

The Business-To-Business Supplier
Opportunities Created In Baltimore City
By The Development of The East Baltimore
Biotech Park and The UMB Research Park

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Executive Summary

The Empower Baltimore Management Corporation (EBMC) retained the Jacob France Institute of the University of Baltimore to conduct an analysis of the business-to-business and minority business opportunities created by the development of the East Baltimore Biotech Park and University of Maryland, Baltimore Research Park. These two developments have the potential to assist in the transformation of Baltimore City into a major center for high technology and biotechnology business activity. The EBMC commissioned this report for two reasons:

1. To identify and assist small and especially minority businesses in linking to the growth opportunities presented by the development of the biotechnology industry in Baltimore City. The information gathered in this report can be used to identify strategic relationships, capital needs, and other business assistance tools to allow small and minority businesses to take advantage of future opportunities.
2. Because minority businesses hire a greater percentage of minorities than non-minority companies, the information gathered in this report could assist City leaders in providing greater career opportunities for residents in the Empowerment Zone, who are largely residents of color.

This report analyzed the strength of the biotechnology industry supplier sector in Baltimore City compared to Maryland and national biotechnology centers, estimated the level of local purchases that may potentially be made as the biotechnology industry develops in the City; and identified key targets for development or recruitment efforts. The major results of this analysis are:

- Baltimore City has the least extensive network of biotechnology supplier industries when compared to key competing Maryland jurisdictions (Baltimore County and Montgomery County) and key national biotechnology centers (Boston, Los Angeles, New York, Philadelphia, Research Triangle Park, San Diego, San Francisco, and Seattle).
- The development of the East Baltimore Biotech Park and University of Maryland, Baltimore Research Park will create an opportunity to develop the City's biotechnology industry supplier network, by generating \$229 million in estimated purchases from Baltimore City suppliers. There are 31 supplier industry sectors where local purchases of over \$1 million are estimated and 10 more with local purchases of over \$500,000.
- The development of the East Baltimore Biotech Park and University of Maryland, Baltimore Research Park will create opportunities for Baltimore City to develop or attract biotechnology supplier companies. Strong opportunities exist for business and professional services firms, businesses that provide building support services, commercial printing, and businesses that provide workers and training to biotechnology companies. Opportunities also exist for the City to attract other high technology businesses, including drug companies, R&D companies, and computer and data processing companies.

The development of the biotechnology sector in Baltimore City stimulated by the development of the two proposed research parks will create significant business-to-business opportunities. However, the City will face significant competition from suburban jurisdictions in attracting these firms and minority businesses often face barriers in these sectors. The City will need a proactive strategy to attract these businesses and promote minority business opportunities.

The Empower Baltimore Management Corporation

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1.0 Introduction

The Empower Baltimore Management Corporation (EBMC) retained the Jacob France Institute of the Merrick School of Business at the University of Baltimore (The France Institute) to prepare an analysis of the potential business-to-business supplier opportunities created by the development of the East Baltimore Biotech Park and the University of Maryland, Baltimore (UMB) Research Park. The EBMC commissioned this report for two reasons:

1. To identify and assist small and especially minority businesses in linking to the growth opportunities presented by the development of the biotechnology industry in Baltimore City. The information gathered in this report can be used to identify strategic relationships, capital needs, and other business assistance tools to allow small and minority businesses to take advantage of future opportunities.
2. Because minority businesses hire a greater percentage of minorities than non-minority companies, the information gathered in this report could assist City leaders in providing greater career opportunities for residents in the Empowerment Zone, who are largely residents of color.

The two goals of this analysis are to:

- Estimate the level and composition of purchases from local suppliers in Baltimore City that will be generated by the development of the East Side Biotech Park and the UMB Baltimore Research Park; and
- Identify biotechnology and related industry supplier sectors that Baltimore City could target for recruitment to support biotechnology development. A special emphasis was placed on identifying supplier opportunities for small and/or minority-owned businesses.

