2004 Comprehensive Plan Amendments

#	Date	Resolution #	Page #	Policy	Change
1	2/3/05	05-8		T.1.2	LOS C to LOS D
2	2/3/05	05-8	IM7	T.1.2	LOS C to LOS D
3	3/4/05	NA	LU2		Table LU1 mathematical error

City of Frederick, Maryland

Comprehensive Plan

2004

Planning Commission
Recommendation for Approval
August 30, 2004

Mayor and Board of Aldermen Approval
September 16, 2004

CITY OF FREDERICK
MAYOR AND BOARD OF ALDERMEN

RESOLUTION NO. 04-26

A RESOLUTION FOR THE PURPOSE OF ADOPTING THE CITY OF FREDERICK 2004 COMPREHENSIVE PLAN

WHEREAS, Maryland Annotated Code, Article 66B requires municipalities to periodically adopt comprehensive plans including policies statements, goals and interrelated plans for private and public use, transportation, and community facilities, documented in texts and maps which constitute the guide for future development; and

WHEREAS, the policies and implementation strategies in the 2004 Comprehensive Plan for The City of Frederick, are based on the preferred scenario and background studies for water & sewer, transportation, fiscal impacts and housing; and

Where as the Mayor and Board of Aldermen have received the Comprehensive Plan from the Planning Commission dated August 30, 2004; and

WHEREAS, the Mayor and Board of Aldermen have determined that it is in the best interest of the City to adopt the 2004 Comprehensive Plan recommended by the Planning Commission as amended by the Mayor and Board of Aldermen at its September 16, 2004 meeting; and

WHEREAS, the 2004 Comprehensive Plan shall constitute a general plan for The City of Frederick setting forth goals and a guide for future development. The adoption of the 2004 Comprehensive Plan shall not be construed as approval of individual projects which may be recommended therein, and the Aldermen shall reserve to themselves the right to consider, debate, oppose or support specific actions that may come before them that are intended to implement specific elements of this plan; and

NOW, THEREFORE, BE IT RESOLVED that The City of Frederick Mayor and Board of Aldermen adopt The City of Frederick 2004 Comprehensive Plan as

ADOPTED AND APPROVED, the 16th day of Sept. 2004

Barbara A. Clarke
WITNESS

Jennifer P. Dougherty
JENNIFER DOUGHERTY, MAYOR

Approved for Legal Sufficiency:

Sandra A. Nichols
OFFICE OF LEGAL SERVICES

ACKNOWLEDGMENTS

The City of Frederick Comprehensive Plan was made possible through the efforts and contributions of many different individuals and organizations. Several public meetings were held as part of the planning process and many citizens participated in these meetings as well as other plan update venues including neighborhood meetings. The members of the Comprehensive Plan Update Steering Committee are given special recognition for their extensive efforts and time spent on the Plan's development over more than two years.

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PLAN HIGHLIGHTS

A Vision for Frederick in 2030

The historic spires of Frederick

The City of Frederick, Maryland is one of the most historic and charming communities in the country. It is a city with a strong sense of place, a rich heritage, and a robust and diverse economy. Its vibrant and cultured downtown is surrounded by walkable neighborhoods, employment centers and mixed use areas where residents are afforded both scenic views of the downtown spires and the Catoctin Mountains.

The City of Frederick has grown in a manner that is fiscally and environmentally sound and that has phased growth with adequate infrastructure. Rather than trying to stop growth altogether and remain a small town or become a large city due to unregulated growth, the City of Frederick has chosen to manage its growth so that it has become an urban employment and residential center while maintaining its small-town charm, unique historic heritage, and exceptional quality of life.

The characteristics that define the City of Frederick's exceptional quality of life include:

- a thriving downtown,
- local and plentiful job opportunities,
- convenient and multi-modal transport options,
- adequate sanitary sewer treatment and water supply systems,
- a range of housing opportunities,
- quality education for all ages,
- quality health care,
- an intact and thriving Frederick Town Historic District,
- vibrant arts and entertainment,
- abundant parks and recreation,
- healthy and protected natural resources, and
- an open community partnership between citizens, businesses, and government.

This Comprehensive Plan—through its policies and recommended implementation strategies—envisions an expanded City of Frederick. Its recommendations outline a city with expansive growth that changes Frederick's role into a major population and employment center. At the same time, the Plan's recommendations reinforce downtown Frederick as the heart of the City with its vibrant mix of government, institutional, park, retail, housing and services uses.

The Baltimore-Washington Region—especially the City of Frederick and Frederick County—has experienced substantial growth and development over the last several decades. The Plan's recommendations on expanded City boundaries allow the City to control its destiny by both shaping the community character of new areas at the City's edges and managing the

timing and sequencing of growth with adequate public infrastructure provision.

The ability to control the character of development is critical to retaining and reinforcing what makes Frederick neighborhoods and developments distinctive. The Plan's recommendations on growth management are designed to ensure the short and long-term livability and attractiveness of Frederick's residential areas and the viability of employment areas to attract and retain development.

Organizing Themes

This Plan's recommendations are guided by five themes that serve as the Plan's overall goals. These themes are used to organize each of the Plan's elements. They express and reinforce the major concerns the Plan seeks to address and the issues raised by stakeholders.

Theme: Balancing Growth

This theme relates to the need to manage growth and a wide variety of activities that affect the overall quality of life in the City. The theme encompasses such issues and recommendations as environmental protection, growth management, annexation, future land use, and the adequacy and delivery/timing of infrastructure in a fiscally responsible manner.

Highlights of the Plan's recommendations for Balancing Growth:

- Phase annexation with the availability of adequate transportation, sanitary sewer and water services.
- Balance the distribution and timing of future population and job growth in relation to the availability of existing and planned infrastructure.
- Maintain an appropriate balance between public and private sector responsibilities for road investments and improvements.
- Adopt an Adequate Public Facilities Ordinance for city-controlled roads to phase development with the availability and adequacy of existing and future city roadways.
- Promote a diversified economic mix.
- Facilitate the expansion of office and research and development firms in the City of Frederick.
- Establish dedicated City revenues for funding capital improvements so that there is certainty that new facilities needed to serve existing and future residents can be implemented in a timely and predictable manner.
- Provide adequate public water and sewer capacity to serve projected growth within the City of Frederick as well as its annexation areas.
- Encourage growth that enables the City's non-residential tax base to comprise a larger share of the overall tax base.
- Draw upon the City's education resources to promote job creation, enhancement and retention.
- Facilitate the development of an adequate housing supply for current and future city residents.

Annexation should be phased to reflect the availability of sewer and water treatment capacity

Promote the development of housing with costs that reflect the range of incomes generated within the City.

Increase the amount of active open space and public recreation amenities consistent with state and national standards.

Strive to reduce impervious surface cover and promote best practices of storm water management.

Improving access to transit in the City can help reduce dependence on private automobiles

Theme: Enhancing Mobility, Accessibility and Connectivity

This theme addresses the need to facilitate motor vehicle movement (mobility) and the need to balance that with the ability and desire of people and business to reach desired places and activities (accessibility). The recommendations under this theme address such issues as reducing roadway congestion, the need for increased connectivity of the City's road network and among different land uses, multi-modal transportation choices, the enhancement of the pedestrian and bicycle systems, and the Frederick Municipal Airport. Recommendations also address ways to reinforce community connectedness via improved communication and information exchange.

Highlights of the Plan's recommendations for Enhancing Mobility, Accessibility and Connectivity:

Given the City's increasing role as a regional center and the expected growth in the Frederick region, a number of key new roadways are among the City's most critical transportation needs. The Plan recommends a new North-South Parallel Highway along the eastern flank of the City. This proposed new road addresses several of the City's transportation challenges. By linking US 15, I-70, and I-270, it forms a direct link between existing commuter origin points in northern Frederick County, southern Pennsylvania to employment centers in the Baltimore-Washington region including Montgomery County, and Baltimore City. The Parallel Highway allows travelers to reach those destination without driving along US 15 through the City of Frederick. Testing and evaluation of the City's roadway system was undertaken as part of the Plan update process. The results show that, with the Parallel Highway in place, there will be major reductions in north-south and east-west trips on U.S. 15, U.S. 40, MD 355, Gas House Pike, and portions of Monocacy Boulevard through the City of Frederick.

Establish land use patterns in newly developing or redeveloping areas that minimize the number of auto trips and that incorporate a mixture of uses with facilities and design elements that enhance the environment for pedestrians and transit service.

Preserve and enhance roadway capacity on local, collector and arterial routes that serve the City of Frederick for local access and mobility while working with the State to improve capacity via interstates and limited access highways for regional through travel.

Encourage development that meets Transit Oriented Design standards.

Support the improvement of the Frederick Municipal Airport and ensure its long-term viability.

Enhance access to and through scenic environmental corridors.

Actively work with the State of Maryland to increase the number of MARC trains serving the city with the ultimate goal of expanding service

to accommodate "reverse" commuters traveling from Montgomery County and the Washington, DC area to Frederick in the morning and returning south in the evening.

Promote bicycle and pedestrian mobility in the City.

Theme: Enhancing the Community

This theme focuses on improvements to the quality of life beyond the provision of housing, employment, basic environmental protection and public services. The recommendations under this theme address such issues as the preservation of the City's historic architectural and landscape legacy, enhancement of community character and application of urban design guidelines, and creation and enhancement of civic spaces/gateways and cultural amenities.

The Delaplaine Arts Center, part of the City's rich set of cultural resources

Highlights of the Plan's recommendations for Enhancing the Community:

Enhance and revitalize existing neighborhoods and upgrade commercial corridors.

Preserve and enhance the quality of life in existing neighborhoods.

Identify, document, designate and protect significant historic resources.

Enhance community identity and visual character through improved city gateways.

Preserve viewsheds of historic City spires and views to the countryside.

Ensure that road improvements minimize adverse impacts in adjacent areas and environs.

Improve the visual and physical relationship between businesses and their surrounding neighborhoods.

Encourage the development of compact residential neighborhoods.

Theme: Supporting a Vibrant Downtown

The recommendations under this theme address the special role and needs of Frederick downtown. The recommendations address such issues as downtown business development, housing and mixed use development, arts and entertainment, traffic and circulation, pedestrian mobility, parking and redevelopment issues.

The downtown is the center of government, commerce, and the arts, and maintains the City's historic identity

Highlights of the Plan's recommendations for Supporting a Vibrant Downtown:

Preserve and enhance the historic downtown street grid system.

Reinforce downtown Frederick as a center of government, commerce and the arts.

Continue to locate all levels of government in the downtown

Continue to promote the Carroll Creak linear park corridor as an extension of the downtown

Implement mixed-used development to establish Carroll Creek Park as a central public gathering place.

Support diverse residential development in the downtown area.

Encourage greater residential and job density in the downtown area.

The Monocacy River is a local and regional resource

Improve and maintain sidewalks, crosswalks and pedestrian amenities throughout downtown.

Theme: Interacting with the Region

The recommendations under this theme address the need to foster interjurisdictional and institutional cooperation. The recommendations address such issues as County-City-State coordination on infrastructure provision, environmental protection, regional planning, and transportation.

Highlights of the Plan's recommendations for Interacting with the Region:

Plan for and provide for adequate public water and sewer capacity to serve project growth. Ensure that as part of any joint City/County service agreements, that the City retains its right to annex and self-determination for its future growth and development.

Through relationships with Frederick County and surrounding jurisdictions, reinforce the City of Frederick's role as a regional center.

Coordinate with Frederick County to protect and promote agricultural preservation and rural landscapes in areas outside the City of Frederick's annexation areas.

In cooperation with Frederick County, strive to improve transit service to and around the City of Frederick.

Coordinate City and County service provision to improve services for City and County residents.

Reinforce the City of Frederick's role in the technology sector as the northern anchor of the I-270 Technology Corridor and as one corner of the Maryland Technology Triangle (Baltimore, Montgomery County and Frederick).

The City and County can work together to preserve agriculture in the region

ROLE AND NEED FOR THE 2004 COMPREHENSIVE PLAN

Need for a New Comprehensive Plan

The City of Frederick has experienced a high level of growth over the last several decades. As it has grown from a small historic town to an expanding urban housing and employment center, there is a need for a new Comprehensive Plan that provides specific guidance to meet the City's major challenges, which include:

- Achieving concurrence between growth and infrastructure;
- Balancing residential and employment growth;
- Improving and enhancing the quality of life for residents;
- Enhancing interjurisdictional coordination related to infrastructure provision;
- Ensuring that the City remains the urban center for Frederick County;
- Preserving and enhancing the City's distinct character and vibrant downtown; and
- Ensuring the preservation of significant historic and archaeological resources as development of the City proceeds.

Preserving and enhancing the City's distinct character is a critical focus of the Comprehensive Plan

Relationship to the 1995 City of Frederick Comprehensive Plan

As part of the Comprehensive Plan update process, each chapter of the 1995 Comprehensive Plan was reviewed to help determine which goals and objectives had been accomplished and what new guidance might be needed. This analysis found that of the 58 policies listed in the plan, four (7 percent) had been completed, 19 (33 percent) were on-going, 23 (40 percent) had not been completed, and 11 (19 percent) were not measurable.

The general strengths of the 1995 Comprehensive Plan include its overview of existing conditions and context; its easy-to-use and understand presentation and format; and its comprehensive scope. Its shortcomings include a lack of guidance for plan implementation including action steps, recommendations and priorities, and land development regulation that are all needed to guide growth and development decisions.

Appendix A of this 2004 Comprehensive Plan includes an assessment of that plan done as part of the Plan Assessment and Investigation Report (PAIR—the "planning-to-plan" phase of the Comprehensive Plan update. Appendix C includes the Planning and Zoning Department assessment of the 1995 plan mentioned above.

Role and Purpose of the Comprehensive Plan

The Comprehensive Plan is a guide for the location, character and extent of proposed public and private development in the City of Frederick, Maryland. The Comprehensive Plan's policies and recommendations will be

implemented over time through many distinct decisions including the rezoning and subdivision of land and the location and construction of public improvements. The Comprehensive Plan provides the policy basis for the integration and coordination of these decisions and actions. This Comprehensive Plan also provides specific guidance for how the City's development regulations should be update, enhanced, and streamlined to facilitate plan implementation. The City's land use ordinances and zoning maps are to be amended to be consistent with the Comprehensive Plan.

Under the State's planning statutes (see below) the Comprehensive Plan must be updated every six years. This revision and update is needed to respond to changing conditions, unforeseen events and trends and changing objectives.

Legal Basis

Under Maryland Law, the Planning Commission has the duty to make and approve a Comprehensive Plan and then recommend its adoption to the Mayor and Board of Aldermen. The Comprehensive Plan is to "serve as a guide to public and private actions and decision to ensure the development of public and private property in appropriate relationships." The State law (Article 66B) requires that the Comprehensive Plan "serve as a guide for the development and economic and social-well being" of the City. The Comprehensive Plan is to be composed of a number of interrelated elements that address the following areas: land use, transportation, community facilities, sensitive areas, mineral resources, and plan implementation. The Planning Commission may include other elements, as it deems necessary, such as economic development and tourism, and parks and recreation.

As a result of year 2000 amendments, Article 66B now includes "Eight Visions" that must be implemented through the plan's recommendations. The "Eight Visions," which are incorporated in this Comprehensive Plan, are:

1. Development is concentrated in suitable areas,
2. Sensitive areas are protected,
3. In rural areas, growth is directed to existing population centers and resource areas are protected,
4. Stewardship of the Chesapeake Bay and the land is a universal ethic,
5. Conservation of resources, including a reduction in resource consumption, is practiced,
6. To assure the achievement of items (1) through (5) of this section, economic growth is encouraged and regulatory mechanisms are streamlined,
7. Adequate public facilities and infrastructure under the control of the County or municipal corporation are available or planned in areas where growth is to occur, and
8. Funding mechanisms are addressed to achieve these visions.

PLAN UPDATE AND PUBLIC INVOLVEMENT PROCESS

The Plan is Supported by Extensive Data Analysis

The Comprehensive Plan is based on a substantial amount of supporting analysis and information. To make the Plan as reader-friendly as possible, much of this analysis and background data has been separated from the Comprehensive Plan's recommendations in this volume. The Plan's Appendix provides a summary of the rigorous analysis that was undertaken as part of the Plan Update process including existing condition assessments, population and employment forecasts, vacant land assessment and capacity analysis, alternative scenario development for the future of the City of Frederick and associated transportation, sewer and water, and fiscal testing and evaluation. The reader seeking more background information and data analysis is directed to this valuable resource material, which is included on a CD that has been packaged with this document.

Plan Process

The Comprehensive Plan Update is the result a two-year effort and is based on a substantial amount of supporting analysis and information. The planning process began with the Mayor and Board of Aldermen's appointment of the Plan Update Steering Committee (*see more on this later on in this introductory section*) to provide guidance to the Planning Commission on the Comprehensive Plan Update and process.

The first phase of the update process was a "planning-to-plan" phase that resulted in the *Plan Assessment and Investigation Report (PAIR)*. The PAIR established the issues to be addressed in the Comprehensive Plan Update, areas of further investigation, and potential strategies that could be used to address the issues. This phase was followed by:

- an in-depth understanding of **existing conditions and trends**, including an analysis of **historic architectural** resources,
- rigorous regional **demographic and employment forecasting**,
- a data-intensive **scenarios** development and evaluation phase, and
- a **plan development, review and adoption** phase.

Understanding Existing Conditions and Trends

A major analytical task of the Comprehensive Plan Update was to understand demographic trends, historic architectural resources, and existing conditions of major infrastructure systems. This existing conditions investigation involved the following research.

Architecture Survey

An architectural survey completed by Betty Bird & Associates identified historic properties in the City of Frederick outside the Frederick National

Register Historic District and identifies significant historic resources worthy of further investigation and/or preservation.

Land Supply Assessment

Vacant land provides an opportunity for infill development

In conjunction with the City of Frederick, the Maryland Department of Planning undertook a land capacity analysis of the City and outlying areas. The capacity analysis was crucial in determining the amount of land available to accommodate future growth and redevelopment. Using existing City records and the State of Maryland's *PropertyView,* MDP:

- Identified vacant lands via assessment records,
- Removed from consideration those lands that could not be developed due to environmental constraints,
- Estimated development capacity of the remaining vacant land in terms of jobs and households, and
- Identified lands with redevelopment potential and estimated the development capacity of these redevelopment lands.
- Created a series of maps showing the areas of potential development and their development capacity.

The capacity analysis found that overall the City of Frederick had developable vacant land for approximately 7,000 additional housing units.

Economic Assessment

Using at-place employment data (purchased from InfoUSA), the HNTB team analyzed the quantity, type and location of jobs within the City of Frederick and outlying areas. The analysis provided valuable insights into the City's at-place employment base and economic strengths and weaknesses. The analysis found, for example, that the City contained almost half of all jobs in Frederick County, and had two jobs for every city household, indicating a very healthy employment base. The analysis also found that the City of Frederick had especially strong employment concentrations in health care and biotechnology. County-wide employment and commuting patterns were also analyzed.

Housing Assessment

In collaboration with Thomas Hammer, PhD, the HNTB team prepared an assessment of the City's existing housing and recent trends. The report analyzed a variety of housing data—production trends, housing type and age, tenure, and affordability. The analyses also included comparisons with Frederick County and the region.

Sanitary Sewer and Water Assessment

The HNTB team assessed the existing conditions of the City's water and wastewater facilities and identified potential deficiencies.

Transportation Assessment

The City-Wide Traffic Study completed by the RBA Group and the Gallop Corporation was used to understand existing road conditions and identify

potential transportation system deficiencies. As part of the understanding of existing conditions, the HNTB team relied on the previous RBA work, and augmented that with an understanding of the City's public transportation, airport, and pedestrian and bicycle facilities. Recommendations from other transportation studies were also documented.

Regional Forecasts

Thomas Hammer, PhD prepared demographic and economic forecasts for the City of Frederick and the region to understand how much and what kinds of the regional growth (jobs and households) the City will capture. The forecasts were prepared using a top-down hierarchical approach. First, a national forecast was developed, then a regional forecast linked to national trends was developed, and finally the regional forecast was allocated to the Study Area using a calibrated mathematical model.

Alternative Scenarios

The Comprehensive Plan process included the development of two scenarios for the future of Frederick. Creating scenarios requires one to ask "what might happen" in addition to asking "what you would like to happen" (also known as "visioning"). Fusing these answers in a meaningful way is the essence of scenario building.

Asking what might happen forces people to think about how their desires equate with realities—a different kind of exercise than "wish-listing." During this process stories for each scenario were developed about what might happen, and were vetted to see if they made sense. Then the honed scenarios were evaluated to see which provided the most advantages and the least disadvantages from a number of different perspectives. The idea was to step back, look at trends, existing conditions, and driving forces in the "world out there" as well as values of various Frederick stakeholders (the world "in here"). This knowledge was then synthesized to develop scenarios that were plausible and that balanced relevance with fresh ideas.

The two scenarios were presented to the Plan Steering Committee, Planning Commission, and Mayor and Board of Aldermen. After consideration and modification, both were carried forward for consideration and evaluation. They were evaluated primarily for their roadway, infrastructure (sewer and water), and fiscal impacts. Other impacts assessed included parks and the environment.

Based on growth assumptions for the two alternative scenarios, HNTB developed a demographic and employment forecast for each scenario and allocated the projected 2030 households and jobs to analysis areas including Traffic Analysis Zones (TAZs) for transportation analysis using the City's newly developed transportation demand model. The same forecasts were also allocated to Fiscal Analysis Zones (FAZs) for fiscal testing and also for sewer and water analysis. The process was accomplished through stages involving future land use designation, GIS modeling, and manual iterations.

Two Scenarios Considered

The first scenario—"**Upgrading in Place"**—tells a story of the urban enhancement of Frederick. Capital dollars and political energies are focused

on this inward-looking effort. The second scenario—"**Expanding Horizons**"—is a story of Frederick becoming a regional employment and residential center. Both have many facets in common including mixed-use development, retaining the special qualities that make Frederick attractive, e.g., the vitality of downtown, preservation of historic resources and a high value placed on the environment.

Preferred Scenario

Based on a review of the extensive analysis and results, the Planning Commission preferred the Expanding Horizons scenario and recommended its approval to the Mayor and Board of Aldermen. The Mayor and Board subsequently adopted the Expanding Horizons scenario as the "preferred" scenario and directed the Planning Department staff to draft this Comprehensive Plan based on the Expanding Horizons scenario.

Alternative Scenarios Considered

#1 UPGRADING IN-PLACE—Urban Enhancement

The City of Frederick is the government, institutional, educational, cultural and urban center for the County. Frederick's outstanding regional accessibility and its historic charm and character are key ingredients that the City should build upon as it chooses to mature as an urban center for Central Maryland.

This scenario has the City focus on improving and reinforcing the things that make it special and on improving the quality of life for existing residents and businesses. It allows the City to focus more of its scarce resources in already developed areas rather than spreading these resources within the existing City boundaries and substantially expanded annexation areas. However, it does envision some annexation.

The City continues to attract new residents and businesses from the Washington DC region as well from other places. There is an understanding that the City must grow somewhat in physical size but we do not seek expansive growth. The City of Frederick appeals to the growing market for defined, place-based communities.

The City continues to reinforce and invest in downtown as its major activity center, county and city government center, and visitor destination. Because the City builds-out its existing supply of residentially zoned land by 2015, it should plan ahead now for the annexation of some additional lands and designate them for residential and mixed use development.

Funding for infrastructure and desired city services will continue to be tight. Citizens and businesses want increased parks and open space acquisition and facilities, urban design improvements at City gateways, and other upgrades to reinforce the special qualities of the City but for which the City has limited funds. Innovative ways to pay for these improvements and infrastructure will have to be explored.

The City focuses efforts to earmark lands for employment, particularly the biotech and health care industries to ensure that existing businesses have room to expand and new businesses have land on which to develop.

Increasing scarcity of ready-to-build housing lots may lead to increasing land values and housing prices. Thus the City earmarks additional lands for higher density development to lessen these trends and provides incentives for developers to create moderately priced housing options.

The City's historic and constrained roadway patterns are maintained because of the community's desire to maintain the fabric of the historic city. Some downtown streets that are one way to facilitate traffic flow are redesigned as two-way streets. Both the constrained roadways and the return to two-way flows are implemented with the understanding that

there may be longer intersection delays during peak travel times than if roads were widened or maintained as one-way pairs. Additional bus service to and from the MARC train station is implemented along with some additional bus service throughout the City.

Upgrading in Place

	Population	Jobs
Existing (2000)	52,800	41,800
Additional	29,200	22,300
Total (2030)	82,000	64,100

Alternative Scenarios Considered

#2 EXPANDING HORIZONS—Regional Employment Center

The City of Frederick is the state's second largest city and a major employment center. People continue to move here to gain access to the growing pool of employment opportunities close to home. The increasing employment base has helped the City to expand services and investment in public and community facilities, not previously possible. Newcomers and existing residents continue to enjoy and find attractive the City's quality of life, in-town and close-by natural amenities, and historic charm.

In this scenario, to assure control over its destiny, the City expands its boundaries through extensive annexation to accommodate both residential and employment growth. There is a particular focus on employment and the City is now recognized as a major employment center. Businesses stay, expand and move to Frederick in increasing numbers because of the access to a regional work force, the agglomeration of biotech, health care, and specialized manufacturing jobs, and access to higher education and training resources. Frederick is now connected to Leesburg and the surrounding employment center in eastern Loudoun County at the other end of the US 15 in a significant way through cross-commuting.

The growth of the City changes the nature and requirements of city government. Government must increase in capacity and more importantly in sophistication and in its ability to manage increasing complexity and diversity of infrastructure and service delivery.

After more than 10 years, the impacts of Frederick's MARC commuter rail services have begun to pay off with trains now running in both directions at peak AM and PM periods to accommodate reverse commuters from Washington, DC and Montgomery County as well as some limited weekend service. The City also teams with the state and county to provide improved bus service throughout the City and enhanced connections to MARC train and bus service to slow the rate of traffic congestion and provide transportation choices.

Downtown continues to be the heart of the City and has a vibrant mix of government, institutional, retail, housing and service uses. Nevertheless, the increased size of the City and its companion challenges of serving newly developing areas, the City can not focus as much on reinvestment in older areas.

The federal government further decentralizes some of its facilities related to bio-research and bio-defense and moves them to Frederick. This increases the number of high-paying jobs in the City and leads to spin-offs in the private sector around Fort Detrick and in Tech and R&D Parks around the City.

More lands are planned for higher-density housing and a mix of housing types to meet the demands of the diverse economic community that makes Frederick unique. Given continued limited state funds for infrastructure, the City explores innovative ways of paying for infrastructure including a new joint city/county entity that both plans for and provides sewer and water services. Because of the City's historic development patterns and relatively narrow road rights-of-way, there is the realization that the City will tolerate increases in congestion rather than destroy the fabric of the City. However, where feasible, substantial new roadway investments are made to improve access within and through the City.

Expanding Horizons

	Population	Jobs
Existing (2000)	52,800	41,800
Additional	51,200	43,600
Total (2030)	104,000	85,400

Plan Development, Review and Adoption

The Comprehensive Plan was prepared based on the "Expanding Horizons" scenario and the extensive input of a 21-member Steering Committee. The Steering Committee included representatives from residential, business and governmental interests. The planning staff conducted informal surveys at City events, distributed over 2,000 flyers both in English and Spanish, wrote newspaper articles, and placed radio and televisions spots. There were also more than 150 public meetings to identify and examine background issues and community needs and to create new policies. In all, more than 700 citizens commented on this plan during its development.

During the comprehensive plan process, several items were reviewed and adopted by the Mayor and Board of Aldermen, including:

Public Participation Plan—adopted June 20, 2002,

Plan Assessment Investigation Report (PAIR)—adopted November 7, 2002,

Comprehensive Plan Scope of Work—adopted February 20, 2003

Amended professional services contract to include a Fiscal Analysis component—adopted on July 17, 2003

Two potential scenarios—presented August 7, 2003

Preferred scenario—adopted December 18, 2003

The comprehensive plan elements were created by the Steering Committee and reviewed by staff and the Planning Commission. The Planning Commission held five workshops beginning in June 2004 and culminating with the recommendation of the Plan to the Mayor and Board of Aldermen on August 30, 2004. The Plan was reviewed and fine-tuned by the Mayor and Board of Aldermen, and was adopted by the Mayor and Board of Aldermen on September 16, 2004.

Public Involvement Process

Public Meetings

The City held three city-wide public meetings during the Comprehensive Plan process. These meetings included a Comprehensive Plan kick-off meeting, an issues identification meeting, and a meeting to get public reaction to the two alternative scenarios for the future of Frederick that was evaluated as part of the Plan Update. These city-wide meetings were supplemented by more than 20 meetings held with neighborhood and community groups in different parts of the City to identify issues and desires.

Steering Committee

The Plan Update Steering Committee crafted the Plan's recommendations

A Steering Committee was appointed by the Mayor and Board of Aldermen to help guide the Comprehensive Plan's development. The Steering Committee members represented citizens, business persons, and government officials. The Steering Committee was a key resource and sounding board for the Planning Department staff and the consultant team from HNTB. The Steering Committee met more than 24 times over a two-year period. The Steering Committee and its component task forces—in 69 meetings—contributed to the Plan's issue identification phase, undertook research and analysis into potential planning solutions, assisted in the development of alternatives for the City's future and recommended approval of the "Expanding Horizons" alternative, and drafted preliminary Comprehensive Plan policies and strategies. The Steering Committee also drafted a mission statement for the Comprehensive Plan (see box on page IN-14).

Since the Steering Committee was constituted as a representative of the citizens and interest groups within the City, it also had the responsibility to collect and share the information discussed at meetings with other members of the community.

Steering Committee Mission Statement for the Comprehensive Plan

The City of Frederick is preparing a twenty year strategic development plan that will guide the City towards maintaining its unique character and excellent quality of life. The purpose of the City of Frederick's Comprehensive Plan is to provide a coordinated set of guidelines to direct future growth and development of the City as proposed by a team of consultants, a steering committee (comprised of business, city government, and residential representatives), and concerned citizens. The result of the plan is to maintain and improve the City's character and quality of life while building human and physical assets and infrastructure.

The City of Frederick is one of the most historically unique and charming communities in the country. It is a vibrant community with a strong sense of place, a rich heritage, and a cultured urban center surrounded by farms and forests. It is, however, currently at the transitional phase when a small town becomes a big City. Rather than trying to stop growth altogether and stay a small town or become a large City due to unregulated growth, the City of Frederick chooses to recognize and encourage its growth into a major urban center while maintaining its small-town charm and unique historic heritage. As a result, a strategic plan is being developed to incorporate the underlying principles that will guide Frederick's growth and development. Among these principles is the preservation of its quality of life, defined by its natural, rural, cultural, and architectural heritage. The preservation and nurturance of the natural environment is one of our first priorities as there can be no quality of life for the citizens of Frederick if the immediate and supporting environment is inimical to health and wellbeing. Therefore, our wetlands, watersheds, and natural habitats must be preserved and nurtured. Quality of life for Frederick City residents includes a thriving downtown, local job opportunities, easy and convenient transportation, affordable housing, quality education for all ages, quality health care, arts and entertainment, parks and recreation, and an open community partnership between citizens, businesses, and government. To achieve a good quality of life, three things must be occur: 1) The interests of businesses, industries, and citizens must receive equal consideration; 2) Private sector leadership is a form of community stewardship and is inclusive, visionary, and unselfish, and; 3) The local government encourages participation, hears each individual, identifies the common good, and then acts promptly and effectively to achieve that good.

The implementation of the Comprehensive Plan will be carefully laid out in stages that are economically and environmentally sound in order to meet growth while accommodating infrastructure. The intent is to have, twenty years from now, a City that is culturally rich, diverse, and tolerant, vibrant with a strong sense of place, ecologically and economically sound and prosperous, and with scenic views of spires and mountains. The Comprehensive Plan addresses the ways that we, the citizens of Frederick chosen to represent and speak on behalf of the public at large, direct our government to bring this about.

Public Education and Outreach

Comprehensive Plan Homepage

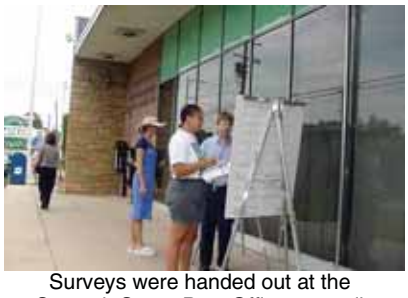
The City of Frederick established the Comprehensive Plan homepage on the City's website. This was used as a repository of information pertaining to the Comprehensive Plan process and including meeting dates, meeting summaries, press releases, and contact information as well as background documents and the draft plan. It also included a comment page.

Media Outreach

The City of Frederick developed and distributed press releases to the *News-Post, Gazette,* Channel 10, WFMD, and other media outlets on the progress of the comprehensive planning process. In addition, public meetings relating to the Plan Update were advertised in the local newspapers, on local radio stations, television channels 10 and 99, and on the City's website.

Keeping People Updated

The Planning Department maintained and used both an email and regular mail address list database to keep interested individuals updated on the planning process. The Planning Department also produced a series of newsletters about the Plan Update process and disseminated these to the email list, on the City's website and at City Hall, the C. Burr Artz Library and other government buildings.



Surveys were handed out at the Seventh Street Post Office, as well as other locations.

The Planning Department also developed information exhibits about the Plan process and displayed them in prominent public places including the Frederick Towne Mall, and the C. Burr Artz Library. Planning Department staff also handed out surveys in three different locations within the City of Frederick to gather additional public input. The Planning Department also had a table at the "In the Street" event to allow for additional input. They also met with local stakeholders in the Community such as Frederick Community College, Hood College, Board of Education, local developers and businesses owners, Maryland School for the Deaf, and Fort Detrick.

Regional Cooperation

Throughout the Comprehensive Plan process, the City of Frederick consulted with Frederick County and the Town of Walkersville to discuss the Plan's development and common regional issues. One issue discussed was the proposed limited access North-South Parallel Road east of Frederick that is needed to relieve projected traffic congestion on US 15 and other regional routes and is recommended in this Comprehensive Plan.

HOW TO READ THIS PLAN

The City of Frederick Comprehensive Plan is to be used as a guide for land use, infrastructure, and development decisions within the City and its future annexation areas. It is also to be used to present the City's land use, infrastructure, and development policy framework and to guide development and infrastructure decision making and coordination with Frederick County and the State of Maryland.

This section of the Comprehensive Plan describes how it is organized, identifies the five key themes of the Plan, references and makes the reader aware of the detailed analysis that undergirds the Plan's recommendations, outlines the issues the Plan seeks to address, and provides the Vision for the City's future.

Plan Organization

This Comprehensive Plan is organized into nine elements as follows:

Land Use
Transportation
Fiscal Health
Community Facilities
Economic Development
Housing
Parks and Recreation
Environment and Natural Resources, and
Plan Implementation.

Each element includes polices and related implementation strategies. Tables, images, text boxes and maps supplement the Comprehensive Plan's text.

The Comprehensive Plan is Organized Around Five Themes

This Comprehensive Plan is organized around five themes as described below. These are essentially the goals of the Plan.

These themes are used to organize each of the Plan's nine elements (for instance, land use, transportation, housing, etc.) because they express and reinforce the major concerns the Plan seeks to address and the issues raised by stakeholders during the Comprehensive Plan Update, as well as in other recent planning and visioning efforts such as ASPIRE Frederick. The hope is that the Plan's format provides the reader with an understanding of the overlapping and integrated nature of the planning issues and recommended solutions for the City of Frederick.

Balancing Growth

This theme relates the need to manage growth and a wide variety of activities that affect the overall quality of life in the City. The theme includes issues such as the growth management, annexation, future land use (including jobs and housing), adequacy and delivery/timing of infrastructure in a fiscally responsible manner, and environmental protection.

Enhancing Mobility, Accessibility and Connectivity

This theme addresses the need to facilitate motor vehicle movement (mobility) and the need to balance that with the ability and desire of people and businesses to reach desired places and activities (accessibility). This theme thus includes issues such as roadway congestion, the need for increased connectivity of the City roadway network and among different land uses, multi-modal transportation choices, the enhancement of the pedestrian and bicycle systems, and the Frederick Municipal Airport. This theme also addresses ways to reinforce community connectedness via improved communication and information exchange.

Enhancing the Community

This theme focuses on improvements to the quality of life beyond the provision of housing, jobs, basic environmental protection, and public utilities. The theme includes issues such the preservation of the City's historic architectural and landscape legacy, enhancement of community character and application of urban design guidelines, and creation and enhancement of civic spaces, gateways and cultural amenities.

The In the Street Festival is one of many events that enliven the downtown

Supporting a Vibrant Downtown

This theme addresses the special role and needs of Frederick's downtown. The theme includes issues such as downtown business development, housing and mixed use development, arts and entertainment, traffic and circulation, parking, and redevelopment opportunities.

Interacting with the Region

This theme addresses the need to foster interjurisdictional and institutional cooperation. It includes county-city-state coordination on infrastructure provision, environmental protection, regional planning, and transportation, as well as coordination with major institutions.

The Comprehensive Plan Seeks to Address Numerous Cross-Cutting Issues

This City of Frederick Comprehensive Plan addresses a wide range of issues that relate to how much, where and what type of development will occur in the City and its future growth areas. The issues are cross-cutting: they are interrelated to one and other and are best addressed in an integrated fashion. This Comprehensive Plan provides that integrated response to a range of issues facing the City of Frederick. The main issues it addresses are categorized below.

- Growth and Development Trends and Forecasts
  - How much should the City grow?
  - How much can the City grow? What are the infrastructure constraints? What are the fiscal impacts of various alternatives? What should the City's mix of employment and housing be?
  - How much land is needed?
  - What should the jobs to housing balance be?
- Community Character and Design
  - How can downtown be enhanced?
  - How can the image of the City's gateways be improved?
  - How should the City coordinate/address development issues with large institutions in the City?
- Coordination with the County and Region
  - How much land should be annexed?
  - What are the options for sewer and water service expansion?
- Growth Management
  - How should the City coordinate and phase growth and development with the availability and adequacy of the transportation system?
  - How should the City better coordinate growth and adequate treatment capacity of sanitary sewer and an adequate and dependable supply of water?
  - What can the City do about growing regional congestion and commuting and impacts of roads within the City of Frederick?
- Transportation
  - How can the City's transportation facilities for pedestrians and bicyclists be improved?
  - How should the City plan for and encourage transit service and ridership?
  - How will the City address congested roadways?
- Parks and Recreation
  - How much land is needed for parks and recreation?
  - What kinds of facilities are needed and where?
- Fiscal Health
  - What is the long range fiscal outlook of the City based on forecast growth and need for services?
  - How should the City pay for needed transportation improvements?
- Economic Development
  - What is the basis of the City's economy today and in the future?
  - What kind of job growth and what types of jobs?
  - How can the City increase its economy viability?
- Historic Preservation
  - How should the City promote historic preservation and adaptive reuse?
  - How should the City address historic resources, particularly outside the Frederick Towne Historic District?
  - What steps should be taken to identify and protect the city's architectural resources?
  - What roles should developers and private property owners have in the preservation of historic resources?
- Environment and Natural Resources
  - How can the City ensure an optimal level of forested open space and forest conservation?
  - How can the City minimize adverse impacts to watersheds from impervious surfaces?

A Vision for Frederick in 2030

The City of Frederick, Maryland is one of the most historic and charming communities in the country. It is a city with a strong sense of place, a rich heritage, and a robust and diverse economy. Its vibrant and cultured downtown is surrounded by walkable neighborhoods, employment centers and mixed use areas where residents are afforded both scenic views of the downtown spires and the Catoctin Mountains.

The City of Frederick has grown in a manner that is fiscally and environmentally sound and that has phased growth with adequate infrastructure. Rather than trying to stop growth altogether and remain a small town or become a large city due to unregulated growth, the City of Frederick has chosen to manage its growth so that it has become an urban employment and residential center while maintaining its small-town charm, unique historic heritage, and exceptional quality of life.

The characteristics that define the City of Frederick's exceptional quality of life include:

- a thriving downtown,
- local and plentiful job opportunities,
- convenient and multi-modal transport options,
- adequate sanitary sewer treatment and water supply systems,
- a range of housing opportunities,
- quality education for all ages,
- quality health care,
- an intact and thriving Frederick Town Historic District,
- vibrant arts and entertainment,
- abundant parks and recreation,
- healthy and protected natural resources, and
- an open community partnership between citizens, businesses, and government.

CITY OF FREDERICK REGIONAL CONTEXT AND TRENDS

This section describes the City of Frederick and its place in the Baltimore-Washington region, provides an overview of demographic and economic trends, and discusses the population and employment forecasts for the City.

Location and Regional Context

Nestled between the Monocacy River and the Catoctin Mountains, the City of Frederick sits almost directly in the center of Frederick County. Frederick's unique natural and cultural setting makes the City a desirable location for residents, workers, and visitors alike. The unincorporated land around the City was once largely agricultural, and Frederick County still contains more agricultural land than any county in the State. However, the City and County have both experienced substantial growth and suburbanization in recent decades.

It is the City of Frederick's vibrant and varied urban fabric that differentiates it from the rest of the County and creates a distinct sense of place. Contemporary residential neighborhoods ring the City's compact, walkable, and active downtown. Much of the downtown's success is due to the community's emphasis on the preservation of historic downtown structures. In addition to hosting municipal and county government, downtown Frederick is also the State's largest historic district, as well as a recently designated arts and entertainment district.

Part of Frederick's attractiveness lies in its proximity to Central Maryland's major urban centers, as shown in Figure IN.1. Frederick is equidistant from Baltimore and Washington, DC, located 50 miles northwest of the US Capitol Building, and 50 miles west of Baltimore's Inner Harbor. Frederick is closer to a number of small cities, sitting approximately 25 miles southeast of Hagerstown, 25 miles southwest of Westminster, 30 miles northwest of Rockville, and 20 miles north of Leesburg, VA. The Town of Walkersville, located five miles to the northeast, is the nearest municipality.

The City of Frederick is also well-connected to the regional transportation network. Interstate 70 connects Frederick directly to Baltimore and Hagerstown and points west, while I-270 begins in Frederick and links the City to the District of Columbia and the Capital Beltway. US 15 runs directly through the center of the City, linking Frederick to Northern Virginia, West Virginia, and southern Pennsylvania. US 340 also begins in Frederick, connecting the City to Charles Town, WV and Winchester, VA.

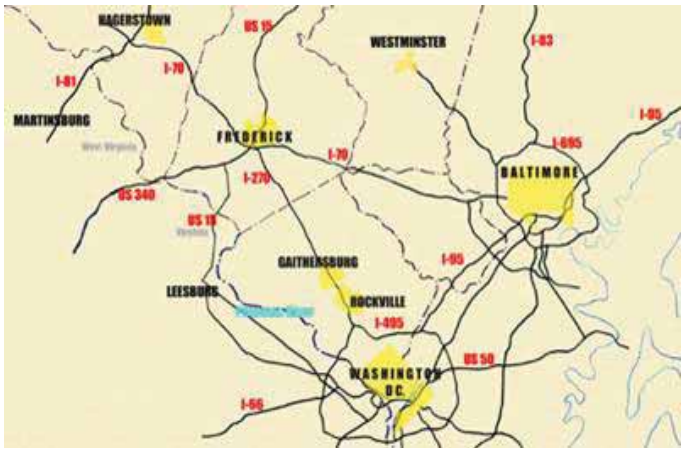


Figure IN.1: Frederick's relationship to the region

In addition to its major road links, Frederick serves as the terminus of one spur of the MARC Brunswick commuter rail line. This line serves Union Station and the I-270 corridor, and connects to the WMATA MetroRail and MetroBus system.
The City of Frederick also owns and operates Frederick

Municipal Airport, which serves as a reliever facility for General Aviation traffic from Baltimore-Washington International (BWI), Washington-Dulles, and Reagan National airports. With more than 130,000 annual operations, Frederick Municipal is the second-busiest Maryland airport, after BWI.

Access to transportation facilities makes Frederick a desirable and convenient location for residents and businesses

Frederick's access to transportation facilities has made it a popular residential location for commuters to jobs in Baltimore and Washington, DC. However, with strength in economic sectors such as biotechnology, manufacturing, and entertainment, Frederick is also an employment hub in its own right. Nearly half of Frederick County's jobs are located within the City limits, and Frederick County is a net importer of workers from nearby jurisdictions, include Washington and Carroll Counties in Maryland; Berkeley, Franklin, and Jefferson Counties in West Virginia; and Adams County in Pennsylvania. The location of municipal, county, and federal government institutions in the City (such as Fort Detrick), and also strengthens Frederick's economic base.

Demographics and Economic Trends

The City of Frederick and its environs have experienced extremely strong growth pressures in the last two decades. This can be attributed to the City's strategic location at the confluence of major interstates and the restrictive growth policies of adjacent counties.

Population Trends

The City of Frederick's year 2000 population of about 53,000 is nearly twice the City's population in year 1980 of about 28,000 (See Figure IN.2). The City's share of Frederick County population remained constant at about 25 percent during this period.

The City's total number of households increased from 11,300 in year 1980 to about 21,000 in year 2000, an increase of over 9,000. The average household size remained constant at about 2.5 persons per household.

County Employment Trends

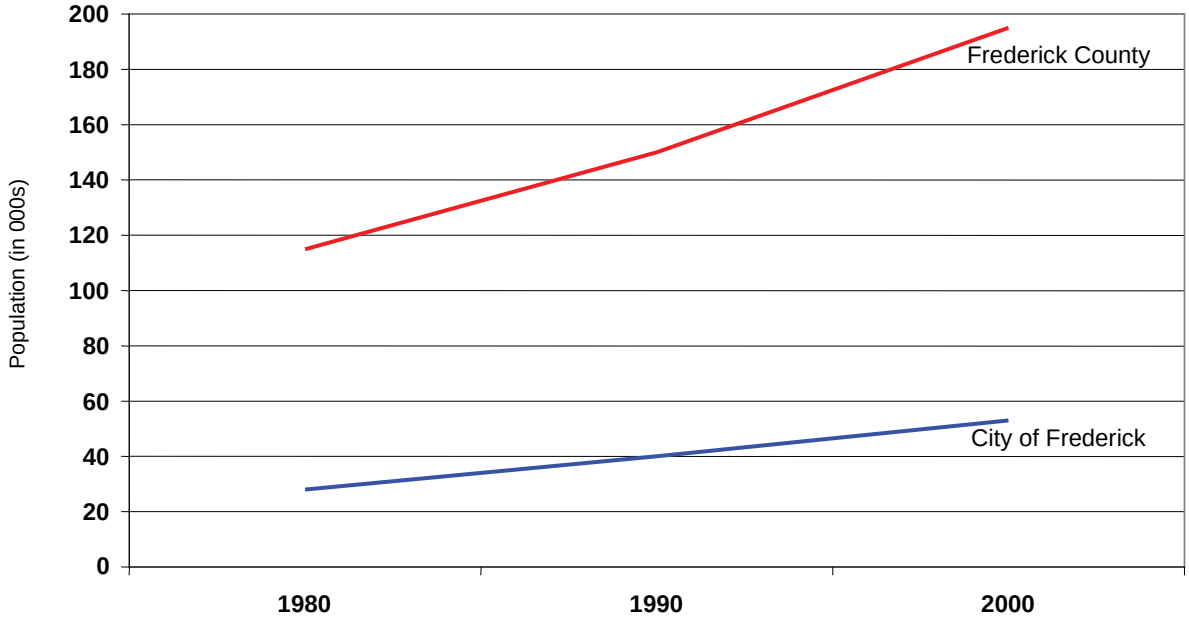
In the absence of at-place employment trends for the City of Frederick, County data was used to illustrate job growth trends. During the last two decades, Frederick County's at-place employment grew at a much faster rate than its household growth. From 1980 through 1998, jobs in the County (which includes the City) grew from 29,000 to 65,000, or 124 percent. Households also grew rapidly during this period but not as sharply, up approximately 85 percent. The resulting jobs to housing ratio for Frederick County, a useful indicator of economic self-sufficiency, grew from 0.77 in 1980 to approximately 0.94 in 1998. This belies somewhat the perception of the County as a bedroom community. Figure IN.3 shows the trends in jobs-housing ratio for Frederick County and the region. City data is included only for 2000, since historical city-level at-place employment data are not available. The City is a job-rich environment, with two jobs for every existing household.

An historical view of employment in Frederick County helps to explain some of the current patterns in the economic structure of the County. Figure IN.4 shows the sector-level employment in Frederick County from 1969 through

2000. For the most part, these local trends match regional and national trends. For example, the dip in construction employment in the early 1990s coincides with the economic recession that hit the nation during that period.

Of particular interest is the growth in the services, retail, finance, and construction sectors since approximately 1987. There was a veritable explosion in jobs in the service sector. The Service Sector includes health, personal services, and educational services—some of the strengths of the City and County economies. Driven by these activities, Frederick County clearly kept pace with the nation's move toward a service-based economy.

Figure IN.2
Population Growth-1980-2000
City of Frederick and Frederick County



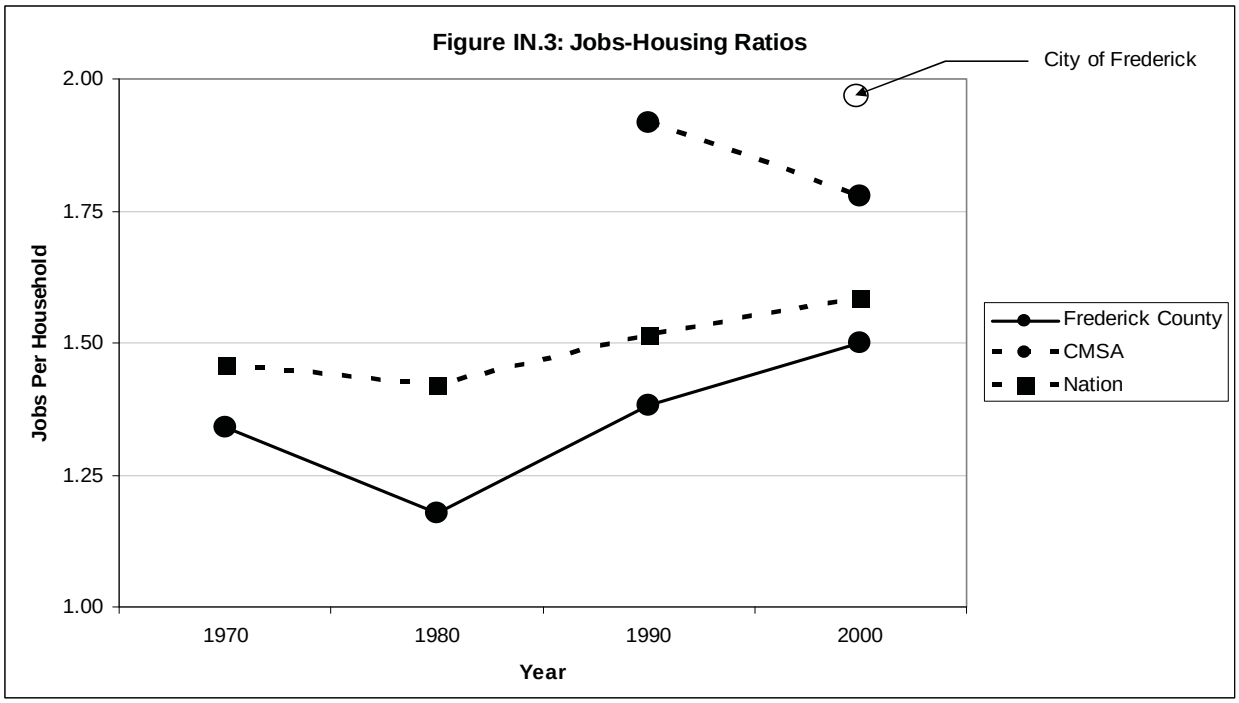
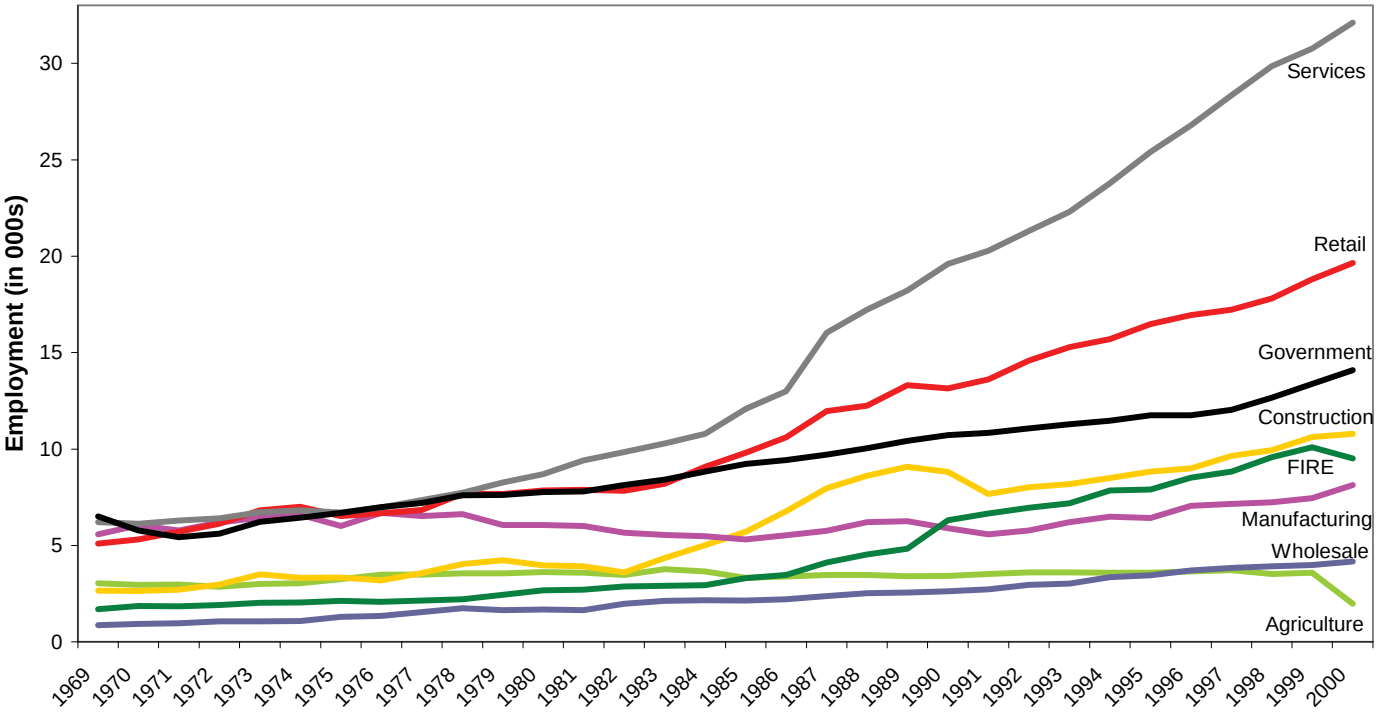


Figure IN.4
Employment by Sectors 1969-2000
Frederick County



City Employment

In 2000, the City of Frederick was home to approximately 42,000 jobs and 2,700 establishments. Of these, 5,300 jobs were located at Fort Detrick. Table 1 shows the distribution of these jobs by industry type.

