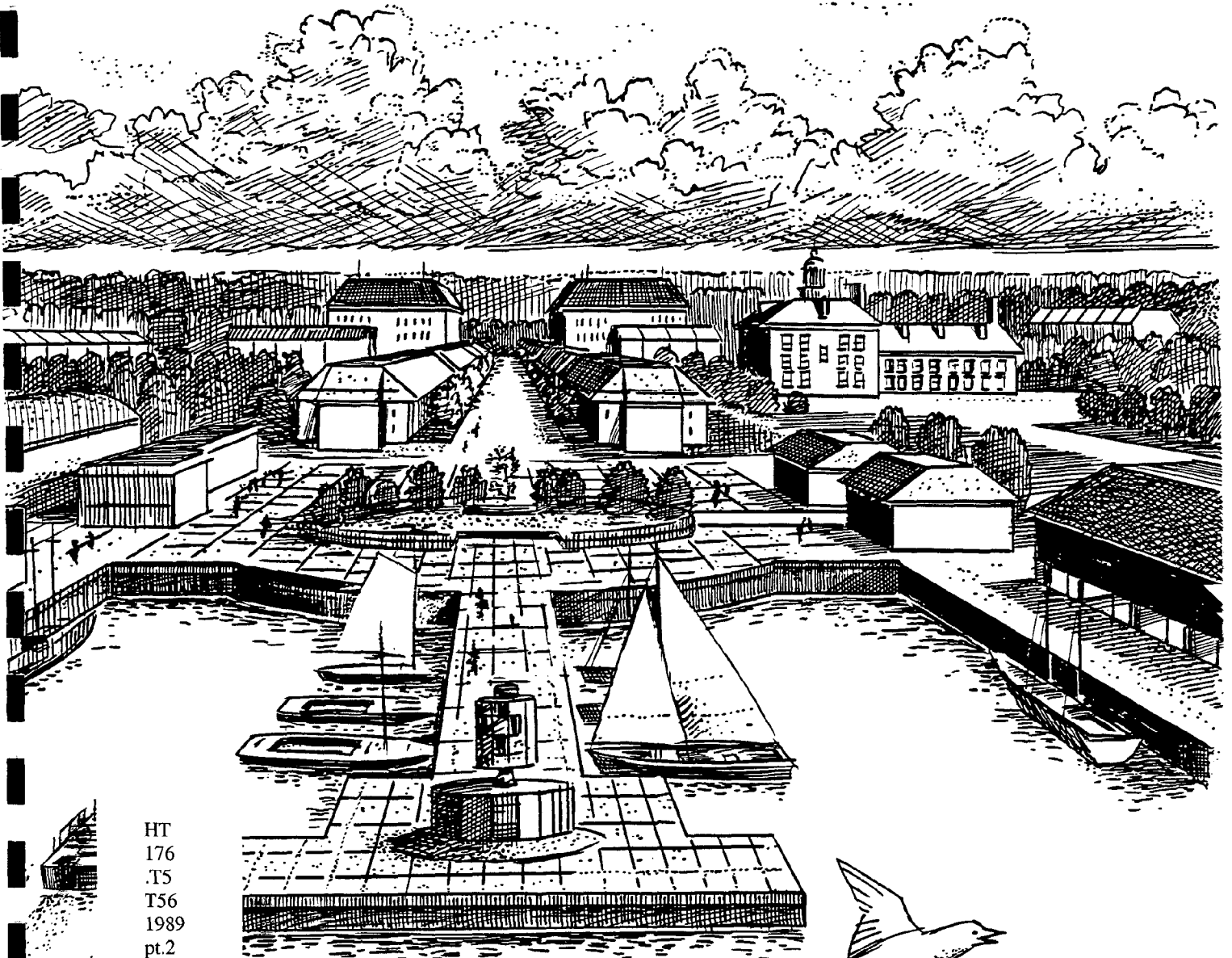
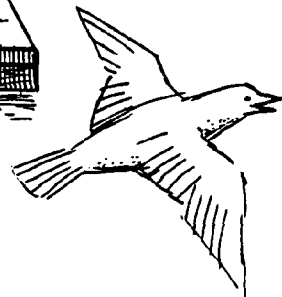


TINICUM WATERFRONT VISION FOR YEAR 2000



HT
176
.T5
T56
1989
pt.2



**Part Two
Background I
RDC Institute**

TINICUM TOWNSHIP
WATERFRONT FEASIBILITY ANALYSIS
PART II
BACKGROUND I

TINICUM TOWNSHIP

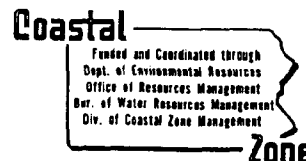
JULY 1989

RDC INSTITUTE, INC.
UPLAND, PA 19015

PT 2

HT 176.75 756/1989

The preparation of this report was financed through the Pennsylvania Coastal Zone Management Program under provisions of the Coastal Zone Management Act of 1972, administered by the Division of Coastal Zone Management, Office of Resource Management, Pennsylvania Department of Environment Resources.



Consultant Services for the
Tinicum Waterfront Feasibility Analysis
were provided by
Land Design/Research, Inc.
Quarry Park Placed/ Suite 201
9175 Guilford Road
Columbia, Maryland 21046-2660

and

Delaware County Planning Department
Toal Building
2nd and Orange Streets
Media, PA 19063

CONTENTS

Part II Background I

Section	Page
I PREAMBLE	1
II INTRODUCTION	4
III ECONOMIC AND DEMOGRAPHIC CONDITIONS	5
The Regional Economy	5
Regional Employment Projections	8
Delaware County Trends and Projections	11
Population and Household Trends and Projections	12
Income Trends and Projections	14
Economic Context Conclusions	14
IV PHYSICAL CONTEXT	17
The Tinicum Waterfront Study Area	17
Study Area -- Physical Constraints	18
Siltation	18
Existing Shoreline Condition	20
Shoreline Stabilization	20
Siltation and Shoreline Stabilization Conclusions	22
Management Structures and Zoning Constraints	22
Study Area -- Market Constraints	27
Development Sties	28
Conclusions	32
Study Area -- Opportunities	32
V ASSESSMENT OF RESIDENTIAL MARKET SUPPORT	36
Current Conditions	36
Assessment of Demand	36
Conclusions	45

VI	ASSESSMENT OF MARINA SLIP AND DRY STORAGE MARKET SUPPORT	49
	The Boating Environment	49
	Competitive Environment	49
	Assessment of Demand	50
	Historical Boat Registration	50

APPENDIX A

Fee Simple Acquisition	A-1
------------------------	-----

APPENDIX B

Funding Sources	B-1
-----------------	-----

Section I
PREAMBLE

The Tinicum Waterfront, like most other waterfronts in this country was, until recently, one of the most neglected resources of our time. Waterfronts were allowed to deteriorate as a result of underutilization, inadequate planning, and lack of private investment into new water related projects. Because of this type of neglect, Tinicum is now experiencing all the problems associated with the declining properties fronting on waterways. Some of these problems consist of conflicting land uses, deteriorating piers and bulkheads, siltation of navigable waters, and lack of public access to the river.

RDC Institute, Inc. (RDC) a private, non-profit economic development organization whose major mission is to encourage and stimulate economic growth, received a grant from The Pennsylvania Coastal Zone Management Program as a beginning to combat these conditions. This grant has been used to develop a Tinicum Township Waterfront Action Plan. The principal objectives of this project are to stimulate economic activity, encourage the construction of a public boat ramp, and make recommendations regarding physical improvements to both off-shore and on-shore conditions. This document presents a strategy for transforming the Tinicum Waterfront into a more attractive, accessible waterfront which will provide efficient use of properties and enhance economic activities in the community.

Because of the complexity of issues related to this project, RDC sought the services of a private consultant with extensive and combined experience in economic development, real estate marketing, marina, and waterfront development.

Through a competitive selection process, Land Design/Research, Inc. (LDR) of Columbia, Maryland was selected as the primary consultant. LDR is recognized nationally and internationally for its successful design of urban waterfronts, mixed-use developments, and town center revitalization strategies.

The Delaware County Planning Department (DCPD) was also added to the project team to bring to bear their extensive knowledge of local attitudes, government policies and land use objectives, as well as their specific expertise in demographics, land use characteristics and data collection and analysis.

Together, these three agencies have developed a strategy to bring Tinicum's waterfront back to full potential.

The report is structured into a three-part document. The three-part format is used to present the Action Plan and supporting documents in a simplified method, so township officials, existing property owners, and prospective private investors can use this document with the greatest of ease. Part I explains the development plan and the steps that are

necessary to implement improvements. Parts II and III examine the data that was analyzed and the rationale supporting the recommendations. They can be appreciated separately or referenced together for a complete overview.

Part I. "Action Plan"

This section is the result of the analyses of the economic, physical, and regulatory environments of the community. It contains the recommended development program that envisions the Tincum Waterfront in the future. It identifies appropriate water-related and water dependent uses for future development and other areas for physical improvement. The Action Plan is an identification of a series of actions that need to be carried out to accomplish the development program. It provides the immediate and long-range steps that must be taken to bring Tincum's Waterfront to full potential.

This section can benefit anyone who has an interest in investing in the Tincum Waterfront, current landowners, prospective developers, or water recreation enthusiasts. Also, it is a guide to assist government officials in their public policy deliberations regarding the waterfront area.

Part II. "Background I"

This section discusses the economic and demographic conditions of the region. It also discusses off-shore conditions, such as the severe siltation and shoreline conditions. Alternative scenarios for addressing shoreline stabilization are discussed in this section, and a detailed section of assessment of the residential market, marina slips and dry storage market support is included. This section helps the reader understand why certain recommendations were made for new waterfront development.

Part III. "Background II"

This section consists of data that was analyzed for input into the Action Plan . It discusses the demographics at the local level and identifies certain trends within the project area. It also discusses policy documents such as the Township's Comprehensive Plan and Zoning requirements for waterfront development and provides information on existing infrastructure and public services within the community. Regulations at the local, state and federal levels which must be considered when contemplating waterfront development are also discussed.

The Tincum Waterfront Action Plan has been developed for the purpose of bringing the Tincum Waterfront to its full potential. There are many opportunities and constraints to

new water related and water-dependent uses along the Tinicum Waterfront. This Plan does not provide all the answers, but it is an initiative to begin the transformation. We trust that this Action Plan will serve as a valuable resource for public officials making decisions, existing property owners who are considering improvements to their properties, and prospective private investors interested in the Tinicum Waterfront.

Section II INTRODUCTION

In December of 1988, RDC Institute commissioned Land Design/Research, Inc. (LDR) to identify market supportable development potentials for water dependent and water related uses for the Tinicum Waterfront in Tinicum, Pennsylvania. The study area consists of approximately 160 acres and is adjacent to the Philadelphia International Airport.

The general objective of the LDR work was to provide a revitalization strategy which would allow the Tinicum Waterfront to achieve its full potential for water dependent uses. The study was to concentrate on public access (public boat launch) to the water as well as identifying development opportunities which would promote economic revitalization and job creation. The study also outlines off shore conditions and establishes a program outlining the restoration and stabilization of the shoreline and waterway. General cost estimates for new public infrastructure and shoreline improvements are included as well as an action plan for implementation of the recommendations.

To achieve this objective, LDR staff interviewed local real estate professionals and developers, regional and county planners, economic development officials, local businessmen and large corporations, economists with state and Federal Reserve banks, The U.S. Army Corps of Engineers, Coastal Zone Management, The Fish Commission, marina operators, a variety of consultants involved in waterfront revitalization and marina development, and local citizens. This information was augmented with a variety of analytical studies and models. Each model was adjusted to reflect the unique conditions found at the Tinicum Waterfront.

The following text is the result of this study. Section III presents an overview of economic and demographic conditions in the area as they will influence future development. Section IV presents both physical and market opportunities and constraints which will confront development at the Tinicum Waterfront. Section V provides a detailed assessment of residential market support and Section VI provides a detailed assessment of marina slip and dry storage market support. As a result of the above analysis, a development program and an action plan were prepared to provide guidance to both the public and private sectors in their revitalization efforts. The development program and action plan can be found in Part 1 of the three-part document.

Section III ECONOMIC AND DEMOGRAPHIC CONDITIONS

The economic and demographic conditions found in a region determine the development opportunities and constraints facing the use of a specific property. This section provides an overview of trends in employment, population, households, and personal income in the Tincum Waterfront region since 1970 and includes forecasts of relevant economic and demographic factors to the year 2000.

Data for all the economic and demographic indicators are arrayed in a series of tables and are separated into two mutually exclusive market areas. The region, in this analysis, is comprised of a three county area and consists of Philadelphia, Montgomery, and Chester Counties. The local geography is comprised of Delaware County which contains the Tincum Waterfront Study Area (see Exhibit 1 -- Regional Location Map). While Delaware County is part of the region, it has been separated from the other counties to better illustrate growth trends which will influence development in proximity to the study area. A variety of data sources were consulted and utilized for the trend and projection analyses, however, some results were adjusted on the local level to reflect knowledge of Delaware County garnered from interviews with local business, government, and planning representatives, regional and statistical planning agencies and the district Federal Reserve Bank.

Based on the interviews, the development potential and ultimate viability for a variety of products, within the Tincum Waterfront Study Area, will be influenced by the health of the regional economy and the prevailing market conditions of its real estate markets.

The Regional Economy

The strength of the regional economy has historically depended upon the manufacturing sector of Philadelphia. Similar to many other major U.S. port cities, the recessionary period of the mid 1970's and early 1980's severely affected the regional manufacturing base. Total regional employment decreased from 1.413 million in 1970 to 1.312 million in 1975, a decrease of over 100,000 jobs. The decline was primarily experienced in the labor intensive manufacturing sector as many firms lost competitiveness due to obsolescent facilities and/or foreign interests. The decline in the manufacturing sector is forecasted by the Delaware Valley Regional Planning Commission (DVRPC) to continue through 2000, as the entire region follows the national trend of shifting to a service oriented economy. The declining trend "bottomed-out" in the early 1980's and total employment is expected to grow modestly to 1.491 million by 1990.

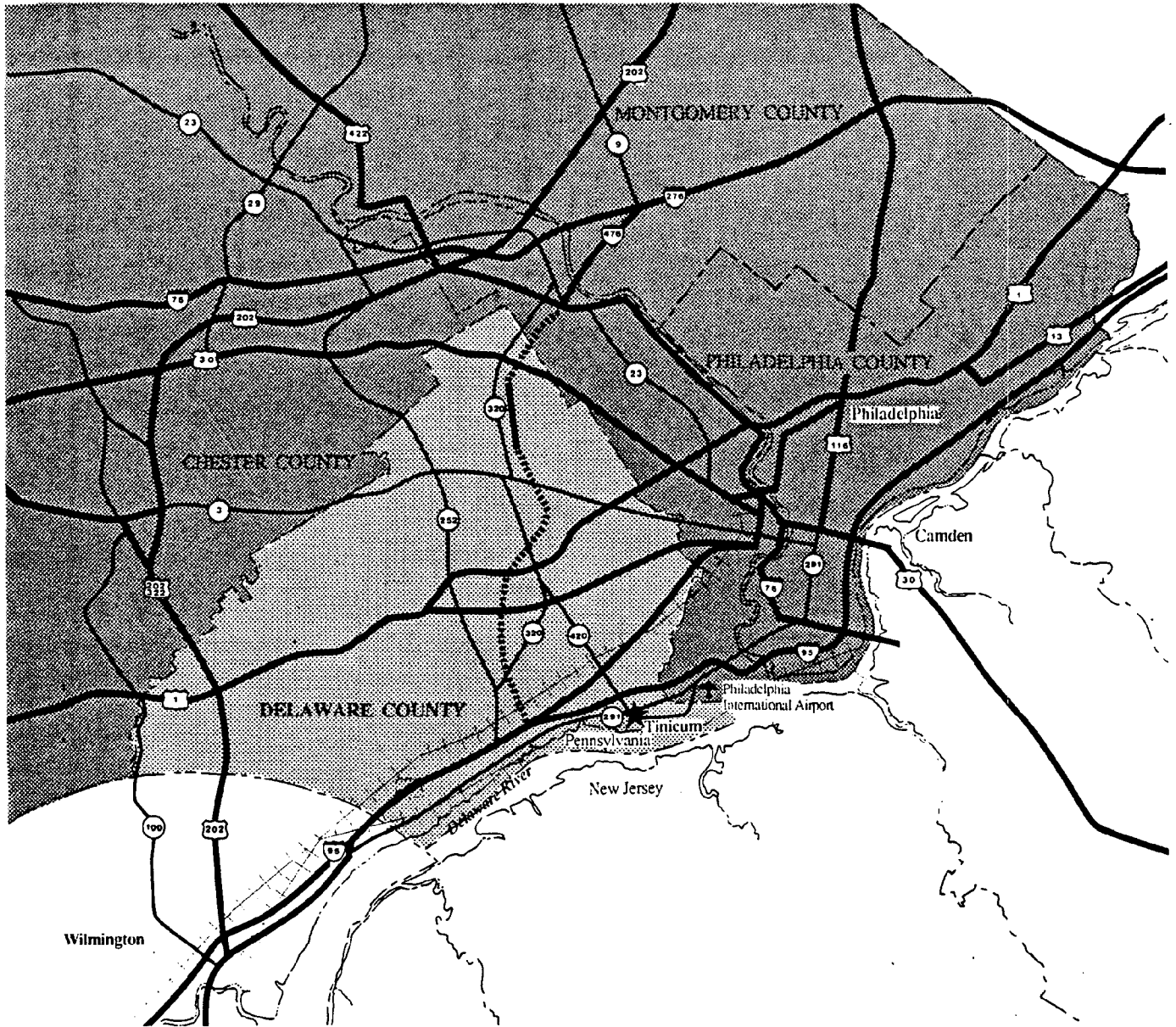


Exhibit 1

Regional Location Map

Tincum Waterfront

- ★ Site
- ▨ Delaware County
- ▨ Surrounding Region - Chester, Montgomery, Philadelphia County

First Fidelity Bancorporation's (FFB) **Regional Economic Trends** report anticipates the region to experience a period of slowly decelerating economic growth. According to the report, the factors that generated strong national economic growth in 1987-1988 are eroding, and a tight monetary policy is providing the framework for a national slowdown. This is significant because regional economic growth has been declining while national growth has remained robust. It appears that a national slowdown could intensify the regional slowdown.