This report used the IMPLAN economic model to develop an estimate of the local purchasing patterns of the biotechnology and related industries sector in Baltimore City. Baltimore City local industry purchasing patterns were then compared to benchmark jurisdictions in Maryland (Baltimore County and Montgomery County) and to the core urban counties in other leading biotechnology industry regions (Boston, Los Angeles, New York, Philadelphia, Raleigh-Durham (Research Triangle Park), San Diego, San Francisco, and Seattle)¹ to identify potential gaps in the Baltimore City biotechnology and related industry supplier base. This report describes the methodology used and findings of this analysis.

2.0 The Size, Composition, And Economic Impact Of The Proposed East Baltimore Biotech Park And The UMB Research Park

The development of the East Baltimore Biotech Park and the UMB Research Park represent a significant opportunity to not only reverse the declines that have occurred in Baltimore City economic activity and employment but to actually assist in transforming the City into a major high technology center. This report is not a feasibility study for the two proposed developments. It does not evaluate or test the projections made in the various feasibility studies

¹ The eight biotechnology comparison regions were chosen based on the *Signs of Life: The Growth of Biotechnology Centers in the U.S.* report (Brookings Institution, 2002) which identified these cities along with Washington-Baltimore as the nine leading biotechnology centers in the nation.

conducted for the East Side Biotechnology Park or the preliminary planning materials provided on the UMB Research Park. This study simply uses the results of the available studies to:

1. Prepare an estimate of the potential economic impacts on Baltimore City of the two developments;
2. Estimate the expected level of purchases that could be made from local suppliers based on current economic conditions in Baltimore City; and
3. Identify potential gaps in the Baltimore biotechnology and related industry supplier base.

The primary goal of this analysis is to identify both existing and potential business-to-business supplier relationships that could be developed by EBMC and the City of Baltimore to take advantage of and support the expected development of the biotechnology and related industries sector.

2.1 Total Jobs Created By The East Baltimore Biotech Park And The UMB Research Park

The first step in this analysis is the development of an estimate for the number and industrial composition of the projected employment for the East Baltimore Biotech Park and the UMB Research Park.

The final estimate available for the employment impact of the East Baltimore Biotech Park was for a total of 8,000 jobs to be created directly in the Park once the project is completed and fully developed.² The Jacob France Institute prepared an estimate of the total employment associated with the UMB Research Park based on conversations with one of the firms associated with the development of the proposed park. Based on the square footage planned for the research park at the time of this analysis, the Jacob France Institute estimates that a total of 3,000 jobs may be created in the proposed research park, 2,000 jobs in Phase I and 1,000 jobs in Phase II. Thus, the two proposed developments are expected to create a total of 11,000 new jobs in Baltimore City, once completed and fully leased.

There was no data available on the expected distribution of this employment by industry. Thus, an estimate of employment by industry was made. There is a general consensus that both the East Baltimore Biotech Park and the UMB Research Park will focus on biotechnology and related companies. However, there is no generally accepted industry-based definition of the biotechnology sector. For example, in its analysis of high technology employment in Maryland, the Maryland Department of Labor, Licensing and Regulation (DLLR) developed a definition of the Biotechnology and Biomedical sector. This industry-based definition includes Standard Industrial Classification (SIC) codes 283 - Medicinals and Botanicals (pharmaceuticals), 384 - Medical Instruments and Supplies, and 385 - Ophthalmic Goods. This definition is restrictive and only includes pharmaceutical and medical equipment production. Many biotechnology firms are classified in other industry classifications, most importantly High Technology Research, another high technology sector analyzed by DLLR. Because of the proximity of the East Baltimore Biotech Park to the Johns Hopkins Medical School and Hospital and the UMB Research Park to the UMB campus and University of Maryland Medical System, it is likely that a significant portion of the firms attracted to the two development sites will be involved in

² *The East Baltimore Study: Final Report*, by Urban Design Associates, Brophy & Reilly, Glatting Jackson, Nottingham & Associates, and Zimmerman Volk Associates.

general medical and biotechnology research and even medical testing in addition to pharmaceutical and medical instrument production. Thus, this analysis bases its estimate of the industry of employment for the 11,000 jobs projected to be created by the two development on the state-level distribution of employment in the combined Biotechnology and Biomedical and High Technology Research³ sectors in 2000.

