



# Employment Forecasting in Fairfax County

For Metropolitan Washington Council of  
Governments (COG) Cooperative Forecasting  
and Data Subcommittee

by

Department of Planning and Zoning

April, 2013

Mubarika Shah

# Fairfax County Employment Forecasting Process

## Methodology

- Top-down

  - Countywide Employment Totals by Employment Sectors

- Bottom-up

  - Small Area, Transportation Analysis Zones (TAZ)  
Level Employment by COG Land Use Categories

# Components of Top-down process

- **Data sources**
  - **COG Econometric Model Output**
  - **Regional Economic Monitoring System (REMS) Report**
  - **Virginia Employment Commission's (VEC) historic data**
  - **Fairfax Co. Population Growth by Department of Neighborhood & Community Services (DNCS)**
  - **Fairfax County Existing Land Use data and Economic Development Authority's Commercial Activities data**
- **Employment type**
  - **Grouped into 11 industry sectors**

# Employment Sectors

- **Manufacturing**
- **Construction**
- **TCPU** (transportation, communication, public utilities)
- **Wholesale Trade**
- **Retail Trade**
- **F.I.R.E.** (finance, Insurance, real-estate)
- **Business Services**
- **Health Services**
- **Other Services**
- **Membership Org**
- **Government**
  - Federal Civilian & Military Govt.**
  - State & Local Govt.**

# Top-down process

- **Develop trends by employment sectors**
  - **Based on historic data and assumed future conditions**
- **Application of trends by type of employment**
  - **Regional Forecast**
    - **Fairfax County Market Share**
  - **Fairfax County Population Ratio**
    - **Number of Employees per thousand population**
- **Results**
  - **Countywide Employment in 5 year increments**

# Example of Top-down Forecast for Sectors

- **Manufacturing**
- **Construction**
- **TCPU**
- **Wholesale Trade**
- **Retail Trade**
- **F.I.R.E.**
- **Business Services**
- **Health Services**
- **Other Services**
- **Membership Org**
- **Government**
  - Federal Civilian &  
Military Govt.**
  - State & Local Govt.**

# Top-down Process Second Step Market Share Allocation

## Construction

Forecast is based on market share of MSA sector employment.

### Regional Forecast

| Year                | <u>2000</u> | <u>2005</u> | <u>2010</u> | <u>2015</u> | <u>2020</u> | <u>2025</u> | <u>2030</u> |
|---------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Regional Employment | 144400      | 162709      | 180693      | 188784      | 194331      | 198294      | 196822      |

### Fairfax Forecast

|                |       |       |        |        |        |        |        |
|----------------|-------|-------|--------|--------|--------|--------|--------|
| Percent of MSA | 21%   | 21%   | 19.50% | 19.50% | 19.50% | 19.50% | 19.50% |
| Employment     | 30364 | 34169 | 35235  | 36813  | 37895  | 38667  | 38380  |

# Top-down Process Second Step Market Share Allocation

## Health

Forecast is based employees/1000 population.

### Regional Forecast

| <u>Year</u>                   | <u>2000</u> | <u>2005</u> | <u>2010</u> | <u>2015</u> | <u>2020</u> | <u>2025</u> | <u>2030</u> |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Regional Employment           | 161793      | 178879      | 208574      | 235542      | 263660      | 291912      | 314403      |
| MSA population                | 4544.9      | 4737.4      | 5193.5      | 5561.4      | 6000.6      | 6410.8      | 6634.8      |
| MSA employees/1000 population | 35.6        | 37.8        | 40.2        | 42.4        | 43.9        | 45.5        | 47.4        |
| Growth Percent                |             | 1.1         | 1.1         | 1.1         | 1.0         | 1.0         | 1.0         |

### Fairfax Forecast

|                           |        |          |          |          |          |          |          |
|---------------------------|--------|----------|----------|----------|----------|----------|----------|
| County Population         | 969749 | 1,045000 | 1,114100 | 1,149800 | 1,174600 | 1,187400 | 1,197400 |
| Employees/1000 population | 30     | 32       | 34       | 36       | 38       | 38       | 40       |
| Employment (county)       | 29082  | 33440    | 37879    | 41393    | 44635    | 45121    | 45501    |



