

April 28, 2006

Mr. Richard McGuinness
Boston Redevelopment Authority
1 City Hall Square
Boston, MA 02201

Mr. McGuinness,

Enclosed is our report entitled Management Tools: Boston Marine Industrial Park. It was written at the Boston Marine Industrial Park during the period of March 13 through April 28, 2006. Preliminary work was completed in Worcester, Massachusetts, prior to our arrival in Boston, Massachusetts. Copies of this report are simultaneously being submitted to Professors Gerstenfeld and Vernon-Gerstenfeld for evaluation. Upon faculty review, the original copy of this report will be catalogued in the Gordon Library at Worcester Polytechnic Institute. We appreciate the time that you have devoted to us.

Sincerely,

James Citrone

James Coletti

Kristina Nigro



Report Submitted to:

Professor Susan Vernon-Gerstenfeld
Professor Arthur Gerstenfeld
Boston, MA Project Center

By

James Citrone

James Coletti

Kristina Nigro

In Cooperation With

Richard McGuinness, Director of Waterfront Planning
Boston Redevelopment Authority

Management Tools: Boston Marine Industrial Park

April 28, 2006

This project report is submitted in partial fulfillment of the degree requirements of Worcester Polytechnic Institute. The views and opinions expressed herein are those of the authors and do not necessarily reflect the positions or opinions of the Boston Redevelopment Authority or Worcester Polytechnic Institute.

This report is the product of an education program, and is intended to serve as partial documentation for the evaluation of academic achievement. The report should not be construed as a working document by the reader.

ABSTRACT

This document discusses the implications of Special Condition #7 of the Chapter 91 license governing the South Boston Marine Industrial Park; owned and operated by the Boston Redevelopment Authority/Economic Development Industrial Corporation. The results of our research and investigation of the park provide a solution to track and monitor the mixture of land use within the Marine Industrial Park and recommends and supports uses of available space for purposes other than maritime industrial. By means of the Land Use Matrix and inventory database, the BRA can maintain Chapter 91 compliance by ensuring that a minimum of 67 percent of the park is reserved for marine use. The document outlines the necessary background and research methods used throughout the project, regarding the exploration of industrial development and success, and the reuse of industrial buildings.

AUTHORSHIP PAGE

Each group member, James Citrone, James Coletti, and Kristina Nigro, has contributed equivalent efforts throughout the development of this project. The members worked in parallel to complete the researching, writing, and analysis of the project and to produce this report.

ACKNOWLEDGEMENTS

We would like to extend our gratitude to the following people for their contributions to this project. Without their help, this project would not have been possible.

Richard McGuinness (liaison), Tony Maranello, Larry Mammoli, Bob Tumposky, Dennis Davis II, Jim Clark, Marla Cumming, Eileen Rumble, and others at the Boston Redevelopment Authority for their time and efforts throughout this project.

We also extend our gratitude to the businesses that agreed to take part in the interview process during our seven weeks in Boston. This includes Jack Cavalier of Partners and Simons, Al Marzi of Harpoon Brewery, Robert Nagle of John Nagle Company, Richard Pinkowitz of Immunetics, and Jim Stavis of North Coast Seafood. Their time and responses were crucial in developing our recommendations for the future of the Boston Marine Industrial Park.

Finally, we would like to thank our advisors, Arthur Gerstenfeld and Susan Vernon-Gerstenfeld, for their never-ending support and guidance throughout the existence of the project. We appreciate their time and dedication to the project from beginning to end.

EXECUTIVE SUMMARY

The City of Boston purchased the 167-acre South Boston Naval Annex from the United States Department of Defense in 1977 through a division known as the Economic Development and Industrial Corporation (EDIC). At this time, an Economic Development Plan (EDP) was created to facilitate productive reuse of the land and construction of a marine industrial park. Following this acquisition, the EDIC also purchased a 24-acre segment of land containing the former South Boston Army Base. This land lodged Building #114, now the Boston Design Center and the Bronstein Industrial Center, a previous World War I structure in use for approximately seventy years, featuring 1.65 million square feet and spanning one-third of a mile long. Today, the Boston Marine Industrial Park (BMIP) is comprised of both parcels of land totaling 191 acres.

The Marine Industrial Park is the city's strategic solution to preserving manufacturing and other industries, creating job opportunities via economic activity. The park's convenient location within the City of Boston makes it easily accessible for employees and businesspersons. It is located approximately five minutes from Logan International Airport, the Conley Freight Terminal, and the I-93 and I-95 highways with direct access to MBTA transportation via Boston's new Silver Line. At the present time, the Marine Industrial Park employs all types of maritime, industrial, and light industrial operations. This includes biomedical equipment manufacturers, beer brewers, travel, computer, import and export, seafood, ship repair, and fabric design related companies. Since the Boston Redevelopment Authority oversees all aspects of the Marine Industrial

Park including its initial construction, current operations, and its future, the agency receives and reviews filings for new development within the park as well.

While the Boston Redevelopment Authority facilitates growth and maintenance of the Marine Industrial Park, its work also affects other aspects of the city. The work efforts of the BRA/EDIC have allowed the Marine Industrial Park to serve the community of Boston both economically and visually. However, the city continues to plan for future development to allow the park to grow and operate at its maximum potential. With the demands in today's business world, it is very easy for industrial property such as the BMIP to be misused. In addition to being a central industrial park within Boston and accessible by railways, highways, and airports, the park's waterfront location is also beneficial to its existence. Due to limited waterfront industrial property, space at the park is in high demand which causes the need to enforce the preservation of this space for promoting maritime industry and activities.

The state of Massachusetts' primary means of protection and promotion of public use of its waterfront property is the Massachusetts General Law, Chapter 91. The principle viewpoint behind this governance is that the air, sea, and shore do not belong to any one person, but rather to the public at large. Through the laws imposed by Chapter 91, the Commonwealth can preserve and protect the public's rights and guarantee that even private waterfront areas can be protected and serve purpose to the public. Many agencies take part in preserving the public rights to land and water, including the Department of Environmental Management, the Massachusetts Coastal Zone Management, and the Division of Fisheries and Wildlife. However, the section of the

Department of Environmental Protection (DEP), Waterways Regulation Program, is the primary division that implements and enforces Chapter 91.

Chapter 91 is a licensing program composed of nine special conditions which regulate current uses and future land developments. Conditions discussed here include Special Conditions #2 and #7. Special Condition #2 states that under no circumstances shall less than 67 percent of the Designated Port Area (DPA) parcels of the total BMIP land area, consisting of all filled tidelands landward of the project shoreline, be dedicated exclusively to such water-dependent industrial uses. Special Condition #7 requires a bi-annual land use report to be submitted to the DEP to check its compliance with the license and other special conditions. The report is to include an up-to-date inventory of BMIP land usage, including the names of the lessees, their amount of space, and whether the lessee is a water-dependent industry, general industrial, commercial, or temporary. To account for unused land, the inventory must also contain information on vacant parcels and any proposed uses. Finally, the inventory must list any recent changes in tenancy, as well as future expectations of expiring leases and proposed structural changes.

To calculate land use percentages in satisfying Special Condition #2 of the Chapter 91 license, we gathered specific land use data from the BMIP including parcel names, addresses, and square footages, and developed an interactive database and reporting tool to perform the calculations. The data within the database can be easily updated to reflect future changes regarding land usage at the BMIP. Its primary output is a table with land use percentages in which the BRA can submit to the DEP as a formal compliance status report. Information about tenants, tenant use, unused space, and proposed uses can also be entered into the database. We recommend that the BRA make

efforts to incorporate the database into the normal operations, planning, and management of the Marine Industrial Park.

We also examined three buildings at the BMIP to help make recommendations regarding the reuse of the Bronstein Industrial Center. The buildings examined were the Bronstein Industrial Center, North Coast Seafood, and the 12 Channel St. building. We inventoried these buildings and created reports containing information such as ceiling height, number of elevators and loading docks, utilities, usage, and square footage. We analyzed the results of each inventory report to form the conclusions and recommendations of our project. We recommend to the BRA that the Bronstein Industrial Center be used primarily for light industrial purposes. Moreover, leasing to commercial and retail businesses that directly benefit the park can also provide value in this circumstance.

By interviewing various tenants at the park, we were able to gather a mix of quantitative and qualitative data. The semi-structured interviews encompassed the tenants' type of industry, opinions on public transportation and park accessibility, advantages and disadvantages of locating at the Marine Industrial Park, and future developments in and around the park. We interviewed a biotechnology company, seafood processing and distribution companies, a marketing firm, and a beer brewery. Although this represents a small sample of industries at the park, the diverse mix was instrumental to eliminating any bias in the responses. The resulting advantages and disadvantages of being located within the park assisted in comparing the park to other locations. Traffic, parking, and employment results allowed us the ability to further investigate the various implications on the park's surrounding society. Tenants' views on how future

development outside the park was also instrumental when determining how certain businesses would be affected. We recommend that the BRA work to protect truck routes within and surrounding the park. Future projects should explore how nearby developments, such as the apartment building and hotel under construction, will affect industries and employment aspects at the BMIP.

CONTENTS

ABSTRACT	iii
AUTHORSHIP PAGE	iv
ACKNOWLEDGEMENTS.....	v
EXECUTIVE SUMMARY	vi
CHAPTER ONE: INTRODUCTION	3
CHAPTER TWO: BACKGROUND	5
ACCESS AND TRANSPORTATION.....	5
INDUSTRIAL DEVELOPMENT	8
Industrial Success	9
Industrial Development and Sustainability	11
Effects on Surrounding Communities	15
LEGISLATION.....	18
Environmental Protection	18
Zoning and Land Use.....	19
CHAPTER THREE: METHODOLOGY	23
COLLECTING THE DATA.....	23
ORGANIZING THE DATA.....	25
ANALYZING THE DATA	27
CHAPTER FOUR: DATA ANALYSIS	28
BUILDING INVENTORY.....	28
The Bronstein Industrial Center	29
North Coast Seafood Facility.....	30
12 Channel Street	32
LAND-USE MATRIX	33
TENANT INTERVIEWS	34
Advantages and Disadvantages for the BMIP Tenants	35
Developments In and Around the Boston Marine Industrial Park.....	36
Trucks and Traffic Concerns.....	37
EMPLOYMENT AND INDUSTRY TRENDS.....	38
CHAPTER FIVE: CONCLUSIONS.....	41
FUTURE USE OF VACANT SPACE.....	41
MONITORING CAPABILITIES OF THE LAND USE MATIRX.....	42
FUTURE PROJECTS.....	43
CHAPTER SIX: RECOMMENDATIONS	44
APPENDIX A.....	45
THE BOSTON REDEVELOPMENT AUTHORITY ¹	45
APPENDIX B: LAND USE MATRIX	Error! Bookmark not defined.
APPENDIX C: TENANT INTERVIEW SUMMARIES..	Error! Bookmark not defined.
Partners and Simons (Jack Cavalier).....	49
Harpoon Brewery (Al Marzi).....	49
John Nagle Company (Robert Nagle)	50
North Coast Seafood (Jim Stavis).....	51
Immunitics (Richard Pinkowitz)	51

TABLES

Table 1: Potential Benefits of Eco-Industrial Development.....	15
Table 2: Bronstein Industrial Center vs. North Coast Seafood.....	32

FIGURES

Figure 1: South Boston Marine Park Location	10
Figure 2: The Industrial Network in Kalundborg, Denmark	14
Figure 3: Entity-Relationship Diagram	26
Figure 4: The Bronstein Industrial Center	29
Figure 5: Aerial View of North Coast Seafood	30
Figure 6: 12 Channel Street	32
Figure 7: Trends in Employment Manufacturing in United States (Adapted from www.bls.gov).....	39
Figure 8: Manufacturing vs. Private Industry Hourly Wages (Adapted from www.bls.gov).....	40

CHAPTER ONE: INTRODUCTION

Land use and development affects surrounding communities, socially and economically. According to Yan Song and Gerrit-Jan Knaap (2002), zoning ordinances in the United States have forced commercial zones, where employment resides, away from residential zones. Urban sprawl, defined by The American Heritage Dictionary of the English Language (2000) as the unplanned, uncontrolled spreading of urban development, causes increases in traffic and employee commute times, air pollution, loss of open space, inequitable distribution of economic resources, and the loss of a sense of community (Smart Communities Network, 2006). A well-planned combination of zones merging residential housing with offices, and exclusive commercial and industrial zoning can effectively solve many of these issues, including the preservation of open space, prevention of unemployment by connecting citizens with nearby job opportunities, and bestow a greater sense of community (American Planning Association, 1998).

