

Southern Essex Regional Labor Market: Blueprint Update 2002

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EXECUTIVE SUMMARY

This Labor Market Blueprint Update provides current labor market information to the Southern Essex Workforce Investment Board (WIB) on three critical, industries offering family-sustaining wages and career advancement opportunities: Construction, manufacturing, and telecommunications. The report builds on *The Southern Essex Regional Labor Market: A Blueprint*, completed in August 2000, and is designed to assist the WIB in the investment of its workforce development resources. The Blueprint Update provides information and analysis in three areas:

- ◆ Current information on each of the three critical industries in the region, including levels of employment in positions requiring less than a bachelor's degree, common human resource challenges, and skills and education gaps each industry faces in hiring workers;
- ◆ Case studies of successful career ladder training programs in each industry to inform the WIB's policy and funding decisions;
- ◆ In-depth examination of two key human resource issues in the region that may shape how the WIB interacts with particular industries: The impact of anticipated retirements in the next three to five years, and the use of temporary staffing agencies to meet entry-level employment needs.

Findings in each of these areas are outlined below.

Construction

- ◆ Construction employment has continued to hold up well through the economic downturn, with contractors continuing to provide employment opportunities, although current opportunities are generally focused on higher-end jobs.
- ◆ The most important human resource issue in the construction industry is the need for technical skills. While there are fewer openings for apprentices and laborers, employers have a difficult time finding workers with high levels of technical skills such as licensed electricians, plumbers, and HVAC technicians.
- ◆ Contractors would like to see technical training programs reinstated at the high school level and increased efforts to publicize the benefits of construction employment.
- ◆ Non-union construction employers tend to look to community colleges to meet their basic training needs, while providing more technical training themselves. Apprenticeship programs provide union workers with technical skills.

Manufacturing

- ◆ While the manufacturing industry has been the hardest hit by the economic downturn, there are still a number of employment opportunities, particularly for higher-end work. This is because manufacturing in the region has changed over the past 25 years to focus on high value-add work, while the low value-add assembly jobs have mostly left the area.
- ◆ The most critical human resource issue in the manufacturing industry is the demand for technical skills. Similar to the construction industry, there are fewer low-skilled manufacturing jobs left in the region, but there is still present and anticipated future demand for technically skilled positions.
- ◆ Manufacturing employers often use community colleges, particularly North Shore Community College and Northern Essex Community College, to meet entry-level and technical skills training needs.

Telecommunications

- ◆ While the popular perception is that the telecommunications industry has crashed with the “dot-coms,” the reality is that, while times are tough now in terms of hiring, there is significant employment in particular sub-sectors of the telecommunications industry. Local carriers such as Verizon appear to be where much of the telecommunications employment is currently concentrated.
- ◆ Telecommunications jobs are available at firms in other industries. For example, many financial services firms employ large numbers of workers in telecommunications occupations to ensure that their communications networks stay open to customers and their business 24 hours a day, seven days a week.
- ◆ Many positions in telecommunications that appear from the outside to require high levels of formal education can be obtained by workers possessing the necessary skills but without a Bachelor’s degree or higher in education. One company surveyed stated *“Many of our positions are very highly skilled, but it’s less a matter of a degree than experience. Most skills are from on-the-job experience.”*

Career Ladders Training Programs

Career ladders training programs exist in each of the three industries studied. In the unionized construction industry, apprenticeship programs are themselves a career ladder model, offering training and work experience at progressively higher paid, higher skilled levels. The Apprenticeship Preparedness Program in Boston helps women and racial and ethnic minorities, traditionally under-represented in the trades, gain access to this first rung of the ladder. Another program, the Florida Construction Institute, provides training to meet entry-level and state licensing requirements, followed by advanced training opportunities.

The manufacturing industry may have the most examples of successful career ladders training programs. The Detroit Manufacturing Technology Bridge (DMTB) program focuses on moving

workers from entry-level, low paying assembly and production jobs, to more technically advanced positions that offer higher wages and benefits. These positions are also more likely to be retained in the United States, an important consideration in developing training programs in the manufacturing industry. The program uses community colleges and community-based organizations as training and supportive services providers.

In telecommunications, the Verizon Next Step program provides training and advancement opportunities for workers while providing the company with the skilled workforce needed to work with the advanced technology becoming prevalent in this industry. The program partners with a group of community colleges to provide the training.

Future Retirements

- ◆ The impact of future retirements is likely to have only a minimal impact in the construction industry. People traditionally do not work all the way to retirement age in this industry. One respondent told us, “*Construction is a young man’s game.*” This contractor believed that as people age in this industry, they tend to seek economic stability by moving to jobs within their occupational specialties, but in other industries.
- ◆ In manufacturing, there appears to be a significant human resource issue on the way due to future retirements in high-end occupations such as Computer Numerical Control (CNC) machinists and programmers. Many of the incumbent workers in these positions have held their jobs for 20 or more years and there is no current pool of trained workers ready to step into these positions when they become available. This situation represents an opportunity for the development of training programs now that will meet these anticipated employer needs in the future.
- ◆ The telecommunications industry is so young and the pace of both business and technological change is so rapid that retirement problems appear to be a long way off.

Temp Agency Employment

- ◆ Each of the three target industries utilizes temp agencies to fill short-term vacancies in clerical positions. Other uses of temp agencies have decreased during the economic downturn.
- ◆ The construction industry uses both temp agencies for both high-end and low-end work. At the high end, national temp agencies provide skilled workers such as journeymen and master electricians for short-term work. At the low end, local temp agencies provide day laborers—low-skilled workers crucial for building and renovation work.
- ◆ Manufacturing firms often use temp agencies to fill seasonal demand for low and medium skilled production workers. Manufacturing employers are the most likely to use temp agency placements to “try out” workers for potential full-time employment.

- ◆ Telecommunications employer respondents did not use temporary workers, though this finding may vary across a larger number of companies and in a different economy.

Recommendations

- ◆ The construction and manufacturing industries in the region are increasingly focusing on higher end work, which in turn is driving a demand for higher skilled workers. The WIB should promote training programs that can place workers in entry-level positions relatively quickly and then provide additional training over 12 to 18 months that will lead to employment in high-skill, high-wage jobs.
- ◆ The WIB can act as both a direct funder and as catalyst for funding from other public and private sources. The WIB should consider convening industry groups, including employers, unions, and training providers, to develop innovative programs and submit them for funding consideration.
- ◆ Funding of basic skills programs such as English for Speakers of Other Languages (ESOL) and Adult Basic Education (ABE) are critically important to building the foundation that workers can continue to learn from over the long-term. Funding for these programs should be enhanced to the extent possible, and connected to employment training programs, with employment in critical industries in the region as a successful outcome.
- ◆ Employers see community colleges as critical training providers. Special attention should be paid to developing the capacity of these organizations to provide training to low-income workers. The WIB should also promote linkages between community colleges and community-based training providers to better meet the needs of both employers and workers.

The current economic climate has likely had an impact on the findings presented here, particularly those pertaining to employer demand for increased technical skills and limited demand for lower-skilled workers. Some will suggest that the current economic climate is not favorable for making investments in employment training programs. However, in many ways this is exact time to implement training programs, so that when the economy recovers and hiring picks up, workers with technical skills that employers are seeking will be ready. This represents a win-win arrangement for employers, workers, and the Workforce Investment Board.

INTRODUCTION

The Southern Essex Workforce Investment Board (WIB), one of 16 such entities in Massachusetts, is responsible for setting policy and overseeing all federal and state funded workforce development programs across the 19 cities and towns in the north shore area. The mission of the WIB is to develop, support, maintain, and positively direct the workforce development system in the Southern Essex region so that it meets the labor force needs of area residents and employers.

In 1999, the WIB partnered with the Center for Community Economic Development of the University of Massachusetts Boston to produce a labor force blueprint which provided new and updated information about the labor market needs of the region. *The Southern Essex Regional Labor Market: A Blueprint*, completed in August 2000 provided:

- ◆ An overview of the existing labor force;
- ◆ Analysis of eight critical and emerging industries in the region;
- ◆ Major occupations within these industries and the skills required to obtain employment therein;
- ◆ Human resource challenges and training needs within these industries;
- ◆ Current training capacity in the Southern Essex region to meet these needs; and
- ◆ Analysis and guidance on how to increase training capacity where needs are not currently being met.

The blueprint focused on five critical industries: health care, retail trade, manufacturing, construction and personnel supply services, and three emerging industries: telecommunications, software services, and web-based banking. Since publication of that report, there have been substantial changes in the regional labor market which merit further study due to their impact on the effectiveness of workforce development policies and programs. This report provides updated data on the eight industries, and a more in-depth analysis of the labor market and training environment in three of them—manufacturing, construction and telecommunications. The following components of this report focus on those three industries:

- ◆ Updated employment and wage information;
- ◆ Information on job vacancies in the region, both current and projected, with a special eye toward the impact of the aging of some of these industries' most highly skilled workers;
- ◆ An analysis of key skills, education, and training gaps that prevent Southern Essex residents from obtaining entry-level positions in these industries and moving up a career pathway within them;
- ◆ A set of case studies demonstrating promising practices for career ladder development;
- ◆ Information on the use of temporary staffing agencies in the critical industries in the Southern Essex region and an analysis of where and when they might offer quality employment opportunities for residents; and
- ◆ An analysis of how the SEWIB can best bridge the gap between residents' current skills, education, and experience and employers' requirements.

This labor market blueprint update utilizes information from both existing, published data as well as first-hand accounts from employers and other key labor market stakeholders in the region. It is designed to provide the Southern Essex Workforce Investment Board with information and analysis on the critical employment generating industries in the region. It will enable the WIB to fine tune policies regarding the use of public job training resources for the region.

Methodology and Report Overview

This report narrows the focus from five critical and three emerging industries to two critical industries and one emerging industry: construction, manufacturing, and telecommunications. These industries were selected by the WIB based on their potential for good wages and advancement opportunities for low and semi-skilled workers in the region.

The report focuses on the demand side of the labor market, with particular attention to:

- ◆ What change has occurred in these industries over the last 18 months, and what impact has the current economic downturn had on the demand for labor in the three industries in the Southern Essex region?
- ◆ To what extent are current vacancies in these industries caused by gaps between worker skills, education and experience and employer requirements? In addition, how will future retirements affect human resource issues in the three industries?

First, updates are provided to the prior data on the original eight industries, extending it through the year 2000. Information is presented on total growth within each industry to identify whether trends identified in the labor market blueprint have changed in any significant ways.

Second, for a more detailed analysis, occupational matrices were constructed for each manufacturing and construction sub-sector.¹ These matrices serve three main functions: 1) The wage information for the most important occupations in a sub-sector gives an indication of whether or not an investment in training programs for these occupations is likely to provide a payoff to workers. 2) An examination of the occupational mix in an industry allows providers to focus on large and/or fast-growing occupations within an industry when designing programs to meet employer needs. 3) An analysis of the job mix at different skill and training levels offers insights on the potential for developing career ladders within an industry.

Career ladder potential is defined by levels, each job categorized by level, with a mix of levels indicating the existence of a career pathway. The levels are a qualitative measure that demonstrates the approximate location of particular occupations within an occupational pathway.

¹ In manufacturing, matrices for four sub-sectors of Industrial Machinery and Equipment are included. Data are suppressed for two additional sub-sectors: SIC 351 Engines and Turbines and SIC 357 Computer and Office Equipment due to the small number of firms in those sectors in the region. Total data suppressed represents 1,087 jobs in three firms. Further, telecommunications is not amenable to this type of analysis under data collection methods in use through the end of 2000. However, new data collection systems initiated in 2001 will allow for quantitative analysis in the telecommunications industry in the future.

To construct these levels, the occupations were first grouped on the basis of similar but progressive job functions and skill sets. Then, skill and educational requirements were examined. Within an occupational family, levels 1, 2, and 3 generally reflect increasing wages. However, wage levels are not comparable across occupations due to inherent inequities of the labor market. Within an occupational pathway, higher levels generally require additional skills, experience and/or educational attainment. The additional amount of increased skills, experience, or education required to advance to a higher level varies across different occupational pathways. None of the positions in the occupational matrices generally requires a bachelor's degree as a condition of hiring, although some incumbents in these jobs may have one.

Level 1 jobs are entry-level positions, such as assemblers or customer service representatives, which require little previous skill, experience, or training. Level 2 jobs represent a step up from Level 1, and usually involve additional training or certification. Examples of these jobs include telephone and cable television line installers and repairers, testers, or customer service coordinators. Level 3 jobs are generally the highest rung prior to professional-level positions or those requiring a bachelor's degree. Examples of jobs at this level include engineering technicians or management support workers.

Estimated educational requirements and wages were drawn from the Occupational Employment Statistics (OES) Survey published by the U.S. Bureau of Labor Statistics (BLS). To determine the number of jobs at each of the three levels, employment matrices for firms in the Standard Industrial Classifications (SICs) designated by the BLS were used.²

The matrices also include projections drawn from the state Division of Employment and Training, and are subject to certain caveats. The reader should bear in mind that they are simply projections, and that they are for Massachusetts as a whole; particular regions and/or specific firms within a region may vary. Finally, they are for occupations as a whole. If a particular sub-sector, such as Industrial Machinery and Equipment, does better than manufacturing as a whole, then jobs may be growing in that sub-sector and still show overall decline.

Third, to determine specific job vacancies in the three selected industries, a three-pronged approach was used. A phone survey of 8-10 employers in each industry was conducted to identify the number of vacancies, specific occupations for which vacancies were most prevalent, and specific human resources challenges. A survey of advertisements placed in the largest local

² This method of employment level determination carries with it some potential biases. Because each of the OES matrices aggregates data across various sub-sectors, we cannot be sure that one sub-sector did not predominate. Further, wage information by occupation may be biased, due to inequities across the labor market between, for example, a customer service representative in a software company versus ones in a telephone company. These biases may result in the understatement or overstatement of job levels for particular positions, as well as the numbers of jobs at each level in the study area. It seems likely, given the large numbers of jobs we are reporting, that any differences caused by the data issues described above are likely to be small. The other main issue that arises from this problem is the over-reporting or underreporting of particular jobs. We are not able to solve this problem directly. Therefore, the WIB and the programs it funds are advised to work closely with specific employers to determine their occupational mix as part of the program development process.

papers and *The Boston Globe* for jobs in the three selected industries was also conducted, as well as a survey of jobs posted with the Career Centers in the Southern Essex region.