As presented in Table 1, the East Baltimore Biotech Park and the UMB Research Park are projected to create 11,000 jobs, 2,487 (23%) jobs in the Biotechnology and Biomedical Sector and 8,513 in the High Technology Research sector (77%).

Table 1
Direct Employment Impacts Of The
East Baltimore Biotech Park And The UMB Research Park On Baltimore City

Industry	East				Total	
	Baltimore Biotech Park	UMB Research Park Total	Phase I	Phase II	Baltimore City	% of Total
<u>Total Employment</u>	<u>8,000</u>	<u>3,000</u>	<u>2,000</u>	<u>1,000</u>	<u>11,000</u>	<u>100%</u>
Biotechnology and Biomedical	1,809	678	452	226	2,487	23%
Pharmaceutical Manufacturing	1,361	510	340	170	1,871	17%
Medical Instruments/Ophthalmic Goods	448	168	112	56	616	6%
High Technology Research	6,191	2,322	1,548	774	8,513	77%

Source: The Jacob France Institute, EBMC.

³ The DLLR High Tech Research classification includes both engineering and research services. The industry classification used in this analysis is research, development and testing - SIC 873 only.

2.2 The Economic Impact of The East Baltimore Biotech Park and The UMB Research Park

The total projected number of jobs associated with the East Baltimore Biotech Park and the UMB Research Park were used to prepare an estimate of the total economic impact of the final operations of the two developments. This economic impact estimate is based on the full employment impact of the operation of each research park as if it occurred in 2002. All financial estimates are in year 2002 dollars and the economic impact of the construction of the two parks is not included in this estimate.⁴ This analysis uses an economic model⁵ to estimate both the economic activity generated by and the economic impact of the two developments. This analysis focuses on three measures of economic impact: economic output (a figure similar to Gross State Product); employment; and employee compensation. Four measures of the economic impact of the two developments are included in this report:

- 1) Direct effects, which represent the change in economic activity – in this case the production of biotechnology related goods and services in the two developments – being analyzed;
- 2) Indirect effects, which represent the changes in inter-industry purchases, for example the purchase of raw materials from a local supplier, in response to the change in demand from the directly effected industries;
- 3) Induced effects, which represent the changes in spending from households as income and population increases due to changes in production; and
- 4) Total effects, which are the combined total of direct, indirect and induced effects.

The direct effects of the development of the East Baltimore Biotech Park and the UMB Research Park will generate a total of \$1.6 billion dollars in economic activity in Baltimore City, \$1 billion from the new economic activity occurring in the two developments, \$289.6 million from the *Indirect impacts* occurring from the local purchases made by the firms locating in the two parks and \$251.9 million in *Induced impacts* from the increase in Baltimore City resident incomes. The East Baltimore Biotech Park accounts for 73% of the total estimated impacts and the UMB Research Park accounts for the remaining 27% (see the Appendix for a breakdown of the impact of the UMB Research Park by construction Phase). Once fully developed and leased, the two research parks will create a total of 16,987 jobs with estimated earnings of \$612.6 million.

⁴ This analysis does not adjust for the potential impact of the two projects on biotechnology businesses in other parts of Baltimore City, for example companies moving from other parts of the City into the new developments. Nor does this analysis attempt to adjust for the two parks' absorption of growth that would occur even without the two developments. This analysis is included for illustrative purposes and should not take the place of a more complete economic impact analysis.