The region has experienced relatively slow total employment growth and is continuing to under-perform the nation. The disappointing rates of growth are spread across all employment sectors (shown in table 1) with the exception of finance, insurance, and real estate (F.I.R.E.) which grew slightly faster in the region (2.1 percent) than the nation (1.7 percent).

*Table 1 Employment Growth, Percent Change
December 1987 – December 1988*

	U.S.	Philadelphia Region
Manufacturing	2.1	-0.9
Durables	2.5	-1.4
Nondurables	1.6	-1.4
Nonmanufacturing	3.8	2.3
Construction	5.9	5.7
T.C.U.	3.2	0.7
Trade	3.9	1.3
Wholesale	5.4	1.7
Retail	3.5	1.1
F.I.R.E.	1.7	2.1
Services	5.4	3.3
Government	2.2	1.9
Total:	3.5	1.7

Source: FFB Regional Economic Trends

Regional unemployment rates fell to levels which are considerably less than the national average and continue to underlie the recent problem of labor shortages in the region (Table 2). Another emerging trend which could further exacerbate the regional labor problem is the tremendous slowdown in the growth of the labor force; in 1988, the region's labor force expanded by only 0.3 percent.

Table 2 Regional Unemployment Rates, 1988

	Unemployment Rate	% Change 1987-1988
Chester County	2.2	-0.4%
Delaware County	2.6	-0.5%
Montgomery County	2.3	-0.6%
Philadelphia County	4.5	-0.7%
United States	5.3	-0.5%

Source: FFB Regional Economic Trends

Low unemployment and stagnant conditions within the labor force are exerting upward pressures on wages and consumer goods. The Philadelphia Consumer Price Index (CPI) rose by 5.6 percent while the nation experienced a 4.4 percent increase during the 1987 to 1988 period. Additionally, posted regional retail sales in 1988 grew at only 1 percent. Inflationary pressures, modest employment increases, and reduced sales volumes indicate a short term economic slowdown for the region.

Regional Employment Projections

The recessionary period coincided with the publishing of the 1980 census data. "Official" DVRPC projections for the region were calculated from this data, and were shaped by the sharp economic downturn occurring at that time. As a result, the regional employment and population projections may be slightly understated. However, the rates of growth appear to be consistent with recent economic trends and reflect the best available data. It is also important to recognize that this is regional data, and that stronger growth rates in Montgomery and Chester Counties are statistically mitigated by the City of Philadelphia.

As seen in Table 3, growth beyond 1990 is expected to be modest and reach 1.555 million by 2000, an increase of over 64,000. The service and wholesale/retail trade sectors are expected to achieve over 95 percent of the growth while the other sectors remain flat. The only sector projected to decline is manufacturing, but at a nominal rate. Table 4 illustrates the average annual growth rates and the numeric increases expected by employment sector through the year 2000.

Table 3

EMPLOYMENT TRENDS AND PROJECTIONS
TINICUM WATERFRONT MARKET AREAS
1970-2000

	EMPLOYMENT (Thousands)										PERCENTAGE DISTRIBUTION									
	1970	1975	1980	1984	1990	2000	1970	1975	1980	1984	1990	2000	1970	1975	1980	1984	1990	2000		
Delaware County	10.5	10.6	10.7	11.5	11.9	12.0	5.8%	5.7%	5.1%	5.3%	5.2%	5.1%	5.8%	5.7%	5.1%	5.3%	5.2%	5.1%		
Construction	52.6	47.4	45.1	37.1	33.4	29.4	29.2%	25.6%	21.5%	17.0%	14.7%	12.6%	29.2%	25.6%	21.5%	17.0%	14.7%	12.6%		
Manufacturing	7.9	6.7	7.5	9.2	9.4	9.2	4.4%	3.6%	3.6%	4.2%	4.1%	3.9%	4.4%	3.6%	3.6%	4.2%	4.1%	3.9%		
Transp., Communications and Utilities (TCU)	37.5	41.9	49.6	52.6	55.1	57.5	20.8%	22.6%	23.6%	24.1%	24.3%	24.6%	20.8%	22.6%	23.6%	24.1%	24.3%	24.6%		
Wholesale & Retail Trade	7.3	8.5	15.1	15.5	16.7	17.7	4.0%	4.6%	7.2%	7.1%	7.4%	7.6%	4.0%	4.6%	7.2%	7.1%	7.4%	7.6%		
F.I.R.E. (1)	40.6	43.7	56.9	68.3	75.9	83.4	22.5%	23.6%	27.1%	31.3%	33.5%	35.7%	22.5%	23.6%	27.1%	31.3%	33.5%	35.7%		
Services	23.9	26.4	25.3	24.0	24.5	24.7	13.3%	14.3%	12.0%	11.0%	10.8%	10.6%	13.3%	14.3%	12.0%	11.0%	10.8%	10.6%		
Government	180.3	185.2	210.2	218.2	226.9	233.9	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
Total:	67.0	52.7	50.0	55.9	57.2	57.6	4.7%	4.0%	3.6%	3.9%	3.8%	3.7%	4.7%	4.0%	3.6%	3.9%	3.8%	3.7%		
3 County Area	379.9	300.2	276.2	240.8	228.0	216.0	26.9%	22.9%	20.1%	17.0%	15.3%	13.9%	26.9%	22.9%	20.1%	17.0%	15.3%	13.9%		
Construction	84.2	73.2	72.5	68.1	70.5	70.2	6.0%	5.6%	5.3%	4.8%	4.7%	4.5%	6.0%	5.6%	5.3%	4.8%	4.7%	4.5%		
Manufacturing	280.8	261.1	277.8	293.4	310.4	330.0	19.9%	19.9%	20.2%	20.7%	20.8%	21.2%	19.9%	19.9%	20.2%	20.7%	20.8%	21.2%		
Transp., Communications and Utilities (TCU)	90.6	90.5	113.0	122.7	130.9	138.2	6.4%	6.9%	8.2%	8.6%	8.8%	8.9%	6.4%	6.9%	8.2%	8.6%	8.8%	8.9%		
Wholesale & Retail Trade	297.1	315.0	382.8	431.3	485.1	533.7	21.0%	24.0%	27.8%	30.4%	32.5%	34.3%	21.0%	24.0%	27.8%	30.4%	32.5%	34.3%		
F.I.R.E. (1)	214.3	219.4	204.6	206.3	209.2	209.8	15.2%	16.7%	14.9%	14.5%	14.0%	13.5%	15.2%	16.7%	14.9%	14.5%	14.0%	13.5%		
Services	1413.9	1312.1	1376.9	1418.5	1491.3	1555.5	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
Government																				
Total:																				

Source: DVRPC; LDR Development Economics

Table 4

EMPLOYMENT GROWTH RATES AND NUMERIC INCREASES
 TINICUM WATERFRONT MARKET AREAS
 1970-2000

	AVERAGE ANNUAL GROWTH RATE				
	1970 1975	1975 1980	1980 1984	1984 1990	1990 2000
DELAWARE COUNTY					
Construction	0.2%	0.2%	1.9%	0.6%	0.1%
Manufacturing	-2.0%	-1.0%	-4.4%	-1.7%	-1.2%
Transp., Communications and Utilities (TCU)	-3.0%	2.4%	5.7%	0.4%	-0.2%
Wholesale & Retail Trade	2.3%	3.7%	1.5%	0.8%	0.4%
F.I.R.E. (1)	3.3%	15.5%	0.7%	1.3%	0.6%
Services	1.5%	6.0%	5.0%	1.9%	1.0%
Government	2.1%	-0.8%	-1.3%	0.3%	0.1%
Total:	0.5%	2.7%	1.0%	0.7%	0.3%
3 COUNTY AREA					
Construction	-4.3%	-1.0%	2.9%	0.4%	0.1%
Manufacturing	-4.2%	-1.6%	-3.2%	-0.9%	-0.5%
Transp., Communications and Utilities (TCU)	-2.6%	-0.2%	-1.5%	0.6%	0.0%
Wholesale & Retail Trade	-1.4%	1.3%	1.4%	1.0%	0.6%
F.I.R.E. (1)	0.0%	5.0%	2.1%	1.1%	0.6%
Services	1.2%	4.3%	3.2%	2.1%	1.0%
Government	0.5%	-1.3%	0.2%	0.2%	0.0%
Total:	-1.4%	1.0%	0.8%	0.9%	0.4%
NUMERIC INCREASES IN EMPLOYMENT					
DELAWARE COUNTY					
	1970 1975	1975 1980	1980 1984	1984 1990	1990 2000
Construction	0.10	0.10	0.80	0.40	0.10
Manufacturing	-5.20	-2.30	-8.00	-3.70	-4.00
Transp., Communications and Utilities (TCU)	-1.20	0.80	1.70	0.20	-0.20
Wholesale & Retail Trade	4.40	7.70	3.00	2.50	2.40
F.I.R.E. (1)	1.20	6.60	0.40	1.20	1.00
Services	3.10	13.20	11.40	7.60	7.50
Government	2.50	-1.10	-1.30	0.50	0.20
Total:	4.90	25.00	8.00	8.70	7.00
3 COUNTY AREA					
Construction	-14.30	-2.70	5.90	1.30	0.40
Manufacturing	-79.70	-24.00	-35.40	-12.80	-12.00
Transp., Communications and Utilities (TCU)	-11.00	-0.70	-4.40	2.40	-0.30
Wholesale & Retail Trade	-19.70	16.70	15.60	17.00	19.60
F.I.R.E. (1)	-0.10	22.50	9.70	8.20	7.30
Services	17.90	67.80	48.50	53.80	48.60
Government	5.10	-14.80	1.70	2.90	0.60
Total:	-101.80	64.80	41.60	72.80	64.20
Total:	-96.9	89.8	49.6	81.5	71.2

Source: DVRPC; LDR Development Economics

Delaware County Trends and Projections

Delaware county also experienced the effects of the recessionary period in their manufacturing sector. The loss of manufacturing jobs was primarily concentrated in the riverfront portion of the county and the economies of the affected townships/boroughs were negatively impacted due to the lack of diversification. However, Delaware County employment grew in every sector with the exception of manufacturing and government between 1970 and 1984. Total employment grew from 180,300 in 1970 to 218,200 in 1984, an increase of 37,900 or 21 percent (Table 3). The County is projected to grow modestly by DVRPC through the year 2000, and is expected to add 7,000 new jobs between 1990 and 2000 (Table 4). The service and wholesale - retail trade sectors are expected to capture the majority of the growth while manufacturing is expected to continue its decline.

We feel these projections are conservative and the County will experience job growth of a higher magnitude based upon leadership interviews and recent development patterns in the eastern portion of Delaware County. The area which is anticipated to benefit is known as the Industrial Corridor and is geographically framed by I-95 and Route 291. Several projects/announcements have been realized or released which could not be accounted for at the time DVRPC released its projections:

- The Boeing Helicopter Company has received a \$2.5 billion contract with the federal Government to develop the V-22 tilt-rotor helicopter and is in competition for the development rights of the LHX helicopter. Employment at Boeing could increase by 3,000 to 4,000 between 1990 and 2000 (recent developments in the U.S. Budget may affect the development of the V-22).
- United Parcel Service has developed its regional distribution center within the Tinicum Township's boundaries and is expected to generate 3,000 new jobs by 1993.
- The Henderson Group is developing the Airport Business Park which has the potential to generate another 5,000 jobs over the next 15 years.
- Hotel and adaptive reuse development within the Industrial Corridor has also been significant due to the expansion of the Philadelphia International Airport.
- The completion of the Blue Route (I-476) in the early 1990's is anticipated to spawn additional economic development in Delaware County.

The Delaware County economy appears to be well positioned relative to the region as a whole, and the Tinicum Waterfront Study Area is strategically located in the center of this resurging economy.

Population and Household Trends and Projections

Population

Table 5 displays trends and projections in population and household formation for the region and Delaware County. Population levels for the three county region demonstrated a decline between 1970 and 1988, from 2,850,719 to 2,665,979. Growth occurred in Chester and Montgomery Counties but large decreases in Philadelphia County accounts for the region's declining numbers.

Since 1985, nominal increases in population have been observed and are attributable to increases in employment. Population growth is not expected to grow significantly by DVRPC and is expected to reach 2,818,940 by the year 2000. Most of the growth can be expected in the suburban fringes of the three county region.

Delaware County experienced sharp population declines between 1970 and 1980, declining from 600,035 to 555,007. The loss of manufacturing jobs during the recessionary period was the primary impetus for the decline. Delaware County has reversed the declining trend and population has increased modestly to an estimated 565,364 people in 1988, an increase of 10,357 or 2 percent. County subdivision data reflects a continuation of this trend, and a much stronger growth rate than the DVRPC projections. As a result both population and household projections have been adjusted to reflect the higher level of growth. The majority of the growth is anticipated to occur in the western portion of the county where most of the new housing starts will be captured. This trend will continue as eastern Delaware County has very limited land resources. County population is projected to increase slightly from 565,364 to 574,495 between 1988 and 2000, an increase of 9,131.

Households

Households are the key demographic unit, in that personal income, spending, and location of residency are factors which tend to be affected at the household level. Household growth has been more pronounced than population growth, due in part to declining household sizes caused by changing American life-styles. Table 5 illustrates the trends and projections for the region and Delaware County.

Even though regional and County population levels declined by 247,266 between 1970 and 1980, the total number of households increased by 49,320 over the same time period, from 1,090,835 to 1,140,155. The three county region is projected to increase from an estimated 1,015,716 households in 1988 to 1,108,591 by 2000, an increase of

Table 5

POPULATION AND HOUSEHOLD TRENDS AND PROJECTIONS
 TINICUM WATERFRONT REGIONAL MARKET
 1970 - 2000

	1970	1980	1988	1990	1995	2000	Average Annual Growth							
							'70-'80	'80-'88	'88-'90	'90-'95	'95-'00			
POPULATION														
Delaware County:	600,035	555,007	565,364	567,776	571,351	574,495	-0.75%	0.23%	0.21%	0.13%	0.11%			
Surrounding Region:*	2,850,719	2,648,481	2,665,979	2,669,755	2,722,530	2,818,940	-0.71%	0.08%	0.07%	0.40%	0.71%			
TOTAL:	3,450,754	3,203,488	3,231,343	3,237,532	3,293,881	3,393,435	-0.72%	0.11%	0.10%	0.35%	0.60%			
HOUSEHOLDS														
Delaware County:	181,049	192,332	206,971	209,171	215,421	220,921	0.62%	0.95%	0.53%	0.60%	0.51%			
Surrounding Region:*	909,786	947,823	1,015,716	1,027,716	1,069,716	1,108,591	0.42%	0.90%	0.59%	0.82%	0.73%			
TOTAL:	1,090,835	1,140,155	1,222,687	1,236,887	1,285,137	1,329,512	0.45%	0.90%	0.58%	0.78%	0.69%			

* Note: Surrounding Region Consists of Montgomery, Chester, & Philadelphia Counties

Source: DVRPC Forecasts; National Planning Data Corp.; LDR Development Economics

over 90,000 households. Delaware County is also projected to achieve increases from an estimated 206,971 households in 1988 to 220,921 in 2000, an increase of nearly 14,000.