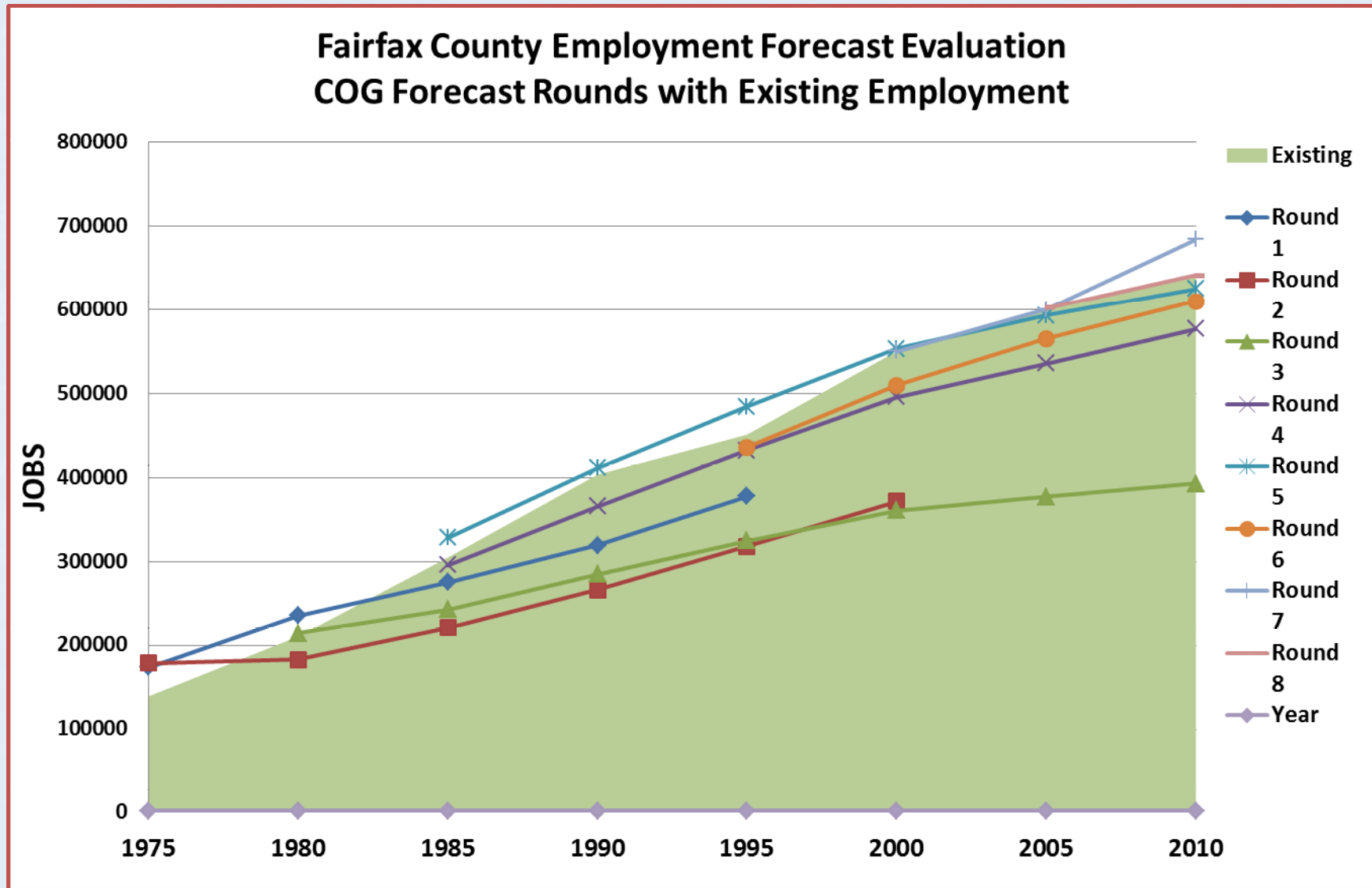
# Bottom-Up Method

- **Base Year Employment (2010)**
  - Consultant Data (Info USA, Dunn & Bradstreet Employment Data)
  - Existing Development Information (Land Use Map)
  - Direct Information from Institutional Employers (govt., schools, hospitals)
  