⁵ The Jacob France Center used the IMPLAN input-output model developed by the Minnesota IMPLAN Group. IMPLAN allows for the estimation of total economic impacts based on the number of jobs associated with a project. All impact figures are in year 2002 dollars.

Table 2
Economic Impact Of
The Development Of The East Baltimore Biotech Park
And The UMB Research Park On Baltimore City

Item	Direct Impact	Indirect Impact	Induced Impact	Total Impact
<u>Total City Impact of Two Projects</u>				
Economic Output (Mil. \$)	1,062.6	289.6	251.9	1,604.0
Employee Compensation (Mil. \$)	415.1	110.5	87.0	612.6
Employment (# of Jobs)	11,000	3,087	2,900	16,987
<u>East Baltimore Biotech Park</u>				
Economic Output (Mil. \$)	772.8	210.6	183.2	1,166.6
Employee Compensation (Mil. \$)	301.9	80.3	63.3	445.5
Employment (# of Jobs)	8,000	2,245	2,116	12,361
<u>The UMB Research Park</u>				
Economic Output (Mil. \$)	289.8	79.0	68.7	437.4
Employee Compensation (Mil. \$)	113.2	30.2	23.7	167.1
Employment (# of Jobs)	3,000	842	784	4,626

Source: IMPLAN and the Jacob France Institute

2.3 Estimated Share of Total Purchases Made Locally - Baltimore City Versus Comparison Jurisdictions

The IMPLAN model can also be used to estimate the level of local purchases made to support the local production of goods or services. The IMPLAN model allows for the production of a commodity to be broken down into estimated *Commodity Demand* (local purchases of goods or services), and the *Value-Added* through the production process. Commodity demand represents the total purchases of goods and services used in production. These commodity purchases can be further broken down into those purchases that are estimated to be made locally (in Baltimore City) and those purchases estimated to be made from outside of the region being studied. Local purchases are estimated using *Regional Purchase Coefficients*, which are an estimate of the proportion of the total local supply of a good or service used to satisfy local demands.

The IMPLAN model was used generate the estimated level of direct local purchases required to support the production of goods and services occurring in the Biotechnology and

Biomedical and High Technology Research sectors in Baltimore City.⁶ Estimates of local purchasing activity were also made for two benchmark jurisdictions in Maryland (Baltimore County and Montgomery County) and to the core urban counties⁷ in the eight other leading biotechnology industry regions (Boston, Los Angeles, New York, Philadelphia, Raleigh – Durham (Research Triangle Park), San Diego, San Francisco, and Seattle).

As presented in Table 3, Baltimore City has the lowest level of total raw material purchases made from local suppliers for nearly every industry:

- Drug producing firms in Baltimore City only purchase 37% of total raw materials requirements from local (Baltimore City) suppliers. This is lower than in all benchmark Maryland jurisdictions and all leading biotechnology cities;
- Medical equipment producing firms in Baltimore City only purchase 38% of total raw materials requirements from local (Baltimore City) suppliers. This is lower than in one benchmark Maryland jurisdiction and all leading biotechnology cities; and
- Research, Development and Testing firms in Baltimore City only purchase 50% of total raw materials requirements from local (Baltimore City) suppliers. This is lower than in all benchmark Maryland jurisdictions and all leading biotechnology cities.

The low level of estimated local purchases is consistent with Baltimore City's current economic structure. Despite the presence of two major research universities, two major teaching hospitals, and a substantial base of high technology business services firms, Baltimore City has yet to emerge as a leading center for biotechnology or other high technology activity. Baltimore City accounts for only 5% of total High Technology employment in Maryland, compared to 15% of total private sector employment.⁸ A recent analysis of the biotechnology sector in Baltimore City found that the City had a lack of a core specialization in the biosciences and research sectors and had been unsuccessful in attracting new or relocating biosciences companies.⁹ Because of the low level of current biosciences and research industry activity, Baltimore City lacks a substantial base of suppliers to these sectors. Expanding the currently limited base of City suppliers will be essential if the City is to experience the full economic benefits from the development of the East Baltimore Biotech Park and the UMB Research Park. Furthermore, the expansion in the base of biotechnology and research sector suppliers will support the development of the two parks by facilitating the creation of a cluster of related biotech and research firms. However, in developing this supplier base, the City will face competition from the existing base of biotechnology and research sector suppliers in the Baltimore region and other parts of Maryland.