Income Trends and Projections

Table 6 shows trends and projections of Total Personal Income (TPI) and Average Household Income (AHI) for both market areas. All dollar amounts shown in this table are shown in 1988 constant dollar values. The effect of inflation have therefore been factored out. The amounts shown indicate growth and decline in real purchasing power.

Total personal Income trends are important in establishing market strength for retail and other consumer markets. Stabilization of average household incomes, together with increasing growth in household numbers combine to produce growth in total personal income. The three county region's total personal income was stagnant during the 1970 to 1980 period and increased nominally from \$31.1 billion to \$31.4 billion. Delaware County TPI was also stagnant during this time and increased slightly from \$7.21 billion in 1970 to \$7.28 billion in 1980. TPI rebounded strongly in both market areas during the 1980 to 1988; Delaware County increased 13 percent to \$8.2 billion and the regional TPI increased 8 percent from \$31.4 billion to \$34.0 billion. TPI is projected to grow from \$34.0 billion in 1988 to \$41.5 billion in 2000. Delaware County's total personal income is expected to increase from the 1988 level of \$8.2 billion to \$9.2 billion in 2000.

Average household incomes also declined through the late 1970's and early 1980's as real purchasing power suffered from double digit inflation. This trend is consistent with national trends. With the easing of inflation and economic expansion, incomes stabilized between 1980 and 1985. Incomes are projected to increase, but at very moderate rates due to the density of the population centers. This is also consistent with national trends. The three county region's average household income was estimated to be \$33,170 in 1988. The three county region's average was substantially reduced by Philadelphia County's concentrations of lower income households. Regional AHI is expected to increase and is anticipated to reach \$37,470 by 2000.

Delaware County's average household income was estimated to be \$39,744 in 1988. The County is projected to experience consistent but moderate growth and AHI is projected to reach \$41,494 by 2000.

Economic Context Conclusions

Like many other industrialized metropolitan areas, this region has enjoyed an economic resurgence during the last six years. The recession of the late 1970's and early 1980's has lead to diversification and ultimately strengthened the economic base. However, an

Table 6

PERSONAL INCOME TRENDS AND PROJECTIONS
 TINICUM WATERFRONT REGIONAL MARKET
 1970-2000
 Constant 1988 Dollars

TOTAL PERSONAL INCOME (In Millions of Dollars)	1970	1980	1988	1990	1995	2000	Average Annual Growth				
							'70-'80	'80-'88	'88-'90	'90-'95	'95-'00
Delaware County:	\$7,209.3	\$7,275.9	\$8,244.1	\$8,365.6	\$8,777.1	\$9,166.9	0.09%	1.66%	0.74%	0.98%	0.89%
Surrounding Region:*	\$31,083.5	\$31,388.0	\$34,044.6	\$34,911.5	\$38,210.3	\$41,538.9	0.10%	1.06%	1.27%	1.89%	1.74%
TOTAL:	\$38,292.8	\$38,663.8	\$42,288.7	\$43,277.1	\$46,987.4	\$50,705.8	0.10%	1.17%	1.17%	1.71%	1.58%
AVERAGE HOUSEHOLD INCOME											
Delaware County:	\$39,109	\$37,485	\$39,744	\$39,994	\$40,744	\$41,494	-0.42%	0.75%	0.31%	0.38%	0.37%
Surrounding Region:*	\$33,659	\$32,642	\$33,170	\$33,970	\$35,720	\$37,470	-0.30%	0.20%	1.21%	1.03%	0.98%
TOTAL:	\$34,563	\$33,459	\$34,283	\$34,989	\$36,562	\$38,139	-0.32%	0.31%	1.03%	0.90%	0.86%
PER CAPITA INCOME											
Delaware County:	\$11,981	\$13,109	\$14,582	\$14,734	\$15,362	\$15,956	0.94%	1.40%	0.52%	0.85%	0.77%
Surrounding Region:*	\$10,900	\$11,851	\$12,770	\$13,077	\$14,035	\$14,736	0.87%	0.97%	1.20%	1.47%	1.00%
TOTAL:	\$11,088	\$12,069	\$13,087	\$13,367	\$14,265	\$14,942	0.88%	1.05%	1.07%	1.34%	0.95%

* Note: Surrounding Region Consists of Montgomery, Chester, & Philadelphia Counties

Source: DVRPC Forecasts; National Planning Data Corp.; LDR Development Economics

economic slowdown is forecasted by many planning agencies, large corporations, and financial institutions. All leading economic and demographic indicators are projecting modest growth. As with most regional economies measured on a macroeconomic scale, there will be submarket activity which exceeds the regional expectations. The submarkets which have the most to offer will be the focus of development attention during the next five to seven years.

The Industrial Corridor and the Tinicum Waterfront area represents one of the strongest submarket opportunities based on an economic context. Growth in household formation will occur, despite modest population growth; this combined with the number of new jobs being generated by Boeing, UPS, and other developments would indicate market demand and potential for housing, and recreational facilities.

Section IV
PHYSICAL CONTEXT

When searching for development opportunities, it is important to examine the opportunity and constraints of an area as well as its locational characteristics in conjunction with market area demographics and economic characteristics. Redevelopment areas represent major community assets but their final disposition has to balance a variety of public and private interests. Waterfront areas, in particular, present many obstacles which are unique and tend to complicate an already difficult process. This section evaluates the Tincum Waterfront Study Area in a physical context and will examine many of the factors which will affect the supportable development program.

The Tincum Waterfront Study Area

The Tincum Waterfront Study Area extends from the lower limit of the Tincum Industrial Park property southward to Darby Creek. It is apparent that when man first arrived in numbers on the Tincum Waterfront that it was an area of uncommon beauty. Its frontispiece was Tincum Island which separated it from the Delaware River. It enjoyed a back channel of acceptable depths and was surrounded by vast areas of wetlands. The area had and continues to have an approximate 6' range of tide which was, and is, acceptable for waterfront use. The natural channel between the mainland and Tincum Island provided a natural harbor and easy access to the Delaware River.

Because of its prime qualities this area became the early settlement location for those who sought water dependent use. In the intervening years the area around the waterfront was developed and considerable wetland acreages were filled by heavy industry and major transportation facilities. The success of the large manufacturing concerns provided economic stability and vitality within the area. However, the national economic decline in the 1970's forced the closure and contraction of many large employers. The lack of a diversified economy resulted in economic decline and a severe loss in vitality. The loss of jobs, tax revenue, and consumer spending resulted in the general deterioration of the area and inhibited new investment.

Transportation improvements have reasserted the area as a strategic location and the surrounding areas have benefited from new investment and several revitalization projects. However, the Tincum Waterfront Area has not enjoyed the boon of its surrounding environs, and the study area with its ancillary facilities has aged, and in many instances has suffered considerable deterioration. The result is that the present waterfront contains many deteriorated establishments and the shoreline characterized by abandoned pile and mooring facilities, sunken boats and other debris.

Study Area -- Physical Constraints

Several development constraints have been identified and will have an effect on any water dependent development within the Tincum Waterfront Study Area. The major constraints include:

- 1) severe siltation and shoreline condition;
- 2) lack of a permanent management structure and appropriate zoning;
- 3) multiple property ownership; and
- 4) cost of solutions.

Siltation

There are ample natural water depths for recreational craft and light commercial vessels in the channel between the Tincum shoreline and Tincum Island. These depths remain constant and dredging is not required therein. However, the area between the channel and the shoreline is severely shoaled. Consequently, the area between the shoreline and the customarily used channel, which is the most desirable area for mooring facilities, has severe limitations in its use. The traditional method of dealing with such a problem is to improve the water depths by dredging. The major constraints and issues associated with dredging in this area have been identified. However, the complexity of the issue will require additional and detailed engineering study to determine hydrologic conditions, the existence of shallow water habitat, the extent to which dredging may occur, and refined cost estimates.

The most economical dredging is performed by hydraulic pipeline dredge. However, this technique requires disposal areas within 4,000 to 5,000 feet of the area to be dredged. Such disposal area acreage does not now exist, nor can any such areas be readily identified. Available open acreage in the vicinity has a higher use or are wetlands which make them unacceptable disposal sites to regulatory agencies. The consequence of this is that the dredging in this area must be performed by means of the mechanical dredging technique. This technique employs a floating excavator capable of digging the shoal material and then placing the material in scows. The scows, when loaded, draw approximately 12 feet of water. The scows are then moved off site and the dredged material is unloaded at an upland approved disposal site. This is a costly dredging method. The size of the plant itself demands overdredging simply to obtain flotation for the dredging equipment. The size of the plant also requires the removal and replacement of some of the piles in the marina area to permit maneuvering.

A recent limited study to restore 8 foot depths along 725 feet of this waterway indicated a dredging cost of approximately \$335,000. This equates to about \$500 per lineal foot of shore face. Actual costs and the approximate number of cubic yards to be dredged will

vary upon the ultimate configuration and placement of the shoreline stabilization structures. It was anticipated this area might support 219 berths if intensely developed. Consequently the capital cost for only the initial dredging would be approximately \$1,155 per berth. (This cost includes removal of all existing piles but does not include replacement).

In addition to the above, it must be anticipated that dredging will be required as a repetitive operation. It is a phenomenon of the Delaware Estuary, of which this back channel is a part, that a natural silt load is carried down the Delaware River. The silt has been identified as a product of erosion from the uplands, particularly the Pocono Mountains area. The silts do not reach sea but settle into the Delaware River. It is for this reason that the Corps of Engineers dredges over 5,000,000 cu. yds./year from the Delaware River to maintain a fixed channel depth. The shoreline in the Tinicum Area is subject to similar siltation problems. The silt in transit in the water will settle at slack tides into the previously dredged areas and thereby deplete the required depth. Admittedly, this is not an overnight process; but it demands dredging at recurring intervals. For the purpose of this study it seems probably that an annual dredging maintenance cost will approximate one-third of the initial cost or an annual recurring operating cost of about \$150 per lineal foot of shore face. (This estimated cost includes an allowance for pile removal and replacement as may be necessary.) Translating this into a cost per berth will depend on the intensity of the fore shore development for berthing.

The estimate of maintenance dredging cost as approximately one-third of the initial cost reflects a professional opinion. A more refined number would require test dredgings with observations thereafter. The one-third estimate suggests redredging at approximately three year intervals. Many operators along the Delaware River waterfront find it necessary to redredge on yearly intervals; however in those instances the deeper commercial ship depths are necessary. The recurring shoaling problem is endemic to the Delaware River. It costs shipping interests on the Delaware River millions of dollars each year to maintain suitable depths for their activities.

Man made structures such as jetties and groins offer no solution to the recurring shoaling problem. The mechanism of transport of solids is complicated. In the instance of the Delaware River, the shoaling is not only the result of hydrodynamics but also the result of flocculation of silt particles caused by the salinity which comes up the river on flood tides.

It can be speculated that an increase in current velocity along the shore line off Tinicum could scour shoals, however, this can not be achieved. One usually achieves an increase in flow speed by decreasing the area of flow. This can not be achieved in this back channel as any decrease in channel area by structures would only cause more water to flow through the main stem of the Delaware River rather than causing greater flow through the back channel. The use of groins to minimize shoaling is often suggested. This would be counterproductive. A groin usually collects material on the up current side.

In this instance there are reversals of currents with the tides with a result that shoaling would be enhanced on each side of the groin.

Existing Shoreline Condition

A consequence of the high cost of dredging is that dredging has not occurred along the subject waterfront; the number of berths available have become limited; and there has only been a limited undertaking to create new boat slips to accommodate the constantly increasing demand for berths for recreational craft. The result has been a deteriorating waterfront which overall has not generated sufficient income to overcome deterioration of existing facilities.

It is evident that with the exception of the Anchorage Marina property, the remainder of the facilities are not being well maintained. A detailed inventory of all facilities is beyond the scope of this report. However, field examination quickly verifies that a first priority for any substantial development requires a debris clean-up program. Abandoned structures, sunken objects, and debris on the shore line need to be removed. A shoreline stabilization program would also be necessary to improve the existing conditions.

Shoreline Stabilization

There are several different approaches to shoreline stabilization. All of the approaches have positive attributes, but some have severe regulatory consequences. For the purposes of restoring recreational boating to the Tinicum Waterfront, two construction approaches were determined to best facilitate this ambition. Several configurations for each alternative are possible and the costs and related constraints will vary with each configuration. The following discussion identifies the major issues confronting a shoreline stabilization program.

- ***The Solid Fill Bulkhead***

A solid fill bulkhead would involve the construction of a solid wall in some location forward of the heavily shoaled area. The wall could be constructed with a variety of materials ranging from concrete to wood pilings; the area between the wall and the existing shoreline would be graded with an appropriate fill material. This approach would provide a "clean" edge to the shoreline, provide greater developable area, and reduce both the initial and maintenance dredging costs. A straight line bulkhead from the Anchorage Marina to the southern edge of the Governor Printz Park would require about 3,000 feet of bulkhead and would result in several acres of filled land. New boat mooring facilities could be installed in the existing deeper water and new areas

dredged forward of the bulkhead. This alternative represents the best approach from a developer's perspective: it is easier to build, available acreage is increased, and initial and maintenance dredging is more efficient and less expensive.

However, several constraints are associated with this approach: the cost for the bulkhead would be an estimated \$4,500,000. This would only cover bulkhead cost and the required fill. The regulatory agencies (State of PA and Corps of Engineers) would require an arduous permitting process as well as mitigation for the water body extinguished by the fill. Their traditional request for mitigation is on an acre for acre basis. This would require obtaining equivalent high ground in this vicinity for reduction to a wetland state. The costs of wetlands mitigation can reach \$200,000 per acre. However, it may be less in some instances. Usual mitigation is performed by changing high ground to mid-tide height. This can involve 12 feet of excavation which equals to about 20,000 cu. yds. of excavation per acre at about \$5./cu. yd. or about \$100,000. This must be done along waterfront areas. The real estate could cost \$30,000 or more per acre. Precise grading of the excavated area is required and is costly. Wetlands planting is also necessary and is expensive. The costs of plantings can reach more than \$150,000 per acre. Any serious consideration of a bulkhead concept would suggest an undertaking to identify available mitigation areas and the costs of acquisition.

Another issue surrounding solid fill bulkheads is the potential loss of riverine and wetlands habitat. Environmental agencies have been extremely rigorous in preventing the loss of any type of habitat. For this reason, any type of fill situation will have difficulty in obtaining approval.

- ***Sheet Piling and Relieving Platform***

This approach would involve a bridging concept consisting of a promenade constructed upon a series of supporting pilings. The promenade could consist of a solid paving material such as slab concrete, brick, or wood. The pilings may be constructed of wood, concrete, or steel. This approach would provide the appearance of a "clean" edge, but would not increase the developable area or reduce dredging costs. Maintenance dredging costs could be higher with the presence of the supporting pilings and the lack of a true "clean" edge. The lack of this edge will provide collection areas for silt and the shoaling process will occur at a faster rate. Construction costs are estimated to be 25 to 50 percent higher (cost will vary with selected materials) than a straight line bulkhead. Again new boat slips and mooring facilities could be installed in the deeper waters and the newly dredged areas. This approach would probably have to utilize a principle known as zonation mooring, which allows the berthing of smaller vessels in closer proximity of the shore to compensate for the loss of depth caused by siltation.