Fourth, to examine why vacancies exist in the three industries and how the job training system can meet these needs, a series of four in-depth interviews with key employers and union officials in each industry were conducted. A protocol was developed to solicit information on skill and employment needs, job mobility (career paths), human resource issues and responses, and the potential impact of the aging of their industry's workforce. Interviews were also conducted with staff of One Stop Career Centers and training providers in the region to identify challenges from their end in meeting the identified human resource needs of employers in the selected industries.

Different components of the study were designed to help the WIB better understand the role of temp agencies in the Southern Essex region. Employers were asked specific questions regarding their use of temp agencies to determine which industries use them most and why, and which occupations are most frequently contracted through temp agencies. A series of interviews with 3-5 temp agencies was conducted to learn about which firms use their services and for which jobs. This information is used to attempt to identify where quality jobs are available through temp agencies and how the WIB could work with this industry to develop better job opportunities for low-income workers.

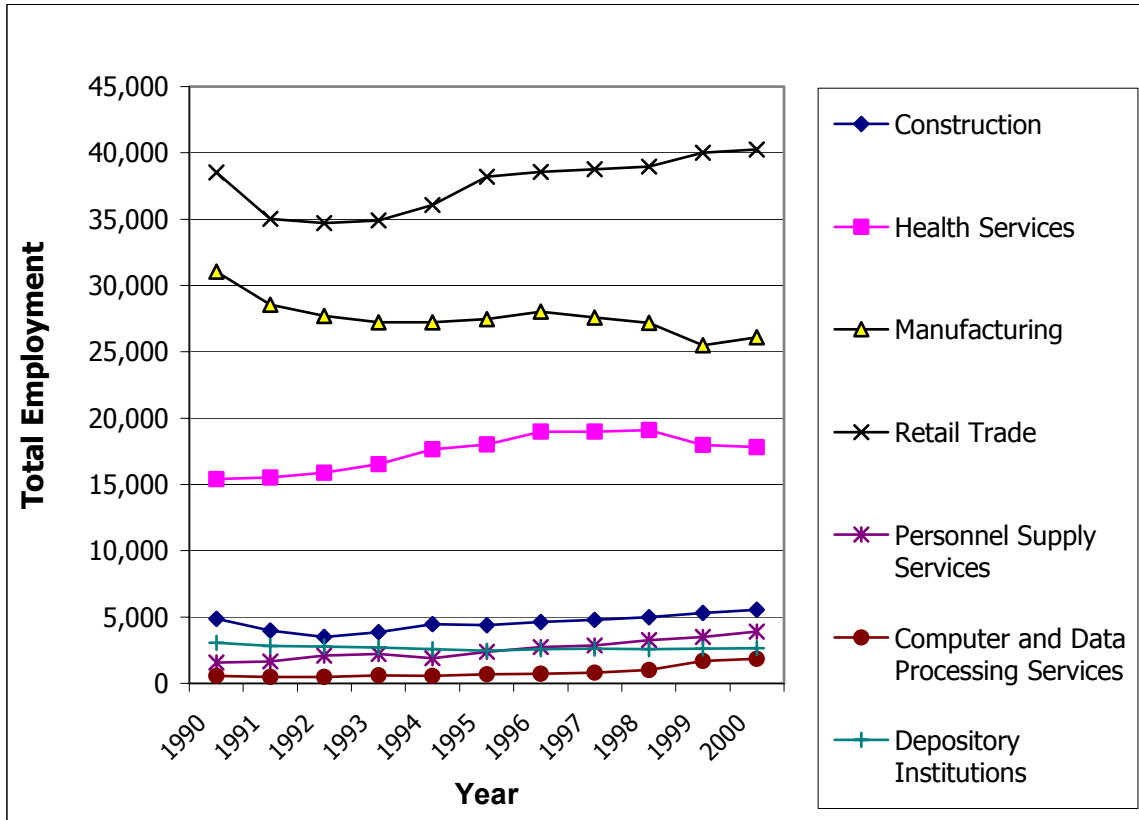
Finally, a set of four case studies of career ladders training programs, covering all three industries, provides insight into how the WIB could help improve the training provided by the organizations it funds.

The final section of the report provides an analysis of the gaps uncovered between residents' current skills, education, and job experience, and the requirements of employers in the selected industries. It draws on the findings on the temporary agencies and career ladder program models to pose a set of recommendations on how the WIB can best bridge those gaps to provide Southern Essex residents access to entry-level and advanced positions in the selected industries.

CRITICAL INDUSTRIES: A SNAPSHOT

This section examines labor demand in the years 1999 and 2000 (the last year for which data is available). The first section uses the updated data to give an overview of seven of the industries³ discussed in first blueprint published in August 2000. This is followed by a more detailed look at critical sub-sectors of the manufacturing and construction industries.

Figure 1: Southern Essex Region Employment in Selected Industries: 1990-2000



Source: MA Division of Employment and Training. ES-202 data.

Overall, there are few surprises. The dominant industries in the region have remained dominant. Growth continued in most industries. Employment levels grew in all industries except health services and manufacturing. The greatest growth occurred in personnel supply services and computer and data processing services. Between 1990 and 2000, employment in personnel supply services has more than doubled, from 1,571 in 1990 to 3,910 in 2000. Growth in computer and data processing services employment has been even more dramatic, more than tripling from 573 in 1990 to 1,838 in 2000. The personnel supply services industry is considered in greater detail later in this report.

³ Telecommunications is not amenable to this type of analysis.

While the growth rates of these two industries have been impressive, retail trade, manufacturing, and health services continue to have by far the highest levels of employment in the region. Over the two-year period, retail trade continued to gain employment slightly, while manufacturing lost about 4 percent and health services lost nearly 7 percent of employment. While these industries are still the largest employers in the region, these levels of employment loss in only two years merit ongoing attention.

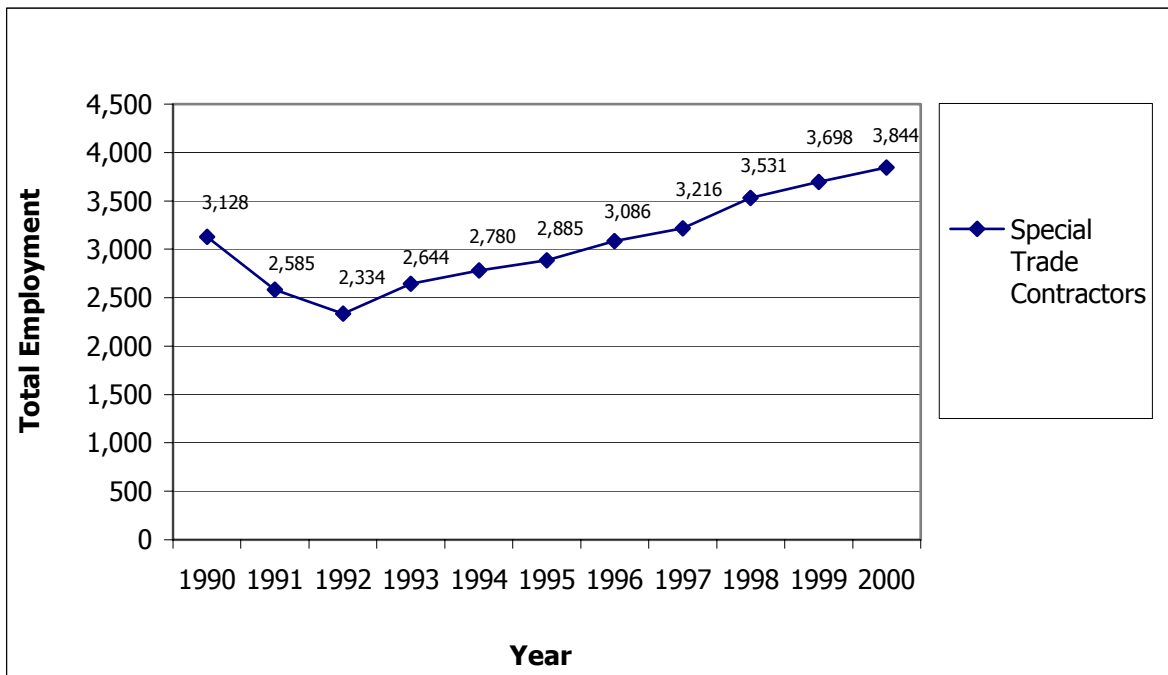
Construction employment continued to grow through 2000, gaining over 10 percent over the 1998 employment level, from 4,999 to 5,534. However, in the period 1990 to 2000, construction employment is only up 14 percent, from 4,847 in 1990 to 5,534 in 2000. This is probably due in large part to the cyclical nature of the industry as shown by the massive job loss in the industry in the early 1990s. Employment dipped to a low of 3,485 in 1992 and then slowly grew back as the economy recovered.

Telecommunications was one of the three emerging industries researched for the first labor force blueprint and was selected for analysis in this report because it is reasonably well-developed, with some mature companies, and because it has many entry points for job seekers.

Construction: Special Trades Contractors

The specialty trades contractors comprise the largest sub-sector of construction employment in the Southern Essex region and continued to show employment growth in 1999 and 2000, as shown in figure 2.

Figure 2: Southern Essex Region Employment in Special Trade Contractor Sub-Sector: 1990-2000



Source: MA Division of Employment and Training. ES-202 data.

While employment growth has held up well to date, construction industry is particularly dependent upon the macro-economy and therefore the downturn in the economy in 2001 may decrease employment in this industry. However, because the housing market has held up quite well to date, the construction industry may remain strong.

Special trades contractor sub-sectors have generally shown the same modest growth as the sector as a whole. Only concrete work and miscellaneous special trades contractors showed decreased employment from 1998 to 2000, as shown in Table 1.

Table 1: Special Trades Contractors Employment by Sub-Sector

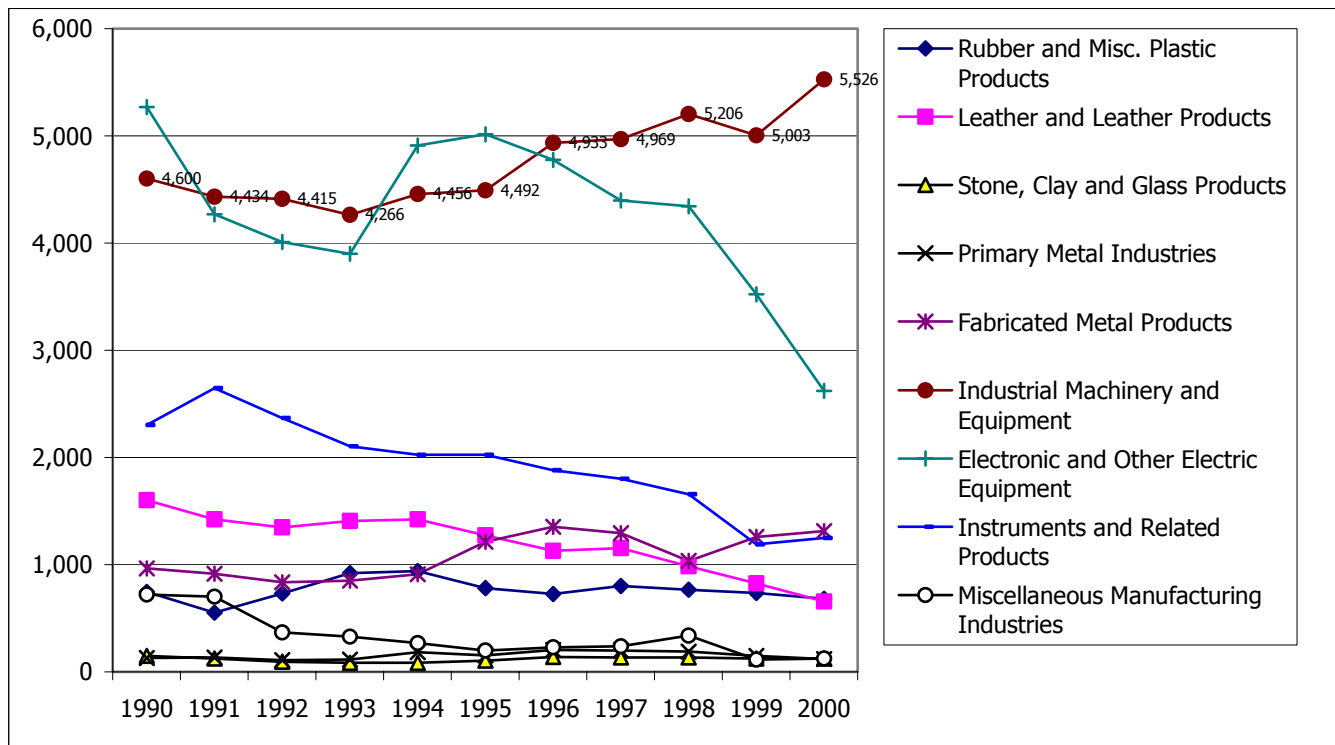
SIC Code	Title	1998 Employment	2000 Employment
171	Plumbing, Heating, and Air Conditioning	995	1107
172	Painting and Paper Hanging	250	286
173	Electrical Work	640	806
174	Masonry, Stonework, and Plastering	354	380
175	Carpentering and Floor Work	277	365
176	Roofing, Siding, and Sheet Metal Work	125	134
177	Concrete Work	151	112
179	Miscellaneous Special Trade Contractors	739	651

Source: MA Division of Employment and Training, ES-202 data

Manufacturing-Industrial Equipment

Manufacturing holds perhaps the best opportunity of any industry for the development of career ladders. Manufacturing is also a historically important industry in the Southern Essex region.