⁶ It is important to note that these estimates are based on the total production of a commodity rather than industry based production, and thus, includes co-production of the commodities being analyzed by other industries. Thus, there is some error in these estimates. Furthermore, these estimates are based on national averages, not local information. These estimates, however, represent a reasonable first order estimate of local purchases.

⁷ The IMPLAN model is created on county-level basis. Thus, in some cases, Baltimore City is being compared not to the comparison City – but to the larger county. Because a county trading area is larger and generally includes both a larger number and a wider variety of suppliers, local purchases in these instances may be over-estimated.

⁸ See <http://www.dllr.state.md.us/lmi/hightech/htregion.htm>.

⁹ Battelle Memorial Institute, The Jacob France Institute and Lipman Frizell & Mitchell, *Feasibility Study for a New Incubator Assistance Program at University of Maryland Baltimore*, February 2002.

Table 3
The Estimated Share Of Purchases Made From Local Suppliers
Baltimore City And Comparison Jurisdictions

Item	Drugs	Medical Equipment	Research, Development and Testing Services
Baltimore City	37%	38%	50%
<u>Comparison Maryland Jurisdictions</u>			
Baltimore County	66%	42%	62%
Montgomery County	65%	35%	64%
<u>Comparison Cities¹</u>			
Boston	48%	41%	58%
Los Angeles	54%	55%	66%
New York	49%	43%	61%
Philadelphia	63%	42%	51%
RTP-Raleigh-Durham	64%	43%	51%
San Diego	66%	52%	69%
San Francisco	38%	40%	66%
Seattle	63%	43%	55%

(1) Counties in which the comparison city is located.

Source: IMPLAN and the Jacob France Institute

2.4 Estimated Baltimore City Purchases

The IMPLAN model was also used to estimate the level of local purchases that could potentially be made from local (Baltimore City) suppliers once the East Baltimore Biotech Park and the UMB Research Park are fully developed and leased. The total level of economic activity occurring in the two developments was estimated by sector. These sector level economic activity estimates were used to estimate the level of direct local purchases based on current Baltimore City economic conditions and the IMPLAN *Commodity Demand* and *Regional Purchase Coefficients* data discussed above. The results of this analysis are presented in Table 4. The development of the East Baltimore Biotech Park and the UMB Research park will generate \$229 million in estimated purchases from Baltimore City suppliers.¹⁰ The breakdown of purchases from the top 73 suppliers (all supplier industries with over \$100,000 in estimated purchases) is presented in Table 4. Direct local purchases are concentrated in a few core industries, with the top five supplier sectors accounting for 39% of total local purchases, the top ten supplier sectors accounting for 60% of total local purchases, and the top twenty supplier sectors accounting for 83% of total local purchases. The major opportunities for suppliers are in the wholesale trade, advertising, management consulting, engineering-architectural services and real estate sectors. There are, however, numerous other opportunities for businesses in other sectors. There are 31 supplier industry sectors where local purchases of over \$1 million are estimated and 10 more with local purchases of over \$500,000.

¹⁰ All estimated purchases are in year 2002 dollars.