- **First Five Years (2010-2015)**
  - Existing occupancy/vacancy by market area
  - Absorption rate
  
- **Next Five Years (2015-2020)**
  - Under Construction
  - Site Plans Approved/submitted
  
- **Following Five Years (2020-2025)**
  - Plans, Rezoning's submitted/approved
  
- **Future Years (2030, 2035, 2040)**
  - Comprehensive Plan Potential

# Bottom-Up Controls

- TAZ growth stops when Comprehensive Plan Potential is met
- Total does not exceed Countywide target totals (top down) more than 3%

# Past 35 Years Forecast Review

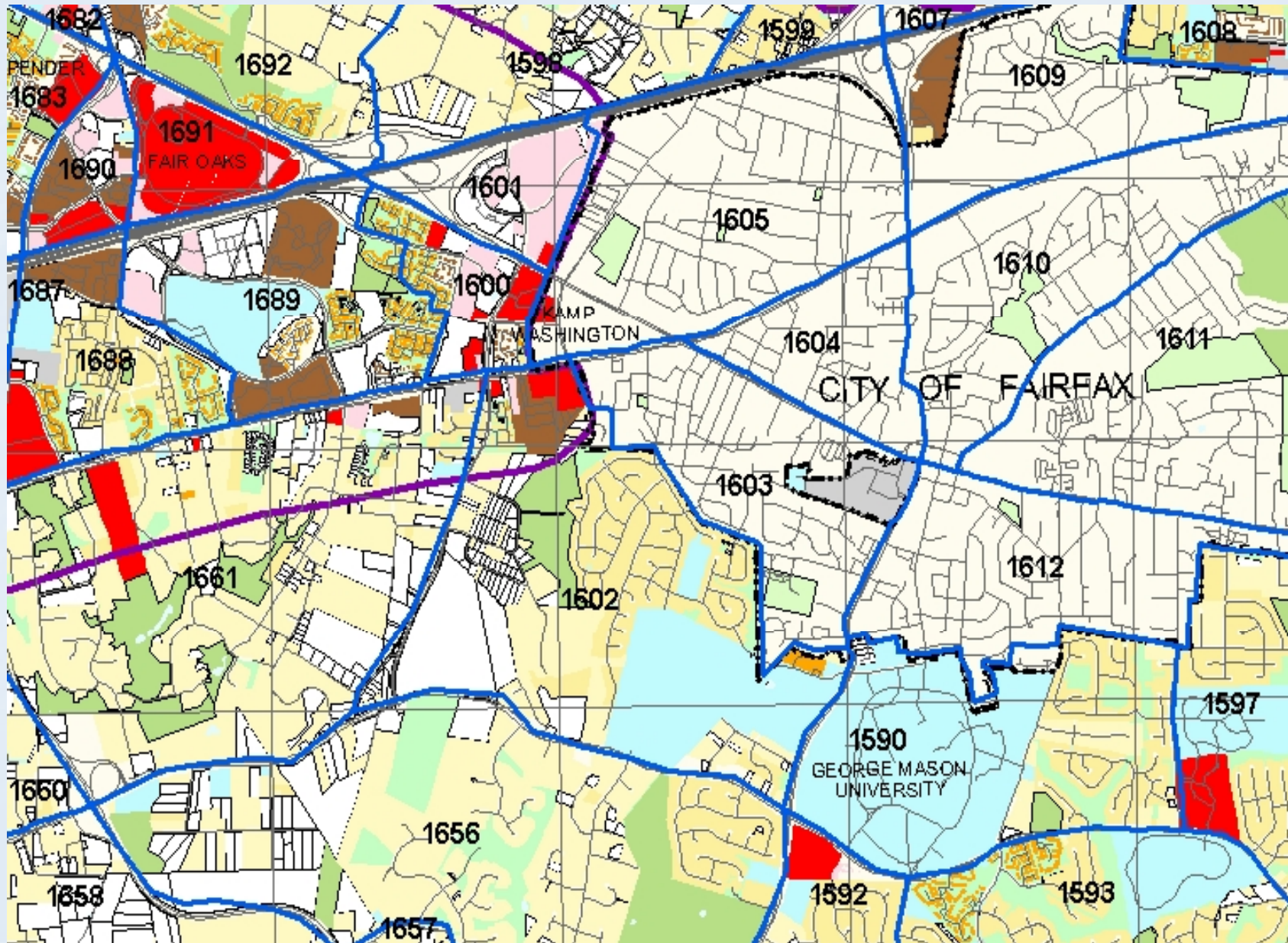


**Questions?**

- Additional material if needed



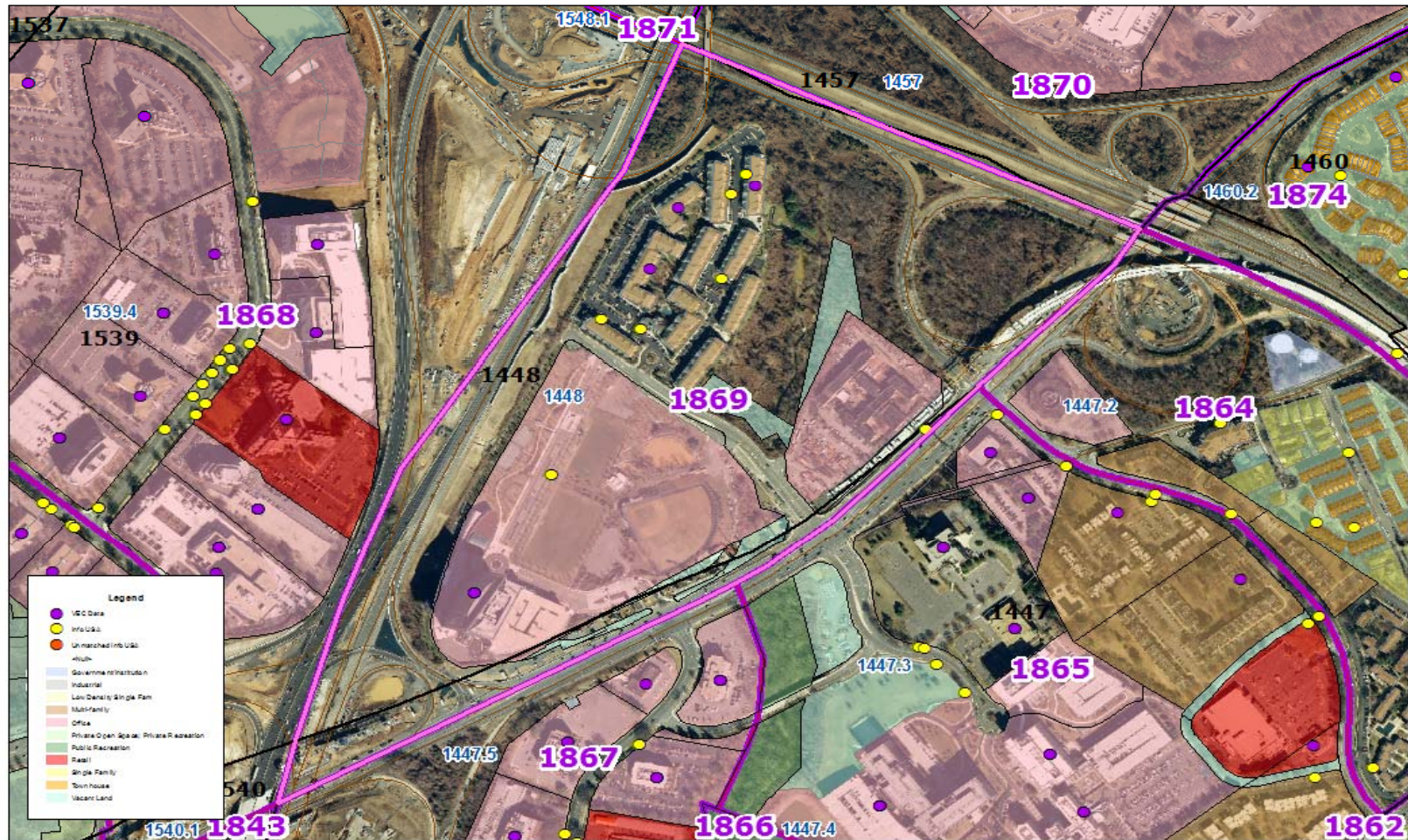
# Land Use Map Sample (with TAZ)