The advantages to this approach are centered around environmental sensitivity and the approval process. Disturbance of wetlands and riverine habitats is minimized and fill is not required. Some mitigation may be required, but the level of obligation is substantially reduced. The approach would also promote public access and have additional recreational values as a walking promenade and as a fishing pier. A boardwalk thereby would provide public benefits beyond boating benefits.

Siltation and Shoreline Stabilization Conclusions

The Tincum Waterfront is in deteriorated condition. The waterfront shoaling has made much of the area formerly used for the mooring of recreational vessels unusable. Dredging of the waterfront has not taken place, nor is it likely take place because of the high cost of the required dredging. Consequently, the marinas in the area have become very limited in size and usefulness, and those that continue to operate, with small exception, are in need of considerable maintenance. Development of the area, particularly for boating, requires that access be provided to the naturally deeper water. Dredging and shoreline stabilization must occur if a water dependent development program is utilized in the revitalization of the study area. However, the cost and problems in such an undertaking are great and approval of either approach will be based upon environmental sensitivity and compromise.

It is recommended that any shoreline treatment involve minimal cut and fill and that the structural design follow the contour of the existing shoreline. This will amplify the pedestrian experience, and minimize environmental impact. To facilitate the permitting process, the sheet piling and relieving platform approach is recommended and dredging should occur as close to shore as possible to maximize marina development.

Management Structures and Zoning Constraints¹

Management Structure

The Tincum Waterfront revitalization is currently constrained by the lack of a permanent management structure. In any revitalization strategy, controversy will arise and emotional debate will follow. It is imperative in Tincum Township that an independent organization (a waterfront management council/commission) manage the redevelopment process from

¹ Text in this section contains excerpts from **Improving Your Waterfront: A Practical Guide**, published by the U.S. Department of Commerce-National Oceanic and Atmospheric Administration.

beginning to end. Waterfront councils are special purpose government or quasi-public entities which are formed specifically for the purpose of dealing with coastal areas. Councils are empowered to control land use and development within their zones of jurisdiction. Land use planning studies, environmental assessments, shoreline access plans, and waterfront development proposals are typical functions assumed by these councils. Councils also assume a regulatory function as part of their management responsibilities. This is usually in the form of a permit that is required before any land owner can significantly alter shorefront property. The permit mechanism provides the council with a powerful tool for guiding development in the coastal zone.

A Tincum Waterfront council should coordinate the development process as well as disseminate information to all parties. It is apparent that the organization will also have to mediate discussions and the decision making process between the local residents, local elected officials, private developers, and the regulatory agencies. Independent management is necessary because political pressures could limit elected officials' ability to make controversial decisions and developers might not be sensitive to the needs of the local residents.

Councils have utilized a mixture of representatives from all levels of government, private business, and citizen groups. Including a broad cross section of interests allows the council to avoid charges of elitism or special interest dominance.

Some of the most difficult problems in urban waterfront revitalization result from complicated and fragmented institutional arrangements. Urban waterfronts are subject to multiple jurisdictions and overlapping governmental responsibilities, more so than other areas. The waterfront council/commission should be able to provide the necessary public infrastructure for the entire study area, be aware of all the constraints, and provide sites with accelerated permitting procedures.

Obtaining sufficient investment capital to finance an entire project is a major obstacle. Tincum's Waterfront redevelopment will require a unique, high initial capital outlays for water and shoreline improvements. The local government may have difficulty raising the necessary funds and face stiff competition in acquiring federal aid. Because of the need to work closely with investors an independent management structure can be more efficient than traditional government approaches of working with private financial and development interests.

This type of management structure has played a significant role in many revitalization projects nationally. Examples of successful councils include:

- 1) Charles Center-Inner Harbor Management, Inc. -- Baltimore, Maryland;
- 2) Corning Intown Futures -- Corning, New York;
- 3) Laclede's Land Redevelopment Corporation -- St. Louis, Missouri;

- 4) Crown Center Redevelopment Corporation -- Kansas City, Missouri; and
- 5) San Francisco Bay Conservation and Development Commission -- San Francisco, California.

Zoning

The traditional use of waterfronts has been for shipping, manufacturing, and land based transportation and storage facilities and most zoning ordinances were written to accommodate these uses. However, many older waterfronts are no longer used as intensively for such activities and redevelopment efforts have been inhibited by attempting to fit market supportable uses into incompatible zoning categories and building codes. The Tinicum Waterfront is a prime example of a waterfront in need of amended zoning.

The Delaware County Planning Department has developed a new zoning ordinance for the Waterfront which would utilize special purpose zones and districts to assist the redevelopment effort. The ordinance provides the local government the legal authority for innovative land use controls. Such authority can encourage waterfront redevelopment, when simple rezoning of waterfront parcels is not enough to accommodate special requirements of waterfront activities, such as mixed use commercial development, historic preservation, and recreation. In addition, conventional zoning often fails to provide the essential flexibility required to respond to the changing market conditions that occur as areas become redeveloped. The lack of this type of zoning will constrain the redevelopment effort.

Property Ownership Constraints

The Tinicum Waterfront Study Area consists of approximately 160 acres and title is controlled by 26 property owners. Due to the potential costs associated with dredging and the amount of shoreline to be stabilized, some form of land assemblage must occur to provide development sites which would attract public and private investment. Fragmented ownership will severely complicate a unified redevelopment strategy by limiting the size of development sites and the timing of their disposition. Land assemblage will also be required to assure appropriate land use and design consistency. Individual property owners may participate in this process and may realize significant returns through equity partnerships. Appendix A details several land acquisition strategies. Property owners may also choose to develop their own properties and have the option to do so.

Additionally, the State owns the bottom of the waterway from the water line outward to the center line of the Delaware River. The State in the past decade, has become sensitive about their ownership rights on these riparian lands. It now requires a real estate

document (the submerged lands license) to be executed to authorize occupancy of their lands. This is not costly and should not be a barrier to any otherwise acceptable project.

Vehicular and Pedestrian Constraints

The study area is constrained by the lack of direct vehicular and pedestrian access to the water. The current grid road system terminates a block away from the water and inhibits continuity in traffic flow. Access to the water (visually and physically) is very difficult and is limited to stub streets which terminate near the River. Pedestrian access is limited to the Governor Printz Park. The current vehicular and pedestrian environments are stark and suffer from neglect; revitalization efforts should address better access, debris removal, and a landscaping program. The other limitation to any development of water dependent use in the Tincum Area may be noise intrusion from Philadelphia Airport.

Cost of Solutions

The initial and maintenance costs associated with the basic waterfront improvements are substantial. Recommended dredging and shoreline stabilization approaches are estimated to be a minimum of \$7 million. It is apparent that the necessary improvements are cost prohibitive for the existing facilities. Table 7 illustrates the public expenditures for dredging and shoreline stabilization.

To date, the Tincum Waterfront Study Area is an unproven area and will have tremendous difficulty in obtaining private financing. The lack of adequate private financial resources will require some form of public sector assistance. All governmental aid programs will evaluate the study area on a cost/benefit basis and will probably involve some form of cost sharing. As a result, the study area must incorporate public facilities which will provide substantial benefit for a large region. The development of public facilities would begin to justify public expenditure and involvement in the stabilization and maintenance of the Tincum Waterfront. Public sector involvement would also induce the flow of private investment into the study area. Leadership interviews revealed the need for several types of facilities which would benefit the general public as well as the industrial complexes along the Delaware River. The uses include:

- 1) **Emergency Services Center:** this facility would provide water oriented, emergency fire and rescue service for the Philadelphia International Airport and the large industrial complexes on the river. This type of service is currently provided out of Philadelphia, but many local government officials and Township fire officials feel the response times are inadequate if air disasters and/or industrial fires occurred at this part of the

Table 7

TINICUM STUDY AREA
PUBLIC INFRASTRUCTURE EXPENDITURES

Public Improvements	Cost Per Sq. Ft. or Linear Ft.	Quantity	Total Cost	Maintenance Cost
Dredging	\$500 -- \$550	8,700 Ft.	\$4,350,000 -- \$4,785,000	\$1,450,000 - \$1,595,000 Every 3 Years
Shoreline Stabilization	\$2,300 -- \$2,500	1,140 Ft.	\$2,622,000	\$2,850,000

Shoreline Promenade: (1)

Notes:

(1) Right-of-way cost has not been included in this figure.

Delaware River. The center would also provide replacement offices for the Marine Police and the Pennsylvania Fish Commission.

- 2) **Public Boat Ramp:** This facility would serve the emergency services center as well as the general boating public. There are only 7 public boat ramps in Pennsylvania which provide access to the Delaware River. Industrial/transportation complexes and waterfront development pressures have drastically restricted public access to the Delaware River. Increases in boating activity will lead to increasing demands for public access. The Tincum Waterfront has ample land to accommodate such a use.
- 3) **Commercial Barge Facility:** The study area has an existing, but abandoned, commercial dock which could be reactivated. The facility was closed due to siltation and represents an opportunity to stimulate economic development and water dependent uses. There has been considerable interest in the location but the lack of ample water depths has prohibited its reuse.
- 4) **Public Access and Recreational Uses:** Major expenditures for shoreline improvements will require intensive attention to public access and water dependent recreational facilities. Marinas and a continuous pedestrian promenade, park enhancements, and nature trails are facilities which could benefit the region and be accommodated by the study area.

Study Area -- Market Constraints

Market Overview

The Tincum Waterfront Study Area is strategically located in the center of the Industrial Corridor. This corridor has been rediscovered and has received a considerable amount of interest, property speculation, and new development activity. As the region and the county shifts towards a service oriented economy, obsolescent manufacturing plants are being given new life through adaptive reuse projects. Several large development nodes are beginning to reestablish the Corridor and its development character. The uses include:

- defense oriented manufacturing;
- air and surface transportation service and distribution facilities;
- "back office" space;
- hotel/lodging facilities; and
- warehousing and light fabrication facilities.

The development interest is being driven by several factors which include: location relative to the improved and planned infrastructure, lower land prices and taxes, and the resurgence of employment centers. Development within the Tinicum Waterfront Study Area will be able to draw and benefit from the success of the surrounding environment.

Transportation

Historically, poor accessibility and an industrial image isolated the Tinicum area from much of the metropolitan area. Several recently completed and planned transportation improvements have improved the accessibility and desirability of eastern Delaware County and has transformed the area into a strategic location for businesses which are dependent upon visibility and major transportation networks. Major transportation attributes include:

- **Interstate 95** -- the final section of this road has recently been completed and access to Philadelphia and other northern jurisdictions has been greatly enhanced.
- **Interstate 476 (Blue Route)** -- the completion of this project in the early 1990's will provide the final link of the northwest "beltway" around Philadelphia. The road will provide needed linkages and access to I-95 and eastern Delaware County for suburban communities to the west and northwest of the Tinicum Waterfront Study Area.
- **The Industrial Highway -- Route 291** -- this is a major arterial road which runs parallel to I-95 and accommodates access into the major employment centers as well as the Tinicum Waterfront Study Area.
- **The Philadelphia International Airport** -- a recent expansion of the airport has increased passenger and flight volume capabilities. The airport has become a focal point of the transportation network and has been a major economic development tool.
- Passenger and freight rail service are also available via Conrail and Amtrak.

Development Sites

Transportation improvements have played a significant role in attracting new businesses and the expansions of others. Exhibit 2 illustrates 14 significant development sites within the Industrial Corridor which characterize the types of projects being considered and the location of available sites. This data was compiled by DVRPC and the projects include new construction, redevelopment sites, expansion sites, and vacant sites. The Sites include:

- 1) LCA leasing Site consist of approximately 50 acres; the site is scheduled to be developed for a trash to steam plant.
- 2) Riverbridge Industrial Center consisting of 55 acres and is owned by the Delaware County Redevelopment Authority. The Delaware County Partnership for Economic Development is trying to develop a port facility on this site.
- 3) Scott Paper Company Site has recently added a 50-megawatt co-generating facility at their Chester Plant.
- 4) Baer Site is a 25 acre site which has been completely cleared. One constraint is the presence of power lines. Adjacent to this site is the recently renovated Baldwin Towers located on 15 acres.
- 5) Penn Ship Building Site occupies 185 acres and is currently used for ship construction, repair, and cargo handling.
- 6) PECO Site is a 65 acre site is adjacent to Boeing and is clear of structures.
- 7) Boeing Vertol occupies 315 acres and has recently expanded. The plant is near capacity and may expand on the PECO site.
- 8) Piasecki Aircraft Corporation consists of 36 acres and has approximately 116,000 square feet of existing building; Piasecki is not utilizing their entire site.
- 9) Ramada Site consists of 20 vacant acres north of the Piasecki site.
- 10) Tincum Industrial Park is a 290 acre site which has 2.5 million square feet of space constructed. This is an adaptive reuse project which is providing inexpensive space to a variety of users. They have leased 800,000 square feet.
- 11) Airport Business Center is 250 acre site with approximately 300,000 square feet of newly constructed class A space. Plans call for 2.5 to 3 million square feet of office, R&D, retail, and warehouse space over a 10 to 15 year period for the property.
- 12) Airport Business Center Industrial center part of the above development offering industrial and R&D space.
- 13) United Parcel Service is in the process of constructing a 25 acre building on its 200 acre site in Tincum Township. This will be a major regional distribution center and will greatly enhance the local economy.

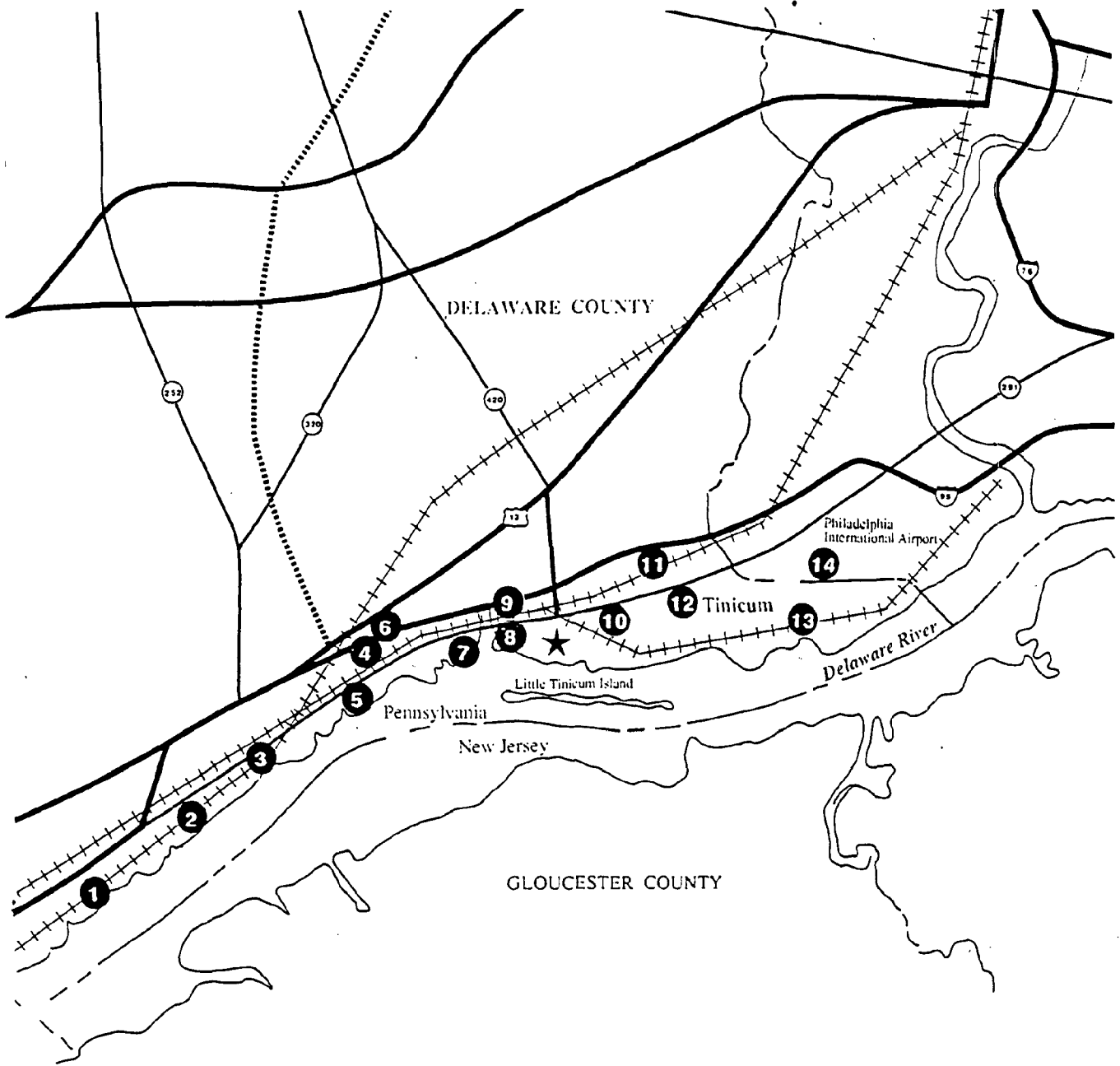


Exhibit 2

Significant Development Sites

Tincum Waterfront

★ Site

- 14) Philadelphia International Airport has recently expanded and renovated its international terminal. Airport usage and improved accessibility is expected to enhance development in the Corridor.