There is a view that the effective reuse of land is important. According to a report from the Commission on Behavioral and Social Sciences and Education (1993), effective land use in urban areas will promote economic growth and meet the needs of the community, the city, and its prospective tenants. To maximize the productivity of areas, especially industrial parks, it would make sense to create an inventory of structures and land availability. Such information will help the park stay consistent with the mandates, zoning policies, and waterways regulations. The data collected will help with the development of a framework for the future use of industrial parks. There are many industries that can provide city residents with job opportunities.

Developments that use land efficiently can also increase monetary capital as well as the surrounding land value. Governments fund redevelopment projects to retain a competitive advantage, promote industrial growth, and provide employment opportunities. The land surrounding marine industrial parks can also increase in value depending on the quality of the newly redeveloped area. These redevelopments will permit industrial parks to generate a growing workforce by attracting citizens and thereby reducing unemployment and increasing overall productivity.

Our group completed an Interactive Qualifying Project (IQP) in cooperation with the Boston Redevelopment Authority (BRA). The goals of our project were to:

- 1.) Provide the BRA with an effective means of tracking and analyzing land use of the Marine Industrial Park to maintain Chapter 91 compliance.
- 2.) Examine several existing buildings within the park to determine their ability to support proposed uses.

Chapter 91 requires that 67 percent of total land within the marine park be reserved for maritime use. The two objectives of our first goal were to gather data to build a parcel database and to develop a Land Use Matrix document using this data. Objectives for the second goal were to analyze inventory and tenant interview data and recommend alternate uses for the vacant space within the park. In addition, the BRA seeks to maximize the property's value in efforts to promote economic growth. Since 1977, the Boston Marine Industrial Park (BMIP) has been managed by the BRA and the Economic Development and Industrial Corporation (EDIC), which have become a unified entity. In order for the BRA/EDIC to continue to develop the BMIP successfully, they have devised a Master Plan which includes specific details and planning criteria regarding the

park's past, present, and future. Future BRA projects will attempt to attract new industries to the site and maximize the space available, most efficiently. The design and deployment of a land inventory system will help these authorities monitor aspects of the park by aiding in decision-making and analysis. The land inventory system will also provide a quick reference to various park assets, tenants, and related details so that hypotheses and supporting arguments can be made for the proper re-use and further development of obsolete buildings within the park.

CHAPTER TWO: BACKGROUND

The modern day industrial park is defined by the Dartmouth College Conference on Industrial Parks (1958) as a planned industrial district with a comprehensive and continuing goal to assure compatibility between the park's industrial operations and the character and need of communities which surround it. The industrial operations within the district include a wide variety of uses from light industrial to office space. Once manufacturing-oriented centers, today's industrial parks represent a dynamic workspace for businesses of all types and sizes. They harbor new technologies, provide a solid job base to the local community, and contribute to the area's overall economic life. Issues and arguments regarding access and transportation, land development, and legislation are presented below.

ACCESS AND TRANSPORTATION

The transportation and accessibility aspect of any industrial park or commercial zone is a contributing factor to success as it permits convenient access to and from the park. This type of access is most beneficial for workers employed at the park. While it is

helpful for existing industrial parks, it also helps to promote the foundation of new parks. According to Amekudzi and Fomunung (2004), transportation projects carefully planned and designed to improve accessibility can promote redevelopment and positive economic and social impact. Decreased worker commute times and public transportation are especially valuable. This aids in building a strong workforce from surrounding and distant areas, which acts as a means of reducing unemployment and remains a novel asset to employers. Transportation for cargo is equally important as it provides the infrastructure for moving goods to and from manufacturing and warehousing facilities.

Airport access for industrial park tenants can be an extremely valuable asset when it acts as the primary method of cargo import and export, especially for industries such as seafood and freight (Boston Redevelopment Authority, 2006). Airport-accessible industrial parks include the 45 acre Keene Industrial Park in New Hampshire (<http://www.ci.keene.nh.us/>), the Mulgrave Marine Industrial Park in Nova Scotia with access to Port Hawkesbury Airport, and North Bay Marine Industrial Park of Oregon, which is within 15 minutes of a North Bend Municipal Airport. Koopman suggests that increased taxes can result from the need to fund road repairs due to wear and tear caused by buses and freight transport. While not vital to operation, air freight transport can alleviate this burden for marine parks and increase freight turn-around time for tenants vs. conventional transportation via roads. While airports provide enormous benefits for freight operators, they must take certain factors into consideration before utilizing such resources for business. These factors include the increasing levels of congestion at the major airport cargo hubs and restrictions on noise and night-flying (Gardiner et al., 2005). Gardiner et al. continue to state that freight operators initially research locations based on

airports' geographic locations and restrictions such as capacity and noise limits prior to considering a particular airport's terminal fees, quality, and marketing.

Waller and Hughes (1999), posit that public transportation systems often become obsolete and of lesser value when cities incur significant redevelopment and related changes. They continue to argue that the assistance of transportation to bring employees to employers is necessary to promote the idea that “work pays for families with moderate incomes.” This idea suggests that employee wage and salary surpluses from reduced transportation costs can be allocated for other living expenses and personal use. Many industrial parks contain public transportation with noticeable success such as the Brisbane-Crocker Industrial Park in California. Many employers take part in the Brisbane Shuttle Consortium which offers transportation passes to park employees at a reduced rate (Peninsula Traffic Congestion Relief Alliance, 2006). An example of a city with a prominent transportation system is Curitiba, Brazil. According to Rabinovitch and Hoehn (1995), Curitiba's transportation system helps residents effectively reach jobs, homes, and other places of interest, preventing any negative repercussions from the city's quadrupled population. This was achieved by adding dedicated bus lanes for express travel, which provides the benefits of an exclusive underground system while only incurring minimal implementation costs comparable to a surface solution. The authors present survey data showing that at least 20 percent of new bus passengers previously traveled by automobile. This is congruent with the reduced traffic congestion which has saved approximately 27 million liters of fuel per year.

Lastly, it is important to analyze the traditional and well-known means of transportation: roads. An extensive and well-maintained network of roads can be

beneficial for worker accessibility and cargo transport. York Region, comprised of nine municipalities in Canada, validates the importance of roads used for movement of goods. York Region's Transportation Master Plan (2000), asserts that trade is what fuels the region's economy and depends heavily on its efficient and effective transportation system – particular highways. The document states that the York Region's highway system experiences annual vehicle travel in excess of 30 billion miles, with over 840 million tons of goods in transport. Constant road and highway improvements usually lead to lower operating costs and travel times for their users. The plan continues to point out that road improvements will result in less wear on vehicles, shorter trips, and better fuel efficiency. One can see how these benefits, as well as many other transportation system innovations, may directly contribute to a company's overall success and the success of its surrounding industrial area as well.

INDUSTRIAL DEVELOPMENT

Land use can be described as the exploitation of land for various uses and purposes. According to the Columbia Encyclopedia on land use (2005), America's land has been exploited for economic gain throughout history. The encyclopedia also explains how land use is now a concern due to the population increase and industrial expansion which causes the depletion of natural resources, habitats, and wildlife. One solution, proposed by the U.S. Environmental Protection Agency (EPA) and other environmental protection agencies, is to impose laws and regulations to ensure that land is being used appropriately and as effective as possible. Industries are also contributing factors in economic and workforce development. As explained in the following sections, industries create numerous jobs for a variety of different types of workers as well as generating

monetary capital. It is also important for industries to maintain a positive relationship with their surrounding environment. There is a need for environmental sustainability and economic development and these needs must satisfy each other.

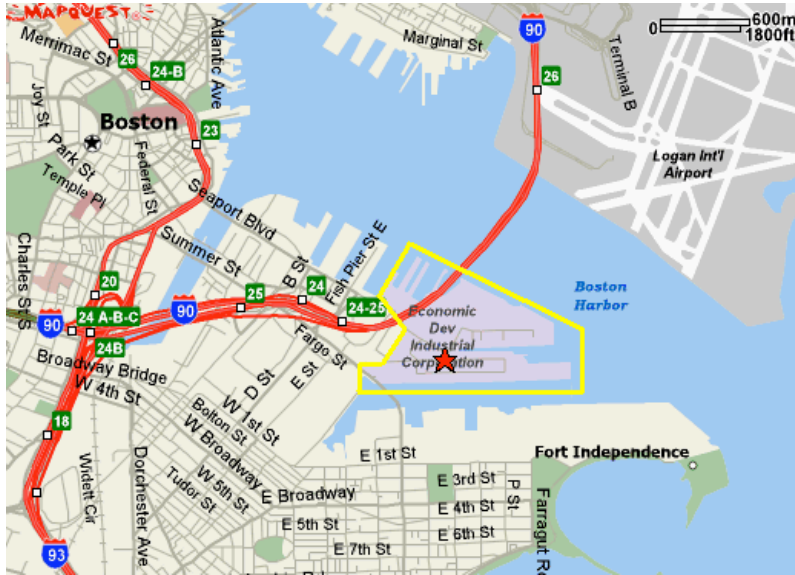
Industrial Success

There are many factors which contribute to the success of an industrial park. The National Graduate Institute for Policy Studies is an institute aimed at advancing policy research and collecting and analyzing policy related information. According to a forum on industrial parks and foreign direct investment attraction (GRIPS Development Forum, 2003), the conditions for a successful industrial park are location, infrastructure service within the park, and flexibility.

The location of an industrial park will have a tremendous effect on its productivity. The GRIPS Forum and Wikipedia Encyclopedia on industrial parks (2005) also explain how industrial parks should be close to an airport or seaport in which transportation to and from the port and nearby urban center should be close, inexpensive, and efficient. The area outside an industrial park should also provide a workforce at a reasonable cost. Amenities within the area that attract managers, engineers, and professionals and directly benefit local industries also contribute to successful development. An example of a location which meets these criteria is the South Boston waterfront in Massachusetts. Figure 1 displays how the South Boston Marine Industrial Park is located near the inner City of Boston, Logan International Airport, the waterfront and seaport, and has access to highways and public transportation. This type of transportation infrastructure allows for easy access to and from the industrial park which,

in turn, helps to reduce shipping expenses when compared to areas with inferior transportation networks.

Figure 1: South Boston Marine Park Location



(Adapted from <http://www.mapquest.com/maps/main/adp>.)

With respect to a park's infrastructure, many industries require various resources necessary to operate. Wikipedia and an article called "Real Estate and Site Selection" (n.d.) believe that resources such as electricity, telephones, water, waterfront access, Internet access, sewage treatment, transportation, and buildings of various sizes should be available to accommodate as many types of businesses as possible. Supply of these resources must also be adequate, of high quality, and competitively priced.

Industrial success may also be derived from an industrial park's flexibility. In some cases it is necessary to re-use space and land parcels for purposes other than initially expected. For example, many of the buildings within the BMIP were originally built to accommodate military vehicles and operations during World War II. These buildings are now antiquated and lack important characteristics necessary to support

industrial activity. Much of the available space for rent is exceptionally large and resides in multistory buildings. According to Charles Bartsch and Elizabeth Collaton (1996), a trend driven by international competition, changing markets, and advances in technology have caused the Nation to experience a major shift from heavy manufacturing to light manufacturing and specialty production. These new businesses are creating a demand for smaller and more compact facilities. Collaton and Bartsch (1996) also suggest that the development and re-use of older, and often abandoned, buildings can greatly benefit the surrounding communities. Adapting the facilities could not only restore the buildings and their physical environment, but also the jobs and vitality of the communities as well. Since many of these sites can be found in urban environments, revitalization would particularly benefit low-income and minority residents who suffered health and economic consequences of living near these buildings. Re-use can also take advantage of existing infrastructure and thus reduce urban sprawl. Finally, the authors note that by returning these facilities to productive uses, cities can create jobs, boost tax revenue, and produce many social, environmental, and aesthetic benefits.