# TAZ Level Search

**Traffic Analysis Zone: 1869**  
**Business Center: TYSONS CORNER URBAN CENTER**



# Non-residential Employment Factors Sample

| Land Use Code                                 | Description                           | Use Group  | GFA<br>sq ft/Employee |
|---|---------------------------------------|------------|-----------------------|
| <b>Office Buildings and Selected Services</b> |                                       |            |                       |
| 410   | Office Park                           | Office     | 300                   |
| 421   | General low rise office               | Office     | 300                   |
| 422   | Medical and/or dental low rise office | Office     | 300                   |
| 423   | Government leased low rise office     | Office     | 250                   |
| <b><i>Industrial Production</i></b>           |                                       |            |                       |
| 111   | Planned industrial park               | Industrial | 450                   |
| 112   | Industrial conglomeration             | Industrial | 450                   |
| <b><i>Retail Trade</i></b>                    |                                       |            |                       |
| 311   | Neighborhood shopping center          | Retail     | 400                   |
| 312   | Specialty shopping center             | Retail     | 400                   |
| 313   | Community shopping center             | Retail     | 400                   |



# NAICS to Land Use Sectors Conversion Table

TABLE 1  
PERCENTAGE OF  
EMPLOYMENT BY LAND USE CATEGORY

| INDUSTRY                      | SIC       | OFFICE | RETAIL | INDUSTRIAL | OTHER |
|-------------------------------|-----------|--------|--------|------------|-------|
| Agriculture                   | 01-73     | --     | --     | --         | 100%  |
| Veterinary                    | 074-075   | --     | 10%    | --         | 90    |
| Farms, Landscaping            | 076-078   | --     | --     | --         | 100   |
| Forestry                      | 08        | --     | --     | --         | 100   |
| Fishing                       | 09        | --     | --     | --         | 100   |
| Mining                        | 10-12     | --     | --     | 100%       | --    |
| Oil & Gas                     | 131-132   | --     | --     | 100        | --    |
| Oil & Gas Wells               | 138       | --     | --     | --         | 100   |
| Mining                        | 14        | --     | --     | 100        | --    |
| Construction                  | 15-17     | --     | --     | --         | 100   |
| Manufacturing                 | 201-274   | --     | --     | 100        | --    |
| Commercial Printing           | 275       | --     | 50     | 50         | --    |
| All other MFG.                | 276-399   | --     | --     | 100        | --    |
| Railroads                     | 40-41     | 5%     | --     | 95         | --    |
| Motor Freight                 | 42        | 5      | --     | 95         | --    |
| U.S.Postal Svc.               | 43        | --     | 20     | --         | 80    |
| Other Transport.              | 44-47     | --     | --     | --         | 100   |
| Communication                 | 48        | 100    | --     | --         | --    |
| Utilities                     | 49        | --     | --     | --         | 100   |
| Wholesale Trade               | 50-51     | 10     | --     | 80         | 10    |
| Retail Trade                  | 52-59     | --     | 100    | --         | --    |
| Banking & Credit              | 60-61     | 50     | 50     | --         | --    |
| Securities                    | 62        | 75     | 25     | --         | --    |
| Insurance                     | 63-64     | 95     | 5      | --         | --    |
| Real Estate/Investment        | 65-67     | 100    | --     | --         | --    |
| Hotels                        | 70        | --     | 70     | 30         | --    |
| Laundries                     | 721       | --     | --     | --         | 100   |
| Photo, Beauty, Shoe<br>Repair | 722-725   | --     | 100    | --         | --    |
| Funeral                       | 726       | 10     | --     | 40         | 50    |
| Misc. Services                | 729       | 20     | 80     | --         | --    |
| Advertising                   | 731       | 100    | --     | --         | --    |
| Credit Reportg.               | 732       | 100    | --     | --         | --    |
| Direct mail                   | 7331      | 100    | --     | --         | --    |
| Blueprints, etc.              | 7332-7339 | --     | 30     | 70         | --    |
| Bldg. Svcs, Computer          | 734-737   | 100    | --     | --         | --    |
| Research Labs                 | 7391      | 30     | --     | 30         | --    |
| Mgt., P.R., Detectives        | 7392-7393 | 100    | --     | --         | --    |
| Equipment Rental              | 7394      | 30     | 10     | 60         | --    |
| Photo Labs                    | 7395-7397 | 30     | 10     | 60         | --    |
| Misc. Bus. Svcs.              | 7399      | 80     | 20     | --         | --    |
| Auto Repairs                  | 75        | --     | 100    | --         | --    |
| Misc.Repairs                  | 76        | --     | 100    | --         | --    |
| Motion Pictures               | 78        | 20     | --     | 20         | 60    |
| Amusement Svc.                | 79        | 10     | --     | --         | 90    |
| Doctors                       | 801-804   | 70     | 30     | --         | --    |
| Nursg. Homes, Hospitals       | 805-806   | --     | 100    | --         | --    |
| Medical Labs                  | 807       | --     | --     | --         | 100   |
| Other Health                  | 808-809   | 50     | 50     | --         | --    |
| Legal Svcs.                   | 81        | 100    | --     | --         | --    |
| Educational Sv.               | 82        | 10     | --     | --         | 90    |
| Social Svcs.                  | 83        | 40     | 60     | --         | --    |
| Museums                       | 84        | 50     | 20     | --         | 30    |
| Membership Orgns.             | 86        | 100    | --     | --         | --    |
| Private Households            | 88        | --     | --     | --         | 100   |
| Engineers, etc.               | 891-893   | 100    | --     | --         | --    |
| Misc. Services                | 899       | 95     | --     | 5          | --    |