Market Conditions

The hotel/lodging industry has also been very active within the Route 291 Corridor in Delaware County. Approximately 1,600 rooms have been developed to date in the Corridor with over 600 additional rooms planned near the airport. Several other major hotel/office projects have been announced, but the status of these is uncertain.

Market conditions for a variety of products are showing strong indications of being overbuilt within the region. Office development has occurred at a rapid pace and over 5 million square feet is under construction in the City of Philadelphia alone. Suburban office markets have very high vacancy rates (20 percent) with most of the vacancy in existing buildings. Much of the planned space is being occupied through consolidation rather than core growth. Office dependent employment growth is also expected to be modest and will contribute to the soft market conditions. Commercial brokers and analysts are estimating 5 to 7 year office inventories. Given the highly competitive nature of the office market and the lack of a superior office site in the study area, speculative office development is not recommended.

According to Pannell Kerr Forster and Laventhol and Horwath, hotel development in Tinicum Township will be slightly overbuilt once the planned hotels are on line. Building height restrictions will also be in effect in the study area due to the airport approach zone. Hotel development is land consumptive due to parking requirements and height constraints prohibit land efficiencies within the study area. Additionally, hotel development concentrations are elsewhere and development of hotel space would preempt valuable waterfront property to a private use with little to no benefit to the local and regional residents. New hotel development is an inappropriate land use given the objectives of the revitalization. Due to the market conditions and development constraints, new hotel development is not recommended in the study area. However, the study area could benefit tremendously from the rehabilitation of the existing Walbers facility.

Review of retail sales data has illustrated a declining trend regionally, and any new full scale retail offering would compete in an overbuilt market. Additionally, the study area does not represent an appropriate full scale retail site due to land availability, visibility, and access. New convenience and marine oriented retail offerings may prove viable if a market niche or a captive market can be established.

Conclusions

Based upon existing and planned land uses, the amount and configuration of the land available in the study area, we feel the Tinicum Waterfront Study Area is locationally positioned to serve several roles and accommodate different uses:

- **Infill residential** -- based upon household growth and interviews with the major local employers, there appears to be sufficient demand to warrant the development of rental apartments and townhouses. Section V of this report contains the residential analysis and quantifies housing products by type, income supported housing value, and an absorption schedule.
- **Water dependent/related recreational facilities** -- the study area represents one of the few areas remaining in eastern Pennsylvania where the public can access the water for recreational use. Given the latent demand for public boating access, dry and wet storage, and the lack of many facilities, there appears to be ample market support for a variety of water dependent uses. These include:
 - pleasure craft marinas
 - public boat launch and water rescue facility
 - recreational open space
 - neighborhood scale convenience retail and commercial services

Study Area -- Opportunities

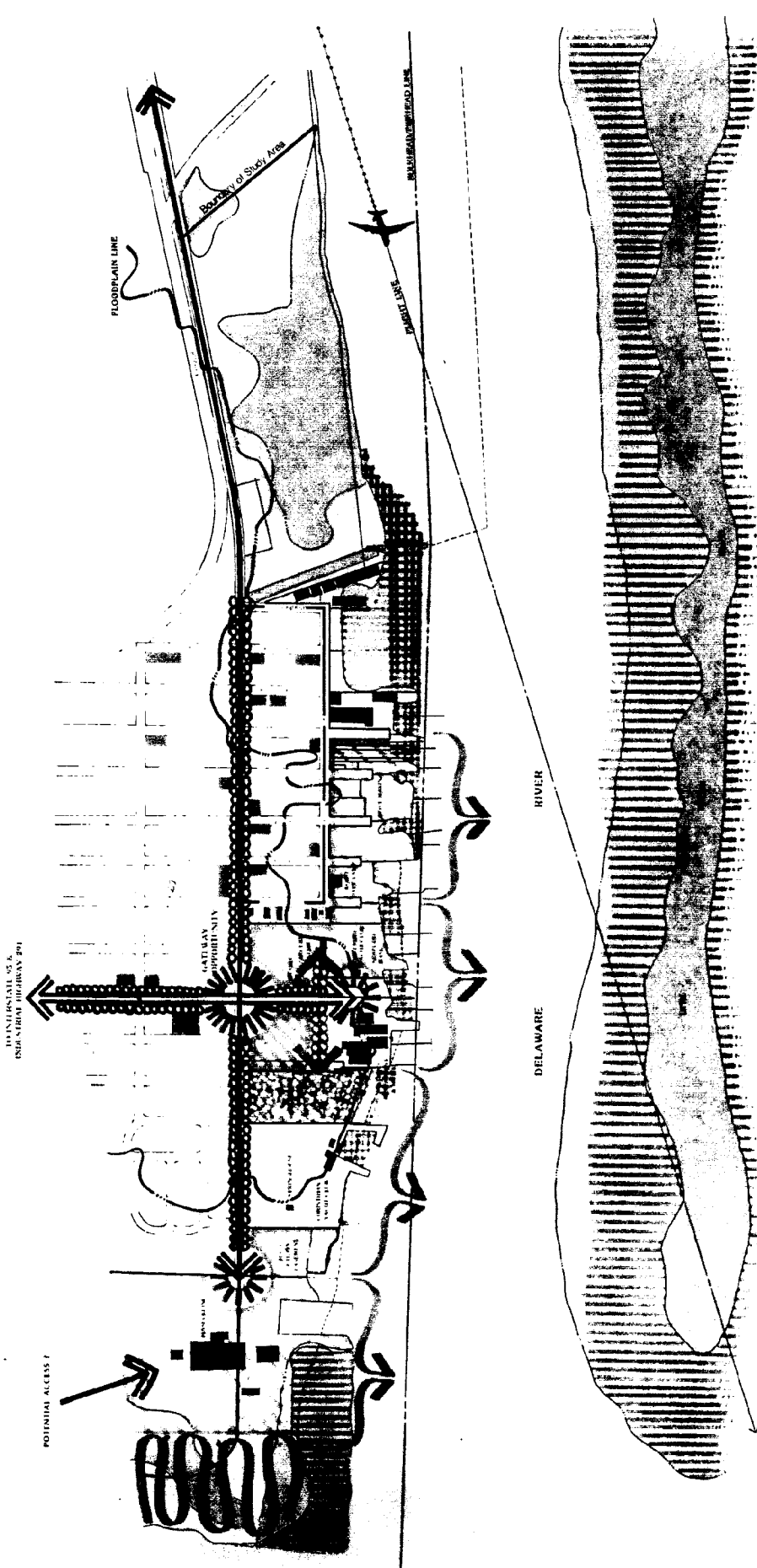
The physical and market constraints appear to dramatically limit the development potential of the study area. However, the Tinicum Waterfront Study Area is similar to many other urban waterfronts which have been successfully revitalized. The basic components for successful redevelopment are present and it is important to recognize that waterfront revitalization is a long term process. The positive attributes of the study area should not be underestimated. With the proper infrastructure, there is great potential for the development of a historically significant, water dependent destination. The envisioned waterfront would consist of facilities which utilize the river intensively (commercial and recreational), create jobs, and benefit the region as a whole. Several factors support this:

- 1) Recorded history of Tinicum Township dates back to 1643. The study area was the location of the first settlement and seat of government by white men in the Commonwealth of Pennsylvania. There are several prominent historic sites and structures within the study area which are tributes to the first settlement of "New Sweden". This rich heritage represents a tremendous thematic framework from which to build upon.

- 2) The study area is one of the few remaining locations in eastern Pennsylvania where public access to the water is still possible. The lack of other public access locations in conjunction with increasing levels of boating activity assures utilization of a quality facility. The back channel has ample depths for recreation craft and water sports.
- 3) The back channel is a natural harbor and access to the Delaware River is potentially easy.
- 4) The study area is in close proximity to a large population area and has excellent transportation linkages.
- 5) Private development interest in both the project area and the Industrial Corridor is very high.
- 6) The economic expansion of the immediate area will raise the demand for waterfront recreational areas.

From a planning perspective, there are several opportunities to create a water dependent and water related destination. The study area opportunities are graphically illustrated by Exhibit 3. The following narrative describes the opportunities illustrated by Exhibit 3.

- The potential for a gateway approach to Tinicum Waterfront from I-95 and 291 on Wanamaker Avenue.
- The potential for a gateway hub at the intersection of Wanamaker and 2nd Streets. This area could be the place where the visitor feels like they have arrived at Tinicum.
- Wanamaker Avenue and 2nd Streets are the two major streets that serve the waterfront and should be focused upon as image streets.
- There is a major potential for a dramatic terminus at the end of the Wanamaker Avenue approach along the waterfront. This is where most visitors to the site will see the water first.
- The potential for a green spine extension from Governor Printz Park to Lazaretto Museum. This would allow for two historic landmarks to be connected while providing a nicer setting for Lazaretto. The Lazaretto Building would be given more visual prominence as a landmark building.



- EXISTING RESIDENTIAL
- EXISTING COMMERCIAL
- EXISTING INDUSTRIAL/WAREHOUSE
- PUBLIC OPEN SPACE
- PRIVATE OPEN SPACE
- ISLANDS
- TIDAL FLATS
- AREAS OF OBSERVABLE SITUATION
- POTENTIAL BUFFER
- POTENTIAL PARK LANGUAGE
- DISCOURAGED OPPORTUNITY
- MAJOR ARTERIAL SPINE
- SECONDARY ARTERIAL SPINE
- LOCAL ROAD FOR DEVELOPMENT OPPORTUNITY
- AREAS OF PROM. WATER FRONTAGE & ACCESS

Opportunities & Constraints

Exhibit 3
TINICUM WATERFRONT
 TINICUM TOWNSHIP, PENNSYLVANIA

RDC INSTITUTE, INC.
 LAND DESIGN RESEARCH, INC.

January 1989
 Scale: 1"=200'

North ↑

- The Corinthian Yacht Club prefers to retain privacy. This prevents a continuous pedestrian promenade along the waterfront. However, a good opportunity exists to link the west end of the waterfront with the central portion by extending a green spine from Governor Printz Park to the Old Springhouse. This could be a continuation of the spine extension to the Lazaretto Building.
- The lower portion of the Piasecki site is the current location of the Fisheries Division. There is a great potential for boat ramp access here, accompanied and managed by Fisheries, Police, Fire, etc.
- There are areas along the waterfront which are not suitable for water dependent uses. Only where arrows address the water, is it suitable for water dependent uses.
- There is a secondary terminus potential at the west end of 2nd Street, it may act as a gateway entrance to any development that will take place there.
- The potential for a new access route connecting the west end of the site to Industrial Highway.
- The Piasecki site has excellent development potential for non-water dependent uses such as a boat storage park. This site can be developed as one or Piasecki could remain and the waterfront edge be developed as a separate site.
- Palustrine wetlands are best left undeveloped to act as a natural buffer from Boeing plant and Philadelphia Airport.
- Four of five development blocks in the central area are large enough in parcel size to be developed under current property ownership. The fifth block will take more collaboration among property owners to make it successful.

Section V.

ASSESSMENT OF RESIDENTIAL MARKET SUPPORT

Current Conditions

The recent rediscovery of the Industrial Corridor as a strategic location has created an influx of new employment. The current average unemployment rate for the combined market areas is estimated to be 3.4 percent. At this level, the labor force could be considered fully employed. Additionally workers need to be brought into the area to fill expansion needs. Hence, new jobs almost directly lead to new households and increasing levels of housing demand. Development data available from the Delaware County Planning Department supports this conclusion.

Assessment of Demand

To develop an evaluation of future housing needs, long-term growth trends in household formation and distribution by income have been examined as a means of determining the future demand for quality infill residential development within the Tinicum Waterfront Study Area.

Historical Trends in Household Growth

Since changes in the number of households generally translates into changes in demand for housing units, historical trends in household formation can reveal much about residential development. It is important to know the specific number of households associated with various income ranges. Knowing the incomes of these households provides some indication of how much they can afford to spend on housing. Table 8 shows the number of households by income for the years 1980 and 1988. Note that these incomes are in 1988 constant dollars, therefore, the effects of inflation have been factored out.

Table 9 places these brackets into several income groupings for the period 1980 to 1988 for Delaware County. From this grouping several important trends become apparent. In the period 1980 to 1988, those households in the lowest and highest income brackets (less than \$20,000 and greater than \$50,000 respectively) in the county showed the greatest growth. Middle income households (\$20,000 to \$49,999) declined modestly in comparison of the growth occurring within the end brackets. Low income households in Delaware County increased by 3.55 percent and the higher income brackets saw a 28.05 percent increase. This could reflect a lack of moderate income housing availability.

Table 8

1980-1988 HOUSEHOLD GROWTH TRENDS BY INCOME BRACKET
 TINICUM WATERFRONT MARKET AREA
 (1988 Constant Dollar Brackets)

Household Incomes	Number of Households		Percentage Distribution		Percent Change
	1980 Census	1988 Est.	1980	1988	
Delaware County					'80-'88
\$0 - \$7,499	18,040	17,712	9.4%	8.6%	-1.8%
\$7,500 - \$14,999	20,036	21,677	10.4%	10.5%	8.2%
\$15,000 - \$19,999	15,899	16,502	8.3%	8.0%	3.8%
\$20,000 - \$24,999	15,912	16,171	8.3%	7.8%	1.6%
\$25,000 - \$29,999	16,322	16,227	8.5%	7.8%	-0.6%
\$30,000 - \$34,999	15,990	15,374	8.3%	7.4%	-3.9%
\$35,000 - \$39,999	15,435	15,176	8.0%	7.3%	-1.7%
\$40,000 - \$49,999	25,978	25,747	13.5%	12.4%	-0.9%
\$50,000 - \$74,999	31,370	39,678	16.3%	19.2%	26.5%
\$75,000 - and over	17,349	22,706	9.0%	11.0%	30.9%
Total Households:	192,331	206,970	100.0%	100.0%	7.6%

Source: LDR Development Economics; National Planning Data Corporation

Table 9 Household Growth by Income Categories 1980-1988

	Household Growth	Percentage Growth
Low Income:		
\$0 - \$19,999	1,916	3.55%
Moderate Income:		
\$20,000 - \$49,999	(942)	-1.05%
High Income:		
\$50,000+	13,665	28.05%
Total:	14,639	7.61%

Projected Household Growth

Table 10 displays the projected number of households by constant dollar income brackets for 1980, 1988, 1990, 1995, and 2000. These projections were derived from the historical pattern of net household numerical change by income category. Projection methodology is outlined in the Appendix B.

Table 11 summarizes the trends found in these projections. In the years 1990 and beyond, a growing number of households will be found within the moderate to higher income ranges. This is expected because of the continued trend of two-wage earner households and the projected strengthening of the Delaware County economic base. As the area employment continues to diversify, more individuals will be able to find employment commensurate to their experience/education and more households will be able to have at least two wage earners if they desire to do so.