Industrial Development and Sustainability

Urban planners, developers, and industrial park managers must consider sustainability. This idea was outlined in a paper entitled “Designing Eco-Industrial Parks: A Synthesis of Some Experiences” (1998), which demonstrated how sustainability requires the consideration of social and community aspects, ecological integrity, and economic efficiency. This field of study is known as industrial ecology and focuses on the application of environmentally sustainable, economic development. The goal of this approach is to unite industry and the environment through a social perspective. Industries

have been known to generate air pollution, solid waste, soil erosion, and cause the extinction of many species of animals. Solutions to the problem could be the use of renewable energy sources and creating a more efficient production system. Industrial parks should take the results of their practices into consideration to minimize negative effects on the surrounding community.

Communities are comprised of the people and the environment within and around them. These entities must work cohesively in order to achieve sustainability; this implies the need for interaction and interdependence. The stability of an ecosystem depends on the interconnectedness of the components within the ecosystem and its expansion as the ecosystem grows. This statement can easily be applied to industrial parks. Such parks need to make use of the tools provided by the environment in which they are located. Eventually, their dependence on these tools will grow as the park grows.

It is important to note that industries should possess resources but not waste them. Articles called “Wasted Wealth, Capital, Labor, and Resources” (2001) and “Waste Management” (2006) portray how large amounts of waste, both monetary and materialistic, accumulates throughout industrial processes. Examples of industrial costs were given concerning the land which must be cleared to grow products, fuel required for certain industrial processes, well maintained building infrastructure, money for marketing and distribution, materials for packaging, and waste disposal. Industrial waste can be described as a lost resource and much of the waste is persistent, bio-accumulative, and toxic. Such waste can enter the environment through air emissions, wastewater discharge, landfill dumping, and other related methods. Solutions to these problems would be to consider the reduction of material input and increase recycling of certain materials. These

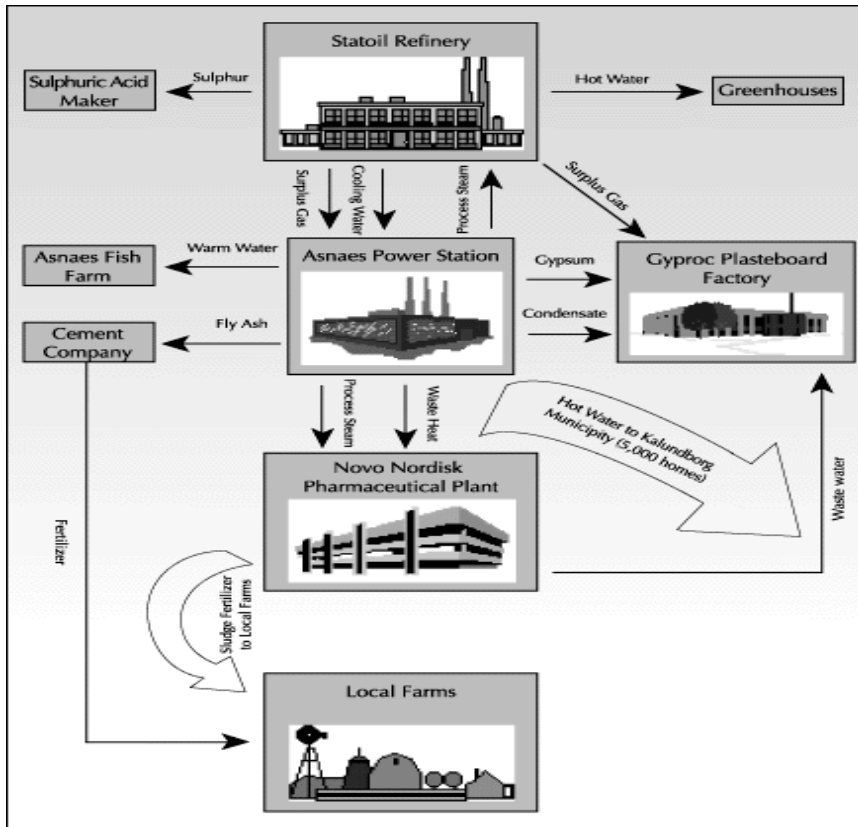
changes can help the industry decrease waste management costs, reduce compliance violations, and reduce environmental liability.

On a larger scale, industrial parks rely on many resources for productivity which include land where facilities are located, building materials, energy supply, and water. A paper on business and industry relating to sustainability (World Resources staff, 1999) and a paper called “Eco-Industrial Parks” (2005) state that industrial parks have not focused on sustainability. Industrial parks may not have realized their location with respect to chains of suppliers and consumers which are related to chains that occur in many ecosystems. Industrial parks should be established with an objective to minimize negative effects on the ecosystems by maintaining their characteristics and adhering to constraints. The parks also need to examine their use of energy systems to maximize energy efficiency and explore the use of renewable energy sources extensively. The benefits from developing environmentally conscious industrial parks are described in the sections following.

A variety of communities have started successful industrial development activities with a focus on environmental issues. An article entitled “A Planner's Overview of Eco-Industrial Development” (2000) describes the world’s first Eco-Industrial park in Kalundborg, Denmark. The park contains a power station, pharmaceutical manufacturer, plasterboard factory, fish farm, and an oil refinery. This article, as well as another article entitled “Community Development” (1999), confirms that the industrial network in Kalundborg, Denmark is practical and that shared resources between the containing industries are mutually beneficial and environmentally favorable. These facilities share resources such as water, steam, surplus gas, and waste materials through negotiations.

Figure 2 below shows some exchanges within the network of the industrial park. The figure displays how the byproducts of industries are reused by other industries within the same park, which decreases the overall waste of the industrial park.

Figure 2: The Industrial Network in Kalundborg, Denmark



(Adapted from Source: Maile, D. et al., 2000. *A Planner's Overview of Eco-Industrial Development*. 2000 APA National Planning Conference.)

Economic development is very important to industries and industrial parks. “A Planner's Overview of Eco-Industrial Development” (2000) continues to explain how undeveloped and reusable sites, high unemployment rates, poor transportation infrastructure, foreclosures, and poor education systems can cause problems for economic development in certain locations. The article “Community Development” (1999) states that addressing these issues requires many tools geared toward viewing economic development through a social perspective. As described earlier in this section, there

should be a focus on integrating business, environmental sustainability, and a sense of community to create economic development. This type of development requires local partnerships between government agencies, community leaders, industries, and developers.

There are many benefits of adapting eco-industrial strategies which are outlined in Table 1. Upon analysis of this table, it becomes clear that communities, the environment, and businesses profit from eco-industrial strategies and these profits range from monetary capital to quality of life. The table also displays the network between these entities and shows how changes in the way industrial parks are managed may have a substantial impact on networks around them.

Table 1: Potential Benefits of Eco-Industrial Development

Communities	Environment	Business
Improved environment and habitat	Continuous environmental improvement	Higher profitability
Improved tax base	Reduced pollution	Reduction of environmental liability
Improved health for employees	Innovative environmental solutions	Reduction of operating costs
Enhanced quality of life near eco-industrial development	Increased protection of natural ecosystems	Improved efficiency
Minimized impact on infrastructure	More efficient use of natural resources	Reduced waste disposal costs
Recruitment of higher quality companies		Income from sale of by-products

(Adapted from Source: Maile, D. et al., 2000. *A Planner's Overview of Eco-Industrial Development*. 2000 APA National Planning Conference.)

Effects on Surrounding Communities

Industrial parks affect surrounding communities in many ways. Depending on the type of industrial park and where it is located, industrial parks can have an affect on traffic flow, local housing costs and value, jobs, smell, pollution, and several other

aspects of a community. We will also see how these effects need to be minimized in order to maintain a solid community-industry relationship.

Industrial park development affects traffic flow which, in turn, has an effect on the environment around them. With respect to industrial parks, traffic flow must be properly maintained. An article entitled “The Effect of Road Traffic on Residential Property Values” (2001) describes how the construction of new roads contributes to economic growth since any competitive economy requires a well-maintained transport infrastructure. The article also notes an increase in the number of vehicles and road transportation over that last several years.

Industrial parks are known for generating truck traffic on a regular basis. The increase in traffic along local roads will make it more time consuming possibly dangerous for local residents to move about, by car or by foot. The effect of truck traffic on a surrounding area is outlined in “Other Materials” (2001). The article confirms how the operation of trucks in neighborhoods has created safety problems and decreased the quality of life in some communities.

Truck traffic also contributes to the air pollution and noise within industrial parks. Local residents must cope with related fumes and vibration caused by the operation of these large vehicles. The article mentioned above continues to explain how truck drivers and business owners are concerned with their truck routes and have voiced concerns regarding congestion, narrow streets, inadequate curbside space, and deficient signage which increases transport turn-around time and the cost of operation. While construction of new roads is increase accessibility, one can see its somewhat negative side effects on local residents, property, and businesses.

Pollution is also a factor which causes concern for local residents and communities. Industrial parks are major contributors to pollution due to the production of goods from raw material and, as discussed previously, transportation. Dr. David Kopec (2003) states that pollution can take many forms (air, solid, and noise) and can be generated from sources such as vehicles, industry exhaust, litter, and noise. He continues to explain how several studies have shown that foul-smelling pollutants can negatively affect a person's mood and increase aggression. Signs of pollution in a community can reduce dwellers' desire to travel by foot and raise safety concerns which may cause inhabitants to relocate. Pollution caused from vehicle traffic, especially diesel trucks, and buses are most common for the average community.

To resolve these issues, communities could ban trucks from traveling in or through certain areas, or limit the hours of operation on certain roads. Along with Dr. David Kopec, an article entitled "Health and Air Pollution" (2006) verifies that air pollution has become a major health concern. It states that air pollution caused by industrial processes is of primary concern due to the types of toxins such processes produce. The article also notes that those most susceptible to harm from pollution are children and the elderly. Some airborne toxins have been known to cause cancer, even at low levels. In efforts to reduce pollution and improve quality of life, several standards, which will attempt to limit the amount of toxins being released, are to be imposed in the near future.

In order for successful industrial parks to continue to thrive along with satisfying the surrounding communities, owners often employ a park management staff. A management staff oversees many aspects of the industrial parks' activities. The GRIPS

Development forum (2003) regarding Vietnam's industrial parks explains how a crucial factor to a successful industrial park is an efficient and responsive management staff. The Urban Land Institute (2001) also suggests that an efficient management staff must be directly involved with the operating plans, budgeting, and reporting of necessary information to the owners, as well as cost control, lease administration and collections, utility maintenance and general repairs, parking, project management, and tenant services. Finally, a constant effort to remain in compliance with governing laws and regulations contributes greatly to the work of the park management staff.

LEGISLATION

Management of an industrial park is a rather demanding task due to constant requests from tenants and pressures from park owners and the city to increase revenue. In addition to the demands placed on the management staff, the majority of industrial districts are governed by strict regulations with jurisdiction over a wide range of industrial activities. It is the job of managerial personnel to be aware of the local, state, and federal laws and regulations pertaining to operations and liability within the park. Moreover, park management must utilize the appropriate monitoring and reporting measures, as well as observe tenant compliance. With such laws and regulations controlling aspects of the parks' activities, remaining in compliance becomes a challenging task.

Environmental Protection

The Urban Land Institute (1975) states that increased interest in preservation and enhancement of the natural environment, as well as the recognized need to efficiently

utilize dwindling energy resources, represents the two most dramatic developmental restrictions to surface within the development of industrial areas as a whole. This interest is still a focus in today's industry. It is visible, most recently, in the numerous studies involving eco-industrial parks, which combine productivity with sustainability (www.indigodev.com). To control the impacts of industrial areas on the environment and neighboring communities, the government passed legislation. At the federal level, the U.S. Environmental Protection Agency (EPA) has been working with businesses and throughout the United States to reduce the amount of pollutants introduced into surrounding air and water sources since the early 1960s. The EPA helps to control pollution by issuing permits to businesses that specify the levels of emissions allowed from each industrial process, as well as by helping industrial businesses discover alternate ways to comply with the federal regulations. Specific federal laws enforced by the EPA are the Clean Air Act (1970), the Noise Control Act (1967), the Federal Water Pollution Control Act (1971), and the Coastal Zone Management Act (1972). Each example of legislation has been put in place for the protection of the environment and energy resources surrounding such industrial zones. Since enactment, each law has been enforced and has impacted all industrial businesses, including those in Boston.