4

Continued

# Top-down Process: First Step

## Historic Trends

| <b>CONSTRUCTION</b>  | <b>HEALTH SERVICES</b>   |
|--|--|
| <p>Due to exceptional job growth and low vacancy rate since 1997 (under 5%) in office market, there was a modest increase in this sector between 1999-2000. It is expected to maintain at this level till 2005 and decrease slightly in 2010 and remain steady there after because of shortage of vacant land.</p> | <p>Employment in this sector responds to the growth in population. Although the major head offices are not located in the county, there has been a steady growth in the health sector.</p> |
| <p><b>Based on percentage of MSA Construction sector employment.</b></p>   | <p><b>Based on employment per 1000 population.</b></p>   |
| 1980: 22.4% of MSA Construction sector employment  | 1980: 12.8 employees/1000 population   |
| 1985: 18.6% of MSA Construction sector employment  | 1985: 15.9 employees/1000 population   |
| 1990: 21.1% of MSA Construction sector employment  | 1990: 20.8 employees/1000 population   |
| 1995: 20.6 of MSA Construction sector employment   | 1995: 26 employees/1000 population   |
| 1996: 20.6% of MSA Construction sector employment  | 1996: 25 employees/1000 population   |
| 1997: 22% of MSA Construction sector employment  | 1997: 26.6 employees/1000 population   |
| 1998 18.9% of PMSA Construction sector employment  | 1998: 27.2 employees/1000 population   |
| 1999 23.1% of PMSA Construction sector employment  | 1999: 29.4 employees/1000 population   |
| 2000 21.6% of PMSA Construction sector employment  | 2000: 30 employees/1000 population   |
| 2001 19.3% of PMSA Construction sector employment  | 2001: 30.7 employees/1000 population   |
| 2000-2005: 21% of PMSA Construction sector employment  | 2000: 30 employees/1000 population   |
| 2010-2030: 19.5% of PMSA Construction sector employment  | 2010: 34 employees/1000 population   |
|  | 2015: 36 employees/1000 population   |
|  | 2020: 38 employees/1000 population   |
|  | 2025-2030: 40 employees/1000 population  |