Housing Demand -- Ownership

Table 12 shows these trends in a different form. First, it focuses on the incremental change in the number of households between the years and it also highlights the average growth per year for a selected number of income brackets. This study focuses on those households having average incomes of \$30,000 and above. These brackets were chosen

Table 10

1980-2005 PROJECTED HOUSEHOLD GROWTH BY INCOME BRACKET
 TINICUM WATERFRONT MARKET AREA
 (1988 Constant Dollar Brackets)

Household Incomes	Number of Households					Percentage Distribution				
	1980	1988	1990	1995	2000	1980	1988	1990	1995	2000
Delaware County										
\$0 - \$7,499	18,040	17,712	17,562	17,137	16,762	9.4%	8.6%	8.4%	8.0%	7.6%
\$7,500 - \$14,999	20,036	21,677	21,827	21,952	22,002	10.4%	10.5%	10.4%	10.2%	10.0%
\$15,000 - \$19,999	15,899	16,502	16,642	16,792	16,867	8.3%	8.0%	8.0%	7.8%	7.6%
\$20,000 - \$24,999	15,912	16,171	16,309	16,524	16,699	8.3%	7.8%	7.8%	7.7%	7.6%
\$25,000 - \$29,999	16,322	16,227	16,319	16,819	17,194	8.5%	7.8%	7.8%	7.8%	7.8%
\$30,000 - \$34,999	15,990	15,374	15,444	15,919	16,319	8.3%	7.4%	7.4%	7.4%	7.4%
\$35,000 - \$39,999	15,435	15,176	15,246	15,556	15,831	8.0%	7.3%	7.3%	7.2%	7.2%
\$40,000 - \$49,999	25,978	25,747	25,837	26,237	26,662	13.5%	12.4%	12.4%	12.2%	12.1%
\$50,000 - \$74,999	31,370	39,678	40,678	43,178	45,378	16.3%	19.2%	19.4%	20.0%	20.5%
\$75,000 - and over	17,349	22,706	23,306	25,306	27,206	9.0%	11.0%	11.1%	11.7%	12.3%
Total Households:	192,331	206,970	209,170	215,420	220,920	100.0%	100.0%	100.0%	100.0%	100.0%

Source: LDR Development Economics; National Planning Data Corporation

Table 11

PROJECTED HOUSEHOLD GROWTH BY INCOME
TINICUM WATERFRONT MARKET AREAS
1988 - 2000

	Household Growth Numerical Change				Household Growth Percentage Change			
	88-90	90-95	95-00	88-00	88-90	90-95	95-00	88-00
Delaware County	140	(150)	(250)	(260)	0.25%	-0.27%	-0.45%	-0.47%
LOW INCOME:								
\$0 - 19,999	460	1,900	1,650	4,010	0.52%	2.13%	1.81%	4.52%
MODERATE INCOME:								
\$20,000 - \$49,999	1,600	4,500	4,100	10,200	2.56%	7.03%	5.99%	16.35%
HIGH INCOME:								
\$50,000+	2,200	6,250	5,500	13,950	1.06%	2.99%	2.55%	6.74%
Total								

Source: LDR Development Economics; National Planning Data Corp.

based upon the likelihood that they could reasonably afford the type of market rate housing which would be offered in Delaware County. As the second column of this table shows this translates into for-sale housing priced at a minimum of \$79,100.

The price of housing which is affordable to each bracket was determined by using the following assumptions about real estate and home purchase transactions:

- a 10 to 20 percent cash down payment;
- financing at 10.60 percent effective debt service constant;
- an average of 28 percent of household income allocated for interest and principal payments;
- a 30-year mortgage; and,
- the maximum loan values generated are discounted by 2.5 percent to reflect the cost of the various fees and points related to real estate transactions.

The above assumptions are typical of the values currently found in the home finance markets. Because a varying down-payment percentage was utilized, some overlapping has occurred in the resulting income supported housing values. Thus, as seen for example in the left portion of Table 12, a household with an income of \$34,999, putting 20 percent down, can afford a housing value higher (\$103,800) than a household of \$35,000 with only 10 percent down (\$92,300).

Overall household incomes between \$30,000 and \$75,000 will support a housing unit value (selling price) ranging from \$79,100 at the low end to over \$222,500 at the high end of the selected income scale.

The housing values reflect selling costs and are meant to include the cost of land. Housing unit prices at the low end of the value scale could reflect multi-unit construction, and all prices are expressed in 1988 constant dollar values. The ultimate sales price for units will be higher than indicated here as a result of future inflation in both construction costs and personal incomes. In addition, it also should be noted that the level of interest rates can have an important impact on housing prices.

Interest rate fluctuations have a dramatic influence on the housing market by affecting the affordability of housing. As interest rates rise, the income required to support the same value of housing also increases, due to higher interest costs. In the late 1970's and early 1980's, interest rates rose faster than household incomes and inflation, contributing to sharp declines in housing affordability. The high interest rates effectively closed the home ownership market to many households. As interest rates have declined from their peak, lower income categories have regained access to home ownership.

Table 12

GROSS DWELLING UNIT DEMAND
 TINICUM WATERFRONT MARKET AREA
 GENERATED BY HOUSEHOLD GROWTH FOR SELECTED INCOME / UNIT VALUE CATEGORIES
 1988 - 2000

Income Bracket	Income Supported Housing Value	Incremental Growth			Total 1988 -2000	Average Growth per Year		
		'88-'90	'90-'95	'95-'00		'88-'90	'90-'95	'95-'00
Delaware County								
\$30,000 - \$34,999	\$79,100 - \$103,800	70	475	400	945	23	95	80
\$35,000 - \$39,999	\$92,300 - \$118,700	70	310	275	655	23	62	55
\$40,000 - \$49,999	\$105,500 - \$148,300	90	400	425	915	30	80	85
\$50,000 - \$74,999	\$131,900 - \$222,500	1,000	2,500	2,200	5,700	333	500	440
\$75,000 - and over	\$197,800 - and over	600	2,000	1,900	4,500	200	400	380
TOTALS:		1,830	5,685	5,200	12,715	609	1,137	1,040

Source: LDR Development Economics; National Planning Data Corporation

Table 12 also shows that in the period 1988 to 2000, there will be a gross potential demand for 12,715 for-sale housing units in Delaware County. Much of this demand falls within a few price ranges. Table 13 is a summary of gross demand found in the county.

Table 13 Gross Dwelling Unit Demand

Income Supported Housing Value	Total 1988-2000
\$79,100 -- \$103,800	945
\$92,300 -- \$118,700	655
\$105,500 -- \$148,300	915
\$131,900 -- \$222,500	5,700
\$197,800 -- and over	4,500
Total:	12,715

Source: LDR Development Economics

The next step of the analysis is to estimate the share of the total potential demand that could be captured at sites located within the study area. This analysis appears in Table 14, which shows capture rates by income category and the time period on the left side of the table, the resulting incremental demand for sites in the study area in the center of the table, and the average annual absorption of units on the right. The capture rates are based on several factors:

- 1) The study area is an urban environment with a limited amount of land available for water related uses. Multifamily (townhouse) development represents the highest and best use for an ownership product. Given the limited amount of land, single family detached housing does not represent the highest and best land use.
- 2) Interviews with the large local employers revealed a strong and unmet demand for affordable housing. Employers indicated difficulty in filling entry level positions due to the lack of quality housing opportunities available for moderate income households.
- 3) Most of the available land for residential development within Delaware County is zoned for single family development. These areas are anticipated to accommodate higher income households.

The capture rates range from 0 percent for the upper two housing categories to 10 percent in the lower housing category during the 1990 to 1995 time period. Capture rates were placed at 0 percent during the '88-'90 time period because it is unlikely any

Table 14

CAPTURED MARKET DEMAND AND ABSORPTION RATE
 TINICUM WATERFRONT MARKET AREA
 1988 - 2000

Housing Value Range	Market Capture		Incremental Demand			Total 1988 -2000	Average Annual Absorption			
	'88 -'90	'95 -'00	'88-'90	'90-'95	'95-'00		'88-'90	'90-'95	'95-'00	
Delaware County										
\$79,100 - \$103,800	0.0%	10.0%	15.0%	0	48	60	108	0	10	12
\$92,300 - \$118,700	0.0%	7.5%	10.0%	0	23	28	51	0	5	6
\$105,500 - \$148,300	0.0%	2.5%	5.0%	0	10	21	31	0	2	4
\$131,900 - \$222,500	0.0%	0.0%	0.0%	0	0	0	0	0	0	0
\$197,800 - and over	0.0%	0.0%	0.0%	0	0	0	0	0	0	0
TOTALS:	0	81	109	190	0	17	22			

Source: LDR Development Economics; National Planning Data Corporation

product could be delivered in this time frame. Capture rates for the 1995 to 2000 time period have been increased slightly reflecting increased popularity of the area as redevelopment occurs.

Given the estimated capture rates, The Tinicum Waterfront Study Area could expect to absorb 190 ownership units between 1990 and 2000. Absorption ranges from an estimated 17 units per year during 1990 and 1995 to 22 units per year during the 1995 to 2000 time period.

Housing Demand -- Rental

Demand for rental housing units can be projected in a similar way. For this study, households with incomes of \$15,000 to \$34,999 were reviewed. This is based upon judgments about rental offerings within Delaware County and the type of development which could be feasibly marketed in this area. Income levels below \$15,000 were not considered because this represents a below market rate or subsidized unit. The assessment of future demand follows the same general format as used in the analysis of the home ownership market. Table 15 takes the projections of household growth shown in Table 10 and breaks these projections into specific rental income brackets. Assumptions about a household's ability to rent housing units are applied to each bracket. The center of the table shows the incremental growth in the number of households which can afford each of these rent ranges.

Table 16 estimates the share of total potential rental demand that could be captured at sites within the study area. The format and methodology is identical to the ownership demand which is illustrated in table 13. The capture rates range from 2.5 percent for the most expensive rental unit to 15 percent for the least expensive unit during the 1990 to 1995 time period. Capture rates are expected to increase during the 1995 to 2000 period to 4 and 17 percent respectively.

Based on these capture rates, 214 rental units could be absorbed between 1990 and 2000. Absorption is expected to range from 24 units per year between 1990 and 1995, to 20 units per year between 1995 and 2000. Demand for rental units could be substantially higher if home prices and interest rates continue to escalate.

Conclusions

The demand for moderate income housing, based on new household formation, during the 1990 to 2000 time period would support the development of 190 townhouse and 214 apartment units. This estimated does not include those existing households which might consider relocation within the study area. If development of quality housing occurs

Table 15

GROSS RENTAL UNIT DEMAND
 TINICUM WATERFRONT MARKET AREA
 GENERATED BY HOUSEHOLD GROWTH FOR SELECTED INCOME / UNIT VALUE CATEGORIES
 1988 - 2000

Income Bracket	Income Supported Monthly Gross Rental Cost		Incremental Growth		Total 1988 -2005	Average Growth per Year	
	'88-'90	'90-'95 '95-'00	'88-'90	'90-'95 '95-'00		'88-'90	'90-'95 '95-'00
Delaware County							
\$15,000 - \$19,999	\$410 - \$470	140 150 75	140	150	365	70	30 15
\$20,000 - \$24,999	\$470 - \$520	138 215 175	138	215	528	69	43 35
\$25,000 - \$29,999	\$520 - \$550	92 500 375	92	500	967	46	100 75
\$30,000 - \$34,999	\$550 - \$640	70 475 400	70	475	945	35	95 80
\$35,000 - \$39,999	\$640 - \$670	70 310 275	70	310	655	35	62 55
TOTALS:		510 1,650 1,300	510	1,650	3,460	255	330 260

Source: LDR Development Economics; National Planning Data Corporation

Table 16

CAPTURED RENTAL MARKET DEMAND AND ABSORPTION RATE
 TINICUM WATERFRONT MARKET AREA
 1988 - 2000

Monthly Gross Rental Cost	Market Capture		Incremental Demand			Total 1988 -2000	Average Annual Absorption					
	'88	'90	'88-'90	'90-'95	'95-'00		'88-'90	'90-'95	'95-'00			
	-		-				-					
Delaware County												
\$410 - \$470	0.0%	15.0%	0	23	13	36	0	5	3			
\$470 - \$520	0.0%	10.0%	0	22	21	43	0	4	4			
\$520 - \$550	0.0%	7.5%	0	38	30	68	0	8	6			
\$550 - \$640	0.0%	5.0%	0	24	24	48	0	5	5			
\$640 - \$670	0.0%	2.5%	0	8	11	19	0	2	2			
			TOTALS:									
			0	115	99	214	0	24	20			

Source: LDR Development Economics; National Planning Data Corporation

in step with the waterfront improvements, the improved aesthetic environment could intensify demand expectations. An aggressive marketing program to the major employers could also be instrumental in achieving an accelerated build-out.

Section VI.

ASSESSMENT OF MARINA SLIP AND DRY STORAGE MARKET SUPPORT

The Boating Environment

The boating environment in the Tincum Waterfront Study Area is conducive to the establishment of additional marina facilities. Pennsylvania has a very strong boating tradition and the Delaware River has historically been a focus for both commercial and recreational boating. In the early 1900's, the Delaware River was used extensively for cargo and passenger transport as well as yachting events. The Tincum Waterfront was the focal point for many of the wealthy recreational users, and it was not uncommon for the back channel to be filled with large passenger ships and luxury yachts. However, World War II and heavy industrialization brought about a series of changes which dramatically affected the recreational boating environment. The war precipitated the dredging of the main channel of the Delaware River and the extensive filling of wetlands. This reduced the water flow in the Tincum's back channel and initiated the existing shoaling conditions. The lack of environmental regulation during this period permitted heavy industry and others to discharge waste and debris into the river. The combination of severely polluted waters and siltation resulted in the decline of recreational boating on the Delaware River. Additionally, large manufacturing firms concentrated around the river and eliminated many of the prime locations for recreational boating access.

Environmental regulation initiated the clean up of the river during the 1970's, and pollution levels have been substantially reduced. The river's waters are now conducive to recreational boating, but the number of adequate boating facilities is very limited. Limited facilities and public access are creating strong pent up demand for boats slips on the Delaware. Pennsylvania's strong boating tradition is illustrated by the sharp increases in the number of boat registrations. For the period between 1978 and 1988, total boat registration for the state has increased from 167,528 to 265,823. This represents 98,295 new boats or increase of 59 percent over ten years. According to the Pennsylvania Fish Commission, there are more boats registered in Pennsylvania than in the individual states of Maryland, Delaware, and New Jersey. Additionally, boat registration in Pennsylvania is only required for motorized vessels; pure sailing vessels are not counted in the registration statistics. Marina and public boat ramp development has not kept pace with the increasing levels of demand.

Competitive Environment

While demand for marina facilities is widespread, available facilities are extremely limited. There are three areas of concentration for Pennsylvania based marina operations serving the Delaware River: Center City Philadelphia, Bensalem/Croyden, and the combined

townships of Tinicum and Ridley. There are approximately 1,800 to 1,900 slips within these areas and the majority of the surveyed marinas were 100 percent occupied with waiting lists. Well maintained, full service operations are all located in the city area. The vacancy which is currently present in the market is due to recently completed expansions (the Anchorage Marina -- 120 slips), slips reserved for transient boaters (110 slips), and slips which were unoccupied but had deposits reserving them (75 slips). Every marina manager surveyed indicated the need for additional marina slips and a strong demand for winter dry storage. The larger, and truly competitive operations all had supporting services available. The services most frequently provided were: boat repair; boat sales; fuel and electricity; and shower/laundry/bathroom facilities.

The Delaware River primarily attracts power boaters and the strongest slip demand is for boats between the sizes of 20 and 40 feet. Transients are typically in boats larger than 40 feet and require pier space for docking. This market is not very large and slip occupancy fluctuates dramatically. Transients tend to be wealthy and consistently dock near the city due to the availability appropriate docking space and of other cultural/urban activities. Table 17 details the characteristics of 11 competitive facilities.

Assessment of Demand

To develop an evaluation of future slip and storage space needs, long-term growth trends in boater registration and distribution by size of craft have been examined as a means of determining future demand. Conversations with the Pennsylvania Fish Commission were held to confirm the projection methodology and to determine the appropriate market area from which the Tinicum Waterfront Study Area could draw. The **1987 Recreational Boating Participation Survey**, prepared for the Fish Commission by Chilton Research Services was also utilized during this process. It was determined that large, full service marina facilities located in the study area could draw from a 12 county area. The included counties are listed in table 18. This premise is based upon the lack of existing facilities in eastern Pennsylvania and a 30 minute to 2 hour average drive time.