Figure 3: Manufacturing Employment in the Southern Essex Region by Sub-Sector: 1990-2000



Source: MA Division of Employment and Training, ES-202 data.

Figure 3 shows variation across different sub-sectors in manufacturing in the region, using data from 2000, the last year for which data was available. Industrial machinery shows strong growth, which is good news since it is the largest single largest manufacturing employment generator in the Southern Essex Region. Growth in the manufacturing industry is significant to the region because of the strong potential for high paying jobs, as shown in the occupational matrices in the appendix. The WIB should strongly consider funding training that will support the further growth of this industry.

EMPLOYERS

In the three selected industries, construction, manufacturing, and telecommunications, vacancy information was collected from several sources to determine the extent of employment opportunities for workers with less than a bachelor's degree in education. Employers in the region were surveyed regarding their vacancies, skill shortages, and recruitment methods, and about the effects of the economic downturn.⁴ The results of those surveys are presented below. Responses on the use of temp agencies are analyzed later in the report.

Construction

Advertisements in the construction industry were the strongest of the three industries. In the month of September 2001 there were more than 200 openings advertised in the construction industry in the Southern Essex region. The top three positions advertised were carpenters, laborers, and electricians. Since union construction jobs are filled through hiring halls, these advertised vacancies overwhelmingly represent non-union jobs. Union employment is a significant portion of all construction employment in the region, but is not covered by this method of analysis. Thus there were more openings in this industry than described above. Both union and non-union firms were included in the phone and in-person interviews.

Despite the economic downturn, shortages still remain in critical areas, usually at higher levels of skill and experience. For example, one contractor interviewed was still hiring licensed electricians, but was no longer hiring apprentices due to a slowdown in work. Carpenter positions appear to be the most numerous in the region but are also some of the lowest paid positions in the construction industry, at least in non-union shops.

The firms interviewed had little to say about why they could not fill openings when they had them. One respondent predicted that construction jobs would become harder to fill due to a lack of support from local schools for jobs where people work with their hands. He felt that the high schools push all students toward college, but that college is not for everyone. High-wage jobs in this industry certainly merit attention from both training providers and secondary schools.

There are some significant challenges surrounding construction industry employment. Research on youth in the Southern Essex region has shown that few of them are interested in construction jobs due to the inconsistent and difficult nature of the work.⁵ Also, construction employment is often inaccessible to people of color and women. Public relations efforts and providing pre-apprenticeships such as the Apprenticeship Preparedness Program described in Section __ could help address these issues.

⁴ Factors beyond the control of the SEWIB and the research team may have had an impact on responses. The economic downturn became recognized as a recession in the fall of 2001, although it actually began much earlier. The effect may have been to artificially depress hiring during the period when research was being conducted. In addition, the events of September 11, 2001 may have had an impact on the decision to advertise job openings in September. Where employers mentioned either of these events, they are included in the analysis.

⁵ See "Employment Issues in Southern Essex County: The Voices of Youth," by Suzanne M. Buglione and Suzanne Singh, Center for Community Economic Development, University of Massachusetts Boston, for the Southern Essex Workforce Investment Board, August, 2001.

When asked about the impact of future retirements, few respondents expected much impact in construction. One interviewee stated, "*Construction is a young man's game.*" This contractor believed that as people age in this industry, they tend to seek economic stability by moving to jobs within their occupational specialties, but in other industries. For example, an electrician might move from working for an electrical contractor to working as an electrician at a manufacturing plant. This suggests that the SEWIB should consider cross-industry training efforts in addition to developing sectoral strategies.

Interestingly, construction contractors do utilize temp agencies and not just for laborer positions as might be assumed. Respondents cited use of temp agencies for electricians, plumbers, and HVAC technicians. Temp agencies were generally used to meet spikes in demand rather than as a substitute for regular workers or as a temp-to-perm testing strategy.

Employers in the construction industry were quite vocal about the region's training system. Their biggest concern was the decreasing commitment of secondary schools to the trades. Many construction companies used to be able to obtain workers with a mid-range level of skills right out of the high school trade programs, which often provided both hands-on instruction and internship opportunities. Construction employers strongly urged that these programs be re-emphasized in the region's secondary schools. One respondent said "*The schools are pushing everyone to go to college and it's not for everyone. Some (trades)people make more money than kids with college degrees.*"

Construction companies rely on community colleges to prepare workers for their industry. . North Shore Community College was cited most frequently. For example, one employer looked to the community colleges to provide a person with basic math skills and pre-electrician training prior to his hiring them as an apprentice. Once hired, the employer assumed responsibility for providing additional training. Few employers used nonprofit training providers to meet their hiring or training needs.

Manufacturing

The manufacturing industry had approximately 75 openings advertised in the month of September. The top three positions advertised for were production workers, machinists—specifically CNC milling and lathe machine operators—and shipping/receiving.

The economic downturn appears to have hit the manufacturing industry hardest in the Southern Essex region. One firm reported "*We had a lay-off about a month ago. Things have slowed down considerably... We're going to be shutting down for 2 weeks over the holidays; usually we just do 1 week.*" When asked how his company was faring, another respondent replied "*Lousy. We're an engineering company. Income is derived from sales of our product. If we're not selling, we don't need as many folks in accounting, human resources, assembly, etc. When we do need folks, we have a pool of candidates we can call back in from layoff.*" Most firms surveyed reported hiring freezes or simply no job openings for the last quarter of 2001, some extending back into the summer. Some of the larger firms still had openings, mostly in the production area, but even those were less than usual.

Just over 40 percent of positions in the firms surveyed were open to workers with a high school diploma or less. Another 18 percent require an associate’s degree. Twenty-six percent require a bachelor’s degree and the remainder require education beyond a bachelor’s degree. However, manufacturing firms vary widely in their requirements. Some production-focused firms have few positions requiring more than a high school diploma, while some of the more technical ones require higher levels of education. One large employer noted that 55 percent of their positions require a high school degree plus some type of apprentice course or technical license. Even in technical manufacturing environments, skills appear to be more important than education and are often gained by on-the-job experience and in-house training.

Manufacturers reported that their most frequently used means of recruiting workers are word of mouth and career centers. Unfortunately, career centers, while used by all responding companies, were not noted by any of them as among the two most effective recruitment resources.

Table 2: Recruitment Methods in the Manufacturing Industry

Recruitment Method	Times Mentioned as used	Times Mentioned as most effective
Word of Mouth	12	9
Career Centers	12	0
Newspaper	8	4
Temp Agencies	8	3
Internal Promotion	5	3
Job Fairs	3	0
College Recruiting	2	0
Internet	2	0
Other-Walk-ins	2	0
Other-Tech Schools	1	0

The primary education and skills issue facing surveyed employers is lack of sufficient technical skills, followed by lack of sufficient work experience and communication skills. Employers cited difficulty finding workers with blueprint reading, drafting, math skills, and technical writing skills. Several manufacturing firms also cited difficulties in finding technology workers such as computer programmers and network administrators. Primary human resources issues included retention, lack of trained machinists (mentioned multiple times) and coping with hiring freezes and downsizing.

Future retirements will be an issue in specific occupations in the manufacturing industry. Since much of the low value-added manufacturing employment in Massachusetts has been lost to offshore competition over the past twenty years, that which remains tends to be high value-added, requiring high levels of skills. In addition, new areas of manufacturing such as telecommunications equipment and medical device manufacturing, both of which require highly skilled production workers, have become increasingly important in the region. This transformation coupled with the demographics of the industry, have exacerbated existing skill gaps and will require an investment in training of lower-skilled workers.

A specific example may highlight this issue. In certain areas of manufacturing, one of the high-skill, high-wage jobs is CNC machinist. Most incumbents in these positions at the companies interviewed have been in these positions for 20 or more years. Most of these workers developed their skills on the job and then upgraded their skills informally to keep up with changing technology. Many of them are likely to retire in the next three to five years and because of historically low turnover, there is no pool of workers ready to step into these jobs. Training for these occupations takes 12 to 18 months, but development of training programs to fill these anticipated vacancies can be done in the interim before they occur.

Manufacturing firms vary significantly in their use of temp agencies to fill openings. More than half of the respondents reported using temp agencies though not recently due to the economic downturn. Most used temp agencies for secretarial/clerical positions; a few used them to hire production workers to meet spikes in business or short-term labor shortages. Often these are planned, annual hires of temporary workers for one to three months to finish off end-of-the-year production, although this practice has been unnecessary in the past year due to the economic downturn. One respondent reported using the temp agency to find permanent employees.

Manufacturing firms were similar to construction companies in their use of the region's training system. They decried the lack of high school curricula covering skills such as blueprint reading, drafting, and machining. Some used community colleges, particularly Northern Essex Community College and North Shore Community College. Again similar to construction, few manufacturing firms used nonprofit training providers to meet either hiring or training needs.

Telecommunications

The telecommunications industry had the fewest job openings of the three industries. Just fifteen job vacancies for positions requiring less than a bachelor's degree were advertised in the region. Interestingly, most of these openings were not for technical jobs but were for clerical or shipping positions in telecommunications firms. This carries some good news for lower skilled workers seeking to gain employment in this industry, in that at least among the firms that were hiring, telecommunications is maturing in the region, moving from research and development to actually shipping products to customers.

Of the telecommunications companies contacted to date, education requirements are not high for most positions. One company surveyed stated "*Many of our positions are very highly skilled, but it's less a matter of degree than experience. Most skills are from on-the-job experience.*" For this company, the associate's degree appears to be particularly relevant, with 67 percent of positions requiring this credential. Accordingly, technical skills were reported as the greatest human resources challenge.

Future retirements are unlikely to be a major human resource issue in the telecommunications industry because of the youth of the industry. Responding telecommunications companies also reported no use of temp agencies.

Much has been made in the media about the crash of the telecommunications industry. Indeed, many sectors of this industry have been affected severely, particularly the "dot-coms," equipment manufacturing, and competitive local exchange carrier (CLEC) sectors. However, in

areas such as software development and the public utility sector, employment opportunities continue to exist, though they may be fewer than what they were a year or two ago.

In addition, many telecommunications jobs exist in other industries. For example, the financial services industry employs a large number of workers in telecommunications positions. Therefore, in considering the development of training programs for this sector, the WIB should work with employers in telecommunications-specific firms and in those firms that employ large numbers of workers in telecommunications occupations, even if they are in other industries.

Cross-cutting Issues

The most significant change between the 2000 blueprint and today is in how industry representatives define their human resource challenges. In 2000 human resource professionals and others identified basic skills such as communications skills, English-language skills, and basic math skills as barriers to hiring. Today, technical skills have risen to the top of the list as most the common human resource challenge. There are several possible explanations for this shift. One is that employers were willing to hire lower-skilled workers in the boom times and were subsequently under pressure to develop the workers' skills to meet the job requirements. With the economic downturn, employers are able to be more selective in their hiring, which may lead them to focus more on technical skills. Another possible explanation is that increasingly complex technology has focused more human resources attention on technical skills. It will be important for the WIB to work closely with employers to identify their changing human resource needs to ensure that the training the WIB funds remains relevant to employer needs.

Another similarity across the three industries is in the use of training providers. Community colleges appear to be well thought of and utilized in each industry. However, community-based training providers appear to be off the radar screen of construction, manufacturing and telecommunications employers. It may be worthwhile to make efforts to promote the capacities of these providers to employers or, as necessary, help community-based training organizations develop their capacities to meet employer needs. Also, employers in construction and manufacturing bemoan the lack of training opportunities relevant to their industries in secondary schools in the Southern Essex region. This was also reflected in focus groups conducted for the WIB in which youth in the region registered a generally unfavorable opinion of employment in the construction and manufacturing industries and appeared to be unaware of how these industries have changed and the positive employment opportunities they hold.

THE ROLE OF TEMPORARY STAFFING AGENCIES

The construction, manufacturing and telecommunications industries all use temporary staffing agencies to fill at least some of their employment needs. This is reflective of national trends showing the increasing importance of temporary employment agencies⁶ and contingent labor across the labor market. Community-based and advocacy organizations are beginning to respond to these trends by providing training for temp agency workers to enable them to advance to permanent jobs, advocating for fair treatment of temps, and in some cases organizing competing temporary employment agencies of their own. This section provides information on national and state trends in temp agency employment and descriptions of several programmatic efforts to address problems that have arisen from the increase in temporary employment. It also discusses how employers in the region say they use agencies, and ways in which the WIB can effectively work with the temporary staffing industry.

National and State Trends in Temporary Agencies

Nationally, temp agencies comprise one of the fastest growing industries and this trend is expected to continue for at least the next ten years. Temporary staffing giant Manpower, Inc. is the largest employer in the United States. Between 2000 and 2010, the personnel supply services industry is expected to grow by 49 percent. In 2000, approximately 3.9 million workers nationwide were employed in the personnel supply services industry.⁷

In Massachusetts, approximately 71,000 workers were employed in the personnel supply services industry in 2000: approximately 3,900 in the Southern Essex region.⁸ The number of people working as temps in a year is likely to be much greater than these numbers, as annual turnover in this industry is estimated to be 450 percent.⁹ These numbers also reflect the national past and projected rapid growth trends.

Occupations that are hired through temp agencies have branched out from the general perception of the industry as providing primarily clerical workers. Currently, approximately 40 percent of all temp agency workers are in clerical positions, including receptionists, office workers, data entry workers, and file clerks. Production, transportation and material moving occupations such as assemblers, fabricators, hand packers, and freight, stock and material movers account for another 37 percent. Most (17 percent) of the remaining temp agency employment is concentrated in professional and service workers.¹⁰

⁶ Temporary employment agencies are known by a variety of names. The SIC classification is Personnel Supply Services. Here we use the term “temp agency” for reasons of brevity and because it is probably the most common usage.