# Round 8 Econometric Model

## Round 8 Econometric Totals: 1983 MSA - Adjusted for Household Constraint

| Employment by NAICS Category (Thousands)           | 2005    | 2010    | 2015    | 2020    | 2025    | 2030    | 2035    | 2040    |
|--|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Total Nonfarm</b>                               | 2,808.4 | 2,892.1 | 3,085.0 | 3,280.5 | 3,454.2 | 3,636.9 | 3,812.0 | 3,988.3 |
| <b>Non-Manufacturing</b>                           | 2,749.0 | 2,842.3 | 3,033.1 | 3,229.8 | 3,406.1 | 3,591.6 | 3,769.1 | 3,945.1 |
| <b>Service Providing Private</b>                   | 1,960.8 | 2,048.7 | 2,210.2 | 2,382.6 | 2,545.6 | 2,715.1 | 2,881.5 | 3,042.8 |
| <b>Construction, Natural Resources, and Mining</b> | 174.1   | 152.5   | 175.3   | 194.0   | 207.0   | 224.4   | 244.0   | 262.7   |
| <b>Manufacturing</b>                               | 59.4    | 49.8    | 51.9    | 50.7    | 48.1    | 45.3    | 42.9    | 41.4    |
| <b>Trade</b>                                       | 382.4   | 381.1   | 391.4   | 402.5   | 412.2   | 416.6   | 417.9   | 410.9   |
| <b>Retail</b>                                      | 252.6   | 255.7   | 259.3   | 263.1   | 267.6   | 270.2   | 272.3   | 266.5   |
| <b>Wholesale Trade</b>                             | 66.9    | 65.5    | 68.2    | 71.2    | 73.7    | 74.4    | 73.5    | 72.4    |
| <b>Transportation, Warehousing, Utilities</b>      | 62.9    | 60.0    | 63.9    | 68.1    | 70.9    | 72.0    | 72.1    | 72.0    |
| <b>Information</b>                                 | 98.3    | 83.0    | 87.4    | 93.6    | 104.6   | 118.6   | 138.7   | 158.7   |
| <b>Financial Activities</b>                        | 155.9   | 148.2   | 154.4   | 157.4   | 160.2   | 163.0   | 167.4   | 169.0   |
| <b>Professional &amp; Business Svcs</b>            | 636.9   | 674.0   | 790.8   | 907.7   | 1,013.9 | 1,137.0 | 1,254.2 | 1,396.2 |
| <b>Educational &amp; Health Svcs</b>               | 294.7   | 341.8   | 370.7   | 398.3   | 420.5   | 436.6   | 451.4   | 454.8   |
| <b>Leisure &amp; Hospitality</b>                   | 231.2   | 236.5   | 243.2   | 252.0   | 258.6   | 264.0   | 267.9   | 267.7   |
| <b>Other Services</b>                              | 161.4   | 184.0   | 172.3   | 171.2   | 175.4   | 179.3   | 184.0   | 186.8   |
| <b>Government</b>                                  | 614.1   | 641.1   | 647.6   | 653.2   | 653.5   | 652.1   | 643.7   | 640.1   |
| <b>Federal Government</b>                          | 339.1   | 340.6   | 335.2   | 330.4   | 322.9   | 316.0   | 304.7   | 296.6   |
| <b>State &amp; Local Government</b>                | 274.9   | 300.4   | 312.4   | 322.8   | 330.6   | 336.1   | 339.0   | 343.5   |
| <b>Military</b>                                    | 75.9    | 70.7    | 70.3    | 70.5    | 70.6    | 70.2    | 69.5    | 69.1    |
| <b>Self Employed (Non-Farm x 0.093)</b>            | 261.2   | 269.0   | 286.9   | 305.1   | 321.2   | 338.2   | 354.5   | 370.9   |
| <b>Total (Including Military)</b>                  | 3145.4  | 3231.7  | 3442.2  | 3656.1  | 3846.1  | 4045.3  | 4236.0  | 4428.3  |