Historically, the City of Frederick has been the commercial, institutional and industrial center of Frederick County. This is reflected in the employment data. The government sector is the City's largest, with more than 7,400 jobs in Frederick (including the 5,300 jobs at Fort Detrick), or 17.8 percent of the City's total jobs. Health care is close behind, with approximately 7,000 jobs (16.9 percent), followed by retail with more than 4,500 jobs (10.8 percent), accommodation and food with about 2,900 jobs (7.0 percent), manufacturing with approximately than 2,850 jobs (6.8 percent), and education with approximately 2,650 jobs (6.3 percent).

Within the government sector, the large majority of the jobs fall within national security (4,000 jobs) and general government (2,100). The national security sub-sector includes jobs specifically assigned to Fort Detrick. Related jobs at the National Cancer Institute and similar institutions are included in the general government figure.

Within the health care sector, most jobs fall within ambulatory health care, which includes doctor's offices, dentists, clinics, and HMO facilities. Hospitals and nursing homes also support a large number of employees. The high number of ambulatory health care jobs reflects the presence of Mid Atlantic Medical Services, Inc. (MAMSI), an HMO with 1,400 employees. Even without MAMSI, however, there are more than 250 individual ambulatory health care establishments.

Given the City's proximity to two interstates, it is not surprising that the City has a significant number of retail jobs. More than one in six establishments in the City of Frederick is dedicated to retail activities. In addition to general merchandising, which includes big box retail, grocery stores and similar types of retail establishments, the City also has about 50 motor vehicle parts stores that account for approximately 840 jobs. Of the approximately 2,900 jobs in the accommodation and food sector, almost all (94 percent) are at food and drinking places.

Manufacturing has been a significant part of the City's economy for many years. However, in 2002, it was only the City's fifth largest sector in terms of total jobs. The largest sub-sectors within this category are machinery manufacturing (670 jobs), printing (520) and apparel manufacturing (400).

Educational services provide more than 2,600 jobs in the City of Frederick, the majority of which are found in primary and secondary education—public and private schools. The City is also home to Hood College and Frederick Community College. While neither employs more than 600 people, both institutions are large for a city of Frederick's size.

The City of Frederick remains a center for manufacturing employment

Table IN.1

City of Frederick, Jobs by Industry, 2000

	Employees	
Industry	**Number**	**Share of Total**
Government (All Levels)[1]	7,445	17.8%
Health Care and Social Assistance	7,058	16.9%
Retail	4,534	10.8%
Accommodation and Food	2,911	7.0%
Manufacturing	2,849	6.8%
Education [2]	2,648	6.3%
Other Services	2,574	6.2%
Finance and Insurance	2,426	5.8%
Professional Services	1,920	4.6%
Construction	1,747	4.2%
Wholesale	1,363	3.3%
Information	897	2.1%
Real Estate	852	2.0%
Arts, Entertainment, and Recreation	749	1.8%
Transportation/Warehousing	638	1.5%
Administrative/Waste Management	565	1.4%
Unclassified Establishments	245	0.6%
Management of Companies	200	0.5%
Agriculture and Ag Support	154	0.4%
Utilities	50	0.1%
Mining	6	0.0%
All Industries	**41,831**	**100%**

[1] Jobs at Ft. Detrick and the National Cancer Institute are included in the Government totals

[2] Education and Professional Services have only one 3-digit NAICS subdivision. The categories above are 4-digit subdivisions.

Source: InfoUSA

Of the 1,900 employees in the professional services category, more than 400 provide legal services, while the rest are spread among a variety of fields ranging from architecture to veterinary services. The other services category is equally diverse, comprising everything from automobile repair to beauty services to religious and non-profit enterprises. Finance and insurance is not as large as the other sectors, but it does represent approximately 2,400 jobs. Construction also accounts for approximately 1,750 jobs, the majority of which (1,051) are within specialty trades.

The five industries with the largest number of employees (Government, Health Care Retail, Accommodation, and Education) together comprise more than 24,500 jobs, or 59 percent of the City total. Moreover, the ten largest sub-sectors (National Security, Food and Drinking Places, General Government, Ambulatory Heath Care, Hospitals, Primary and Secondary Education, Religious and Nonprofit, Nursing Homes, Insurance Carriers, and General Merchandising) have nearly half of the total jobs in the City.

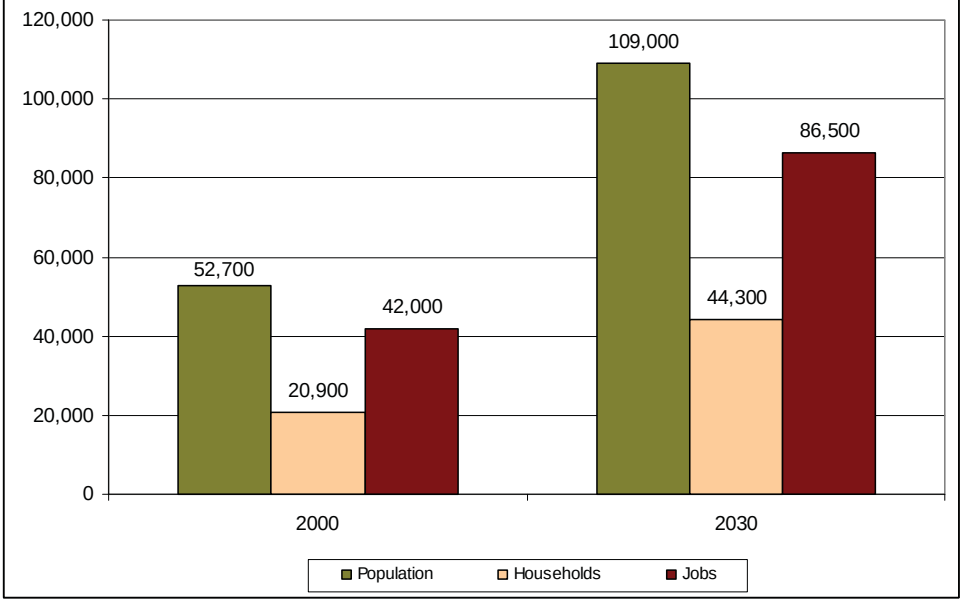
City Population Forecast

From 2000 through 2030 the City of Frederick is projected to experience a population gain of more than 56,000 at an annual growth rate of about 3.6 percent. This amounts to an increase of more than 23,000 households (See Figure IN.5).

City Employment Forecast

The City of Frederick is projected to account for progressively rising shares of regional employment growth. From 2000 through 2030 the total employment in the City is projected to increase by more than 100 percent. By 2030 the City is projected to have about 86,500 jobs at an annual growth rate of 3.5 percent.

Figure IN.5
Projected Population, Household, and Job Growth



Forecast Methodology

Demographic and economic forecasts for the City of Frederick Study Area were prepared using a top-down hierarchical approach. First, a national forecast was developed, then a regional forecast linked to national trends was developed, and finally the regional forecast was allocated to the Study Area using a calibrated mathematical model.

An employment-driven forecast technique was used. The time trends for twenty industries were estimated using all data in the 32-year historical record, on the notion that long-term forecast should rest upon long-term relationships. Regional employment (CMSA) was expressed as a ratio to national employment for each of the twenty subject industries in each of the 32 historical years. The regional forecast was estimated based on the relationship studied through the ratios and the region's baseline employment profile.

The regional economic forecast was allocated into 78 districts that involved the division of major counties into as many as eight subareas. Frederick County was divided into a South District, an East District and a North district as well as the Central Study Area. The 1990-2000 change in the 20 employment sectors was used to calibrate the forecast model and estimate the employment for each of the districts. In addition to the 1990-2000 employment change, variables measuring land availability and agglomeration were also used.

Finally, the Study Area employment forecasts were broken down into the City of Frederick and Rest of Study Area. This was based on initial economic activity levels and land availability measures.

Demographic forecasts were established by determining the future populations necessary to support the regional economy.

LAND USE ELEMENT

Introduction

The past few decades have seen a significant expansion of the Baltimore-Washington region's urbanized area. Due to its unique combination of natural and cultural settings, a vibrant and varied urban fabric, a well-connected transportation system, and proximity to both Baltimore and Washington, DC, the City of Frederick has experienced high growth pressures in recent years. This pressure has produced substantial employment and residential expansion, both within City limits, and in surrounding portions of Frederick County.

As a result, the City's population nearly doubled between 1980 and 2000—from about 28,000 people to 53,000 people. During the same period, the City added more than 9,000 households—from 11,300 in 1980 to about 21,000 in 2000. As discussed in the Introduction to this Comprehensive Plan, the City's population is projected to double again—to more than 100,000 people—by 2030, adding more than 23,000 new households. The City's job base is also expected to double during this timeframe. The City's existing land use is shown on Map LU.1. Table LU.1 shows the existing land use by type and the percentage of the total that each land use represents in the City and in the potential annexation areas.

Concerns about future land use, growth trends, and Smart Growth were frequently expressed by stakeholders of the City of Frederick in the Plan Assessment and Investigation Report (PAIR). Specific concerns included:

- The implications of Smart Growth on the City of Frederick.
- The desire to manage growth without generating sprawl.
- The effects that Growth Management efforts in other jurisdictions are having on the City of Frederick.

The last point is especially important, since Frederick borders Montgomery and Howard Counties. These two "mature" counties have limited growth potential and have growth management policies that have tended to deflect new residents and employment to Frederick.

Table LU.1: Current Land Use

Land Use Type	Acreage in City	Share of City	Acreage in Annexation Areas	Share of Annexation Areas
Commercial	1,086	8%	1,115	5%
Industrial	724	5%	724	3%
Institutional	2,789	21%	2,835	13%
Mixed Use	167	1%	167	1%
Conservation	7	0%	10	0%
Recreation	998	7%	1,217	6%
Right of Way	398	3%	631	3%
Residential	3,883	29%	4,171	20%
Vacant	3,289	25%	10,448	49%
Total	**13,341**	**100%**	**21,318**	**100%**

The Challenge Ahead: Issues this Element Seeks to Address

Despite continuing growth pressures, the City has only a limited ability to accommodate new residents and businesses. A capacity analysis performed by the Maryland Department of Planning (MDP) estimates that, within current municipal boundaries, the City of Frederick has developable land for only 7,000 new households—only a portion of the households that the City will need to accommodate projected growth. To make room for new residents and employees, the City will need to annex unincorporated portions of Frederick County.

One major challenge for the City is to annex new land while still preserving the distinct character that makes the City attractive to growth in the first place. Balancing the geographic distribution of new households and jobs, and coordinating growth with infrastructure availability is an important aspect of this effort. At the same time, the City must strive to revitalize existing neighborhoods and commercial centers to preserve and enhance community character. In general, growth and revitalization should also be carried out in a manner that respects and preserves the City's significant historic and natural resources. The City should also coordinate its growth and annexation plans with Frederick County. Such collaboration can help to protect and promote agricultural preservation in areas outside the future City boundaries.

Downtown Frederick is the embodiment of the compact, walkable, historic setting that attracts new residents and workers. The downtown has undergone rejuvenation over the last decade, emerging as a destination for dining and specialty retail stores. Renewed interest and investment have increased the demand for downtown residences and facilitated the rehabilitation of older housing units. One of the most important land use issues the City faces is to continue to enhance downtown's vitality and provide additional services and amenities for residents and visitors.

As the City grows and redevelops, it should apply the lessons learned from the downtown's success, by fostering compact and mixed use urban development forms into new development, to facilitate walking, bicycling and

Coordinating land use and transportation is key to the success of East Street

opportunities to develop transit. This development will also reduce the number of vehicle trips to shop and do business and reduce energy consumption.

Land use-transportation coordination is a key to achieving balanced growth. In the past, the City's transportation infrastructure and planning tools have not kept pace with land development. This Comprehensive Plan includes recommendations for updates to the City's land management regulations to coordinate the site-specific as well as overall citywide impacts of land use on transportation, such as demand for new and/or improved facilities, as well as the impacts of the transportation system on land use, such as improving accessibility.

Theme: Balancing Growth

It shall be the policy of the City to:

Policy LU.1: Use the Comprehensive Plan text and maps to guide development decisions, assess land use development proposals, and to promote public health, safety and welfare.

Implementation Strategies

1. The Comprehensive Plan contains detailed recommendations for development and preservation, including the appropriate location for various types of development, the general character of roads, and the extent of public water and sanitary sewer utilities. The text of the Plan is supplemented by a number of key maps that provide the foundation of the Comprehensive Plan. The key maps include the Comprehensive Plan Map, which designates future land use and overall policy direction; the roadway transportation maps including roadway classification, roadway congestion, planned number of lanes, and transit map in the Transportation Element; and the sewer and water service phasing map in the Community Facilities Element. These maps should be used in conjunction with one another as well as the text and other maps of this Comprehensive Plan. *[See also the Transportation Element, Policy T.1, the Community Facilities Element, Policy CF.1, and associated implementation strategies.]*
2. Use Table LU.2: Future Land Use Classification and Table LU.3: Overlay Zones in concert with other plan text and maps to review and assess the suitability of development proposals, including zoning and site plan proposals and public development actions.
3. Revise the City's zoning ordinance and maps to be in conformance with the recommendations of this Comprehensive Plan.
4. As supplemental guidance to the Comprehensive Plan, develop and adopt small area plans with input from local residents and business owners. These plans should include a focus on enhancing community identity through urban design as well as recommended land use or redevelopment changes. *[See also Policy LU.14 and associated implementation strategies.]*

Table LU.2: Future Land Use Classification

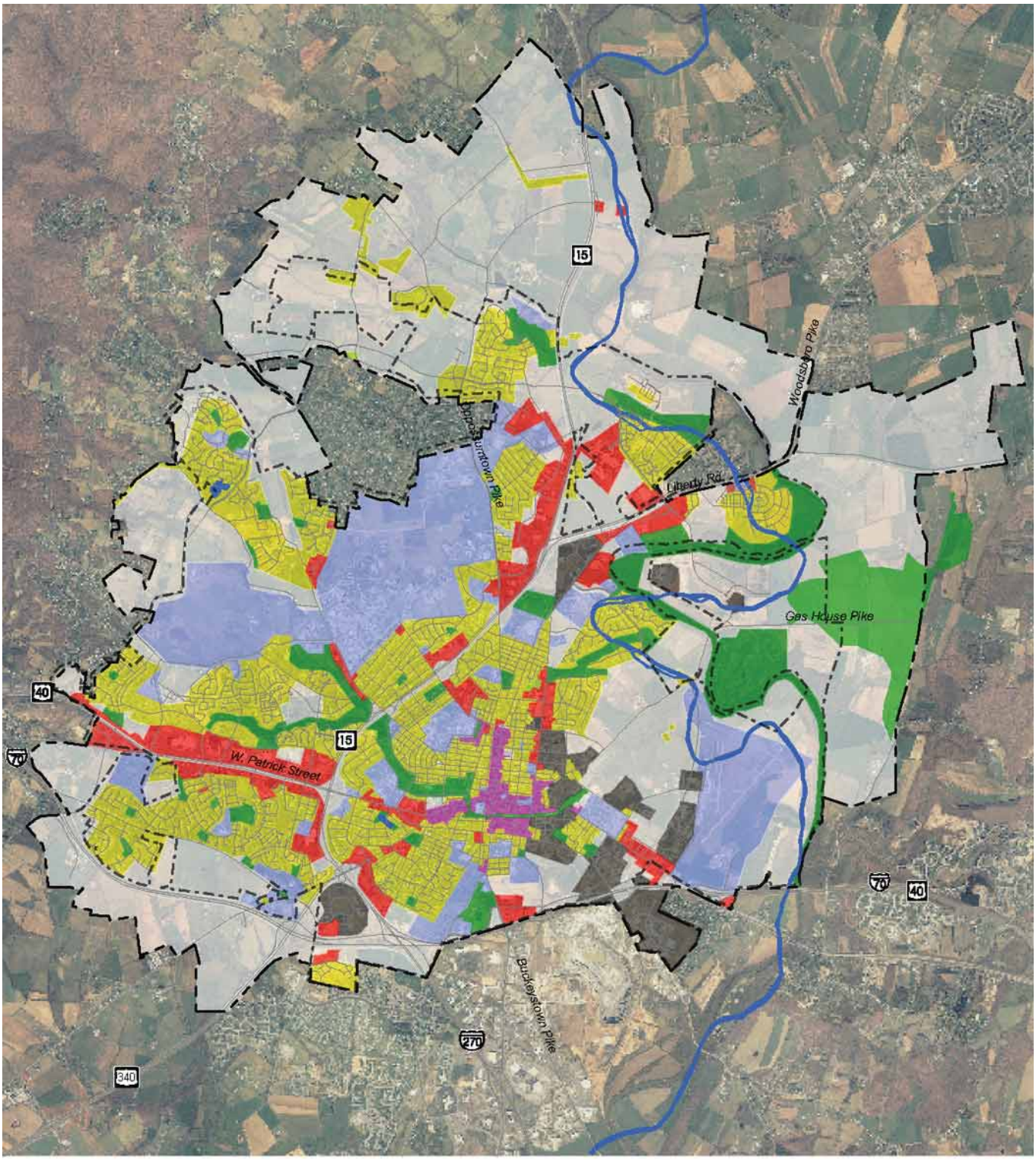
(Use in conjunction with the Comprehensive Plan Map)

Land Use	Recommended Density/Intensity	Recommended Uses
Residential Moderate	3.5 to 4.9 DU/AC	Single-family, detached, attached and multi-family units and associated uses. Secondary uses including neighborhood-serving retail and services may also be appropriate.
Residential Medium	5 to 11.9 DU/AC	Single-family, detached, attached and multi-family units. Secondary uses including neighborhood-serving retail and services may also be appropriate.
Residential High	12 or more DU/AC	Single-family, detached, attached and multi-family units. Secondary uses including neighborhood -serving retail and services may also be appropriate.
Planned Mixed Use[1]	7 or greater DU/AC; FAR of .25 or greater for non-residential uses	A combination of uses including residential and non-residential uses. Non-residential uses may include office, other employment, retail, and institutional uses.[1]
Downtown Mixed Use	Variable[2]	A combination of uses including residential and non-residential uses. Non-residential uses may include office, other employment, retail, and institutional uses. The intent of this designation is to enhance and expand the downtown mixed use area including the extension of the historic grided street pattern and the compact, mixed use development with buildings oriented to the street as downtown infill occurs and adjacent areas are redeveloped for new uses.
Office	Variable[2]	Office, medical office and research and development with retail and service uses as secondary uses only. The intent of this designation is to preserve high-quality future office lands primarily for office uses. Secondary uses should serve the businesses and employees in the office area and may include the sales or services such as meals, banks, personal services, day care and business-support services. These commercial needs of employment centers should be met in ways that do not substantially increase peak hour traffic.
Industrial	Variable[2]	Industrial, manufacturing/assembly, or warehouse distribution uses. Office uses are also appropriate.
Retail – Neighborhood	Variable[2]	Retail uses within or in close proximity to residential areas that provide residents with convenient and pedestrian access to essential retail stores and services.
Retail – General	Variable[2]	Retail uses that serve a community or regional market beyond a single neighborhood or development. Community level retail includes supermarkets and numerous non-retail services. Regional-serving retail includes specialized stores, department stores and services that draw customers from a larger area.
Institutional	Variable[2]	Public, private or non-profit owned areas when the public is invited or permitted to congregate. This includes hospitals, houses of worship, schools, government offices and facilities, and other similar facilities.
Recreation	Variable[2]	Lands and facilities owned by the City or other level of government for the purpose of recreation or publicly-accessible open space.
Conservation	Variable[2]	Privately-owned land for recreation or open space.

[1] Additional guidance on mixed use development areas is provided in the box entitled "Planned Mixed Use Designation" on page LU-7.

[2] Variable based on site and surrounding area context, conditions and impacts (see "Planned Mixed Use designation" on page LU-7).

Map LU.1: Current Land Use



Current Land Use
City of Frederick Comprehensive Plan

Prepared by HNTB

0 1 Miles

Current Land Use Categories

- Commercial
- Office
- Industrial
- Right of Way
- Vacant
- Institutional
- Mixed Use
- Residential
- Conservation
- Recreation

Existing City Boundary

Planned City Boundary, 2030

Table LU.3: Special and Overlay Districts

Overlay Zone	Key Provisions
Airport Overlay	This proposed zone would be designated for lands around the airport to control land uses to address safety issues and to notify contract purchasers of noise and other impacts on lands near the airport. Such an overlay district should be evaluated as part of the update to the Airport Master Plan.
Frederick Town Historic District	In 1952, the City of Frederick became the second city in Maryland to establish a local historic district and organize a Historic District Commission to protect its architectural heritage. Because of this careful stewardship of historic resources, Frederick enjoys one of the best-preserved historic districts in the nation.
Carroll Creek Overlay	The purpose of this overlay district would be to reinforce the planned high-quality, pedestrian-friendly environment and control signage and visual clutter along the Carroll Creek Corridor, an important focal point and economic development area of downtown Frederick.
Commercial Overlay	The purpose of this proposed overlay district would be to improve revitalizing commercial corridors by maintaining the long-term mobility of such corridors, limiting access and the number on conflict points, promoting improved pedestrian and vehicle circulation and controlling signage, visibility obstructions and clutter. The Golden Mile on Route 40 would be a good candidate for this overlay zone.
City Gateway District	The purpose of these overlay districts would be to establish attractive entrances and control signage and visual clutter at entrances to the City or entrances to special areas of the City.

Planned Mixed Use Designation

The planned mixed use designation is intended for large planned nodes of a mix of employment, retail, office and residential development. Public uses may also be appropriate. The intent is to have mixed use, master planned developments that have compact development patterns that provide more opportunity to walk and bicycle; increase opportunities for transit; and reduce the number of vehicle trips. The development within the planned mixed use areas should be planned with the following kinds of characteristics:

1. *Buildings spaced close together and located adjacent to the street with little or no setback;*
2. *Adjacent land uses that provide for compact, mixed use development with buildings oriented towards the street;*
3. *A built environment in which it is convenient to walk from place to place;*
4. *Publicly-accessible and usable community commons, open space, public plazas or other community gathering space.*
5. *Sidewalks with ample width located adjacent to buildings and connecting the buildings to the street network;*
6. *On-street parking, structured parking or shared, general purpose parking lots that are located behind or to the side of buildings;*
7. *Shared parking for complementary uses to reduce pervious cover and an overabundance of parking.*
8. *Streets designed with a pedestrian orientation for the ease of crossing by pedestrians;*
9. *An interconnected street network to facilitate local auto, bicycle and pedestrian circulation except where topography severely constrains the potential for street connections. Public road connections should create city blocks, minimize the use or cul-de-sac streets, use traditional street patterns to the greatest extent possible and provide connections to existing or future surrounding development.*
10. *Provision for integrated transit stops including van/bus stops, bicycle and pedestrian facilities and including street amenities that support these transportation modes.*

Location

The planned mixed use designation is planned for a number of large areas that are designated as potential annexation areas on the Comprehensive Plan Map. The Comprehensive Plan Map also recommends that the most highly accessible sites within these planned mixed use area be reserved for office uses. These are sites that are made accessible via existing or planned arterial or freeway road interchanges/intersections.

Mix of Uses

The desire is to have a mix of a residential, employment and retail/services except where designated for primarily for office uses on the Comprehensive Plan Map. The proportion of each use is determined in large part by surrounding land uses, existing and proposed roads/interchanges, and site location.

	Mixture of Uses			
Location Criteria	**Residential**	**Office**	**Retail**	**Industrial**
Located in close proximity to arterial or freeway interchanges	Less	More	Less	Less
Located near other residential	More	Less	More	Less
Located near other employment	Less	More	Less	More
Areas not located near arterials	More	Less	Less	Less
Located near the airport	Less	More	Less	More
Located on or near a major truck route	Less	Less	More	More

Annexation in Maryland

Annexation must conform to the requirements of Article 23A (§9 and 19) of the Annotated Code of Maryland. The annexed land must share a boundary with the annexing municipality, it cannot already be part of an existing municipality, and the annexation cannot create an "enclave" of unincorporated area (e.g., a piece of land completely surrounded by incorporated land).

The annexation process is triggered either through a municipal legislature or via citizen petition. A municipal legislature can propose annexation of adjacent land only with the consent (usually in petition form) of 25 percent of the registered voters of the area to be annexed, and owners of 25 percent of land in the area to be annexed. Alternately, residents of an unincorporated area can petition the adjoining municipality to be annexed. Again, the signatures of 25 percent of the annexation area's registered voters and owners of 25 percent of its property must sign the petitions.

Following a successful petition, the municipal legislature submits a plan for the provision of future public services and facilities to the newly annexed area. It also introduces an annexation resolution. After public hearings on the topic, the municipal legislature then votes on the resolution. If the resolution succeeds, citizens and landowners of either the annexing municipality or the annexed territory may petition for the annexation question to be put to a public referendum. Again, the 25 percent/25 percent signature benchmark must be obtained. The County legislature may also force such measures with a two-thirds majority vote. If an annexation resolution is unchallenged, the vote of the municipal legislature is the final word on the subject.

Annexation Impact Report

An impact report is required for each proposed annexation, to be prepared by the applicant. This report, at a minimum, should include:

A map showing the present and future boundaries of the city (as shown on the Comprehensive Plan Map) in the vicinity of the proposed annexation. The map should also show existing and proposed land use patterns in the areas to be annexed.

An analysis regarding the ability of the area to be serviced by water and sewer.

An analysis of the effect of annexation upon the Frederick County public school district system, including the estimated number of students generated and the capital construction required.

An analysis of the estimated traffic generation and the impact on the roadway system.

An analysis of the impact on historic and cultural resources.

An analysis of the fiscal impacts.

An analysis explaining how the proposed annexation is in conformance with the Comprehensive Plan.

Policy LU.2: Phase the annexation of the unincorporated areas shown as potential annexation areas on the Comprehensive Plan Map with the availability of adequate transportation, sanitary sewer, and water services.

Implementation Strategies

1. Annex of the area to the east of the City as shown on the Comprehensive Plan Map. *(See Table LU.4 for recommended annexation phasing and forecast development.)*
2. Annex of the area to southwest of the City as show on the Comprehensive Plan Map should only occur if the new arterial connector road between Mt. Phillip Road and Crestwood Road is programmed and constructed.
3. An annexation report must be completed for each annexation (*see box on page LU-8 for a description of the Annexation Impact Report Guidelines*).
4. Annexations and associated rezonings must be consistent with the recommendations of this Comprehensive Plan.
5. Require all properties located outside of the City, but contiguous to the City's boundary, to annex prior to provision of City sanitary sewer or water service. In no case should the City annex property that cannot or will not be served by City services including sanitary sewer and water service. *[See also the Community Facilities Element, Policy CF.1 and associated implementation strategies]*

Table LU.4: Recommended Annexation Phasing and Forecast Development

Recommended Annexation Area	Acres	Anticipated Annexation Timeframe	*Existing Development (Year 2000)* HH	Jobs	*Forecast Development (By Year 2030)*[1] HH	Jobs
Fill-in Areas – Various Locations	962	By 2006-10	911	1,094	2,400	2,750
West of Existing City	689	By 2006-10	303	396	1,050	750
North/Northwest of Existing City	2,764	By 2006-15	339	373	2,600	3,650
Possible Annexation Areas						
Northeast of Existing City	1,550	By 2015-25	386	177	2,972	1,252
Southwest of Existing City[2]	732	By 2015-20	259	162	1,300	3,000
East of Existing City	1,242	By 2020-25	140	24	450	1,100

[1] *Forecast development for annexation areas only, including existing development as of year 2000.*

[2] *No annexation should occur before the construction of a new arterial connector road between Mt Phillips and Crestwood Roads.*

Policy LU.3: Encourage mixed use developments, a range of housing types throughout the City and a balance of residential and non-residential growth. *[See also, the Housing Element, Policy H-2, and associated implementation strategies*]

Implementation Strategies

1. Discourage additional low-density residential development characterized by wide streets, large lots, and deep setbacks.

2. Maintain the jobs-rich nature of the City's economy at an approximate ratio of two jobs for every household.
3. Continue to monitor and track development approvals.
4. Encourage integration of special residential uses, licensed group homes, and foster care facilities into residential areas.
5. Amend the development regulations to permit home-based occupations in appropriate zoning districts to provide local services and employment opportunities.
6. The area north of MD 26 on either side on MD 194 should be studied as a possible location for future annexation.

Policy LU.4: Balance the distribution and timing of future population and job growth in relation to the availability of existing and future infrastructure.

Implementation Strategies

1. As part of the implementation of this Comprehensive Plan, propose an Adequate Public Facilities Ordinance (APFO) to phase development with the availability and adequacy of existing and future infrastructure. *[See also the Transportation Element, Policy T.1, Implementation Strategy 1 and associated box]*
2. Study additional impact fees or excise taxes to pay for growth-related infrastructure and capital improvements including transportation, sanitary sewer and water and parks. *[See also the Transportation Element, Policy T.2, Implementation Strategy 5]*

Policy LU.5: Guide and regulate development in an efficient and streamlined manner through a process and regulations that are user-friendly and predictable.

Implementation Strategies

1. "User-friendly" means that the ordinance is organized logically, information is consolidated into matrices where appropriate, and that drafting conforms to best practices for technical writing.
2. During the update of the City's development regulations, address the differences in building height requirement of the Historic District Commission (HDC), Carroll Creek District, and the Zoning Ordinance, as well as other discrepancies that may exist.
3. During the update to the City's development regulations, update bulk and massing requirements, such as floor area ratios, and consider establishing impervious surface ratios for both residential and non-residential uses.
4. During the update to the City's development regulations, revise the parking standards including off-site parking regulations. *[See also the Transportation Element, Policy T.10, and associated implementation strategies*]
5. During the update to the City's development regulations, include trip generation standards.
6. During the update to the City's development regulations, update use regulations with regard to types of uses, separation standards, and permitted districts.

7. During the update to the City's development regulations, provide a revised approach to City permitting of institutional uses. Options could include an institutional Euclidean zoning district, floating zone, or supplemental use regulation for institutional uses or other approaches that are consistent with the emerging law pertaining to zoning of institutional uses such as churches.
8. During the update to the City's development regulations, include requirements for protecting or preserving historic resources. *[See also the Land Use Element, Policy LU.15 and associated implementation strategies.]*
9. Update the special exceptions standards by adding criteria for uses requiring special exception review, deleting special exception review where administrative staff review is appropriate, and adding new special exception uses where needed.
10. Establish protocols for effective inter-departmental communication throughout the regulatory process.

Policy LU.6: Employ innovative performance standards as the criteria for site planning and/or subdivision plats.

Implementation Strategies

1. As part of the update of the City's development regulations, incorporate Performance Standards. These should include standards for various uses and the associated auto trips and roadway level of service, landscaping and buffering, and for protection of critical environmental habitats.

Theme: Enhancing Mobility, Accessibility, and Connectivity

It shall be the policy of the City to:

Policy LU.7: Continue to improve Frederick Municipal Airport and ensure its long-term viability. *[See also the Transportation Element, Policy T.12 and associated implementation strategies]*

Frederick Municipal Airport is the second-busiest in Maryland.
(photo courtesy of airnav.com)

Implementation Strategies

1. Acquire land required by the Airport Master Plan, as amended, for the airport's long-term viability.
2. As part of the update of the City's development regulations, create an airport overlay district for areas surrounding the airport to ensure compatibility with the future development of the airport as designated in the Airport Master Plan.
3. Ensure the documentation or preservation of significant historic resources that may be in the path of proposed airport development (specifically the Rosenstock site).
4. Prohibit "through the fence" operations at the airport, to allow better control of the property boundaries, maintain economic viability, and provide a secure environment for users.
5. Update the Airport Master Plan.

Policy LU.8: Preserve arterial corridor capacity and improve the safety and appearance of major roadway corridors within the City.

Implementation Strategies

1. As part of the update of the City's development regulations, develop a Corridor Overlay along US 40 (the "Golden Mile")—with possible applicability to other arterial corridors—which addresses connectivity (e.g., cross access easements, inter-parcel access), traffic capacity issues, and aesthetics. *(See Table LU.3 for a complete list of recommended Overlay Districts.)*
2. Implement sign and architectural controls along US 15 and I-70 to improve the visual image from these major routes through Frederick.
3. Work with the State Highway Administration to develop safety design standards for intersections that will also prevent mid-block crossing on state roads.
4. As part of the update of the City's development regulations, revise the standard details for arterials to create a more inviting appearance.
5. Support the Catoctin Mountain Scenic Byway Study.

Revised design details on arterial roads, such as East Street, can greatly improve their appearance.

Policy LU.9: Develop land use patterns that minimize the number of auto trips and that are transit supportive. *[See also the Housing Element, Policy H.4 and associated implementation strategies.]*

Implementation Strategies

1. As part of the update to the City's development regulations, incorporate guidelines or regulations, including those that conform to the principles of Transit Oriented Development (TOD), to encourage development that facilitates pedestrian, transit and non-automobile-oriented modes of travel *[See also the Transportation Element, Policy T.9, associated implementation strategies, and the associated box describing TOD].*
2. As part of the update to the City's development regulations, implement development standards for employment, residential, and mixed use areas so that they can be served by existing or future transit service.
3. Facilitate the development of communities that mix residential, institutional, commercial and office uses to provide convenience, increase opportunities for walking and transit service, and reduce the number and length of automobile trips. The non-residential uses in these communities should be compatible in design and scale with surrounding neighborhood development.
4. Implement interconnections between neighborhoods, including more street grids and non-motorized pathways.
5. Promote transit-oriented development around the existing MARC train station on East Street.
6. Develop regulatory incentives for mixed use development that encourage the planned, coordinated development of mixed land uses on adjacent properties.

Policy LU.10: Increase accessibility to land use and development information for citizens, businesses, and developers.

Implementation Strategies

1. Implement a query function on the City's website that will enable the public to research property and permit information including all properties within the City.
2. Augment the City's current public notice system for zoning and other proposed land use actions, through expanded use of the City's website and other measures.

Theme: Enhancing the Community

It shall be the policy of the City to:

Policy LU.11: Promote a high quality built environment.

Public art is part of a high-quality built environment

Implementation Strategies

1. As part of the update to the City's development regulations, include regulations that recognize the existence of distinctly "downtown" districts, as well as more suburban districts of the City.
2. In newly developing or redeveloping existing communities, encourage the use of unifying themes, town squares, parks, cultural resources, and public open space to help create community identity. *[See also the Parks and Recreation Element, Policy PR.1 and associated implementation strategies.]*
3. Provide economic incentives for the adaptive reuse of historic structures or sites in new development.
4. As part of the update to the City's development regulations, assess street tree requirements, to determine the best way to maintain a tree-lined urban fabric, while accounting for the potential conflict between tree roots and underground utilities.
5. Minimize the exposure of residential uses to highway noise particularly along US 15 and I-70.
6. As part of the update to the City's development regulations, implement zoning regulations and standards consistent with the historic district that create a sense of place along the Carroll Creek corridor and implement the recommendations of the Carroll Creek Park Design Development Standards report. Consider an overlay zone to enhance the appearance of the built environment along Carroll Creek.
7. Encourage the installation and integration of public art in existing neighborhoods and new development.
8. As part of the update to the City's development regulations, incorporate urban design guidelines.
9. Use forest conservation and the preservation of sensitive environmental features to enhance the built environment. *[See also the Environment and Natural Resources Element, Policy EN.1 and associated implementation strategies.]*

Policy LU.12: Preserve and enhance the quality of life in existing neighborhoods.

Implementation Strategies

1. Reinforce existing residential neighborhoods.
2. Reinforce existing neighborhood commercial areas and activity centers.
3. Continue promoting public safety through community partnerships.
4. Support community-based organizations to guide neighborhood revitalization efforts.
5. Explore ways to retrofit certain existing neighborhoods with traditional neighborhood design aspects to enhance walkability.
6. Promote the restoration and rehabilitation of historic residential structures to conserve the City's housing stock and historic fabric.
7. Educate property owners of historically significant buildings or sites about applying for and utilizing state and federal assistance program.
8. Review and revise the buffers and transition areas between business and residential uses to address potential conflicts between adjacent uses within the City's established and diverse mixed use areas.
9. Investigate a rental housing maintenance inspection program to ascertain whether or not housing, building, electrical and plumbing codes are being met.

Policy LU.13: Promote the development of safe, healthy, and attractive new neighborhoods.

Implementation Strategies

1. Connect new development to new and existing park and recreation facilities.
2. Support the linkages recommended in the 2002 Shared Used Path Plan.
3. Promote land use diversity and encourage the development of neighborhood-serving retail that is accessible (via roads and sidewalks) to all areas of the surrounding neighborhood *(see box at right)*.
4. Consider providing incentives that encourage developers to achieve high-quality design and energy efficiency in new developments.
5. Consider Planned Neighborhood Developments (PNDs) to achieve better design and clustering in new developments while addressing uses, scale, and land use compatibility.
6. Integrate existing significant historic and natural resources into development plans.
7. Promote an integrated balance of ownership, rental and public housing. *[See also the Housing Element, Policies H.1, H.2, and associated implementation strategies.]*
8. Provide a mix of housing styles and densities within neighborhoods and new developments.
9. As part of the update to the development regulations, considering giving the Planning Director the ability to grant variances for certain health and safety issues (such as handicapped ramps) that only impact a small percentage of the required setback. As part of this strategy, define that threshold percentage.

Neighborhood-Serving Retail

A Neighborhood-Serving Retail district is designed to revitalize and protect commercial districts that serve the City residents who live in the areas immediately around those establishments. The Neighborhood-Serving Retail district is a place where local merchants can locate without the need to compete with the larger-scale commercial establishments in other parts of the city.

The Neighborhood-Serving Retail district encourages commercial development that is at a scale and character that is in keeping with the surrounding neighborhood, emphasizes pedestrian convenience, and provides goods and services that nearby residents need.

Policy LU.14: Encourage revitalization of the City's neighborhoods and commercial corridors.

Implementation Strategies

1. Use the North Market, East End and West Patrick Street Legacy Plans *(see Figure LU.1)* to guide revitalization of these neighborhoods.
2. As part of the update of the City's land development regulations, include provisions to require that new development within older residential areas reflects the existing neighborhood character in terms of bulk, size, design, and height.
3. Develop a systematic neighborhood planning strategy to prepare small area plans for all parts of the City.

Policy LU.15: Identify, document, designate, and protect significant historic resources, including archaeological resources.

Implementation Strategies

1. Continue to develop the City of Frederick Inventory of Historic Properties, and use it to identify and protect historic sites and districts during the development review process and as part of the annexation process.
2. Increase the public's awareness of the City's cultural and historical resources and of the programs for the rehabilitation of historic structures and the protection of archaeological sites.
3. During the update of the City's development regulations, incorporate design standards from the Frederick Town Historic District Design Guidelines that are ministerial in nature into the zoning regulations for the Historic District Overlay Zone.
4. Facilitate the adaptive reuse of historic structures (e.g., residential units above commercial establishments).
5. As part of the update to the City's development regulations, adopt guidelines for archaeological surveys as part of the development review process to assess the effects of development on historic structures and archaeological sites.
6. As part of the development review process, assess the affect of development on historic structures and archeological sites.
7. Develop a GIS layer that documents historic resources for use by all City departments and the public via the City's website. This information will not include the location of archaeological sites, which is protected information. *[See also Policy LU.10 and associated implementation strategies.]*
8. Initiate a public education program to explain the cultural and economic value of historic resources and provide property owners with rehabilitation strategies.
9. Develop funding programs for structural rehabilitation work for low-income owners of historic properties.
10. Use the *Frederick City Architectural Survey (see box at left)*, historic context studies, and other resources to be developed, to assess the impact of proposed development on significant historic resources.

Historic Resources in the City of Frederick

The Frederick City Architectural Survey completed by Betty Bird & Associates identifies historic properties located outside the National Register Historic District. The purpose of the survey was to identify properties that were constructed before 1955, to identify areas with threatened resources and to identify geographic areas that were likely to contain significant resources. The report contains three maps:

Area Surveyed

Map of Resources identified as Pre-1955

Map Showing Property Types

These maps, along with the County's Historic Site Surveys (1995 & 1996), should be used in the development review process to aide decision makers on the types of resources that are present on a property.

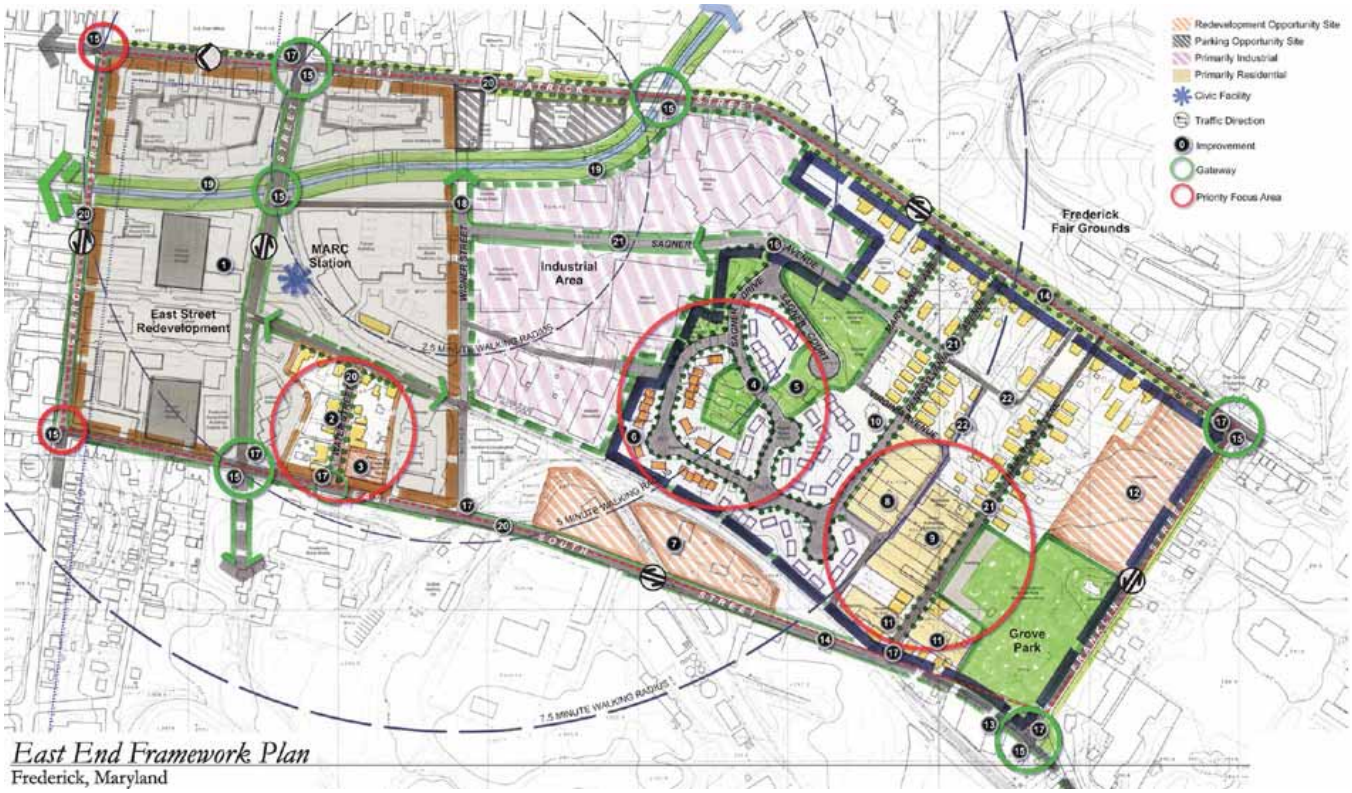
Adaptive reuse of historic structures can give older buildings new life.

Figure LU.1: Legacy Plans

North Market Street Framework Plan

Frederick, Maryland

Figure LU.1: Legacy Plans



Policy LU.16: Enhance community identity and visual character through improved City gateways.

Implementation Strategies

1. The Comprehensive Plan map identifies key City gateways. These gateways are located in highly visible areas along the primary routes leading into the City including: US 40, US 15, MD 26, East Street, East Patrick Street, Jefferson Street, West Patrick Street, South Street, Bentz Street, North Market St (extended), and Rosemont Avenue.
2. Establish a typology of gateways (*see box below for suggested typology*). East Street should be declared as the priority gateway to be used as a model for the development of other gateways.
3. Adopt a gateway overlay district to guide and regulate the visual appearance of major gateways/entrances to the City.
4. Implement City gateway features (landscaping and signage) at major City entrance to define City boundaries and project a high quality image.

Types of City Gateways

The following three levels of gateways are recommended:

Major City Gateways

US 15 at Biggs Ford Road
US 15 at Monocacy Blvd/Christopher Xing
MD 26 at the Monocacy River
US 40 at Christopher Crossing
US 40 at US 15
E. Patrick Street at Monocacy Blvd
S. Market Street at Mt. Olivet Cemetery
East Street at Walser Drive
US 340 at Jefferson Pike/Jefferson Street
South Street at Jefferson Street

Historic District Gateways

E. Patrick Street at Wisner
N. Market Street at 9th Street
Bentz Street at 2nd Street

Neighborhood Gateways

N. Market Street (extended) at MD 26
Rosemont Avenue at US 15

Policy LU.17: Preserve critical viewsheds of historic City spires and views to the countryside.

Implementation Strategies

1. Billboards are not permitted in the City of Frederick. Establish a mechanism to phase out the existing billboards within the City in an effort to reduce visual clutter. *[See also, Policy LU.8 and associated implementation strategies.]*
2. Implement design guidelines that encourage the consideration of viewshed issues, including whether a new or redeveloped building will block views of the rural countryside or the City's historic downtown spires, or along major road and non-motorized corridors.

Views of the City and countryside help define the City's identity

Theme: Supporting a Vibrant Downtown

Downtown Market Analysis

In 2003 the City of Frederick and the Downtown Frederick Partnership commissioned the Market Analysis and Retail Strategy Downtown Frederick, MD*. The objective of the market analysis was to generate recommendations to guide the on going retail revitalization of Downtown Frederick. The recommendations presented in the analysis designed to be useful to public sector organizations and private investors for the implementation of historic preservation and adaptive reuse programs within the Maryland "Main Street" guidelines.*

Among the findings of this report is the statement that the "sustainable retail rejuvenation occurs simultaneously with other public and private efforts to bolster the importance of downtown as a multi-purpose activity center and residential neighborhood…Downtown's competitive market position and its drawing power are predicated upon maintaining its role as a unique specialty shopping and dining destination."

Frederick's downtown has a unique character that should be expanded

It shall be the policy of the City to:

Policy LU.18: Ensure that Citywide development patterns support the health and vitality of Downtown Frederick.

Implementation Strategies

1. Expand the look and feel of downtown to the east along North East Street.
2. Explore relocation of the current downtown Post Office and distribution center, and the redevelopment of this site as mixed use, to enhance the commercial viability of the downtown. A full service Post Office, without a distribution facility, should remain part of the downtown.
3. As part of the update to the City's development regulations, develop standards for home occupations in the downtown without going through the BZA hearing process.
4. Encourage high residential density in the downtown area along Carroll Creek and the East Street corridor to enhance the downtown as a place for residents *and* as a visitor destination.

Policy LU.19: Reinforce Downtown as a center of government, commerce and the arts. *[See also the Economic Development Element, Policy EC.13 and associated implementation strategies.]*

Implementation Strategies

1. Encourage core government services to stay in downtown, recognizing the City's role as the County Seat.
2. Implement the recommendations of the 2003 Downtown Parking Study. *[See also the Economic Development Element, Policy EC.12, and the associated box about the Downtown Parking Study.]*
3. Preserve residential land uses at the fairgrounds except in the eastern quarter of the fairground, which should be rezoned for institutional and/or mixed uses such as offices, hotels, and a conference center.
4. Implement the recommendations of the 2003 Market Analysis and Retail Strategy for Downtown Frederick, MD (see box at left).
5. Encourage higher education opportunities in the downtown.
6. Continue to work with the Downtown Frederick Partnership to preserve cultural resources and promote downtown Frederick as an Arts and Entertainment District.
7. Continue to work with the Downtown Frederick Partnership to strengthen the economic potential of downtown Frederick as a Main Street Community.

Policy LU.20: Reinforce the historic character of downtown Frederick.

Implementation Strategies

1. Continue to document—through photographs and written materials—the properties in the Frederick Town Historic District.

2. Consider expanding the Frederick Town Historic District to encompass the boundaries of the National Register of Historic Places "Frederick Historic District." Alternatively, designate portions of the Frederick Historic District as separate, smaller districts.
3. Establish height limits on downtown buildings to preserve views of the historic spires as well as views to the mountains.
4. Extend the downtown street grid system to the fairgrounds and areas east of North East Street.
5. Expand the alley system in downtown *(see Map T.7: Alleys in the Transportation Element).*
6. Promote the use of tax incentives and credits for building rehabilitation in the downtown historic district.
7. Assist low-income residents in finding funding for the rehabilitation of buildings in the historic district.

Theme: Interacting with the Region

It shall be the policy of the City to:

Policy LU.21: Seek a relationship with Frederick County and surrounding jurisdictions that reinforces the City of Frederick's role as a regional center and supports the common goals of the City and surrounding communities.

Implementation Strategies

1. Update the 1988 City-County annexation policy to reflect the recommendations of this Comprehensive Plan.
2. Work with the County to re-consider the recommendations in the Frederick Region Plan to be compatible with the City of Frederick's Comprehensive Plan regarding annexation and future land use.
3. Examine alternative strategies to limit or delay City development in areas where schools are overcrowded.
4. Coordinate with the Frederick County to protect and promote agricultural preservation and rural landscapes in areas outside the City of Frederick's future annexation areas.
5. Support efforts to co-locate community facilities adjacent to existing and future school sites.
6. Establish a collaborative City/County population, housing unit, and employment forecasting process and forecasts to be used for infrastructure planning, including schools in the Frederick Region.
7. Support the Civil War Heritage Area Plan to enhance tourism in Washington, Frederick and Carroll counties through the State's Heritage Area program.
8. Work with the Monocacy Scenic River Commission to protect the Monocacy River and its tributaries.

The City's agricultural heritage is an important part of its current and future identity

TRANSPORTATION ELEMENT

Introduction

Within the larger Baltimore-Washington metropolitan region, Frederick is strategically located at the confluence of two major interstates, I-270 and I-70. In addition, the City is served by other major US and State highways including US 15, US 40, US 340, MD 355 and MD 26. Frederick Municipal Airport—which has more annual operations than any Maryland Airport except Baltimore-Washington International—and MARC's Brunswick commuter rail line also contribute to the strong regional accessibility of Frederick.

The City of Frederick was laid out on a basic grid network of streets. Over the years the street network has evolved into a combination of the traditional grid and other neighborhood street patterns such as cul-de-sacs and curvilinear streets. Currently, the City includes over 70 miles of public streets and roads, owned and maintained by various separate jurisdictions including the city, county and state.

Frederick's highly accessible location has made the City a destination of firms and residents seeking alternatives to the highly congested, high priced counties of central Maryland. Frederick has become a sub-regional destination for work and non-work trips, and its commuting patterns reflect that trend. Table T.1 shows that, while Frederick is still a net exporter of workers it also attracts a large number of in-commuters, the vast majority of whom drive automobiles. More important, Frederick has attracted an increasingly large share of in-commuters, as demonstrated by its jobs sufficiency ratio (the number of people working in the county, divided by the number of County residents working outside the County). This ratio for Frederick increased from 0.47 in 1990 to 0.58 in 2000.

Table T.1: Commute Patterns, Year 2000

Share of Frederick County Residents Who Live and Work in the County	71%
Share of Frederick Residents Who Work Outside the County	29%
Share of Frederick County Employees Who Live Outside the County	29%
Jobs Sufficiency Ratio	0.58

Note: City-level data were not available from the U.S. Census Bureau at the time of this analysis

Source: 2003 City of Frederick Fiscal Impact Analysis

While the downtown grid itself offers the kind of high-density urban environment that is conducive to pedestrian and bicycle activity, many community facilities and shopping opportunities are located far enough from major residential areas that residents must drive to those locations, instead of walking or bicycling.

Transportation issues have been high in the list of priorities for the stakeholders of the City of Frederick. The Plan Assessment and Investigation Report (PAIR) identified a number of specific issues of concern, including:

- Heavy traffic congestion on the City's major thoroughfares, including interstates, US Highways, and State and County facilities
- Inadequate funding for new transportation facilities
- Lack of multi-modal infrastructure
- Lack of planning and facilities for bicycles and pedestrians

Addressing these concerns will require a number of physical changes and policy decisions, as outlined in this element. These changes include new and expanded facilities for automobiles, pedestrians and bicycles, improved intersections, and expanded transit service.

The Challenge Ahead: Issues this Element Seeks to Address

The primary concerns facing Frederick's transportation system is its ability to handle the increased demands placed upon it by new residents and workers, coupled with the demands placed on the City's road system by pass-through traffic—those trips that neither start nor end in Frederick, but which substantially contribute to overall congestion.

Given the City's increasing role as a regional center, as well as the significant annexationsof developable land outlined in the Land Use Element, a series of new roadways are among the City's most critical transportation needs. Specifically, this Plan calls for the construction of a North-South Parallel Road, as shown in Figure T.1.

This new road addresses several of the City's transportation concerns. By linking US 15, I-70, and I-270, it forms a direct commuter link between important commuter origin points in upper Frederick County, Pennsylvania, and the Baltimore-Washington region. The Parallel Highway also allows travelers to reach those destinations without driving along US 15 through the City of Frederick. Testing and evaluation of the City's roadway system was undertaken as part of the Plan update process. The results show that, with the Parallel Highway in place, there will be major reductions in north-south and east-west trips on US 15, US 40, MD 355, Gas House Pike, and portions of Monocacy Boulevard (see Figures T.3 and T.4) through the City of Frederick.