Table 4
Estimated Local Purchases From The Companies In The East Baltimore Biotech Park And
The UMB Research Park, By Leading Industry

Industry	Estimated Local Purchases	Industry	Estimated Local Purchases
Total Local Purchases	229,885,309		
Purchases From Top 73 Industries			
Wholesale Trade	22,204,858	Inorganic Chemicals - N.E.C.	660,023
Advertising	20,952,707	Insurance Carriers	641,915
Management and Consulting Services	18,797,295	Photofinishing- Commercial Photography	583,625
Engineering- Architectural Services	15,534,195	Commercial Printing	533,972
Real Estate	12,897,787	Glass Containers	498,716
Personnel Supply Services	11,492,470	Railroads and Related Services	481,397
Accounting- Auditing and Bookkeeping	10,174,345	Plastics Materials and Resins	455,728
Other Business Services	10,161,519	Surface Active Agents	462,303
Drugs	8,114,045	Local Interurban Passenger Transit	426,728
Communications- Except Radio and TV	7,748,447	Metal Stampings - N.E.C.	417,604
Computer and Data Processing Services	7,714,329	Chemical Preparations - N.E.C.	424,177
Legal Services	7,552,952	Business Associations	330,966
Banking	6,729,844	Relays & Industrial Controls	307,116
Research, Development & Testing Services	6,231,836	Typesetting	283,529
Motor Freight Transport and Warehousing	5,163,176	Water Supply and Sewerage Systems	278,202
Maintenance and Repair Other Facilities	4,958,239	Laundry Cleaning and Shoe Repair	242,781
Paperboard Containers and Boxes	4,353,715	Special Dies and Tools and Accessories	212,376
Electric Services	4,133,744	Water Transportation	208,726
Automobile Rental and Leasing	3,413,177	Credit Agencies	199,475
Security and Commodity Brokers	3,402,837	Motion Pictures	190,619
U.S. Postal Service	3,346,981	Nonwoven Fabrics	184,671
Cyclic Crudes- Interm. & Indust. Org. Chem.	2,853,303	Landscape and Horticultural Services	186,855
Eating & Drinking Places	2,498,283	Book Printing	176,892
Hotels and Lodging Places	2,411,891	Miscellaneous Retail	171,351
Equipment Rental and Leasing	2,104,365	Adhesives and Sealants	165,751
Services To Buildings	1,800,243	Industrial Gases	164,801
Medical Instruments and Supplies	1,512,519	Primary Nonferrous Metals - N.E.C.	143,462
Other State and Local Govt Enterprises	1,300,716	Theatrical Producers- Bands Etc.	143,556
Sanitary Services and Steam Supply	1,291,355	Glass and Glass Prods- Exc. Containers	136,437
Miscellaneous Repair Shops	1,232,088	Automotive Dealers & Service Stations	129,475
Detective and Protective Services	1,114,420	Printed Circuit Boards	118,595
Job Trainings & Related Services	925,119	Other Nonprofit Organizations	121,021
Automobile Repair and Services	883,003	Gas Production and Distribution	116,890
Metal Coating and Allied Services	800,609	Commercial Sports Except Racing	109,344
Colleges- Universities- Schools	734,602	Lubricating Oils and Greases	106,431
Air Transportation	682,389	Electrical Repair Service	103,598
Electronic Components - N.E.C.	653,592		

Source: IMPLAN and the Jacob France Institute

2.5 Potential Targets for Recruitment

The estimated local purchases information presented above is based on existing economic conditions in Baltimore City. However, as described in Section 2.3 of this report, Baltimore City has a less developed base of biotechnology and high technology research suppliers than competing biotechnology areas. It is possible for the City to derive even greater economic benefits from the development of the East Baltimore Biotech Park and the UMB Research Park through the targeted development or recruitment of additional supplier businesses. The most viable targets (total sales greater than \$500,000, appropriate for the area, and in a business sector not dominated by large firms) for recruitment or development are presented in Table 5. These target industries are further broken down into businesses already established in the City and those industries with low regional purchase coefficients (less than 50% - signifying that more than 50% of Baltimore City demand for that good or services is met by non-local suppliers).