Zoning and Land Use

At the local and state levels of government, the most common legislation regarding industrial parks is zoning laws. Since most industrial areas reside in industry-specific clusters, it may be difficult to utilize the land for purposes other than those in which they were initially zoned. For example, the BMIP has allocated all but one zone for industrial use, presenting a challenging task to fill over three million square feet of

space with industrial and light industrial businesses, or as described by the BRA, “skilled labor industry”. The BRA must work closely with the zoning board and city personnel to continuously revise and improve the Zoning Code in efforts to better manage growth, and to preserve and enhance the character of each area within the city. Another example of complications with zoning laws is the North Bay Project in Seattle, WA. Mark Griffin (personal communication, February 23, 2006), the Real Estate Development Manager of the North Bay Project, agrees that zoning and land use requirements make the task of leasing industrial space challenging. According to the group’s market analysis, the North Bay Project development team does not believe they will lease available space by relying solely on heavy industrial use, which is what the site is currently zoned. The project team is requesting zoning changes from the City of Seattle to accommodate a more desirable mixed-use facility. With limited industrial demands, many parks face similar problems as the BMIP and North Bay sites regarding issues of leasing vacant space. The Urban Land Institute (2001) claims the protection of industrial districts is still an issue today, due to growing pressure to allow other uses in areas zoned specifically for industrial use.

It is common for park mandates to exist regarding the type of industries allowed to reside in the park. Within marine parks, for example, a high percentage of businesses are required to be maritime industrial related. One problem facing this fact is the lack of means to monitor the compliance of this mandate, as is the case with the North Bay Project and the BMIP. Early in the North Bay Project, the Port Commission (2005) mandated that over half of the space proposed within the future park was to be dedicated maritime dependent use. This introduced the need for a monitoring system which is currently being pursued by the project team. The need for a monitoring system is mainly

due to shoreline regulations and policies meant to preserve industrially zoned waterfront land for industries that must be located on or near the water. This is somewhat analogous to the problem presented to the BRA and EDIC regarding the Boston Marine Industrial Park. The Commonwealth of Massachusetts' primary means of protecting and promoting public use of its waterfront property is the Massachusetts General Law, Chapter 91.

Under this law, any development on or near water or public access must obtain a license from the State of Massachusetts. Under the Chapter 91 license, the BMIP is required to reserve a minimum of 67 percent of the total land within the industrial park for maritime industrial use. From this regulation, certain parcels were chosen to be dedicated exclusively to water-dependent industrial or accessory uses. This license limits the potential tenants of the vacant properties. Furthermore, it forces the BMIP to be consistent with its own legislative purpose and with the original purpose for which the site was authorized. A problem with such limitations is the popularity of the Boston waterfront area. Inquiring tenants who are unable to meet the requirements imposed by Chapter 91 are not eligible to locate within the marine park.

Water is not the only limiting factor for industrial areas. For instance, during development of the Subic Bay Freeport Park in Bataan Province, Republic of the Philippines, a high demand for an industrial area existed. However, according to the Urban Land Institute (2001), due to its location, over 4,700 acres of forest were required to be protected. A portion of the revenue from the Subic Bay Freeport is used to protect the forest surrounding the park from illegal logging and poaching. Unlike the BMIP, Subic Bay has to attract visitors since tourism is a thriving industry in the Philippines. Without tourists visiting the park, it would not be productive. The park contains safety

zones for scuba diving near by ship wrecks and also welcomes visitors to the protected forests.

There are many industrial districts around the world; each with their own set of regulations regarding all aspects of the park from uses to appearance. It is common for industrial parks to possess a Master Plan or similar document which includes these regulations as well as an outlook for the future of the park. The Master Plan of the Boston Marine Industrial Park provides background history of the park's components, legislation details, and plans for future developments and compliance maintenance strategies. Other parks, such as Burns Harbor in Indiana, issue a Declaration of Restrictions to tenants and developers. Issued by the Indiana Port Commission (2006), the declaration regulates elements of the park including possible uses, size and placement of buildings, required conditions, and performance standards. The declaration also outlines the process necessary for tenants to further develop their respective property. The purpose of such declarations is that regulations, requirements, and future build-out processes are clearly stated and accessible to all current and prospective tenants of the industrial area.

Mark Griffin (personal communication, February 23, 2006), the Real Estate Development Manager of the North Bay Project, conveys that legislation regarding industrial policies and land use in a city's plan and zoning codes are present for several reasons. These reasons include ensuring the city has a diverse economic base and maintaining an ample supply of appropriately zoned land for industrial uses, suitable for businesses which prefer an urban location as opposed to a suburban location. By creating a diverse economic base and fostering industrial uses, the city can remain competitive in many different markets.

CHAPTER THREE: METHODOLOGY

This chapter describes the steps and strategies used for collecting, organizing, and analyzing the data necessary to complete the project. As declared within the Introduction, the goals of the project are: to provide the Boston Redevelopment Authority with a computerized tool for tracking land use and maintaining Chapter 91 compliance, and to develop a recommendation for the re-use of buildings and further park development. Specific objectives include creating an inventory of parcel and building characteristics, interviewing tenants of the park, and examining the available space to be reused.

COLLECTING THE DATA

In order to obtain the information needed, we researched journals, case studies, and handbooks which documented the land use and development of industrial areas of all types, including general industrial and marine industrial parks. A key topic regarding land use and development was the re-use of industrial buildings similar to those at the Boston Marine Industrial Park. Additionally, we researched city demographics and investigated the United States Census of 2002, specifically focusing on the City of Boston. This investigation was necessary to draw conclusions regarding Boston's tax base, job development, and changes in population regarding age and education levels.

Following our initial investigation of the BMIP and other industrial parks, we reviewed the BRA/EDIC Master Plan for the Boston Marine Industrial Park, as well as the respective compliance guidelines governing the park. In order to collect the data needed for the database, we used existing data supplied by the Boston Redevelopment Authority. We constructed a database from data contained within an existing spreadsheet.

For each parcel within the park, the database includes the total square footage and the breakdown of marine industrial, general industrial, and commercial land use. Next, we implemented a reporting feature which utilizes the parcel data within the database to perform the necessary calculations to produce the Land Use Matrix. The Land Use Matrix contains details about each parcel as well as the calculated percentages of total maritime, general industrial, and commercial use. This permits personnel at the BRA to query the park's current compliance status as well as compliance reports for future build-outs.

As discussed in the Background section, the Chapter 91 license outlines a method for considering buildings with multiple floors. The method for allocating percentage of each use to the building footprint involves calculating the sum of the total useable interior square footage and transferring the percentage of each use, proportionally, to the footprint of the building in question.

Next, we gathered data to build an inventory of the Bronstein Industrial Center and North Coast Seafood, which are located within the park. These buildings were chosen based on recommendations by the BRA. The inventory data provided a means for comparison of a newer and usable facility, such as North Coast Seafood, and the Bronstein building. Currently, leasing space in the Bronstein Industrial Center has been problematic due to the available space being obsolete and not able to support today's industrial businesses. The inventory includes parcel letters, street addresses, total square footage, and individual square footages for each type of use. We also recorded values for specific variables of the buildings that would help determine its ability to support certain

uses. Variables include ceiling heights, number of floors, availability of freight elevators and other utilities, and the condition of the spaces.

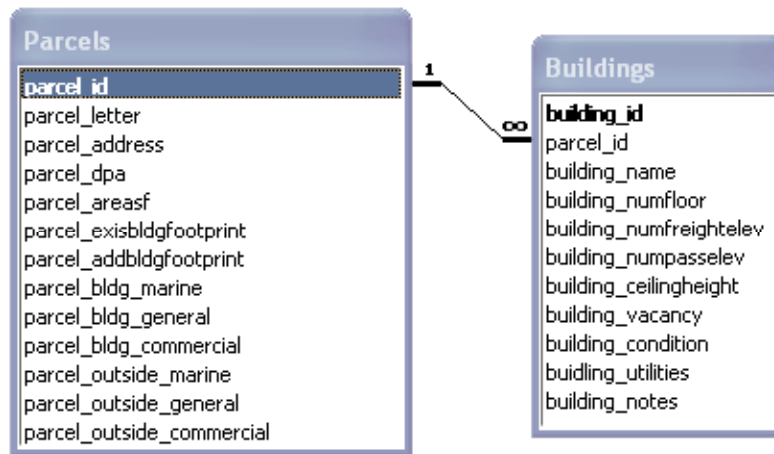
Finally, we conducted five tenant interviews, using a brief, semi-structured format, to explore the advantages and disadvantages of locating at the marine park, as well as tenants' experiences and outlooks for the future of the BMIP. In addition, how the developments outside the park are affecting industry, as well as how industry affects those developments, were investigated. The tenant interviews were used to gain insight from the tenants about how they perceive the existing park and what they believe future industries would need from the park and its available space to maximize efficiency.

ORGANIZING THE DATA

The collected data is stored in a Microsoft Access database. Upon consulting the BRA's Management Information Systems Department, this database package proved to be the best solution due to reasons including cost, turn-around time for implementation, and compatibility. The database includes total square footage and square footage by land use type for each parcel, as well as specific inventory information for select buildings. For example, parcels F, I, and J contain Building #114, comprised of the Boston Design Center and the Bronstein Industrial Center. Building #114 is primarily used for general industrial purposes and runs parallel to Drydock Avenue and Black Falcon Avenue. The eight story building's 100,000 square feet houses various tenants which make use of the building's freight elevators and loading docks, as well as the natural gas and electric service, telephone and data, passenger elevators, and in-house cafés. This example represents the type of information stored in the database and the level of detail.

The Access database package provides the means to store data in tables, as with most database packages. The inventory database uses two tables, ‘Parcels’ and ‘Buildings’. The ‘Parcels’ table stores the parcel letter, street address, and square footages for total area, building footprint, and area surrounding the building footprint. The ‘Buildings’ table contains the inventory information of each building including the number of floors, square footage, occupancy, utilities, and condition. Access also provides a way to link tables together with commonalities, called a relationship. A relationship is established between the ‘Parcels’ table and the ‘Buildings’ table to track which parcel a particular building resides on. The tables and linking relationship is shown below in Figure 3.

Figure 3: Entity-Relationship Diagram



The data model represented is normalized. Database normalization is the process of removing repeating groups and duplicate data by determining each attribute’s functional dependencies and possibly restructuring the design in conformance to a set of standards. The chosen standard is Third Normal Form, or 3NF for short, which requires that all data attributes in a given table be directly related to one another. Additional data or data not strictly related must be stored in a separate table. The goal of 3NF is to store

information only once and to prevent data anomalies. Anomalies cause unpredictable results. An example is a table containing information which encompasses more than one main idea. Upon removing a particular record from the table containing information unique to the rest of the database, unexpected data loss can occur.

Finally, we use Access's reporting feature to present calculations and analyses on-screen. The reports generated by Access, specifically the Land Use Matrix, are integral to the BRA by providing a means of analyzing the marine park's compliance status at the present time, or for future development purposes.

ANALYZING THE DATA

We analyzed the data gathered at the marine park by examining the information in the Land Use Matrix. The land use analysis provides us with percentages for verifying compliance with Special Condition #2 of Chapter 91. As a result of that work, the Land Use Matrix can now be used by the BRA to report land use percentages to the State of Massachusetts on a bi-annual basis.

We analyzed the information gathered in our inventory reports for the Bronstein Industrial Center, North Coast Seafood, and the 12 Channel Street building. Our analysis allowed us to form an argument about older, obsolete buildings in the marine park to be used for commercial, retail, and light industrial processes including research and development.

We analyzed the data obtained from the interviews, especially those that pertain to social implications caused by the industrial park. From this data, we were able to make recommendations to the BRA regarding social impacts and potential future projects.

CHAPTER FOUR: DATA ANALYSIS

After collecting our data, we categorized the data into four parts for a more detailed analysis. These parts include the land inventory, the Land Use Matrix, interviews, and statistical data regarding demographics, jobs, and future expectations for trends within today's industry.