A new North-South Parallel Road would link Frederick's major highways

Another significant road addition is a Southern Circumferential road, which would form a complete "loop" around the city—when combined with Monocacy Boulevard, Christopher Crossing, Crestwood Boulevard and Walser Drive—and would provide improved access to the City's southwest sector.

Theme: Balancing Growth

It shall be the policy of the City to:

Policy T.1: **Use the future transportation system maps (Map T.1: Roadway Classification Map; Map T.2: Roadway Lanes; Map T.3 and T.4: 2030 Volume to Capacity Maps; Map T.5: Recommended Cross-Access Connections; Map T.6: Shared Paths Plan; Map T.7: Pedestrian Safety Problem Areas; Map T.8: Constrained Roads; Map T-9 Alleys; and Map T.10: Transit Map) in conjunction with Tables T.1 and T.2, the Comprehensive Plan text and the Comprehensive Plan Map to coordinate the phasing of development with roadway capacity and investments.**

Implementation Strategies

Transportation improvements should be coordinated with other infrastructure improvements

1. As part of the implementation of this Comprehensive Plan, propose an Adequate Public Facilities Ordinance for roads (see box on page T-9) to phase development with the availability and adequacy of existing and future City roadways.
2. Level of Service (LOS) should be set at a minimum of D **[1]** for City roadway links. Procedures for the determination of exception areas should be included in the standards. A lower level LOS standard may be permitted for the following reasons: (a) application of the standard to a specific roadway would be in conflict with other recommendations of this Plan (including the protection and enhancement of historic, environmental or cultural resources) or (b) capacity improvements are budgeted for construction within two years or the developer has made a contractual commitment to make the improvement via a mitigation plan or other regional improvements. Phasing of development within specific timeframes may be acceptable. *(See Maps T.3 and T.4 2030 Volume to Capacity Maps)*
3. Coordinate the timing and implementation of transportation improvements with other infrastructure improvements.
4. Establish a mechanism through the capital budget process including a monitoring report that coordinates and integrates development, road building and fiscal impacts.
5. Update of the City's development regulations to ensure consistency with the Comprehensive Plan's transportation maps and text to implement the functional classification road network and right-of-way widths.

[1] Amended on 2/3/05 by Resolution 05-8

Table T.2: Recommended Functional Classification of Roadways

Roads are classified by their function: providing mobility or providing access to property. The urban functional classification system consists of all roads, streets, and highways located inside the urban/urbanized area boundary. The State Highway Administration (SHA) lists four classes of highway in the urban system: urban principal arterials, urban minor arterials, collector streets, and local streets. Frederick has also separated out from the Urban Principal Arterial class. In addition, the City of Frederick defines an additional, non-SHA category: Alleys. Map T.1 shows the recommended functional road classification for the City of Frederick.

Interstate/Limited Access Highway: These routes carry the highest volumes and serve the demand for inter-regional travel.

Urban Principal Arterial: This classification includes principal arterials with no access controls. These roads carry the highest proportion of urban travel on the minimum lane mileage, connect major activity centers, and serve the demand for inter-area travel.

Urban Minor Arterial: This classification augments principal arterials and provides a link to urban collectors. It also places more emphasis on land access than principal arterials.

Urban Collector: These roads provide land access and traffic circulation in residential, and commercial/industrial areas, and distribute and channel trips between local streets and arterials.

Urban Local: These roads direct access to abutting land with the lowest level of mobility. Service to through traffic is discouraged.

Alley: These roads serve a finite number of users, and may provide off-site parking (not a SHA definition). *See Map T.9.*

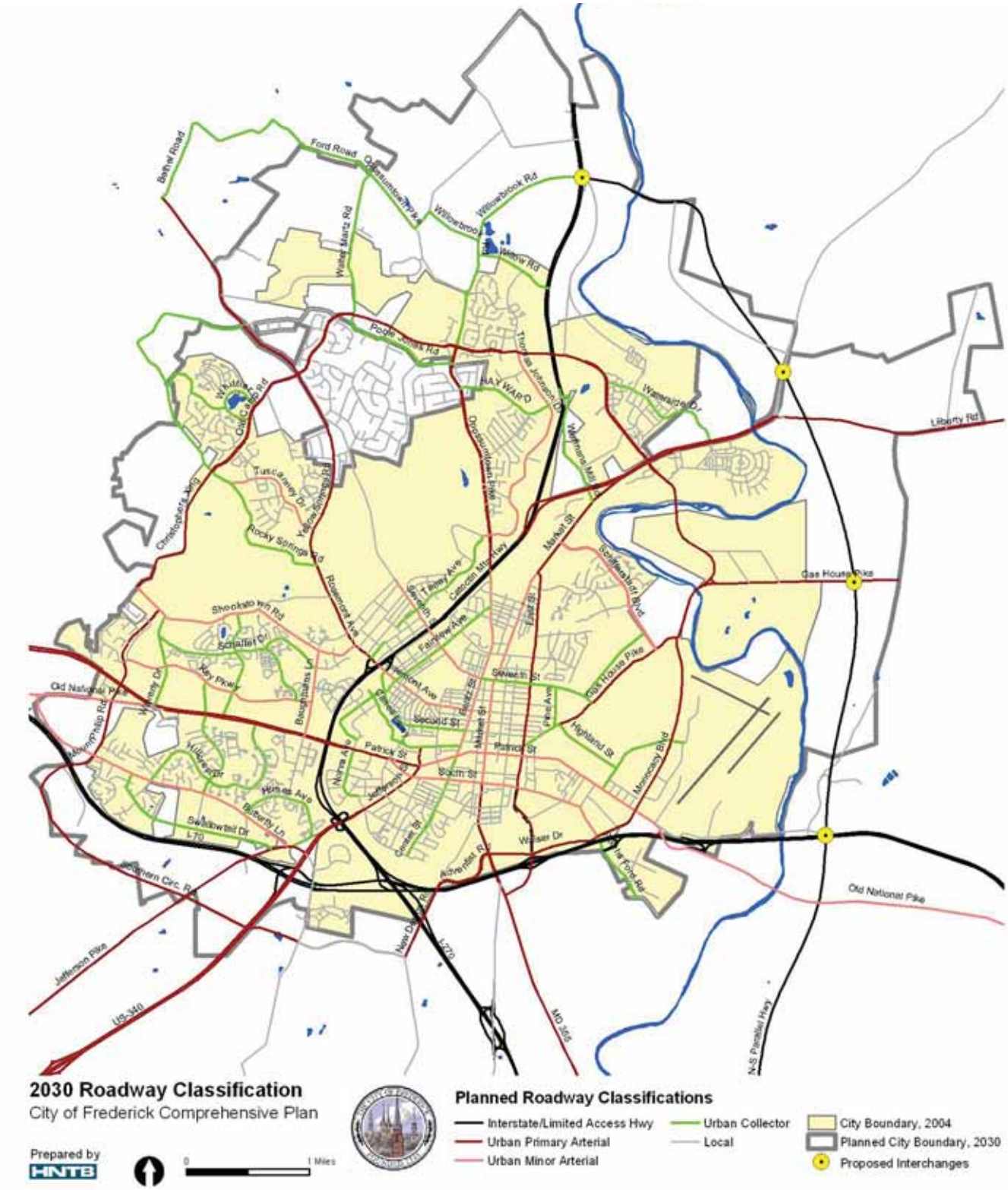
Table T.3: Recommended Transportation System Improvements

Road Segment/ Intersection	From	To	Recommended Improvement	Responsible Party	Priority Timing 2004-2010	2010-2020	2020-2030
East Street	South Street	Walser Drive	Extension	State	X		
Airport Drive East	Public Works	Bowman Farm Road	New Road	Developer	X		
Shookstown Road	Willowdale Drive	Old Camp Road	Upgrade	Developer	X		
*Walser Drive	N. Market Street	South Street	New Road	State		X	
*Monocacy Boulevard	South Street	Patrick Street	Upgrade	State		X	
*Monocacy Boulevard	Hughes Ford Road	Gas House Pike	New Road	City/County	X		
*Monocacy Boulevard	Gas House Pike	River Bridge	Upgrade	City/County/Developer	X		
*Christopher Crossing	US 15	Pool Jones Road	New Road (2 segments), Upgrade of existing road	City/County/Developer		X	
*Christopher Crossing	Pool Jones Road	Yellow Springs Road	Urban Section Upgrade	County	X		
*Christopher Crossing	Rocky Springs Road	Shookstown Road	New Road	City/Developer		X	
Gas House Pike	City Line	Monocacy Boulevard	Upgrade	City/County/Developer	X		
East Street	Patrick Street	5th Street	Upgrade	City/State	X		
East Street	5th Street	9th Street	Upgrade	City/State	X		
MD 26	MD 355	US 15	NB Ramp	City/County/State	X		
Butterfly Lane	MD 180	Alt 40	Upgrade	Developer	X		
TJ Reliever Road	T.J. Drive	Oppossumtown Pike	New Road	City	X		
Linden Avenue	Current end	Himes Blvd	Extension	City		X	
Mill Island Parkway	Current end	Biggs Ford Road	Extension	City/Developer		X	
Schifferstadt Boulevard	Gas House Pike	Current End	New Road	Developer		X	
North-South Parallel Road	I-270	US 15	New Road	State			X
US 15 Service Road	Planned Mill Island Parkway Extension	Monocacy Blvd	New Road	Developer		X	
New Road	Monocacy Boulevard	(Worman's Mill Road)	New Road	Developer		X	
Main Farm Collector	Wheyfield Drive	Monocacy Boulevard	New Road	Developer	X		
Riverside Corp Park	Gas House Pike	Monocacy Boulevard	New Road	Developer	X		
Swallowtail Drive	Humberson Lane	MD 180	Extension	Developer		X	
McCain Drive	Butterfly Lane	Swallowtail Drive	Extension	Developer		X	
Himes Road	Butterfly Lane	Swallowtail Drive	Extension	Developer		X	
Northwest Collector	Monocacy Boulevard	Tuscarora Court	New Road	Developer		X	
Tuscarora Creek Collector	Yellow Springs Pike	Walter Martz Road	New Road	Developer		X	
Biggs Ford Road	US 15	Willowbrook Road	Extension	Developer/City	X		
East South Street	East Street	Monocacy Blvd	Upgrade	City	X		
Bowmans Farm Road	Airport Drive East	Linganore Road	Extension	Developer/City	X		
US 40	Mt. Philip Road	US 15	Upgrade	State		X	
Southern Circumferential Rd	Mt. Philip Road	Ballenger Creek Pike	New Road	Developer/City		X	
Baughmans Lane	US 40	Shookstown Road	Upgrade	City		X	
Tuscanney Drive	Kemp Lane	Rosemont Avenue	Upgrade	Developer/City		X	
Yellow Springs Road	Christophers Crossing	Bethel Road	Upgrade	Developer/City		X	
Bethel Road/Ford Road			Intersection	Developer/City		X	
Walter Martz Road	Opossumtown Pike	Christophers Crossing	Upgrade	Developer/City			X
Highland Street	East Street	Monocacy Boulevard	Upgrade	City			X
Northeast Collector #1	Woodsboro Pike	N-S Parallel Road	New Road	Developer/City			X
Northeast Collector #2	Liberty Road	Stauffer Road	New Road	Developer/City			X
Bernard Street	Franklin Street	Monocacy Boulevard	Extension	Developer		X	
New Street	South Street	East Street Ext.	New Road	Developer		X	
7th Street	East Street	Gas House Pike	Extension	Developer	X		
New Street	7th Street Extended	Schifferstadt Boulevard Extended	New Road	Developer	X		

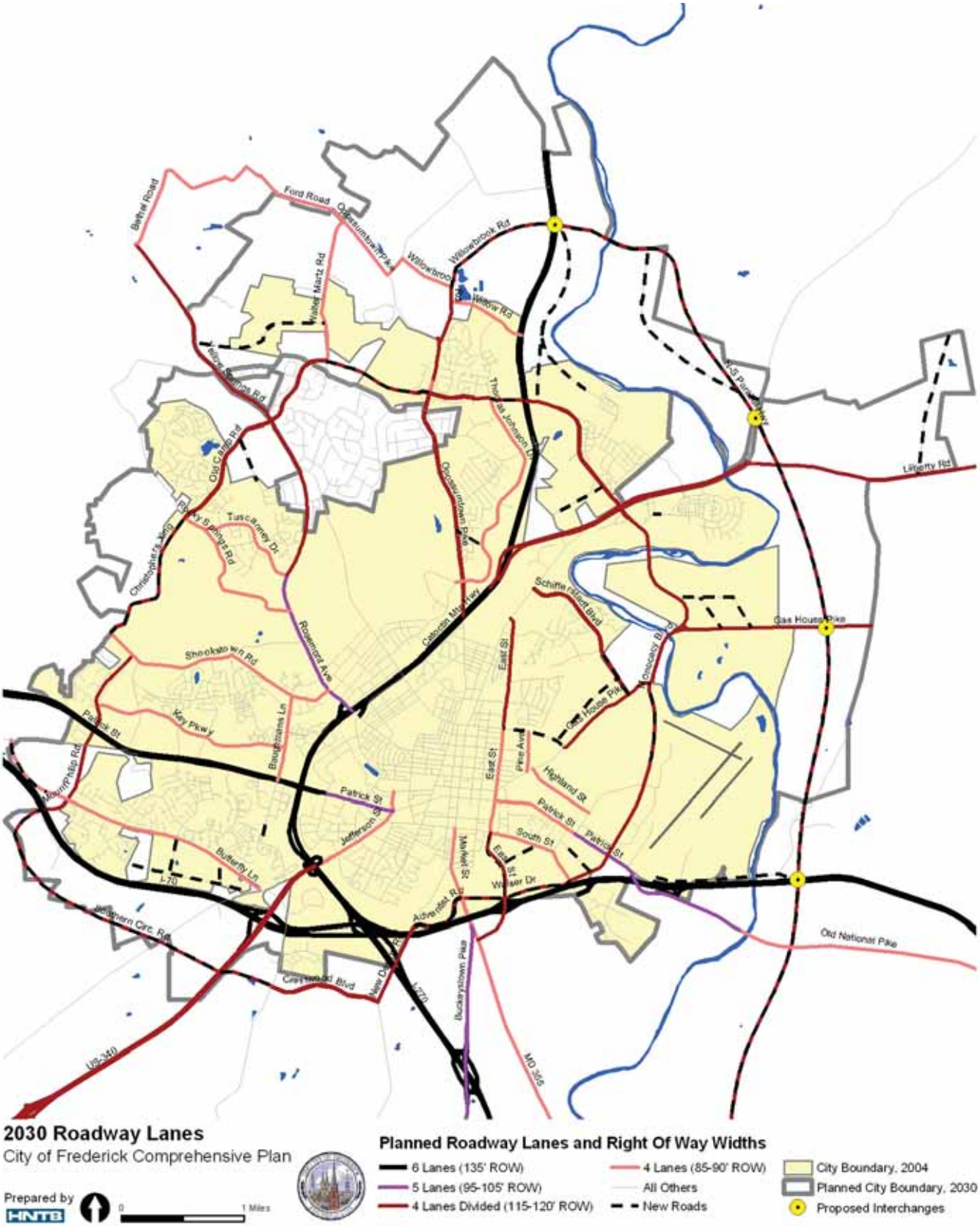
The City's Engineering and Planning Departments will review and update this list periodically to provide a complete inventory of recommended improvements to intersections and road segments.

* Road is part of the City's "Loop Road System"

Map T.1: 2030 Roadway Classification



Map T.2: 2030 Roadway Lanes



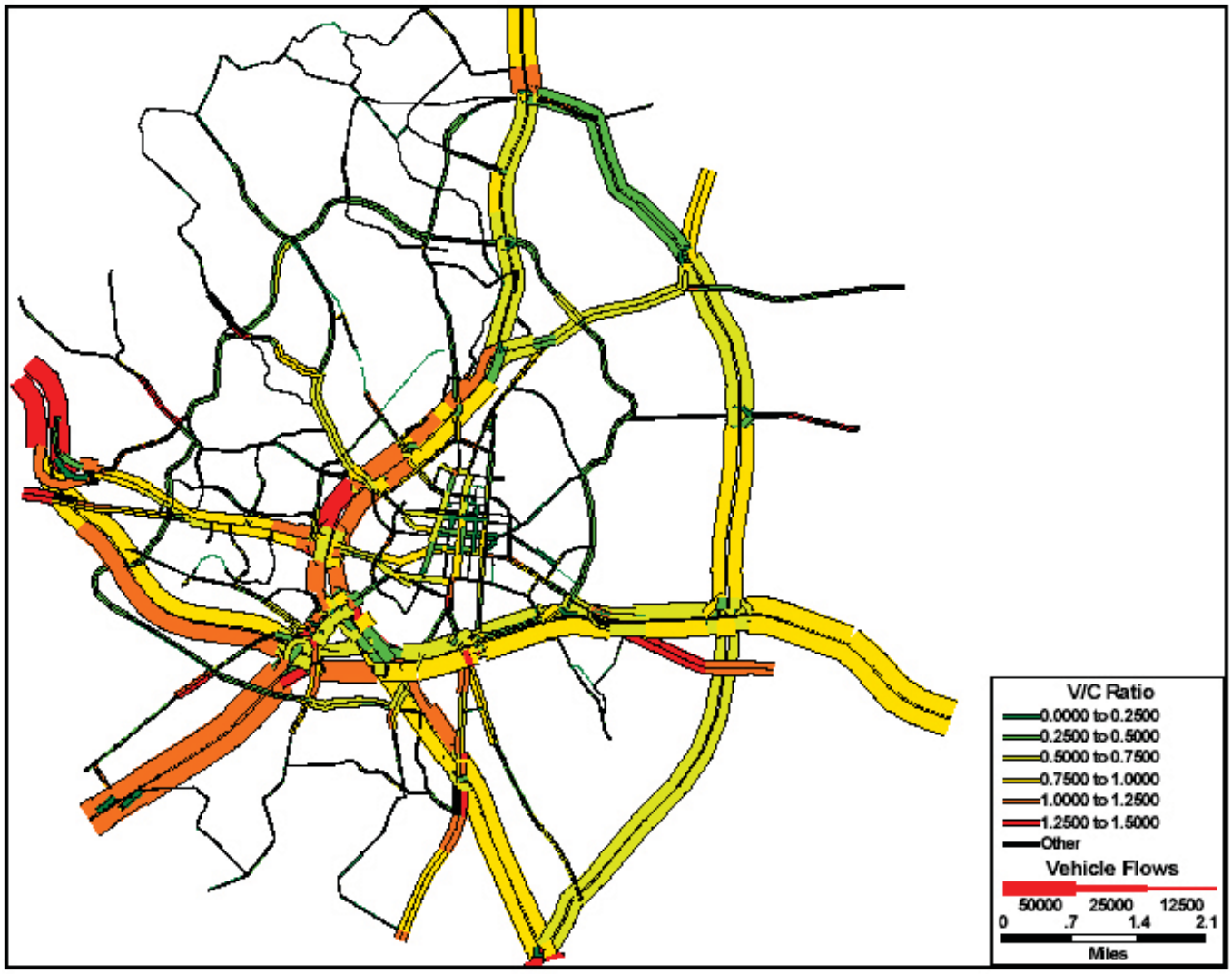
Volume to Capacity Maps

The volume to capacity (V/C) ratio depicted on Maps T.3 and T.4 reflects the traffic conditions of average peak period, which is assumed to account for 10 percent of total daily traffic. These maps are the result of travel demand forecasting undertaken as part of the Plan update. The resultant V/C ratios are based on the projected size and capacity of a given road segment and the average volume on that segment for the year 2030, based on forecasted households and jobs within the Frederick area as well as within the region.

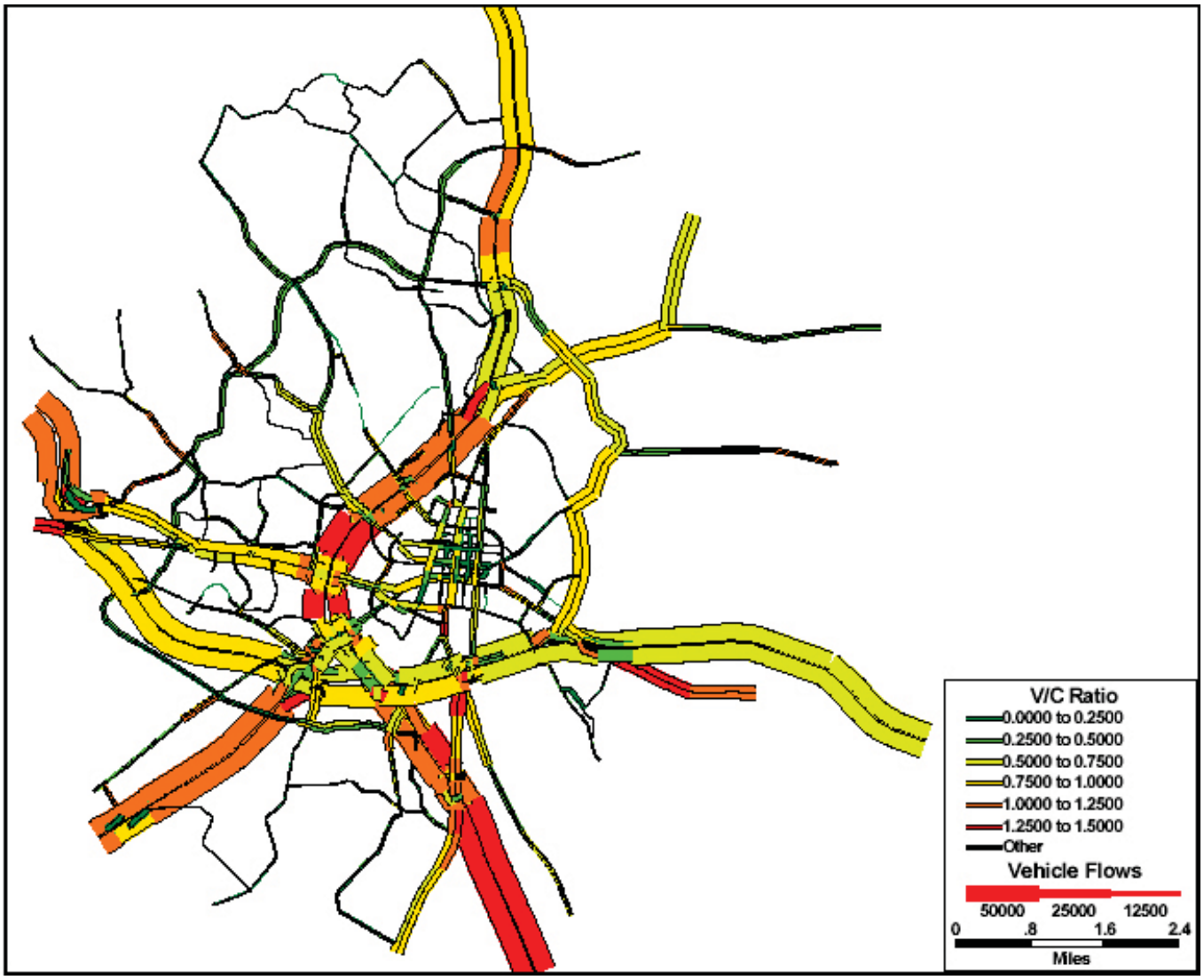
To gain an understanding of the performance of Frederick's road system in the future, the V/C ratio provides a very clear and understandable measure. Consider the numbers as a percent of a roadway capacity that is used. When the ratio is greater than 1.0 at peak period, these are the areas that will experience the worst congestion and delay in travel speed.

On Maps T.3 and T.4, the V/C ratio is depicted graphically by color. Deeper oranges and reds indicate unstable, congested conditions, while greens indicate freer flowing, uncongested roads.

Map T.3: 2030 Volume to Capacity Ratios, with North-South Parallel Road



Map T.4: 2030 Volume to Capacity Ratios, without North-South Parallel Road



What is an Adequate Public Facilities Ordinance?

*An **adequate public facilities ordinance** establishes standards and a methodology for judging whether public infrastructure (usually roads, water supply, sewer service and schools) has sufficient capacity to accommodate new development. An APFO prohibits new development until the necessary improvements are made or, in some instances, programmed.*

As the Maryland Department of Planning has written:

"In plain English, APF laws say that, if roads are too congested, if the school classrooms are too crowded, if the water system cannot provide enough water, if the sewer pipes or treatment plant are full, or if there are not enough playing fields for recreational use, then development cannot be approved until the problem is corrected."

Twelve counties in Maryland, including Frederick County, have established some form of APFO (these include Anne Arundel, Baltimore, Calvert, Carroll, Charles, Harford, Howard, Montgomery, Prince George's, St. Mary's and Washington.

The types of facilities examined for adequacy in APFOs vary according to the jurisdiction and its need for public facilities. Ten of the 12 counties cited above test for adequacy in roads, schools, water and sewer facilities.

According to a survey by MDP, every Maryland county with an APFO evaluates road capacity near proposed developments in some fashion. Most jurisdictions evaluate their transportation networks by measuring levels of service (LOS) of roads and intersections. These levels of service are generally based on the Transportation Research Board's Highway Capacity Manual and range from "A" to "E" (free-flowing to heavily-congested).

Several counties allow higher levels of road congestion in designated growth areas or urban areas to encourage and accommodate development in these areas. For instance, Montgomery County allows heavier traffic congestion in the vicinity of transit stations and intersections in Harford County outside planned growth areas must have an LOS of "C" while those within planned growth areas are permitted an LOS of "D" or better.

Policy T.2: Maintain an appropriate balance between public and private sector responsibilities for road investments and improvements.

Implementation Strategies

1. Identify and earmark a City revenue stream for transportation improvements.
2. Maintain an aggressive but financially responsible capital budget for future transportation improvements.
3. Establish a mechanism through the capital budget process including a monitoring report that coordinates and integrates development, road building and fiscal impacts.
4. Require all new development to pay their designated fair share toward the cost of mitigating their impact on transportation facilities. Mitigation measures need to conform to the Comprehensive Plan.
5. Establish a formal system to define how developers will participate in the financing of transportation infrastructure. Study and implement transportation impact fees for new or improved transportation facilities or to increase roadway or intersection capacity that is made necessary by new development. Assess facilities within the impact area of the

development site including both on and off-site impacts of the development.

6. Enforce standards for and require traffic impact studies for all developments that will significantly increase the peak hour traffic on the roadway system or create safety deficiencies (such as turning movements, driveway location, etc). These studies will determine the magnitude of roadway improvements required to accommodate the traffic generated by the proposed development. They will provide the necessary information for City staff and elected and appointed officials to make more informed decisions about what transportation improvements—both on and off-site—are needed as a result of new development proposals. *[See Appendix H for Traffic Impact Study Guidelines, included on the CD packaged with this document]*
7. Consider implementing an "adopt-a-road" program to encourage volunteers to perform litter removal on City roads.

Theme: Enhancing Mobility, Accessibility, and Connectivity

It shall be the policy of the City to:

Policy T.3: Preserve and enhance roadway capacity on local, collector and arterial routes that serve the City of Frederick for local access and mobility while working with the State to improve capacity via interstates and limited access highways for regional through travel.

Implementation Strategies

[See Policy T.17 and associated implementation strategies]

Policy T.4: Ensure that design and capacity standards for roadways are appropriately related to roadway function and classification.

Implementation Strategies

Standards should be updated for roadways, as well as bicycle and pedestrian facilities

1. As part of the update to the City's development regulations, review and update existing standards for different types of roadways and bicycle and pedestrian facilities.
2. As part of the update to the City's development regulations, amend design and capacity standards to ensure a proper relationship for function and classification.
3. Based on the impact of the proposed development, require dedication or reservation of needed right-of-way during the preliminary subdivision, final subdivision and/or site plan approval process.
4. Single-family residential units shall have access from the lowest classified roadway available.

Policy T.5: Plan for and implement a City roadway network with multiple connections between routes and uses.

Implementation Strategies

1. Provide connections to several surrounding roadways within developments.
2. Review the internal circulation pattern for streets within a development to ensure adequate linkages between major activity areas within and abutting the development.
3. Based on the impact of the proposed development, require connections and internal cross-access easements between retail/commercial developments and/or consolidated driveways to minimize traffic on arterial or collector roadways *(see Map T.5: Recommended Cross-Access Connections).*
4. Based on the impact of the proposed development, require dedication of future right-of-way for planned links of roadways, to ensure interconnectivity between adjacent subdivisions.
5. Develop access management regulations.
6. During the update of the City's development regulations, include standards for street connectivity between contiguous residential developments.

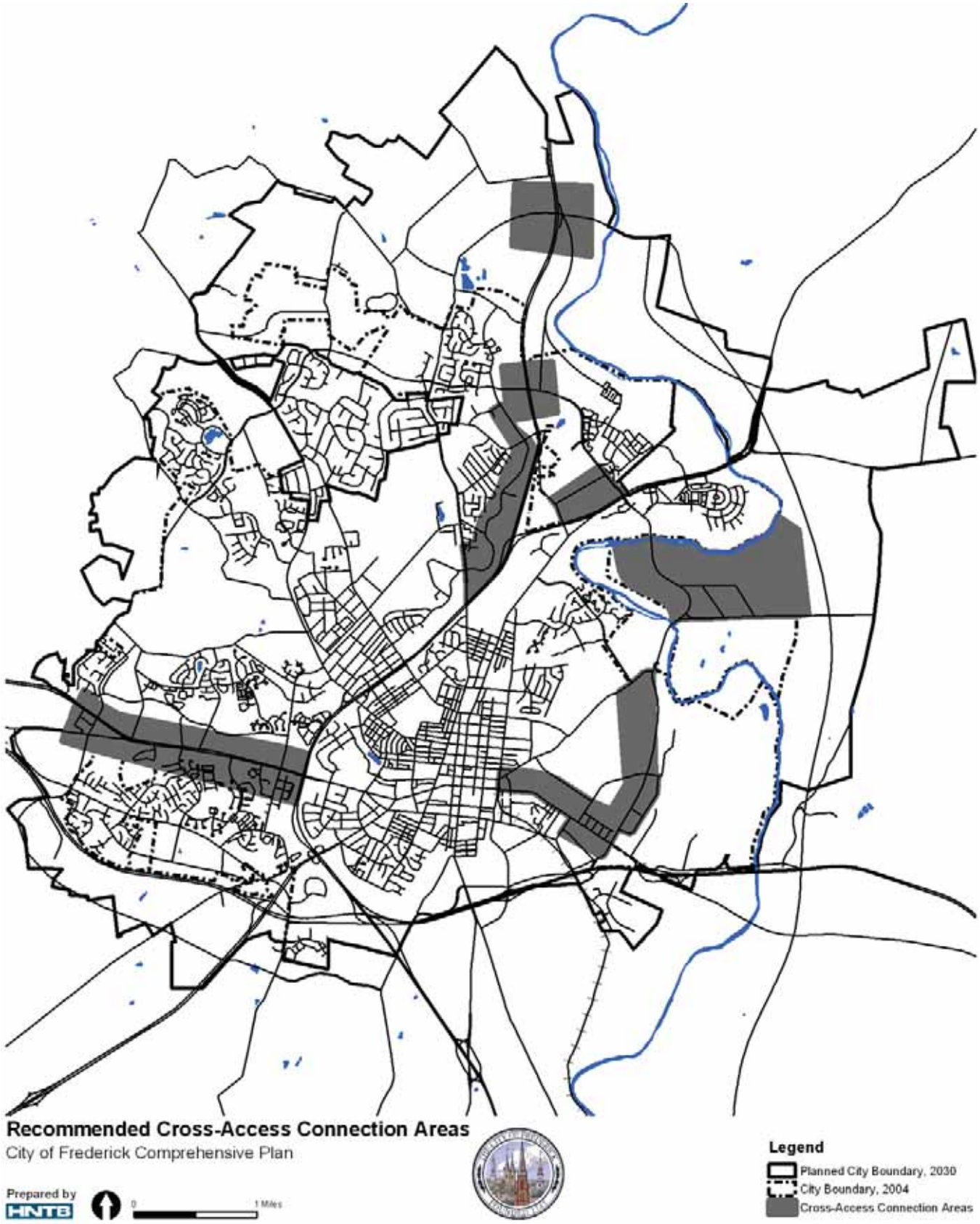
Policy T.6: Promote alternatives to the single occupant vehicle.

Implementation Strategies

1. Actively work with the State of Maryland to increase the number of MARC trains serving the City with the ultimate goal of expanding service to accommodate "reverse" commuters traveling from Montgomery County and the Washington DC area to Frederick in the morning and returning south in the evening. Also promote the advent of weekend service.
2. Partner with TransIT to enhance bus operations in the City of Frederick including the downtown express.
3. Study incentives to encourage car and vanpool programs.
4. Encourage large employers to implement transportation demand management measures such as telecommuting and staggered work hours.
5. Promote park and ride lots in areas of the City near interstates, limited access roadways and divided highways.
6. As part of the development review process encourage pedestrian- and bicycle-friendly mixed-use development. *[See also the Land Use Element, Policy LU.9 and associated implementation strategies.]*

Partnering with TransIT can improve accessibility for residents

Map T.5: Recommended Cross-Access Connections



Policy T.7: Promote bicycle and pedestrian mobility in the City of Frederick.

Implementation Strategies

1. Implement the Shared Use Path Plan *(See Map T.6)*. Make the segment that is planned under US 15 at Schifferstadt, which would connect the downtown with the Golden Mile, a priority.
2. Improve the safety of pedestrian and bicycle travel through revised roadway design standards that accommodate all modes of transportation, reduce travel speeds on local and collector roads and/or employ traffic calming measures.
3. Promote the integration of alternative modes of transportation within office and residential parking areas, such as transit stops, additional sidewalks, and bicycle parking.
4. Develop a bicycle plan and network map for the City of Frederick for on-road routes.
5. Develop a comprehensive signage system for the bikeway network.
6. During the update of the City's development regulations, provide bicycle parking standards within the parking chart.
7. Identify and improve pedestrian safety "problem areas" throughout the Downtown *(see Map T.7).*

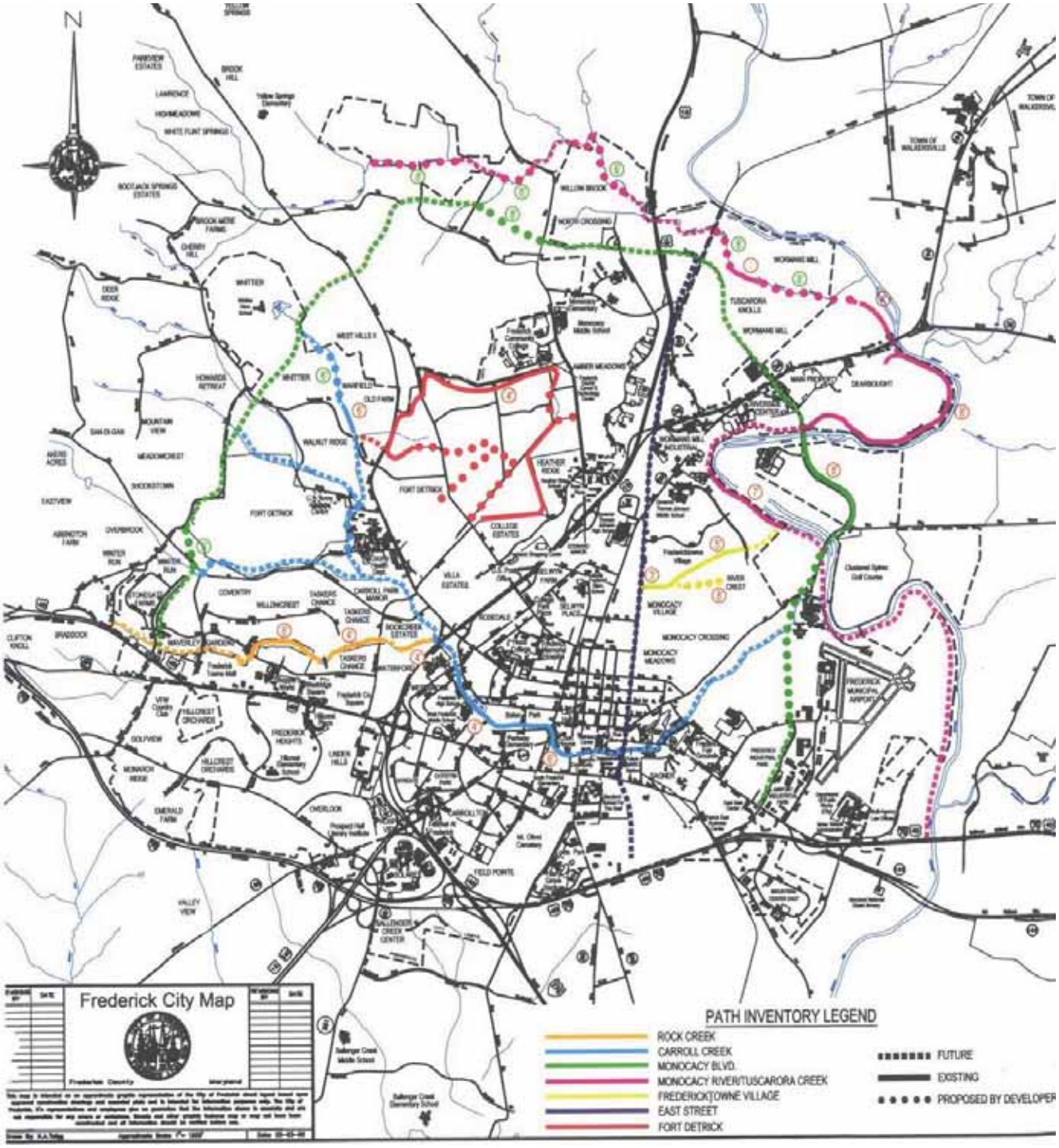
Policy T.8: Strive to maximize safety and efficiency through roadway improvements and design.

Implementation Strategies

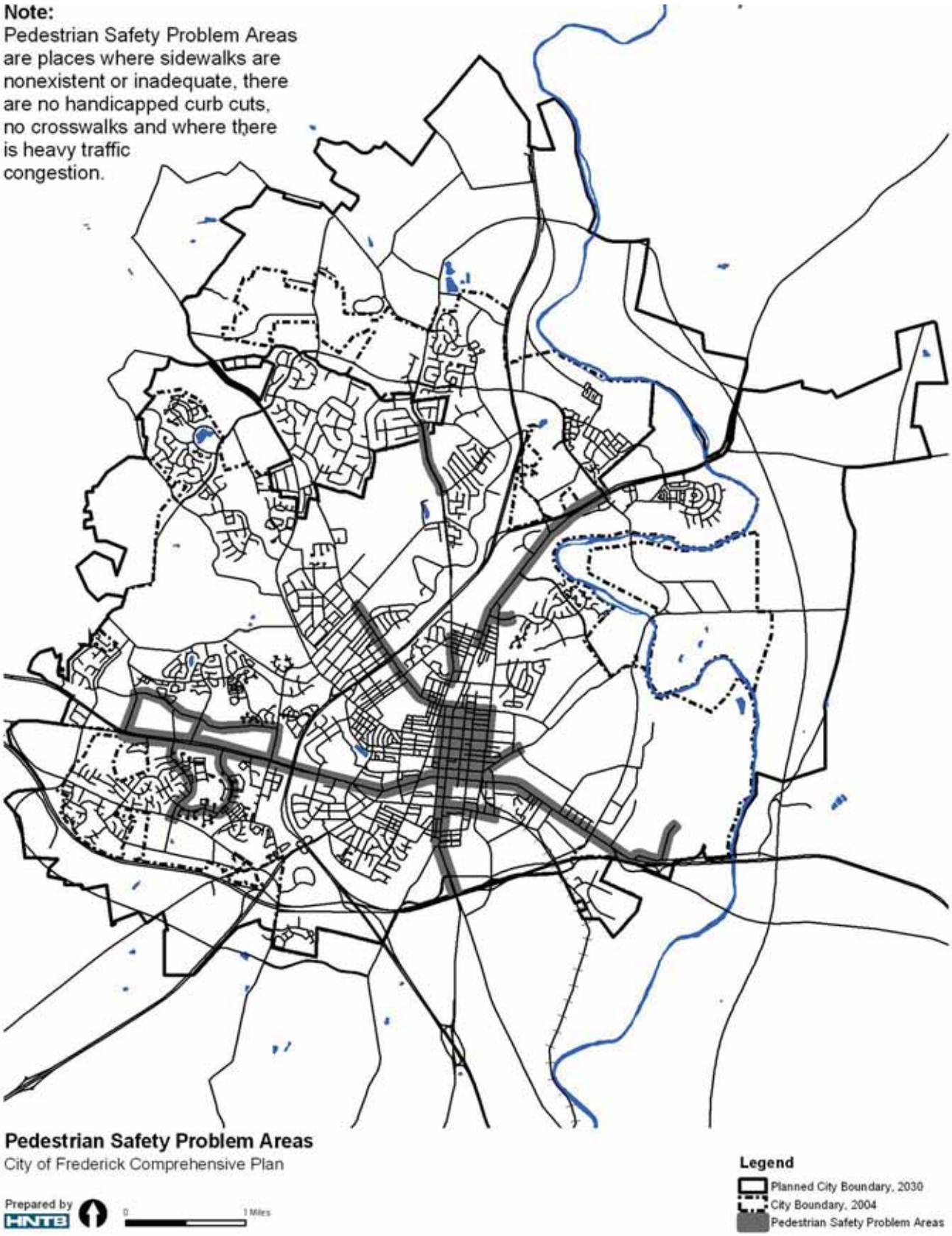
1. Monitor the incidence of crashes/accidents annually as one indicator of where safety improvements may be needed.
2. Identify transportation system management improvements that could be implemented quickly to include low-cost projects such as improved signal timing and/or phasing, signage and marking, minor widening, channelization and turn restrictions.
3. Minimize on-site/off-site traffic circulation conflicts by providing efficient and safe vehicular movement between public access points and all other destinations within a site, such as parking spaces, package pickup locations, service stations, drive-through lanes, and passenger pickup areas.
4. Provide safe and efficient vehicular circulation that is compatible with pedestrian bicycle facilities and flow.
5. Establish parking lot and structure design guidelines that promote efficiency of the paved area, promote the integration of landscaping, facilitate safe and convenient movement of pedestrians through the parking lots, and adequately address handicapped (accessible) parking.
6. Except for historic road names, ensure that segments of the same road have the same name to make navigation easier.
7. Add pedestrian signals and controls to intersections throughout the downtown. *[See also Policy T.7 and associated implementation strategies.]*

Names should remain the same for segments of the same road

Map T.6: Shared Use Path Plan



Map T.7: Pedestrian Safety Problem Areas



Transit Oriented Development is recommended for the Golden Mile

Policy T.9: Encourage development that meets Transit-Oriented Design (TOD) standards.

Implementation Strategies

1. Develop a set of TOD design and development guidelines, and distribute those guidelines to developers, planners, and development review staff *(see box below).*
2. Educate City and County planning staff on procedures to review site development plans for transit accessibility
3. As part of the update of the City's development regulations, include TOD guidelines.
4. Focus initial TOD efforts on the Golden Mile and East Patrick Street from I-70 to Franklin Street.
5. As transit service increases, develop a list of additional TOD locations throughout the City.

What is Transit-Oriented Development?

Across the United States a growing amount of attention has been paid to the role of land use planning in the success of transit systems. Transit Oriented Development (TOD) is one response to this focus.

In essence, TOD is pedestrian-friendly development (similar to the designs often embodied in New Urbanist or Traditional Neighborhood Design [TND] developments) focused around transit access points. Elements of TOD include compact, mixed-use development patterns with facilities and design that enhance the environment for pedestrians in terms of safety, walking distances, comfort, and the visual appeal of the surroundings.

With the cooperation of local governments, transit agencies and developers, TOD projects can direct growth to transit stops, counteract dispersed low-density development, and create attractive and vibrant mixed-use, pedestrian-oriented environments. Atlanta, Dallas, Seattle and Charlotte are a few of the many local governments implementing TOD in their communities. Closer to home, Montgomery County, MD has been at the forefront of TOD implementation for some time.

The goals of TOD are to reduce vehicle ownership and usage while increasing livability. Because transit users are often pedestrians, the elements that support transit and pedestrian activity are generally the same. Successful TOD projects have buildings and public spaces that are oriented and designed to make pedestrian movement convenient and pleasant.

Policy T.10: Implement parking standards that adequately serve specific uses balanced with a desire to reduce unnecessary impervious surface cover and reduced development costs.

Implementation Strategies

1. As part of the update to the City's development regulations, reconsider the City's parking ratios/standards. In addition, consider reduced parking standards for adaptive reuse projects outside of downtown (where parking regulations are already lower than in other parts of the City) and in future transit-oriented developments.
2. In the event that reduced parking standards are adopted, assess the need for an extended neighborhood parking permit program.
3. As part of the update to the City's development regulations, incorporate provisions for expanded shared parking agreements and facilities.
4. As part of the update to the City's development regulations, include standards for the use of permeable paving in parking lots.
5. Require that parking areas, associated aisles, and other interior throughways be screened from the street with berms, walls, and/or landscaping.

Policy T.11: Direct the flow of truck traffic to those facilities that are most suitable and away from other routes and areas where through truck traffic is incompatible with adjacent land uses or that may cause safety issues.

Implementation Strategies

1. Develop a system of truck routes with the following goals:
   a. Reduce South Street truck traffic.
   b. Reduce alleyway truck traffic in the downtown.
   c. Restrict delivery time for key City arterials.
2. Designated truck routes should be arterials with connections to collectors for local access for deliveries.
3. The truck route system should be established by 2006 or prior to the opening of East Street Extension (whichever comes first).

Alleys are not suitable truck routes in the downtown

Policy T.12: Support the improvement of the Frederick Municipal Airport and ensure its long-term viability.

Implementation Strategies

1. Implement the extension of the of the airport's main runway to 6,000 feet.
2. Improve access to the developable lands around the airport to enhance their attractiveness for economic development and maintaining the safety and continuation of airport functions. Provide access from the east via a new roadway that connects Bowman's Farm and Linganore Roads, and will eventually tie into the new North-South Parallel Road interchange at I-70.
3. Update the Airport Master Plan.
4. Develop the east side of the airport in accordance with the approved Airport Layout Plan.

5. Adhere to the FAA and Homeland Security recommendations with respects to air protection zones (specifically the Washington, DC Metropolitan Area Air Defense Identification Zone [ADIZ] and prohibited air space around Camp David).
6. Develop the Bailes Lane area in accordance with the Bailes Lane Re-Use Plan. This plan provides enhanced potential for long term development of the airport, minimizes potential land use conflict in adjacent development, and has moderate costs for the overall plan.
7. *[For additional guidance related to the airport, see also the Land Use Element, Policy LU.7; the Economic Development Element, Policy EC.5; and associated implementation strategies].*

Theme: Enhancing the Community

It shall be the policy of the City to:

Policy T.13: Ensure that road improvements minimize adverse impacts in adjacent areas and environs.

Constrained roads, such as portions of West Patrick Street, should not be widened or altered

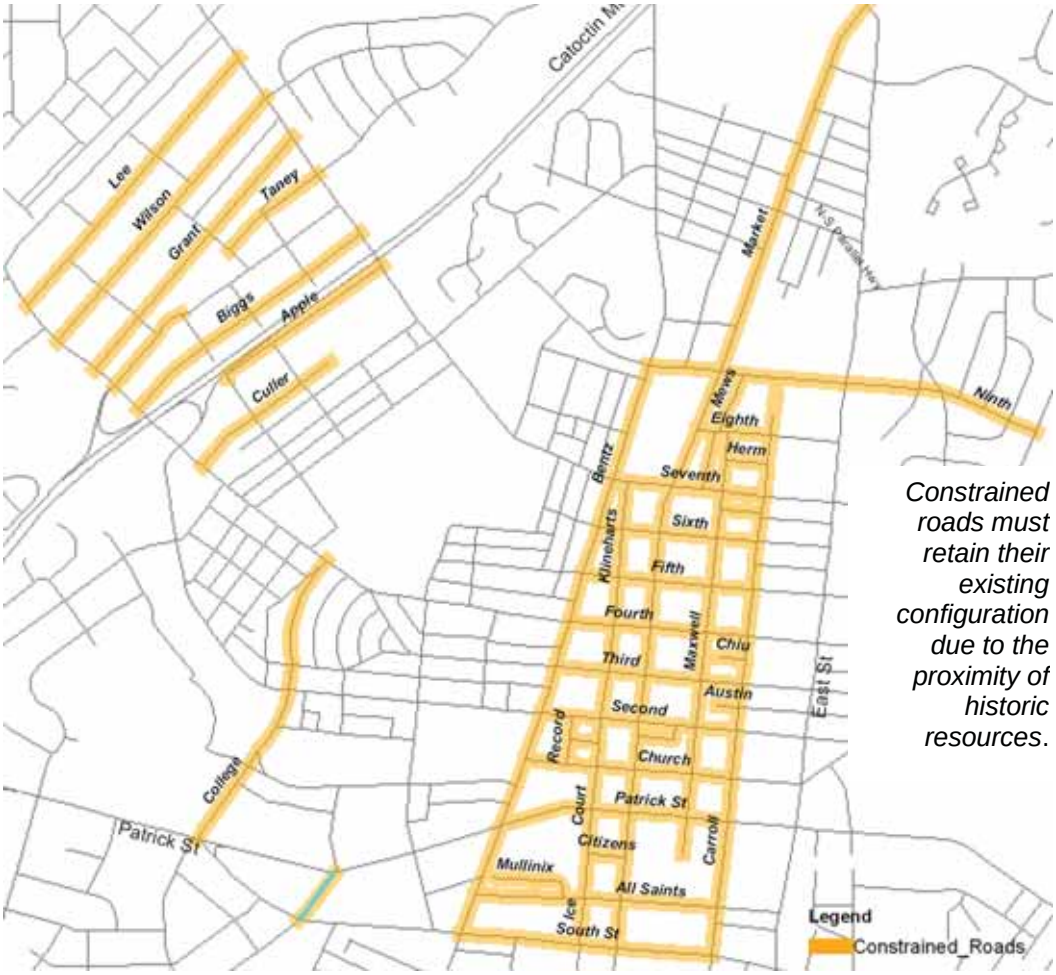
Implementation Strategies

1. Assess the potential adverse impacts on historic and environmentally sensitive areas when improving or constructing roadways or other transportation facilities.
2. Develop guidelines for the minimum required distance between historic/environmental areas and new roads.
3. Study the need for noise mitigation devices along US 15, MD 26 and I-70. The State of Maryland has several sample ordinances that could be used in the City of Frederick.
4. Retain constrained roads included in Table T.4 and identified in Map T.8 in their current configuration. Do not widen them, due to the constraints placed on these roads by historic development patterns.
5. Consider implementing traffic calming devices throughout the City.

Table T.4: Constrained Roads and Corridors

Individual Streets Between Rosemont Ave and 7th Street		
Lee Place	Taney Avenue	Apple Avenue
Wilson Place	Biggs Avenue	Culler Avenue
Grant Place		
All Streets Within These Boundaries		
Northern Boundary:	9th Street	
Eastern Boundary:	Carroll Street/Alley	
Southern Boundary:	South Street	
Western Boundary:	Motter Avenue/Bentz Street	
Constrained Corridors		
Road	**From**	**To**
College Terrace	Rockwell Terrace	West Patrick Street
North Market Street	9th Street	North East Street
Water Street (Entire Length)		
B&O Avenue (Entire Length)		
South Market Street	South Street	New Design Road
West Patrick Street	Bentz Street	Jefferson Street
West South Street	Bentz Street	Jefferson Street
Jefferson Street	Patrick Street	South Street

Map T.8: Constrained Roads



Constrained roads must retain their existing configuration due to the proximity of historic resources.

Policy T.14: Ensure that roadway location and design considers the impact on historic resources.

Implementation Strategies

1. Identify resources that lie in the potential paths of new and expanded roads.
2. Modify the design of new and expanded roads to protect historic resources and their settings.
3. Implement mitigation strategies if cultural or historic resources will be irreparably impacted by new or existing road construction.
4. Theme: Supporting a Vibrant Downtown
5. It shall be the policy of the City to:

Theme: Supporting a Vibrant Downtown

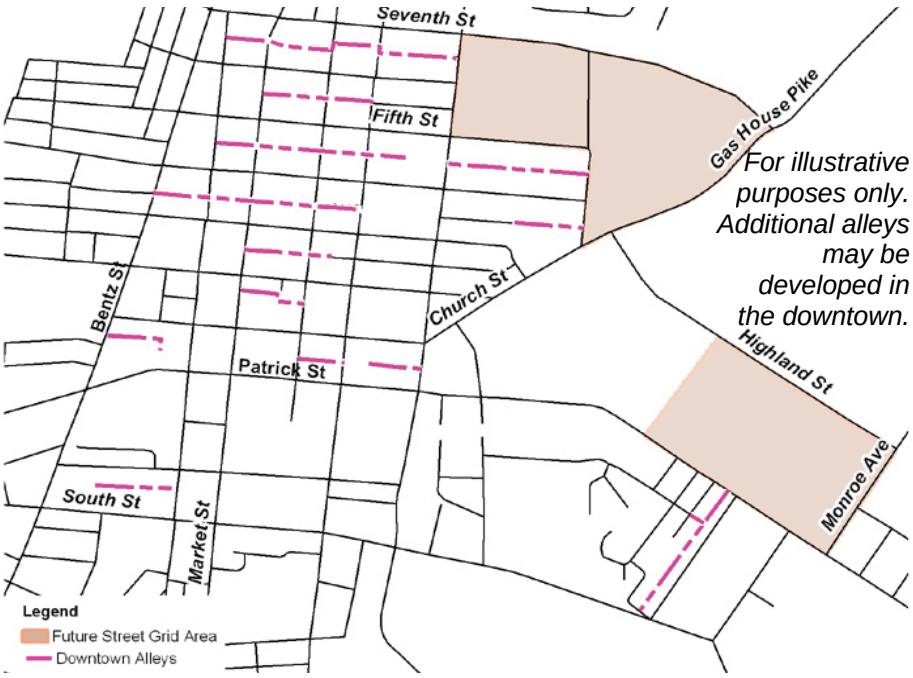
It shall be the policy of the City to:

Policy T.15: Preserve and enhance the historic grid system

Implementation Strategies

1. Maintain historic street names.
2. Preserve and expand the downtown alley system as a secondary means for access, to provide for service delivery and pick-up and to provide an alternative to on-street parking. *(See Map T.9. This map is for illustrative purposes only. Additional alleys may be developed in the downtown.)*
3. As part of the update of the City's development regulations, develop design standards for new alleyways.
4. Continue the downtown street grid system to East Church Street/Gas House Pike and at the Fairgrounds, if sold and redeveloped.