As presented in Table 5, there are strong opportunities for business and professional services firms (Advertising, Legal Services, Engineering and Architectural Services, Accounting, Auditing, and Bookkeeping Services, and Management and Public Relations). There are also opportunities for businesses that provide building support services (Building Maintenance and Repair, Services to Buildings, and Detective, Guard, and Armored Car (Security) Services). Opportunities also exist for businesses to provide workers and training to the companies to be located in the two parks (Personnel Services and Job Training Services). Non-service based opportunities exist in Paperboard Containers and Boxes manufacturing, Photocopying, Commercial Photography and Commercial Printing businesses. Most of these sectors are well established in the City.

There are also opportunities for the recruitment of businesses not currently strongly established in the City. These include other high technology businesses -- Drug companies, Research, Development, and Testing services (these are the targeted industries for the two parks) and Computer and Data Processing Services. Thus, the development of the two research parks will help stimulate further development of the City's high technology sector, by creating new demand for its products and services. The development of the two research parks will also create new demand for the City's retail base and could create new opportunities for residential development.

The majority of large-scale supplier opportunities generated by the development of the Eastside Biotech Park and the UMB Research Park will be concentrated in business and professional services and high technology industries. Furthermore, the biotechnology and research sectors also have highly specialized needs. This may limit the potential benefits to small or minority businesses, especially those already in the area, that tend to be in less specialized and highly skilled and have only limited exposure to the biotechnology/research sector. Strong opportunities for small or minority businesses will exist in the building services sectors. The development of the two research parks will also generate substantial local demands for retail and personal services businesses in the area. This analysis does not include the potential purchases by the 11,000 workers in the two parks, so the potential increase in local retail demand is even greater than the numbers presented in this analysis. Thus, there are strong opportunities for the development of small or minority retail and personal services businesses both in and surrounding the two parks.

Table 5
Potential Target Supplier Industries for the Biotechnology Sector

SIC Code	Industry
<u>Established Baltimore City Industries</u>	
Part 15 - 17	Building Maintenance and Repair
265	Paperboard Containers and Boxes
731	Advertising
732-733 - Various	Other Business Services
734-738 - Various	Photocopying, Commercial Photography
734	Services to Buildings
735	Miscellaneous Equipment Rental and Leasing
736	Personnel Supply Services
7381	Detective, Guard and Armored Car Services
753 and 7549	Automotive Repair and Services
769	Miscellaneous Repair Services
811	Legal Services
833	Job Training and Related Services
871	Engineering and Architectural Services
872	Accounting, Auditing and Bookkeeping Services
874	Management and Public Relations Services
<u>Low RPC Baltimore City Industries</u>	
274	Commercial Printing
283	Drugs
472	Arrangement of Passenger Transportation
520-570	General Retail
737	Computer and Data Processing Services
873	Research Development and Testing Services

Source: IMPLAN and the Jacob France Institute

Appendix: The Economic Impact Of The UMB Research Park, By Phase Of Construction

Appendix Table Economic Impact of The Development of the East Baltimore Biotech Park And The UMB Research Park on Baltimore City

Item	Direct Impact	Indirect Impact	Induced Impact	Total Impact
<u>Total UMB Research Park</u>				
Economic Output (Mil. \$)	289.8	79.0	68.7	437.4
Employee Compensation (Mil. \$)	113.2	30.2	23.7	167.1
Employment (# of Jobs)	3,000	842	784	4,626
<u>Phase I - 500,000 Square Feet</u>				
Economic Output (Mil. \$)	193.2	52.6	45.8	291.6
Employee Compensation (Mil. \$)	75.5	20.1	15.8	111.4
Employment (# of Jobs)	2,000	561	523	3,084
<u>Phase II - 250,000 Square Feet</u>				
Economic Output (Mil. \$)	96.6	26.3	22.9	145.8
Employee Compensation (Mil. \$)	37.7	10.1	7.9	55.7
Employment (# of Jobs)	1,000	281	261	1,542

Source: IMPLAN and the Jacob France Institute