BUILDING INVENTORY

The examination of buildings enabled us understand the various characteristics about the space which certain businesses require for their operations. By further researching these buildings, we were able to understand why businesses need certain amenities these buildings may have to offer. This assisted us in forming an argument for the use of buildings for specific operations, depending on the characteristics of the building, such as ceiling heights.

Also included in the inventory is the 12 Channel Street building. Work in this building involved inventorying as well as noting changes in the BRA's current floor plans with actual, observed build-outs. This allows a means for the BRA to provide accurate square footages for available space, as well as providing appropriate cost estimates to prospective tenants.

The Bronstein Industrial Center

Figure 4: The Bronstein Industrial Center



The Bronstein Industrial Center is located within the South Boston Marine Industrial Park at 21-23-25 Drydock Avenue. The Bronstein building was built in the early 1900s for the housing and maintenance of military equipment. Built for

military use, the building possesses some notable attributes. These attributes include a large loading dock capacity, freight elevators, and over 800,000 square feet of space. Each floor can provide 250 pounds per square feet of loading capacity, as well as elevators with capacities of 5000 pounds. The Bronstein Industrial Center is an 825,000 square foot building which offers space of up to 100,000 square feet. The leased space houses a vast array of tenants whom have altered the space to best suit their needs. Alterations include finished floors, fresh paint, added wall divisions, and additional entrances and exits.

The Bronstein Industrial Center's location and attributes outlined above are important for the future of the building. Unfortunately, due to its age and changes in current industrial trends as a whole, building vacancies have become a problem. The low ceilings, excessive and somewhat invasive columns, and large undeveloped spaces are not ideal for today's industrial uses. As discussed in our Background, industrial trends now include light industrial and specialty production which requires smaller and more compact facilities. The Bronstein center is a multistory building with limited access to

loading docks and elevators. Each of the three sections of the Bronstein center is eight stories tall, with over 34,000 square feet of space on each floor. All eight floors in each section must share just two freight elevators and five loading docks. The fact that eight stories of would be required to share these amenities is not appealing to modern industries.

North Coast Seafood Facility

Figure 5: Aerial View of North Coast Seafood



(Adapted from local.live.com)

North Coast Seafood is located at 7 Drydock Avenue, within the Boston Marine Industrial Park. This facility was constructed by North Coast Seafood Company in 1999 for strict maritime industrial use. The facility's purpose is to accept shipments of raw and frozen seafood and to process and package it for vendors. The two story, 50,000 square foot facility utilizes the first floor for seafood processing needs. The first floor includes access to ten loading docks, which can be seen above in Figure 5. The second story contains accounting and executive offices, as well as remaining space reserved for lease to a prospective tenant.

Unlike the Bronstein Industrial Park, North Coast Seafood is a maritime industrial facility and has many key characteristics for such use. The processing plant on the ground level contains temperature-controlled rooms for each phase of seafood processing, as well as large freezer units to hold the finished products. In addition, the processing facility has ceiling heights of 16 feet to permit handling equipment to easily load and unload trucks. Included within the facility is a café for employees and visitors of the park. Lastly, the facility's unused space can be leased to potential businesses. However, under the North Coast Seafood's license with the state, the space must be used by maritime uses, only until the end of 2006. Because of this license requirement, the owners of the facility are finding it difficult to lease the space, which has been vacant since the facility was built in 1999.

The following table shows the difference in characteristics between the two facilities inventoried. By displaying this information side by side, a comparison can be made between the two buildings. This comparison of the two industrial facilities will be helpful in making our argument to the BRA regarding future uses of obsolete space within the BMIP. By displaying how an occupied and updated facility has specific characteristics which are necessary for today's light industrial and manufacturing businesses. These characteristics include higher ceiling heights and individual amenities like elevators, utilities, and loading docks. Table 2 shows the inventory data for the Bronstein Center and North Coast Seafood. North Coast Seafood can efficiently process seafood on the first floor due to the higher ceilings, which allows the facility to operate without the need for elevators. Moreover, North Coast Seafood does not share loading docks which enables them to access their product input and output at all times. Other data

displayed is the square footage and usage of each facility. Finally, the loading capacity was listed to exhibit the Bronstein’s ability to accommodate industry with heavy equipment, even into the higher floors.

Table 2: Bronstein Industrial Center vs. North Coast Seafood

<u>Characteristic</u>	<u>Bronstein Industrial Ctr.</u>	<u>North Coast Seafood</u>
Square Footage	825,000	50,000
Use	Mixed-Use	Maritime/Seafood Process.
Stories	8	2
Ceiling Height	13’	16’
Elevators (Freight/Employee)	2 Employee 2 Freight	2 Employee No Freight
Loading Docks	15 (5 x 3 Sections)	10
Loading Capacity	250 Pounds/Sq. Ft.	150 Pounds/Sq. Ft.

12 Channel Street

Figure 6: 12 Channel Street



The building located at 12 Channel Street was built in the 1940’s by the military to help support manufacturing for World War II efforts. As visible in Figure 6, the building consists of nine floors and totals over 300,000 square feet of space. Each floor is broken into suites and tenants share four freight elevators. Loading capacities per each floor ranges

from 150 pounds per square feet to 250 pounds per square feet. Since the building is suitable for multiple uses, many companies coexist. Examples include a trucking company and a cabinet manufacturer.

Inventory of this building differed from the other two as we did not evaluate characteristics. As instructed by the BRA, we noted and fixed discrepancies between the BRA's AutoCAD floor plan document with actual build-outs. We found that the majority of the walls were incorrectly represented in the BRA's current floor plan. In addition to walls, we also found additional entrances and exits within suites that were missing on the existing plans.

The accuracy of this information is integral to the leasing department of the BRA/EDIC. When space is rented to tenants within the building, the price is calculated by square footage of space. With these wall and new build-out details correctly depicted within the floor plans, the proper price can be calculated and the BRA/EDIC can ensure maximization of profits. This will also help with future leases, because the proper square footage can be represented in the details for the available spaces.

LAND-USE MATRIX

Upon gathering the details of each parcel from the existing Land Use Matrix and making minor updates, we imported the data into the database for calculation of land use percentages and square footage sums. (Appendix B).

Parcels are initially divided into two types, Designated Port Area (DPA) and Non-DPA. This reduces the amount of land to be analyzed for Chapter 91 compliance, as Non-DPA parcels are generally not subject to this license. As of April 2006, there are twenty-eight DPA parcels. The Land Use Matrix calculates the sum of total square footage for

Designated Port Areas, remaining land, and total square footage with results being 5,015,151 sq. ft., 356,862 sq. ft., and 5,372,013 sq. ft. respectively. Designated Port Areas make up 93.4 percent of the Marine Industrial Park's total land, with 3,848,369 sq. ft. (76.7 percent) of this land used for marine industrial purposes. Comparing this number with the required 67 percent maritime use requirement imposed by Chapter 91, it is evident that the park is well within their target range. The rest of the DPA parcels are divided between general industrial (21.9 percent) and commercial (1.3 percent). Commercial land use is least common in the marine park as the BRA seeks to minimize the amount of traffic and retail-type businesses. When analyzing this data, it becomes apparent that a majority of the available space on higher floors, specifically in the antiquated Bronstein Industrial Center, is industrially unsuitable. Space usable for industrial purposes is usually located on the first floor and with appropriate ceiling heights and with access to freight elevators. Floors above the ground level provide available space vertically, which maximizes the use of the land and, therefore, the parcel.

TENANT INTERVIEWS

We conducted the tenant interviews on site at the Boston Marine Industrial Park with a representative from the managerial staff of the company interviewed. The goal of the interviews was to gain knowledge about various aspects of the industrial park. Of the forty candidates we contacted, only five were successfully interviewed. Many tenants do not permit interviews or are concerned with how the information will be used. Several other tenants were eager to schedule interviews but cancelled due to conflicts with other priorities. Fortunately, the five tenants interviewed represent a fairly diverse mix of companies including a beer brewery, marketing firm, seafood processing and seafood

distributing, and a biotechnology company. The interviews were conducted with Jack Cavalier of Partners and Simons, Al Marzi of Harpoon Brewery, Robert Nagle of the John Nagle Company, Jim Stavis of North Coast Seafood, and Richard Pinkowitz of Immunetics. The following analysis is divided into sections pertaining to the interview questions. These sections are: the advantages and disadvantages of being within the BMIP, the concern for truck traffic, and the future of the BMIP with regards to developments in and around the park. Complete summaries for each of the interviews we conducted can be found in Appendix C.

Advantages and Disadvantages for the BMIP Tenants

All five of the companies we interviewed listed the most advantageous characteristic as easy access to major highways, cargo ports, and the airport. Along the same line, they all acknowledged the Silver Line as a convenient way for employees to commute to and from work. Jack Cavalier of Partners and Simons, a marketing company located within the Bronstein Industrial Center, recognized an advantage of the Bronstein Center as offering ample space at warehouse pricing. Immunetics, a biotechnology company within the same building as the Bronstein Center, agrees with Cavalier that the space in the building is a major advantage. This is especially for Immunetics because they have been able to grow over the past two years within their original space and develop the space to suit the company's specific needs. North Coast Seafood, a seafood processing company, and the John Nagle Company, a seafood distribution company, stated their advantages of being within the marine park to be the park's focus on maritime industrial and specialty needs. John Nagle is able to distribute seafood to many of the

seafood processors directly within the park, and North Coast Seafood was able to build a new facility specifically for their processes.

Disadvantages were slightly varied as opposed to the advantages provided by tenants. Nagle suggested the zoning laws and higher leasing rates as disadvantages. North Coast Seafood noted a disadvantage as being located in the City of Boston as a whole with the future intentions to build tourism rather than industry in the city. Immunetics was concerned with the coexistence of biotech laboratories with industrial companies, and the potential restrictions on laboratories within the Boston area. Harpoon Brewery stated a disadvantage as the upcoming developments outside the park due to traffic congestion and future truck route limitations. Finally, Partners and Simons listed their disadvantage as not being within walking distance of certain parts of Boston. Each of these disadvantages varies greatly for each industry represented in the interviews. Although most of them show concern for the future existence of their businesses, it seems that the general disadvantage pertained to the potential future developments in and around the park, as well as legislation regarding restrictions.

Developments In and Around the Boston Marine Industrial Park

Another topic of discussion during the interview process was whether or not future developments in and around the BMIP would affect the industry harbored in the marine park. Each company voiced concerns and recommendations for these future developments, especially those located in the surrounding areas of the BMIP.

First, we will discuss the views of the industrial companies interviewed, which include Harpoon Brewery, North Coast Seafood, and John Nagle Company. Although Harpoon Brewery welcomes the public into the park for tours and taste testing, the

company is skeptical of the new developments outside of the park due to its potential of increasing pedestrian congestion, traffic, lights, and truck regulations. The John Nagle Company also recognized that the surrounding developments could slow down businesses within the park. North Coast Seafood agrees with Nagle about the idea of slowing down businesses, and claims it could potentially “choke” the industry within the park by encroaching on industrial properties due to land location and value.

On the other hand, we will discuss views of Partners and Simons and Immunetics, a marketing firm and biotechnology company, respectively. Both companies agree that a moderate amount of residential development outside of the park could enhance the area. The future build-out of additional amenities like restaurants, banks, insurance companies, and client or employee meeting places can help to attract the public to park.

The conflict of views with this question raises an eyebrow in regards to the future of these developments and the industry. The park is one of the few remaining areas in Boston that is reserved for the industrial sector. Therefore, it is the park and the industry within the park that should be protected. It would be helpful to further investigate how these developments are going to affect the future of these industrial companies, especially those that are marine-related.

Trucks and Traffic Concerns

Finally, the last discussion question pertains to the use and importance of trucks to businesses within the park. This includes the general need for trucks, how the truck traffic within the park affects the businesses, and the truck routes leading into and out of the park to the major highways and transport areas. Once again, we noticed a similar split between the industrial companies and those of other sectors like marketing and biotech.