Map T-9: Alleys



Policy T.16: Promote multi-modal transportation options in the downtown *[See also Transportation Policies T.6, T.7, and associated implementation strategies].*

Implementation Strategies

1. Continue to work to implement the recommendations of the 2003 Downtown Parking Study, including the alleyways in the downtown for off-street parking.
2. Continue to implement the 2002 Shared Use Path Plan and the Carroll Creek Master Plan.
3. Promote the development of a complete Multimodal Center at the MARC Station.

Frederick MARC Station

Theme: Interacting with the Region

It shall be the policy of the City to:

Policy T.17: Work cooperatively with Frederick County, the State of Maryland, Fort Detrick and the Town of Walkersville to promote coordinated regional transportation planning and programming.

Implementation Strategies

1. In conjunction with Frederick County, strongly and actively pursue the North-South Parallel Road to the east of Frederick as shown on the Comprehensive Plan Map. This roadway is to be a limited access divided highway that will provide increased mobility in the Frederick Region and provide an alternative north-south facility to the congested US 15.
2. Work with the State of Maryland and neighboring jurisdictions to implement the recommendations of the I-270/US 15 Multi-Modal Corridor Study. The recommendations include an express bus service connecting MARC Monocacy station and Shady Grove Metro station.
3. Coordinate with Frederick County in using the City of Frederick's Comprehensive Plan to plan transportation facilities.
4. Coordinate with Frederick County to use the City's newly developed transportation demand modeling capacityto evaluate and plan for needed roadway improvements.
5. In cooperation with Frederick County, provide frequent transit service for major traffic generators and attractors including employment nodes.
6. Work with the State on linkages to the regional bicycle network.
7. Provide the framework and justification of the North-South Parallel Roadway to the County so that ultimately it will be shown on the State's Highways Needs Inventory (HNI).
8. Continue the collaborative effort with the State and County on the development of a citywide "wayfinding" program.
9. Promote the development of the Southwest loop connection from Mount Phillip Road to MD 180.
10. Support City and County efforts to lobby the State for improvements to US 15 and other State roads in the City.

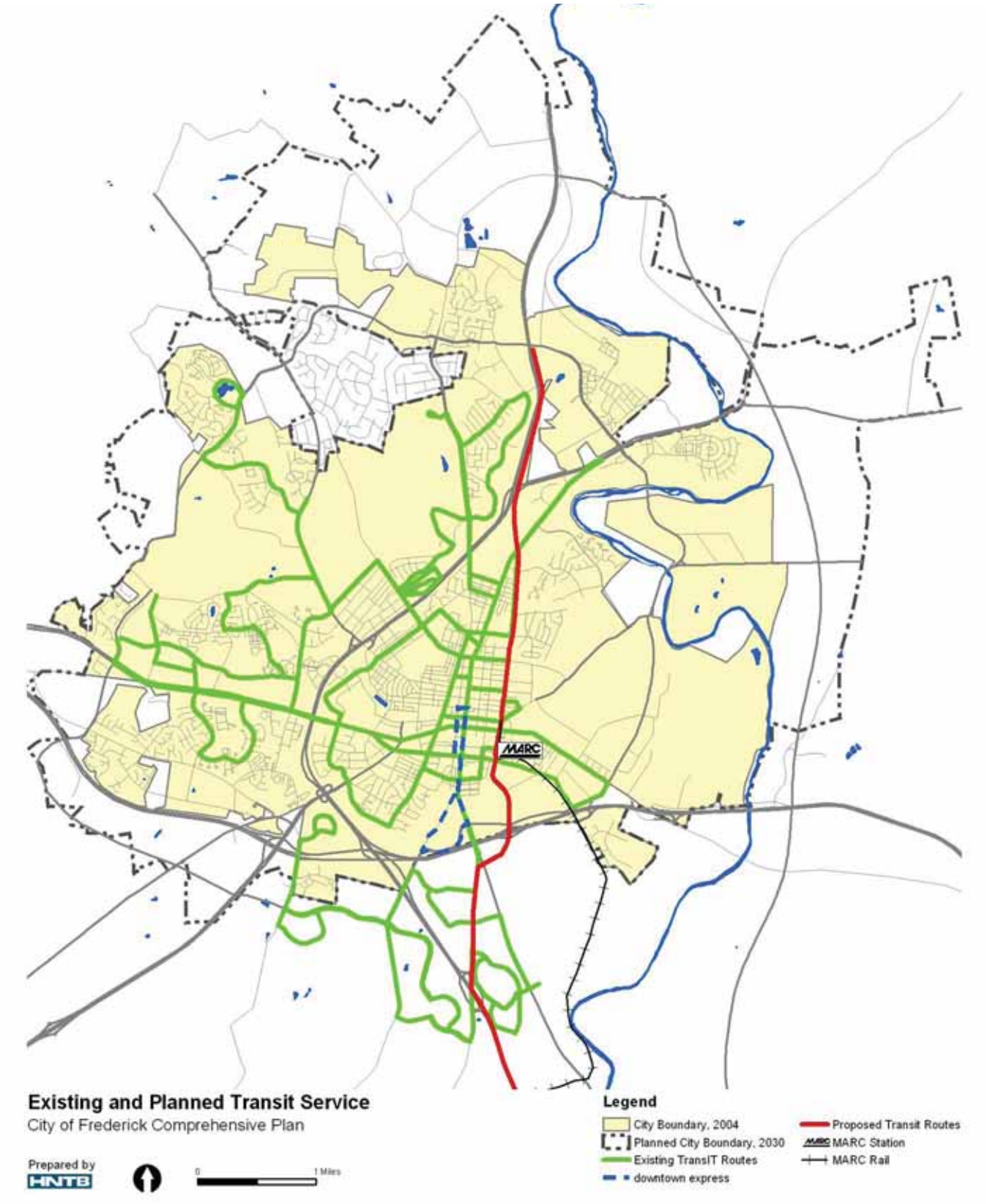
Transit service—including the County's TransIT system—can improve local and regional accessibility

Policy T.18: In cooperation with Frederick County, strive to improve transit service to and around the City of Frederick

Implementation Strategies

1. Provide transit access to major traffic generators and attractors. Map T.10 shows the location of existing and proposed transit enhancements.
2. Promote the MARC train station area as a multimodal transportation hub and mixed-use development area.

Map T.10: Current and Proposed Transit Service



FISCAL HEALTH ELEMENT

Introduction

The City's financial management system is divided into a number of funds. A separate sum of money is set aside for each fund. Funds are established for special program groups which usually have specific revenue sources and/or accounting requirements associated with their expenditures. The City's major funds include the General Fund, Water and Sewer Fund, Parking Fund, Housing and Community Development Fund, Golf Course Fund, the Weinberg Center Fund, and the Airport Fund.

The General Fund is usually referred to as the operating budget and is used to finance the day-to-day operations of the City. It is the largest part of the City's total financial operations. For FY 2004 (July 1, 2003 to June 30, 2004), the City's General Fund budget totals just over $52 million.

Figure FH.1 shows the sources of General Fund revenues in FY 2004. Real Estate Taxes comprise the largest revenue source for the City, accounting for $23,000,000 or 45 percent of the FY 2004 budget. Property is assessed at 100 percent of estimated market value. The FY 2004 rate is $.64 per $100 assessed value.

In the Plan Assessment and Investigation Report (PAIR,) Stakeholders of the City of Frederick identified several concerns related to fiscal issues in the City of Frederick. Among those issues were:

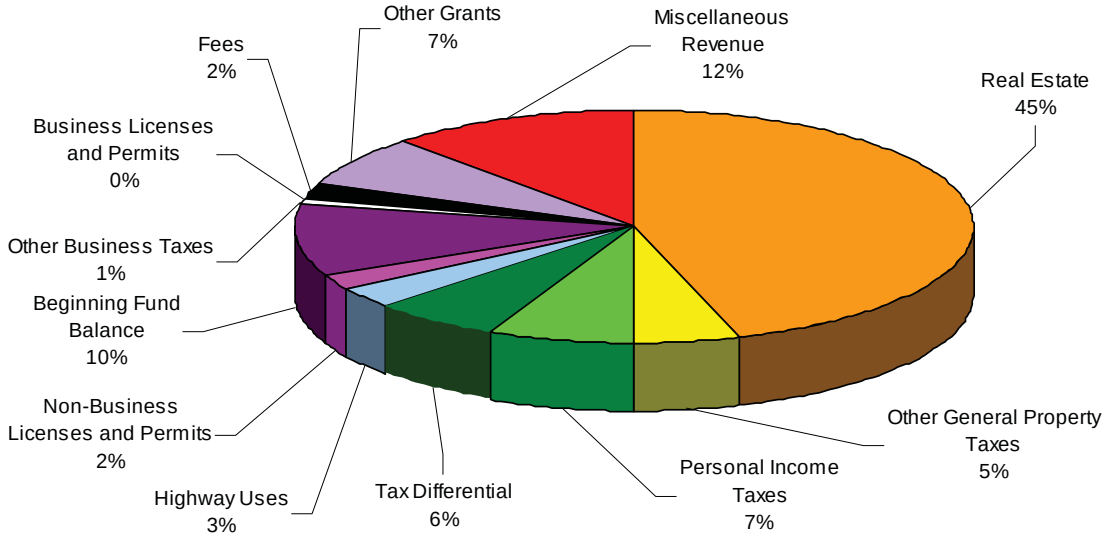
The desire to explore additional funding sources for infrastructure.

The need to reinforce the City's commitment to the Capital Improvement Plan (CIP).

The need to explore the effects of the lack of predictability in state and federal funding for infrastructure.

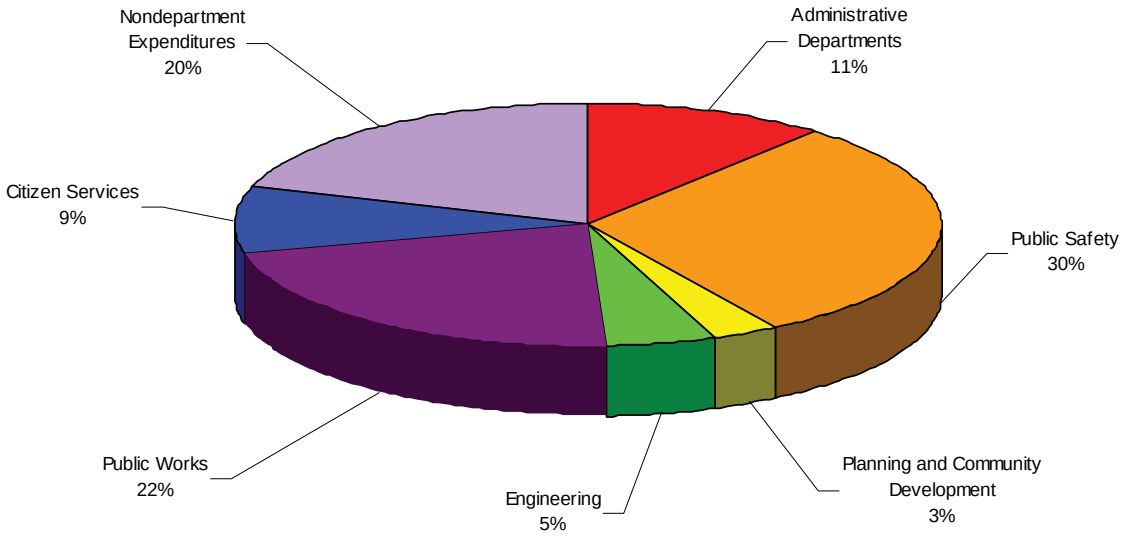
This element addresses these issues with a number of policies designed to enhance the City's fiscal health. For further information, please see the Fiscal Analysis in Appendix G, which is included in electronic form on the CD packaged with this document.

Figure FH.1
City of Frederick, Maryland
General Fund Revenues FY2004



General Fund income is used to pay for City services and departments, as shown in Figure FH.2. Public Safety, including the Police Department, is the largest single user of General Fund expenditures, followed by Public Works, which includes waste collection, snow removal, and street maintenance functions.

Figure FH.2
City of Frederick, Maryland
General Fund Expenditures FY2004



The Challenge Ahead: Issues this Element Seeks to Address

Among the most pressing issues is how the City's fiscal system will support the future annexation and growth outlined in the Land Use, Transportation, and Economic Development Elements. Specifically, how will the City provide services and infrastructure for existing residents and businesses while making sure that new growth pays for its fair share?

The *Fiscal Impact Analysis*, conducted in November 2003, examined the fiscal impacts of new growth in both of the alternative scenarios considered for this Comprehensive Plan *(see Plan Introduction, page IN-10)*, including the *Expanding Horizons* scenario (Scenario #2) that this Plan embodies. The results of that analysis showed that, based on the best available projections of future economic conditions, new growth would result in increasing net fiscal benefits through the Comprehensive Plan's horizon year of 2030 *(see Figure FH.3)*.

Several factors account for this positive fiscal outcome. The projected new growth in the City would have relatively high assessed values for residential and nonresidential development, and this would produce significant property tax and personal income tax revenues.

The City must take steps to help those projections to become reality, and to protect itself in case economic conditions change for the worse. The policies in this element of the Comprehensive Plan work toward that goal by establishing dedicated funding for needed capital improvements, limiting the tax burden on residents and taking a long-term approach to fiscal health.

Figure FH.3
Annual Net Fiscal Results of Scenario 2 ("Expanding Horizons")
(x $1000)

Theme: Balancing Growth

It shall be the policy of the City to:

Policy FH.1: Identify dedicated revenues for funding capital improvements.

Implementation Strategies

1. Establish a target percentage of General Fund expenditures to be spent on capital improvements.
2. Ensure that new growth pays for its fair share of capital facilities through impact fees.
3. Evaluate and update impact fees on a regular basis to ensure they accurately reflect current levels-of-service, costs, and development assumptions.
4. Ensure master plans (utilities, parks and recreation, public safety, etc.) complement this Comprehensive Plan and that these plans include a fiscal analysis component containing both revenues and expenditures.

Policy FH.2: Encourage growth that enables the City's non-residential tax base to comprise a larger share of the overall tax base.

Implementation Strategies

1. Maintain the jobs-rich nature of the City's economy at an approximate ratio of two jobs for every household *[see also the Land Use Element, Policy LU.3 and associated implementation strategies]*.

Policy FH.3: Evaluate expenditures for both current fiscal impacts as well as impacts on future budgets to avoid creating long-term fiscal imbalances.

Implementation Strategies

1. Include both direct salary costs and the City's share of fringe benefit costs in analyses and discussions about employee compensation.
2. Evaluate expenditures that could be funded through other methods or sources. For example, running trash collection services as an enterprise operation as opposed to a General Fund operation.
3. Pay all current operating expenditures with current operating revenues. Avoid budgetary procedures that fund current expenditures at the expense of future needs.
4. Evaluate the operational costs (staffing, maintenance) when considering new capital facilities, not just capital costs.

Theme: Enhancing Mobility, Accessibility and Connectivity

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Theme: Enhancing the Community

It shall be the policy of the City to:

Policy FH.4: Maintain a diversified and stable revenue system.

Implementation Strategies

1. Explore opportunities to maximize revenues by:
   a. Revising revenue collection procedures;
   b. Reducing delinquent payments;
   c. Instituting or increasing service charges, fines and penalties;
   d. Updating property assessments;
   e. Investing a greater proportion of idle cash;
   f. Selling surplus property or equipment.
2. Review fee, permit, and license amounts on an annual basis to ensure they accurately reflect the cost of providing services.
3. Identify restricted revenues (those legally earmarked for a specific purpose) and monitor the City's use of these funds to minimize volatility associated with these revenues.
4. Identify intergovernmental revenues and monitor the City's use of these funds to minimize volatility associated with these revenues.
5. Identify grant revenues and monitor the City's use of these funds to minimize volatility associated with these revenues.
6. Identify revenues that are one-time in nature and ensure they are not being used to fund on-going expenditures.

Policy FH.5: Maintain sufficient unrestricted fund balance to maintain creditworthiness and provide resources for emergencies or unexpected needs.

Implementation Strategies

1. Set a fund balance target as a percentage of General Fund expenditures.
2. Establish policies for uses of funds from unreserved fund balance.
3. Avoid using unreserved fund balance to finance on-going expenditures as much as possible.

Policy FH.6: Adhere to credit industry standards and recommendations for debt management to maintain creditworthiness and ensure lowest borrowing costs possible.

Implementation Strategies

1. Incorporate credit industry benchmarks into the City's financial management policies and practices.

Theme: Supporting a Vibrant Downtown

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Theme: Interacting with the Region

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COMMUNITY FACILITIES ELEMENT

Introduction—Sanitary Sewer

In the past the City of Fredrick's sewer system boundaries generally corresponded to the City's boundaries. However, during the 1980's and 1990's as the City annexed areas north and south of its boundaries, these new areas were served by the County's sewer system. Areas located in the north of the City (See Map CF.1) that were annexed in the 1980's are served by the County's sewer system and are part of the City/County Flow Allocation Agreement (3rd Amendment), ratified in July 2004. The sewerage from this area bypasses the City's wastewater treatment plant and is processed at the County's Ballenger Creek Wastewater Treatment Plant (WWTP). The City/County Flow Allocation Agreement sets aside an allocation of 1.028 million gallons per day (MGD) at the Ballenger Creek WWTP for City properties located north of the City that are within the Agreement area. In addition, the portion of the City located in the south that lies in the Ballenger Creek Basin (south of I-70) is served by a sewer system that also discharges into the County's Ballenger Creek collection system and the Ballenger Creek WWTP. In these areas, sewer laterals are constructed to County standards and discharge into the collector system. Also, within the City of Frederick there is a third sewerage collection system that is owned and operated by Fort Detrick for its sole use.

For more in-depth information on sanitary sewer and water infrastructure, see the Comprehensive Plan background report entitled Water and Sewer Services Analysis in Appendix G, which is included in electronic form on the CD packaged with this document.

The Challenge Ahead: Issues this Element Seeks to Address—Sanitary Sewer

Additional sewer treatment capacity is needed to serve new residents and businesses. The City's WWTP is a modern, recently upgraded biological treatment plant. The wastewater treatment plant has a design average daily flow capacity of 8.0 MGD. In total, the City has a wastewater treatment capacity of 9.028 MGD, which takes into account both the City's WWTP and the City/County Flow Allocation Agreement that permits another 1.028 MGD of to be diverted to the County's Ballenger Creek WWTP. Current City sanitary sewer flow is approaching the available capacity. Fort Detrick is served by a small 1.0 MGD WWTP. This WWTP is currently operating at about 80 percent capacity. It does not offer additional wastewater treatment capacity for the City. The City will need to develop additional treatment capacity in the near future, either on its own or in cooperation with the County, to serve future households and businesses.

Levels of nitrogen and phosphorus are the primary pollution problem facing the Chesapeake Bay. Reducing these pollutants has been a major focus of the multi-state Chesapeake Bay Program over the past two decades. The 1987 Chesapeake Bay Agreement, as amended in 1992, set a goal to reduce levels of nitrogen and phosphorus by 40 percent by 2000, and to maintain that reduction thereafter. The Chesapeake 2000 Bay Agreement reaffirms this as the minimum commitment, and proposes to remove all

nutrient and sediment impairments to the Bay by 2010. This goal will almost certainly require additional reductions.

In Maryland, a Nutrient Cap Strategy Workgroup, consisting of tributary teams, stakeholders, and state and local government staff, developed the "the Excess Nutrient Cap Strategy." This strategy calculated numerical limits on total nitrogen discharge from all of the Chesapeake dischargers. Both the City and the County WWTPs have established numerical nitrogen goals.

The need to meet these stringent new nutrient reduction goals will have a major impact on any new or increased/expanded flows from either the City or County WWTPs. The need to address these goals in the expansion WWTP capacity in the future must be considered and is currently being studied.

Introduction—Water

The Frederick area is a part of the Potomac River Basin, and has two major drainage basins; Catoctin Creek and the Monocacy River. In addition, the smaller tributaries of Little Catoctin Creek West, Washington Run, and Tuscarora Creek South drain directly into the Potomac River. The main stem of the Monocacy River, or at least one of the tributaries, is used by three municipalities in the County including the City of Frederick for all or part of their water supply.

The Frederick City water service area serves residential, commercial, and industrial users. The following sources supply water in the City's service area:

1. Monocacy River
2. Linganore Creek
3. Mountain Sources: Fishing Creek Reservoir
4. City of Frederick wells (Frederick Towne Village/Monocacy Village/Riverwalk Parks)

The City of Frederick's water system is comprised of four sources of water, as shown in Figure CF.1): Lake Linganore, the Monocacy River, Mountain Source—which includes Fishing Creek, and the City's well field. In addition to the four sources of water, the City of Frederick has interconnections with Fort Detrick's, and Frederick County's water systems. This allows a margin of comfort in dealing with operational issues such as equipment failures, point source contamination, maintenance shutdowns, droughts and other emergencies.

The City operates four water treatment plants with a combined production capacity of 13 MGD to treat its potable drinking water supply. These plants include:

Lake Linganore Water Treatment Plan

The Lake Linganore Water Treatment Plant was constructed in 1932 and underwent an expansion in 1993. The plant currently has a capacity and supply to the City of Frederick of 6.0 MGD of water.

The Monocacy River Water Treatment Plant

Monocacy River Water Treatment Plant

The Monocacy River Water Treatment Plant has a capacity of 3.0 MGD. This plant, originally constructed in 1960, was expanded from the 2.0 MGD to 3.0 MGD in 1988. This plant is adjacent to the Fort Detrick Water Treatment Plant.

Lester Dingle Water Treatment Plant

The Lester Dingle Water Treatment Plant uses the Fishing Creek Reservoir and the Tuscarora Creek as its sources of water. This plant was constructed in 1986 and has a capacity of producing 3.0 MGD. However, the Tuscarora Creek supply is not currently being used due to problems associated with the questionable condition of supply mains, and turbidity during high and low water flows in summer periods. This plant with the current drinking water regulations in place and its restricted supply is limited to a Safe Yield of 1.7 MGD.

Zenon Ultrafiltration Water Treatment Plant

The Zenon Ultrafiltration Water Treatment Plant is the City's newest facility coming online in September of 2002. This plant is a portable system that is currently located within Riverwalk Park. The Zenon Ultrafiltration Water Treatment Plant has a production capacity of 1 MGD and is expandable to 3 MGD. This plant is used to treat the 0.365 MGD average day of water the City is permitted to withdraw from Well #4.

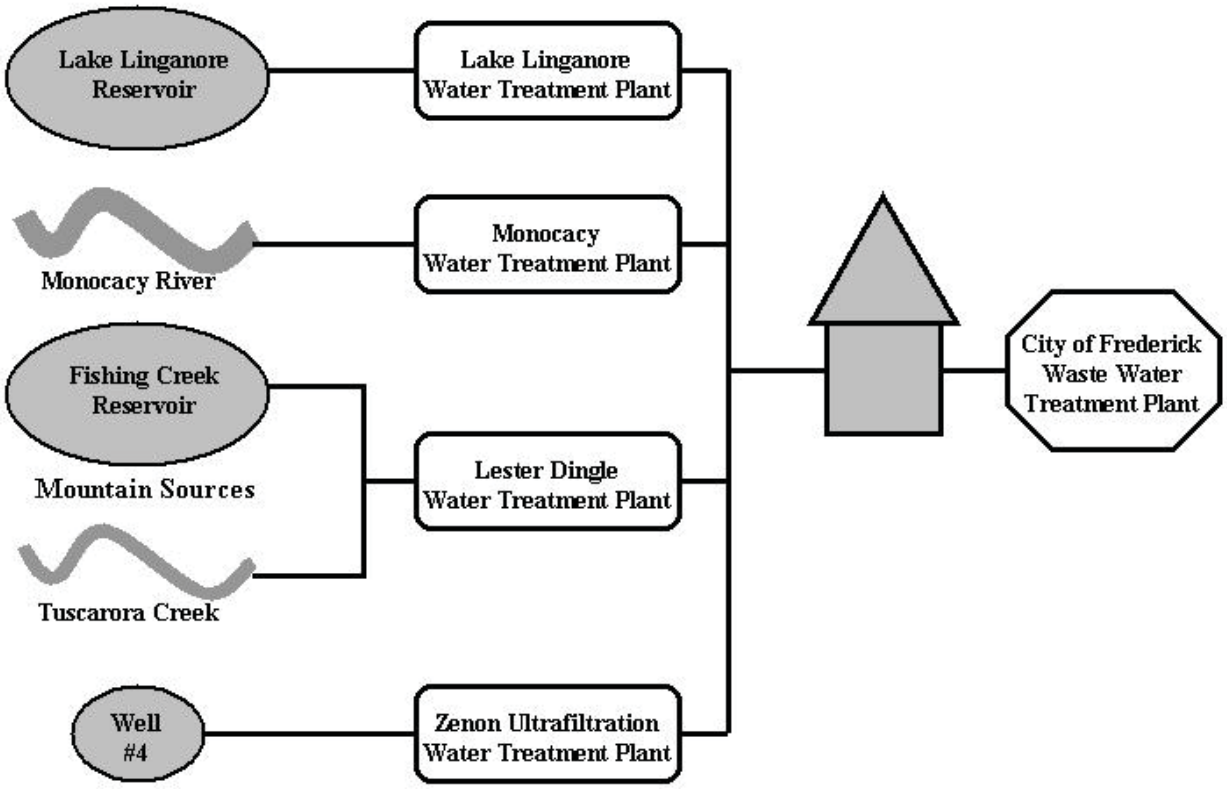
The Challenge Ahead: Issues this Element Seeks to Address—Water

Water shortages have been a major issue in the City of Frederick, exacerbated by record drought conditions in 2002. The City has been aggressively investigating and addressing the need for water on all fronts: new water sources, expanded treatment capacity, allocation of scare water resources, maintenance of the existing system and leak detection/repair, and conservation.

One future water supply source for the City of Frederick is the Potomac River, via a new main that will provide water to a new County water treatment plant (New Design Road). It is expected that this project will be completed by June of 2005. In 2003 the Maryland Department of the Environment approved a water appropriation permit that will allow Frederick County to withdraw 16 MGD (Average Day) and 26 MGD (Maximum Day) from the Potomac River. The permit identifies 5 MGD (Average Day) and 8 MGD (Maximum Day) to be dedicated to the City of Frederick.

In December 2003, the engineering consultant firm Malcolm Pirnie completed the City's *Water Resources Development & Optimization Plan*. The plan identified six new water supply projects, which may result in incremental sources of supply while the County is designing and constructing the Potomac Supply Water Treatment Plant modifications and transmission main.

Figure CF.1: The Frederick Water Supply System



Each of the options requires permits or approvals from Federal and State governments. In addition, several options also require negotiating agreements with third parties (e.g., LaFarge Quarry, Fort Detrick, etc). Due to the approval and extensive coordination that is necessary, it is difficult to predict exact completion dates. The City intends to start working on all of these initiatives simultaneously. If one or more of these initiatives proves to be unproductive, others will already be in progress.

These initiatives are listed below in order of their projected completion timeframes.

1. Develop existing test wells 3 and 7 into production wells (2004)
2. Utilize Fort Detrick excess treatment capacity to supply additional water (2004)
3. System Demand Reduction (2004)
4. Monocacy Flow Augmentation (2004-5)
5. Additional Groundwater (2004-6)
6. Mountain Supply Improvements (2006)

A newly created City Water CIP Team is tasked with implementing these projects.

Introduction-Other Facilities

The City of Frederick provides its own public safety services. Divided into three bureaus, Administrative, Operations and Support Services, the

Fire protection is provided by the County Fire Department, while the City maintains its own Police Department

Frederick Police Department provides 24 hours a day, seven day a week law enforcement services for the nearly 53,000 residents of Frederick's approximately 20 square miles. The Administrative and the Operations Bureaus are commanded by captains while the Support Services is managed by a civilian director. The City generally has a low level of crime, contributing to the City's high quality of life.

Frederick County provides public school and fire protection services for all County and City residents. The coordination of school construction to meet growing enrollment is a challenge for many Maryland counties as well as other jurisdictions around the country. The County has implemented an Adequate Public Facilities Ordinance (APFO) for schools to try to reduce school overcrowding and phase housing development with the availability of school capacity. The City of Frederick does not have an APFO for schools (since the control of the schools including school construction is outside its authority) but does coordinate on forecasts of pupil generation.

Theme: Balancing Growth

It shall be the policy of the City to:

Policy CF.1: Use the Comprehensive Plan text and maps to guide community facilities decisions including decisions about water and sewer service extensions. Increased water and sewer demands due to forecast future growth, development, and potential annexations will require that existing facilities be supplemented to accommodate growth to the year 2030.

Implementation Strategies

1. Require all properties located outside of the City, but contiguous to the City's boundary, to annex prior to provision of City sanitary sewer or water service. In no case should the City allow property to be annexed that cannot or will not be served by City services including sanitary sewer and water service. *[See also, the Land Use Element, Policy LU.2; the Transportation Element, Policy T.1; and associated implementation strategies*]
2. Update the City's Water and Sewer Master Plan to be consistent with the recommendations in this Comprehensive Plan. Several of the annexation areas recommended in this Comprehensive Plan were not evaluated in the 2000 version of the City's Water and Sewer Master Plan and further technical and cost analysis should be completed.
3. Require the City's Water and Sewer Master Plan to be updated every five years.
4. Map CF.1 depicts the planned City of Frederick annexation areas and the location of existing wastewater and water treatment plants (WWTP/WTP). Table CF.1 provides the acreage for these annexation areas. Table CF.2 describes the service considerations for each annexation area.

Map CF.1: Annexation Areas, Existing and Proposed Sewer Areas

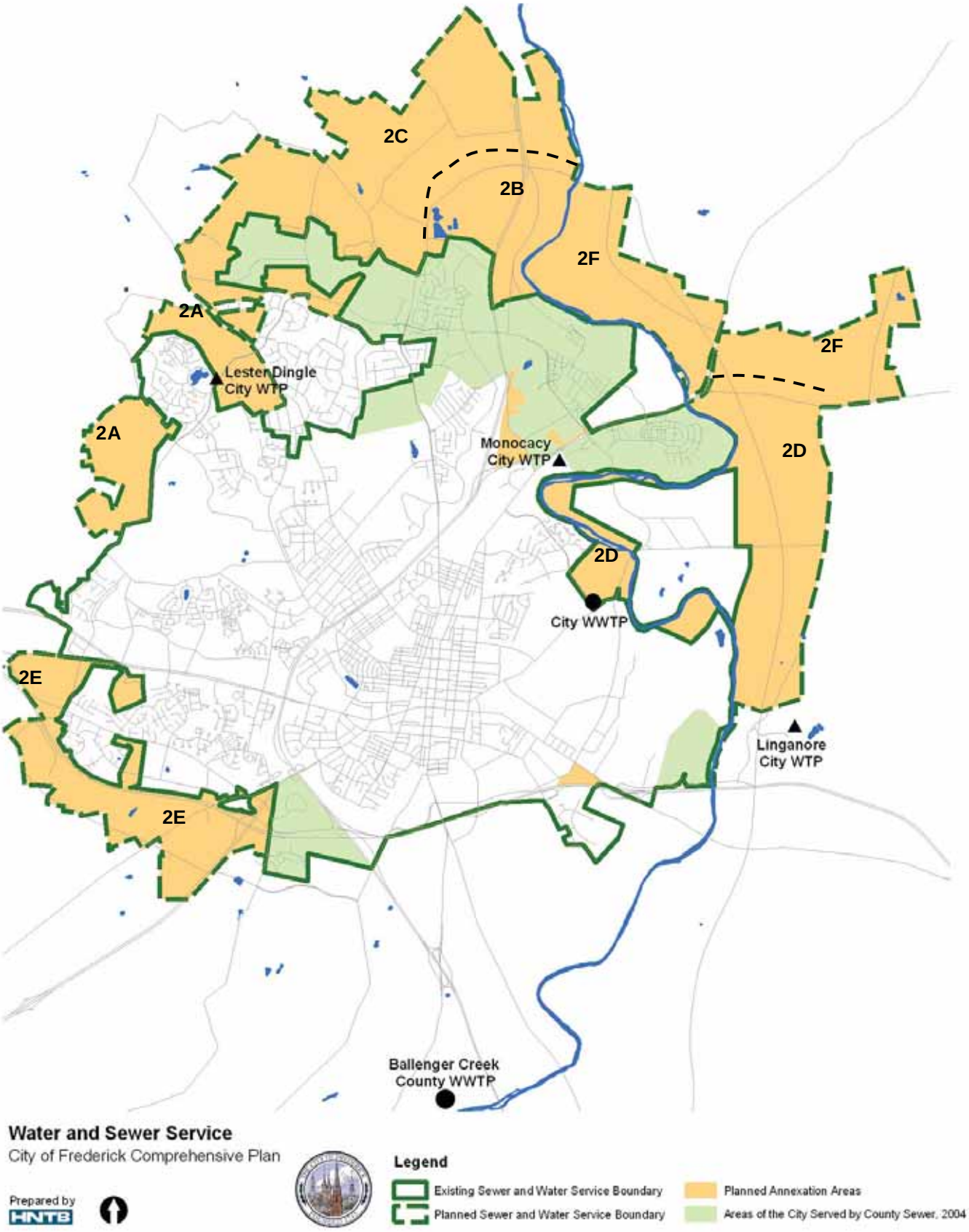


Table CF.1: Planned Annexation Areas—Acreage

Annexation Area	Description/Location	Acres	Percent of Planned Annexation Area	Percent Increase over 2004 City Area
Area 1	"Fill-in" Areas	962	12%	7%
Area 2A	West of Existing City	689	9%	5%
Area 2B	North of Existing City	174	2%	1%
Area 2C	North of Existing City	2,590	33%	19%
Area 2D	East of Existing City	1,242	16%	9%
Area 2E	Southwest of City, south of I-70	732	9%	6%
Area 2F	Northeast of City	1,550	19%	11%
Total		**7,939**	**100%**	**58%**

Table CF.2: Planned Annexation Areas and Future Sewer and Water Service

Annexation areas 1, 2A, and 2B are relatively easy to serve, and the service costs have already been studied in the 2000 Water and Sewer Master Plan. These areas are all within the planned water service area outlined in the 2000 Water and Sewer Master Plan except for 2B, which is in the County's WWTP service area, and a portion of 2A, which is outside the City's Service Area, but which can be served.
Annexation area 2C will be more costly to serve with sewer as it is a very long distance from the WWTP, and it must be served by the County WWTP. In addition, no detailed utility planning or engineering studies have been done for this area as it was not included in the 2000 Water and Sewer Master Plan. Transmitting water service to annexation area 2C may also be difficult due to the distance to the Lester Dingle WTP, the distance to the County water service connection, and circumventing Fort Detrick.
Annexation area 2D will be more costly to serve as no detailed utility planning or engineering studies have yet been done for this area, it is a long distance from the WWTP, and it must be served by the County WWTP. Water service for this area should be relatively economical because the area abuts the Linganore WTP.
Annexation area 2E is possibly the most costly area to serve as no detailed utility planning or engineering studies have yet been done for this area, it is isolated due to being south and west of I-70, and it must be served by the County WTP and WWTP.
Annexation area 2F was added to the planned annexation area following the completion of sewer and water analysis undertaken as part of this plan's development. Additional study of this area is required to determine the steps necessary to provide it with sewer and water service.

Policy CF.2: Provide adequate public water and sewer capacity to service projected growth within the City of Frederick as well as within all potential annexations areas.

Implementation Strategies

1. Implement the six new water supply projects identified in the *Water Resources Development and Optimization Plan,* in order to augment the City's short-term water requirement until the Potomac River water supply comes online.
   a. Develop existing test wells 3 and 7 into production wells
   b. Utilize Fort Detrick excess treatment capacity to supply additional water
   c. System demand reduction
   d. Monocacy flow augmentation
   e. Additional groundwater
   f. Mountain supply improvements
2. In order to meet the projected long-term (2030) average day water requirements, work closely with the County in overseeing the construction of the New Design Transmission Main that will be used to convey the Potomac Water Supply to the City.

3. Continue to identify and develop other additional water sources.
4. In order to meet short-term wastewater treatment needs, revise the existing agreement with the County to expand the amount of wastewater treatment capacity at the County's Ballenger Creek WWTP that is allocated for City use.
5. In order to meet long-term (2030) wastewater treatment needs, evaluate the following options:
   a. Expand the City's current wastewater treatment plant facility.
   b. Work in cooperation with the County to expand the capacity at the County's Ballenger Creek WWTP.
   c. Work in cooperation with the County to obtain future wastewater treatment capacity at the County's proposed McKinney WWTP.
   d. Identify alternative means to expand the City's wastewater treatment capacity through the Water and Sewer Master Plan Update.
6. Ensure that, as part of any City/County joint service agreement, City retains its right to annex and self-determine its future development and expansion. Any joint City/County agreement will include this right of self-determination, and will include the potential lands the City plans to annex and for which the City of Frederick plans to provide services, as recommended in this Comprehensive Plan.
7. Prohibit private wells for potable use and septic systems in the City.
8. Work in cooperation with all appropriate State and County agencies to develop regulations that would allow the use of private wells within the City for irrigation.
9. Limit the use of pump stations due to their high operating costs.
10. Enforce and review the currently permitted industrial wastewater discharge limits for large wastewater users to ensure that they remain reasonable and safeguard treatment capacity for the City overall. If some large users were to discharge at their permitted volume and strength, the City WWTP could become overloaded and have difficulty meeting discharge permits. Given the small amount of current excess average daily flow capacity at the City's WWTP, consideration should be given to reevaluation of these limits.
11. Take the lead in design and construction of new water and sewer lines. By construction these new lines, the City of Frederick will be able to control the pace and direction of new growth in the City.

Policy CF.3: Enhance public safety and emergency preparedness.

Implementation Strategies

1. Continue to participate in the Frederick County Department of Fire/Rescue Services emergency preparedness training programs.
2. Continue to map and analyze crime trends to ensure appropriate deployment of manpower and resources.
3. Work to streamline, improve and expand the Neighborhood Watch Program.
4. Conduct traffic enforcement operations at intersections designated as having a high incidence of collisions.
5. Study emergency response time and develop a level of service for

Emergency response time should be an element of the development review process

inclusion in the development review process.

6. Provide crime prevention information to neighborhoods throughout the City to promote awareness and improve public safety.
7. Provide Police Activity League facilities in the Golden Mile corridor.
8. Meet or improve upon the City's level of service standard for police officers.
9. Complete the implementation of the "Geographic Accountability Model" to define mapping boundaries of the police assignment zones.
10. Actively pursue land acquisition for multiple purpose public facilities in the northern section of the City. These facilities could include a fire station, park, school, DPW yard and/or library.
11. When acquiring land or accepting dedicated land for public facilities, use the information in Table CF.3 as a guide.

Table CF.3: Land Requirement Guidelines for Community Facilities

Facility Type	Requirement
Elementary School	15-20 acres
Middle School	25-30 acres
High School	50+ acres
All Fire Stations	Minimum 5 Acres Located at the corner of 2 major roads

Note: These are guidelines only. Final site acquisition needs to be approved by Frederick County Public Schools (school sites) or the Frederick County Fire and Rescue Services Division (fire stations).

The City should develop an automated system for waste collection

Policy CF.4: Provide efficient solid waste collection.

Implementation Strategies

1. Develop an automated collection system for waste pickup.
2. Increase the amount of solid waste collected at curbside that is recycled.
3. Develop new storage standards for multi-family and townhouse development to eliminate the use of trash can corrals.
4. Work with Frederick County to develop alternatives to the disposal of solid waste.

Theme: Enhancing Mobility, Accessibility and Connectivity

See Transportation Policy T-1, implementation strategy 3 for guidance on coordinating the timing and implementation of various infrastructure improvements.

Theme: Enhancing the Community

It shall be the policy of the City to:

Policy CF.5: Provide for safe and efficient water and wastewater service to protect the health, growth and economic well being of the City of Frederick.

Implementation Strategies

1. Continue efforts to remove inflow and infiltration sources within the existing sanitary sewer system.
2. Continue to diligently monitor water service contracts for recapture of un-used allocated water for re-allocation to other users.
3. Based on actual water use, review and revise the water allocation standards for non-residential uses. The existing standards may result in over allocation of scarce water resources.
4. Continue to work vigorously to reduce the amount of unmetered water in the current system.
5. Continue to identify and reduce the amount of “unaccounted for” water via Maryland Department of the Environment Audits.
6. Continue the leak detection and water repair program throughout the City with particular attention to the older portions of the City including downtown.
7. Develop a water emergency plan to deal with the potential loss of one of the four current water sources.
8. Continue to evaluate current water use information, determine large volume water customers, and identify additional water consumption reduction measures.
9. Develop a program to encourage reduction in water use, recycling and the use of gray water to reduce overall water consumption.
10. Acquire/purchase back up power generators for all City water and sewer facilities.
11. Consider the integration of the water resource issue with stormwater management by evaluating the construction of stormwater recovery/retention facilities, which could also provide for water reuse for irrigation or other possible reuse.
12. Strive to reduce nitrogen discharges from the City’s WWTP to improve the health of the Chesapeake Bay and to meet nitrogen removal goals.
13. Create a storm water management plan for the City of Frederick.
14. Develop standards for adequate flow pressures without using pump stations, to be used during the development review process.

Policy CF.6: Provide clean, well-maintained public facilities.

Implementation Strategies

1. Continue and expand programs that clean City streets.
2. Continue and expand programs that clean and care for the City's parks.

Theme: Supporting a Vibrant Downtown

It shall be the policy of the City to:

Policy CF.7: Provide safe and adequate water and sewer resources for the downtown.

Implementation Strategies:

1. Continue to monitor the need to rehabilitate existing water and sewer lines in the downtown, and identify deficiencies in these systems that must be corrected in order to accommodate downtown growth *(see also Policy CF.9, implementation strategy 2)*.

Theme: Interacting with the Region

It shall be the policy of the City to:

Policy CF.8: Coordinate City and County sanitary sewer and water provision.

Implementation Strategies:

1. Continue to work cooperatively with the County to provide water and sewer services that support the future growth of the City of Frederick, efficiently provide services to both jurisdictions, and reduce development pressures on rural areas of the County.
2. Work with Fort Detrick to meet its water and sewer demand.

Policy CF.9: Coordinate City and County service provision to improve services for City and County residents.

Implementation Strategies

1. Co-locate offices with the County and State to coordinate citizen services.
2. Continue to coordinate with the County to maintain County government facilities in downtown Frederick.
3. Identify additional funding sources to renovate, modernize and build schools.
4. Work with the County to eliminate duplication of services.
5. Work with the Frederick County Public Schools (FCPS) to support an academy/magnet high school initiative in the City of Frederick.
6. Work with FCPS to reserve and acquire future school sites and limit and phase development based on surrounding school capacities.
7. Continue to work with the FCPS to improve pupil generation forecasts.
8. Support efforts to improve schools located within the City that are in need of renovations.

The City and County should work together to improve pupil generation forecasts

ECONOMIC DEVELOPMENT ELEMENT

Introduction

The City of Frederick has experienced strong employment growth during the past 30 years. The result of this growth has been a diversified, jobs-rich economy in the City of Frederick. The City contains more than half of all jobs found in Frederick County, and has with more than two jobs for every City household.

Economic Clusters and Biotechnology in Frederick

Much of this economic activity stems from a few key industries and industrial clusters. Clusters are groups of inter-related industries that represent the full life cycle of a product or activity, from raw materials to finished products. For example, an "automotive products" cluster might include auto parts manufacturers, car dealerships, auto supply stores, repair shops, and even gasoline stations.

Frederick's emerging biotechnology cluster has generated a substantial portion of the City's recent economic growth, and has helped to fuel the City's increased economic diversity. The City's Department of Economic Development defines the "Bioscience" cluster as a combination of the biomedical research activities at Fort Detrick (including the National Cancer Institute) and nearby biotechnology firms. This grouping of industries accounts for the development of biotechnology, from knowledge-based research (Fort Detrick and the National Cancer Institute) to the development of biotechnology products such as medicines and medical machinery—as represented by private biotechnology firms.

Local higher education resources such as Hood College and Frederick Community College contribute to the biotechnology cluster: Hood College's specialization in biosciences provides opportunities for technical synergies. Outside the City, Mount St. Mary's entrepreneurship program (which may soon include a PhD program) is attractive to the "new economy" mindset of a number of technology-related industries. Frederick's biotechnology cluster also benefits from its role as part of a larger cluster that spans the I-270 corridor (including the National Institutes of Health in Bethesda), one of the nation's foremost biotechnology centers.

For a more in-depth economic profile, see the Comprehensive Plan background report entitled City of Frederick Economic Assessment in Appendix D, which is provided in electronic form on the CD included with this document.

Other Areas of Specialization

Frederick is also one of the few jurisdictions in the Baltimore-Washington region with a significant manufacturing presence. Specific manufacturing strengths include machinery (including manufacturers of biotechnology-related machinery) printing, and apparel manufacturing.

Frederick's agricultural identity and the City's historic role as the economic and institutional center of Frederick County also create some economic strength. As the county seat, the City is a center for government. It is also a hub of and retail activity, and has a strong concentration of entertainment jobs. The latter reflects Frederick's tourism industry, which derives its strength from the City's historic and cultural resources, as well as Frederick's role as a gateway to nearby natural and recreational resources. Frederick is also a regional leader in agriculture and food products.

Whereas biotechnology is a "new economy" industry, many of Frederick's other strengths, such as agriculture and manufacturing, are rooted in the "old economy." Agriculture and manufacturing have experienced nationwide decline in recent years. However, there is still some demand for these industries, and Frederick's historic strengths in food products and manufacturing make it the Baltimore-Washington region's only destination of choice for such activities.

Agriculture has helped to define the City's identity, and continues to play an important role in the City's economy

Economic development issues are some of the most important concerns facing City stakeholders. The Plan Assessment and Investigation Report (PAIR) identified a number of specific issues of concern, including:

- The growth of employment uses south of the city limits.
- The need to redevelop employment areas such as the Golden Mile.

This element addresses these concerns and others with policies that promote the recruitment and development of a balanced employment base, while capitalizing on the City's existing and emerging economic strengths.

The Challenge Ahead: Issues this Element Seeks to Address

In coming years, Frederick will see continued economic growth. A mix of new and existing jobs will help the City build upon its robust, diverse economic base, while making it resistant to cyclical economic downturns. Frederick has the opportunity to capitalize on its key industries, but should not do so to the exclusion of other types of jobs. For example, the pursuit of biotechnology employment should not prevent the City from attracting complementary jobs, such as those in professional services or retail.

The overarching challenge for the City is to guide the type, pace and location of Frederick's employment growth. At the same time, the City's infrastructure must support this growth in a way that maintains the City's overall vision for the future. This Comprehensive Plan defines the locations most appropriate for the expansion of key industries and important economic sectors, and outlines some of the policy decisions necessary to take advantage of those locations. The Transportation and Community Facilities Elements address the infrastructure changes necessary to make economic development goals a reality.

Theme: Balancing Growth

It shall be the policy of the City to:

Policy EC.1: Promote a diversified economic mix.

Implementation Strategies

1. Identify appropriate developable lands with planned water and sewer service to support a range of employment opportunities, to ensure the long-term economic health of the City.
2. Identify locations in need of maintenance and enhancement of water and sewer service to meet the needs of new and existing non-residential development.
3. Create incentives for business attraction and retention.
4. Improve the mix of uses in industrial parks/areas, focusing on businesses with a greater net benefit to the City's tax base.
5. Strengthen the economic engines of Frederick's economy: Biotechnology, Information Technology, Manufacturing, Services, and Tourism.
6. Support efforts to enhance Frederick's identity as a "biotech cluster," part of the I-270 Technology Corridor.
7. Market the attractive job opportunities in the manufacturing industry—an industry that has remained a fairly constant portion of the City's employment base over the last 30 years.
8. Create a partnership with Frederick County to promote a diverse regional economy.
9. As part of the update of the City's development regulations, permit and encourage flexibility in the review of industrial and office parks.

Policy EC.2: Facilitate the expansion of office and research and development firms.

Implementation Strategies

1. Ensure that an adequate amount of land is planned and appropriately zoned for office and research and development uses. *[See also the Land Use Element, Policy LU.1 and associated implementation strategies.]*
2. Capitalize on the existing supply of "non-traditional" office space to attract an increased share of the region's "creative services" industry (architects, engineers, computer software developers, consultants).

The City of Frederick should emphasize small business and specialty shopping in the downtown

Policy EC.3: Support small and minority-owned businesses in the downtown area.

Implementation Strategies

1. Preserve and enhance an entrepreneurial climate that enables new and unique businesses to compete and contribute to the downtown economic mix.
2. Encourage a retail mix that emphasizes small businesses and specialty goods and services, combined with dining and entertainment establishments.

Policy EC.4: Draw upon the City's educational resources to promote job creation, enhancement, and retention (*see box at right*)**.**

Implementation Strategies

1. Foster strategic partnerships between core industries (e.g., Biotechnology, Services) and educational institutions (Hood College, Mount St. Mary's, and Frederick Community College) to match curriculum with workforce and training needs.
2. Encourage a higher education presence in downtown.

Job Enhancement

This term refers to partnerships between businesses and educational institutions that allow employees to improve their skills or gain advanced degrees at local schools while maintaining their employment status.

What Kind of Jobs Will the City of Frederick Have in the Future?

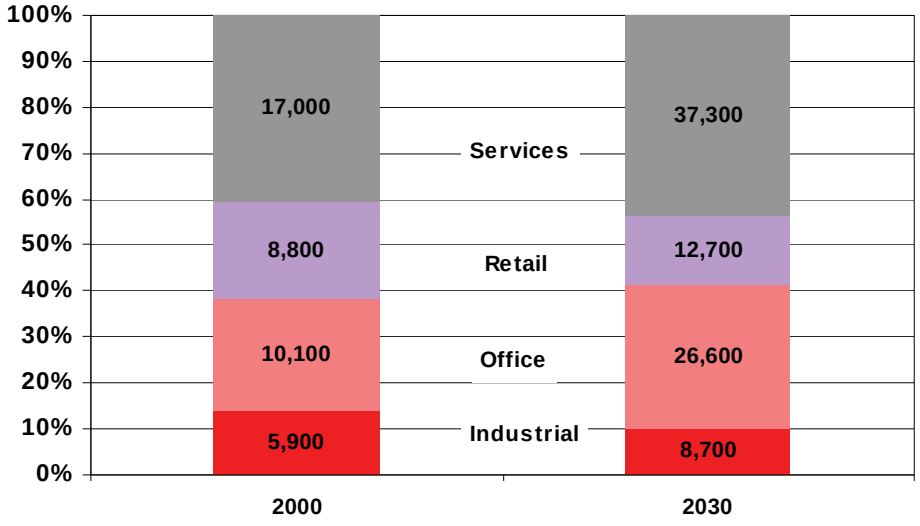
The chart below compares the year 2000 and forecast 2030 employment profile of the City of Frederick based on four key employment sectors. It shows that the Services Sector is projected to add the highest number of new jobs and will comprise more than 40 percent of the total jobs in 2030. This sector includes jobs in health consumer, business, and legal services. Business services – which comprise advertising, equipment rental, business support operation such as photocopying, equipment rental, computer programming services, data processing etc – are projected to experience the highest growth among all the services.

The number of industrial jobs will increase modestly: the 2000 to 2030 industrial jobs increase is likely to be accounted for by jobs in "new economy" sectors like biotechnology. By contrast, the 1990 to 2000 growth in the manufacturing is projected to abate and experience decline. Overall, the share of industrial jobs is projected to decline from 15 percent in 2000 to 10 percent in 2030 given the comparative strength of other sectors.

Office jobs are projected to grow from 10,000 jobs in 2000 to over 26,000 by 2030, an increase of more than 150 percent. The growth in this sector will be accounted for by government, administrative, financial and professional jobs. By 2030 office jobs will increase to more than 30 percent of the total jobs in the City of Frederick.

On the retail side, jobs are expected to increase by almost 50 percent. Most of the job increase in retail sector will be accounted for by eating and drinking places. However, retail jobs will account for a decline in the share of total jobs from over 20 percent in 2000 to 15 percent of the total jobs in 2030.

City Employment Forecast for Key Economic Sectors



Theme: Enhancing Mobility, Accessibility, and Connectivity

It shall be the policy of the City to:

Policy EC.5: Improve the relationship between transportation facilities and employment locations.

Implementation Strategies

1. Concentrate job growth close to major transportation centers and corridors, and the downtown. *[See also the Transportation Element, Policy T.9, associated implementation strategies, and the associated box describing TOD.]*
2. Make commercial areas more transit-friendly, through physical improvements to commercial areas.
3. Work with the County TransIT to increase the frequency of bus service within the City of Frederick and to better serve jobs and households. Consider providing bus service along Monocacy Blvd.
4. Market the airport as a break-bulk location for freight and cargo.
5. Continue to promote the airport as a resource for corporate users in the region.

Policy EC.6: Revitalize critical economic centers and corridors.

The Golden Mile is one of several key economic corridors undergoing revitalization

Implementation Strategies

1. Establish distinct identities for key commercial areas within the City of Frederick, specifically the Golden Mile/West Patrick Street; East Patrick Street/I-70 Gateway; and South Jefferson Street. *[See also the Land Use Element, Policy LU.14 and associated implementation strategies.]*
2. Use public/private partnerships to revitalize centers and corridors.
3. Enhance the gateway role of key corridors with visual and physical improvements.
4. Strengthen the downtown as an economic center.

Policy EC.7: Encourage a business-supportive infrastructure. *[See also the Community Facilities Element, Policy CF.5 and associated implementation strategies.]*

Implementation Strategies

1. Partner with all stakeholders to complete the development of Monocacy Blvd.
2. Aggressively pursue opportunities to enhance the City's telecommunications, fiber optics and high speed Internet access to promote economic development.
3. Promote the extension of high speed telecommunications connectivity to businesses and residents to better position the City and County to attract high tech businesses and enhance telecommuting.
4. Work with State and other agencies to investigate the possibility of establishing a telework center in the City.
5. Identify and work to remove impediments to attraction and retention of businesses.