Historical Boat Registration

Table 18 illustrates historical boat registration data for the 12 county area from 1978 to 1988. The data reflects all motorized watercraft registered within the state during this time, this includes motorized sailboats. Total registration has grown from 48,557 to 80,942 during this time period. This represents an increase of 32,385 boats or 67 percent. This market area represents approximately 1/3 of the registered boats in Pennsylvania. Table 18 also shows the rapid incremental growth for this time period. Boat registration grew by only 274 boats between 1978 and 1979 compared to 5,729

Table 17

SURVEY OF COMPETITIVE MARINA FACILITIES
TINICUM WATERFRONT MARKET AREA

Marina Name	Total Wet Slips	Occupancy	Total Dry/Land Storage	Occupancy	Slip Sizes	Annual Rent	Rent Per Foot	Transient Rent Per Foot	Additional Mooring Fees	(%) Power Boats	(%) Sail Boats
Penn's Landing Marina	60	caters to transients	0	0	0 to 19 20 to 25 26 to 30 31 to 35 36 to 40 41 to 45 46 to 50 51 to 55 56 to 60 61 to 65 66 to 70	\$12.00 \$15.00 \$18.00 \$21.00 \$25.00 \$30.00 \$35.00 \$40.00 \$45.00 \$50.00 \$55.00			NA	90%	10%
Piers Marina Will be adding Pier 5 Marina Next Year: 15 slips for 50' and up	88	100%	0	NA	18 to 22 23 to 29 30 to 35 36 to 40 41 to 50	\$1,200 \$1,675 \$2,075 \$2,575 \$3,075	\$66.67 to \$54.55 \$72.83 to \$57.76 \$69.17 to \$59.29 \$71.53 to \$64.38 \$75.00 to \$61.50	\$1.00 to \$1.25 per foot per day	NA	60%	40%
Philadelphia Marine Center	297	81%	100	100%	up to 25 26 to 35 36 to 40 41 to 45 46 to 50 51 to 55 56 to 70	\$1,600 \$1,800 \$2,200 \$2,600 \$3,000 \$3,400 \$3,900	\$0 to \$64.00 \$69.23 to \$51.43 \$61.11 to \$55.00 \$63.41 to \$57.78 \$65.22 to \$60.00 \$66.67 to \$61.82 \$69.64 to \$55.71	\$1.25 per/ft/day	larger slips have \$600 patio option	65%	35%
Jack's Neshaminy Marina	300	100%	600	100%	up to 70	\$500 \$1,500	\$0 to \$21.43	NA	NA	99%	1%
Anchorage Marina 100 slips have just been completed 20 are silted in	200	40%	NA	NA	16 to 20 21 to 25 26 to 27 28 to 30 31 to 34 35 to 36 37 to up	\$940 \$1,175 \$1,269 \$1,410 \$1,598 \$1,692 \$1,739	\$58.75 to \$58.75 \$55.95 to \$50.76 \$48.81 to \$52.22 \$50.36 to \$53.27 \$51.55 to \$49.76 \$48.34 to \$48.31 \$47.00 to \$47.00	\$20/night flat rate	NA	85%	15%
Morrow's Marina	120	100%	NA	NA	up to 20 21 to 32	\$800 \$1,280	\$40.00 to \$40.00 \$40.00 to \$40.00	NA	\$10 Boat Ramp Fee	100%	0%

Table 17 Continued

SURVEY OF COMPETITIVE MARINA FACILITIES
TINICUM WATERFRONT MARKET AREA

Marina Name	Total Wet Slips	Total Dry/Land Storage	Occupancy	Slip Sizes	Annual Rent	Rent Per Foot	Transient Rent Per Foot	Additional Mooring Fees	(%) Power Boats	(%) Sail Boats
Miller's High Life Marina	30	25	100%	18 to 35	\$540 \$1,050	\$30.00 \$30.00	NA	NA	100%	0%
Glenview Marina	NA	100	NA	18 to 40	\$180 \$400	\$10.00 \$10.00	NA	NA	70%	30%
Prospect Park	60	NA	100%	Up to 22	\$475 \$550	\$21.59 \$25.00	NA	NA	100%	0%
Philadelphia Seaplane Base	50	175	100%	Up to 35		\$20.00 to \$35.00	\$10/Day	\$7/Launch \$60/Season	60%	40%
Fox Grove Marina	Achievable No. Unknown due To Siltation	25	100%	Up to 25		\$27.00		\$5/Launch	75%	25%

Source: LDR Development Economics Field Survey

Table 18

TOTAL BOAT REGISTRATIONS
TINICUM WATERFRONT MARINA MARKET AREA
1978 - 1988

County	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	Change 1978 - 1988	
												Number	Percent
Berks	3,343	3,565	4,199	4,557	4,860	5,181	5,452	5,758	5,819	6,185	6,502	3,159	94.50%
Bucks	7,118	7,201	7,598	7,718	8,054	8,480	8,864	9,508	9,778	10,665	11,638	4,520	63.50%
Chester	2,293	2,351	2,511	2,580	2,702	2,924	3,177	3,427	3,588	3,999	4,350	2,057	89.71%
Dauphin	4,460	4,490	4,855	5,106	5,423	5,775	5,846	6,255	6,540	6,842	7,189	2,729	61.19%
Delaware	3,052	2,870	3,051	3,066	3,178	3,318	3,339	3,483	3,653	3,934	4,367	1,315	43.09%
Lancaster	3,409	3,415	3,728	3,971	4,315	4,724	5,080	5,550	5,938	6,608	7,308	3,899	114.37%
Lebanon	1,259	1,288	1,461	1,544	1,583	1,756	1,905	2,042	2,133	2,345	2,615	1,356	107.70%
Lehigh	4,261	4,326	4,645	4,693	4,946	5,303	5,490	5,748	5,943	6,288	6,593	2,332	54.73%
Montgomery	5,650	5,634	5,993	5,999	6,302	6,664	7,031	7,599	7,921	8,563	9,236	3,586	63.47%
Northampton	4,189	4,234	4,627	4,693	4,878	5,189	5,366	5,669	5,860	6,224	6,640	2,451	58.51%
Philadelphia	4,099	4,070	4,209	4,190	4,259	4,436	4,481	4,577	4,659	5,039	5,413	1,314	32.06%
York	5,424	5,387	5,803	6,042	6,403	6,899	7,235	7,697	8,012	8,521	9,091	3,667	67.61%
Market Area Total:	48,557	48,831	52,680	54,159	56,903	60,649	63,266	67,313	69,844	75,213	80,942	32,385	66.69%

Total Number of Registered Boats in Pennsylvania: 167,528 171,019 183,536 188,185 197,193 208,852 216,859 228,561 236,011 250,586 265,823

Market Area Boat Registration as a Percentage of State: 29.0% 28.6% 28.7% 28.8% 28.9% 29.0% 29.2% 29.5% 29.6% 30.0% 30.4%

Market Area Boat Registration Increases: 274 3,849 1,479 2,744 3,746 2,617 4,047 2,531 5,369 5,729

Market Area Boat Registration Increases (%): 1% 8% 3% 5% 7% 4% 6% 4% 8%

source: Pennsylvania Fish Commission; LDR Development Economics

new boats between 1987 and 1988. This demonstrates the increasing popularity of boating within the potential drawing area.

Table 19 displays the projected number of boat registrations for 1990, 1995, 2000, and 2005. The projections were derived from the historical pattern of boat registration change. The projections actually represent a conservative level of increased based upon historical trends. Recent boat registration trends indicate annual increases between 2,500 and 5,700 within the 12 county area. The projections reflect a slower rate of annual increase which range from 2,500 between 1988 and 1990, 3,600 between 1990 and 1995, 3,200 between 1995 and 2005. The projected rates of increase result in a total of 55,000 new boat registrations between 1988 and 2005.

Examination of detailed boater registration data will determine the level of anticipated demand by type of space for marina facilities. Boats under 16 feet are typically trailered to a water access location and launched via a boat ramp.

Within the Delaware River area, boats larger than 20 feet are the primary source of demand for wet slips. This group also represents the largest demand source for dry storage during the winter months. Table 20 illustrates powerboat and motorized sailboat registration trends, distributed by size, for the 12 county region between 1984 and 1988. In 1988, boats under 16 feet represented the largest market segment with a total of 46,600 or 57.57 percent of the total. Boats between 16 and 26 feet represented 34.19 percent of the total with 27,673. Boats over 26 feet comprise the remainder of the market and represent a small but growing segment. Boats within these size classifications comprise 93 percent of all boat registrations which were shown in table 18. Watercraft not included consisted of canoes, rafts, and jet skis. This trend is fairly consistent and was held constant through the detailed projection process. An interesting trend is evident from this data: people are buying bigger boats! The percentage distribution reflects a declining trend within the 16 feet and under classification and an increasing trend for boats greater than 16 feet. This implies a growing demand for marina slips.

Table 21 illustrates projected boat registration, by size, for 1990, 1995, 2000, and 2005. The projections reflect a continuation of historic trends with boats over 16 feet increasing in popularity. The projections yield a total of 51,273 new boat registrations between 1988 and 2005. All of these will require some form of marina facility or boat ramp to access the water.

Table 22 estimates the potential share of this growth which could be attracted to the Tincum Waterfront if a quality facility was developed. Table 22 estimates demand levels for dry storage and wet marina slips between 1990 and 2005. An absorption analysis is also presented on the right side of the table. Modest capture rates were utilized and were determined to be attainable if an aggressive marketing plan was implemented and

Table 19

TOTAL BOAT REGISTRATION PROJECTIONS
TINICUM WATERFRONT MARINA MARKET AREA
1988-2005

County	1988	1990	1995	2000	2005	Incremental Growth					Total 1988 -2005	Average Growth per Year				
						'88-'90	'90-'95	'95-'00	'00-'05	'88-'90		'90-'95	'95-'00	'00-'05		
Berks	6,502	6,990	8,650	10,125	11,601	488	1,660	1,476	1,476	1,476	5,099	244	332	295	295	
Bucks	11,638	12,336	14,711	16,822	18,933	698	2,375	2,111	2,111	2,111	7,295	349	475	422	422	
Chester	4,350	4,668	5,748	6,708	7,668	318	1,080	960	960	960	3,318	159	216	192	192	
Dauphin	7,189	7,610	9,045	10,321	11,596	421	1,435	1,276	1,276	1,276	4,407	211	287	255	255	
Delaware	4,367	4,570	5,260	5,873	6,487	203	690	613	613	613	2,120	102	138	123	123	
Lancaster	7,308	7,910	9,955	11,773	13,591	602	2,045	1,818	1,818	1,818	6,283	301	409	364	364	
Lebanon	2,615	2,824	3,534	4,165	4,797	209	710	631	631	631	2,182	105	142	126	126	
Lehigh	6,593	6,953	8,178	9,267	10,356	360	1,225	1,089	1,089	1,089	3,763	180	245	218	218	
Montgomery	9,236	9,790	11,670	13,341	15,012	554	1,880	1,671	1,671	1,671	5,776	277	376	334	334	
Northampton	6,640	7,018	8,303	9,446	10,588	378	1,285	1,142	1,142	1,142	3,948	189	257	228	228	
Philadelphia	5,413	5,616	7,306	8,808	10,310	203	1,690	1,502	1,502	1,502	4,897	101	338	300	300	
York	9,091	9,657	11,582	13,293	15,004	566	1,925	1,711	1,711	1,711	5,913	283	385	342	342	
Market Area Total:	80,942	85,942	103,942	119,942	135,942	5,000	18,000	16,000	16,000	16,000	55,000	2,500	3,600	3,200	3,200	3,200

Source: Pennsylvania Fish Commission; LDR Development Economics

Table 20

POWERBOAT REGISTRATIONS BY SIZE AND MOTOR CLASSIFICATION
 TINICUM WATERFRONT MARINA MARKET AREA
 1984 -1988

	Boat Registration Trends				Annual Percentage Change		
	1984	1986	1987	1988	'84-'86	'86-'87	'87-'88
Under 16 Feet							
Outboard:	39,501	44,708	44,116	45,626	6.6%	-1.3%	3.4%
Inboard:	352	597	658	974	34.8%	10.2%	48.0%
Subtotal:	39,853	45,305	44,774	46,600	6.8%	-1.2%	4.1%
As a % of all boats:	62.99%	64.87%	59.53%	57.57%			
16 to Less Than 26 Feet							
Outboard:	14,693	17,901	18,233	20,250	10.9%	1.9%	11.1%
Inboard:	3,695	5,342	6,060	7,423	22.3%	13.4%	22.5%
Subtotal:	18,388	23,243	24,293	27,673	13.2%	4.5%	13.9%
As a % of all boats:	29.06%	33.28%	32.30%	34.19%			
26 to Less Than 40 Feet							
Outboard:	175	205	223	262	8.6%	8.8%	17.5%
Inboard:	356	512	480	557	21.9%	-6.3%	16.0%
Subtotal:	531	717	703	819	17.5%	-2.0%	16.5%
As a % of all boats:	0.84%	1.03%	0.93%	1.01%			
40 to 65 Feet							
Outboard:	6	13	13	17	58.3%	0.0%	30.8%
Inboard:	16	19	20	27	9.4%	5.3%	35.0%
Subtotal:	22	32	33	44	22.7%	3.1%	33.3%
As a % of all boats:	0.03%	0.05%	0.04%	0.05%			
Over 65 Feet							
Outboard:	1	3	6	14	100.0%	100.0%	133.3%
Inboard:	1	1	1	3	0.0%	0.0%	200.0%
Subtotal:	2	4	7	17	50.0%	75.0%	142.9%
As a % of all boats:	0.00%	0.01%	0.01%	0.02%			
TOTAL:	58,796	69,301	69,810	75,153	8.9%	0.7%	7.7%
Boats in These Classifications as a Percentage of all Registered Boats in the Market Area:	93%	99%	93%	93%			

Source: Pennsylvania Fish Commission; LDR Development Economics

Table 21

PROJECTED POWERBOAT REGISTRATIONS BY SIZE AND MOTOR CLASSIFICATION
TINICUM WATERFRONT MARINA MARKET AREA
1988 -2005

	PROJECTED BOAT REGISTRATION					Total 1988 -2005	Average Growth per Year			
	1988	1990	1995	2000	2005		'88-'90	'90-'95	'95-'00	'00-'05
Under 16 Feet										
Outboard:	45,626	48,080	56,929	64,273	71,250	25,624	1,227	1,770	1,469	1,395
Inboard:	974	1,026	1,215	1,372	1,521	547	26	38	31	30
Subtotal:	46,600	49,107	58,145	65,645	72,771	26,171	1,253	1,808	1,500	1,425
As a % of all boats:	61.96%	61.44%	60.15%	58.85%	57.56%					
16 to Less Than 26 Feet										
Outboard:	20,250	21,807	27,101	32,120	37,355	17,105	778	1,059	1,004	1,047
Inboard:	7,423	7,994	9,934	11,774	13,693	6,270	285	388	368	384
Subtotal:	27,673	29,800	37,035	43,894	51,048	23,375	1,064	1,447	1,372	1,431
As a % of all boats:	36.79%	37.29%	38.31%	39.35%	40.38%					
26 to Less Than 40 Feet										
Outboard:	262	300	430	573	737	475	19	26	29	33
Inboard:	557	639	914	1,219	1,567	1,010	41	55	61	70
Subtotal:	819	939	1,344	1,792	2,304	1,485	60	81	90	102
As a % of all boats:	1.09%	1.18%	1.39%	1.61%	1.82%					
40 to 65 Feet										
Outboard:	17	21	35	51	69	52	2	3	3	4
Inboard:	27	33	55	80	110	83	3	4	5	6
Subtotal:	44	55	90	131	179	135	5	7	8	10
As a % of all boats:	0.06%	0.07%	0.09%	0.12%	0.14%					
Over 65 Feet										
Outboard:	14	21	43	70	102	88	3	4	5	7
Inboard:	3	4	9	15	22	19	1	1	1	1
Subtotal:	17	25	52	85	124	107	4	5	7	8
As a % of all boats:	0.02%	0.03%	0.05%	0.08%	0.10%					
TOTAL:	75,153	79,926	96,666	111,546	126,426	51,273	2,387	3,348	2,976	2,976

Source: Pennsylvania Fish Commission; LDR Development Economics

the spaces and 1,309 wet marina slips could be realized by 2005. Table 22 details the anticipated demand for both products by size and time frame.

Based on this analysis, several expanded marina operations could be developed in conjunction with a large dry stack operation. Marinas typically offer services in addition to wet and dry storage space; unfortunately there are no industry standards which can be used to determine the amount of this space. It is recommended that the developed facilities include space for supporting services within the study area. These services should include marine equipment and boat sales, food and beverage sales, fuel sales, waste disposal facilities, public bathrooms, and boat repair.