⁷ U. S. Bureau of Labor Statistics, “Career Guide to Industries: Personnel Supply Services,” <http://www.bls.gov/oco/cg/cgs039.htm>

⁸ Massachusetts Division of Employment Training, ES-202 data.

⁹ Campaign on Contingent Work, “What’s Wrong With Temp Work? A Report on the Temp Industry in Massachusetts by the Campaign on Contingent Work,” 2000.

¹⁰ U. S. Bureau of Labor Statistics, “Career Guide to Industries: Personnel Supply Services,” <http://www.bls.gov/oco/cg/cgs039.htm>

Wages are generally lower for temporary workers in given occupations than they are for their counterparts in the same jobs in private industry as a whole, as shown in Table 3.

Table 3: Median hourly earnings of Occupations in personnel supply services, 2000

Occupation	Personnel Supply Services	All Industries
Secretaries, except legal, medical, & executive	\$11.45	\$11.47
Customer Service Representatives	\$10.16	\$11.83
Data Entry Keyers	\$9.65	\$10.42
Receptionists & Information Clerks	\$9.53	\$9.63
Office Clerks, general	\$9.38	\$10.16
Laborers & Freight, Stock, & Material Movers, hand	\$7.62	\$9.04
Helpers-Production Workers	\$7.47	\$8.66
Packers & Packers, hand	\$7.40	\$7.53

Source: U. S. Bureau of Labor Statistics, "Career Guide to Industries: Personnel Supply Services."

Working with the Personnel Supply Services Industry

Organizations concerned with low-income workers have sought ways to address the problems workers have in temp agencies, including low wages, little opportunity for training or advancement, and no benefits. Some groups work directly with temp agencies. This strategy is controversial because of the relatively low wages the agencies pay, poor access to career ladders, and the contingent nature of the work. On the positive side, temp work offers people who have been out of the labor market for a long time an easier path to re-entry, and the potential to develop skills and networks that can lead to permanent jobs. Two main ways that organizations have sought to work with the personnel supply services industry are the development of nonprofit temp agencies and entering into partnerships with for-profit training providers.

A number of nonprofit training organizations have branched out into the provision of temp agency services, either as a program within an existing organization or as a new, free-standing nonprofit organization.¹¹ Other nonprofits providing temp agency services include community development corporations, homeless shelters, and union-community-based organization partnerships, which have formed such initiatives as Labor Connection in Los Angeles, the Milwaukee Careers Cooperative, and Goodwill Temporary Services in Portland, Oregon. Each of these organizations operates a temp agency that attempts to balance a business focus with a social mission. Benefits to the nonprofit organization from organizing a temp agency include revenue flows, enhanced standing with the local business community, and the ability to better serve clients that traditionally are employed by for-profit temp agencies, such as the homeless population.

Nonprofit organizations take on competing with for-profit temp agencies, requiring significant staffing and infrastructure development, as well as start-up funding to cover the initial period of

¹¹ Much of the information in this section is drawn from Doris Seavey, "New Avenues into Jobs: Early Lessons from Nonprofit Temp Agencies and Employment Brokers," Center for Community Change, 1998.

recruitment, training, and sales calls that must occur before revenues can begin to flow in. In addition, it requires certain adjustments in business practices that not all nonprofit organizations are prepared to make. Nonprofit temp agencies differ from their for-profit counterparts in several ways that are important for their workers, including:

- ◆ Nonprofit temp agencies are more likely to offer training to workers before they begin their first placement. This training can last up to two weeks. Intensive training is likely to enhance the employment success of workers who have not had a strong attachment to the labor market in the past, including former welfare recipients, recent immigrants, and workers with limited formal education.
- ◆ Nonprofit temp agencies are more likely to provide training both before placement and while a person is working for the temp agency. This is likely to translate into job success and better opportunities for advancement to higher-paying jobs.
- ◆ Nonprofit temp agencies may be more likely to pursue a temp-to-perm strategy, attempting to use temporary placements to get a workers a foot in the door at companies that may offer them a permanent position down the road.
- ◆ Nonprofit temp agencies are more likely to have the capacity and desire to help a potential worker who does not work out on his or her first job assignment. In contrast, for-profit temp agencies expect high levels of turnover and expect a certain percentage of their hires to fail and be rapidly replaced.

While the nonprofit temp agency employment model appears attractive, it has only recently begun to expand beyond a few pilot programs so a true evaluation of its efficacy is still some time away.

Other nonprofit organizations have chosen to partner, formally or informally, with for-profit temp agencies to provide employment opportunities for their clients. In some cases, the nonprofit group provides assessment, job readiness training, and skills training prior to recommending the client to the temp agency for placement. In other cases, the arrangement involves little more than allowing the temp agency to recruit workers on-site, as is the case at many homeless shelters.

One way that nonprofit organizations can really help temp agency workers is by providing ongoing training and supportive services to enable them to remain employed and eventually to advance to permanent employment. Both the temp agency and the worker benefit from this arrangement. The temp agency gets an increasingly skilled worker who is more likely to be able to remain on the job since his or her support service needs are being met, all at no cost to the temp agency. The worker is able to advance, hopefully to regular employment, while being connected to social services as needed. However attractive it may appear, this model has had difficulty being sustained in the current workforce development funding environment.

Temp Agency Use in the Construction, Manufacturing, and Telecommunications Industries in the Southern Essex Region

Each of the three target industries uses temp agencies to perform some basic clerical functions at certain times, primarily to meet temporary vacancies caused by vacations or time spent hiring a permanent employee. Few employers interviewed used this type of temp agency placement to evaluate a worker for potential full-time hiring.

Construction

Construction firms in the Southern Essex region use temp agencies in several ways. Non-union contractors use specialized temp agencies that can supply experienced and licensed tradespeople such as journeyman or master electricians on a daily or project basis, much as unionized firms use the union hiring hall. Such workers are at or near the top of the career ladder in their occupation and are making relatively high wages. Many of these temp agencies are national in scope and work with temp workers in various states over the phone or by Internet. Because the main requirement for these positions is state licensing, the agencies can verify a worker's suitability for the job at a distance, without needing a personal interview. This type of temporary employment is used to cover a spike in business or temporary absence of a permanent employee, rather than to try a worker out on a temporary basis prior to a permanent offer of employment. Due to the high hourly wage that such workers command, plus the agency fee, it would not make economic sense for employers to use temp agency workers to fill permanent slots.

Construction firms also use temp agencies at the low end of the occupational structure, to hire day laborers to fill very low-skilled, non-licensed positions. These workers are more likely to be hired through the temp agency on a regular basis as a substitute for permanent employees. Wages are low enough that even taking the agency fee into account, the employer does well economically by not having to pay benefits and not taking on the burdens associated with having permanent employees. This use of temp agencies appears to be most common in building construction and renovation, which relies on a large pool of unskilled labor and is generally privately funded, thereby not requiring the payment of prevailing wages.

Manufacturing

Manufacturing firms interviewed for this project use temporary workers less than their counterparts nationally. This may well be because the manufacturing industry in the Southern Essex region is focused on higher value-added production, particularly in machining, medical devices, and telecommunications equipment manufacturing. These firms have a preponderance of high skill, high wage jobs that would be difficult to hire for on a temporary basis.

Where manufacturing firms do use temp agency labor is in production jobs. Several firms cited an annual plan to ramp up to meet a specific need—either year end or a high production period—by hiring temporary production workers. These firms use temp agencies to hire for positions including production worker, packer, soldering assembly worker, and tester, for periods of one to three months. These positions are lower-skill and lower-wage than the machining positions cited as being most in demand in the industry. Therefore, we can conclude that high-wage workers in

the region's manufacturing industry are not being replaced with temp agency workers, at least in the firms we interviewed.

Some firms do use temp agencies placements as a means of evaluating a person for a permanent job. As one respondent put it, "*We were desperate (for soldering assembly and testers). We brought them in in hopes that the person would stay on.*" This practice may have been more widespread before the economic downturn.

Telecommunications

None of the telecommunications firms surveyed used temp agencies for workers.

Conclusions

Temp agency employment remains a double-edged sword in workforce development. It offers the opportunity to place low-skilled workers with limited job histories into the workforce quickly, an important consideration in the current "work first" policy environment. It also offers workers the opportunity to develop a history of job experience and success and, in some cases, a chance to obtain some training to develop their skills.

There are also downsides to temp agency employment. Wages in temp agencies are lower than in regular placements in the same occupations. Many temp agencies have histories of treating their workers in unfair manners, including poor safety practices, charging workers high fees to cash their paychecks, and failing to provide documentation of employment so that workers can claim benefits they have earned. Finally, the work is, by its very nature, contingent, which makes it hard for a worker to develop any level of personal stability, not knowing when or from where his or her next (meager) paycheck is coming.

Considering the size and rapid growth of the personnel supply services industry in region, the WIB certainly should continue to monitor its impact on the regional labor force. However, given the downsides to temp agency employment noted above, short of creating some sort of temp-to-perm business itself, the WIB may find it difficult to find ways to promote employment leading to sustainable wages in this industry. One positive step might be to encourage employers to take advantage of the time they do use temp agencies to screen workers for regular employment when full-time positions open up.

CAREER LADDER MODELS IN THREE INDUSTRIES

Career ladders is a concept that has gained a great deal of import in workforce development circles over the past few years. The career ladders strategy is to develop a series of occupations within a firm or industry that workers can move along by gaining additional skills, education, and/or experience in exchange for increased compensation, greater job security, and increased responsibility. The development of career ladders requires a system-wide approach that includes employers, workers, unions, workforce development training organizations, and funders. The career ladders approach may be one of the most important strategies to help lower-income people move to jobs that pay sustainable wages.

The development of career ladder programs offers several advantages for employers, low-income workers, and workforce development organizations. Employers are able to retain their needed workers, improve employee motivation and morale, and fill vacancies in higher level positions with workers who have proven themselves on the job. Employers may also be able to access public sources of funding to support the training of their workers. Low-income workers are able to avoid going from poverty to being a long-term member of the working poor that traps so many workers and their families.¹² Also, employers that support career ladders are more likely to pay for training for their workers. Additional education, combined with a formalized occupational pathway at their place of employment, or possible with other employers in the same industry,¹³ makes career and wage advancement more likely. Workforce development organizations can increase the effectiveness of their training dollars by supporting career ladders programs that maintain an active involvement with a worker after s/he obtains an entry-level job and begins to advance to higher wages.

The development and implementation of career ladders programs requires training providers or labor market intermediaries that seek to catalyze career ladders to take a number of general steps. These include:

- ◆ Developing linkages with employers, unions, workers, other training providers, and supportive services providers;
- ◆ Developing curricula and providing training that is worker-centered and meets identified employer needs;
- ◆ Providing training and other services both at employer locations and through a network of accessible locations for workers in the community.

In addition, in order to work effectively in a target industry, workforce development organizations need to understand the particular requirements and needs of the industry as a

¹² Working for America Institute, <http://www.workingforamerica.org/documents/journal13/page1.html>

¹³ For more information on external career ladders, see Randall Wilson, "Career Ladder Strategies in the Long-Term Care Industry: Promising Practices," by Randall Wilson, Center for Community Economic Development, University of Massachusetts Boston for the Boston Workforce Development Coalition, 2001.

whole, and of the participating companies in particular. This section includes case studies of career ladder programs in each of the target industries to address and illustrate these specifics, as well as general program implementation steps followed by an analysis of lessons and implications for the Southern Essex Workforce Investment Board.

Construction

Industry insiders have long seen developing construction training programs as particularly difficult. The variable hours and contingent nature of work in the industry have worked against comprehensive training programs. Funding for training, an issue in workforce development programs generally, has seemed unobtainable to actors in the construction industry because they are unfamiliar with the system and are under great time pressures. However, technology advances in the industry and labor shortages throughout the late 1990s have moved workforce development issues to the top of the construction industry agenda. A recent survey of homebuilder associations found that 100% of the state homebuilders' associations had been requested by their members to increase their involvement in workforce development.¹⁴

Because construction occupations generally require a significant amount of training prior to employment, there exists the opportunity for tying together both pre-employment training that will help workers gain access to construction industry jobs and incumbent worker training that will help workers move up within the industry. In this light, we present information on two programs, one of each of type of training. The Apprenticeship Preparedness Program in Boston provides a leg up for workers seeking to enter union apprenticeships, which are themselves a model of worker training and advancement. The Florida Construction Institute, in collaboration with the National Center for Construction Education and Research, provides both entry-level and ongoing career ladders training in the construction industry.

Apprenticeship Preparedness Program

Historically, access to construction jobs and union apprenticeship programs has been limited for women and racial and ethnic minorities. Apprenticeship programs are the gateway to high-paying career opportunities in construction occupations such as carpentry, painting, electrical, and plumbing. The Apprenticeship Preparedness Program (APP) represents a collaborative model of assisting underrepresented groups to enter apprenticeships and the trades.

The APP is operated in the greater Boston area by the Boston Building Trades Council, which includes the trades unions. Initiated in 1991, it was originally funded by the Central Artery/Third Harbor Tunnel project and was one of a number of programs managed by a group of nine community-based organizations called the Community Training Collaborative (CTC). CTC members included La Oficina Hispana de la Comunidad, Women in the Building Trades, and United South End Settlements. Central Artery/Third Harbor Tunnel funding was cut dramatically in 1999,¹⁵ although the program continues to operate on a smaller scale today, offering two 10-week sessions each year.

¹⁴ Home Builders Institute, "Home Builders Associations and Skilled Worker Activities," December, 2000.

¹⁵ Yvonne Abraham and Steven Wilmsen, "Community assails cuts in Big Dig job training," *Boston Globe*, June 14, 1999, p. B1.