6. Streamline and accelerate regulatory processes to create a more business-friendly environment in the City.

Theme: Enhancing the Community

It shall be the policy of the City to:

Policy EC.8: Improve the visual and physical relationship between businesses and their surrounding neighborhoods.

Implementation Strategies

1. Review the buffers and transition zones between business and residential areas to encourage positive interaction between these development types.
2. Establish/reinforce an attractive visual appearance in commercial areas.
3. Enforce regulations that require the approval of business licenses and zoning certificates before a business can open.

Policy EC.9: Support a commercial mix that addresses the service needs of Frederick residents.

Implementation Strategies

1. Identify and encourage the neighborhood-serving businesses that meet the needs of citizens. *[See also the Land Use Element, Policy LU.13 and associated box describing neighborhood-serving retail.]*
2. Strengthen County, state, and regional economic partnerships to give local businesses access to financial incentives.

Theme: Supporting a Vibrant Downtown

It shall be the policy of the City to:

Policy EC.10: Continue to locate all levels of government in the downtown.

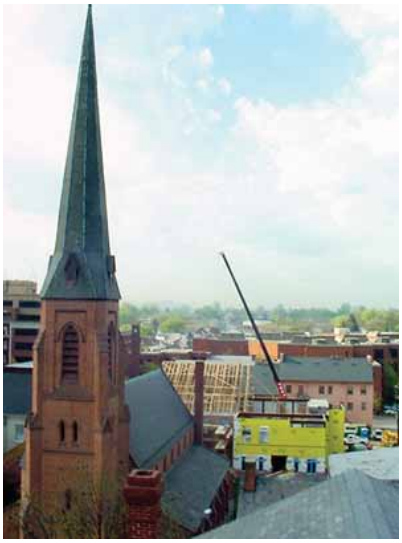
Implementation Strategies

1. Pursue improvement and enhancement of existing government buildings.
2. Identify potential office sites for government entities *(see also the Community Facilities Element, Policy CF.9, implementation strategy 2)*.

Policy EC.11: Encourage greater residential and job density in the downtown area.

Implementation Strategies

1. Add new residential units and commercial tenants in the downtown through infill, adaptive re-use, and redevelopment.



New development in the downtown can help make the City stronger overall.

Downtown Parking Plan

The City of Frederick completed a parking study for the downtown business district in 1989. It followed this effort with the formation of a Parking Task Force in 2000 to further study all aspects of parking in the business district. The Parking Task Force recommended that the City hire a consultant to develop a full-scale Downtown Parking Plan.

That plan, formally adopted in 2003, includes a long list of strategies to make parking in downtown Frederick friendlier, while still producing revenue for the City. Among those strategies was the extension of downtown express bus service from a satellite parking lot at Harry Grove Stadium, and a parking rate increase that brought the City's rates up to the level charged by similar jurisdictions, while still maintaining an excellent value.

The Downtown Parking Plan identified locations for new parking garages, which would help to sustain new and infill development especially along Carroll Creek. New technologies, such as electronic parking meters and upgraded parking garage ticket dispensers were also recommended and implemented to better serve parking customers.

2. Implement the recommendations of the Downtown Market Analysis and Retail Strategy regarding residential and commercial mix along Carroll Creek Park.
3. Encourage the rehabilitation of upper-floor space in commercial zones to increase the number of residential-above-commercial units.
4. Attract neighborhood-serving retail uses such as grocery and drug stores within walking distance of downtown residents.
5. Continue to promote the downtown as one of the City's major employment centers.

Policy EC.12: Create an attractive physical climate for downtown economic investment and success.

Implementation Strategies

1. Implement the recommendations of the Downtown Parking Plan *(see box at left)*.
2. Improve and standardize signage and wayfinding.
3. Improve and maintain sidewalks, crosswalks, and pedestrian amenities to encourage non-vehicular traffic throughout the downtown.
4. Implement mixed-use development to establish Carroll Creek Park as a central public gathering place.
5. Work to reduce the number of blighted and neglected properties.
6. Continue to implement streetscape improvement programs throughout the downtown.

Policy EC.13: Strengthen downtown Frederick's position as a center for culture and the arts. *[See also the Land Use Element, Policy LU.19 and associated implementation strategies.]*

Implementation Strategies

1. Continue to promote Frederick, and especially the downtown, as a tourist destination, capitalizing on downtown's historic buildings and its recent designation as an Arts and Entertainment District.
2. Support the Arts and Entertainment District by expanding the menu of arts and cultural programming in downtown venues, including the Weinberg Arts Center, East Church Street Park, the Cultural Arts Center, the Delaplaine Visual Arts Center, and Carroll Creek Park.
3. Explore the creation of a Public Art Commission to promote art work in downtown and along Carroll Creek.

Theme: Interacting with the Region

It shall be the policy of the City to:

Policy EC.14: Continue to market Frederick as a desirable tourist destination.

Implementation Strategies

1. Work with Frederick County Tourism to market the City's historic resources as a primary tourist attraction by enhancing facilities,

services and activities that support both visitor-based economic development and the Frederick residential and business communities.

2. Reinforce the City's role as the gateway to the Catoctin Mountains, and the "base camp" for tourism-related visitation to state and national parks, Civil War sites, and other recreational activities.
3. Work with Fort Detrick and Frederick Community College to develop a regional conference center.

Policy EC.15: Reinforce Frederick's role in the technology sector—as the northern anchor of the I-270 Technology Corridor, and as one corner of the Maryland Technology Triangle (Baltimore, Montgomery County, Frederick).

Implementation Strategies

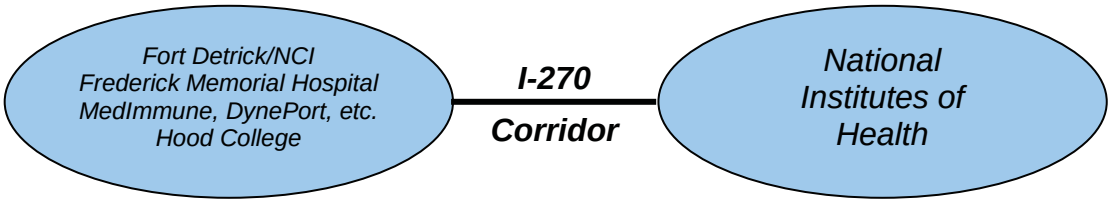
1. Support the Technology Incubator's goal of to aiding and encouraging entrepreneurs in the biotechnology and information technology sectors.
2. Reinforce Frederick's role as a leader in biotechnology and biodefense by strengthening the relationship between Fort Detrick and the City's business community.
3. Establish a formal connection between Fort Detrick and Frederick's business community (e.g., a Military Alliance) to ensure mutually beneficial decision making.
4. Pursue economic spin-off development and redevelopment around Fort Detrick, including Area B.

Biotechnology Jobs in Frederick

The employment forecast for the City of Frederick examined the future of biotechnology employment. The biotechnology industry includes two distinct types of operations: manufacturing of products for sale; and research and development activity, plus related office functions. Frederick's biotechnology employment is currently focused more on manufacturing than on R&D.

The National Institutes of Health in Bethesda, and related businesses in the area already provide a major R&D presence, as well as an anchor to the I-270 Technology Corridor. However, given the limits on the growth of biotechnology manufacturing in high-cost areas such as metro Washington, Frederick has an opportunity to capture a significant number of new biotech R&D jobs, becoming a second anchor in a "biotechnology barbell" along I-270.

The Frederick area's existing base of scientific, engineering, national defense, and central administrative activity, plus its access to a highly skilled labor force and its proximity to major life science research functions (such as Fort Detrick and NCI), can help Frederick gain status as a diversified center for biotechnology employment.



HOUSING ELEMENT

Introduction

The City of Frederick has been subject to high growth pressures in the last two decades. Between 1990 and 2000, the City's population increased by 31 percent, and the rest of Frederick County experienced similar gains. Development pressure has been directed towards Frederick by restrictive land use policies in counties located closer to the region's urban centers, especially Baltimore and Montgomery Counties, as well as by the lure of Frederick's historic downtown and desirable neighborhoods. The City of Frederick has followed the Smart Growth model by accommodating much of its new housing demand in areas that are already developed or planned for development.

Housing growth in the City of Frederick accelerated during the 1990s. Throughout the 1980s, the City gained 500 to 600 new housing units per year; by 2000, that figure had jumped to 945 units. Growth is expected to continue in future years. In fact, as Table H-1 shows, the City will double the current number of households by 2030.

Table H-1: Existing and Forecast Households

	2000	2030 (Forecast)
Households	20,900	41,400

For a more in-depth analysis of the City's housing stock and composition, see the Housing Assessment in Appendix D, which is included in electronic form on the CD packaged with this document.

For citizens and elected officials, the most pressing housing-related issues facing the City, and expressed during the update to the Comprehensive Plan, revolved around affordable housing. Specific concern was expressed for the need to encourage housing that was affordable for the residents who wished to both live and work in the City.

The Challenge Ahead: Issues This Element Seeks To Address

As these growth pressures continue, the foremost challenge facing the City will be to facilitate the provision of an adequate mix of housing unit types, prices, and locations.

Housing Unit Type. Despite the increase in residential construction activity during the last decade, the same period has witnessed a rapid drop-off in the number of new *multi-family* units being constructed. This change in residential unit mix has significant implications for existing and perspective City residents. Moderate-income income households tend to be home-renters rather than homeowners; a majority of renters occupy housing units that have been built specifically for rental, specifically multi-family structures.

The recent decline in multi-family housing construction means that fewer moderate-income families can afford to live in the City of Frederick. The fact

that, in 2000 about 29 percent of the renter households spend more than 35 percent of their monthly income on housing is one sign that rental housing costs are stretching the budgets of a large number of households.

Housing Cost. Closely related to the type of homes being built in Frederick is the cost of those homes. Trends show a rapid appreciation of housing prices in the City: prices for comparable residential units increased by seven percent per year during the 1990s, and by more than ten percent per year since 2000. Thus, for example, a home valued at $185,000 in the mid-1990s was worth as much as $260,000 in 1999 and up to $360,000 in 2003.

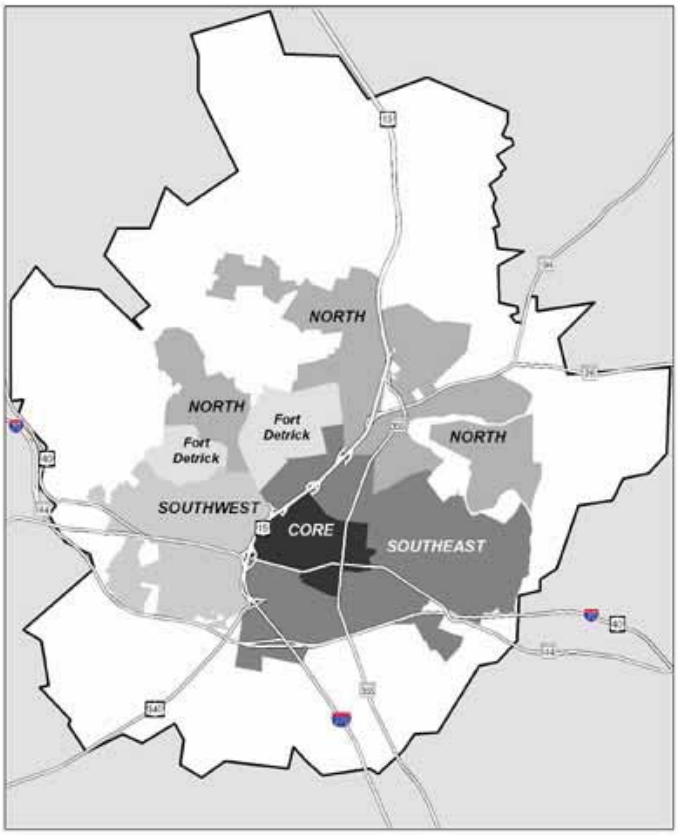
To some degree, this increase is a result of rising home values in the Baltimore-Washington region. However, the change in housing unit mix has also been a factor. A large portion of new construction has come in the form of detached single family homes, which tend to be more expensive than multi-family units.

Housing Location. The new housing stock built in the 1990s has not been equally dispersed across the City. While areas east of US 15 experienced little housing growth, the Southwest and North sectors of the City (see Figure H.1) received nearly all of the City's new residential development. By itself, this geographic trend is not necessarily problematic. However, when combined with the finding that little of this new construction is in the form of multi-family units, and that much of the new construction is not affordable for moderate-income families, it is an indication of income segmentation of the City's population. Not only is there a shortage of housing that is affordable for moderate-income families, but these families and individuals are also concentrated (by necessity rather than by choice) in the older portions of the City.

Given this imbalance, the policies in this element of the Comprehensive Plan are designed to facilitate the provision of a wide variety of housing options (including more modestly priced dwelling units). The Comprehensive Plan as a whole also encourages coordination of new residential development with other elements that help to bridge the gap between "housing units" and "community": neighborhood amenities, multi-modal transportation options, employment growth and infrastructure improvements.

Finally, in addition to accommodating new residential growth, the Comprehensive Plan addresses the preservation of existing housing stock. This will be especially crucial in the historic downtown. The historic core has the oldest housing stock in the City, and this stock is valuable specifically because of its historic nature.

Figure H.1: Sub-Areas in the City of Frederick



Theme: Balancing Growth

It shall be the policy of the City to:

Policy H.1: Facilitate the development of an adequate housing supply for current and future City residents.

Implementation Strategies

1. Facilitate housing production by improving the predictability in the annexation, planning, and permitting process. Several growth management tools should be used to accomplish this goal including: phasing of annexations, phasing of infrastructure improvements and expanded service (roads, water, sewer), and holding zones for properties without services.
2. Promote the production of a range of housing types in all parts of the City.
3. The City's Department of Community Development should take steps to increase marketing and awareness of City housing programs.
4. Encourage the use of master-planned neighborhoods and mixed use developments through new construction.

Policy H.2: Promote the development of housing with costs that reflect the range of incomes generated within the City.

Implementation Strategies

1. Consider implementing an inclusionary housing program such as Montgomery County's Moderately Priced Dwelling Unit (MPDU) program *(see box at left)*. The City may consider using the Frederick County program as a starting point.
2. Explore other options and incentives to produce more modestly priced units. These options could include but are not limited to priority permit processing, performance standards, fee exemptions, and property tax deferral.
3. Use community partnerships involving non-profit housing and social service agencies to increase homeownership opportunities for very low income households.
4. Continue to use CBDG program to rehabilitate blighted, vacant houses for reuse for first-time homeowners.
5. Work with non-profit agencies and community-based organizations to develop a housing counseling program to provide pre- and post-purchase counseling for low- and moderate-income first-time homebuyers.
6. Explore a mortgage buy down program to provide more modestly priced housing units.
7. During the update of the City's development regulations, consider changing regulations to permit accessory dwelling units above garages as a special exception use for all existing owner-occupied single-family lots. New developments that wish to have accessory dwelling units above garages would need to have the Planning Commission approve that use at the site-plan level.

Inclusionary Housing Programs

Inclusionary housing programs provide economic incentives to developers in exchange for producing affordable and modest-sized dwelling units.

The Moderately Priced Dwelling Unit Program (MPDU) *of Montgomery County, Maryland, for example, requires developers of 35 or more housing units to make 12.5 percent to 15 percent of the units affordable. In return, developers receive a density increase of up to 22 percent. Montgomery County controls the selling price of the units for 10 years and the rental rate for 20 years to ensure that they remain affordable. After that time, when the units are resold at market rates, the County shares in the profits, which can be used to improve housing choices. In addition, the Montgomery County Housing Authority and a nonprofit clearinghouse can purchase up to 40 percent of the affordable units built through this program.*

8. Permit professionally-managed Single Room Occupancy (SRO) hotels in appropriate zoning districts including General Commercial Zones by Special Exception with strictly enforced quality inspections, permit and licensing requirements. Allow for reduced parking standards as most occupants would not own automobiles.

Theme: Enhancing Mobility, Accessibility and Connectivity

It shall be the policy of the City to:

Policy H.3: Improve the availability of housing for the elderly and individuals with disabilities, as well as shelter for the homeless.

Implementation Strategies

1. Disperse the location of special needs services such as residential-care facilities, shelters, and group homes throughout the City.
2. Allow higher residential densities in moderate density multi-family zones for housing limited to occupancy by elderly or disabled households, based on the lower peak period traffic trip-making and reduced parking needs that these households generate.
3. Change the development regulations to permit administrative review and appeal by the Planning Director to approve variances from the setback requirements for "reasonable accommodation" of ramps for people with disabilities.
4. Encourage builders of new single-family homes to build "adaptable" homes—those that have features that could be adapted to accommodate people with disabilities, such as lower light switches, plumbing that permits the lowering of sinks without necessitating rearranged piping, and wider doorways.

Policy H.4: Enhance multi-modal transportation options for neighborhoods. *[See also the Land Use Element, Policy LU.9 and associated implementation strategies.]*

Implementation Strategies

1. Promote higher-density residential and pedestrian-friendly development within walking distance (a 10-minute walk) of existing and planned public transit routes (including the MARC station).
2. Work with the County TransIT to prioritize transit for underserved neighborhoods.
3. Facilitate the construction of bikeways and pedestrian paths within and between neighborhoods. The starting point should be the timely implementation of the Shared Use Path Plan *(See the Transportation Element, Map T.6)*.
4. Promote new housing development near employment centers to reduce regional commuting.

Theme: Enhancing the Community

It shall be the policy of the City to:

Policy H.5: Encourage the development of compact residential neighborhoods.

Implementation Strategies

1. Monitor development to achieve a gross residential density of at least 3.5 units per acre in keeping with Smart Growth guidelines.
2. Encourage infill development (development that occurs on vacant or abandoned parcels in an otherwise built-up portion of the City) and redevelopment (new development that replaces or substantially refurbishes existing structures) that is compatible with surrounding land uses.
3. During the update of the City's development regulations, consider an overlay zone for infill developments. The zone could include flexible zoning regulations that may allow a higher density, reduction of parking or setbacks for infill developments. The Maryland Department of Planning has developed a model infill ordinance that could be used as a starting point.
4. Encourage the adaptive reuse of existing buildings for residential use.
5. Review the cost and benefits of adopting a revision to the Building and Fire Codes requiring sprinklers in all new residential units.

No-Impact Home-Based Businesses

"No-Impact" is a legally-accepted term in Maryland. The Maryland Cooperative Housing Act defines a "no-impact home-based business" as a business that:

1. *Is consistent with the residential character of the dwelling unit;*
2. *Is subordinate to the use of the dwelling unit for residential purposes and requires no external modifications that detract from the residential appearance of the dwelling unit;*
3. *Uses no equipment or process that creates noise, vibration, glare, fumes, odors, or electrical or electronic interference detectable by neighbors; and*
4. *Does not involve use, storage, or disposal of any grouping or classification of materials that the United States Secretary of Transportation or the State or any local governing body designates as* a hazardous material.

Theme: Supporting a Vibrant Downtown

It shall be the policy of the City to:

Policy H.6: Support diverse residential development in the downtown area.

Implementation Strategies

1. Add new residential units within the downtown.
2. Encourage the rehabilitation of upper-floor space in commercial zones to increase the number of residential-above-commercial units.
3. Attract neighborhood-serving retail uses such as grocery and drug stores within walking distance of downtown residents. *[See also the Land Use Element, Policy LU.13, and associated box about neighborhood-serving retail uses.]*
4. Permit administrative review for "no-impact" home occupations without going through the BZA hearing process. "No-impact" home-based businesses are those that have minimal adverse impacts on the surrounding residential community. *(see box at left)*.
5. During the update of the City's development regulations, review the requirements for upper story conversions that may currently hinder their rehabilitation.
6. Allow for higher densities in the downtown area.

Theme: Interacting with the Region

It shall be the policy of the City to:

Policy H.7: Support Frederick County and State of Maryland efforts to ensure a balanced regional housing approach.

Implementation Strategies

1. Collaborate with Frederick County to facilitate the development of a wide range of housing options in the County and the City.
2. During the update of the City's development regulations, ensure that the Building Code facilitates the approval of structures with "green" building features, such as energy-efficient building materials, water-efficient landscaping, or minimized impervious surface [*See also the implementation strategies in the Environment and Natural Resources Element, Policy EN.3: Strive to reduce impervious cover and promote best practices of storm water management*].

A balanced housing approach can provide housing choices, including single-family, and multi-family units, ranging from contemporary to historic.

PARKS AND RECREATION ELEMENT

Introduction

The City of Frederick has 56 public parks, totaling 440 acres—an average size of 7.8 acres. These parks generally fall into three categories, as defined by the National Recreation and Park Association (NRPA): neighborhood parks, community parks, and special facilities. These definitions are based on park size, function and service area of the parks.

Beyond the City boundaries, Frederick is located close to a number of County, state and national parks, including Gambrill State Park, Cunningham Falls State Park, Pinecliff Park, Shookstown Park, Braddock Heights Park, Ballenger Creek Park, Catoctin Mountain Park, and Monocacy National Battlefield. These regional resources provide additional recreational opportunities for City residents. For a more in-depth analysis of the City's parks and recreation facilities, see the Comprehensive Plan background report entitled Parks and Recreation Assessment in Appendix D, which is included in electronic form on the CD packaged with this document.

In the Plan Assessment and Investigation Report (PAIR,) Stakeholders of the City of Frederick identified several park and recreation concerns for the City. Among those issues were:

- The need for a long-range plan to identify and prioritize where additional parks and active recreation facilities are needed.
- The need to facilitate the dedication and development of new park facilities.

This element addresses these and other park and recreation issues with a number of policies designed to enhance the quality of life for the residents of Frederick and improve the City's parks and recreation facilities.

The Challenge Ahead: Issues this Element Seeks to Address

The City has about eight acres of park land per 1,000 residents, slightly less than the 10 acres per 1,000 residents recommended by the NRPA. As a result, there is a need for approximately 100 additional acres of parkland to serve the existing population. As the City reaches its year 2030 projected population, there will be a need for approximately 500 additional acres of park land.

Distribution of park and recreation facilities is an issue this Comprehensive Plan seeks to address. While additional community park acreage is necessary, the existing community parks are well distributed throughout the City. Neighborhood parks are not nearly as well distributed. These smaller facilities are primarily concentrated in and around the downtown and neighborhoods to the west. Northern neighborhoods, where the City has

experienced substantial growth, are under-served by neighborhood parks, indicating a need for more parkland in this area.

Theme: Balancing Growth

It shall be the policy of the City to:

Policy PR.1: Increase the amount of active open space and public recreation amenities consistent with state and national standards.

Implementation Strategies

1. Strive to increase the level of service for parks to 10 acres of combined neighborhood and community parkland per 1,000 residents and to implement the National Recreation and Park Association (NRPA) classification guidelines and standards, as shown in Table PR.1.
2. During the update of the City's development regulations, incorporate NRPA definitions of park types, and create park acreage standards based on the number of dwelling units.
3. Acquire lands now for community parks that are located to serve existing and future populations of the City, as shown on Map PR.1: Existing Park Service Areas.
4. Acquire a large community park (25+ acres) in the northern section of the City. This facility should be developed with sports fields *[see Comprehensive Plan Map for potential location].*
5. Identify new sites for neighborhood and community parks so that additional parklands can be acquired—either purchased by the City or through the development review process.

What Are NRPA Standards?

The National Recreation and Park Association (NRPA) is a national, non-profit service organization dedicated to advancing parks, recreation and environmental efforts that enhance the quality of life for all people. NRPA works closely with national, state and local recreation and park agencies, corporations and citizens' groups in carrying out its objectives. As part of its activities, NRPA has created a hierarchy of park types, as well as a set of acreage standards for different park types. This information is shown in Table PR.1.

Table PR.1: NRPA Parkland Classification and Standards

Type	Service Area	Desirable Size	Acres/1000 Residents	Desirable Site Characteristics and Facilities
Neighborhood Parks	¼ to ½ Mile	5-15 Acres	1 to 2 Acres	Serve the surrounding neighborhoods with open space and facilities such as basketball courts, children's play equipment and picnic tables
Community Parks	1-2 Miles	25+ Acres	5 to 8 Acres	May include areas suited for intense recreation facilities such as athletic complexes and large swimming pools. Easily accessible to nearby neighborhoods and other neighborhoods
Regional Parks	Several Communities	200+ Acres	5 to 10 Acres	Contiguous with or encompassing natural resources
Special Use Areas	No Applicable Standards	Variable Depending on use	Variable	Area for specialized or single purpose recreation activities such as campgrounds, golf courses etc.

The entrance to Baker Park, the City's downtown park and central civic gathering place

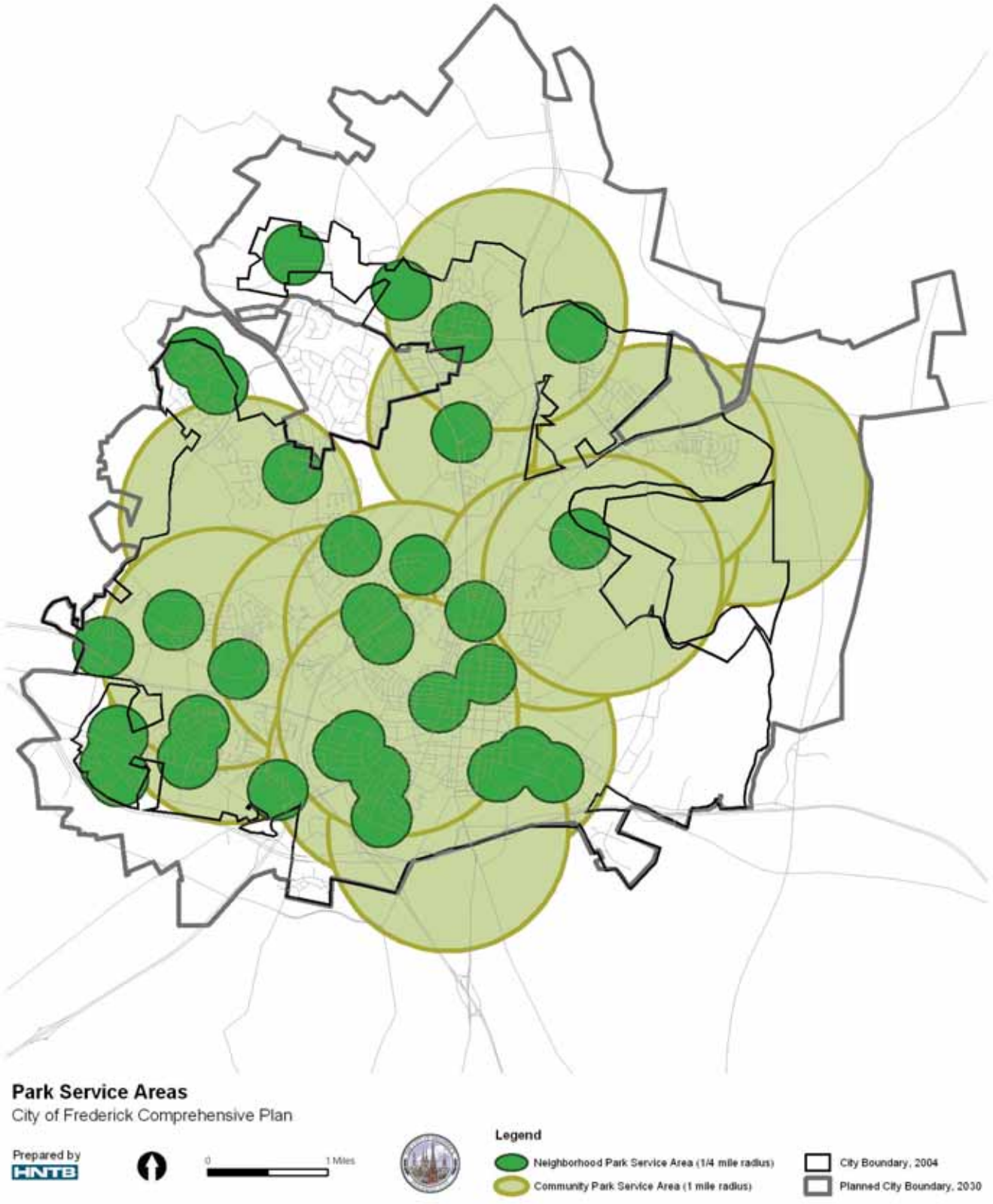
6. Develop plans to create a regional "East Church Street Park" following Carroll Creek along Gas House Pike.
7. Amend the development regulations to encourage the majority of private open space within new developments (maintained by a private homeowner's association) to be centrally located and require that the open space be accessible to all homes in the development.
8. Periodically survey residents to better understand what types of recreation facilities are desired and periodically assess the residents' needs and usage.
9. Establish larger parks of 10 acres or more to allow for adequate sports fields and to reduce the deficit of sports fields in the City.
10. Continue to implement the Parks Facilities Development Impact Fee for new residential developments.
11. During the update of the City's development regulations, require the dedication of neighborhood parkland to meet national standards.
12. Establish an impact fee to acquire sufficient land for future community parks appropriately distributed throughout the City.
13. Continue efforts to develop undeveloped or underutilized parks within the City of Frederick.
14. Promote the use of parks to protect natural resources.
15. Establish park development guidelines, to be used in the design and development of parks. The guidelines would address items such as field size, parking, landscaping and other issues.

Policy PR.2: Encourage sustainable design principles in the development and maintenance of parks.

Implementation Strategies

1. Establish a city-wide policy of afforestation within City parkland that complements but does not compete with the needs for active recreation areas.
2. Explore the possibilities of using the City of Frederick's Municipal Forest and Watershed for limited recreational uses. *However, the quality of the Municipal Forest's natural environment should be the City's first responsibility.*
3. Work to protect water quality by protecting streams and stream banks. The park system should provide adequate buffers for streams and wetlands.
4. Work with the Board of Education to develop environmental education and interpretive facilities.
5. Use native plant species and in landscaping, when possible.

Map PR.1: Existing Park Service Areas



Theme: Enhancing Mobility, Accessibility and Connectivity

It shall be the policy of the City to:

Policy PR.3: Enhance access to and through the park system for all categories of users.

Parks and playgrounds for underserved neighborhoods should be a priority

Implementation Strategies

1. Prioritize the development of neighborhood parks for underserved neighborhoods (*See Map PR.1*).
2. Identify and construct critical sections of the Shared Use Path Plan each fiscal year *[See also the Transportation Element, Policy T.7 and associated implementation strategies, and Map T.6.]*
3. Improve access to recreational facilities and expand programs for handicapped/disabled, elderly and other individuals with physical limitations.
4. Work with TransIT to enhance bus connections to all community and regional parks.

Theme: Enhancing the Community

It shall be the policy of the City to:

Policy PR.4: Facilitate public involvement and promote stewardship of Frederick's open space resources.

Implementation Strategies

1. Maximize the joint use of recreational facilities for community purposes.
2. Encourage volunteerism in the maintenance of parks and recreational facilities.
3. Establish an "adopt-a-stream" program to help protect and enhance the stream valley system.
4. Promote the "Friends of the Park" program.

Performing arts events enliven the City's public parks

Policy PR.5: Promote the appreciation of Frederick's historic and cultural heritage in park system planning and design.

Implementation Strategies

1. Incorporate local history and heritage in park elements through signage and public art.
2. Promote performing arts and cultural festivals in park facilities.
3. If significant historic resources exist on proposed park land, incorporate their preservation into park development.

Theme: Supporting a Vibrant Downtown

It shall be the policy of the City to:

Policy PR.6: Promote the integration of the downtown with the open space system.

Implementation Strategies

1. Continue to promote the Carroll Creek linear park corridor as an extension of the downtown.
2. Mitigate adverse impacts of shared use path construction on historically sensitive structures in the downtown.

Theme Interacting with the Region

It shall be the policy of the City to:

Policy PR.7: Collaborate with Frederick County and other agencies to enhance parks and recreational facilities for the City's residents.

Implementation Strategies

1. Continue to work with the Board of Education on issues of mutual concern such as the development of joint use facility agreements to provide for shared use of school facilities for public recreational programs.
2. Establish partnerships with Frederick County, the Frederick County School Board, civic and religious organizations, and the private sector to enhance the variety, quality, and accessibility of recreation programming and facilities available to the City of Frederick residents.
3. Work with Fort Detrick to develop sections of the Shared Use Path Plan adjacent to Fort Detrick.
4. Enhance access to and awareness of recreational opportunities in facilities such as the Gambrill State Park, Utica County Park, and Catoctin Mountain Park.
5. Lobby Frederick County for additional resources to maintain and enhance the City park system.

ENVIRONMENT AND NATUAL RESOURCES ELEMENT

Introduction

The City of Frederick has a considerable diversity of habitat within a relatively small area. Within a short distance, in nearly every direction from the City's center, there are forested lands, streams and a scenic river, open farmland with fence rows, and wooded parcels. The City of Frederick maintains an 8,000-acre Municipal Forest in the mountains to the northwest of the City, primarily to protect the City's mountain water sources. Beyond this forest, Frederick also serves as a gateway for many local and regional environmental resources in the Catoctin Mountain region.

One of the most important natural resources of the City of Frederick is the Monocacy River. The Monocacy River is one of the largest tributaries of the Potomac and its watershed drains about 970 square miles in Carroll, Montgomery, and Frederick counties in Maryland and parts of Pennsylvania. The Monocacy is also the principal water resource in the Frederick region. Most wetlands in the Frederick region are also located along the Monocacy and its tributaries.

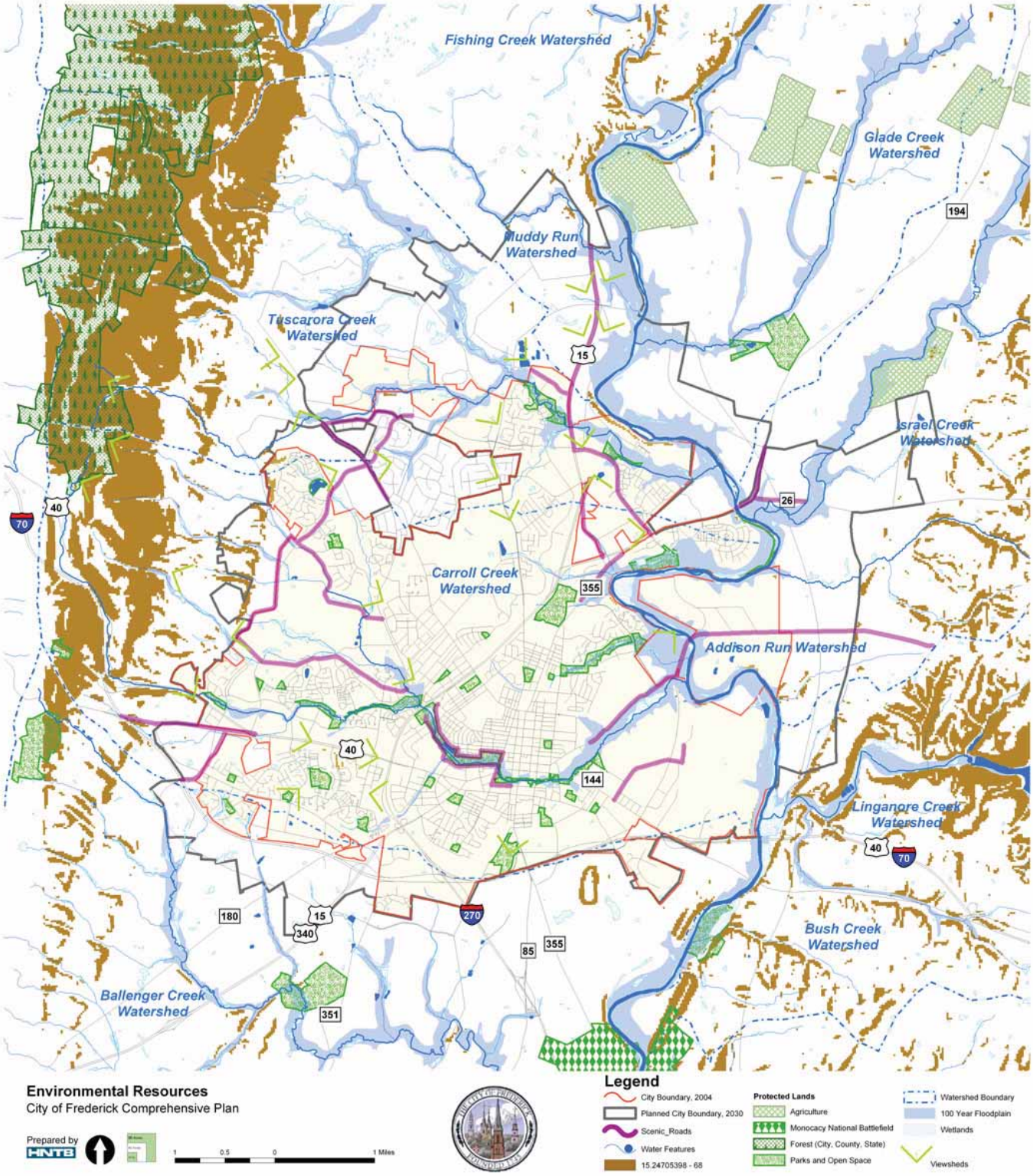
The Challenge Ahead: Issues This Plan Seeks to Address

An important concern for the City of Frederick is to determine the balance between the State of Maryland's already stringent environmental regulations and any additional environmental protection activities the City wishes to undertake. This balance applies to the preservation of forest land, the management of air quality, and the protection of water quality.

For example, Maryland's Planning Act requires jurisdictions to address sensitive areas in their Comprehensive Plans. This element addresses that requirement. Sensitive areas include streams and their buffers; 100-year floodplains; habitats of threatened and endangered species; and steep slopes as well as other areas that the city determines are in need of protection. Map EN.1 depicts sensitive areas in and around the City of Frederick. As the City continues to deal with growth pressures, the protection of its sensitive areas will be a critical challenge. Given Monocacy River watershed's importance to Frederick, and the diversity of sensitive areas it contains, this habitat should receive special consideration.

The municipal annexation described in the Land Use Element will also have a major impact on how the City interacts with its natural surroundings. Development plans for annexation areas should take into consideration the effects that new development will have on surrounding natural resources. The City must decide on the appropriate balance between development and natural resource preservation, and should develop policies to help its citizens and businesses achieve that balance.

Map EN-1: Environmental Resources



Theme Balancing Growth

It shall be the policy of the City to:

Policy EN.1: Protect streams and their buffers.

Implementation Strategies

1. During the update of the City's development regulations, establish setbacks from the Monocacy River and its tributaries, as recommended by the Monocacy Scenic River Commission.
2. Establish the baseline condition of the local streams and consider a plan to improve stream health. The plan should include measures such as the planting of native vegetation, providing stream buffers, and establishing a riparian buffer zone.
3. Consider the protection of historic resources along stream banks, especially archaeological sites, by designating buffer zones that encompass these resources.

Policy EN.2 Work to maintain and improve water quality.

Implementation Strategies

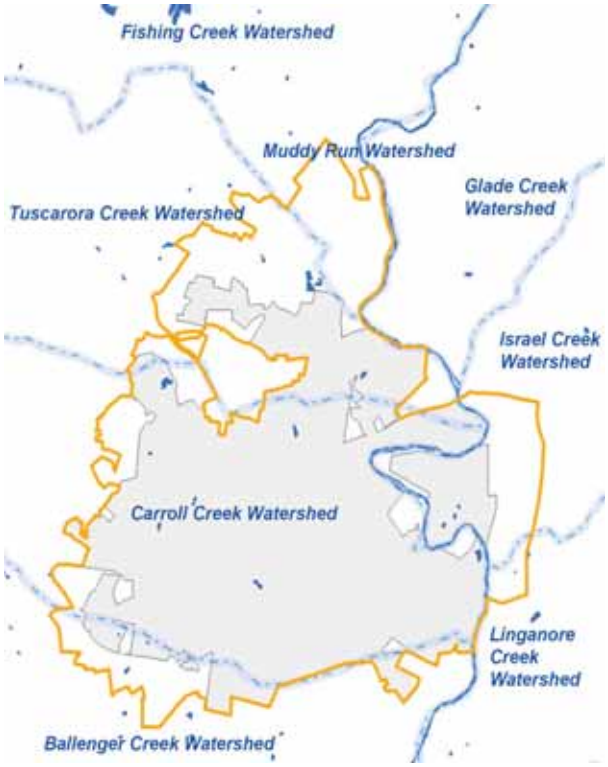
1. Consider using bio-retention ponds within the City of Frederick. A pond located along Carroll Creek at Highland Street could help break down bacteria and absorb excess nutrients from the downtown, and prevent them from entering the Monocacy River.
2. Require the preservation of stream valley corridors as a method of maintaining water quality.

Policy EN.3: Strive to reduce impervious cover and promote best practices of storm water management *(see box on page EN-4).*

Implementation Strategies

1. Allow the use of permeable surfaces for driveways and parking areas in residential and commercial developments.
2. Encourage a greater use of rainwater and gray water to reduce demand for City water.
3. Use stormwater runoff in large developments to water the landscaping.
4. Promote enhancement of wetlands in conjunction with preservation efforts.
5. Create a Stormwater Management (SWM) Master Plan that encourages best management practices that minimize and treat storm water at its source, including such as grass swales, rain gardens and green building techniques. Promote the use of regional and joint SWM facilities in the City of Frederick.
6. During the update of the City's development regulations, investigate opportunities to encourage innovative techniques for stormwater management.

The City of Frederick has seen the impact of high impervious surface during flood events along Carroll Creek



Impervious Surface Coverage

Impervious surface coverage refers to the amount of land covered by materials that cannot be penetrated by water (e.g., rainwater and runoff), especially surfaces such as asphalt and concrete. When any watershed is covered by more than 10 percent imperious surfaces its water quality begins to deteriorate due to increased pollution and erosion from surface runoff. Above 20 percent imperious surface cover, water quality is seriously degraded and aggressive mitigation becomes essential if water quality is to be maintained.

The City of Frederick currently occupies significant portions of two watersheds: Carroll Creek and Tuscarora Creek. Annexation of land to the north of the current City boundaries will add land from the Muddy Run watershed. All three of these watersheds are part of the larger Monocacy River watershed. All three watersheds are approaching or above 10% impervious surface coverage, with the Carroll Creek watershed at an estimated 30% coverage.

Policy EN.4: Reinforce the value of existing wooded areas and implement appropriate measures to protect them.

Implementation Strategies

1. Inventory and map all wooded and afforestation areas.
2. Adopt strong tree preservation standards that protect existing wooded areas and require sensitive development practices.
3. Establish forest conservation receiving areas.
4. Consider the protection of woodlands as a means of protecting archaeological resources, by setting the boundaries of conservation areas to encompass the entire archaeological resource.

Policy EN.5: Promote tree planting.

Implementation Strategies

1. Establish a citywide afforestation policy.
2. Establish guidelines for linear park plantings in conjunction with forest conservation.
3. Establish receiving areas for afforestation.
4. Establish standards on how afforestation should be conducted in parkland dedicated to the City.
5. Promote the street tree program within the City.
6. *[See also the Land Use Element, Policy LU.11 and associated implementation strategies.*]

An afforestation policy can help to maintain the City's "green" image

Best management practices can help to prevent erosion along streams

Policy EN.6: Promote erosion and sediment control.

Implementation Strategies

1. Evaluate and upgrade the City's standards regarding erosion, and sediment control.
2. Develop standards to implement best management practices along streams to encourage natural buffer areas and reduce the need for grass cutting near streams.
3. Evaluate City streams for evidence of erosion and develop appropriate restoration efforts.

Policy EN.7: Preserve steep slopes.

Implementation Strategies

1. Encourage development to fit into the natural landscape. Discourage cut-and-fill practices requiring excessive excavation and retention.
2. Require developments to submit a slope analysis to clearly depict where steep slopes will be disturbed. Adopt standards for appropriate remediation techniques.
3. Plant steep slopes with trees and plant materials to reduce soil erosion and flooding.

Policy EN.8: Streamline environmental regulations.

Implementation Strategies

1. Merge environmental regulations from the Zoning, Subdivision, Storm Water Management, Floodplain, and Forest Conservation Ordinances into an Environmental Section of the City's development regulations.
2. Establish standards or incentives that permit the dedication of floodplains as a linear park system.
3. As part of the update to the City's development regulations, establish protective standards for nuisances, such as noise.
4. As part of the update to the City's development regulations, increase the amount of dedicated recreation land that is outside the floodplain.
5. As part of the update to the City's development regulations, establish buffer standards for isolated wetlands.

Policy EN.9: Protect rare, threatened and endangered species.

Implementation Strategies

1. Protect habitats of threatened and endangered species, following both state and federal species lists and guidelines.
2. Continue to work with the Maryland State Department of Natural Resources and federal agencies under the Endangered Species Act.
3. Consider the protection of habitats as a means of preserving archaeological resources, by designating protective boundaries to encompass the entire archaeological resource.

Theme: Enhancing Mobility, Accessibility and Connectivity

It shall be the policy of the City to:

Policy EN.10: Enhance access to and through scenic environmental corridors.

Implementation Strategies

1. Implement the Shared Use Path Plan and develop a list of priority links and segments. *[See also the Transportation Element, Policy T.7, the Parks and Recreation Element, Policy PR.3 and associated implementation strategies.]*
2. Identify and preserve habitat corridors.
3. Continue to preserve stream valley corridors and provide access to them via low impact pathways.
4. Promote the City's publicly-accessible stream valleys as an outdoor classroom for learning and student environmental projects.

Theme: Enhancing the Community

It shall be the policy of the City to:

Policy EN.11: Promote environmental education and sustainable design practices.

Implementation Strategies

1. Educate the public on the City's natural resources and the importance of these resources as they relate to the region and the state.
2. Collaborate with the Board of Education and other groups to establish environmental interpretation programs.

Theme: Supporting a Vibrant Downtown

It shall be the policy of the City to:

Policy EN.12: Enhance environmental quality of the downtown.

Implementation Strategies

1. Promote the Carroll Creek linear park corridor as an extension of downtown.
2. Encourage green building techniques in the downtown.

Carroll Creek linear park can become a focal point for downtown, and for the city as a whole

Theme: Interacting with the Region

It shall be the policy of the City to:

Monitoring can help keep tabs on the condition of sensitive streams, such as Tuscarora, Carroll, and Rock Creeks.

Source: Maryland Department of Natural Resources

Policy EN.13: Partner with Frederick County and the State of Maryland and others to address regional environmental issues.

Implementation Strategies

1. Work with Frederick County to promote composting and recycling, including areas that are not presently served by the recycling program.
2. Establish long-term stream-monitoring stations to evaluate the Tuscarora, Carroll and Rock creeks with assistance from Frederick County, the Maryland State Department of Natural Resources, the Chesapeake Bay Foundation, and others.
3. Establish a public education campaign to reduce the tonnage of waste taken to the County landfill.
4. Work with the State on linkages to the state's regional bike network.
5. Continue to work with the County and State to expand the stream valley park system to promote pedestrian access, improve water quality and improve wildlife habitats.

PLAN IMPLEMENTATION

Introduction

The recommendations and implementation strategies identified in the proceeding Comprehensive Plan Elements provide the basis for this Implementation Element. The Plan Implementation framework that follows this introduction provides a summary listing of the Comprehensive Plan's implementation and streamlining provisions. The priority of each of these items is identified. Three levels of priority are set. The first is Priority 1: those items for which implementation is recommended in the short-term—by the end of calendar year 2005. The next is Priority 2: those items that should be implemented in the mid-term—by the end of calendar year 2008. The next is Priority 3: those items to be implemented in the long term—after 2008. OG indicates tasks that are ongoing, and have no distinct completion date. The Planning Commission should review this priority list annually.

The Implementation Element also identifies the City agency or agencies that will be responsible for implementation. State or other agencies are also identified as appropriate.