The marketing and biotech firms claimed little use or need for trucks for operations. They receive small shipments from local carriers, but do not ship products or contribute to the overall truck traffic. Partners and Simons noted the traffic within the park as a problem. However, it is necessary to remember that within any thriving industrial park, traffic will exist.

The seafood processing and distribution businesses, as well as Harpoon Brewery, agree that there is a concern for truck traffic, although it is not within the park. As these companies already have a steady flow of goods to and from their facilities, trucks are a vital part of their operations. The concern for these companies is the flow of traffic outside the park, especially with the developing residential buildings. North Coast Seafood confirmed there had been two deaths related to truck traffic within the past five years, and implied it would get worse as the developments attracted more people along busy truck routes. Each of these businesses suggested the protection and maintenance of the existing truck routes in and out of the park so that the flow of trucks would be efficient for the businesses and safe for the people in the surrounding areas.

EMPLOYMENT AND INDUSTRY TRENDS

The United States is always experiencing changes in trends regarding industry and employment. However, our research of trends regarding the general industrial and manufacturing industries was staggering. The data discussed in this section was obtained from the United States Bureau of Labor Statistics, which is accessible online at www.bls.gov.

The major focus of our research was data regarding manufacturing. Manufacturing is currently an industry that is being stipulated within the Bronstein

Center. As displayed in Figure 7, since 1995, manufacturing has been experiencing a decrease in employment, especially seen by the steep decline between the years of 2000 and 2003. This trend shows a general *decline* in manufacturing over that past ten years and is anticipated by the U.S. Bureau of Labor to continue to decline another 5.4 percent over the 2004-2014 period. Although the demand for manufacturing has declined, it is important to note that overall productivity of the manufacturing industry, and the wages, have been experiencing an increase in both categories. In Figure 8, the trend for wages are shown for manufacturing versus private industry through 2004. Production workers, in the manufacturing sector in 2004, earned an average hourly pay of \$16.14, which is slightly higher than the average for production and non-managerial workers in the private industry sector at \$15.67 an hour.

Figure 7: Trends in Employment Manufacturing in United States (Adapted from www.bls.gov)

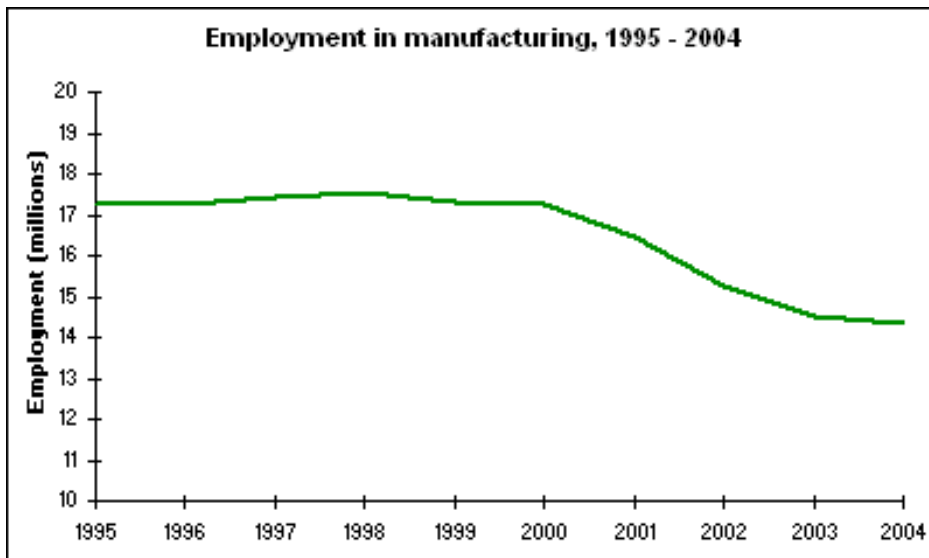
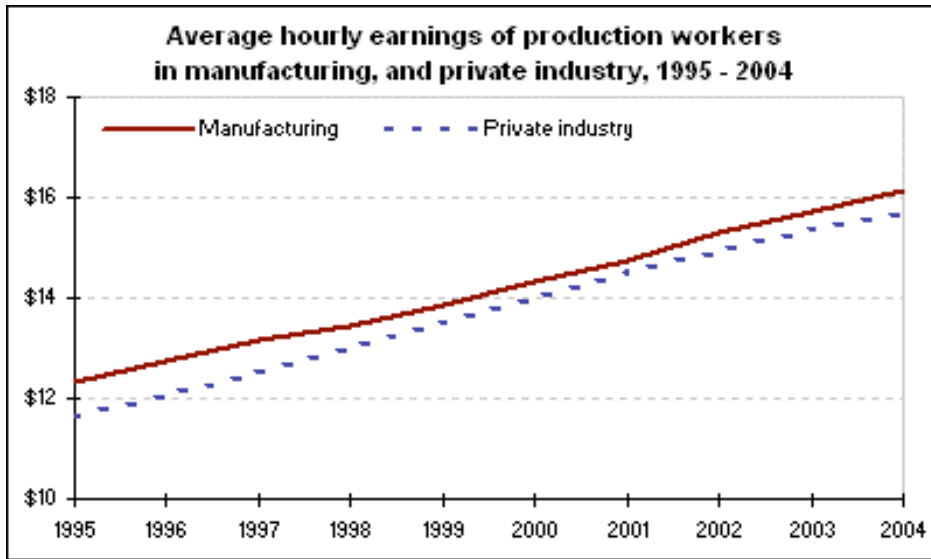


Figure 8: Manufacturing vs. Private Industry Hourly Wages (Adapted from www.bls.gov)



The trends in the United States are inline with those in Massachusetts. Since September of 2005, the state experienced a decrease in manufacturing jobs. As of February 2006, the twelve-month change in manufacturing jobs within Massachusetts is 1.5 percent. Other industries throughout Massachusetts have experienced a less than 0.5 percent decrease or experienced an increase over the past twelve months. Finally, in comparison to U.S. average weekly wages through 2004-2005, Suffolk County's average is \$1198 which is much higher than the country's average of \$777.

It is easily observed that a major industry in the marine park is seafood processing and distribution. According to the BRA, the average hourly wage for these skilled workers is between \$10 and \$20, depending on skill level and benefits. Assuming a forty-hour workweek, the average weekly wage would be between \$400 and 800, which is slightly lower than the national average and significantly lower than the Suffolk County average.

This data shows that manufacturing is indeed struggling in Massachusetts and in the U.S. Furthermore, industries within the BMIP are providing jobs with wages and

benefits below that of the national average. However, the increase in other industries is promising for the future of the U.S. In addition to the industry-specific rise and fall, Boston remains higher than the national averages in many categories.

CHAPTER FIVE: CONCLUSIONS

FUTURE USE OF VACANT SPACE

After the completion of the inventory process, analysis of some major vacancies within the Boston Marine Industrial Park, and a comprehensive review of research regarding the re-use of older industrial buildings and trends in today's industry, we have reached many conclusions regarding the reuse of vacant industrial spaces. The comparison of the inventories concerning newer versus older facilities provided a means of accurately comparing such facilities. In addition to the inventory results, we were also able to utilize research within the current trends of today's industry to make improvements to the vacant spaces. Improvements can include reducing the size of available space and attempting to attract different types of industries.

We found the struggle of leasing space and retaining tenants in buildings like the Bronstein Center is due to the zoning and land use restrictions mandated throughout the BMIP. The Bronstein Center is considered a Designated Port Area and is zoned for industrial and manufacturing uses (non-water dependent).

As the United States remains the leading industrial power in the world, it is clearly diverse and technologically advanced. The fact that the U.S. has continued to experience a sharp *decline* in manufacturing provokes the need to lease space within facilities like the Bronstein Industrial Center. However, with an anticipated rise in

modern industries, such as graphic design, printing, and computer technologies, the desire for such space is likely to rise as well.

Modern industries include light manufacturing, research and development, and specialty production businesses, as discussed earlier. These companies require less supporting amenities and smaller space than those found within buildings like the Bronstein Center since such companies are usually small and relatively new. The Bronstein Center and the 12 Channel Street buildings can maximize their occupied space by subdividing the floors into smaller units to better meet the needs of these industries, both immediately and for the future. With smaller spaces, the BRA/EDIC can lease to more companies and increase employment opportunities in this area, within the manufacturing and industrial sectors. Finally, although commercial and retail are not necessarily desired within the marine park due to traffic and pedestrian congestion, these businesses can offer support to the industries within the park. Examples of commercial and retail businesses are law offices, banks, insurance companies, eateries, and places for workers to enjoy their off time. These businesses would also occupy space and would hardly contribute to truck traffic or public attraction.

MONITORING CAPABILITIES OF THE LAND USE MATIRX

As the Land Use Matrix is generated dynamically from data within the parcel inventory database, this design provides significantly more flexibility for the Boston Redevelopment Authority. Previously, the BRA used an Excel spreadsheet to calculate parcel land use. This solution made it difficult for users to adjust parcel boundaries and to add and remove parcel definitions. This is a feature in which the BRA deemed necessary during the course of the project. The tabular, record-style nature of the database allows

data to be easily edited and parcels to be added, removed, and redefined. Upon changing numeric values in the parcel database, the Land Use Matrix will reflect the changes instantaneously. It is important to maintain the data within the database to ensure its integrity. A well-populated database containing accurate data is essential for any organization managing vast amounts of information. The data can be manipulated and transformed to produce new and informative reports beneficial to the organization as needed. For example, Microsoft Access provides the ability to create new reports by performing custom calculations on any combination of data elements from the database. The extensibility of the reporting feature permits immediate implementation of new reports if the BRA should require them. Lastly, while powerful and efficient, Microsoft Access provides only a single-user solution and does not support any type of concurrency. Conveniently, the data can be exported into a variety of other database formats which can be useful for feeding data to other applications such as the BRA's public website or the BRA intranet (a web-based tool for internal use). This can provide access to useful information from anywhere within the marine park and within the boundaries of the Boston Redevelopment Authority's network for use by all personnel who may benefit.

FUTURE PROJECTS

Finally, we conclude that future research and investigation would be beneficial to the park. Most importantly, we believe that the surrounding developments and their affects on the industrial park should be thoroughly investigated for the future and well being of the park and for future residents living outside of the park. This investigation

should re-evaluate the risks of residential and commercial businesses encroaching on the park's perimeter.

CHAPTER SIX: RECOMMENDATIONS

After analyzing the data presented to us and completing our own investigation, we were able to make five recommendations to the Boston Redevelopment Authority for the future build-out and development of the Boston Marine Industrial Park. The recommendations are as follows:

1. Incorporate the inventory database into the normal operations, planning, and management of the marine park.
2. Reconsider the current use of such buildings like the Bronstein Center and 12 Channel Street for light industrial and research and development purposes.
3. Protect and maintain current truck routes in and out of the industrial park.
4. Investigate the restrictions and regulations for developments outside of the BMIP.
5. Permit limited commercial and retail businesses into the park which can directly support and coexist with existing industries in the park.

APPENDIX A: THE BOSTON REDEVELOPMENT AUTHORITY¹

The Boston City Council established the Boston Redevelopment Authority, known as the BRA, in 1957. It is located at One City Hall Square, Boston, Massachusetts. The BRA maintains control and responsibility previously possessed by the Boston Housing Authority. This encompasses public housing and other urban development and zoning duties. Three years later, Boston eliminated the City Planning Board thus giving the BRA ultimate jurisdiction over the city's future land and development endeavors. In summary, the BRA's primary responsibilities include:

- Reviewing proposed development projects requiring review or concerning public land.
- Recommendations regarding major construction and redevelopment.
- Drafting and recommendations regarding zoning.
- Master plans for infrastructure, downtown, and community economic development.
- Acquiring, selling, and leasing real estate for economic gain.
- Issuance of revenue bonds and notes for project finance.
- Ownership and operation of three industrial parks.