One barrier to entry to union apprenticeship programs is the lack of basic skills, including a high school diploma or GED. To be considered for union training programs, applicants must have either a high school diploma or GED and pass a written test. The content of the tests vary from trade to trade but generally contain mathematics including high school-level algebra, tests of reading ability, and hands-on tests of spatial ability. For workers who do not have or cannot document possession of the required credentials or skills, these are formidable barriers indeed. The APP provides refresher courses on the basic skills required for passing the apprenticeship entrance examinations, and partners with other organizations to provide GED classes or assistance in obtaining the requisite documentation to those who need it.

Another barrier to accessing construction apprenticeships and employment is the misperceptions many people have about employment in trades. Unlike more traditional white male entrants to the industry, non-traditional workers may be unfamiliar with the true nature of the work. For example, many people think only of laborer positions when they think of construction jobs, and are unaware of how technologically advanced much of the work in the construction industry is. The APP addresses this issue by taking participants on trips to job sites to observe workers in various trades in action. The goal is to motivate them to pursue apprenticeship and future employment opportunities in the trades.

Florida Construction Institute

The Florida Construction Institute (FCI) is a partnership of the community colleges of Florida, the Florida Home Builders Association and its local branches in the state, and the National Center for Construction Education and Research. The main goal of the program is to provide opportunities for entry into construction occupations and sustained upward mobility in the field. In operation since the fall of 2000, the Institute piloted its program at the Community College of Jacksonville and has since expanded to an additional eight sites. There are plans to eventually integrate the FCI curriculum into the general curriculum at all of Florida's community colleges.

The FCI provides training in five occupations in the construction industry: Masonry; carpentry; electrical; plumbing; and heating, ventilation and air conditioning (HVAC). The training programs for state certification require between 960 and 1650 hours of classroom instruction, which is provided by the local community colleges.

FCI classes provide two types of credit in addition to meeting state certification requirements. First, all courses provide community college credit that can be applied toward an associate degree and possibly as transfer credit at a four-year college or university. Second, courses are accredited by the National Center for Construction Education and Research (NCCER).¹⁶ NCCER produces standardized construction training curricula and also maintains a national registry database of people who have completed it. The national registry makes NCCER training and certification portable across the country, which is an asset for workers who complete it.

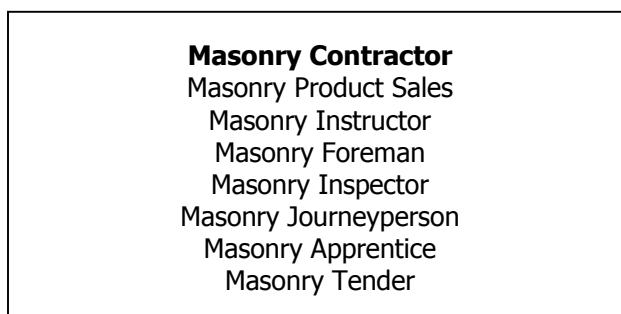
¹⁶ More information on the National Center for Construction Education and Research is available at http://www.nccer.org/About_NCCER/about_home.asp

On the job experience is also part of the FCI program. Students are provided with paid employment at local builders while in training. They are paid between \$6 to \$15 per hour, based on their length of time in the program and the number of training courses they have completed. Employers receive salary reimbursement for the period that the student is enrolled in both training and on the job work experience.¹⁷ Funding for both the initial training and the supported jobs at the pilot site during the training is provided by First Coast Workforce Development, the local Workforce Investment Board serving Jacksonville. FCI anticipates partnering with other local WIBs as the program is implemented in additional community colleges across the state.

In addition to courses offered as part of the employment training program, additional construction-related courses are offered once a person goes to work on a regular, full-time basis. Training opportunities are available at the community college, providing workers with a stable base from which to advance, and at local contractors who are NCCER certified.¹⁸

From an applicant's first contact with the program, career ladders are a clear part of the curriculum. Career ladders in each of the occupational groups are explained in the program's materials, which require an applicant to select an occupational training area. A sample of the masonry career ladder is shown in Figure 4.

Figure 4: Masonry Career Ladder



Source: Florida Construction Institute¹⁹

An interesting feature of the career ladder formulations promoted by FCI is that each one ends with a self-employment position at the top. Thus, FCI is promoting both career ladder employment and entrepreneurship. The construction industry is a perfect match for such a strategy due to the relative ease of entry for new businesses. Indeed, most of the construction firm owners interviewed for this report worked their way up through the ranks prior to starting their own company, albeit without such a clear vision of what it takes as that provided by FCI.

Funding for training provided by FCI comes from three sources. The local Workforce Investment Board funds training slots in the program for applicants from their local region. The Florida legislature appropriated \$500,000 to Florida Community College at Jacksonville to

¹⁷ Source: <http://www.flconstructioninstitute.com/Jobs.htm>

¹⁸ Locally, George W. Gould Construction Institute, Burlington, MA is the nearest NCCER-certified training provider.

¹⁹ Source: <http://www.flconstructioninstitute.com/Careers.htm#Career%20Ladders>

develop and implement the program and prepare for its replication at other community colleges across the state of Florida.

Once a worker completes the program, a third funding source may kick in. Local contractors may sign a National Training Service Agreement (NTSA) with NCCER. Under a NTSA, the contractor agrees to add \$0.15 per craft hour to their bid for all work. This money then goes to support incumbent worker training, with \$0.13 being spent directly on training a specific firm's workers and \$0.02 going to NCCER for the development of curricula. The funds go to a NCCER account earmarked for the specific contractor. The contractor then selects local training most relevant to the company's needs and then invoices NCCER for the cost. NCCER provides curriculum to local training organizations and maintains a national registry of participants and what training they have completed. The national registry and the fact that it comes from a respected industry-led organization makes the training both portable and useful to the worker as s/he seeks to advance along a career pathway.

Analysis

Construction companies in the Southern Essex region have identified concerns about skills shortages or mismatches among both entry-level and higher skilled workers in their industry. At the entry-level, the lack of knowledge about the construction industry and the relatively low levels of basic skills among many applicants can be barriers to employers finding enough workers to meet their needs. For non-union shops this means a lack of entry-level workers; for unions and union employers it means a shortage of successful applicants to enter and successfully complete apprenticeship programs. For workers that are able to enter the construction industry, there are additional barriers to advancement within the industry to occupations that have the potential to pay self-sufficiency wages.

The APP model shows promise of addressing the first issue. By reaching out to workers not traditionally involved in the construction industry in large numbers, the APP educates new potential applicants about the benefits of construction industry employment. APP also benefits the apprenticeship programs by serving as a screening device so that potential applicants who find out that construction occupations are not for them may find this out prior to spending time and resources on entering training. Tapping non-traditional sources of construction labor is one potential solution to the labor shortage in the industry.

The FCI program addresses some of the key issues for advancement within the construction industry. First, FCI places the career ladder concept in front of workers even before they enter the construction industry for the first time. Developing both the expectation of a career ladder and knowledge of potential career ladder steps in the industry is important for new entrants to the field. The program may also reinforce the importance of career ladders in the employers and industry associations with which the program partners. Second, by partnering with NCCER, the program has developed a sustainable funding mechanism that can support longer-term advancement along a career ladder. Employers are also able to self-select the training that best meets their business needs. Employees benefit from the additional wages and benefits that can

be had at higher rungs of the career ladder. This program concept appears to offer the sort of win-win alternative that the publicly funded employment training system should encourage.

Manufacturing

Though the concept of career ladders draws on the structure of traditional manufacturing firms, the decline in manufacturing in the U.S. and the loss of many of the lowest skilled jobs in the industry to foreign competition have signaled a need to address the way workers today enter and remain in the industry. The remaining manufacturing jobs in the United States generally require higher levels of skills and education, making it difficult for long-term manufacturing employees who did not upgrade their skills to remain employed in the industry. The change in occupational structure in the manufacturing industry has also made it more challenging to enter the industry by raising the educational bar for entry-level employment in manufacturing. The manufacturing program used here as a case study has attempted to address both the increased entry-level skills requirement and the need for regular upgrading of skills to advance within the industry.

Detroit Manufacturing Technology Bridge

The Detroit Manufacturing Technology Bridge (DMTB) program is designed to bridge the gap that characterizes much of the manufacturing industry in the U.S. between low-skill, low-paying, dead-end jobs and high-skill, high-paying jobs. In 1998, the DMTB program was developed and funded as a three-year pilot project. The DMTB program also has a sister program operating in Chicago, the Chicago Manufacturing Technology Bridge. The impetus for development of this program was two-fold:

- ◆ Manufacturing businesses found that they were unable to fill high-skill positions externally and that their incumbent workforce was unable to keep up with the demand for continuous education to stay abreast of the rapidly changing technology in the field.
- ◆ Community organizations, particularly the Detroit Empowerment Zone and the Detroit Hispanic Development Corporation, determined that their constituents' employment problems often had resulted from the loss of low-skill manufacturing jobs in the area.

The general framework of the DMTB program follows that of "tech prep" program used in high school school-to-career programs. Goals of the program include:

- ◆ Preparation of educationally disadvantaged adults for career path employment as technicians;
- ◆ Job placement into entry-level manufacturing technician positions;
- ◆ Provision of the social basis for positive life styles and attitudes toward work, family, and the community;
- ◆ Building economic self-sufficiency and self-esteem;
- ◆ Inclusive, rather than selective, in supplying participants with the foundation for career-long learning on-the-job and in formal technical training; and

- ◆ Articulation of an educational path to post-secondary technical education in advanced technology fields.²⁰

The initial framework of the DMTB program is comprised of two phases. A third phase was added based on the experience of students in the pilot rounds of the program. The first phase of training is the recruitment and training of students in the basic background of the program. For students who attend full-time, the first phase of the program is 16 weeks, 20 hours of training per week. For students who are currently employed, the program was broken down into training modules of four to eight hours, which delivered according to student availability. In addition, the program includes a Weekend Technical College that provides short-term workshops and seminars that are created as particular industry needs emerge. Sample course topics include CAD/CAM basics, Blueprint Reading, and Numerical Control Concepts. In addition to enhancing the ability of the program to meet employers' needs, the Weekend Technical College courses also sets the stage for a student's participation in ongoing training once s/he has completed the initial 320 hour training program and obtains employment.

The second phase of the program is ongoing training for career advancement and employment retention. Participants enroll in community college courses for credit leading to an Associates degree in Manufacturing Technology or other area relevant to their workers' specific job needs. Workers can also continue to take courses in the Weekend Technical College. While this component of the DMTB program is less fully developed than the first phase, at the sister program in Chicago, more than 25 percent of people who obtain entry-level employment go on to take community college courses toward the Associates degree.²¹

In the course of implementing the program, instructors identified a need for a structured learning program and more in-depth assessment process prior to a student entering program training. This led to the development of the Pre-Bridge Foundation Skills program, comprised of three main areas: assessment, academic support, and a learning skills readiness course. The assessment covers both academic skills, English language skills, and social elements included to identify supportive services needs. The academic support piece is delivered by computer-based training, allowing each student to proceed at her or his own pace through a series of activities designed to meet basic skills deficiencies. The learning skills readiness course is approximately 40 hours long and includes employer expectations, computer basics, learning strategies, communication skills, and employability skills.²² All new students are required to go through the Pre-Bridge program prior to enrolling in the DMTB program.

The DMTB program draws on both the SCANS (Secretary's Commission on Achieving Needed Skills) and the Advanced Manufacturing Skills Standards developed by the National Coalition for Advanced Manufacturing in their curriculum. In addition, employer representatives provided feedback on the curriculum and assistance in obtaining instructors with industry experience. All of these factors can be considered to be best practices in the workforce development field.

²⁰ Dale Brandenburg and Nancy Ruetz, "Bridge Implementation Guide: The Detroit Migration Experience," Great Cities Institute, University of Illinois Chicago, November, 2001, p. 7.

²¹ Source: <http://www.uic.edu/cuppa/techbridge/Chicago/Chicago.html>

²² Bradenburg and Ruetz, 2001, p. 12.

Another factor critical to the success of the DMTB program is the provision of supportive services. Services including childcare assistance, transportation assistance, and case management are provided to participants while they are participating in the training program and engaged in job search. Assessment of the extent to which students are taking responsibility for managing their life environment in preparation for obtaining full-time employment is part of the regular and ongoing student evaluation process.

The DMTB program was able to bring together an impressive array of community and education organizations to implement the program. The lead educational partners are Wayne State University and the Henry Ford Community College. Wayne State University provides the Vocational ESL program CD-ROM instructional program,²³ as well as feedback on the curriculum to ensure that it will support the learning efforts of students who want to pursue additional education. Henry Ford Community College has led curriculum development and delivery for the program. The Detroit Hispanic Development Corporation leads community-based partners in recruiting students, providing case management, and assisting with job placements in developing community-based training sites. The Hispanic Manufacturing Center takes the lead on engaging employers in the development and evaluation of curriculum materials and assists with getting employers to hire program graduates.²⁴

From the program's inception in 1998 through late 2001, the level of employer involvement in the program has changed significantly. When the program was designed, a decision was made to focus on manufacturing employers in Empowerment Zone because they had demonstrated the commitment to stay when many manufacturers left the neighborhood. Program designers thought that these employers—generally small and medium sized firms—were more likely to participate actively in the program. Early in the program, unemployment in Detroit was at an all-time low and employers were eager to participate in DMTB to have access to qualified workers. When the economy began to turn down, many employers pulled back from active participation in the program because they had no jobs to fill. The economic change also appears to have affected their willingness to allow their remaining employees participate in the career advancement component of the program. Strategically, it may have been wiser for the program to develop connection with larger manufacturing firms that would be more likely to have at least some openings due to normal attrition, even in difficult economic times.

Funding to develop the pilot DMTB program was obtained from various public sources. The National Science Foundation's Advancing Technological Education Program provided significant funding for the development of curriculum and instructional materials. The Detroit Empowerment Zone paid for training of zone residents, as well as serving in a coordinating capacity to bring community-based organizations into the program. The local Workforce Investment Board provided additional funding for program implementation.