Following abbreviations are used under the "Responsibility" column of this chapter:

BDG Budget

CD Community Development

CS Citizens Services

DPW Department of Public Works

ED Economic Development

ENG Engineering

FCPS Frederick County Public Schools

FIN Finance

M&B Mayor and Board of Aldermen

PL Planning

POL Police

REC Recreation

WATER NOW Water NOW Team

Policy and Implementation Strategy		Priority	Responsibility
Policy LU.1:	*Use the Comprehensive Plan text and maps to guide development decisions, assess land use development proposals, and to promote public health, safety and welfare.*		
1.	The Comprehensive Plan contains detailed recommendations for development and preservation, including the appropriate location for various types of development, the general character of roads, and the extent of public water and sanitary sewer utilities. The text of the Plan is supplemented by a number of key maps that provide the foundation of the Comprehensive Plan. The key maps include the Comprehensive Plan Map, which designates future land use and overall policy direction; the roadway transportation maps including roadway classification, roadway congestion, planned number of lanes, and transit map in the Transportation Element; and the sewer and water service phasing map in the Community Facilities Element. These maps should be used in conjunction with one another as well as the text and other maps of this Comprehensive Plan.	1	PL
2.	Use Table LU.2: Future Land Use Classification and Table LU.3: Overlay Zones in concert with other plan text and maps to review and assess the suitability of development proposals, including zoning and site plan proposals and public development actions.	1	PL
3.	Revise the City's zoning ordinance and maps to be in conformance with the recommendations of this Comprehensive Plan.	1	PL
4.	As supplemental guidance to the Comprehensive Plan, develop and adopt small area plans with input from local residents and business owners. These plans should include a focus on enhancing community identity through urban design as well as recommended land use or redevelopment changes.	1	PL
Policy LU.2:	*Phase the annexation of the unincorporated areas shown as potential annexation areas on the Comprehensive Plan Map with the availability of adequate transportation, sanitary sewer, and water services.*		
1.	Annex the area to the east of the City as shown on the Comprehensive Plan Map.	3	PL
2.	Annex of the area to southwest of the City as show on the Comprehensive Plan Map should only occur if the new arterial connector road between Mt. Phillip Road and Crestwood Road is programmed and constructed.	3	PL
3.	An annexation report must be completed for each annexation	1	PL
4.	Annexations and associated rezonings must be consistent with the recommendations of this Comprehensive Plan.	1	PL
5.	Require all properties located outside of the City, but contiguous to the City's boundary, to annex prior to provision of City sanitary sewer or water service. In no case should the City annex property that cannot or will not be served by City services including sanitary sewer and water service.	1	PL
Policy LU.3:	*Encourage mixed use developments, a range of housing types throughout the City and a balance of residential and non-residential growth.*		
1.	Discourage additional low-density residential development characterized by wide streets, large lots, and deep setbacks.	1	PL
2.	Maintain the jobs-rich nature of the City's economy at an approximate ratio of two jobs for every household.	1	ED
3.	Continue to monitor and track development approvals.	1	PL
4.	Encourage integration of special residential uses, licensed group homes, and foster care facilities into residential areas.	1	PL
5.	Amend the development regulations to permit home-based occupations in appropriate zoning districts to provide local services and employment opportunities.	1	PL
6.	The area north of MD 26 on either side on MD 194 should be studied as a possible location for future annexation.	3	PL
Policy LU.4:	*Balance the distribution and timing of future population and job growth in relation to the availability of existing and future infrastructure.*		
1.	As part of the implementation of this Comprehensive Plan, propose an Adequate Public Facilities Ordinance (APFO) to phase development with the availability and adequacy of existing and future infrastructure.	2	PL
2.	Study additional impact fees or excise taxes to pay for growth-related infrastructure and capital improvements including transportation, sanitary sewer and water and parks.	1	PL

Policy LU.5:	*Guide and regulate development in an efficient and streamlined manner through a process and regulations that are user-friendly and predictable.*		
1.	"User-friendly" means that the ordinance is organized logically, information is consolidated into matrices where appropriate, and that drafting conforms to best practices for technical writing.	1	PL
2.	During the update of the City's development regulations, address the differences in building height requirement of the Historic District Commission (HDC), Carroll Creek District, and the Zoning Ordinance, as well as other discrepancies that may exist.	1	PL
3.	During the update to the City's development regulations, update bulk and massing requirements, such as floor area ratios, and consider establishing impervious surface ratios for both residential and non-residential uses.	1	PL
4.	During the update to the City's development regulations, revise the parking standards including off-site parking regulations.	1	PL
5.	During the update to the City's development regulations, include trip generation standards.	1	PL
6.	During the update to the City's development regulations, update use regulations with regard to types of uses, separation standards, and permitted districts.	1	PL
7.	During the update to the City's development regulations, provide a revised approach to City permitting of institutional uses. Options could include an institutional Euclidean zoning district, floating zone, or supplemental use regulation for institutional uses or other approaches that are consistent with the emerging law pertaining to zoning of institutional uses such as churches.	1	PL
8.	During the update to the City's development regulations, include requirements for protecting or preserving historic resources	1	PL
9.	Update the special exceptions standards by adding criteria for uses requiring special exception review, deleting special exception review where administrative staff review is appropriate, and adding new special exception uses where needed.	1	PL
10.	Establish protocols for effective inter-departmental communication throughout the regulatory process.	1	PL
Policy LU.6:	*Employ innovative performance standards as the criteria for site planning and/or subdivision plats.*		
1.	As part of the update of the City's development regulations, incorporate Performance Standards. These should include standards for various uses and the associated auto trips and roadway level of service, landscaping and buffering, and for protection of critical environmental habitats.	1	PL
Policy LU.7:	*Continue to improve Frederick Municipal Airport and ensure its long-term viability.*		
1.	Acquire land required by the Airport Master Plan, as amended, for the airport's long-term viability.	1	PL
2.	As part of the update of the City's development regulations, create an airport overlay district for areas surrounding the airport to ensure compatibility with the future development of the airport as designated in the Airport Master Plan.	1	PL
3.	Ensure the documentation or preservation of significant historic resources that may be in the path of proposed airport development (specifically the Rosenstock site).	1	PL
4.	Prohibit "through the fence" operations at the airport, to allow better control of the property boundaries, maintain economic viability, and provide a secure environment for users.	1	PL
5.	Update the Airport Master Plan.	1	PL
Policy LU.8:	*Preserve arterial corridor capacity and improve the safety and appearance of major roadway corridors within the City.*		
1.	As part of the update of the City's development regulations, develop a Corridor Overlay along US 40 (the "Golden Mile")—with possible applicability to other arterial corridors—which addresses connectivity (e.g., cross access easements, inter-parcel access), traffic capacity issues, and aesthetics.	1	PL
2.	Implement sign and architectural controls along US 15 and I-70 to improve the visual image from these major routes through Frederick.	1	PL
3.	Work with the State Highway Administration to develop safety design standards for intersections that will also prevent mid-block crossing on state roads.	2	PL

4.	As part of the update of the City's development regulations, revise the standard details for arterials to create a more inviting appearance.	1	PL
5.	Support the Catoctin Mountain Scenic Byway Study.	1	PL
Policy LU.9:	*Develop land use patterns that minimize the number of auto trips and that are transit supportive.*		
1.	As part of the update to the City's development regulations, incorporate guidelines or regulations, including those that conform to the principles of Transit Oriented Development (TOD), to encourage development that facilitates pedestrian, transit and non-automobile-oriented modes of travel	1	PL
2.	As part of the update to the City's development regulations, implement development standards for employment, residential, and mixed use areas so that they can be served by existing or future transit service.	1	PL
3.	Facilitate the development of communities that mix residential, institutional, commercial and office uses to provide convenience, increase opportunities for walking and transit service, and reduce the number and length of automobile trips. The non-residential uses in these communities should be compatible in design and scale with surrounding neighborhood development.	1	PL
4.	Implement interconnections between neighborhoods, including more street grids and non-motorized pathways.	1	PL
5.	Promote transit-oriented development around the existing MARC train station on East Street.	1	PL
6.	Develop regulatory incentives for mixed use development that encourage the planned, coordinated development of mixed land uses on adjacent properties.	1	PL
Policy LU.10:	*Increase accessibility to land use and development information for citizens, businesses, and developers.*		
1.	Implement a query function on the City's website that will enable the public to research property and permit information including all properties within the City.	2	IT
2.	Augment the City's current public notice system for zoning and other proposed land use actions, through expanded use of the City's website and other measures.	1	PL
Policy LU.11:	*Promote a high quality built environment.*		
1.	As part of the update to the City's development regulations, include regulations that recognize the existence of distinctly "downtown" districts, as well as more suburban districts of the City.	1	PL
2.	In newly developing or redeveloping existing communities, encourage the use of unifying themes, town squares, parks, cultural resources, and public open space to help create community identity.	1	PL
3.	Provide economic incentives for the adaptive reuse of historic structures or sites in new development.	2	PL
4.	As part of the update to the City's development regulations, assess street tree requirements to determine the best way to maintain a tree-lined urban fabric, while accounting for the potential conflict between tree roots and underground utilities.	1	PL
5.	Minimize the exposure of residential uses to highway noise particularly along US 15 and I-70.	1	PL
6.	As part of the update to the City's development regulations, implement zoning regulations and standards consistent with the historic district that create a sense of place along the Carroll Creek corridor and implement the recommendations of the Carroll Creek Park Design Development Standards report. Consider an overlay zone to enhance the appearance of the built environment along Carroll Creek.	1	PL
7.	Encourage the installation and integration of public art in existing neighborhoods and new development.	OG	PL
8.	As part of the update to the City's development regulations, incorporate urban design guidelines.	1	PL
9.	Encourage the installation and integration of public art in existing neighborhoods and new development.	OG	PL
Policy LU.12:	*Preserve and enhance the quality of life in existing neighborhoods.*		
1.	Reinforce existing residential neighborhoods.		
2.	Reinforce existing neighborhood commercial areas and activity centers.	OG	ED
3.	Continue promoting public safety through community partnerships.	OG	POL
4.	Support community-based organizations to guide neighborhood revitalization efforts.	OG	CS

5.	Explore ways to retrofit certain existing neighborhoods with traditional neighborhood design aspects to enhance walkability.	2	PL
6.	Promote the restoration and rehabilitation of historic residential structures to conserve the City's housing stock and historic fabric.	OG	PL
7.	Educate property owners of historically significant buildings or sites about applying for and utilizing state and federal assistance program.	OG	PL
8.	Review and revise the buffers and transition areas between business and residential uses to address potential conflicts between adjacent uses within the City's established and diverse mixed use areas.	1	PL
9.	Investigate a rental housing maintenance inspection program to ascertain whether or not housing, building, electrical and plumbing codes are being met.	2	PL
Policy LU.13:	*Promote the development of safe, healthy and attractive new neighborhoods.*		
1.	Connect new development to new and existing park and recreation facilities.	1	PL
2.	Support the linkages recommended in the 2002 Shared Used Path Plan.	OG	PL
3.	Promote land use diversity and encourage the development of neighborhood-serving retail that is accessible (via roads and sidewalks) to all areas of the surrounding neighborhood (see box).	1	PL
4.	Consider providing incentives that encourage developers to achieve high-quality design and energy efficiency in new developments.	1	PL
5.	Consider Planned Neighborhood Developments (PNDs) to achieve better design and clustering in new developments while addressing uses, scale, and land use compatibility.	1	PL
6.	Integrate existing significant historic and natural resources into development plans.	1	PL
7.	Promote an integrated balance of ownership, rental and public housing.	1	PL
8.	Provide a mix of housing styles and densities within neighborhoods and new developments.	1	PL
9.	As part of the update to the development regulations, considering giving the Planning Director the ability to grant variances for certain health and safety issues (such as handicapped ramps) that only impact a small percentage of the required setback. As part of this strategy, define that threshold percentage.	1	PL
Policy LU.14:	*Encourage revitalization of the City's neighborhoods and commercial corridors.*		
1.	Use the North Market, East End and West Patrick Street Legacy Plans to guide revitalization of these neighborhoods.	OG	ED
2.	As part of the update of the City's land development regulations, include provisions to require that new development within older residential areas reflects the existing neighborhood character in terms of bulk, size, design, and height.	1	PL
3.	Develop a systematic neighborhood planning strategy to prepare small area plans for all parts of the City.	2	PL
Policy LU.15:	*Identify, document, designate, and protect significant historic resources, including archaeological resources..*		
1.	Continue to develop the City of Frederick Inventory of Historic Properties, and use it to identify and protect historic sites and districts during the development review process and as part of the annexation process.	OG	PL
2.	Increase the public's awareness of the City's cultural and historical resources and of the programs for the rehabilitation of historic structures and the protection of archaeological sites.	OG	PL
3.	During the update of the City's development regulations, incorporate design standards from the Frederick Town Historic District Design Guidelines that are ministerial in nature into the zoning regulations for the Historic District Overlay Zone.	1	PL
4.	Facilitate the adaptive re-use of historic structures (e.g., residential units above commercial establishments).	OG	PL/ED
5.	As part of the update to the City's development regulations, adopt guidelines for archaeological surveys as part of the development review process to assess the effects of development on historic structures and archaeological sites.	1	PL
6.	As part of the development review process, assess the affect of development on historic structures and archeological sites.	1	PL

7.	Develop a GIS layer that documents historic resources for use by all City departments and the public via the City's website. This information will not include the location of archaeological sites, which is protected information.	2	PL
8.	Initiate a public education program to explain the cultural and economic value of historic resources and provide property owners with rehabilitation strategies.	OG	PL
9.	Develop funding programs for structural rehabilitation work for low-income owners of historic properties.	OG	PL
10.	Use the *Frederick City Architectural Survey*, historic context studies, and other resources to be developed, to assess the impact of proposed development on significant historic resources.		
Policy LU.16:	*Enhance community identity and visual character through improved City gateways.*		
1.	The Comprehensive Plan map identifies key City gateways. These gateways are located in highly visible areas along the primary routes leading into the City including: US 40, US 15, MD 26, East Street, East Patrick Street, Jefferson Street, West Patrick Street, South Street, Bentz Street, North Market St (extended), and Rosemont Avenue.	1	PL
2.	Establish a typology of gateways. East Street should be declared as the priority gateway to be used as a model for the development of other gateways.	1	PL
3.	Adopt a gateway overlay district to guide and regulate the visual appearance of major gateways/entrances to the City.	1	PL
4.	Implement City gateway features (landscaping and signage) at major City entrance to define City boundaries and project a high quality image.	1	PL
Policy LU.17:	*Preserve critical viewsheds of historic City spires and views to the countryside.*		
1.	Billboards are not permitted in the City of Frederick. Establish a mechanism to phase out the existing billboards within the City in an effort to reduce visual clutter.	2	PL
2.	Implement design guidelines that encourage the consideration of viewshed issues, including whether a new or redeveloped building will block views of the rural countryside or the City's historic downtown spires, or along major road and non-motorized corridors.	2	PL
Policy LU.18:	*Ensure that Citywide development patterns support the health and vitality of Downtown Frederick.*		
1.	Expand the look and feel of downtown to the east along North East Street.	2	PL
2.	Explore relocation of the current downtown Post Office and distribution center, and the redevelopment of this site as mixed use, to enhance the commercial viability of the downtown. A full service Post Office, without a distribution facility, should remain part of the downtown.	3	ED
3.	As part of the update to the City's development regulations, develop standards for home occupations in the downtown without going through the BZA hearing process.	1	PL
4.	Encourage high residential density in the downtown area along Carroll Creek and the East Street corridor to enhance the downtown as a place for residents *and* as a visitor destination.	1	PL
Policy LU.19:	*Reinforce Downtown as a center of government, commerce and the arts.*		
1.	Encourage core government services to stay in downtown, recognizing the City's role as the County Seat.	OG	PL/ED
2.	Implement the recommendations of the 2003 Downtown Parking Study.	2	DPW
3.	Preserve residential land uses at the fairgrounds except in the eastern quarter of the fairground, which should be rezoned for institutional and/or mixed uses such as offices, hotels, and a conference center.	3	PL
4.	Implement the recommendations of the 2003 *Market Analysis and Retail Strategy for Downtown Frederick, MD.*	2	ED
5.	Encourage higher education opportunities in the downtown.	OG	ED
6.	Continue to work with the Downtown Frederick Partnership to preserve cultural resources and promote downtown Frederick as an Arts and Entertainment District.	OG	ED
7.	Continue to work with the Downtown Frederick Partnership to strengthen the economic potential of downtown Frederick as a Main Street Community.	OG	ED

Policy LU.20:	*Reinforce the historic character of downtown Frederick.*		
1.	Continue to document—through photographs and written materials—the properties in the Frederick Town Historic District.	OG	PL
2.	Consider expanding the Frederick Town Historic District to encompass the boundaries of the National Register of Historic Places "Frederick Historic District." Alternatively, designate portions of the Frederick Historic District as separate, smaller districts.	3	PL
3.	Establish height limits on downtown buildings to preserve views of the historic spires as well as views to the mountains.	1	PL
4.	Extend the downtown street grid system to the fairgrounds and areas east of North East Street.	2	PL
5.	Expand the alley system in downtown.	OG	PL/ENG
6.	Promote the use of tax incentives and credits for building rehabilitation in the downtown historic district.	OG	PL
7.	Assist low-income residents in finding funding for the rehabilitation of buildings in the historic district.	OG	CD
Policy LU.21:	*Seek a relationship with Frederick County and surrounding jurisdictions that reinforces the City of Frederick's role as a regional center and supports the common goals of the City and surrounding communities.*		
1.	Update the 1988 City-County annexation policy to reflect the recommendations of this Comprehensive Plan.	2	PL
2.	Work with the County to re-consider the recommendations in the Frederick Region Plan to be compatible with the City of Frederick's Comprehensive Plan regarding annexation and future land use.	1	PL
3.	Examine alternative strategies to limit or delay City development in areas where schools are overcrowded.	1	PL
4.	Coordinate with the Frederick County to protect and promote agricultural preservation and rural landscapes in areas outside the City of Frederick's future annexation areas.	2	PL
5.	Support efforts to co-locate community facilities adjacent to existing and future school sites.	OG	PL
6.	Establish a collaborative City/County population, housing unit, and employment forecasting process and forecasts to be used for infrastructure planning, including schools in the Frederick Region.	2	PL
7.	Support the Civil War Heritage Area Plan to enhance tourism in Washington, Frederick and Carroll counties through the State's Heritage Area program.	1	PL
8.	Work with the Monocacy Scenic River Commission to protect the Monocacy River and its tributaries.	OG	PL
Policy T.1:	*Use the future transportation system maps (Map T.1: Roadway Classification Map; Map T.2: Roadway Lanes; Map T.3 and T.4: 2030 Volume to Capacity Maps; Map T.5: Recommended Cross-Access Connections; Map T.6: Shared Paths Plan; Map T.7: Pedestrian Safety Problem Areas; Map T.8: Constrained Roads; Map T-9 Alleys; and Map T.10: Transit Map) in conjunction with Tables T.1 and T.2, the Comprehensive Plan text and the Comprehensive Plan Map to coordinate the phasing of development with roadway capacity and investments.*		
1.	As part of the implementation of this Comprehensive Plan, propose an Adequate Public Facilities Ordinance for roads to phase development with the availability and adequacy of existing and future City roadways.	1	PL
2.	Level of Service (LOS) should be set at a minimum of C for City roadway links. Procedures for the determination of exception areas should be included in the standards. A lower level LOS standard may be permitted for the following reasons: (a) application of the standard to a specific roadway would be in conflict with other recommendations of this Plan (including the protection and enhancement of historic, environmental or cultural resources) or (b) capacity improvements are budgeted for construction within two years or the developer has made a contractual commitment to make the improvement via a mitigation plan or other regional improvements. Phasing of development within specific timeframes may be acceptable.	1	PL
3.	Coordinate the timing and implementation of transportation improvements with other infrastructure improvements.	2	PL/ENG/FIN
4.	Establish a mechanism through the capital budget process including a monitoring report that coordinates and integrates development, road building and fiscal impacts.	2	FIN
5.	Update of the City's development regulations to ensure consistency with the Comprehensive Plan's transportation maps and text to implement the functional classification road network and right-of-way widths.	1	PL

Policy T.2:	*Maintain an appropriate balance between public and private sector responsibilities for road investments and improvements.*		
1.	Identify and earmark a City revenue stream for transportation improvements.	2	PL/ENG
2.	Maintain an aggressive but financially responsible capital budget for future transportation improvements.	2	PL/FIN
3.	Establish a mechanism through the capital budget process including a monitoring report that coordinates and integrates development, road building and fiscal impacts.	2	PL/FIN
4.	Require all new development to pay their designated fair share toward the cost of mitigating their impact on transportation facilities. Mitigation measures need to conform to the Comprehensive Plan.	1	PL
5.	Establish a formal system to define how developers will participate in the financing of transportation infrastructure. Study and implement transportation impact fees for new or improved transportation facilities or to increase roadway or intersection capacity that is made necessary by new development. Assess facilities within the impact area of the development site including both on and off-site impacts of the development.	1	PL
6.	Enforce standards for and require traffic impact studies for all developments that will significantly increase the peak hour traffic on the roadway system or create safety deficiencies (such as turning movements, driveway location, etc). These studies will determine the magnitude of roadway improvements required to accommodate the traffic generated by the proposed development. They will provide the necessary information for City staff and elected and appointed officials to make more informed decisions about what transportation improvements—both on and off-site—are needed as a result of new development proposals.	1	PL
7.	Consider implementing an "adopt-a-road" program to encourage volunteers to perform litter removal on City roads.	2	DPW
Policy T.3:	*Preserve and enhance roadway capacity on local, collector and arterial routes that serve the City of Frederick for local access and mobility while working with the State to improve capacity via interstates and limited access highways for regional through travel.*		
	See implementation strategies under Policy T.17		
Policy T.4:	*Ensure that design and capacity standards for roadways are appropriately related to roadway function and classification.*		
1.	As part of the update to the City's development regulations, review and update existing standards for different types of roadways and bicycle and pedestrian facilities.	1	PL
2.	As part of the update to the City's development regulations, amend design and capacity standards to ensure a proper relationship for function and classification.	1	PL
3.	Based on the impact of the proposed development, require dedication or reservation of needed right-of-way during the preliminary subdivision, final subdivision and/or site plan approval process.	1	PL
4.	Single-family residential units shall have access from the lowest classified roadway available.	1	PL
Policy T.5:	*Plan for and implement a City roadway network with multiple connections between routes and uses.*		
1.	Provide connections to several surrounding roadways within developments.	1	PL
2.	Review the internal circulation pattern for streets within a development to ensure adequate linkages between major activity areas within and abutting the development.	1	PL
3.	Based on the impact of the proposed development, require connections and internal cross-access easements between retail/commercial developments and/or consolidated driveways to minimize traffic on arterial or collector roadways.	1	PL
4.	Based on the impact of the proposed development, require dedication of future right-of-way for planned links of roadways, to ensure interconnectivity between adjacent subdivisions.	1	PL
5.	Develop access management regulations.	1	PL
6.	During the update of the City's development regulations, include standards for street connectivity between contiguous residential developments	1	PL

Policy T.6:	*Promote alternatives to the single-occupant vehicle.*		
1.	Actively work with the State of Maryland to increase the number of MARC trains serving the City with the ultimate goal of expanding service to accommodate "reverse" commuters traveling from Montgomery County and the Washington DC area to Frederick in the morning and returning south in the evening. Also promote the advent of weekend service.	3	ED/PL
2.	Partner with TransIT to enhance bus operations in the City of Frederick including the *downtown express*.	1	PL
3.	Study incentives to encourage car and vanpool programs.	2	ED/PL
4.	Encourage large employers to implement transportation demand management measures such as telecommuting and staggered work hours.	2	ED
5.	Promote park and ride lots in areas of the City near interstates, limited access roadways and divided highways.	1	PIO
6.	As part of the development review process encourage pedestrian- and bicycle-friendly mixed-use development	OG	PL
Policy T.7:	*Promote bicycle and pedestrian mobility in the City of Frederick.*		
1.	Implement the Shared Use Path Plan. Make the segment that is planned under US 15 at Schifferstadt that would connect the downtown with the Golden Mile a priority.	2	ENG
2.	Improve the safety of pedestrian and bicycle travel through revised roadway design standards that accommodate all modes of transportation, reduce travel speeds on local and collector roads and/or employ traffic calming measures.	2	ENG
3.	Promote the integration of alternative modes of transportation within office and residential parking areas, such as transit stops, additional sidewalks, and bicycle parking.	OG	PL/ENG
4.	Develop a bicycle plan and network map for the City of Frederick for on-road routes.	2	PL
5.	Develop a comprehensive signage system for the bikeway network.	2	PL
6.	During the update of the City's development regulations, provide a bicycle parking standards within the parking chart.	1	PL
7.	Identify and improve pedestrian safety "problem areas" throughout the Downtown.	OG	PL/ENG/DPW
Policy T.8:	*Strive to maximize safety and efficiency through roadway improvements and design.*		
1.	Monitor the incidence of crashes/accidents annually as one indicator of where safety improvements may be needed.	OG	POL
2.	Identify transportation system management improvements that could be implemented quickly to include low-cost projects such as improved signal timing and/or phasing, signage and marking, minor widening, channelization and turn restrictions.	2	ENG
3.	Minimize on-site/off-site traffic circulation conflicts by providing efficient and safe vehicular movement between public access points and all other destinations within a site, such as parking spaces, package pickup locations, service stations, drive-through lanes, and passenger pickup areas.	OG	PL
4.	Provide safe and efficient vehicular circulation that is compatible with pedestrian bicycle facilities and flow.	OG	PL
5.	Establish parking lot and structure design guidelines that promote efficiency of the paved area, promote the integration of landscaping, facilitate safe and convenient movement of pedestrians through the parking lots, and adequately address handicapped (accessible) parking.	1	PL
6.	Except for historic road names, ensure that segments of the same road have the same name to make navigation easier.	2	PL
7.	Add pedestrian signals and controls to intersections throughout the downtown.	OG	ENG/DPW
Policy T.9:	*Encourage development that meets Transit-Oriented Design (TOD) standards.*		
1.	Develop a set of TOD design and development guidelines, and distribute those guidelines to developers, planners, and development review staff.	1	PL
2.	Educate City and County planning staff on procedures to review site development plans for transit accessibility	OG	PL
3.	As part of the update of the City's development regulations, include TOD guidelines.	1	PL

4.	Focus initial TOD efforts on the Golden and East Patrick Street from I-70 to Franklin Street.	2	PL
5.	As transit service increases, develop a list of additional TOD locations throughout the City.	2	PL/ENG
Policy T.10:	*Implement parking standards that adequately serve specific uses balanced with a desire to reduce unnecessary impervious surface cover and reduced development costs.*		
1.	As part of the update to the City's development regulations, reconsider the City's parking ratios/standards. In addition, consider reduced parking standards for adaptive reuse projects outside of downtown (where parking regulations are already lower than in other parts of the City) and in future transit-oriented developments.	1	PL
2.	In the event that reduced parking standards are adopted, assess the need for an extended neighborhood parking permit program.	2	DPW/PL
3.	As part of the update to the City's development regulations, incorporate provisions for expanded shared parking agreements and facilities.	1	PL
4.	As part of the update to the City's development regulations, include standards for the use of pervious paving in parking lots.	1	PL
5.	Require that parking areas, associated aisles, and other interior throughways be screened from the street with berms, walls, and/or landscaping.	1	PL
Policy T.11:	*Direct the flow of truck traffic to those facilities that are most suitable and away from other routes and areas where through truck traffic is incompatible with adjacent land uses or that may cause safety issues.*		
1. a. b. c.	Develop a system of truck routes with the following goals: Reduce South Street truck traffic. Reduce alleyway truck traffic in the downtown. Restrict delivery time for key City arterials.	2	ENG/PL
2.	Designated truck routes should be arterials with connections to collectors for local access for deliveries.	1	PL
3.	The truck route system should be established by 2006 or prior to the opening of East Street Extension (whichever comes first).	2	ENG/PL
Policy T.12:	*Support the improvement of the Frederick Municipal Airport and ensure its long-term viability.*		
1.	Implement the extension of the of the airport's main runway to 6,000 feet.	1	PL
2.	Improve access to the developable lands around the airport to enhance their attractiveness for economic development and maintaining the safety and continuation of airport functions. Provide access from the east via a new roadway that connects Bowman's Farm and Linganore Roads, and will eventually tie into the new North-South Parallel Road interchange at I-70.	3	PL
3.	Update the Airport Master Plan.	2	PL
4.	Develop the east side of the airport in accordance with the approved Airport Layout Plan.	2	PL
5.	Adhere to the FAA and Homeland Security recommendations with respects to air protection zones (specifically the Washington, DC Metropolitan Area Air Defense Identification Zone [ADIZ] and prohibited air space around Camp David).	OG	PL
6.	Develop the Bailes Lane area in accordance with the Bailes Lane Re-Use Plan. This plan provides enhanced potential for long-term development of the airport, minimizes potential land use conflict in adjacent development, and has moderate costs for the overall plan.	2	PL
Policy T.13:	*Ensure that road improvements minimize adverse impacts in adjacent areas and environs.*		
1.	Identify resources that lie in the potential paths of new and expanded roads.	2	PL
2.	Modify the design of new and expanded roads to protect historic resources and their settings.	2	ENG
3.	Implement mitigation strategies if cultural or historic resources will be irreparably impacted by new or existing road construction.	2	PL/ENG
4.	Retain constrained roads included in Table T.4 and identified in Map T.8 in their current configuration. Do not widen them, due to the constraints placed on these roads by historic development patterns.	OG	PL
5.	Consider implementing traffic calming devices throughout the City.	OG	ENG/PL

Policy T.14:	*Ensure that roadway location and design considers the impact on historic resources.*		
1.	Identify resources that lie in the potential paths of new and expanded roads.	OG	PL
2.	Modify the design of new and expanded roads to protect historic resources and their settings.	2	ENG
3.	Be prepared to implement mitigation strategies if cultural or historic resources will be irreparably impacted by new or existing road construction	OG	ENG/PL
Policy T.15:	*Preserve and enhance the historic street grid system.*		
1.	Maintain historic street names.	OG	PL
2.	Preserve and expand the downtown alley system as a secondary means for access, to provide for service delivery and pick-up and to provide an alternative to on-street parking.	OG	PL/ENG
3.	As part of the update of the City's development regulations, develop design standards for new alleyways.	1	PL
4.	Continue the downtown street grid system to East Church Street/Gas House Pike and at the Fairgrounds, if sold and redeveloped.	2	PL/ENG
Policy T.16:	*Promote multi-modal transportation options in the downtown.*		
1.	Continue to work to implement the recommendations of the 2003 Downtown Parking Study, including the alleyways in the downtown for off-street parking.	OG	DPW
2.	Continue to implement the 2002 Shared Use Path Plan and the Carroll Creek Master Plan.	OG	ENG/DPW
3.	Promote the development of a complete Multimodal Center at the MARC Station.	OG	PL/ED
Policy T.17:	*Work cooperatively with Frederick County, the State of Maryland, Fort Detrick and the Town of Walkersville to promote coordinated regional transportation planning and programming.*		
1.	In conjunction with Frederick County, strongly and actively pursue the North-South Parallel Road to the east of Frederick as shown on the Comprehensive Plan Map. This roadway is to be a limited access divided highway that will provide increased mobility in the Frederick Region and provide an alternative north-south facility to the congested US 15.	3	PL/ENG
2.	Work with the State of Maryland and neighboring jurisdictions to implement the recommendations of the I-270/US 15 Multi-Modal Corridor Study. The recommendations include an express bus service connecting MARC Monocacy station and Shady Grove Metro station.	3	PL/ENG
3.	Coordinate with Frederick County in using the City of Frederick's Comprehensive Plan to plan transportation facilities.	2	PL/ENG
4.	Coordinate with Frederick County to use the City's newly developed transportation demand modeling capacity to evaluate and plan for needed roadway improvements.	2	PL
5.	In cooperation with Frederick County, provide frequent transit service for major traffic generators and attractors including employment nodes.	3	PL/ED
6.	Work with the State on linkages to the regional bicycle network.	3	PL/ENG
7.	Provide the framework and justification of the North-South Parallel Roadway to the County so that ultimately it will be shown on the State's Highways Needs Inventory (HNI).	2	PL/ENG
8.	Continue the collaborative effort with the State and County on the development of a citywide "wayfinding" program.	2	PL
9.	Promote the development of the Southwest loop connection from Mount Phillip Road to MD 180.	3	PL/ENG
10.	Support City and County efforts to lobby the State for improvements to US15 and other State roads in the City.	3	PL/ENG
Policy T.18:	*In cooperation with Frederick County, strive to improve transit service to and around the City of Frederick*		
1.	Provide transit access to major traffic generators and attractors. Map T.10 shows the location of existing and proposed transit enhancements.	2	PL
2.	Promote the MARC train station area as a multimodal transportation hub and mixed use development area.	OG	PL/ED

Policy FH.1:	*Identify dedicated revenues for funding capital improvements.*		
1.	Establish a target percentage of General Fund expenditures to be spent on capital improvements.	2	FIN
2.	Ensure that new growth pays for its fair share of capital facilities through impact fees.	2	FIN
3.	Evaluate and update impact fees on a regular basis to ensure they accurately reflect current levels-of-service, costs, and development assumptions.	2	FIN
4.	Ensure master plans (utilities, parks and recreation, public safety, etc.) complement this Comprehensive Plan and that these plans include a fiscal analysis component containing both revenues and expenditures.	OG	ALL
Policy FH.2:	*Encourage growth that enables the City's non-residential tax base to comprise a larger share of the overall tax base.*		
1.	Maintain the jobs-rich nature of the City's economy at an approximate ratio of two jobs for every household.	OG	ED
Policy FH.3:	*Evaluate expenditures for both current fiscal impacts as well as impacts on future budgets to avoid creating long-term fiscal imbalances.*		
1.	Include both direct salary costs and the City's share of fringe benefit costs in analyses and discussions about employee compensation.	2	FIN
2.	Evaluate expenditures that could be funded through other methods or sources. For example, running trash collection services as an enterprise operation as opposed to a General Fund operation.	2	FIN
3.	Pay all current operating expenditures with current operating revenues. Avoid budgetary procedures that fund current expenditures at the expense of future needs.	2	FIN
4.	Evaluate the operational costs (staffing, maintenance) when considering new capital facilities, not just capital costs.	2	FIN
Policy FH.4:	*Maintain a diversified and stable revenue system.*		
1.	Explore opportunities to maximize revenues by:	3	FIN
a.	Revising revenue collection procedures;		
b.	Reducing delinquent payments;		
c.	Instituting or increasing service charges, fines and penalties;		
d.	Updating property assessments;		
e.	Investing a greater proportion of idle cash;		
f.	Selling surplus property or equipment.		
2.	Review fee, permit, and license amounts on an annual basis to ensure they accurately reflect the cost of providing services.	OG	FIN
3.	Identify restricted revenues (those legally earmarked for a specific purpose) and monitor the City's use of these funds to minimize volatility associated with these revenues.	OG	FIN
4.	Identify intergovernmental revenues and monitor the City's use of these funds to minimize volatility associated with these revenues.	OG	FIN
5.	Identify grant revenues and monitor the City's use of these funds to minimize volatility associated with these revenues.	OG	FIN
6.	Identify revenues that are one-time in nature and ensure they are not being used to fund on-going expenditures.	OG	FIN
Policy FH.5:	*Maintain sufficient unrestricted fund balance to maintain creditworthiness and provide resources for emergencies or unexpected needs.*		
1.	Set a fund balance target as a percentage of General Fund expenditures.	2	FIN
2.	Establish policies for uses of funds from unreserved fund balance.	2	FIN
3.	Avoid using unreserved fund balance to finance on-going expenditures as much as possible.	OG	FIN
Policy FH.6:	*Adhere to credit industry standards and recommendations for debt management to maintain creditworthiness and ensure lowest borrowing costs possible.*		
1.	Incorporate credit industry benchmarks into the City's financial management policies and practices.	OG	FIN

Policy CF.1:	*Use the Comprehensive Plan text and maps to guide community facilities decisions including decisions about water and sewer service extensions. Increased water and sewer demands due to forecast future growth, development, and potential annexations will require that existing facilities be supplemented to accommodate growth to the year 2030.*		
1.	Require all properties located outside of the City, but contiguous to the City's boundary, to annex prior to provision of City sanitary sewer or water service. In no case should the City allow property to be annexed that cannot or will not be served by City services including sanitary sewer and water service.	1	PL
2.	Update the City's Water and Sewer Master Plan to be consistent with the recommendations in this Comprehensive Plan. Several of the annexation areas recommended in this Comprehensive Plan were not evaluated in the 2000 version of the City's Water and Sewer Master Plan and further technical and cost analysis should be completed.	2	ENG
3.	Require the City's Water and Sewer Master Plan to be updated every five years.	OG	ENG
Policy CF.2:	*Provide adequate public water and sewer capacity to service projected growth within the City of Frederick as well as within all potential annexations areas.*		
1.	Implement the six new water supply projects identified in the *Water Resources Development and Optimization Plan*, in order to augment the City's short-term water requirement until the Potomac River water supply comes online. a. Develop existing test wells 3 and 7 into production wells b. Utilize Fort Detrick excess treatment capacity to supply additional water c. System demand reduction d. Monocacy flow augmentation e. Additional groundwater f. Mountain supply improvements	2	ENG
2.	In order to meet the projected long-term (2030) average day water requirements, work closely with the County in overseeing the construction of the New Design Transmission Main that will be used to convey the Potomac Water Supply to the City.	2	WATER NOW
3.	Continue to identify and develop other additional water sources.	OG	WATER NOW
4.	In order to meet short-term wastewater treatment needs, revise the existing agreement with the County to expand the amount of wastewater treatment capacity at the County's Ballenger Creek WWTP that is allocated for City use.	2	ENG
5.	In order to meet long-term (2030) wastewater treatment needs, evaluate the following options: a. Expand the City's current wastewater treatment plant facility. b. Work in cooperation with the County to expand the capacity at the County's Ballenger Creek WWTP. c. Work in cooperation with the County to obtain future wastewater treatment capacity at the County's proposed McKinney WWTP. d. Identify alternative means to expand the City's wastewater treatment capacity through the Water and Sewer Master Plan Update.	2	ENG
6.	Ensure that, as part of any City/County joint service agreement, City retains its right to annex and self-determine its future development and expansion. Any joint City/County agreement will include this right of self-determination, and will include the potential lands the City plans to annex and for which the City of Frederick plans to provide services, as recommended in this Comprehensive Plan.	OG	LEGAL/ENG
7.	Prohibit private wells for potable use and septic systems in the City.	OG	ENG
8.	Work in cooperation with all appropriate State and County agencies to develop regulations that would allow the use of private wells within the City for irrigation.	2	ENG
9.	Limit the use of pump stations due to their high operating costs.	OG	ENG/DPW
10.	Enforce and review the currently permitted industrial wastewater discharge limits for large wastewater users to ensure that they remain reasonable and safeguard treatment capacity for the City overall. If some large users were to discharge at their permitted volume and strength, the City WWTP could become overloaded and have difficulty meeting discharge permits. Given the small amount of current excess average daily flow capacity at the City's WWTP, consideration should be given to reevaluation of these limits.	OG	ENG

11.	Take the lead in design and construction of new water and sewer lines. By construction these new lines, the City of Frederick will be able to control the pace and direction of new growth in the City.	2	ENG/FIN
Policy CF.3:	*Enhance public safety and emergency preparedness.*		
1.	Continue to participate in the Frederick County Department of Fire/Rescue Services emergency preparedness training programs.	OG	PL/POL
2.	Continue to map and analyze crime trends to ensure appropriate deployment of manpower and resources.	OG	POL
3.	Work to streamline, improve and expand the Neighborhood Watch Program.	OG	POL
4.	Conduct traffic enforcement operations at intersections designated as having a high incidence of collisions.	OG	POL
5.	Study emergency response time and develop a level of service for inclusion in the development review process.	2	POL
6.	Provide crime prevention information to neighborhoods throughout the City to promote awareness and improve public safety.	OG	POL
7.	Provide Police Activity League facilities in the Golden Mile corridor.	3	POL
8.	Meet or improve upon the City's level of service standard for police officers.	OG	POL
9.	Complete the implementation of the "Geographic Accountability Model" to define mapping boundaries of the police assignment zones.	2	POL
10.	Actively pursue land acquisition for multiple purpose public facilities in the northern section of the City. These facilities could include a fire station, park, school, DPW yard and/or library.	3	PL/ED
11.	When acquiring land or accepting dedicated land for public facilities, use the information in Table CF.3 as a guide.	OG	ENG
Policy CF.4:	*Provide efficient solid waste collection.*		
1.	Develop an automated collection system for waste pickup.	OG	DPW
2.	Increase the amount of solid waste collected at curbside that is recycled.	OG	DPW
3.	Develop new storage standards for multi-family and townhouse development to eliminate the use of trash can corrals.	2	ENG/DPW
4.	Work with Frederick County to develop alternatives to the disposal of solid waste.	OG	DPW
Policy CF.5:	*Provide for safe and efficient water and wastewater service to protect the health, growth and economic well-being of the City of Frederick.*		
1.	Continue efforts to remove inflow and infiltration sources within the existing sanitary sewer system.	OG	DPW
2.	Continue to diligently monitor water service contracts for recapture of un-used allocated water for re-allocation to other users.	OG	PL
3.	Based on actual water use, review and revise the water allocation standards for non-residential uses. The existing standards may result in over allocation of scarce water resources.	OG	PL
4.	Continue to work vigorously to reduce the amount of unmetered water in the current system.	OG	DPW
5.	Continue to identify and reduce the amount of "unaccounted for" water via Maryland Department of the Environment Audits.	OG	DPW
6.	Continue the leak detection and water repair program throughout the City with particular attention to the older portions of the City including downtown.	OG	DPW
7.	Develop a water emergency plan to deal with the potential loss of one of the four current water sources.	2	DPW/ENG
8.	Continue to evaluate current water use information, determine large volume water customers, and identify additional water consumption reduction measures.	OG	ENG
9.	Develop a program to encourage reduction in water use, recycling and the use of gray water to reduce overall water consumption.	2	ENG/DPW
10.	Acquire/purchase back up power generators for all City water and sewer facilities.	2	DPW
11.	Consider the integration of the water resource issue with stormwater management by evaluating the construction of stormwater recovery/retention facilities, which could also provide for water reuse for irrigation or other possible reuse.	2	ENG/DPW

12.	Strive to reduce nitrogen discharges from the City's WWTP to improve the health of the Chesapeake Bay and to meet nitrogen removal goals.	OG	DPW
13.	Create a storm water management plan for the City of Frederick.	2	DPW
14.	Develop standards for adequate flow pressures without using pump stations, to be used during the development review process.	1	ENG
Policy CF.6:	*Provide clean, well-maintained public facilities.*		
1.	Continue and expand programs that clean City streets.	OG	DPW
2.	Continue and expand programs that clean and care for the City's parks.	OG	REC
Policy CF.7:	*Provide safe and adequate water and sewer resources for the downtown.*		
1.	Continue to monitor the need to rehabilitate existing water and sewer lines in the downtown, and identify deficiencies in these systems that must be corrected in order to accommodate downtown growth.	OG	DPW
Policy CF.8:	*Coordinate City and County sanitary sewer and water provision.*		
1.	Continue to work cooperatively with the County to provide water and sewer services that support the future growth of the City of Frederick, efficiently provide services to both jurisdictions, and reduce development pressures on rural areas of the County.	OG	ENG/DPW/PL
2.	Work with Fort Detrick to meet its water and sewer demand.	OG	ENG
Policy CF.9:	*Coordinate City and County service provision to improve services for City and County residents.*		
1.	Co-locate offices with the County and State to coordinate citizen services.	OG	ED
2.	Continue to coordinate with the County to maintain County government facilities in downtown Frederick.	OG	ED
3.	Identify additional funding sources to renovate, modernize and build schools.	OG	PL/ED
4.	Work with the County to eliminate duplication of services.	OG	ALL
5.	Work with the Frederick County Public Schools (FCPS) to support an academy/magnet high school initiative in the City of Frederick.	OG	M&B
6.	Work with FCPS to reserve and acquire future school sites and limit and phase development based on surrounding school capacities.	OG	PL
7.	Continue to work with the FCPS to improve pupil generation forecasts.	OG	PL
8.	Support efforts to improve schools located within the City that are in need of renovations. North Frederick Elementary, South Frederick Elementary and West Frederick Middle Schools are over 40 years old and have been made a priority by FCPS for renovations in the CIP. The City of Frederick shall continue to support the FCPS in renovating all schools within the City of Frederick.	OG	M&B
Policy EC.1:	*Promote a diversified economic mix.*		
1.	Identify appropriate developable lands with planned water and sewer service to support a range of employment opportunities, to ensure the long-term economic health of the City.	OG	PL/ED
2.	Identify locations in need of maintenance and enhancement of water and sewer service to meet the needs of new and existing non-residential development.	OG	DPW
3.	Create incentives for business attraction and retention.	OG	ED
4.	Improve the mix of uses in industrial parks/areas, focusing on businesses with a greater net benefit to the City's tax base.	1	PL/ED
5.	Strengthen the economic engines of Frederick's economy: biotechnology, information technology, manufacturing, services, and tourism.	OG	ED
6.	Support efforts to enhance Frederick's identity as a "biotech cluster," part of the I-270 Technology Corridor.	OG	ED
7.	Market the attractive job opportunities in the manufacturing industry—an industry that has remained a fairly constant portion of the City's employment base over the last 30 years.	OG	ED
8.	Create a partnership with Frederick County to promote a diverse regional economy.	OG	ED
9.	Identify appropriate developable lands with planned water and sewer service to support a range of employment opportunities, to ensure the long-term economic health of the City.	1	PL

Policy EC.2:	*Facilitate the expansion of office and research and development firms.*		
1.	Ensure that an adequate amount of land is planned and appropriately zoned for office and research and development uses.	OG	PL/ED
2.	Capitalize on the existing supply of "non-traditional" office space to attract an increased share of the region's "creative services" industry (architects, engineers, computer software developers, consultants).	OG	ED
Policy EC. 3:	*Support small and minority-owned businesses in the downtown area.*		
1.	Preserve and enhance an entrepreneurial climate that enables new and unique businesses to compete and contribute to the downtown economic mix.	OG	ED
2.	Encourage a retail mix that emphasizes small businesses and specialty goods and services, combined with dining and entertainment establishments.	OG	ED
Policy EC.4:	*Draw upon the City's educational resources to promote job creation, enhancement, and retention.*		
1.	Foster strategic partnerships between core industries (e.g., biotechnology, services) and educational institutions (Hood College, Mount St. Mary's, and Frederick Community College) to match curriculum with workforce and training needs.	OG	ED
2.	Encourage a higher education presence in downtown.	OG	ED
Policy EC.5:	*Improve the relationship between transportation facilities and employment locations.*		
1.	Concentrate job growth close to major transportation centers and corridors, and the downtown.	OG	PL/ED
2.	Make commercial areas more transit-friendly, through physical improvements to commercial areas.	OG	PL/ED
3.	Work with the County TransIT to increase the frequency of bus service within the City of Frederick and to better serve jobs and households. Consider providing bus service along Monocacy Blvd.	OG	PL
4.	Market the airport as a break-bulk location for freight and cargo.	OG	PL/ED
5.	Continue to promote the airport as a resource for corporate users in the region.	OG	PL/ED
Policy EC.6:	*Revitalize critical economic centers and corridors.*		
1.	Establish distinct identities for key commercial areas within the City of Frederick, specifically the Golden Mile/West Patrick Street; East Patrick Street/I-70 Gateway; and South Jefferson Street.	2	PL
2.	Use public/private partnerships to revitalize centers and corridors.	2	ED
3.	Enhance the gateway role of key corridors with visual and physical improvements.	2	PL/ED
4.	Strengthen the downtown as an economic center.	OG	ED
Policy EC.7:	*Encourage a business-supportive infrastructure.*		
1.	Partner with all stakeholders to complete the development of Monocacy Blvd.	OG	ED/PL
2.	Aggressively pursue opportunities to enhance the City's telecommunications, fiber optics and high-speed Internet access to promote economic development.	OG	ED
3.	Promote the extension of high-speed telecommunications connectivity to businesses and residents to better position the City and County to attract high tech businesses and enhance telecommuting.	OG	ED
4.	Work with State and other agencies to investigate the possibility of establishing a telework center in the City.	OG	ED
5.	Identify and work to remove impediments to attraction and retention of businesses.	OG	ED
6.	Streamline and accelerate regulatory processes to create a more business-friendly environment in the City.	2	ENG
Policy EC.8:	*Improve the visual and physical relationship between businesses and their surrounding neighborhoods.*		
1.	Review the buffers and transition zones between business and residential areas to encourage positive interaction between these development types.	1	PL
2.	Establish/reinforce an attractive visual appearance in commercial areas.	2	PL/ED
3.	Enforce regulations that require the approval of business licenses and zoning certificates before a business can open.	1	ENG

Policy EC.9:	*Support a commercial mix that addresses the service needs of Frederick residents.*		
1.	Identify and encourage the neighborhood-serving businesses that meet the needs of citizens.	OG	ED
2.	Strengthen County, state, and regional economic partnerships to give local businesses access to financial incentives.	OG	ED
Policy EC.10:	*Continue to locate all levels of governments in the downtown.*		
1.	Pursue improvement and enhancement of existing government buildings.	OG	ED
2.	Identify potential office sites for government entities.	OG	ED
Policy EC.11:	*Encourage greater residential and job density in the downtown area.*		
1.	Add new residential units and commercial tenants in the downtown through infill, adaptive re-use, and redevelopment.	OG	ED
2.	Implement the recommendations of the Downtown Market Analysis and Retail Strategy regarding residential and commercial mix along Carroll Creek Park.	OG	ED
3.	Encourage the rehabilitation of upper-floor space in commercial zones to increase the number of residential-above-commercial units.	OG	ED
4.	Attract neighborhood-serving retail uses such as grocery and drug stores within walking distance of downtown residents.	OG	ED
5.	Continue to promote the downtown as one of the City's major employment centers.	OG	ED
Policy EC.12:	*Create an attractive physical climate for downtown economic investment and success.*		
1.	Implement the recommendations of the Downtown Parking Plan.	2	DPW
2.	Improve and standardize signage and wayfinding.	2	ED
3.	Improve and maintain sidewalks, crosswalks, and pedestrian amenities to encourage non-vehicular traffic throughout the downtown.	OG	DPW
4.	Implement mixed-use development to establish Carroll Creek Park as a central public gathering place.	1	PL
5.	Work to reduce the number of blighted and neglected properties.	OG	PL
6.	Continue to implement streetscape improvement programs throughout the downtown.	OG	DPW
Policy EC.13:	*Strengthen downtown Frederick's position as a center for culture and the arts.*		
1.	Continue to promote Frederick, and especially the downtown, as a tourist destination, capitalizing on downtown's historic buildings and its recent designation as an Arts and Entertainment District.	OG	ED
2.	Support the Arts and Entertainment District by expanding the menu of arts and cultural programming in downtown venues, including the Weinberg Arts Center, East Church Street Park, the Cultural Arts Center, the Delaplaine Visual Arts Center, and Carroll Creek Park.	OG	ED
3.	Explore the creation of a Public Art Commission to promote artwork in downtown and along Carroll Creek.	OG	ED
Policy EC.14:	*Continue to market Frederick as a desirable tourist destination.*		
1.	Work with Frederick County Tourism to market the City's historic resources as a primary tourist attraction by enhancing facilities, services and activities that support both visitor-based economic development and the Frederick residential and business communities.	OG	ED
2.	Reinforce the City's role as the gateway to the Catoctin Mountains, and the "base camp" for tourism-related visitation to state and national parks, Civil War sites, and other recreational activities.	OG	ED
3.	Work with Fort Detrick and Frederick Community College to develop a regional conference center.	OG	ED
Policy EC.15:	*Reinforce Frederick's role in the technology sector—as the northern anchor of the I-270 Technology Corridor, and as one corner of the Maryland Technology Triangle (Baltimore, Montgomery County, Frederick).*		
1.	Support the Technology Incubator's goal of to aiding and encouraging entrepreneurs in the biotechnology and information technology sectors.	OG	ED
2.	Reinforce Frederick's role as a leader in biotechnology and biodefense by strengthening the relationship between Fort Detrick and the City's business community.	OG	ED

3.	Establish a formal connection between Fort Detrick and Frederick's business community (e.g., a Military Alliance) to ensure mutually beneficial decision-making.	OG	ED
4.	Pursue economic spin-off development and redevelopment around Fort Detrick, including Area B.	OG	ED
Policy H.1:	*Facilitate the development of an adequate housing supply for current and future City residents.*		
1.	Facilitate housing production by improving the predictability in the annexation, planning, and permitting process. Several growth management tools should be used to accomplish this goal including: phasing of annexations, phasing of infrastructure improvements and expanded service (roads, water, sewer), and holding zones for properties without services.	2	PL
2.	Promote the production of a range of housing types in all parts of the City.	OG	PL
3.	The City's Department of Community Development should take steps to increase marketing and awareness of City housing programs.	OG	CD
4.	Encourage the use of master-planned neighborhoods and mixed use developments through new construction.	OG	PL
Policy H.2:	*Promote the development of housing with costs that reflect the range of incomes generated within the City.*		
1.	Consider implementing an inclusionary housing program such as Montgomery County's Moderately Priced Dwelling Unit (MPDU) program. The City may consider using the Frederick County program as a starting point.	1	PL
2.	Explore other options and incentives to produce more modestly priced units. These options could include but are not limited to priority permit processing, performance standards, fee exemptions, and property tax deferral.	OG	PL/ENG
3.	Use community partnerships involving non-profit housing and social service agencies to increase homeownership opportunities for very low-income households.	OG	CD
4.	Continue to use CBDG program to rehabilitate blighted, vacant houses for reuse for first-time homeowners.	OG	CD
5.	Work with non-profit agencies and community-based organizations to develop a housing counseling program to provide pre- and post-purchase counseling for low- and moderate-income first-time homebuyers.	OG	CD
6.	Explore a mortgage buy down program to provide more modestly priced housing units.	2	CD
7.	During the update of the City's development regulations, consider changing regulations to permit accessory dwelling units above garages as a special exception use for all existing owner-occupied single-family lots. New developments that wish to have accessory dwelling units above garages would need to have the Planning Commission approve that use at the site-plan level.	1	PL
8.	Permit professionally-managed Single Room Occupancy (SRO) hotels in appropriate zoning districts including General Commercial Zones by Special Exception with strictly enforced quality inspections, permit and licensing requirements. Allow for reduced parking standards as most occupants would not own automobiles.	1	PL
Policy H.3:	*Improve the availability of housing for the elderly and individuals with disabilities, as well as shelter for the homeless.*		
1.	Disperse the location of special needs services such as residential-care facilities, shelters, and group homes throughout the City.	OG	CS
2.	Allow higher residential densities in moderate density multi-family zones for housing limited to occupancy by elderly or disabled households, based on the lower peak period traffic trip making and reduced parking needs that these households generate.	1	PL
3.	Change the development regulations to permit administrative review and appeal by the Planning Director to approve variances from the setback requirements for "reasonable accommodation" of ramps for people with disabilities.	1	PL
4.	Encourage builders of new single-family homes to build "adaptable" homes—those that have features that could be adapted to accommodate people with disabilities, such as lower light switches, plumbing that permits the lowering of sinks without necessitating rearranged piping, and wider doorways.	OG	CD
Policy H.4:	*Enhance multi-modal transportation options for neighborhoods.*		
1.	Promote higher-density residential and pedestrian-friendly development within walking distance (a 10-minute walk) of existing and planned public transit routes (including the MARC station).	OG	PL/ED
2.	Work with the County TransIT to prioritize transit for underserved neighborhoods.	OG	PL

3.	Facilitate the construction of bikeways and pedestrian paths within and between neighborhoods. The starting point should be the timely implementation of the Shared Use Path Plan.	OG	PL
4.	Promote new housing development near employment centers to reduce regional commuting.	OG	PL/ED
Policy H.5:	*Encourage the development of compact residential neighborhoods.*		
1.	Monitor development to achieve a gross residential density of at least 3.5 units per acre in keeping with Smart Growth guidelines.	OG	PL
2.	Encourage infill development (development that occurs on vacant or abandoned parcels in an otherwise built-up portion of the City) and redevelopment (new development that replaces or substantially refurbishes existing structures) that is compatible with surrounding land uses.	OG	PL
3.	During the update of the City's development regulations, consider an overlay zone for infill developments. The zone could include flexible zoning regulations that may allow a higher density, reduction of parking or setbacks for infill developments. The Maryland Department of Planning has developed a model infill ordinance that could be used as a starting point.	1	PL
4.	Encourage the adaptive reuse of existing buildings for residential use.	OG	PL/ED/CD
5.	Review the cost and benefits of adopting a revision to the Building and Fire Codes requiring sprinklers in all new residential units.	2	ENG
Policy H.6:	*Support diverse residential development in the downtown area.*		
1.	Add new residential units within the downtown.	OG	PL/ED
2.	Encourage the rehabilitation of upper-floor space in commercial zones to increase the number of residential-above-commercial units.	OG	ED/ENG
3.	Attract neighborhood-serving retail uses such as grocery and drug stores within walking distance of downtown residents.	OG	ED
4.	Permit administrative review for "no-impact" home occupations without going through the BZA hearing process. "No-impact" home-based businesses are those that have minimal adverse impacts on the surrounding residential community.	1	PL
5.	During the update of the City's development regulations, review the requirements for upper story conversions that may currently hinder their rehabilitation.	1	PL/ENG
6.	Allow for higher densities in the downtown area.	1	PL
Policy H.7:	*Support Frederick County and State of Maryland efforts to ensure a balanced regional housing approach.*		
1.	Collaborate with Frederick County to facilitate the development of a wide range of housing options in the County and the City.	OG	PL
2.	During the update of the City's development regulations, ensure that the Building Code facilitates the approval of structures with "green" building features, such as energy-efficient building materials, water-efficient landscaping, or minimized impervious surface.	1	PL
Policy PR.1:	*Increase the amount of active open space and public recreation amenities consistent with state and national standards.*		
1.	Strive to increase the level of service for parks to 10 acres of combined neighborhood and community parkland per 1,000 residents and to implement the National Recreation and Park Association (NRPA) classification guidelines and standards.	OG	REC/PL
2.	During the update of the City's development regulations, incorporate NRPA definitions of park types, and create park acreage standards based on the number of dwelling units.	1	PL
3.	Acquire lands now for community parks that are located to serve existing and future populations of the City, as shown on Map PR.1: Existing Park Service Areas.	OG	REC
4.	Acquire a large community park (25+ acres) in the northern section of the City. This facility should be developed with sports fields.	3	REC
5.	Identify new sites for neighborhood and community parks so that additional parklands can be acquired – either purchased by the City or through the development review process.	OG	REC/PL
6.	Develop plans to create a regional "East Church Street Park" following Carroll Creek along Gas House Pike.	2	REC/PL

7.	Amend the development regulations to encourage the majority of private open space within new developments (maintained by a private homeowner's association) to be centrally located and require that the open space be accessible to all homes in the development.	1	PL
8.	Periodically survey residents to better understand what types of recreation facilities are desired and periodically assess the residents' needs and usage.	2	REC
9.	Establish larger parks of 10 acres or more to allow for adequate sports fields and to reduce the deficit of sports fields in the City.	OG	REC/PL
10.	Continue to implement the Parks Facilities Development Impact Fee for new residential developments.	OG	REC
11.	During the update of the City's development regulations, require the dedication of neighborhood parkland to meet national standards.	1	PL
12.	Establish an impact fee to acquire sufficient land for future community parks appropriately distributed throughout the City.	2	REC/PL
13.	Continue efforts to develop undeveloped or underutilized parks within the City of Frederick.	OG	REC
14.	Promote the use of parks to protect natural resources.	OG	REC
15.	Establish park development guidelines, to be used in the design and development of parks. The guidelines would address items such as field size, parking, landscaping and other issues.	2	REC/PL
Policy PR.2:	*Encourage sustainable design principles in the development and maintenance of parks.*		
1.	Establish a citywide policy of afforestation within City parkland that complements but does not compete with the needs for active recreation areas.	2	REC/PL
2.	Explore the possibilities of using the City of Frederick's Municipal Forest and Watershed for limited recreational uses. However, the quality of the Municipal Forest's natural environment should be the City's first responsibility.	2	REC
3.	Work to protect water quality by protecting streams and stream banks. The park system should provide adequate buffers for streams and wetlands.	OG	REC/DPW
4.	Work with the Board of Education to develop environmental education and interpretive facilities.	OG	REC/FCPS
5.	Use native plant species and in landscaping, when possible.	OG	REC
Policy PR.3:	*Enhance access to and through the park system for all categories of users.*		
1.	Prioritize the development of neighborhood parks for underserved neighborhoods.	2	REC
2.	Identify and construct critical sections of the Shared Use Path Plan each fiscal year.	OG	ENG/DPW
3.	Improve access to recreational facilities and expand programs for handicapped/disabled, elderly and other individuals with physical limitations.	OG	REC
4.	Work with TransIT to enhance bus connections to all community and regional parks.	OG	REC/PL
Policy PR.4:	*Facilitate public involvement and promote stewardship of Frederick's open space resources.*		
1.	Maximize the joint use of recreational facilities for community purposes.	OG	REC
2.	Encourage volunteerism in the maintenance of parks and recreational facilities.	OG	REC/CS
3.	Establish an "adopt-a-stream" program to help protect and enhance the stream valley system.	OG	REC/CS
4.	Promote the "Friends of the Park" program.	OG	REC/CS
Policy PR.5:	*Promote the appreciation of Frederick's historic and cultural heritage in park system planning and design.*		
1.	Incorporate local history and heritage in park elements through signage and public art.	OG	REC
2.	Promote performing arts and cultural festivals in park facilities.	OG	REC/CS
3.	If significant historic resources exist on proposed parkland, incorporate their preservation into park development.	OG	REC/PL
Policy PR.6:	*Promote the integration of the downtown with the open space system.*		
1.	Continue to promote the Carroll Creek linear park corridor as an extension of the downtown.	OG	REC
2.	Mitigate adverse impacts of shared use path construction on historically sensitive structures in the downtown.	OG	REC/ENG

