essentially sandy. Although the site may be a good choice for a gas processing plant,

the proximity of Newark Airport could restrict the erection of stacks.
This site, because of its distance from the waterfront, is generally not
choice for OCS related operations.

III-A. AREAS UNSUITABLE FOR OCS RELATED DEVELOPMENT

The one area in the county where it is preferred that OCS related facilities not be located is along the Elizabeth waterfront between East Jersey Street and Port Avenue, or between Sites 8 and 9 (Exhibit P). The City is hoping to put public recreation facilities in this area and, therefore, industrial development would not be compatible along this strip if these plans were to be realized.

IV. COUNTY VIEW OF NATIONAL, STATE AND LOCAL INTERESTS IN COASTAL ENERGY FACILITY SITING.

The Federal, State and local governments each have different perspectives on the development of offshore oil and gas, which stem from their respective jurisdictions and impacts that decisions of other governmental levels would have on their jurisdictions. Efforts to coordinate the decisions and policies made at each level lead to the Federal Consistency Requirements and the mandate under the 1972 Coastal Zone Management Act that a state's coastal plan be accepted by local governments. The intent is being carried out but sometimes the decision processes become very inefficient and ineffective because participation in certain issues becomes too broad.

We see the major interests of each level of government to be the following:

FEDERAL: The Federal government holds title to the offshore tracts and runs the leasing process. Because it has jurisdiction at the well-site, it addresses platform safety and environmental issues such as oil spills and waste disposal.

The Federal government must also address issues concerning offshore oil and gas development that are of national concern. National energy supply and economic growth are two important reasons for the Federal government to encourage offshore development and to see that local or State objections are not without foundation.

Through existing programs, the Federal Government is also concerned with Marine traffic and development impacts on inland waterways. Although

these types of enforcement decisions may be of more concern to a State than to the Nation as a whole, Federal agencies have been making controlling local decisions concerning waterways for years.

STATE: Ideally the State should cope with those problems which transcend the boundaries of municipal and county governments. The State is responsible for developing a Coastal Zone Management Plan and, therefore, it must be certain that local development schemes are consistent with the plan, including those aspects that have to do with support facilities for offshore oil and gas development.

The State also has a responsibility for the economic health of New Jersey and should try to attract new industries and also protect existing industries which are major economic contributors. In the case of development of offshore oil and gas, this could mean channelling development away from areas which might have detrimental effects on the tourist trade.

It is up to the State to find the balance between creating an attractive industrial setting and maintaining an acceptable living environment. We feel that it would not be inappropriate for the State to intervene in negotiations between a local government and a private developer if the negotiations are not going in a direction which would benefit most of the residents of New Jersey. The State carries more ability to offer alternative solutions due to their statewide knowledge of coastal zone management issues.

LOCAL: Responsibility for accepting or turning away development associated with offshore oil and gas falls primarily with the local governments. Zoning and Planning Board decisions remain the strongest tools available for achieving local development ideals. The counties, through the State's Coastal Zone Management Program, have come up with general guidelines for local development which may occur as a result of outer-continental shelf activities. These guidelines will be of benefit to the oil and gas companies and the State. However, the municipalities will have to deal directly with any development proposals and handle them according to their local master plans, zoning ordinances and building codes. Impacts on the local unit of government will vary with the size of the municipality in which the facility will locate and the nature of the local industrial infrastructure. In Union County, it is anticipated that oil and gas related facilities that may be built in association with offshore drilling activities will have a beneficial effect on our coastal communities provided proper controls are utilized.

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