²³ For the VESL curriculum details, see Mary Jarvis, "Vocational English as a Second Language for Manufacturing Workers with Limited English Proficiency," Wayne State University.

²⁴ Source: http://www.uic.edu/cuppa/techbridge/Project_Over/Proj_over.html

While the difficulty of making job placements in the current economy is providing challenges to the DMTB program, it continues to have an impact on the workforce development system in Detroit. The program continues to provide training, now with an even greater emphasis on enhancing employer partnerships and moving participants into community college courses for credit. In addition, the DMTB has sparked the Henry Ford Community College to develop bridge programs for occupations in the health care industry.

Analysis

Although the DMTB program does not bill itself as a career ladders program—it uses the term “career pathing” instead—it is easy to see how the program really does address the concepts of career ladders development and training. The program seeks to look at workforce development and employment in the manufacturing industry from a systemic approach, bringing together community colleges, universities, community-based organizations, employers, and workforce development funders. It addresses entry-level employment directly, for both incumbent workers who are being left behind by the changing technology in the industry and for potential new workers. Once participants complete the training program and enter the manufacturing workforce, the program works with them and their employers to identify additional training that can lead to enhanced employment retention in the industry and upward movement along a career path. By helping to create a pipeline of new workers, the program also addresses potential employer concerns about vacancies left behind by incumbents who advance.

The strong network of community-based organizations, community college and university training providers, employers, and funders is an important feature of an effective workforce development intervention. In the current environment, no one organization can provide every function necessary to meet the needs of participants and employers. Likewise, few employers or public or private funding sources are able to provide the full amount of resources necessary for employment training programs, making this case a good guide to putting together multiple sources of funding to implement a program.

Telecommunications

The telecommunications industry offers a variety of specific challenges in the development of career ladders training programs. These include:

- ◆ The rapidity of technological change in the telecommunications industry makes for somewhat of a moving target in the development of job competencies and benchmarks with employers.
- ◆ Business change in the industry is every bit as rapid as technological change. The rate at which companies grow, merge, or go out of business makes it difficult to develop stable employer partners. It is particularly difficult to meet with business principals in the telecommunications industry due to the rapid pace of their businesses.

It is important to recognize that the telecommunications industry is comprised of at least three different sub-sectors: manufacturing, traditional service providers, and networking and technical

service providers. Each of these sub-sectors is sufficiently different to require different types of training. The following case falls within the traditional service provider sub-sector, the largest telecommunications employment generator in the region.²⁵

Next Step Program

The Next Step program has operated since 1995 at Verizon (previously Bell Atlantic) to meet the changing technology needs of the telecommunications industry by providing company technicians with upgrading training leading to an associate’s degree. As part of its program description, Verizon states that “In the 1980's and 1990's, 80 percent of technical problems were solved by reference to Bell System Practices, manuals, and stepped work processes (broken down so each could do a part). Today, 80 percent of the technical problems must be solved by a working knowledge of current technologies (ever changing) and intuitive problem solving stemming from that increased knowledge.”²⁶ The Next Step program therefore includes both technical and soft skills training to strengthen participants’ on-the-job problem-solving capacity. In 2000, approximately 1,700 employees were actively participating in the program.

Technical skills training is provided by 24 community colleges in New England and New York. Springfield Technical Community College is the lead community college for the New England region. The training provided by the community colleges leads to the Associates Degree in Applied Science (AAS) with a concentration in Telecommunications Technology. In the first five years of the program, more than 450 participants earned this credential.

Each semester, participants take two courses, which are offered at the community colleges and are taken on company time. The entire program takes a minimum of four years to complete. For students who are interested in the program but cannot successfully pass the entrance examination, a remedial course in college algebra is offered.

Figure 5: Next Step Technical Curriculum²⁷

Semester	Course Title	Credit Hours
1	Technical Math	4
	Computer Applications	3
2	English 1	3
	Electrical Circuits	4
3	Technical Math 2	4
	Electronics 1	4
4	Electronics 2	4
	Physics	4
5	Telecommunications 1	4
	Digital 1	4
6	Digital 2	4
	Telecommunications 2	4
7	English 2	3
	Telecommunications 3	4
8	Social Science	3
	Telecommunications 4	4

²⁵ For information on telecommunications, see O. Steven Quimby, “Career Ladders for the 21st Century,” Boston Workforce Development Center, 2001.

²⁶ Source: <http://www.abo.org>

²⁷ Source: <http://www.abo.org>

: O. Steven Quimby, “Career Ladders for the 21st Century,” Boston Workforce Development Center, 2001.

In addition to the on-campus technical training, the Next Step program makes use of advanced telecommunications technology to make all participants and instructors part of a “Virtual University.” Each instructor and student is issued a laptop computer and a Lotus Notes account to maintain contact between programs. The curriculum also uses programs such as Electronics WorkBench and Math CAD to provide simulations in class and that can be done as homework and then shared with the instructor and fellow students across the Lotus Notes network. Having a personal laptop computer and Internet and email access has had the unanticipated benefit of workers using this technology to communicate on the job and resolve work-related problems more efficiently.²⁸

The second centerpiece to the program is the soft-skills component, known as the Verizon Umbrella Competencies.

Figure 6: The Verizon Umbrella Competencies²⁹

<p>Quality Doing the job right the first time, and doing it in a way that meets or exceeds customers’ requirements</p> <p>Customer Focus Satisfying the needs of customers to a quality standard that builds trust and confidence for long term relationship through exceptional communication and technical skills.</p> <p>Team Building Working as a team to achieve mutual goals, building meaningful and productive professional relationships regardless of personal differences or resource challenges.</p> <p>Project Leadership The process through which individuals exhibit leadership among their co-workers--both in their own work groups and beyond--to ensure customer service projects that exceed customer expectations.</p> <p>Problem Solving Obtaining and evaluating information to develop and implement cost competitive solutions to customer problems in a timely fashion.</p> <p>Technology & Service Delivery Having and applying knowledge of the telecommunications industry, especially up-to-date core technologies, products, and services, in order to deliver these to customers in a timely and expert fashion.</p>
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²⁸ Source: <http://www.aboutnextstep.com/students.html>

²⁹ Source: <http://www.aboutnextstep.com/uc.html>

These competencies are also embedded in each technical training course. Instructors receive extensive training in making the competencies a core part of their curriculum from The Brunswick Institute. The team-building competency is a primary focus of students and course instructors alike. The goal is to move students from group work to informal activities by groups to teamwork to a formal process of working together to meet goals. Comments culled from a survey of students in the program often focused on the way that their participation in the program enhanced both their competence in working as part of a team and their confidence in asserting themselves with managers, vendors, and clients in areas of their expertise.³⁰

Worker advancement through participation in the Next Step program occurs in three ways. First, all participants receive a contractually negotiated raise after the completion of thirty of the sixty credit hours required for the AAS degree. The amount of the raise varies by seniority and job title. Second, upon completion of the program and obtaining the AAS degree, workers are eligible to bid for higher level jobs, with increased wages. Third, workers may be able to make lateral moves with the company in times of layoffs that may allow them to retain employment when their previous job is eliminated.

Partners in the Next Step program include the company, its two main unions, the International Brotherhood of Electrical Workers (IBEW) for workers in New England, and the community colleges. Perhaps because it only enrolls incumbent workers who are already members of one of the unions, the Next Step program is the only one of the programs studied that does not include community-based organizations as partners.

The Next Step program is also funded differently from the other programs. Verizon itself pays for the Next Step program, is part of its collective bargaining agreement with the unions. While this method of funding has been sufficient to implement the Next Step program, other union-company employment training programs do receive public funding through competitive grant award programs, so the option of pursuing outside funding may be available.

Analysis

The Next Step program is substantially different from the others in a number of important ways. First, there is a sole, large employer, Verizon, involved with the program. Verizon's size means that there are likely to be vacancies there even during an economic downturn, while jobs in some smaller firms may dry up. While working with a sole company may not be the best strategy, putting together a small group of larger firms in an industry may be an effective way to develop career ladders training. Second, this is the only case that involves unions as a partner in the program. One benefit is that funding for the program can be contractually negotiated between the company and the union, rather than pursued externally. Another is that the development of career advancement pathways is more prevalent in unionized firms, making acceptance of career ladder training easier to come by. The overall suggestions for practice by the SEWIB from this

³⁰ Source: <http://www.aboutnextstep.com/students.html>

case are the involvement of larger companies and unions whenever possible in funded training programs.

Lessons

Each of the cases presented above focuses on a different industry, with particular requirements to make programs effective. Notwithstanding, there are lessons that can be drawn from the cases as a group. These include:

- ◆ Bringing together a variety of training, recruitment, and supportive services providers is essential. In implementing career ladders programs it is not efficient for any one organization to try to go it alone. Strong partners enhance the overall effectiveness of the program by allowing each partner to perform the role that it is best at.
- ◆ Community colleges may be the best training provider for higher skills training, as they are in each of the examples provided. Community colleges appear to occupy a special niche in the employment training system. Their particular capacities and advantages should be maximized by career ladders programs.
- ◆ Career ladders programs require diverse funding streams. With the exception of the Next Step program, for which funding is guaranteed through the collective bargaining process, the programs are skilled at putting together diverse funding streams to support their operations. This skill is key to program survival, given changes in the economic climate and shifts in emphasis by public and private funders.
- ◆ Overall, the provision of supportive services, in addition to the technical training components, is critical. Left without support, many participants will not be able to complete the program for reasons that have nothing to do with their capacity to learn or their motivation. Child care, transportation, case management, and counseling are critical supportive services.

RECOMMENDATIONS

Construction

- ◆ Develop partnerships with local Home Builders Associations and other trade groups and include them as partners in the creation and implementation of workforce development activities.
- ◆ Work with contractors, unions and local secondary schools to develop outreach efforts and programs that offer training and internships in the trades for high school students.
- ◆ Publicize the high wage potential and career advancement opportunities for skilled tradespeople in both union and non-union firms.
- ◆ Building upon the Apprentice Preparedness Program model, consider funding programs that facilitate the entry of “non-traditional” workers and those with language and education barriers into union apprenticeship programs.

Manufacturing

- ◆ Work closely with employers to identify specific high-wage occupations in which there is or will be a high demand for labor, such as CNC machinists.
- ◆ Identify emerging sub-sectors of the manufacturing industry that focus on high value-added work and therefore are likely to remain in the region. Work with employers, community colleges and other training providers to identify and develop training geared toward the high wage jobs in these sub-sectors.

Telecommunications

- ◆ Telecommunications is the industry most affected by the recent economic downturn. To work effectively with this industry, the WIB should identify a small group of employer partners with whom to facilitate the development of training programs to enable low-income workers to access the high wage jobs that telecommunications offers.

Training Providers

- ◆ Build upon the expertise of community colleges and facilitate increased connections between community colleges and employers, particularly in the construction industry.
- ◆ Work with nonprofit training providers to publicize their areas of expertise, and to develop stronger connections with employers.

- ◆ The WIB should encourage partnership between community-based organizations that provide ESOL, ABE, and other types of basic training and community colleges and other providers of higher level technical training to provide a ladder of training opportunities that will allow workers to attain sustainable wages.

Funding

- ◆ The construction and manufacturing industries in the region are focusing increasingly on higher-end work, which in turn is driving a demand for higher skilled workers. The WIB should promote training programs that can place workers in entry-level positions relatively quickly and then provide additional training over 12 to 18 months leading to employment in high-skill, high-pay jobs.
- ◆ The WIB can act as both a direct funder and catalyst for funding from other public and private sources. The WIB should consider convening industry groups, including employers, unions, and training providers, to develop innovative programs and submit them for funding consideration.
- ◆ Funding of basic skills programs such as ESOL and ABE are critically important to building the foundation that workers can continue to learn from over the long-term. Funding for these programs should be enhanced to the extent possible. They should be connected to training programs, with employment in a critical industry in the region as a successful outcome.

Some will suggest that the current economic climate is not favorable for making investments in employment training programs. However, in many ways this is the exact time to implement training programs, so that when the economy recovers and hiring picks up, workers with technical skills will be ready. This represents a win-win arrangement for employers, workers, and the Workforce Investment Board.