Policy PR.7: Collaborate with Frederick County and other agencies to enhance parks and recreational facilities for the City's residents.			
1.	Continue to work with the Board of Education on issues of mutual concern such as the development of joint use facility agreements to provide for shared use of school facilities for public recreational programs.	OG	REC/FCPS
2.	Establish partnerships with Frederick County, the Frederick County School Board, civic and religious organizations, and the private sector to enhance the variety, quality, and accessibility of recreation programming and facilities available to the City of Frederick residents.	OG	REC/CS
3.	Work with Fort Detrick to develop sections of the Shared Use Path Plan adjacent to Fort Detrick.	OG	REC/PL
4.	Enhance access to and awareness of recreational opportunities in facilities such as the Gambrill State Park, Utica County Park, and Catoctin Mountain Park.	OG	REC/CS
5.	Lobby Frederick County for additional resources to maintain and enhance the City park system.	OG	REC/M&B
Policy EN.1: Protect streams and their buffers.			
1.	During the update of the City's development regulations	1	PL
2.	Establish the baseline condition of the local streams and consider a plan to improve stream health. The plan should include measures such as the planting of native vegetation	3	PL/ENG
3.	Consider the protection of historic resources along stream banks	OG	PL/ENG
Policy EN.2 Work to maintain and improve water quality.			
1.	Consider using bio-retention ponds within the City of Frederick. A pond located along Carroll Creek at Highland Street could help break down bacteria and absorb excess nutrients from the downtown, and prevent them from entering the Monocacy River.	2	ENG
2.	Require the preservation of stream valley corridors as a method of maintaining water quality.	OG	PL
Policy EN.3: Strive to reduce impervious cover and promote best practices of storm water management.			
1.	Allow the use of permeable surfaces for driveways and parking areas in residential and commercial developments.	1	ENG/PL
2.	Encourage a greater use of rainwater and gray water to reduce demand for City water.	OG	ENG
3.	Use stormwater runoff in large developments to water the landscaping.	OG	ENG
4.	Promote enhancement of wetlands in conjunction with preservation efforts.	OG	ENG/PL
5.	Create a Stormwater Management (SWM) Master Plan that encourages best management practices that minimize and treat storm water at its source, including such as grass swales, rain gardens and green building techniques. Promote the use of regional and joint SWM facilities in the City of Frederick.	2	DPW
6.	During the update of the City's development regulations, investigate opportunities to encourage innovative techniques for stormwater management.	1	PL
Policy EN.4: Reinforce the value of existing wooded areas and implement appropriate measures to protect them.			
1.	Inventory and map all wooded and afforestation areas.	3	PL
2.	Adopt strong tree preservation standards that protect existing wooded areas and require sensitive development practices.	2	PL
3.	Establish forest conservation receiving areas.	2	PL
4.	Consider the protection of woodlands as a means of protecting archaeological resources, by setting the boundaries of conservation areas to encompass the entire archaeological resource.	OG	PL
Policy EN.5: Promote tree planting.			
1.	Establish a citywide afforestation policy.	3	PL
2.	Establish guidelines for linear park plantings in conjunction with forest conservation.	2	REC/PL/DPW
3.	Establish receiving areas for afforestation.	2	PL
4.	Establish standards on how afforestation should be conducted in parkland dedicated to the City.	2	REC/PL/DPW
5.	Promote the street tree program within the City.	OG	CS

Policy EN.6:	*Promote erosion and sediment control.*		
1.	Evaluate and upgrade the City's standards regarding erosion, and sediment control.	2	ENG
2.	Develop standards to implement best management practices along streams to encourage natural buffer areas and reduce the need for grass cutting near streams.	2	ENG/DPW/PL
3.	Evaluate City streams for evidence of erosion and develop appropriate restoration efforts.	3	REC/ENG/DPW
Policy EN.7:	*Preserve steep slopes.*		
1.	Encourage development to fit into the natural landscape. Discourage cut-and-fill practices requiring excessive excavation and retention.	OG	PL
2.	Require developments to submit a slope analysis to clearly depict where steep slopes will be disturbed. Adopt standards for appropriate remediation techniques.	1	PL
3.	Plant steep slopes with trees and plant materials to reduce soil erosion and flooding.	OG	PL
Policy EN.8:	*Streamline environmental regulations.*		
1.	Merge environmental regulations from the Zoning, Subdivision, Storm Water Management, Floodplain, and Forest Conservation Ordinances into an Environmental Section of the City's development regulations.	1	PL
2.	Establish standards or incentives that permit the dedication of floodplains as a linear park system.	1	PL
3.	As part of the update to the City's development regulations, establish protective standards for nuisances, such as noise.	1	PL
4.	As part of the update to the City's development regulations, increase the amount of dedicated recreation land that is outside the floodplain.	1	PL
5.	As part of the update to the City's development regulations, establish buffer standards for isolated wetlands.	1	PL
Policy EN.9:	*Protect rare, threatened and endangered species.*		
1.	Protect habitats of threatened and endangered species, following both state and federal species lists and guidelines.	OG	PL
2.	Continue to work with the Maryland State Department of Natural Resources and federal agencies under the Endangered Species Act.	OG	PL
3.	Consider the protection of habitats as a means of preserving archaeological resources, by designating protective boundaries to encompass the entire archaeological resource.	OG	PL
Policy EN.10:	*Enhance access to and through scenic environmental corridors.*		
1.	Implement the Shared Use Path Plan and develop a list of priority links and segments.	2	ENG/DPW
2.	Identify and preserve habitat corridors.	OG	PL
3.	Continue to preserve stream valley corridors and provide access to them via low impact pathways.	OG	PL
4.	Promote the City's publicly accessible stream valleys as an outdoor classroom for learning and student environmental projects.	OG	REC/FCPS
Policy EN.11:	*Promote environmental education and sustainable design practices.*		
1.	Educate the public on the City's natural resources and the importance of these resources as they relate to the region and the state.	OG	REC
2.	Collaborate with the Board of Education and other groups to establish environmental interpretation programs.	OG	REC/FCPS
Policy EN.12:	*Enhance environmental quality of the downtown.*		
1.	Promote the Carroll Creek linear park corridor as an extension of downtown.	OG	REC
2.	Encourage green building techniques in the downtown.	OG	PL/ENG
Policy EN.13:	*Partner with Frederick County and the State of Maryland to address regional environmental issues.*		
1.	Work with Frederick County to promote composting and recycling, including areas that are not presently served by the recycling program.	OG	DPW
2.	Establish long-term stream-monitoring stations to evaluate the Tuscarora, Carroll and Rock creeks with assistance from Frederick County, the Maryland State Department of Natural Resources, the Chesapeake Bay Foundation, and others.	3	REC/DPW

3.	Establish a public education campaign to reduce the tonnage of waste taken to the County landfill.	OG	DPW
4.	Work with the State on linkages to the state's regional bike network.	OG	PL/ENG
5.	Continue to work with the County and State to expand the stream valley park system to promote pedestrian access, improve water quality and improve wildlife habitats.	OG	PL/REC

APPENDIX

These materials are bound separately and are available through the City of Frederick Planning Department.

Annotated List of Appendices

A. Plan Assessment and Investigation Report (PAIR)

The Plan Assessment and Investigation Report establishes the issues to be addressed in the Comprehensive Plan Update, areas of further investigation, and potential strategies that could be used to address the issues.

B. City of Frederick Architectural Survey

The architectural survey completed by Betty Bird & Associates (BB&A) identifies historic properties in the City of Frederick outside the Frederick National Register Historic District and provides information about significant historic resources.

C. Assessment of 1995 City of Frederick Comprehensive Plan

This memorandum completed by the City of Frederick assesses the 1995 Plan and identifies the implementation status of the key recommendations.

D. Existing Conditions Reports

Housing Assessment: Provides an overview of the composition of the City's existing housing and compares it to Frederick County and the region.

Economic Assessment: Provides an overview of the City's economic base and employment specialization.

Capacity Analysis: Provides a land capacity analysis of the City and outlying areas and identifies vacant lands via assessment records.

Transportation Assessment: Assesses existing transportation facilities and conditions and identifies potential deficiencies.

Parks and Recreation Resources Assessment: Assesses the existing parks and recreation resources of the City and identifies underserved areas and facility needs.

E. Demographic and Employment Forecasts

The report prepared by Thomas Hammer, PhD, provides a regional, study area, and City of Frederick forecast based on national and regional trends in population and employment. It projects population, households and employment by sector to 2030.

F. Scenario Allocation Methodology

The memorandum summarizes the key steps in allocation regional and study area forecast to City subareas.

G. Scenario Evaluation Reports

The evaluation reports assess the order of magnitude impacts of the alternative scenarios on the City's infrastructure and fiscal outlook.

Evaluation Chart: Summarizes key land use assumptions and demographic estimates of each scenario.

Transportation Evaluation: Tests the impacts of each scenario on the City's transportation infrastructure using travel demand modeling and analysis.

Fiscal Analysis: Analyzes the existing fiscal base of the City, including current costs, revenues and levels of service. It also includes a fiscal impact analysis to clarify the financial effects of each land use scenario.

Sewer and Water Evaluation: Increased water and sewer demands due to future growth, development, and potential annexations (for each scenario) are evaluated in this memo to determine if the existing facilities can accommodate growth to the year 2030 and necessary facility enhancements.

H. Traffic Impact Study Guidelines (Draft)

These guidelines establish criteria by which the traffic impacts of new development proposals will be evaluated by Planning Department staff. They define submission requirements, the need to prepare a study, study scope and methodology, and the format of the study.

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CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX A

Plan Assessment & Investigation Report (PAIR)

Planning Commission Recommendation, October 14, 2002

Mayor and Board of Aldermen Adoption, November 7, 2002

SUBMITTED TO:

The City of Frederick

SUBMITTED BY:

HNTB CORPORATION

November, 2002

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE
APPENDIX A

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Planning Commission Recommendation, October 14, 2002

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The purpose of the City of Frederick Comprehensive Plan Assessment and Investigation Report (PAIR) is to establish the issues to be addressed in the Comprehensive Plan Update that is to follow the PAIR process and provide the basis for the work scope of the Comprehensive Plan Update. The PAIR seeks to identify key issues facing the City of Frederick, areas of further investigation and potential strategies that could be used to address these issues. The PAIR provides both the context for the Plan Update and the specific problems and issues that the Plan will need to address. The issues included in this document are not listed in order or priority.

SUBMITTED TO:

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November, 2002

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Plan Assessment and Investigation Report

Purpose of this Report

The purpose of the City of Frederick's Comprehensive Plan Assessment and Investigation Report (PAIR) is to establish the issues to be addressed in the Comprehensive Plan Update that is to follow the PAIR process and provide the basis for the work scope of the Comprehensive Plan Update. The PAIR seeks to identify key issues facing the City of Frederick, areas of further investigation, and potential strategies that could be used to address these issues. The PAIR provides both the context for the Plan Update and the specific problems and issues that the Plan will need to address. The issues included in this document are not listed in order or priority

The issues included in this report are a combination of those raised by the Board of Aldermen, Planning Commission, city departments, the plan update Steering Committee (SC) (comprised of business, city, and county government, and residential representatives), and input of the city's planning consultant, HNTB Corporation. They are also based on a review of recent trends and existing city and county plans, other policy documents, and the results of the Aspire Frederick process. The PAIR also builds upon work undertaken by the city in a number of documents, produced by Planning Department staff, that identify recent development trends and existing conditions and assess the implementation of the city's 1995 Comprehensive Plan. These documents include:

- The *Growth and Development Report* (March 2002), which detailed recent trends and provided a regional context within which to view City of Frederick.
- The *Preliminary Assessment of the 1995 Comprehensive Plan* (2002), which reviewed the adopted plan to determine whether its recommendations have been implemented, are on-going, or have not been implemented.
- The Preliminary Issues Report for the 2002 Comprehensive Plan Update (Spring 2002).

There are also a number of recently completed and on-going studies that will be considered in the Comprehensive Plan update process. These include the following:

Adopted Plans

- *1995 Comprehensive Plan (August 1995)* – Provides the basic framework for the growth and vision for the City of Frederick. This plan is currently being updated.
- *Strategic Water Interim Management Plan (May 2002)* – This plans lays out the next steps that will be taken by the City of Frederick to address the current water situation.
- *Shared Use Path Plan (March 2002)* – This plan proposes over 35 miles of paths that will connect the residential, commercial and employment areas in the City of Frederick.
- *Water & Sewer Master Plan (February 2000)* – The plan demonstrates how the City of Frederick will provide water and sewer service to the existing and proposed users over the next 20 years.

- *Phase I South East Street Extension (March 2002)* – This small area plan ties together the land use patterns, transportation network and public amenities for this important corridor in the City of Frederick.
- *Development Opportunities Constraints and Strategies (November 1995)* – This was a technical memorandum prepared for the Carroll Creek Linear Park describing the potential each site along the creek.
- *Carroll Creek Park Master Plan and Implementation Strategy (December 1991)* – The JWA plan setouts the goals and visions for the Carroll Creek Flood Control Project related to development, infrastructure and public amenities.
- *Airport Master Plan (2000)* – The plan show the growth limits and potential improvements of this important reliever airport in the Baltimore & Washington region.
- *2002 – 03 Main Street Program* – The City of Frederick was just awarded the Main Street recognition after a long absence from the program. The Greater Frederick Development Corporation has just hired a Main Street Manager to run this program.

Plans In Progress

- *Aspire Frederick* – This grass roots, long range planning process is to identify how the community would like to see the City of Frederick in terms of quality of life in the next 30 years.
- *Draft Environmental Impact Statement & Section 4F Evaluation I-270 / US 15 Multi Modal Corridor Study* – This study examines the I-270 / US 15 corridor transportation improvements needed from Shady Grove Road to Biggs Ford Road.
- *Proposed Interchange Improvements to US 15 & MD 26* – This preliminary study is to determine the best configuration for the heavily used US 15 & MD 26 partial interchange. This project is a stand-alone project and not part of the I-270 / US 15 Multi Modal Corridor Study.
- *Community Legacy – North Market Street; West Patrick Street; and East End:*
- These three communities are currently developing small area plans that were funded from the State of Maryland. The Community Legacy program will provide flexible financing to meet the unique needs of each area it serves.
- *Hope VI Project* - The US Department of Housing and Urban development holds an annual competition for grants to local housing authorities for redevelop severely distressed public housing sites. The Frederick Housing Authority has applied to redevelop the Taney and Hanson sites on North Bentz Street.
- *Downtown Parking Study* – This project is designed to address the existing and future parking problems in the downtown area. Included in this project are future parking deck locations and review of the current parking rates and enforcement.
- *City-wide Traffic Study* – This project is being completed to assist the Steering Committee of the Comprehensive Plan Update in addressing current and future traffic demands of the City of Frederick.
- *Neighborhood Advisory Council Initiative* – The Neighborhood Advisory Council Initiative is a comprehensive community development initiative designed to empower residents and neighborhoods to strengthen their communities by providing solutions to their own unique issues.

- *Continuum of Care for the Frederick County Coalition for the Homeless 2002 Application* – This application, which is process through HUD, has been developed and implemented by the Frederick County Coalition for the Homeless. There are four organizations that are requesting funding for various supportive housing programs.

Soliciting Issues

To gather the comments of stakeholders, a questionnaire was distributed to the Mayor, each member of the Board of Aldermen, Planning Commission and the SC. Twenty-one questionnaires out of a total of 34 distributed were returned and their comments reviewed and tabulated. A compendium of the summarized comments is included in Appendix A. The questionnaires yielded more than 300 individual responses to a series of questions, including:

- The most challenging or difficult planning issues facing the city
- The most critical issues, trends, and events that could impact the city's future
- The strengths and weaknesses of the current Comprehensive Plan
- Elements of managing growth and development that the stakeholders would like to address through the Comprehensive Plan Update
- Planning tools and strategies the stakeholders would like to learn more about
- The stakeholders' hopes and expectations for the Comprehensive Plan Update

The questionnaire was one step in a multi-part process designed to understand where stakeholders have common ground and where they have divergent views. To understand their positions in greater depth, a presentation to – and discussion with – a joint meeting of the Mayor, Board of Aldermen, Planning Commission and a similar presentation and discussion with the SC followed the questionnaires. These discussions generated more than 50 additional comments on the Comprehensive Plan and its elements.

Below we provide a summary of these comments. This is followed by a discussion of the differences among the responding groups.

Questionnaire Responses

The key comments gleaned from the questionnaires and the meetings are summarized below:

The *economic development* issues cited included the growth of employment uses south of the city limits and the need to redevelop areas such as the Golden Mile.

Under the category of *fiscal policies*, several stakeholders cited taxes as an issue, including the need to provide residents with tax relief, and the desire to explore potential funding sources to pay for public infrastructure. Other fiscal topics included reinforcing the city's commitment to the Capital Improvements Program (CIP) and exploring the effects of the lack of predictability in state and federal funding for infrastructure (a crosscutting issue with infrastructure [see below]).

Growth trends included several comments about the implications of Smart Growth on the City of Frederick, the desire to manage growth without generating sprawl, and the effect that growth management measures in other jurisdictions are having on the city (by generating demand for more housing).

Growth trends also include the regional context: The city and county are adjacent to two mature counties that may be deflecting growth into the City of Frederick. Howard, Montgomery and, to a lesser extent, Loudoun counties have policies in place both to channel growth into designated growth areas and corridors and to preserve their rural hinterlands. These growth areas, especially in Montgomery and Howard counties, have little capacity available for housing, a reality that, together with the accessibility provided by I-270 and I-70, is resulting in leapfrog development in Frederick City and County.

Comments on *housing* centered on affordable housing and, specifically, how the city can encourage the development of housing affordable to the people who work in Frederick as housing prices escalate in the city and in neighboring jurisdictions.

The *infrastructure* issue included comments on the city's water and sewer systems as well as parks. The need to plan for future infrastructure as the city grows was cited by several stakeholders. Another infrastructure issue was the idea of city government as infrastructure, and the need for the government to become larger and more sophisticated (in terms of personnel, policies and structure) as the city grows. Also, specific needs such as implementing a Geographic Information System (GIS) were mentioned.

Regulatory and policy issues pertained to the zoning ordinance and city code. Specific issues included improving the language of the zoning ordinance to better meet the intent of the regulations.

Transportation is a multi-faceted issue, with comments addressing roads (including road design and traffic congestion), transit, and parking. Several stakeholders pointed to the challenges generated by having roads controlled by more than one jurisdiction, and how the city's lack of control over roads leads to the need to coordinate with other jurisdictions.

Urban design encompassed comments on the buffering of incompatible adjacent uses, as well as the need to support mixes of uses, especially in the Carroll Creek corridor and potentially in a new urban district (other than the Planned Neighborhood District (PND), which is already in place). The need to focus on aesthetics was cited by several stakeholders as well.

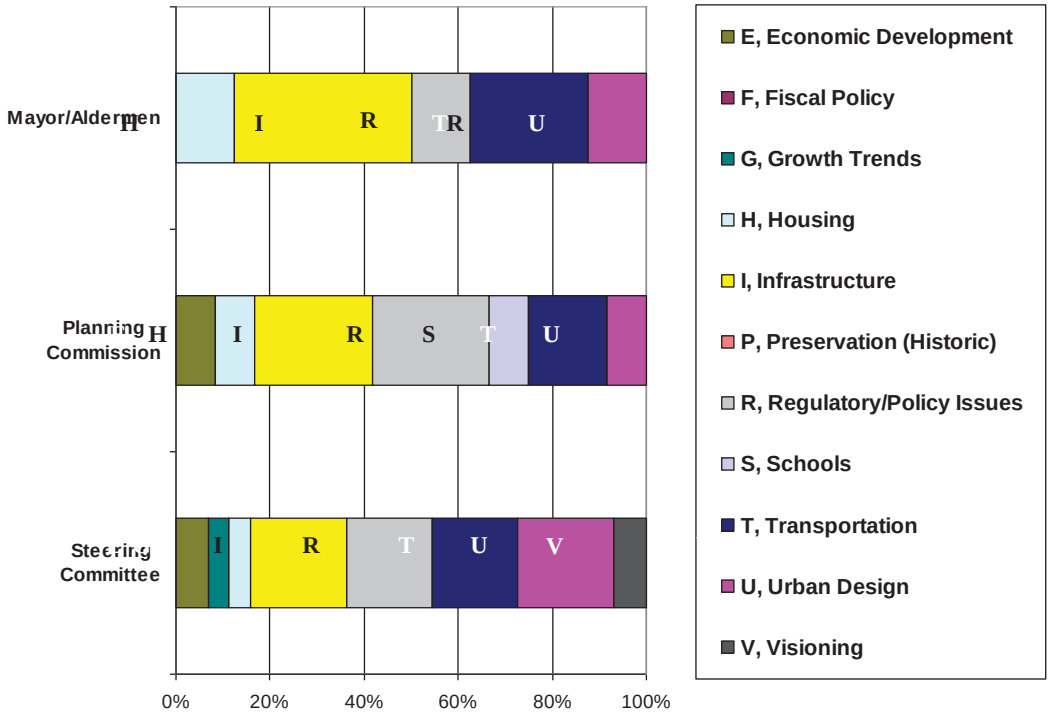
Visioning addressed the need to preserve the heritage of Frederick and to protect the city's quality of life. Creating and reinforcing a vision for downtown was another issue. Integrating the visions for the city and the county also was cited.

A Closer Look at the Responses

Are Aldermen more concerned about infrastructure issues than the SC? Do Planning Commissioners have particular issues they want to focus on? To answer these types of questions and to understand which issues the stakeholders have the most interest and concern about, we cataloged the comments by general category and displayed the results in a series of charts so that it easy to compare where the Mayor and Aldermen, Planning Commission and SC expressed similar concerns and where one group placed more emphasis than another. This allows us to identify the general issues that stakeholders are focused on and to compare this interest among the SC, Planning Commission and the Mayor and Aldermen.

In terms of *planning issues* facing the city, infrastructure, transportation, regulatory and policy issues, and urban design were cited most (see Figure 1).

Figure 1
PLANNING ISSUES: CITY OF FREDERICK
Stakeholder Responses



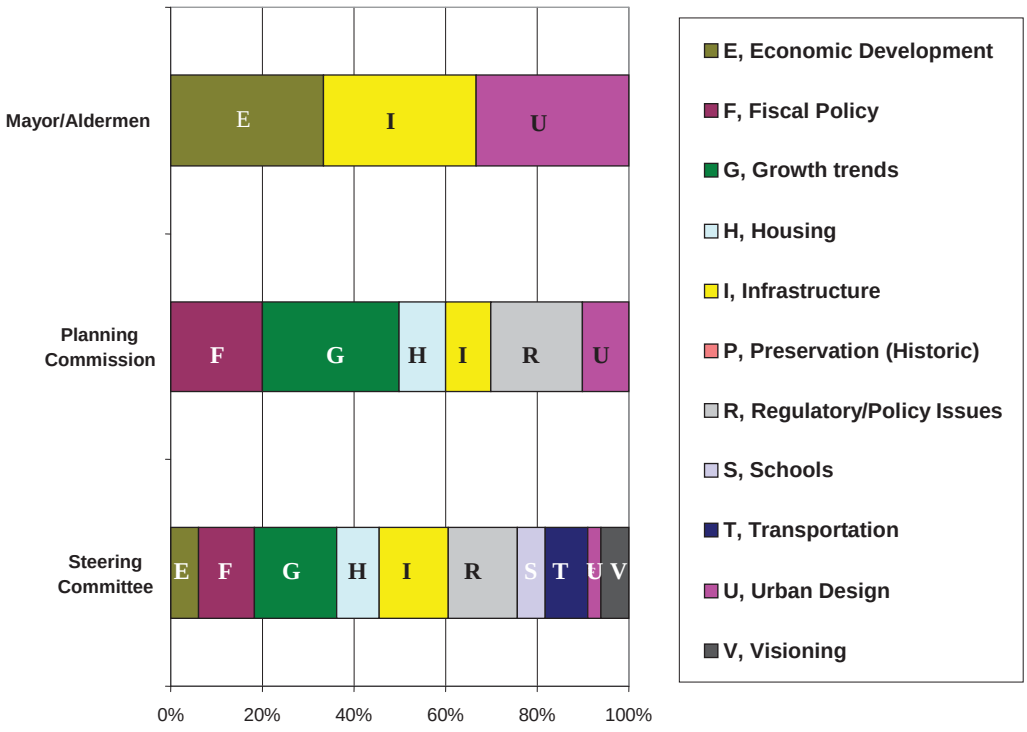
Infrastructure (including water, parkland, and general infrastructure improvements) was a particular interest among the Mayor and Aldermen though it also received comments from the SC and Planning Commission.

The Mayor and Aldermen also recorded more comments per respondent than the SC or Planning Commissioners regarding transportation issues, although both of these latter groups also made several comments about such issues as traffic, parking downtown,

redesigning roads to accommodate future traffic needs, and the lack of multi-modal transportation alternatives.

Regarding *external trends* facing the city, the stakeholders identified a range of issues that cross most of the categories (see Figure 2). Growth trends were a common issue among Planning Commissioners and members of the SC, with both groups citing regulatory and policy issues to a slightly lesser degree. The Mayor and Aldermen logged relatively more comments on urban design issues than the other stakeholder groups.

Figure 2
EXTERNAL TRENDS: CITY OF FREDERICK
Stakeholder Responses



The *growth management questions* that stakeholders have also cluster around infrastructure and regulatory and policy issues. The Mayor and Aldermen emphasized the future availability of water, the future of parks, and how best to provide infrastructure as the city grows. Each of the groups also registered strong interest in exploring such regulatory and policy issues as noise regulations, enforcement procedures, and the development review process.

The types of *planning tools* that the stakeholders want to learn more about fall in line with the issues they have identified in the other questions: regulatory and policy issues, urban design approaches, and managing growth. Here, several members of the Planning Commission identified an Adequate Public Facilities Ordinance (APFO) as a tool that they wanted to learn more about. Commissioners also voiced an interest in learning about a variety of regulatory and policy tools, including overlay zones, density bonuses, minimum

density zoning, interim development standards, regulatory streamlining, and the transfer of development rights. The Mayor and Aldermen, meanwhile, are interested in looking at pedestrian needs, streetscape improvements, and architectural standards under the broad category of urban design.

Report Organization

The issues identified in this report are discussed by posing questions that include crosscutting topics that affect many subject areas, as well as more specific functional areas. For each topic/functional area, issues are briefly defined and follow-on research/analysis and potential strategies are identified.

This PAIR includes discussion of the crosscutting topics and functional areas in the following sequence.

1. Residential and Employment Trends: Past and Future
   - How much *might* the city grow given 30-year trends?
   - How do county policies and regulations affect city growth?
   - How much land is needed?
   - What is the time horizon of the comprehensive plan?
   - What is Frederick's role in the region?
2. What is the city's fiscal outlook?
3. How should the city coordinate land use and transportation?
4. How much water is needed, can be supplied and when?
5. How can the city improve sanitary sewer service?
6. How should the comprehensive plan address area issues?
7. What kinds of parks and recreation lands and facilities are needed?
8. How should the city address historic resources outside the downtown historic district?
9. What makes a good comprehensive plan and land development ordinance? How to strengthen the city's ability to plan for and manage growth.
10. How can the city's unique characteristics and urban design qualities be incorporated into new development?
11. Sensitive areas: given the strength of environmental state regulations, what additional local efforts are needed to ensure environmental sustainability?
12. What city government resources are needed to address and manage growth?
13. How can interjurisdictional and inter-agency coordination be improved?

1.0 Residential and Employment Trends: Past and Future

Like most of central Maryland, the Frederick region has experienced strong growth during the past 30 years. Whether this trend will continue (or continue as strongly) in the future is a matter of debate. No matter how one interprets population and employment forecasts, however, future growth in the City of Frederick will be a central theme of the Comprehensive Plan Update.

It is important to differentiate between what growth *might* occur given historical trends, regional growth and market pressures versus what the city's policy response *should be* to manage and shape these trends. This section of the PAIR focuses on what might happen and then moves on to discuss how the Comprehensive Plan Update process should identify and analyze alternate scenarios to these trends.

To provide a context for the issues that spring from and are affected by growth, we have examined population and employment data to frame several questions that will arise during the plan update process.

Namely:

- How much might the city grow?
- How do Frederick County's policies and regulations affect growth within the city?
- How much land is needed to accommodate this growth?
- What is the city's role within the region?
- What should the time horizon of the plan update be?

As well as several questions that relate to employment growth:

- What is the city's at-place employment?
- What are the city's growth sectors?
- What types of employment growth can the City of Frederick expect given regional and national trends?
- How much land is needed to accommodate job growth?
- Where should the city plan for and zone land for employment?
- Should these areas be concentrated (as the current plan and zoning ordinance specify large areas of employment lands near the airport) or should the city seek to provide more diverse locations and mixed use?

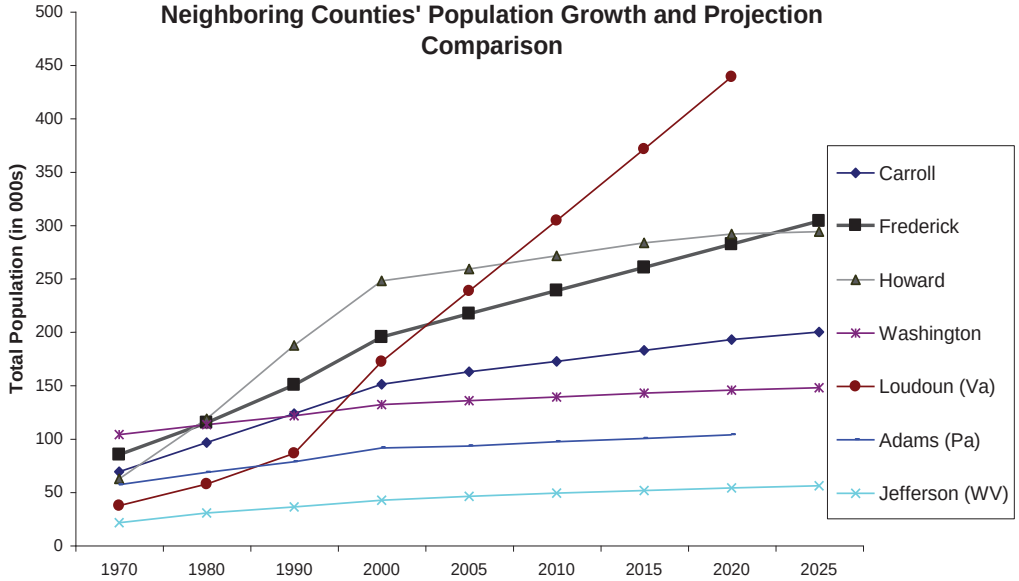
In this section, we introduce these questions, as well as the research and analysis needed to answer them and a few strategies the city should explore during the plan update process to address them.

Issue 1.1 How much *might* the city grow given the city, county and regional trends of the last 30 years?

Population Trends

The Maryland State Data Center (a division of the Maryland Department of Planning) projects growth for all Maryland counties. These forecasts show that Frederick County has grown faster than its neighboring counties, with more than a 30 percent increase during each of the last three censuses. The only county that has grown faster is Loudoun County, VA, which doubled its population between 1990 and 2000. However, Frederick County is projected to grow at a more modest rate during the next 25 years than it has during the past 30. Carroll and Washington counties are expected to have the same flattened trajectory as well. (These forecasts are depicted in Figure 3, as are projections for nearby Adams County, Pa., Loudoun County, Va., and Jefferson County, W.V., for comparison purposes.)

Figure 3
Neighboring Counties' Population Growth and Projection Comparison



Projection Data Sources
Carroll, Frederick, Howard, Washington: Maryland Data Center
Loudoun: Metropolitan Washington Council of Governments (forecast available to 2020)
Jefferson: Regional Research Institute, West Virginia University
Adams: Pennsylvania State Data Center (forecast available to 2020)

The logic of the state's projection is not readily apparent, particularly for Frederick County, given its rapid growth from 1970 to 2000. The difference in the state's forecast compared to past trends is even more curious given that the jurisdictions adjacent to Frederick County also have experienced substantial growth during this period. It certainly could be argued that this trend, coupled with Frederick, Howard, and Montgomery counties' slow growth policies, may deflect more growth to the City of Frederick in the future.

To complement the growth relationship shown in Figure 3, Tables 1 and 2 show the actual population figures and projected growth for Frederick County and other counties in the

region (including Montgomery, which was omitted from Figure 3 because of differences in scale).

Table 1: County Population Growth, 1970 – 2000

County	US Census Counts				70-00	70-00
	1970	1980	1990	2000	Cumulative Change	Compound Average Annual Change
Carroll	69,006	96,356	123,372	150,897	118.7%	2.6%
Frederick	84,927	114,792	150,208	195,277	129.9%	2.8%
Howard	62,394	118,572	187,328	247,842	297.2%	4.7%
Montgomery	522,809	579,053	757,027	873,341	67.1%	1.7%
Washington	103,829	113,086	121,393	131,923	27.1%	0.8%
Loudoun (VA)	37,150	57,427	86,100	172,200	363.5%	5.2%
Berkeley (WV)	36,356	46,775	59,253	79,202	117.9%	2.6%
Adams (Pa)	56,937	68,292	78,274	91,292	60.3%	1.6%
Jefferson (WV)	21,280	30,302	35,926	42,190	98.2%	2.3%

Source: US Census

Table 2: County Population Projections, 2000 – 2025

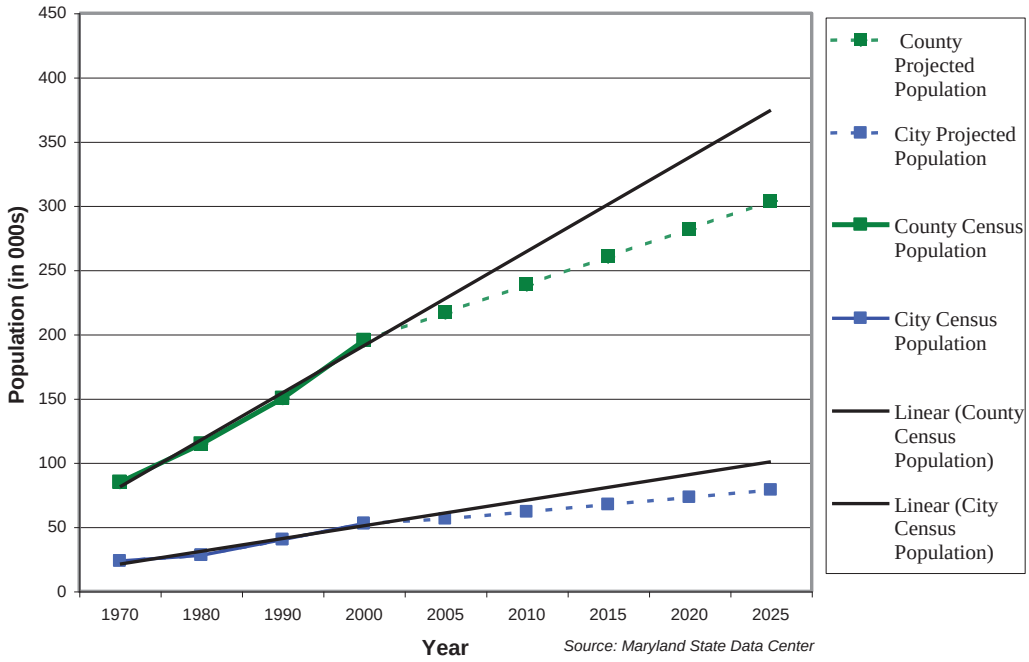
County	US Census	*Projected Population					00-25	00-25
	2000	2005	2010	2015	2020	2025	Cumulative Change	Compound Average Annual Change
Carroll	150,897	162,700	172,300	182,700	192,700	199,800	32.4%	1.1%
Frederick	195,277	217,00	238,700	260,400	282,100	303,800	55.6%	1.8%
Howard	247,842	258,800	271,300	283,300	291,700	293,900	18.6%	0.7%
Montgomery	873,341	928,300	963,300	993,300	1018,300	1038,300	18.9%	0.7%
Washington	131,923	135,500	139,000	142,500	145,400	147,600	11.9%	0.5%
Loudoun (VA)	172,200	238,200	304,200	371,200	439,000			**3.8%
Berkeley (WV)	79,202	81,054	86,014	90,405	94,470	98,164	23.9%	0.9%
Adams (Pa)	91,292	92,976	97,059	100,142	103,475			**0.5%
Jefferson (WV)	42,190	45,836	48,870	51,444	53,755	55,835	32.3%	1.1%

****Data Sources***
Carroll, Frederick, Howard, Washington: Maryland Data Center
Loudoun: Metropolitan Washington Council of Governments (Available to 2020)
Berkeley, Jefferson: Regional Research Institute, West Virginia University
Adams: Pennsylvania State Data Center (Available to 2020)
*** Average Annual Change for 2000-2020*

An Alternative Forecast Based on the Continuation of Past Trends

Given that these forecasts may be low, we examined the data further. Extrapolating the U.S. census population counts for 1970 to 2000,[1] we estimated the total population for Frederick County in 2025 at more than 375,000 (see Figure 4). This is 24 percent higher than the forecasts of the Metropolitan Washington Council of Governments (MWCOG) and Maryland State Data Center (303,400 and 303,800, respectively).

Figure 4
Frederick City and Frederick County Population Projections



The City of Frederick Planning Department has projected the city's population to the year 2025 by assuming that the city's population would remain at 26 percent of the county's total (as projected by MWCOG). However, by extrapolating population trends for the city for 1970 through 2000, the 2025 population can be estimated as high as 100,000 (see Figure 4). This is 27 percent more than the city's planning department's projection of approximately 79,000 by 2025. Moreover, if one assumes that the county's current slow growth policies continue, some of the trend growth otherwise projected for the county likely would be deflected into the city, increasing the city's 2025 population beyond 100,000.

While there is no certainty that the city and county will continue to grow as rapidly as they have in the past 30 years, it is helpful to project linear growth even if it only helps to establish a range of potential development, with the state's forecast forming the low end of the spectrum.

[1] Forecast done by using simple linear regression.

Housing

As the city's role in the region evolves, the demand for particular housing types may change. To understand this, the plan update process should address the mix and balance between single- and multi-family units and how this balance may change as the city grows.

The city has experienced rising housing and land prices, which in turn has increased the need to maintain and expand the city's supply of affordable housing and moderately priced dwelling units. Given these factors, it may be time for the city to consider more aggressive policies to address affordable housing.

Similarly, the rise in housing prices and the tighter supply of housing may be resulting in higher rates of homelessness. An examination of the affordable housing issue should address the housing options available to the people who fill low-income jobs in the city.

Employment

Employment is another element that will drive the city's future growth. Because at-place employment for the city is not available at this time, we use county data to illustrate recent job growth.

During the last two decades, Frederick County's at-place employment grew at a much faster rate than its household growth. From 1980 to 1998, jobs in the county (which include the city) grew from 29,000 to 65,000, or 124 percent. Households also grew rapidly during this period but not as sharply, up approximately 85 percent. The resulting jobs to housing ratio for Frederick County, a useful indicator of economic self-sufficiency, grew from 0.77 in 1980 to approximately 0.94 in 1998. This belies somewhat the perception of the county as a bedroom community.[2]

Although counties (including Montgomery and Howard) that are further along in their development maturation have a more jobs-rich ratio, Frederick County and, in particular, the City of Frederick, are well situated to absorb substantial employment growth given the city's regional highway accessibility, available land, and access to a skilled and educated labor force.

More information is needed about the city's employment base to formulate policies and strategies to strengthen growing and desirable employment sectors and define an effective economic strategy that provides for a healthy fiscal outlook based on a mix of employment and residential ratables within city limits. This will be a key focus of the analysis and research undertaken as part of the plan update process.

The city recently created a Department of Economic Development to help direct its economic development efforts. This is an important first step. Analysis should be undertaken to define total at-place employment in the city, leading growth sectors, the

[2] By comparison, Montgomery County's at place employment grew by 75 percent during this period, for a jobs to housing ratio change from 1.05 in 1980 to 1.20 in 1998.

types of employment growth the City of Frederick can expect given regional and national trends, as well as the city's core strengths and differentiators.

Research/Analysis:

A. Determine the rationale for the Maryland State Data Center and MWCOG forecasts for Frederick, which appear to be quite low given recent growth trends.
B. Meet with staff members of the Maryland Department of Planning (MDP) and MWCOG to review county population projections.
C. Analyze the impacts of a city population of various sizes on transportation, infrastructure, and the city's ability to maintain its fiscal health.
D. Analyze housing trends and the mix of types of residential development (single-family, multi-family, townhouse).
E. Identify current supplies of uncommitted developable lands within the city.
F. Determine current (2000) city at-place employment to understand what percentage of county at place employment is located in the city. Sources include the city's Economic Development Department, the city's Chief Financial Officer, MWCOG, and commercial sources such as, InfoUSA, among others.
G. When more is known about the city's current employment base and the amount and location of vacant and developable lands, undertake a residential and employment supply and demand analysis to ascertain related land needs.
H. Research "holding zone" options and infrastructure extension and phasing options to maintain long-term reserve for future development.
I. Examine the optimal mix and balance of single- and multi-family units in the city, both existing and under future growth scenarios.
J. Determine the need for and supply of affordable housing based on 2000 Census household income and housing prices and rents. Conduct interviews with real estate agents and developers as appropriate.
K. Examine the issue of homelessness within the context of affordable housing in the city.
L. Identify the existing residential/commercial/industrial mix in the city, determine the optimal balance and mix of uses for the plan horizon year, and identify strategies to achieve that mix.
M. Interview residential and employment developers to understand current market trends and perceptions.
N. Identify employment trends and potential by sector for the city and county.
O. Evaluate the city's economic strengths and potential growth industries given regional and national trends and local conditions, including its existing employment base.
P. Evaluate the inventory of uncommitted non-residential lands within the city in terms of location, size, access, and zoning to better understand the city's land capacity to accommodate more employment. A key question here: How much land is zoned for office development?
Q. Develop an inventory of available lands served by or planned to be served by sewer and water service.
R. Develop forecast(s) of employment for the plan horizon year.

Potential Strategies:

A. Seek agreement with the MDP and MWCOG on updated forecasts or at least a range of potential population and employment growth.
B. Consider measures to better integrate multi-family uses with other housing types.
C. Consider the applicability and usefulness of a Moderately Priced Dwelling Unit (MPDU) Ordinance that would require the construction of moderately priced dwelling units as part of developments over a certain size threshold. In addition to the well-known Montgomery County MPDU, investigate other MPDU ordinances.
D. Compare the build-out potential of the city's residential zoning categories to the optimal mix of housing types and consider rezoning land as appropriate.
E. Explore how much land should be reserved for future employment, especially office uses. Such a study should be undertaken as the city continues to work with business owners to enhance the viability of downtown while diversifying the citywide employment base.
F. Develop an economic development strategy in concert with the county to increase the number of jobs within the city.

Issue 1.2 How do Frederick County's policies and regulations affect city growth?

Portions of Frederick County that have been identified by the City of Frederick for potential future annexation are planned and zoned for low density residential uses and agriculture. The density assumed by the county's Comprehensive Plan for these areas (one to four dwelling units per acre) is lower than the densities of adjacent city lands. This development pattern may be inconsistent with the city's desire to promote a more urban type of development and may be inconsistent with the county's designation of the City of Frederick as the county's long-term urban center. However, as county planning staff has noted, the county designates the land within the potential annexation areas as Low Density Residential (or employment of some kind) to show that residential growth there is acceptable in concept. What the density ends up being is a matter of negotiation at the time of annexation. A well-reasoned petition for annexation with a density greater than the Low Density range of one to four units per acre may be granted a waiver of zoning consistency by the Board of County Commissioners.

In the absence of an Adequate Public Facilities Ordinance (APFO) in the city, the county has been relying on the waiver process to try to add conditions that would approximate what the county would have imposed on a developer for timing of school populations, dedications for schools and fire stations, off-site road improvements, and sometimes unit caps to address school capacity.

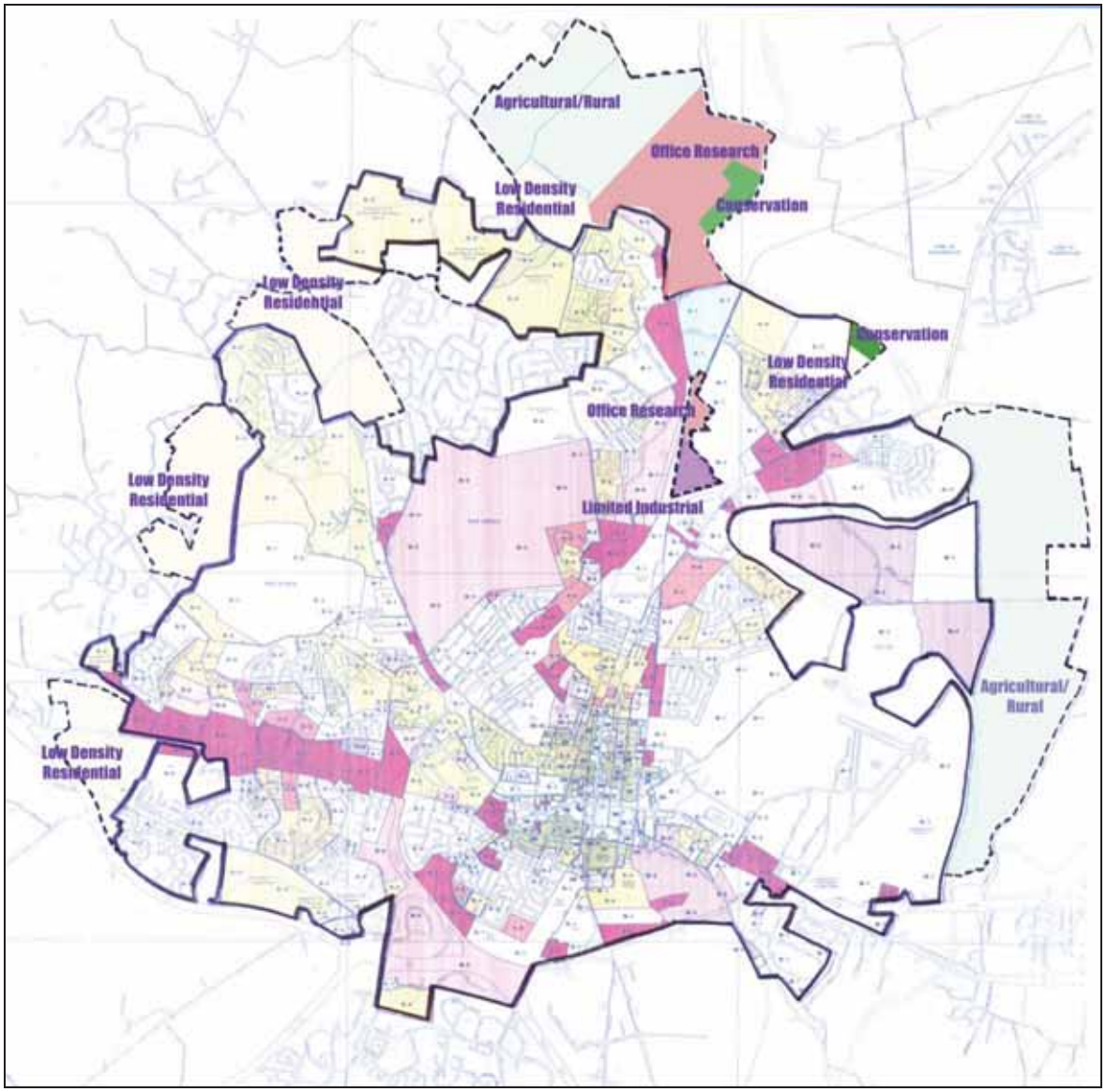
Consequently, county zoning adjacent to the city is generally not a large issue, according to county planning staff. Annexation proposals must be consistent with the county's Comprehensive Plan designation. Given that an annexation petitioner is likely to gain a waiver to the density required in the zoning regulations and the fact that the county's Low Density Residential designation allows one to four units per acre, the five-year wait imposed by state law is often not as onerous as it appears. It also must be noted that the county's Planned Unit Development (PUD) zoning district sometimes results in densities

even greater than four units per acre, a fact that sometimes leads to unit caps during waiver negotiations based on adequate public facilities issues.

However, in one respect, county zoning within the annexation area is relevant. For example, the City of Frederick has asked the county to maintain agricultural zoning within the annexation areas so that widespread, premature development on septic and well does not result. But the county has not been apt to "downzone" where the land was already zoned R-1. In these areas, the 'danger' of premature development outside of city densities and services still exists. If a developer is so anxious that he or she is willing to develop land zoned R-1 (one unit per acre), the county has approved development applications even if the resulting development, are built with wells and septic systems.

Figure 5 shows the county's Comprehensive Plan designation for the city's potential annexation areas. Most areas are planned for agricultural uses, followed by low density residential uses and employment.

Figure 5: Frederick County Comprehensive Plan Designations for the City of Frederick's Potential Annexation Areas[3]



[3] This map does not include minor changes to the county planning designations as adopted in the *Frederick Region Plan*.

Table 3 compares Frederick County and City of Frederick residential district density designations. The table highlights some of the differences between the densities of zoning districts with the same names.

Table 3 Comparing Density: Frederick County & City Residential Zoning Districts

County Districts	Density Class	DU/AC (Maximum)	City Districts	Density Class	DU/AC (Maximum)
A	Agricultural Use	1[4]	A	Agricultural Use	1
R-1	Low	1	No comparable zone		
R-3	Low	3	R-1	Low	2.9
R-5	Medium	5	R-2	Low	4
R-8	Medium	8	R-3	Medium	7
R-12	High	12	R-4	Medium	12
R-16	High	16	R-5	High	18
No comparable zone			R-6	High	24
No comparable zone			R-7	High	30

Sources: Frederick County Draft Zoning Ordinance 2002, City of Frederick Zoning Ordinance, 1986

Research/Analysis:

A. Explore the county's plans and policies to understand how they will need to be changed to allow implementation of (in the long-term) a 50-year growth boundary as the *Frederick Region Plan* recommends.
B. Explore the applicability of a Transfer of Development Rights (TDR) program in conjunction with Frederick County. Frederick County's Comprehensive Plan refers to the potential use of TDR. TDR is a complex growth management tool and its impacts on City of Frederick, a likely receiving area, needs to be fully investigated and understood, as to who would benefit and how to balance and mitigate the impacts of growth and the benefits of preserved agricultural and rural lands.
C. Investigate the effect of the county's APFO on the city's pace of development and CIP.

Potential Strategies:

A. Adopt a TDR program in concert with the county.
B. Revisit the 1988 annexation agreement with Frederick County, examine each of the potential annexation areas, and determine the appropriate scale of development and mix of uses in each area. If the city identifies annexation areas where the county-designated density or uses are not compatible with city goals, request that the county amend these designations.
C. During the review and update of the city's land development regulations and zoning map, review the names of the city's zoning districts and consider renaming the residential zoning districts so that the name of the district more clearly relates to the

[4]Frederick County zoning regulations allow land zoned "A" to be subdivided into three parcels (with the remainder of the land comprising a fourth parcel). After the third parcel has been approved (which need not happen at the same time as the first or second), the land may not be subdivided again unless it is rezoned. The minimum lot size for the subdivided lots is one acre. In an effort to preserve prime farmland for agricultural use, county zoning regulations provide a cluster option that allows landowners to subdivide the least productive ground, with the approval of the Planning Commission. The maximum lot size for a cluster lot is two acres.

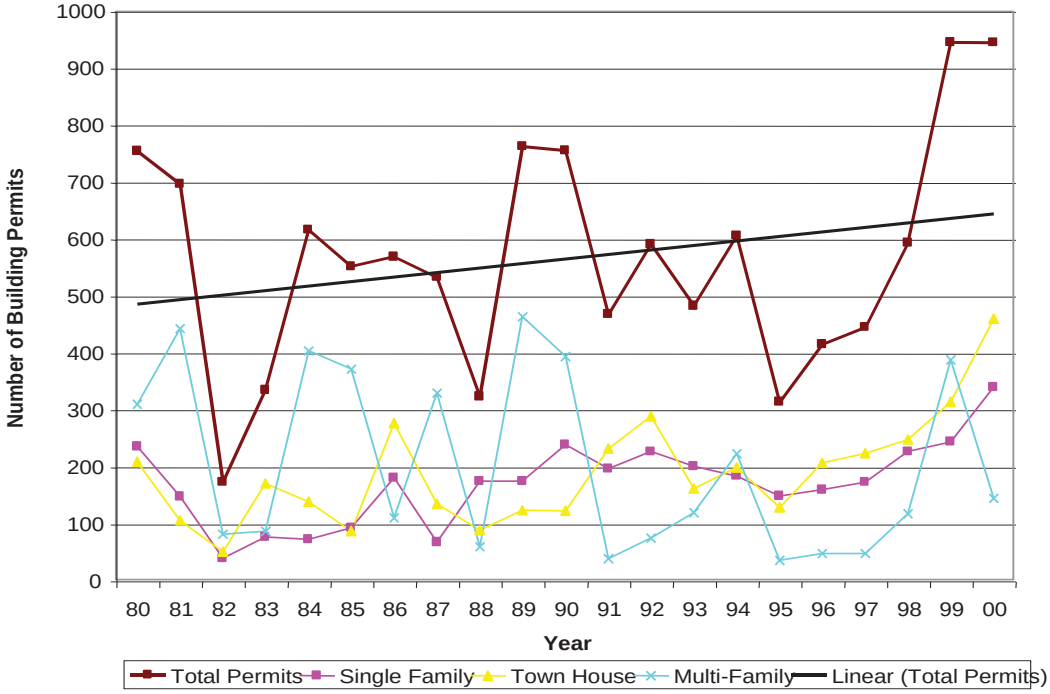
density permitted (e.g., if the maximum density is 4 dwelling units per acre, consider renaming the R-2 zone to R-4 to make the zoning district names more descriptive and intuitive). This would also allow for easier comparison to county zoning districts.