Table 22

POTENTIAL DEMAND FOR WET AND DRY SLIPS
TINICUM WATERFRONT MARINA MARKET AREA
1988 - 2005

	DRY STORAGE SLIPS/SPACES				Total 1988 -2005	Average Growth per Year							
	Potential Capture Rates of New Boats					POTENTIAL DEMAND							
	'88-'90	'90-'95	'95-'00	'00-'05		'88-'90	'90-'95	'95-'00	'00-'05				
Boats Under 16 Feet	0.0%	3.0%	4.0%	4.0%	838	0	265	294	279	0	53	59	56
Outboard:	0.0%	3.0%	4.0%	4.0%	18	0	6	6	6	0	1	1	1
Inboard:													
Boats 16' to less than 26'					856	0	271	300	285	0	54	60	57
				Subtotal:									
Outboard:	0.0%	2.5%	3.0%	3.0%	440	0	132	151	157	0	26	30	31
Inboard:	0.0%	2.5%	3.0%	3.0%	161	0	49	55	58	0	10	11	12
Boats 26' to less than 40'				Subtotal:	601	0	181	206	215	0	36	41	43
Outboard:	0.0%	3.0%	3.0%	3.0%	13	0	4	4	5	0	1	1	1
Inboard:	0.0%	3.0%	3.0%	3.0%	28	0	8	9	10	0	2	2	2
				Subtotal:	41	0	12	13	15	0	2	3	3
				TOTAL POTENTIAL DEMAND FOR DRY STORAGE:	1,498	0	464	519	515	0	93	104	103
Boats 16' to less than 26'													
Outboard:	0.0%	5.0%	6.0%	7.0%	932	0	265	301	366	0	53	60	73
Inboard:	0.0%	5.0%	6.0%	7.0%	342	0	97	110	134	0	19	22	27
Boats 26' to less than 40'				Subtotal:	1,274	0	362	411	501	0	72	82	100
Outboard:	0.0%	4.0%	4.0%	4.0%	17	0	5	6	7	0	1	1	1
Inboard:	0.0%	4.0%	4.0%	4.0%	17	0	5	6	7	0	1	1	1
				Subtotal:	35	0	10	11	13	0	2	2	3
				TOTAL POTENTIAL DEMAND FOR MARINA SLIPS	1,309	0	372	423	514	0	74	85	103

Source: Pennsylvania Fish Commission; LDR Development Economics

Appendix A
POTENTIAL LAND ACQUISITION APPROACHES

Fee-Simple Acquisition

Purchase of fee-simple title is the most direct means of obtaining property, because all that is involved is the outright purchase of land by state or local governments or private interests. This tool involves acquisition of complete ownership in property, the "fee-interest," by outright purchase, gift, condemnation, or purchase with donated funds.

Ownership is, however, restricted by government regulation. It is also the most expensive method of obtaining land, and this often becomes a limiting factor in acquiring necessary properties for urban redevelopment.

Because of tax considerations, land is sometimes donated to a community, or sold below the fair market value. Donations or "bargain sales" of land by private groups, both non-profit and profit, have been important in many redevelopment projects. For non-profit groups such as land conservancies, charitable donations of land to local governments have been used as a means of insuring that the donated property will be developed in a manner that maximizes public benefit. For private, profit-making groups, a gift or sale below the estimated market value (a bargain sale) will result in substantial reductions in the need for initial investment capital.

Leaseback

A fee-simple technique that has often been used both to encourage redevelopment projects and control the manner in which they are implemented, is the purchase/leaseback arrangement. Under this procedure, a local government purchases property for rehabilitating existing structures or creating new development. The property is then leased back to private interests under a standard lessor/lessee agreement.

Leaseback is an incentive for redevelopment, because the local government may lease the property at a relatively low rate, creating a desirable climate for private investment. Additional public benefits can be obtained if the local government chooses to attach restrictions or covenants to the deed, including public access, setbacks, landscaping, etc.

Leaseback arrangements are beneficial to both public and private interests for several reasons. For the local government, high acquisition costs can be defrayed by revenues from the lease-back arrangement. Also, much of the upkeep and improvement costs are assumed by the private, tax-paying, developers. Benefits for private interests are in

avoiding high initial capital outlay, and the advantage of deducting rent from taxes as a business expense. Mission Bay in San Diego has used such a leaseback system.

Inverse Leaseback

A unique variation of the leaseback arrangement has recently been instituted by Baltimore City. This program, probably the first of its kind to be applied in a major metropolitan area, uses a three-pronged contractual arrangement between the city, a newly-formed Industrial Development Authority, and private interests. The goal is to entice commercial and industrial operations back into the city. The basic procedure involves the city's selling newly renovated buildings to private investors, and leasing the property back from them at relatively low rates. Lease payments are set at levels according to the owner's costs for items such as taxes, debt amortization, and investment premiums. The Industrial Development Authority's role is in financing the initial purchase of the property by private investors. Because of its special legal status as a quasi-public, non-profit corporation, it can borrow money at tax-exempt rates and in turn loan it to private investors at low interest rates. This allows the private party to borrow at a low interest rate from the IDA, purchase usable property from the city, and lease it back to the city at a rate that just covers the debt service on the loan and some other expenses.

The main advantages of the program are that private interests can quickly obtain large amounts of capital to purchase space at low cost and relatively small risk. In addition, investors will be able to deduct building depreciation from their taxes, because technically they are the owners of the buildings and property. Eventually, all properties will revert to the city. The primary advantages for Baltimore are that inner city revitalization becomes feasible without increasing the city debt, issuing municipal bonds, or providing tax incentives to individual owners.

Land Writedowns

Land writedowns have been widely used by local governments as an incentive for private investment in urban renewal projects. This procedure involves purchase of blighted properties by the local government, clearance of any dilapidated structures at public expense, and resale of the land to private development interests. The incentive for redevelopment of these properties occurs because the land is sold by the local government either below the purchase price, or at a level below the appraised land value after clearance.

Land writedowns reduce the amount of capital needed by developers to finance local redevelopment projects. This in turn reduces their equity requirement and amount of debt service on loans. In addition, sale of property at an attractive price may allow the

local government leverage with the developer in providing amenities, such as public access, open space, or other provisions that can be included as restrictive covenants attached to the land transaction. The theory is that the tax revenues generated by the new development will eventually cover the public's investment expense.

Conservation Easements

Conservation easements are restrictions that land owners place on property voluntarily or for payment. They can involve such things as allowing the public to cross a property to reach the shore, restricting building height to protect a view, or agreeing to maintain a garden or planting that is a community amenity. When the owner places a conservation easement on a parcel of land, certain rights specified in the easement document are relinquished. As a matter of form, the rights are transferred to a recipient (such as a conservation organization or governmental body) in a legal document. When the document is properly drawn, signed, and recorded, the owner and future owners of the property can no longer exercise those rights given up in the easement document.

An easement holder, such as a local government, has the right to ensure that the restrictions on the land are observed. The easement does not automatically allow public access to the land unless that is specifically provided in the easement document. The owner of the property retains all other rights. Unless the easement document provides otherwise, the owner can, for example, sell the property, live on it, or bequeath it. Also, taxes must still be paid, but often a consideration will be given in return for the easement restrictions.

Land Banking

Land banking has been suggested as a means of directing the nature and timing of urban development in local communities by keeping land out of the open marketplace. In this approach, land is purchased by a local government and held in reserve until such time as conditions are right for its resale and subsequent development.

Land banking provides local decision makers with a tool to control or forestall development within a community to accomplish goals such as containing sprawl or providing open space.

Land banks may operate on a large or small scale. Historically, these programs have not been implemented in American cities because they require initial capital outlays that are excessive for most municipal budgets. Large-scale land banks are usually long-term programs (20 years or more) that serve to control much of local land use decision making. Indirectly, they influence land values, location, and timing of development on privately

owned lands. Large-scale land banking is often a politically unsatisfactory approach, because public opinion tends to run against a government taking full control of land ownership and use.

Small-scale land banking programs, however, are less expensive, and generally more politically acceptable. These are usually labeled "advance acquisition programs" and are implemented by local governments as a hedge against inflation in land values or to obtain optimal locations for future public facilities. This technique is used in Maryland, for example, to preserve space for energy installations.

Short-term land banks can be especially useful in redevelopment of blighted areas. In these cases, land banking consists of purchasing existing dilapidated structures, possibly rehabilitating them and then disposing of the property at a rate that best meets the goals of the community at the particular time. With this degree of control over land disposition, local governments can integrate other incentives, such as provision of public facilities, in timely fashion.

Land Exchange

Land exchange is a technique commonly used by local governments to acquire properties from private interests or from other government agencies in situations when outright purchase would be too costly. In this approach, the local government trades public properties for private lands of equal value.

The goals of land exchange are varied. Lands are frequently exchanged to preserve open space, wetlands, or provide public access. They are also used to consolidate properties for development. On urban waterfronts, private owners of land zoned for industrial uses or other types of business may want to exchange their waterfront parcels for other city-owned lands that are better located or have easier access to transportation facilities.

Land exchange can be divided into the following categories:

- From one governmental agency to another. For example, the Massachusetts Port Authority transferred title of all non-airport related natural areas (salt marsh and tidal flats in East Boston) to the Metropolitan District Commission for conservation and recreation purposes.
- Properties held by governmental agencies because of tax delinquency or foreclosure. Again in Boston, the Real Property Department has agreed to transfer certain properties; the Boston Conservation Commission will manage them and the Public Facilities Department will process and facilitate each transfer.

- Gaining control of surplus property. When a governmental agency, such as the Department of Defense, no longer needs an installation or base, the property is declared surplus and is transferred to the General Services Administration. Many park areas have been acquired by state and local governments through this means.
- Land consolidation, or exchanging one piece of property for another in a different location. This technique has been used successfully to preserve open space and access in the Middlegrounds area of Toledo's waterfront and at Detroit's Renaissance Center. This can be an exchange between public and private interests.

APPENDIX B

POTENTIAL FUNDING APPROACHES

The completion of the Tinicum Waterfront Action Plan provides the Tinicum community with a blue print for revitalizing its waterfront. However, a major part of bringing the waterfront to full potential is funding.

The Tinicum Action Plan recommends both public and private components which would be phased in over a ten year period. The public boat ramp and emergency service center are public facilities and will most likely be constructed with public funds. These funds could be raised ranging anywhere from state and federal programs to private gifts. On the private side, new marinas, boat storage facilities and residential and commercial developments will utilize private financing. Although these private developments are more suitable for financing from the private market at affordable interest rates, they sometimes are not able to attract the necessary financing. Therefore in some cases the infusion of public funds can make a project feasible, while no assistance from the public side, the same project is infeasible.

Because of the many variables confronting the Tinicum waterfront, we would anticipate seeing a combination of funding sources ranging from conventional financing provided by banks to government financing with low interest loans and grants.

There are many funding sources available through both the private and public sectors. Those sources which are particularly relevant to Tinicum are briefly described in this appendix. However, responsibility for assembling and acting on information such as deadlines, eligibility and levels of funding, should be one of the major functions of the Waterfront Management Council. Once established, the council should identify, for both the private and public sectors, which sources are available and how they may be applied to various elements of the Waterfront Action Plan.

The following is a list of programs that could be applied to public and private projects:

Program:
Recreation and Parks Technical Assistance*

Description:
Help local governments improve and strengthen their management, operation, maintenance, personnel administration, and fiscal control of their park, recreation, and community center systems, facilities, and projects.

Agency:
Department of Community Affairs

Contact Person:
Larry Williamson

Address:
553 Forum Building
Harrisburg, PA 17120
(717) 783-2659

Program:
PA Coastal Zone Management Program (CZM)*

Description:
Acquire land, plan, design or construct projects within the coastal zone.

Agency:
Department of Environmental Resources

Contact Person:
E. James Tabor

Address:
Box 1467
Harrisburg, PA 17120
(717) 783-9500

Program:
Recreation Improvement and Rehabilitation Act (RIRA)*

Description:
Provide financial assistance to local governments for planning, acquisition and development/rehabilitation of parks, recreation and community center facilities and areas.

Agency:
Department of Community Affairs

Contact Person:
Larry Williams

Address:
5543 Forum Building
Harrisburg, PA 17120
(717) 783-2659

Program:
Land and Water Conservation Fund (LWCF)*

Description:
Provide financial assistance to local governments for the acquisition, development and rehabilitation of park lands and recreation facilities.

Agency:
Department of Community Affairs

Contact Person:
Larry Williams

Address:
553 Forum Building
Harrisburg, PA 17120
(717) 783-2659

Program:
Revenue Bond and Mortgage Program (RBMP)*

Description:
Energy development opportunities, land acquisition, building construction, machinery or equipment, and energy audits/conservation projects.

Agency:
Department of Commerce

Contact Person:
Bureau of Bond and Loan Programs

Address:
479 Forum Building
Harrisburg, PA 17120
(717) 783-1108

Program:
The Enterprise Capital Fund (ECF)

Description:
New construction, renovation, acquisition of land, equipment, and facilities, refinancing, and interior or permanent financing are all possible.

Contact:
American Development Finance, Inc.
(202) 624-5413

Program:
Business Infrastructure Development (BID)

Description:
Construction and Improvement of drainage, sewer and water supply systems, energy, fire safety and transportation.

Agency:
PA Department of Commerce

Contact Person:
PA Department of Commerce

Address:
494 Forum Building
Harrisburg, PA 17120
(717) 787-7120

Program:
Historic Preservation Grants-In-Kind*

Description:
Assist in the identification, registration and protection of significant historic architectural and archaeological resources in PA.

Agency:
PA Historical & Museum Commission

Contact Person:
Dorothy Hershey

Address:
Box 1026
Harrisburg, PA 17108-1026
(717) 783-9923

Program:
Historic Preservation Program *

Description:
Development and preservation of historic sites and properties.

Agency:
PA Historical & Museum Commission

Contact Person:
PA Historical & Museum Commission

Address:
Box 1026
Harrisburg, PA 17108
(717) 783-9923

Program:
Philadelphia Intervention Fund *

Description:
Through the Intervention Fund, grants ranging from \$1,000 to \$20,000 are made to non-profit incorporated organizations and public agencies in order to enable them to respond quickly and appropriately to preservation issues.

Agency:
The Preservation Fund of Pennsylvania

Address:
2470 Kissel Hill Road
Lancaster, PA 17601
(717) 569-2243

Program:
Smith (Ethel Sergeant Clark) Memorial Fund *

Description:
Most giving limited to Delaware County.

Contact Person:
c/o Philadelphia National Bank FC-1-6-17

Address:
P. O. Box 7618
Philadelphia, PA 19101
(215) 629-2792

Program:
Conservation & Research Foundation Grants *

Description:
Promote the conservation and enlightened use of renewable natural resources, encourage related research in the biological sciences, and deepen the understanding of the intricate relationships between humans and the environment that support them.

Contact Person:
Dr. Richard H. Goodwin, President

Address:
Call Box, Connecticut College
New London, CT 06320
(203) 873-8514

Program:
Mellon Bank Foundation *

Description:
Formerly the Girard Trust Bank Foundation. Grants are limited to Philadelphia and the following counties: Bucks, Chester, Lehigh, Delaware and Montgomery.

Contact Person:
Public Affairs Department, 10th Floor

Address:
One Mellon Bank Center
Philadelphia, PA 19102
(215) 585-3918

Program:
American Conservation Association, Inc. *

Description:
To advance knowledge and understanding of conservation and preserve the beauties of the landscape and the natural and living resources in areas of the United States and elsewhere; to educate the public in the proper use of such areas.

Contact Person:
George R. Lamb, Executive Vice President

Address:
30 Rockefeller Plaza, Rm. 5510
New York, NY 10112
(212) 247-3700

Program:
Atlantic Richfield Foundation Environmental Programs
Grants *

Description:
Programs and organizations devoted to the natural environment (organizations that address natural resources and land use issues, programs that promote environmental education, preservation, public access, conservation, protection etc.).

Contact Person:
E. R. Wilson, President

Address:
515 S. Flower Street
Los Angeles, CA 90071
(213) 486-3342

* Programs listed in the Pennsylvania Division of Coastal Zone Management publication titled "Listing of Alternate Funding Sources to Augment Coastal Zone Management Funded Projects".



NOAA COASTAL SERVICES CENTER LIBRARY

3 6668 14109 4641