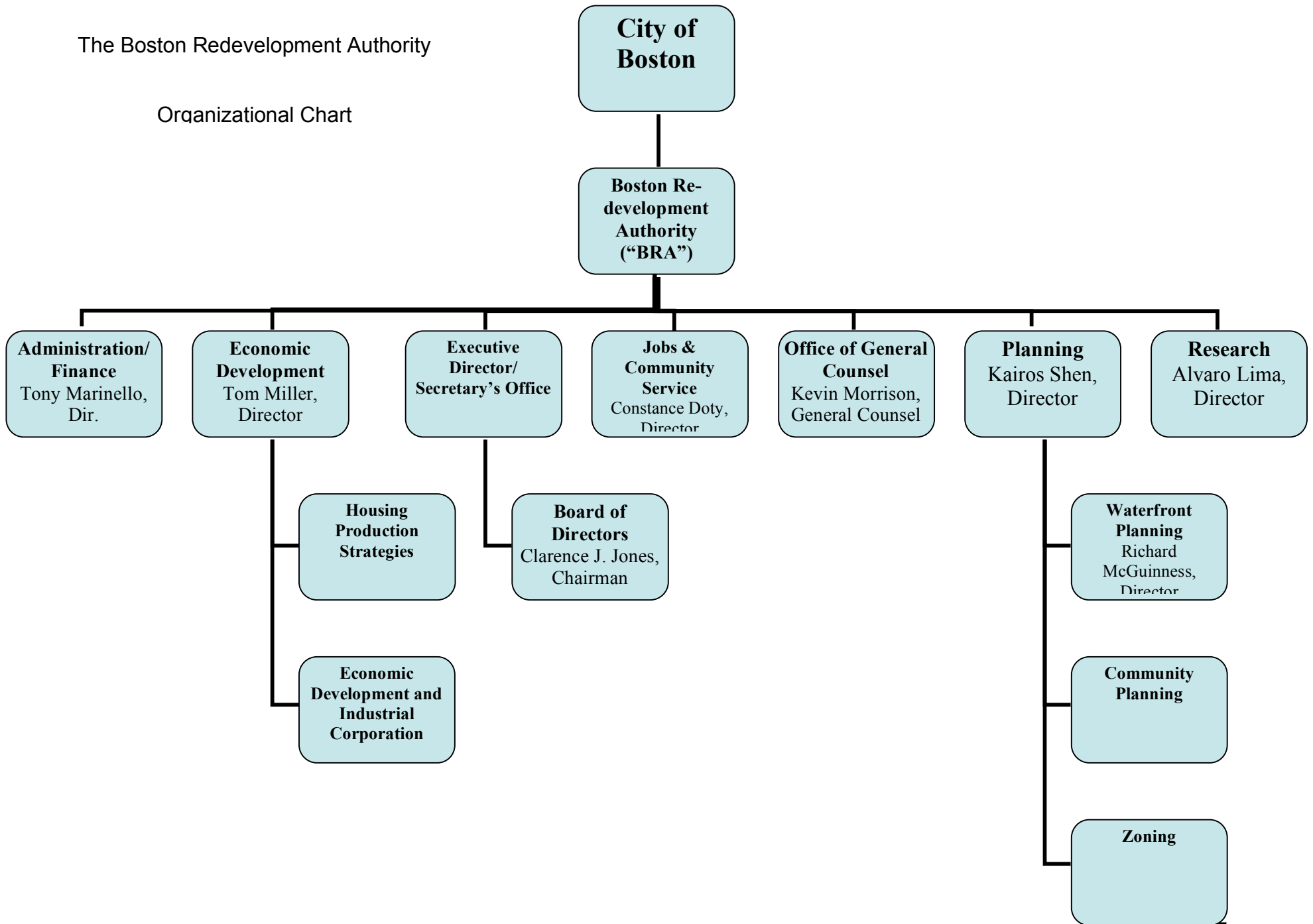
Projects range from commercial office/industrial to residential with initiatives related to policy planning, community and economic development, harbor and municipal planning, etc. in all neighborhoods and regions of the city. At this time, the BRA is actively involved in over 200 projects throughout Boston.

The Boston Redevelopment Authority maintains several divisions to conduct business and facilitate operation in an organized fashion. Main divisions include

Administration and Finance, Economic Development, Office of the General Counsel, Planning, and Research. The BRA is controlled by its Board of Directors, located in the Executive Director and Secretary's Offices. Finally, the authority includes the Jobs and Community Services which allocates federal and state grants for several purposes. These purposes include work-related training programs as well as adult and youth human services including literacy and alternative education.

The Boston Redevelopment Authority

Organizational Chart



APPENDIX B: LAND USE MATRIX

Table 7
Marine Industrial Park Master Plan: Future Buildout Land Usage Matrix

Parcel Address	Parcel Area	Exis Bldg Footprint	Add Bldg Footprint	Marine Industrial		General Industrial		Comm.		Building Footprint		Marine Industrial		General Industrial		Comm.		Area Outside Bldg Footprint		Marine Industrial		General Industrial		Comm.	
				Industrial	Industrial	Industrial	Comm.	Industrial	Industrial	Industrial	Comm.	Industrial	Industrial	Industrial	Comm.	Industrial	Industrial	Industrial	Comm.	Industrial	Industrial	Industrial	Comm.		
DPA																									
B 5 Drydock Ave.	95,824	70,000	0	95,824	0	0	0	70,000	70,000	0	0	0	0	0	0	0	0	25,824	25,824	0	0	0	0	0	0
C-1 1 Terminal St.	69,249	0	20,000	69,249	0	0	0	20,000	40,000	0	0	0	0	0	0	0	0	29,249	29,249	0	0	0	0	0	0
C-2 5 Terminal St.	41,901	0	20,000	41,901	0	0	0	20,000	20,000	0	0	0	0	0	0	0	0	21,901	21,901	0	0	0	0	0	0
D 6 Drydock Ave. (#12)	216,655	35,000	86,000	184,544	30,008	1,200	119,208	88,000	30,008	1,200	1,200	96,544	96,544	0	0	0	0	21,901	21,901	0	0	0	0	0	0
E 10 Drydock Ave. (#15)	24,242	6,384	12,616	11,400	0	0	12,842	19,000	11,400	0	0	7,600	5,242	0	0	0	0	96,544	96,544	0	0	0	0	0	0
F 1 Design Center (#14)	164,011	70,454	0	0	123,008	41,003	70,455	0	52,841	17,614	93,556	0	0	0	0	0	0	41,303	41,303	0	0	0	0	0	0
F-1 Design Center Parking	50,468	0	28,000	0	37,851	12,617	28,000	0	21,000	7,000	22,468	0	0	0	0	0	0	38,348	38,348	0	0	0	0	0	0
G 339 Northern Ave. (#20)	31,120	12,774	0	31,020	0	0	12,774	0	14,231	0	18,246	0	0	0	0	0	0	20,310	20,310	0	0	0	0	0	0
H 22 Drydock Ave. (#49)	53,997	14,231	0	53,997	0	0	14,231	0	14,231	0	39,766	0	0	0	0	0	0	99,961	99,961	0	0	0	0	0	0
I 21-25 Drydock Ave. (#114)	225,37	103,194	0	22,537	202,837	0	103,194	10,319	92,875	0	122,180	12,218	109,962	0	0	0	0	34,367	34,367	0	0	0	0	0	0
J 27 Drydock Ave. (#114)	61,000	34,398	0	6,100	54,900	0	34,398	3,440	30,958	0	26,602	2,660	23,942	0	0	0	0	41,303	41,303	0	0	0	0	0	0
K 36 Drydock Ave.	84,643	7,454	0	84,643	0	0	7,454	7,454	0	0	77,189	0	0	0	0	0	0	38,348	38,348	0	0	0	0	0	0
L Drydock #3 (#1, #22, #23)	474,29	13,072	36,000	474,290	0	0	49,072	49,072	0	0	425,218	0	0	0	0	0	0	41,303	41,303	0	0	0	0	0	0
L-1 24-26 Drydock Ave. (#21)	33,141	25,464	0	33,141	0	0	25,464	25,464	0	0	7,677	0	0	0	0	0	0	41,303	41,303	0	0	0	0	0	0
L-2 7 Tide St. (#54)	51,040	18,000	11,000	51,040	0	0	29,000	29,000	0	0	22,040	0	0	0	0	0	0	38,348	38,348	0	0	0	0	0	0
M 3 Dolphin Way (#31)	148,15	55,922	0	85,518	62,632	0	55,922	39,404	16,518	0	92,228	46,114	46,114	0	0	0	0	34,367	34,367	0	0	0	0	0	0
M-1 Massport Marine Term.	1,951	0	129,240	1,651,406	0	0	129,240	129,240	0	0	1,532,166	1,532,166	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
M-2 Fld Kennedy Ave.	75,310	24,466	0	75,310	0	0	24,466	24,466	0	0	50,844	50,844	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
N 25 Fld Kennedy Ave. (#16)	1,400	85,600	0	0	1,400,000	0	85,600	0	85,600	0	54,400	0	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
O 19 Fld Kennedy Ave. (#29)	61,000	34,000	0	0	61,000	0	34,000	0	34,000	0	27,000	0	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
P 3 Anchor Way (#14)	24,290	12,324	0	0	24,290	0	12,324	0	12,324	0	11,956	0	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
R 6 Tide St. (#18)	179,81	85,968	18,000	179,81	85,968	0	103,968	0	103,968	0	75,842	0	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
S 300 Northern Ave. (#53)	255,59	105,000	0	127,797	127,797	0	105,000	52,500	52,500	0	150,594	75,297	75,297	0	0	0	0	34,367	34,367	0	0	0	0	0	0
V 300 Northern Ave.	270,00	0	0	270,000	0	0	0	0	0	0	270,000	0	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
V-1 Drydock #4	105,00	0	47,000	105,000	0	0	47,000	0	58,000	0	58,000	0	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
W 290 Northern Ave.	172,00	5,960	47,000	172,000	0	0	52,960	52,960	0	0	119,040	119,040	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
X 310-314 Northern Ave.	211,21	64,000	30,000	211,214	0	0	94,000	94,000	0	0	117,214	117,214	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
Z 34 Drydock Ave. (Pier 10)	34,435	2,000	0	34,435	0	0	2,000	2,000	0	0	32,435	0	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
Subtotal	5,015,151	885,665	0	3,848,369	1,098,120	67,662	808,493	546,823	33,414	0	3,039,876	551,297	34,248	0	0	0	0	3,139,837	585,654	69,127	0	0	0	0	0
%	93.4%	86.7%	0%	76.7%	21.9%	1.3%	808,493	546,823	33,414	0%	3,039,876	551,297	34,248	0%	0%	0%	0%	3,139,837	585,654	69,127	0%	0%	0%	0%	0%
Non-DPA																									
A 1 Drydock Ave.	40,879	0	20,000	0	0	0	40,879	20,000	0	0	20,000	20,879	0	0	0	0	0	20,879	20,879	0	0	0	0	0	0
Q 12 Channel St. (#32)	69,878	35,511	0	69,878	0	0	35,511	0	35,511	0	34,367	0	0	0	0	0	0	34,367	34,367	0	0	0	0	0	0
Q-1 4 Drydock Ave. / Channel St.	26,000	2,000	10,000	0	0	0	26,000	12,000	0	0	14,000	0	0	0	0	0	0	14,000	14,000	0	0	0	0	0	0
T 6 Harbor St. (#19)	119,44	78,144	0	119,447	0	0	78,144	0	0	0	41,303	0	0	0	0	0	0	41,303	41,303	0	0	0	0	0	0
T-1 Northern Ave. / Channel St.	55,348	0	17,000	55,348	0	0	17,000	0	0	0	38,348	0	0	0	0	0	0	38,348	38,348	0	0	0	0	0	0
U 7 Channel St. (#17)	45,310	20,000	5,000	45,310	0	0	25,000	25,000	0	0	20,310	0	0	0	0	0	0	20,310	20,310	0	0	0	0	0	0
Subtotal	356,962	135,655	20,000	220,105	69,878	66,879	120,144	35,511	32,000	0	99,961	34,367	34,879	0	0	0	0	3,139,837	585,654	69,127	0	0	0	0	0
%	6.6%	13.3%	0%	61.7%	19.6%	18.7%	808,493	546,823	33,414	0%	3,039,876	551,297	34,248	0%	0%	0%	0%	3,139,837	585,654	69,127	0%	0%	0%	0%	0%
Total	5,372,013	1,021,320	0	4,068,474	1,167,998	134,541	928,637	582,334	65,414	0	3,139,837	585,654	69,127	0	0	0	0	3,139,837	585,654	69,127	0	0	0	0	0

Notes:
 1. Information source is the BRA.
 2. Common facilities not included (Parcels A-1 Park, G-1 EDIC Maint. Yard, G-2 Bell Atlantic Switch Station, Y Parking Garage, and WTA temporary easement of parcel TE-77-18 within parcel M-1).
 Note: Expansion of parking garage currently being designed on Parcel Y.
 3. See Table 5 for Existing Land Use Matrix.
 4. BankBoston Pavilion is a temporary facility and therefore, not considered an existing building or land use for the purpose of this table.
 5. BMIP parcels not within the DPA are not subject to this License, except as otherwise provided in Footnote 7.
 6. General Industrial and commercial uses may occur up to the respective amounts shown only if space equivalent to such amounts is reserved for marine industrial use on Parcel T.
 Tuesday, AI | 25, 2006

APPENDIX C: TENANT INTERVIEW SUMMARIES

Appendix C provides summaries for each of the five, semi-structured tenant interviews we conducted at the Boston Marine Industrial Park in the spring of 2006. The interview summaries are separated by company, accompanied by the name of the executive interviewed.