Appendix Table 1

Occupational Matrix: Manufacturing--Metalworking Machinery

SIC Code 354

Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level ^a	Growth Projection ^b
Machinists	\$16.80	\$17.16	SE	42	3	-4%
Tool & Die Makers	\$20.50	\$20.90	SE	41	3	-12%
Machine Tool Cutting Operators & Tenders, Metal & Plastic	\$11.00	\$10.46	SE	10	2	-30%
Numerical Control Machine Tool Operators & Tenders, Metal & Plastic	\$15.27	\$15.02	SE	10	3	9%
Grinding Machine Tool Setters & Set-up Operators	\$13.61	\$13.23	SE	10	2	n/a
Sales & Related Workers, All Others	\$15.91	\$14.32	MA	9	1	n/a
Assemblers, Fabricators, & Hand Workers, All Others	Not in database		n/a	9	1	n/a
Lathe & Turning Tool Setters & Set-up Operators, Metal & Plastic	\$16.22	\$16.89	SE	9	2	-18%
Machine Tool Cutting & Forming, etc. All Others	Not in database		n/a	9	2	n/a
Machine Builders & Other Precision Machine Assemblers	\$14.68	\$14.54	MA	7	3	-7%
Combination Machine Tool Setters & Set-up Operators, Metal & Plastic	\$15.00	\$15.80	MA	7	2	-2%
Precision Metal Workers, All Others	Not in database		n/a	7	2	n/a
Inspectors, Testers, & Graders, Precision	\$16.28	\$15.17	MA	7	3	-15%
Secretaries, Except Legal & Medical	\$14.00	\$13.48	SE	7	1	-4%
Drafters	\$23.44	\$22.89	SE	7	3	-5%
General Office Clerks	\$10.67	\$10.30	SE	7	1	9%
Machine Forming Operators & Tenders, Metal & Plastic	\$10.50	\$9.82	SE	5	2	-19%
Drilling & Boring Machine Tool Setters & Operators, Metal & Plastic	\$17.32	\$15.99	SE	5	2	-26%
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	5	2	-8%
Shipping, Receiving, & Traffic Clerks	\$11.74	\$11.51	SE	5	1	0%
Woodworkers, All Other Precision	\$10.76	\$9.73	MA	5	2	n/a
Janitors & Cleaners	\$8.85	\$8.23	MA	5	1	6%
Metal & Plastic Machine Setters, Operators, & Tenders	Not in database		n/a	4	2	n/a

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Occupational Matrix: Manufacturing--Metalworking Machinery (continued)						
SIC Code 354						
Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level^a	Growth Projection^b
Industrial Machinery Mechanics	Not in database		n/a	4	3	-3%
Grinding & Polishing Workers, Hand	\$11.17	\$11.19	SE	4	2	-6%
Welders & Cutters	\$15.38	\$14.89	MA	4	2	-3%
Punching Machine Setters & Set-up Operators, Metal & Plastic	\$17.00	\$15.84	SE	4	2	-16%
Maintenance Repairers, General Utility	\$13.25	\$12.75	SE	4	3	2%
Machine Operators, Tenders, Setters, & Set-up	Not in database		n/a	4	2	n/a
Production, Planning, & Expediting Clerks	\$19.65	\$19.40	MA	2	2	-6%
Electric & Electronic Equipment Assemblers, Precision	\$12.79	\$12.58	MA	2	2	-8%
Stock Clerks, Stockroom, Warehouse, or Stockyard	\$11.33	\$10.55	MA	2	1	-2%
Helpers, Laborers, & Material Movers, Hand, All Others	\$11.63	\$10.78	MA	2	1	n/a
Machine Assemblers	\$13.60	\$12.59	MA	2	2	-17%
Electrical & Electronic Engineering Technicians & Technologists	\$20.21	\$18.54	MA	2	3	8%
Electrical & Electronic Assemblers	\$11.06	\$11.01	MA	2	2	-4%
Welding Machine Setters, Operators, & Tenders	Not in database		n/a	2	2	-6%
Hand Packers & Packagers	\$9.13	\$7.18	SE	2	1	12%
Sheet Metal Workers & Duct Installers	Not in database		n/a	2	2	9%
Precision Workers, All Others	\$14.50	\$13.13	MA	2	2	n/a

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Appendix Table 2

Occupational Matrix: Manufacturing--Special Industry Machinery

SIC Code 355

Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level ^a	Growth Projection ^b
Machinists	\$16.80	\$17.16	SE	163	3	-4%
Machine Builders & Other Precision Machine Assemblers	\$14.68	\$14.54	MA	84	3	-7%
Sales & Related Workers, All Others	\$15.91	\$14.32	MA	82	1	n/a
Assemblers, Fabricators, & Hand Workers, All Others	Not in database		n/a	76	1	n/a
Welders & Cutters	\$15.38	\$14.89	MA	52	2	-3%
Secretaries, Except Legal & Medical	\$14.00	\$13.48	SE	49	1	-4%
Drafters	\$23.44	\$22.89	SE	46	3	-5%
Machine Assemblers	\$13.60	\$12.59	MA	41	2	-17%
Sheet Metal Workers & Duct Installers	Not in database		n/a	40	2	9%
Machine Tool Cutting & Forming, etc. All Others	Not in database		n/a	34	2	n/a
Inspectors, Testers, & Graders, Precision	\$16.28	\$15.17	MA	32	3	-15%
Shipping, Receiving, & Traffic Clerks	\$11.74	\$11.51	SE	32	1	0%
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	29	2	-8%
Welding Machine Setters, Operators, & Tenders	Not in database		n/a	29	2	-6%
Lathe & Turning Tool Setters & Set-up Operators, Metal & Plastic	\$16.22	\$16.89	SE	27	2	-18%
Engineering Technicians & Technologists, All Others	\$20.86	\$18.51	MA	27	3	n/a
Machine Tool Cutting Operators & Tenders, Metal & Plastic	\$11.00	\$10.46	SE	26	2	-30%
Electrical & Electronic Equipment Assemblers, Precision	\$12.79	\$12.58	MA	26	2	-8%
Numerical Control Machine Tool Operators & Tenders, Metal & Plastic	\$15.27	\$15.02	SE	26	3	9%
General Office Clerks	\$10.67	\$10.30	SE	26	1	9%
Stock Clerks, Stockroom, Warehouse, or Stockyard	\$11.33	\$10.55	MA	26	1	-2%

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Occupational Matrix: Manufacturing--Special Industry Machinery (continued)						
SIC Code 355						
Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level^a	Growth Projection^b
Industrial Machinery Mechanics	Not in database		n/a	26	3	-3%
Production, Planning, & Expediting Clerks	\$19.65	\$19.40	MA	20	2	-6%
Electrical & Electronic Assemblers	\$11.06	\$11.01	MA	20	2	-4%
Electrical & Electronic Engineering Technicians & Technologists	\$20.21	\$18.54	MA	20	3	8%
Electromechanical Equipment Assemblers, Precision	\$12.37	\$12.07	MA	18	2	-3%
Tool & Die Makers	\$20.50	\$20.90	SE	18	3	-12%
Drilling & Boring Machine Tool Setters & Operators, Metal & Plastic	\$17.32	\$15.99	SE	15	2	-26%
Combination Machine Tool Setters & Set-up Operators, Metal & Plastic	\$15.00	\$15.80	MA	15	2	-2%
Janitors & Cleaners	\$8.85	\$8.23	MA	15	1	6%
Order Clerks, Materials, Merchandise & Service	\$12.74	\$12.23	MA	14	1	0%
Coating, Painting, & Spraying Machine Operators & Tenders	\$11.15	\$10.91	MA	14	2	-4%
Grinding Machine Tool Setters & Set-up Operators	\$13.61	\$13.23	SE	14	2	n/a
Precision Workers, All Others	\$14.50	\$13.13	MA	12	2	n/a
Maintenance Repairers, General Utility	\$13.25	\$12.75	SE	12	3	2%
Grinding & Polishing Workers, Hand	\$11.17	\$11.19	SE	12	2	-6%
All Other Freight, Stock, & Material Movers, Hand	\$11.34	\$10.63	MA	12	1	n/a
Machine Operators, Tenders, Setters, & Set-up	Not in database		n/a	12	2	n/a
Electricians	\$20.41	\$19.75	MA	12	3	7%
Millwrights	\$16.25	\$16.09	MA	12	3	0%
All Other Management Support Workers	\$21.18	\$18.87	MA	12	3	n/a
Helpers, Laborers, & Material Movers, Hand, All Others	\$11.63	\$10.78	MA	9	1	n/a

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Appendix Table 3

Occupational Matrix: Manufacturing--General Industry Machinery

SIC Code 356

Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level ^a	Growth Projection ^b
Assemblers, Fabricators, & Hand Workers, All Others	Not in database		n/a	43	1	n/a
Machinists	\$16.80	\$17.16	SE	26	3	-4%
Sales & Related Workers, All Others	\$15.91	\$14.32	MA	21	1	n/a
Inspectors, Testers, & Graders, Precision	\$16.28	\$15.17	MA	17	3	-15%
Welders & Cutters	\$15.38	\$14.89	MA	15	2	-3%
Numerical Control Machine Tool Operators & Tenders, Metal & Plastic	\$15.27	\$15.02	SE	13	3	9%
Machine Builders & Other Precision Machine Assemblers	\$14.68	\$14.54	MA	13	3	-7%
Lathe & Turning Machine Tool Setters & Set-up Operators, Metal & Plastic	\$16.22	\$16.89	SE	12	2	-18%
Secretaries, Except Legal & Medical	\$14.00	\$13.48	SE	11	1	-4%
Grinding Machine Tool Setters & Set-up Operators	\$13.61	\$13.23	SE	11	2	n/a
Drafters	\$23.44	\$22.89	SE	11	3	-5%
Machine Tool Cutting Operators & Tenders, Metal & Plastic	\$11.00	\$10.46	SE	10	2	-30%
Sheet Metal Workers & Duct Installers	Not in database		n/a	9	2	9%
Industrial Machinery Mechanics	Not in database		n/a	9	3	-3%
Machine Tool Cutting & Forming, etc. All Others	Not in database		n/a	8	2	n/a
Machine Assemblers	\$13.60	\$12.59	MA	8	2	-17%
Shipping, Receiving, & Traffic Clerks	\$11.74	\$11.51	SE	8	1	0%
Combination Machine Tool Setters & Set-up Operators, Metal & Plastic	\$15.00	\$15.80	MA	8	2	-2%
Machine Tool Cutting & Forming, etc. All Others	Not in database		n/a	6	2	n/a
Machine Operators, Tenders, Setters, & Set-up	Not in database		n/a	6	2	n/a
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	6	2	-8%
Stock Clerks, Stockroom, Warehouse, or Stockyard	\$11.33	\$10.55	MA	6	1	-2%
Engineering Technicians & Technologists, All Others	\$20.86	\$18.51	MA	6	3	n/a

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Occupational Matrix: Manufacturing--General Industry Machinery (continued)

SIC Code 356

Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level^a	Growth Projection^b
Machine Tool Cutting & Forming, etc.	Not in database		n/a	6	2	n/a
All Others						
General Office Clerks	\$10.67	\$10.30	SE	6	1	9%
Production, Planning, & Expediting Clerks	\$19.65	\$19.40	MA	6	2	-6%
Helpers, Laborers, & Material Movers, Hand, All Others	\$11.63	\$10.78	MA	6	1	n/a
Drilling & Boring Machine Tool Setters & Operators, Metal & Plastic	\$17.32	\$15.99	SE	6	2	-26%
Tool & Die Makers	\$20.50	\$20.90	SE	6	3	-12%
Metal & Plastic Machine Setters, Operators, & Tenders	Not in database		n/a	5	2	n/a
All Other Freight, Stock, & Material Movers, Hand	\$11.34	\$10.63	MA	5	1	n/a
Precision Workers, All Others	\$14.50	\$13.13	MA	5	2	n/a
Maintenance Repairers, General Utility	\$13.25	\$12.75	SE	4	3	2%
Order Clerks, Materials, Merchandise & Service	\$12.74	\$12.23	MA	4	1	
Electromechanical Equipment Assemblers, Precision	\$12.37	\$12.07	MA	4	2	-3%
Electrical & Electronic Assemblers	\$11.06	\$11.01	MA	4	2	-4%
Janitors & Cleaners	\$8.85	\$8.23	MA	4	1	6%
Electrical & Electronic Equipment Assemblers, Precision	\$12.79	\$12.58	MA	3	2	-8%
Hand Packers & Packagers	\$9.13	\$7.18	SE	3	1	12%
Coating, Painting, & Spraying Machine Operators & Tenders	\$11.15	\$10.91	MA	3	2	-4%
Electrical & Electronic Technicians & Technologists	Not in database		n/a	2	2	n/a
Electricians	\$20.41	\$19.75	MA	2	3	7%
Grinding & Polishing Workers, Hand	\$11.17	\$11.19	SE	2	2	-6%
Industrial Truck & Tractor Operators	\$14.18	\$14.48	SE	2	3	5%
Assemblers, All Other Precision	\$11.65	\$10.58	MA	2	2	n/a

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Appendix Table 4

Occupational Matrix: Manufacturing--Industrial Machinery, NEC						
SIC Code 359						
Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level^a	Growth Projection^b
Machinists	\$16.80	\$17.16	SE	313	3	-4%
Numerical Control Machine Tool Operators & Tenders, Metal & Plastic	\$15.27	\$15.02	SE	76	3	9%
Assemblers, Fabricators, & Hand Workers All Others	Not in database		n/a	54	1	n/a
Machine Tool Cutting Operators & Tenders Metal & Plastic	\$11.00	\$10.46	SE	54	2	-30%
Inspectors, Testers, & Graders, Precision	\$16.28	\$15.17	MA	42	3	-15%
Welders & Cutters	\$15.38	\$14.89	MA	41	2	-3%
Lathe & Turning Machine Tool Setters & Set-up Operators, Metal & Plastic	\$16.22	\$16.89	SE	41	2	-18%
Combination Machine Tool Setters & Set-up Operators, Metal & Plastic	\$15.00	\$15.80	MA	39	2	-2%
Grinding Machine Tool Setters & Set-up Operators	\$13.61	\$13.23	SE	34	2	n/a
Secretaries, Except Legal & Medical	\$14.00	\$13.48	SE	31	1	-4%
General Office Clerks	\$10.67	\$10.30	SE	31	1	9%
Machine Tool Cutting & Forming, etc., All Others	Not in database		n/a	29	2	n/a
Sales & Related Workers, All Others	\$15.91	\$14.32	MA	28	1	n/a
Tool & Die Makers	\$20.50	\$20.90	SE	25	3	-12%
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	25	2	-8%
Welding Machine Setters, Operators & Tenders	Not in database		n/a	25	2	-6%
Drilling & Boring Machine Tool Setters & Operators, Metal & Plastic	\$17.32	\$15.99	SE	22	2	-26%
Shipping, Receiving, & Traffic Clerks	\$11.74	\$11.51	SE	20	1	0%
Janitors & Cleaners	\$8.85	\$8.23	MA	18	1	6%
Industrial Machinery Mechanics	Not in database		n/a	18	3	-3%

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Occupational Matrix: Manufacturing--Industrial Machinery, NEC (continued)

SIC Code 359

Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level^a	Growth Projection^b
Machine Builders & Other Precision Machine Assemblers	\$14.68	\$14.54	MA	17	3	-7%
Grinding & Polishing Workers, Hand	\$11.17	\$11.19	SE	16	2	-6%
Sheet Metal Workers & Duct Installers	Not in database		N/A	16	2	9%
Precision Metal Workers, All Others	\$13.89	\$14.12	MA	12	2	n/a
Maintenance Repairers, General Utility	\$13.25	\$12.75	SE	12	3	2%
Machine Forming Operators & Tenders, Metal & Plastic	\$10.50	\$9.82	SE	11	2	-19%
Production, Planning, & Expediting Clerks	\$19.65	\$19.40	MA	11	2	-6%
Machine Feeders & Offbearers	\$10.06	\$10.65	SE	11	1	-9%
Drafters	\$23.44	\$22.89	SE	9	3	-5%
Stock Clerks, Stockroom, Warehouse, or Stockyard	\$11.33	\$10.55	MA	9	1	-2%
Machine Assemblers	\$13.60	\$12.59	MA	9	2	-17%
Helpers, Laborers, & Material Movers, Hand, All Others	\$11.63	\$10.78	MA	9	1	n/a

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Appendix Table 5

Occupational Matrix: Plumbing, Heating and Air Conditioning						
SIC Code 171						
Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level^a	Growth Projection^b
Plumbers, Pipefitters, & Steamfitters	\$20.65	\$19.46	SE	279	3	2%
Heating, Air Conditioning, & Refrigeration Mechanics & Installers	\$18.02	\$17.45	MA	194	3	8%
Sheet Metal Workers & Duct Installers	Not in database		n/a	120	2	9%
Helpers, All Other Construction Trade Workers	\$13.84	\$13.18	MA	90	1	n/a
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	44	2	-8%
General Office Clerks	\$10.67	\$10.30	SE	40	1	9%
Secretaries, Except Legal & Medical	\$14.00	\$13.48	SE	38	1	-4%
Sales & Related Workers, All Others	\$15.91	\$14.32	MA	20	1	n/a
Stock Clerks, Stockroom, Warehouse, or Stockyard	\$11.33	\$10.55	MA	17	1	-2%
Electricians	\$20.41	\$19.75	MA	14	3	7%
Maintenance Repairers, General Utility	\$13.25	\$12.75	SE	13	3	2%
Truck Drivers, Light & Heavy	Not in database		n/a	13	2	10%
Drafters	\$23.44	\$22.89	SE	9	3	-5%
Carpenters	\$19.65	\$19.13	SE	8	3	1%
Helpers, Laborers, & Material Movers, Hand, All Others	\$11.63	\$10.78	MA	7	1	n/a

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Appendix Table 6

Occupational Matrix: Painting and Paper Hanging

SIC Code 172

Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level ^a	Growth Projection ^b
Painters & Paperhangers, Construction & Maintenance	\$14.81	\$14.11	SE	188	2	3%
Helpers, All Other Construction Trade Workers	\$13.84	\$13.18	MA	24	1	n/a
Secretaries, Except Legal & Medical	\$14.00	\$13.48	SE	7	1	-4%
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	7	2	-8%
General Office Clerks	\$10.67	\$10.30	SE	7	1	9%
Carpenters	\$19.65	\$19.13	SE	3	3	1%
Drywall Installers & Finishers	Not in database		n/a	3	2	n/a

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Appendix Table 7

Occupational Matrix: Electrical Work						
SIC Code 173						
Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level ^a	Growth Projection ^b
Electricians	\$20.41	\$19.75	MA	374	3	7%
Helpers, All Other Construction Trade Workers	\$13.84	\$13.18	MA	82	1	n/a
Telephone & Cable Television Line Installers & Repairers	\$20.40	\$21.61	MA	35	2	23%
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	28	2	-8%
Secretaries, Except Legal & Medical	\$14.00	\$13.48	SE	25	1	-4%
General Office Clerks	\$10.67	\$10.30	SE	24	1	9%
Electrical Powerline Installers & Repairers	\$20.65	\$21.79	MA	15	3	1%
Sales & Related Workers, All Others	\$15.91	\$14.32	MA	15	1	n/a
Maintenance Repairers, General Utility	\$13.25	\$12.75	SE	10	3	2%
All Other Mechanics, Installers, & Repairers	\$15.54	\$14.93	MA	10	2	n/a
Electrical & Electronic Technicians & Technologists	Not in database		n/a	10	2	n/a
Stock Clerks, Stockroom, Warehouse, or Stockyard	\$11.33	\$10.55	MA	8	1	-2%
Plumbers, Pipefitters, & Steamfitters	\$20.65	\$19.46	SE	5	3	2%
Truck Drivers, Light & Heavy	Not in database		n/a	5	2	n/a
Heating, Air Conditioning, & Refrigeration Mechanics & Installers	\$18.02	\$17.45	MA	5	3	8%

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Appendix Table 8

Occupational Matrix: Masonry, Stonework, and Plastering

SIC Code 174

Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level ^a	Growth Projection ^b
Drywall Installers & Finishers	Not in database		n/a	72	2	n/a
Bricklayers & Stonemasons	Not in database		n/a	67	3	11%
Helpers, All Other Construction Trade Workers	\$13.84	\$13.18	MA	63	1	n/a
Insulation Workers	\$16.84	\$14.27	MA	29	2	6%
Plasterers & Stucco Masons	\$22.68	\$20.81	MA	17	3	13%
Carpenters	\$19.65	\$19.13	SE	16	3	1%
Ceiling Tile Installers & Acoustical Carpenters	\$19.76	\$20.91	MA	13	3	7%
Hard Tile Setters	\$20.65	\$17.60	MA	11	2	9%
General Office Clerks	\$10.67	\$10.30	SE	5	1	9%
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	5	2	-8%
Concrete & Terrazzo Finishers	\$18.01	\$16.94	MA	4	2	0%
Truck Drivers, Light & Heavy	Not in database		n/a	4	2	10%
Painters & Paperhangers, Construction & Maintenance	\$14.81	\$14.11	SE	4	2	3%
Sales & Related Workers, All Others	\$15.91	\$14.32	MA	2	1	n/a
Helpers, Laborers, & Material Movers, Hand, All Others	\$11.63	\$10.78	MA	2	1	n/a
All Other Construction Trades Workers	\$24.46	\$28.04	MA	2	3	n/a

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Appendix Table 9

Occupational Matrix: Carpentering and Floor Work

SIC Code 175

Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level ^a	Growth Projection ^b
Carpenters	\$19.65	\$19.13	SE	137	3	1%
Helpers, All Other Construction Trade Workers	\$13.84	\$13.18	MA	29	1	n/a
All Other Construction Trades Workers	\$24.46	\$28.04	MA	22	3	n/a
Carpet Installers	\$16.09	\$16.82	MA	21	2	1%
Sales & Related Workers, All Others	\$15.91	\$14.32	MA	13	1	n/a
Cabintemakers & Bench Carpenters	\$14.09	\$14.39	SE	13	2	-3%
General Office Clerks	\$10.67	\$10.30	SE	12	1	9%
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	11	2	-8%
Secretaries, Except Legal & Medical	\$14.00	\$13.48	SE	9	1	-4%
Maintenance Repairers, General Utility	\$13.25	\$12.75	SE	5	3	2%
Hard Tile Setters	\$20.65	\$17.60	MA	4	2	9%
Stock Clerks, Stockroom, Warehouse, or Stockyard	\$11.33	\$10.55	MA	4	1	-2%
Helpers, Laborers, & Material Movers, Hand, All Others	\$11.63	\$10.78	MA	3	1	n/a
Concrete & Terrazzo Finishers	\$18.01	\$16.94	MA	3	2	0%
Truck Drivers, Light & Heavy	Not in database		n/a	3	2	10%
Drywall Installers & Finishers	Not in database		n/a	3	2	n/a
Assemblers, Fabricators, & Hand Workers, All Others	Not in database		n/a	3	1	n/a
Structural & Reinforcing Metal Workers	Not in database		n/a	3	2	1%

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Appendix Table 10

Occupational Matrix: Roofing, Siding, and Sheet Metal Work

SIC Code 176

Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level ^a	Growth Projection ^b
Roofers	\$16.81	\$16.18	MA	54	2	9%
Helpers, All Other Construction Trade Workers	\$13.84	\$13.18	MA	17	1	n/a
Sheet Metal Workers & Duct Installers	Not in database		n/a	13	2	9%
Carpenters	\$19.65	\$19.13	SE	5	3	1%
General Office Clerks	\$10.67	\$10.30	SE	4	1	9%
Sales & Related Workers, All Others	\$15.91	\$14.32	MA	3	1	n/a
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	3	2	-8%
Truck Drivers, Light & Heavy	Not in database		N/A	2	2	10%
All Other Construction Trades Workers	\$24.46	\$28.04	MA	2	3	n/a
Metal Fabricators, Structural Metal Products	\$14.34	\$13.95	MA	1	2	0%
Helpers, Laborers, & Material Movers, Hand, All Others	\$11.63	\$10.78	MA	1	1	n/a
Structural & Reinforcing Metal Workers	Not in database		n/a	1	2	1%
Payroll & Timekeeping Clerks	\$14.14	\$14.01	SE	1	1	-9%

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Appendix Table 11

Occupational Matrix: Concrete Work						
SIC Code 177						
Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level^a	Growth Projection^b
Concrete & Terrazzo Finishers	\$18.01	\$16.94	MA	28	2	0%
Helpers, All Other Construction Trade Workers	\$13.84	\$13.18	MA	12	1	n/a
Paving, Surfacing, & Tamping Equipment Operators	\$12.45	\$12.66	MA	10	2	3%
Helpers, Laborers, & Material Movers, Hand, All Others	\$11.63	\$10.78	MA	10	1	n/a
Carpenters	\$19.65	\$19.13	SE	5	3	1%
Bricklayers & Stonemasons	Not in database		n/a	3	3	11%
All Other Construction Trades Workers	\$24.46	\$28.04	MA	2	3	n/a
General Office Clerks	\$10.67	\$10.30	SE	2	1	9%
Secretaries, Except Legal & Medical	\$14.00	\$13.48	SE	2	1	-4%
Grader, Bulldozer, & Scraper Operators	\$17.51	\$16.22	MA	2	2	3%
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	2	2	-8%
Structural & Reinforcing Metal Workers	Not in database		n/a	1	2	1%
Plasterers & Stucco Masons	\$22.68	\$20.81	MA	1	3	13%
Sales & Related Workers, All Others	\$15.91	\$14.32	MA	1	1	n/a

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.

Appendix Table 12

Occupational Matrix: Miscellaneous Special Trades Contractors

SIC Code 179

Job Title	Mean Wage	Median Wage	Wage Data Area	Southern Essex Employment	Level ^a	Growth Projection ^b
Helpers, Laborers, & Material Movers, Hand, All Others	\$11.63	\$10.78	MA	44	1	n/a
All Other Construction Trades Workers	\$24.46	\$28.04	MA	44	3	n/a
Structural & Reinforcing Metal Workers	Not in database		N/A	37	2	1%
Truck Drivers, Light & Heavy	Not in database		n/a	31	2	10%
Excavating & Loading Machine Operators	\$19.50	\$17.47	MA	26	2	13%
Helpers, All Other Construction Trade Workers	\$13.84	\$13.18	MA	26	1	n/a
Insulation Workers	\$16.84	\$14.27	MA	21	2	6%
Glaziers	\$18.05	\$16.80	MA	21	2	8%
General Office Clerks	\$10.67	\$10.30	SE	20	1	9%
Secretaries, Except Legal & Medical	\$14.00	\$13.48	SE	18	1	-4%
Elevator Installers & Repairers	\$27.14	\$29.72	MA	18	3	2%
Maintenance Repairers, General Utility	\$13.25	\$12.75	SE	17	3	2%
Grader, Bulldozer, & Scraper Operators	\$17.51	\$16.22	MA	16	2	3%
Bookkeeping, Accounting, & Auditing Clerks	\$13.11	\$12.66	SE	16	2	-8%
Millwrights	\$16.25	\$16.09	MA	16	3	0%
Carpenters	\$19.65	\$19.13	SE	16	3	1%
Sales & Related Workers, All Others	\$15.91	\$14.32	MA	15	1	n/a
Welders & Cutters	\$15.38	\$14.89	MA	14	2	-3%
Plumbers, Pipefitters, & Steamfitters	\$20.65	\$19.46	SE	10	3	2%
Extraction & Related Workers, All Others	Not in database		n/a	10	1	n/a
Pipelayers & Pipelaying Fitters	Not in database		n/a	9	2	n/a
Concrete & Terrazzo Finishers	\$18.01	\$16.94	MA	8	2	0%
Metal Fabricators, Structural Metal Products	\$14.34	\$13.95	MA	8	2	0%
Painters & Paperhangers, Construction & Maintenance	\$14.81	\$14.11	SE	6	2	3%
Mobile Heavy Equipment Mechanics	\$16.99	\$16.13	MA	4	3	5%
All Other Mechanics, Installers, & Repairers	\$15.54	\$14.93	MA	4	2	n/a
All Other Freight, Stock, & Material Movers, Hand	\$11.33	\$10.55	MA	4	1	n/a
Stock Clerks, Stockroom, Warehouse, or Stockyard	\$11.33	\$10.55	MA	4	1	-2%
Payroll & Timekeeping Clerks	\$14.14	\$14.01	SE	4	1	-9%
Bricklayers & Stonemasons	Not in database		n/a	4	3	11%

Sources: Wage data (2000) are from the Occupational Employment Statistics Wage Survey Program conducted by the U.S. Bureau of Labor Statistics.

The list of occupations is drawn from the MA Division of Employment and Training's *Job Guide: The Industry-Occupation Matrix for the United States, 1994, Volume I, Part B*.

Occupational growth projections are drawn from the MA Division of Employment and Training's *Employment Projections 1998-2008: Data on Current and Projected Employment and Education and Training Requirements*.

Employment estimates for the Southern Essex Workforce Investment Area are drawn from MA Division of Employment and Training 2000 Employment and Wages by Industry and Areas (ES-202).

^a Levels are estimated based on entry-level requirements and career ladder potential, which includes trainable steps and salary increases. Methodology is author's.

^b Growth projections are statewide, for 1998 – 2008; particular regions and/or specific firms within a region may vary.