Partners and Simons (Jack Cavalier)

Partners and Simons is a marketing company located on the eighth floor of the Bronstein Industrial Center at 25 Drydock Avenue. The advantages of being located in the Bronstein Industrial Center are space at warehouse pricing and availability of large workstations instead of cubicles. The advantages of being located at the Marine Industrial Park, in general, are the close proximity to downtown Boston and accessibility. Disadvantages include not being within walking distance to certain parts of Boston, traffic, and parking issues. Parking is the major concern because clients need to be able to visit without the burden of parking. There is no fear of the future development surrounding the industrial park. The development could provide added publicity and amenities like restaurants, banking, and law offices. Marine zoning is a necessary, although certain buildings like the Bronstein Industrial Center should not be zoned as exclusive.

Harpoon Brewery (Al Marzi)

Harpoon Brewery is a company that brews and packages beer commercially and is located at 306 Northern Avenue. The one major advantage of being located at the industrial park is easy access to major roadways and highways. The disadvantage of

being located at the park is the development surrounding the park. Current and future development leads to increased congestion, traffic, and regulations for trucks. It was also noted that positive outcomes for the developments may exist. Since Harpoon Brewery invites the public for visits and tours at the brewery, the developments could lead to an increase in visitors.

John Nagle Company (Robert Nagle)

John Nagle Company is a seafood distributing company located at 306 Northern Avenue, Suite 3. The major advantages of being located at the Marine Industrial Park are the close proximity to a strong labor force, police force, fire departments, hospitals, transportation for the labor force, help from the Boston Redevelopment Authority for small businesses, and access to major roadways and highways. An advantage of being located at a marine-specific park is the ability to supply seafood to other fish processing industries within the park. The disadvantages of being at the park are the zoning laws, higher leasing rates, having to plow, and having to build fire hydrants. Thieves were once a concern but have since been eliminated due to militant policing. Developments surrounding the marine park could slow down businesses at the industrial park. It was noted that as of 2006, traffic flow has actually improved because of the construction of new roads surrounding the park. A suggestion by Nagle to keep traffic flow under control is the construction of new roads specific for trucks. There are concerns about retail and commercial activity entering the park but coexistence is possible. The commercial and retail businesses that would most benefit the park must first be determined. Some examples of businesses that could benefit the Marine Industrial Park are insurance agencies, day cares, truck repair, refrigeration repair, and banks.

North Coast Seafood (Jim Stavis)

North Coast Seafood is a seafood processing company located at 7 Drydock Avenue. An advantage for this company is its location to nearby major highways and access to the airport and the freight terminal. In addition, the ability to build their facility to suit their needs has been a major advantage over the past seven years. The City of Boston, in its entirety, was stated as a disadvantage by Stavis. In the opinion of North Coast Seafood, the city has not been protecting the industr. Some of the concerns and examples were the developments surrounding the Marine Industrial Park that could potentially congest truck haul roads with passenger cars and create concern for pedestrians. In addition to congesting these truck routes, a concern for the possibility of “choking” industry within the park is in the future. More concerns were voices regarding Massport and their power to develop the land without being bounded to the same regulations as others within the park. Recommendations made by North Coast are to protect truck routes since the majority of the major industries are dependant on truck transport, especially since there have already been deaths along these routes due to recent developments around the industrial park.

Immunetics (Richard Pinkowitz)

We are fortunate to have been able to meet with Richard Pinkowitz, Vice President, of Immunetics which develops kits and instruments for scientific research and laboratory work. Immunetics is located in the Bronstein Industrial Center at 27 Drydock Avenue, 6th floor. Easy access to the marine park has been most essential to the company by allowing personnel living in western suburbs to commute without hassle. The Silver Line currently provides transportation for five of the seventeen employees at Immunetics.

Public transportation is used mostly by younger employees, age twenty to thirty. The company also claims to have benefited from the initially undeveloped 8,500 square feet of space which allowed Immunetics to custom-build their production facility and offices to meet their needs. Since their decision to relocate to the marine park in November, 2003, Immunetics has recently doubled in size and partly attributes their success over the two years to the area itself. According to Richard, employees have never complained about unreasonable commutes or traffic problems within the park, especially after the steady improvements to the Silver Line since it first opened. He also acknowledges that the marine park accommodates a diverse mix of industries in which the need for companies to be sensitive to their neighbors becomes important for the future. Mr. Pinkowitz is most concerned about the coexistence of biotechnology labs and other, heavier industrial companies. With Boston's regulations regarding lab containment and heightened sensitivity of medical companies, he is also concerned with restrictions imposed on laboratories by the Board of Health as well as negative attention from neighborhood activists which may work to constrain growth of the park. Since Immunetics only receives small packages from local carriers, it does not contribute to the local truck traffic within the park. The company firmly believes that a moderate amount of public attraction enhances the area. Furthermore, Immunetics seeks to create as many job opportunities as possible from which it hires employees from South Boston's small but valuable pool of candidates. Overall, the Boston Marine Industrial Park has proven to be a solution and an asset to Immunetics which has seen continued success throughout its operations at the park.

REFERENCES

- Amedkudzi, A., et al. (2004). *Redevelopment with Transportation Planning*. Urban Planning and Development, 130, 204.
- American Planning Association (1998). *The Principles of Smart Development*. PAS report #479. Chicago, IL.
- Bateman, I., et al. (2001). *The Effect of Road Traffic on Residential Property Values: A Literature Review and Hedonic Pricing Study*. Scotland: Economic and social research council.
- Boston Redevelopment Authority. (1999). *Final Master Plan – Marine Industrial Park*. (EOEA #8161). Boston, MA: Fort Point Associates, Inc.
- Boston Redevelopment Authority. (2005). *Mayor Menino launches Cargo Center Revitalization*. Retrieved January 28, 2006 from <http://www.cityofboston.gov/bra>.
- California Environmental Protection Agency. (2006). *Health and Air Pollution*. Air Resources Board. Retrieved April 11, 2006 from <http://www.arb.ca.gov>
- City of Keene New Hampshire (n.d.). *Keene Industrial Park*. Retrieved April 4, 2006 from <http://www.ci.keene.nh.us>
- Collaton, E., Bartsch, C. (1996). *Industrial Site Reuse and Urban Redevelopment - An Overview*. Cityscape: A Journal of Policy Development and Research, Vol. 2, No. 3, pp. 17-61.
- Commission on Behavioral and Social Sciences and Education. (1993). *Population and Land Use in Developing Countries: Report of a Workshop*. National Academy of Sciences.
- Cote, R. P., Cohen-Rosenthal, E. (1998). Designing eco-industrial parks: a synthesis of some experiences. *Journal of Cleaner Production*, 6, 181-188.
- Dallas Economic Development. (n.d.). *Real Estate and Site Selection*. Retrieved April 11, 2006, from <http://www.dallas-edd.org/siteopportunities.htm>
- Frej, A., et al. (2001). *Business and Industrial Park Development Handbook*. Washington D.C.: ULI-the Urban Land Institute.
- Gardiner, J., Humphreys, I., Ison, S. (2005). Freight operators' choice of airport: a three-stage process. *Transport Reviews*, 25, 85-102.

- GRIPS Development Forum. (2003). *Industrial Parks and FDI Attraction*. National Graduate Institute for Policy Studies.
- Hughes, A., Waller, M. (1999). *Getting There*. Progressive Policy Institute. Retrieved January 29, 2006 from <http://www.ppionline.org>
- Hutchinson, C. (1999). *Community Development*. Retrieved January 29, 2006 from <http://www.biothinking.com>
- Indigo Development. (2005). *Eco-Industrial Parks*. Retrieved January 29, 2006 from <http://www.indigodev.com>
- Kopec, D. (2003). *How Pollution Affects Pedestrian Activity In Communities*. Realty Times.
- Land use. (2005). *The Columbia Encyclopedia*, Sixth Edition 2005. Retrieved January 29, 2006 from <http://www.reference.com/browse/columbia/landuse>
- Lochmoeller, D. C., et al. (1975). *Industrial Development Handbook*. Washington, D.C.: ULI-the Urban Land Institute.
- Maile, D., et al. (2000). *A Planner's Overview of Eco-Industrial Development*. 2000 APA National Planning Conference.
- Maile D., Cohen-Rosenthal, E. (1999). *Handbook of Codes, Covenants, Conditions, and Restrictions for Eco-Industrial Development*. Work and Environment Initiative.
- Massachusetts Department of Environmental Protection. (n.d.). *Waterways – Chapter 91: An Overview and Summary*. Retrieved January 29, 2006 from <http://www.mass.gov/dep>
- New York City Department of Transportation. (2001). *Other Materials*. Retrieved April 11, 2006 from <http://www.transalt.org>
- Oregon International Port of Coos Bay. (2005). *North Bay Marine Industrial Park Details*. Retrieved February 9, 2006 from <http://www.portofcoosbay.com/nbmipdet.htm>
- Peninsula Traffic Congestion Relief Alliance. (2006). *Brisbane-Crocker Industrial Park Area Shuttle*. Retrieved February 11, 2006 from <http://www.commute.org>
- Ports of Indiana. (2006) *Declaration of Restrictions*. Indiana Port Commission. Retrieved April 10, 2006 from <http://www.portsofindiana.com>
- Rabinovitch, J., Hoehn, J. (1995). A Sustainable Urban Transportation System: The “Surface Metro” in Curitiba, Brazil. *Working Paper No. 19*. 1-46.
- Shah, A. (2001). *Wasted Wealth, Capital, Labor, and Resources*. Global Issues.

Smart Communities Network. (2006). Retrieved January 23 2006, from <http://www.sustainable.doe.gov>

South Boston Marine Park Location [image] (n.d.). Retrieved February 10, 2006 from <http://www.mapquest.com/maps/main.adp>

Song, Y., Knaap, G. (2002). *Are mixed land uses marketable?* University of Maryland, MD.

Target Nova Scotia. (2004). *Mulgrave Marine Industrial Park*. Retrieved February 10, 2006 from <http://www.targetnovascotia.com/IPPDF/Mulgrave.pdf>

Urban Sprawl. (2000). *American Heritage Dictionary of the English Language, Fourth edition*. Houghton Mifflin Company.

Watson, S. (1999). *Developing a Vision (Oregon Industrial Business Parks Guide 2000) (Oregon Officials Attempt to Increase the State's Industrial Development Standards)*. Oregon Business 22.6: S10 (3).

Wessex Institute of Technology. (2006). *Waste Management*. Third International Conference on Waste Management and the Environment.

Wikipedia contributors. (2005). Industrial park. Wikipedia, The Free Encyclopedia. Retrieved March 27, 2006 from http://en.wikipedia.org/w/index.php?title=Industrial_park&oldid=32675564

World Resources staff. (1999). *Are Business and Industry Taking Sustainability Seriously?* World Resources Institute.

York Region Transportation Master Plan. (2000). *Goods Movement & The Economy*. Policy Paper No. 5. Retrieved February 22, 2006, from <http://www.region.york.on.ca>