Issue1.3 How much land is needed?

City of Frederick Housing Permit Trends

On average, the City of Frederick has issued 566 new residential permits per year since 1980 with a high of 946 in 1999 and a low of 173 in 1982 (see Figure 6). During this 20-year period, there were three periods of substantially lower levels of permits. The first two, in the early and late 1980s, coincided with national recessions. The most recent dip in permits in the mid-1990s reflects a sharp drop in multi-family permits. Residential permit activity has been strong in recent years, however, increasing 38 percent between 1998 and 2000 to approach 1,000 permits per year.

Figure 6
Frederick City Residential Building Permits Issued, 1980-2000



Future Annexation Areas and Potential Land Needs

The city and county have a 1988 annexation agreement. Although the agreement has not formally been updated, the city's 1995 Comprehensive Plan refined the annexation areas and the *Frederick Region Plan* has acknowledged these revised boundaries. In the city's *2002 Growth and Development Report*, planning staff identified approximately 3,900 acres of potential annexation areas that, based on the city's Water and Sewer Master Plan, can be serviced.

In the city's *Growth and Development Report*, a total of 810 acres of residential land is estimated to be needed during the next 20 years; an amount that could easily be accommodated within the annexation areas. The city's analysis assumes that much of this development will be at densities between 10 and 24 dwelling units per acre (du/ac). This estimated is revisited in the discussion below.

Housing and Employment Demand vs. Supply: How much growth can the city's potential annexation areas absorb?

To get a snapshot of the city's projected housing and employment demand and to quantify the amount of land that will be needed to meet this demand during the next 25 years, we developed four alternatives, each based on a different assumption of the densities at which the housing would build out and an assumption that 20 percent of the potential annexation areas would be developed for employment. This 20 percent assumption is a proxy for a more in-depth analysis to be completed as part of the plan update. This employment land assumption is based on an American Planning Association survey of cities under 100,000 in population and the average percent of lands developed for employment uses.[5]

For this exercise, we assumed that the city would grow to a population of 100,000 by 2025 and then applied a range of residential densities to calculate the amount of acres needed to accommodate the new units. Table 4 describes the four residential and employment alternatives and Table 5 presents the results of the exercise, comparing land supply and demand.

Note Well: This exercise is designed to illustrate land needs for the City of Frederick, given what ***might*** happen as a result of market trends. It is not a recommendation for such a future. The policies and regulations that manage and steer growth and its pace are to be decided as part of the Comprehensive Plan update process, not now at the issue development stage.

No assumptions have been made about what percent of this land demand could be accommodated within the city's existing boundaries through the development of vacant lands or through redevelopment. This is because information on vacant or redevelopable lands within the City of Frederick is not available at the time of the preparation of this PAIR. This data gap will be filled as one of the first data development steps in the Comprehensive Plan update process.

[5] Harris, Christopher, "Bringing Land Use Ratios into the '90s," PAS Memo, American Planning Association, August 1992.

Table 4: Sample Residential & Employment Alternatives for Potential Annexation Areas

Housing Density Alternatives	Residential Density Assumptions	Employment Assumptions
Existing City-wide Residential Density Mix	The city's existing housing mix: 35 percent single family (at 4 du/ac); 35 percent medium density (at 10 du/ac);and 30 percent high density (at 24 du/ac),[6] yielding a blended average of 12 du/acre	Employment acreage was assumed to be 20 percent of the total land area, as per Harris (see footnote 5).
City's Assumed Residential Zoning for Annexation Areas	The city's assumed zoning for the annexation areas: two-thirds at 4 du/ac (R-2); approximately 25% at 7 du/ac (R-3); and the remaining portion at 12 du/ac (R-4).[7] (yielding a blended average of 5.4 du/acre)	Same as above
Smart Growth Minimum	The State's Smart Growth standard of 3.5 du/acre[8]	Same as above
Current County Plan Density	A midpoint of the County's Comprehensive Plan designated "low density" range – 2.5 du/ac	Same as above

In addition, a "market factor" of 1.5 was added to the amount of gross acres needed to allow for some additional land to provide market flexibility and to maintain housing affordability. These calculations exclude vacant lands within the city, for which data were unavailable.

The result is a range of acreages needed to meet projected housing demand. These range from approximately 3,800 to 9,800 acres. The maximum would be the forecasted residential need if the annexation lands maintain the density recommended in the county's Comprehensive Plan and the 20-year pace of development continues.

Table 5: Sample Exercise: Residential & Employment Acres Needed, City of Frederick, 2025*

Residential Density Alternatives	Residential Acres Needed	Employment Acres Needed**	Total Acres Needed	Potential Annexation Acres	Acres Needed as % of Annexation Acres
Existing City-wide Density Mix	3,050	780	3,830	3,900	98%
City's Assumed Zoning for Annexation Areas	4,990	780	5,770	3,900	148%
Smart Growth Minimum	6,450	780	7,230	3,900	185%
County Comprehensive Plan Designated Density	9,020	780	9,800	3,900	251%

Notes:
These calculations exclude vacant lands within the city, for which data were unavailable
** Based on a projected population of 100,000 and a "market factor" of 1.5*
***Assumed as 20 percent of the potential annexation areas based on the APA source cited in footnote 4.*

The city's potential housing and employment demand will have to be accommodated in the city's future annexation areas and on vacant lands within the city. As mentioned

[6] City of Frederick *Growth and Development Report*, March 2002, page 37
[7] City of Frederick *Growth and Development Report*, March 2002, page 38
[8] This also approximates the city's overall gross density of total developed residential lands, divided by the number of housing units.

earlier, the city has calculated approximately 3,900 acres within the potential annexation areas. Table 5 shows the alternative buildout alternatives measured against the total potential annexation area acreage. Thus, for all but one of the alternatives there may be a deficit of lands available for development and, even within that alternative, the need for residential and employment land is almost equal to the potential acreage available. A more detailed table is included in Appendix B.

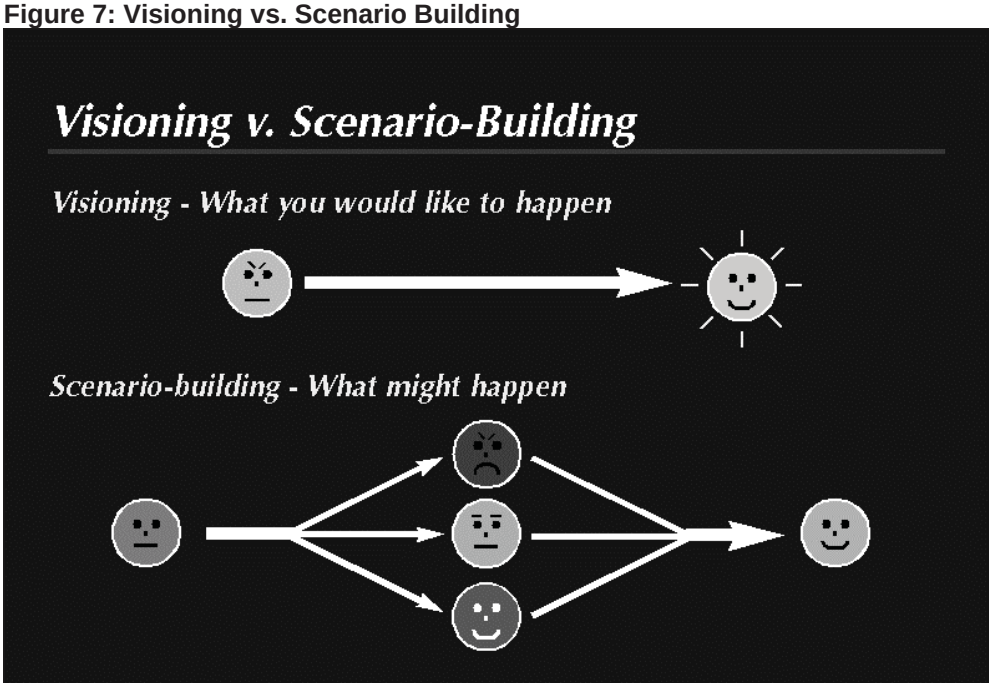
Building Plausible and Desirable Growth Scenarios as part of the Comprehensive Plan Update

As part of the Comprehensive Plan development process, a wide range of plan alternatives must be considered, and the effort must go beyond a focus on "visioning." Structuring plausible alternatives—building scenarios—that are credible and productive is the way to address this need. The City of Frederick Comprehensive Plan will include the development of scenarios, the testing and evaluation of their impacts, and the selection or development of a preferred scenario. The preferred scenario will provide the basis for the development of the new Comprehensive Plan's recommendations and implementation strategies. Included in the scenarios will be assumptions about the mix and composition of future employment and housing, the timing/phasing of this development, and its location.

What is scenario building?

What is a scenario? A scenario is a reasonably plausible but structurally different future. This definition makes scenarios quite different from "visioning" as it is typically practiced. Visioning asks people: "What would you like to see happen?" or "How would you like your community to look?" Such calls often raise false expectations and mask the tradeoffs involved, producing a lowest common denominator recitation of goals and objectives that may mask conflicting issues. Figure 7 shows the difference between visioning and scenario building. In scenario building, the key question is: "What do you think might happen?" This question requires people to uncover and cope with forces that are driving change in their environment.

Figure 7: Visioning vs. Scenario Building



Scenarios should reflect an integrated, consistent storyline–an explanation of how an underlying reality can unfold under feasible circumstances. Plausible alternatives demand respect and objective analysis. Scenario analysis avoids obviously "good" or "bad" visions that favor some easy-to-defend option against straw men. This definition of a "scenario" challenges such easy comparisons as the typical "compact versus sprawl" alternatives that are commonly generated and "tested."

To build planning scenarios, one must match a possible future with a desired future. Two parallel processes are involved, one that is objective and analytical and that sets limits on the range of possible futures, and another that reflects the desires of various interest groups. These processes are brought together so that the goals and objectives of various interest groups are aligned with complementary driving forces to produce possible scenarios. This process is shown in Figure 8.

When is Scenario-building Appropriate?

While scenario-building is a useful discipline for many planning problems, the process described here as part of a comprehensive plan process is applicable in the following situations:

- Where significant change is likely and outcomes are not obvious (a recent and potential large surge in growth, the likelihood of major redevelopment, a military base closure).
- When the time horizon is medium to long-term (10 to more than 20 years).
- Where the community is heterogeneous and reflects different values and views of the future.

All of these situations are present in the City of Frederick as it begins the Comprehensive Plan Update.

What Scenarios are appropriate to test and understand the City of Frederick's Future?

There is a need to acknowledge and recognize that there is more than one way to build scenarios. The *possible*, as well as the *desired* futures, should be combined into scenarios in complementary ways. There is no recipe for this activity. Scenarios can be built step-by-step from the data and can emerge without a storyline. Or an overall framework can be created as a first step and pieces of evidence fitted into the framework. Or one can start with the "official future" and make excursions into surrounding territory.

While it is too early to have defined the set of alternatives for the city's Comprehensive Plan Update, it is not too early to imagine what some plausible scenarios for consideration could be. Early and very preliminary ideas for scenarios range from one that focuses on Frederick as a "Finite City with no further annexation" to one that focuses on what might happen if Frederick became an "Expansive City with substantial annexation." These could be tested against various population and employment projections.

The obvious gaps between these potential scenarios show that there is much room between these two bookend scenarios to be defined and fleshed out. The process of defining alternative scenarios is not one for this PAIR but for the follow-on development of the Comprehensive Plan. The process will include discussions with the Board of Aldermen, Planning Commission, the Steering Committee, and the general public.

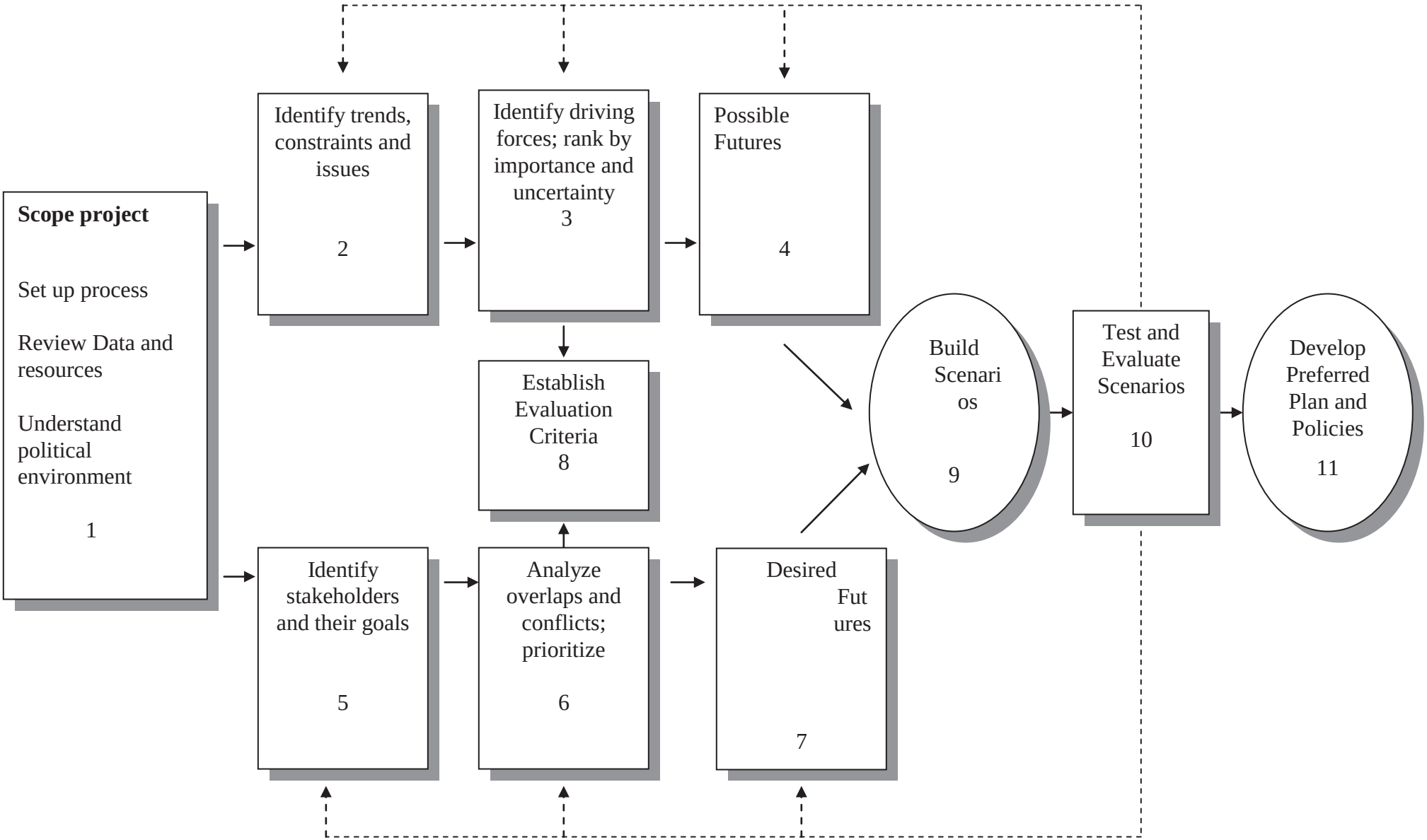
It is important to set basic limits related to scenario development. Important questions about the scope and scale of the scenario process must be answered up front. These include: the timeframe being covered (20 or 50 years?); which items elected or appointed officials might deem off the table; and the available resources (are staff, consultant budgets, time, data, and resources adequate for a sustained analytical process? If not, can a shorter, non-quantitative effort yield useful insights?)

There is also a need to limit the number of scenarios and clearly differentiate them. Three or four scenarios usually suffice, but they need to offer strongly contrasting futures reinforced by memorable names. That is, one should avoid scenario monikers such as A, B and C and instead use names that capture the essence of the ideas and concepts that form the scenarios. One scenario typically scores higher on the (to be established) evaluation criteria than others do. But the preferred scenario (upon which the new Comprehensive Plan will be based) often borrows features and policies from the other scenarios.

Evaluation of the scenarios should include impacts on infrastructure and should also include fiscal testing. It is essential for elected officials and stakeholders to understand the fiscal impact of their ideas. [9]

[9] (For more on scenario building, see Avin/Dembner article in *Planning* magazine, "Getting Scenario-Building Right" November 2001.)

Figure 8 A Recommended Process for Scenario-building



Research/Analysis:

A. Project alternative sizes of the city based on an analysis of impacts of various growth projections, the ability to serve additional lands with infrastructure, and regional growth trends, local attitudes toward city/county roles, etc.
B. Project planned densities for the city's annexation areas.
C. Identify additional lands that may be appropriate for annexation.

Potential Strategies:

A. Revise zoning for vacant city lands and the assumptions for annexation areas based on the city's future residential and non-residential land needs.
B. Investigate various tax policies that could encourage redevelopment of vacant buildings and the development of infill sites.

Issue 1.4 What is the time horizon of the Comprehensive Plan?

While Comprehensive Plans often provide land development guidance for a 20-year horizon, longer-term plans are also employed, particularly when the future impacts of growth on a jurisdiction and associated infrastructure needs may not be apparent within the more traditional 20-year horizon. In fact, the county's recent plan for the Frederick Region advocates 50-year "ultimate development" planning. It would be prudent to forecast the city's growth to 2050 along with land demands for housing and employment and associated infrastructure needs and costs to be able to assess whether the city should amend and increase its potential areas of annexation beyond the currently contemplated areas.

If we project the demand for housing and employment out to 2050 (using a 50-year plan horizon), as recommended in the *Frederick Region Plan*, the land requirements would be substantially higher. Since land patterns adjacent to the city's annexation areas have already begun to be established, it is important to determine in the near-term if the city wants to expand beyond the established annexation areas. If the city does not act upon this until 2025, the opportunity to annex lands that are compatible with urban development patterns will be lost.

Research/Analysis

A. Decide on the horizon year for the Comprehensive Plan: 2025 or 2050?

Potential Strategies

A. Ensure that the Comprehensive Plan Update's land use recommendations, land use supply and infrastructure capacity adequately serve the city's needs to the horizon year as well as addressing the ultimate desired size of the City of Frederick.

Issue 1.5 What is Frederick's role in the region?

Frederick is Maryland's second largest city, considerably smaller than Baltimore City and virtually the same size as Gaithersburg and Bowie. However, unlike Gaithersburg, (a large central place embedded in a highly developed corridor), or Bowie, (which is part of a continuous suburban corridor), Frederick is a central place, situated at the intersection of two interstates and functioning

as the dominant city of a large and rural hinterland. Frederick is located within Maryland's largest county, which has one of the state's lowest densities (measured as persons per square mile). Many still think of Frederick as the small town center of a rural and agricultural county. But recent residential and job growth belie this perception. Understanding these elements will be a central theme of the Comprehensive Plan Update.

Gaining agreement on forecast growth or a range of forecast growth for the city and the county will be an important first step in defining the future land, infrastructure and service delivery needs of the city. To do this, it will be necessary to define the role the city will play within the larger Baltimore-Washington metropolitan region, given regional growth, the impending buildout of Howard and Montgomery counties, Frederick County's rural preservation program, and the county's focus on the City of Frederick for its urban growth.

Regional Accessibility Places the City in Reach of Extensive Employment and Labor Markets

Frederick is located at the crossroads of Frederick County and is the county's designated major growth center. The city is strategically located at the confluence of two major interstates (I-270 and I-70), located less than 30 miles east of a third interstate (I-81) and served by several other major US and state roadways including US 15, US 40, MD 340, MD 355 and MD 26. Fifty miles from both Washington D.C. and Baltimore, the City of Frederick stands at the cusp of becoming the preferred destination of firms and residents seeking alternatives to the highly congested, high priced counties of central Maryland. The city's location affords its residents a high level of accessibility to other parts of the region. It also provides city-based employers with good access to a much larger workforce.

According to the 1990 Census,[10] the average one-way commute time for city residents is 22.5 minutes, about the same as the national average. However, approximately 35 percent of working city residents commute 30-90 minutes each way to work in the Washington D.C. metro area. The city's potential commuter shed is quite wide and reaches into Jefferson County, W.V., Loudoun County, Va., and includes access to Baltimore, Howard, Montgomery, Washington, and Carroll counties.

There is substantial commuting in and out of Frederick County, mostly from Frederick County to other more job-rich counties as well as some in commuting to Frederick County. Only Adams, Washington, and Jefferson counties have more commuters going to Frederick than from it. In- and out-commuting are documented for selected jurisdictions in Table 6 and illustrated in Figure 9.

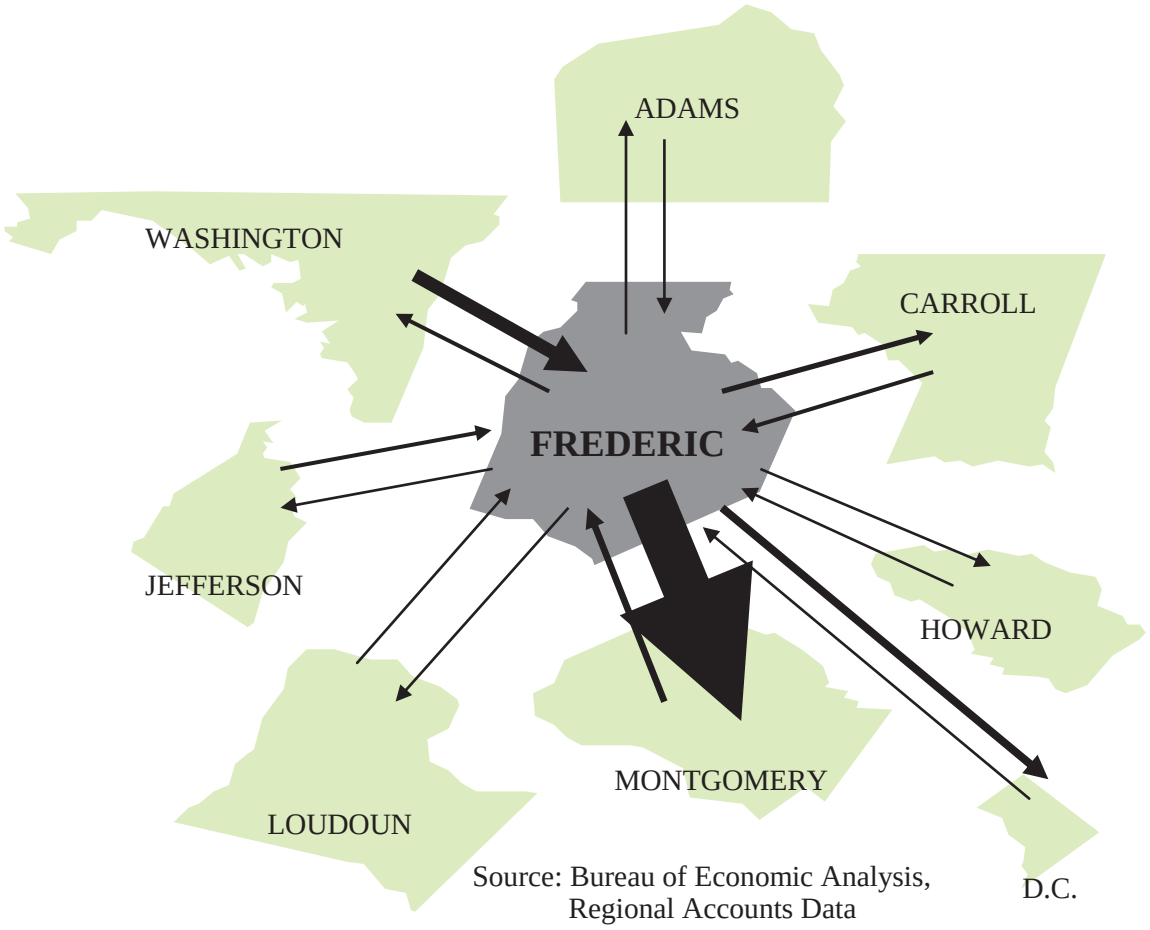
[10] The 2000 county-level average commuting time is available; however, data for cities is not yet available for Maryland. Thus, for data consistency and comparability, we have used the 1990 county data.

Table 6: Frederick County Commuting Patterns to/from Selected Counties, 1990

County	Residents Working in Frederick County	Frederick Residents Working in Selected Jurisdictions	Net In/Out-Commuting (+/-)
Adams (PA)	949	222	+727
Carroll (MD)	1,490	1,688	-198
Howard (MD)	428	890	-462
Montgomery (MD)	2,243	18,887	-16,644
Loudoun (VA)	258	811	-553
Jefferson (WV)	1,014	188	+826
Washington (MD)	5,189	1,190	+3,999
Fairfax (VA)	190	1,385	-1,195
Prince George's (MD)	135	1,144	-1,009
Baltimore City (MD)	92	743	-651
Baltimore County (MD)	257	636	-379
District of Columbia (DC)	56	2,619	-2,563

Source: Bureau of Economic Analysis, Regional Accounts Data, 1998

Figure 9: Regional Commuting Patterns for Selected Counties, 1990



Research/Analysis:

A. Examine the inter-county and commuting patterns that affect greater Frederick.
B. Identify how Frederick can improve its regional accessibility.

C. Review research efforts, cited in the economic development discussion in section 1.1 of this report, related to expanding job opportunities in Frederick to provide alternatives to commuting to other regional employment centers.
D. Test the effects of alternative highway improvements and alternative land use (residential and nonresidential) growth on travel patterns.
E. Identify current Maryland State Highway Administration (SHA) and county highway proposals in the Transportation Improvement Program (TIP) and 20-year inventory.
F. Relate projected levels of service (LOS) in the county overall to average LOS in Montgomery County's I-270 corridor and to the I-95 corridor between Baltimore and Washington.

Potential Strategies:

A. Implement strategies that improve communication among the different branches of government, especially among transportation agencies.

2.0 What is the City's Fiscal Outlook?

Issue 2.1 There is a need to understand the city's current fiscal situation.

Understanding the city's fiscal situation will help us understand how different types of development may affect the city's ability to provide services and invest in infrastructure. Conservative budgeting and maintenance of a stable financial position characterize the City of Frederick's financial operations.[11] The assessed valuation of the city's tax base reached $1.3 billion in 2001 (with non-residential uses accounting for approximately 18 percent of this amount). Between 1998 and 2000, the tax base expanded at an average of 4.5 percent annually.[12]

The city's overall debt burden is moderate, with a net debt burden of $2,856 per capita, or 3 percent of market valuation (down from a debt burden of 5.7% in 1990).[13] In August 2001 the city issued General Obligation and Refunding Bonds and received Aa3[14] and AA[15] ratings from Moody's and Standard & Poor's, respectively. Both credit rating agencies attributed the ratings to the city's expanding and diverse local economy; sound financial operations, significant reserve balances, and moderate and manageable debt burden.

As the city plans for future growth through the plan update process, recommendations for expanded growth-related infrastructure such as sewer and water extensions, additional road capacity and other facilities likely will result. Each of these improvements will have fiscal implications that should be considered and planned for in the plan update process. Moreover, deficiencies in existing facilities are likely to be identified through this process, and these too will carry costs that should be addressed by fiscal policies.

Research/Analysis:

A. Investigate alternative ways to assess fiscal impacts. These range from a data-intensive fiscal modeling approach to a simple assessment based on rules of thumb for capital, and operation and maintenance costs.
B. Define alternative development scenarios for the city as part of the Comprehensive Plan Update to understand the fiscal impacts of different mixes of uses, development patterns, and related development intensities.
C. Research city/county tax differentials.
D. Identify the potential cost of growth-related infrastructure improvements through the scenario building process.

Potential Strategies:

A. Investigate how the city can increase the non-residential portion of its assessable tax base.
B. Implement policies to pay for growth-related infrastructure. These include impact fees, excise taxes, tax increment financing, and special assessment districts.

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[11] Source: Moody's Municipal Credit Research, August 2001.
[12] Source: Standard & Poor's Summary Report for City of Frederick's General Obligation Bonds, August 2001.
[13] Source: Moody's Municipal Credit…Op Cit.
[14] Aa3 indicates low risk. It is Moody's second highest bond rating.
[15] AA is S&P's second highest rating. It reflects the obligator's (Frederick's) strong capacity to meet its commitment.

C. Coordinate with the Department of Economic Development to investigate various tax policies that could encourage redevelopment of vacant buildings and the development of infill sites including land value taxation. Also investigate additional grant possibilities, the use of Tax Increment Financing, and the potential usefulness of an arts district to encourage economic development and revitalization.

3.0 How Should the City Coordinate Land Use and Transportation?

Issue 3.1 Provide some equilibrium between land use and transportation.

The city's transportation infrastructure and planning tools have not kept pace with land development. Recent efforts to understand transportation issues (the on-going circulation studies), the new MARC service connecting Frederick with Washington DC and interim points, and the recent Shared Path Study all are positive occurrences. The Plan Update should build upon these efforts and investigate the expansion of bus service within the city and the county, the addition of bicycle facilities, the development of long-range plans to build a bicycle infrastructure, and efforts to improve pedestrian facilities.

The challenge of balancing land use and transportation touches on many issues.

- **Assessing current transportation deficiencies:** There is a need to identify important priorities, financial strategies, and resources to pay for needed improvements.
- **Assessing the projected growth-related transportation impacts:** New growth will bring with it a need for additional transportation improvements.
- **Quantifying the imbalance between land use and transportation:** There is a need to understand the site-specific as well as overall citywide impacts of land use on transportation (such as demand for new and/or improved facilities) as well as the impacts of the transportation system on land use (such as improving accessibility).
- **Concurrency or need for a timing balance:** Development in certain areas has outpaced adequate transportation improvements.
- **Paying for road improvements:** The demand to build and expand existing capacity is increasing faster than the state or local government's ability to pay for the facilities.
- **Providing better connections between new residential neighborhoods.**
- **Balancing the need to facilitate through-traffic with one-way streets with the objectives of land use and urban design:** The city's one-way system of downtown streets may increase automobile speeds but reduce the livability and pedestrian nature of downtown.
- **Determining how much parking is needed:** The city's high parking standards may be hindering the adaptive reuse of buildings outside of downtown.
- **Understanding that transportation is more than automobiles:** More emphasis should be placed on pedestrian and bicycle circulation, as well as transit service within Frederick as well as to/from other origins/destinations.

Research/Analysis:

A. Identify existing and projected transportation infrastructure deficiencies.
B. Develop alternative, integrated land use and transportation scenarios to assess impacts, costs, and long-term needs.
C. Determine the existing and anticipated traffic volumes and levels of service (LOS) on roadways throughout the city, incorporating various projected growth alternatives for households and employment. These scenarios would address the questions: What are the costs associated with the needed transportation improvements under each alternative scenario? Which, if any, alternatives will result in a slower growth of congestion? What role does projected regional growth outside the city play in congestion within the city?

D. Review the findings of the downtown parking study and balance those recommendations with other city objectives related to land use compatibility, urban design and downtown character.
E. Explore potential improvements to county bus service to meet ridership needs, including employer shuttle services.
F. Review the Draft Environmental Impact Statement & Section 4F Evaluation of the I-270 / US 15 Multi-Modal Corridor Study and explore the potential for the extension of transit to the City of Frederick along the I-270 corridor.
G. Review the county's APFO to understand how to position city initiatives to meet overall county and city goals.

Potential Strategies:

A. Reconsider the city's parking ratios/standards, evaluate provisions for expanded shared parking facilities and reduced standards for adaptive reuse outside of downtown, enhance parking lot and parking structure screening and design requirements, and consider the use of pervious surface for parking lots.
B. Investigate the applicability of an APFO to phase development with the availability and adequacy of existing and future roadways.
C. Investigate the use of impact fees or excise taxes to pay for growth-related infrastructure and capital improvements.
D. Investigate the usefulness of implementing guidelines for developing traffic impact studies so that the city staff and elected and appointed officials can make more informed decisions about what transportation improvements — both on and off-site — are made necessary by potential new development proposals.
E. Investigate potential improvements to the county's bus service within the city.
F. With the initiation of MARC train service to and from Frederick, investigate ways to improve access and development adjacent to the MARC station.
G. Develop a priority list of proposed transportation improvements.

4.0 How Much Water is Needed, Can be Supplied, and When?

Issue 4.1 The city's water supply is not sufficient to meet short- or long-term needs

This shortfall, based on lower levels of available water than anticipated and severe drought conditions, has halted development and placed the city in a water emergency. The city has issued a *Strategic Interim Water Management Plan* that includes a number of conservation, supply and demand side actions, and strategies designed to address the complex set of issues related to expanding the water supply available to the city.

Research/Analysis:

A. How large the city grows will be a determinant in the city's water supply needs. The alternative scenarios discussed above also should include an analysis of water needs to meet the scenarios' land use goals.
B. Evaluate the recommendations in the *Strategic Interim Water Management Plan* and undertake additional analysis to identify and bring online additional water resources.
C. Review how other communities have implemented water allocation systems or ordinances and assess their applicability to the City of Frederick.
D. Identify life cycle issues related to the age of some portions of the existing water distribution system.
E. Analyze existing large users of municipal water to understand their impacts and the potential for conservation measures.
F. Investigate/confirm the city's current water supply as well as potential options for additional water and their potential yields and order of magnitude costs.

Potential Strategies:

A. Develop a priority list of needed improvements/replacements to the existing water distribution system related to aging facilities.
B. Other strategies related to expansion of the water system are to be determined based on results of *Interim Water Management Plan*.
C. Investigate the potential for an integrated city/county water treatment and transmission system.
D. Consider the purchase of land to create a water impoundment area. The area would be used to store large amounts of water as part of a reservoir system to serve the city's water needs in times of severe drought or water shortage. This water resource could also be used for recreational purposes.

5.0 How Can the City Improve Sanitary Sewer Service?

Issue 5.1 Enhance the recommendations of the City's *Water and Sewer Master Plan*

Although the City's *Water and Sewer Master Plan* (2000) recommends improvements to the current wastewater treatment facilities that serve Frederick, some water and sewer issues should be considered in the Comprehensive Plan Update.

An analysis of sanitary sewer overflows (SSOs) is needed because some segments of the major interceptor sewers are hydraulically overloaded. The status of SSOs should be evaluated because this is a major MDE/EPA regulatory issue.

The *Water and Sewer Master Plan* recommends that the city reduce infiltration/inflow (I/I) from the current peak flow of 4.0 times average to 2.5 time average. The feasibility of this goal needs to be confirmed.

Some of the city's wastewater is sent to the Frederick County Ballenger Creek Wastewater Plant. The master plan cites the system's ability to bypass wastewater from the city wastewater plant to the county plant, but allowable flows are not documented in the plan. This situation should be quantified to allow the city to properly evaluate current and future wastewater plant capacity as well as interceptor capacity.

The *Water and Sewer Master Plan* recommends that the current city wastewater treatment plant undergo a series of capital improvements to meet future treatment requirements. Most of these improvements are related to average daily flow conditions and not peak wet-weather flow conditions. As noted above, a peak flow analysis should be completed for the entire wastewater system.

It is important that the city control the extension of sewer service and better control where and when extensions occur. Requiring developers to reimburse the city for these extensions to offset the costs of growth will be a key implementation tool.

Research/Analysis:

A. Analyze sanitary sewer overflows.
B. Evaluate how the city can reduce infiltration and inflow.
C. Examine potential I/I issues, especially in the city's older neighborhoods.
D. Coordinate with Frederick County on allowable flows and use of the Ballenger Creek Wastewater Plant.
E. Assess the city's plant at peak flow conditions to determine needed future upgrades.
F. Examine possible constraints on the capacity or flows in the core area of the city.
G. Determine whether any interceptor capacity issues exist in the northern sections of the city, given the potential for annexation in these areas.
H. Investigate avenues for the city to more effectively control the extension of sewer service and to better control where and when extensions occur that support the city's land use goals.

Potential Strategies:

A. Draft specific recommendations for how the city can reach its goal of reducing infiltration/inflow (I/I) from the current peak flow of 4.0 times average to 2.5 time average. If this Master Plan goal cannot be attained, additional capacity must be planned for and eventually constructed in the interceptors and wastewater plant.
B. Modify current policies on system financing as part of a growth management system.
C. Formulate and establish a policy that allows the city to control the location and phasing of sewer service extensions.
D. Establish an equitable, manageable system for the construction of adequately sized, growth-related sewer improvements.

6.0 How Should the Comprehensive Plan Address Area Issues?

The Comprehensive Plan can be both a broad policy document tied to specific implementation strategies *and* a plan that addresses issues and challenges related to site-specific neighborhood or district issues. The Comprehensive Plan Update will focus on citywide issues, policies, and strategies. Previously completed area specific studies, such as the Carroll Creek Plan, will be referenced. The plan update will identify the need for updates and revisions to these plans, as well as the need to address other area specific issues. While the plan update will not include area plans, it will contain strategies and establish parameters for these follow-up planning studies as necessary.

Issue 6.1 Enhance Downtown

Downtown Frederick has undergone a rejuvenation over the last decade, emerging as a desirable dining and antique shopping destination. Renewed interest and investment have increased the demand for downtown residences and facilitated the rehabilitation of older housing units. As the center of county (and city) government, the downtown retains its role as a legal and government center, enhanced recently by the expansion of the main branch of the county's public library system. However, the city may lack some uses that would increase downtown's vitality and provide additional services and amenities for residents and attractions for visitors.

Research/Analysis:

A. Explore current gaps in the mix of uses downtown as well as long-term needs for other types of uses such as additional cultural facilities. What uses could improve the mix of uses?
B. Investigate the ability to accommodate additional residential uses in the Carroll Creek corridor to increase downtown housing opportunities. Also consider the suitability of office uses in the corridor.
C. Identify undeveloped areas along Carroll Creek and underdeveloped areas and underutilized buildings downtown and identify strategies for a higher and better use for these areas.
D. Identify strategies to promote a balance between downtown and the developing areas of the city so that the economic vitality and the charm of downtown can be retained.
E. Identify redevelopment strategies for older portions of the city and for obsolete buildings to increase reuse of existing structures.
F. Evaluate the long-term alternative uses of the Fairgrounds and assess suitable alternate uses outside of downtown.
G. Investigate the inconsistencies between the Historic District Commission guidelines and the zoning ordinance related to the height restrictions.

Potential Strategies:

A. Develop an action agenda for enhancing downtown Frederick.
B. During the update of the city's land development regulations, resolve the inconsistencies between the HDC guidelines and the zoning ordinance related to regulating building height.

Issue 6.2 Bring new life to older commercial corridors

A task force is studying the strengths and weaknesses of the Golden Mile, which has lost some major retail anchors to other shopping areas. Pedestrian access along the corridor and from adjacent residential areas to the retail areas is poor, and signage and mix of uses continue to be challenges.

Research/Analysis:

A. Review the results of the Golden Mile Task Force and study.
B. Investigate whether there are opportunities to add residential uses to the area to enhance its long-term viability.
C. Interview commercial real estate agents to understand what improvements could make the area more attractive for commercial reinvestment.

Potential Strategies:

A. Develop recommendations and priorities related to circulation, pedestrian access, and economic reinvestment.
B. Improve the connections between adjacent residential areas to the commercial areas.

Issue 6.3 Frederick Airport and its impacts on the surrounding area

Frederick Municipal Airport has more than 130,000 aircraft operations each year. It is an FAA designated general aviation reliever airport for Baltimore Washington International, Reagan National, and Dulles airports. The airport has complied with FAA required design standards designed to provide for safe airport operations and reduce the potential for incompatibility with nearby uses. These include closing of roads, purchase of property, and removal of obstructions in the Runway Protection Zone (RPZ) and Object Free Area (OFA). However, as additional airport facility enhancements are made, there will be a need to assess and augment land use recommendations and associated regulations to guide development in the adjacent areas and those impacted by aircraft noise.

Research/Analysis:

A. Assess the need for additional regulations and land use guidance for areas surrounding the airport to ensure future compatibility.
B. Identify the airport's potential for city/regional economic development and spinoffs. How can the city capitalize on this?

Potential Strategies:

A. Develop an airport overlay zone that would limit the uses permitted.

Issue 6.4 Relationship to large institutional uses – Fort Detrick, Hood College, and Frederick Memorial Hospital

Fort Detrick is the city's largest employer with approximately 6,100 employees. Issues that should be addressed in the comprehensive plan related to Fort Detrick include: traffic impacts on

surrounding roads and identifying appropriate lands close to Fort Detrick that should be planned for spin-off employment uses, enabling the city to capture the tax base benefits of these jobs.

Frederick Memorial Hospital and Hood College are located on 7th Street and have generally been good civic neighbors to adjacent uses. Issues in these areas are related to traffic and circulation. Parking in residential neighborhoods adjacent to the college is also an issue. In addition, there has been some conversion of residential uses to college-related uses adjacent to the college, particularly along Magnolia Avenue. The extent of these changes should be reviewed and monitored to ensure that neighborhood character is not negatively affected.

Research/Analysis:

A. Examine the potential spinoff impacts on the immediate area of a potential shift of the Fort Detrick conference center to the northeast part of the base.
B. Understand the extent of parking conflicts around Hood College.
C. Evaluate the need for residential permit parking in affected areas around Hood College.
D. Understand the extent of conversions from residential to college uses in the area adjacent to Hood College.
E. Understand Hood College's policies and plans for onsite parking and housing.
F. Review the long term plans and master plans for Frederick Memorial Hospital and Hood College.
G. Examine the potential for spin-off medical offices adjacent to Frederick Memorial Hospital.
H. Review the master plans for Hood College, Frederick Memorial Hospital, Frederick Community College, and Ft. Detrick to understand their long-term development plans and their potential impacts on the City of Frederick.

Strategies:

A. Address these large institutional uses in the plan update through recommendations or appropriate text recommendations and/or maps.
B. Identify priority actions for these institutional uses.

Issue 6.5 Improving city gateways

Heavily traveled corridors such as the Golden Mile, East Street, and East Patrick Street provide many residents and visitors with lasting images of the city. Addressing the transportation, land use, and urban design issues along these corridors and at gateways can enhance the character of the city.

Research/Analysis:

A. Identify key city gateways
B. Assess issues/opportunities to improve the function and appearance of city gateways.

Strategies:

A. Explore gateway concepts along important corridors such as East Street, East Patrick Street, the Golden Mile, and along Interstates 70 and 270 and U.S. 15, as well as at entrances to major institutional uses.
B. Develop policies to address land use and design issues adjacent to interstate interchanges.

7.0 What Kinds of Parks and Recreation Lands and Facilities are Needed?

Issue 7.1 Location, facilities, and regulations

There is a need for a long-range plan for parks and recreation and to identify and prioritize where additional active recreation is needed, where additional linear park/trail connections are desirable, and how the city's development regulations should be amended to facilitate not only the reservation or dedication of parklands but also the development of park facilities.

Research/Analysis:

A. Map current parkland and active recreational facilities and identify by park type (e.g., neighborhood, community, regional, special).
B. Apply locational level of service standards to determine which areas of the city are adequately served by neighborhood and community parks and which are not.
C. Explore the need to improve the functionality of existing parks and plan for active recreation on unimproved publicly-owned parklands.
D. Explore the potential for expanding greenways/linear parks and open space connections throughout the city.
E. Explore the extent to which city park facilities serve the larger region and whether user fees are appropriate.
F. Consider the extent to which the city is a tourism magnet/base camp for state parks.

Potential Strategies:

A. Consider amending the regulations that require dedication of lands to the city for park and recreational use as part of the development approval process to reduce the costs of developing, operating, and maintaining parks while still providing useable and conveniently located facilities.
B. Consider requiring a higher portion of land within new developments be set aside for active recreational uses. (In addition to more active recreation, this would also have the effect of reducing lot size and increasing net density.) Also consider amending the regulations to allow tot lots or small "pocket" parks (the current ordinance sets a minimum acreage for parks).

8.0 How Should the City Address Historic Resources outside the Downtown Historic District?

Issue 8.1 Potential expansion of the city's historic preservation efforts

Although the city has designated local and national downtown historic districts, other parts of the city may also be worthy of listing and preserving. A city-wide Architectural Survey of historic resources outside of the present boundaries of the Frederick National Register Historic District has recently been completed.

This survey has two goals. The first is to identify historic districts and historic properties outside of the existing National Register district that are potentially eligible. The second is to provide the City of Frederick with information that can be integrated into the current planning process. The survey is designed to identify properties that warrant an intensive level of investigation, to characterize property types and historic themes represented in the survey area, and to identify historic resources that potentially represent Frederick's growth and development in the 19th and 20th centuries.

The survey will provide the information needed for the city to undertake additional evaluation and registration of resources outside of the plan update process. The survey will serve as a tool for broadening the understanding of the full range of historic resources in the City of Frederick.

Research/Analysis:

A. As a parallel research effort to the Comprehensive Plan Update analysis, the city should undertake additional research to assess historic significance and integrity requirements of resources identified in the architectural survey.
B. As a parallel research effort to the Comprehensive Plan Update analysis, the city should undertake a study to understand the 20th Century historic context of the areas of the City of Frederick that were built during this period (similar work has been done for earlier periods of the city's development).

Potential Strategies:

A. Use the reconnaissance survey to shape preservation strategies and future evaluation and registration efforts. The data from the survey will be used to identify which resources and areas of the city should be the subject of more intensive level survey and, ultimately, preservation.
B. Consider how to incorporate findings from the historic survey into the Comprehensive Plan.
C. Require documentation of historic structures for all annexations as part of the submission packet.
D. Explore strategies to expand preservation through incentives, tax credits, and easements.

9.0 What Makes a Good Plan and Land Development Ordinance? How to Strengthen the city's Ability to Plan For and Manage Growth.

Issue 9.1 The city's Comprehensive Plan needs to provide more specific guidance and include a prioritization of implementation strategies.

Using two published works, William Baer's "General Plan Evaluation Criteria: An Approach to Making Better Plans" (Journal of the American Planning Association, Summer 1997) and Lewis Hopkins' book, *Urban Development: The Logic of Making Plans* (Island Press, 2001), we have reviewed and evaluated the current plan. Baer's methodology provides a way to *examine the plan independent of its outcomes*. He suggests eight categories of criteria (listed and described in Table 7). Baer identifies more than 60 more specific criteria that fall under these classifications. These criteria are included in Table C1 in Appendix C as well as an evaluation of the 1995 Plan against these criteria.

Table 7. Plan Assessment Criteria – What Makes a Good Plan?

Plan Evaluation Criteria – Categories	Description
Adequacy of Context	Explain the context and setting: the what and the why of the document.
"Rational Model" Considerations	Show basic planning considerations based on underlying theory and its criteria.
Procedural Validity	Explain the who and the how of the plan-making; inform the reader about what went on in making the plan and what is going on by publishing it.
Adequacy of Scope	Show how the plan is connected to the larger world.
Guidance for Implementation	Most plans are intended to do something. Consider the instruments [ordinances, regulations, budgets, schedules] and the agencies and persons responsible for making the plan work.
Approach, Data, and Methodology	Make clear the technical bases, if any, of the plan; where the data come from and how they are used, so that others may check the plan's thinking by use of the same criteria.
Quality of Communication	Clear communication above all else is necessary for a fair hearing from others.
Plan Format	Other forms of communication are found in the plan format itself, as well as evidence on who takes professional responsibility for the plan's formulation, when it is adopted, and other incidental concerns that nevertheless communicate professional competence.

Source: William C. Baer, General Plan Evaluation Criteria: An Approach to Making Better Plans. Journal of the American Planning Association 63 (3): 338-39, 1997.

We have used Baer's criteria to evaluate the 1995 Comprehensive Plan. Its *strengths* include its focus on providing a regional framework within which to understand city trends and policies and a transparent, easy-to-understand writing style. Its weaknesses include a poor articulation of the main themes of the plan and its purpose, as well as the lack of specific action steps, implementation techniques, and recommendations and priorities.

Hopkins' plan assessment methodology focuses on *an outcome-based evaluation of the plan*. The City of Frederick Department of Planning's preliminary assessment of the 1995 Comprehensive Plan's implementation is produced in this vein. Hopkins identifies five types of plans that can be effective.[16] These include:

- **Agendas**: lists of things to do; actions not outcomes
- **Policies**: if-then rules of action
- **Visions**: an image of what could be, an outcome
- **Designs**: target, describes fully worked out outcomes
- **Strategies**: contingent actions (paths in decision tree)

Hopkins also identifies four broad criteria for assessing whether plans work.[17]

1. **Effect**: Did the plan have an effect on decision making, actions, or outcomes? For example, it were intended to work as an agenda, how many of the listed actions were taken?

[16] Lewis D.Hopkins. Urban Development , 2001 pg. 34-42.
[17] Hopkins, pg. 46-47.

2. **Net benefit**: Was the plan worth making and to whom? For example, if it were intended to work as strategy, were the gains in efficiency of infrastructure provision over time sufficient to compensate for the costs of making The Plan?
3. **Internal validity (or quality):** Did the plan fulfill the logic of how it was intended to work? For example, if it were intended to work as strategy, did it address interdependence,[18] indivisibility,[19] irreversibility,[20] and imperfect foresight[21] in appropriate ways?
4. **External validity (or quality):** Did the outcomes intended or implied in the plan meet external criteria, such as claims for a just society? For example, if it were intended to work as a vision, did the vision include equity? Ethical acceptability is a crucial component of external validity.

The evaluation of the 1995 plan based on Hopkins' methodology is included in Appendix C.

Research/Analysis:

A. Review other models for plan format and approaches that meet the city's needs and address the plan criteria outlined above and in more detail in Appendix C.

Potential Strategies:

A. Draft the plan so that its methods, analysis, and rationale are clear, it is legally defensible, and meets the state's Smart Growth framework.
B. Structure the plan so that it has a clear set of objectives, recommendations, and priorities and identifies which agencies are principally responsible for each implementation item.
C. Tie the plan to related updates to the city's development regulations.
D. Strengthen the link between the Comprehensive Plan and the guidance it provides for city investment in capital projects (through the Capital Improvement Plan). Also review and suggest changes to the CIP process as necessary.
E. Create the plan update with both Baer and Hopkins' plan assessment and evaluation methodologies in mind.

Issue 9.2 The city's current land development regulations are outdated and lack many facets of modern ordinances.

Like many other cities, Frederick's regulations suffer from a number of common problems. For example, they are not user-friendly (the result of numerous patchwork amendments); they are inadequate or contain excessive improvement standards; they fail to address current growth issues; they over-emphasize land use segregation; they lack urban design standards (scale/massing); and they include confusing procedures.

Research/Analysis:

[18] "Interdependence means that the value of the outcome of one action depends on another action and vice versa" (Hopkins, p. 27).
[19] "Indivisibility means that we cannot take arbitrarily small increments of action" (Hopkins, p. 28).
[20] "Irreversibility means that we cannot take an action, then undo it or replace it with another action without incurring significant costs" (Hopkins, p.29).
[21] "Imperfect foresight means that we do not know the future values of variables pertinent to our decision making" (Hopkins, p.29).

A. Evaluate the code and assess options for enhancement (this will take place during the ordinance update portion of the Comprehensive Plan process).
B. Identify other jurisdictions (including those in Maryland) that have merged their zoning and subdivision regulations into one document and assess how their best practices may be applied in Frederick.
C. Examine the city's development review and rezoning process (coordination, timeline) to understand how it may be streamlined and how incentives may be added.
D. Determine whether the plan map should incorporate or suggest zoning directions as the county's maps and plans do.

Potential Strategies:

A. Following adoption of the Comprehensive Plan, modernize and integrate the city's land use regulations into one streamlined document. Known as a unified development ordinance or code, this is now common practice in Maryland and around the country.
B. Review the development review process to streamline it and make it predictable.
C. Develop urban design standards within the new ordinance or develop urban design guidelines.
D. Consider whether to add a mixed-use district to the zoning regulations.

Issue 9.3 Expand the city's "toolkit" of development regulations

The city's existing regulatory tools, including the land development (zoning and subdivision) regulations, need to be modernized and enhanced to meet the challenges the city is facing and will continue to face in the future. Maryland planning law enables the city to employ a wide range of growth management regulations. The city and region's recent rapid growth requires the city to expand its regulatory toolkit to better manage and coordinate growth with the availability and adequacy of public facilities.

Research/Analysis:

A. Identify regulatory tools and enhancements that would improve the quality and predictability of the development process.
B. Identify the urban design issues such as reverse frontage, preserving viewsheds, buffering of uses, and options for implementation (such as guidelines versus ordinance standards).

Potential Strategies:

A. Explore the appropriateness of growth management tools such as an APFO; corridor overlay zones that would preserve roadway capacity and improve the aesthetic quality of development; density bonuses or variable APFOs to steer growth to certain areas and away from others; minimum density zoning; variable impact fees; timing of water and sewer extensions; school timing, location and improvement policies; excise taxes; and the transfer of development rights (in coordination with the county).
B. Explore various buffering standards to address the concern with providing compatibility among different land uses with promoting a mixed use land use pattern.
C. Identify important vistas and view sheds (such as vistas to the Catoctin Mountains) and develop tools to preserve them.

10. How Can the City's Unique Characteristics and Urban Design Qualities be Incorporated into New Development?

Issue 10.1 Building on Frederick's historic urban character.

The City of Frederick was established in 1745. Frederick's slow but steady growth until World War II left a built environment that reflects several era of American architecture and planning. The historic core of the pre-World War II city has been so well preserved that Frederick has the largest contiguous National Register Historic District in Maryland. Fredericktonians have long been conscious of their heritage. A local historic district was established in the 1950s (at the same time as better-known Annapolis), and the city government was given the power to control design, construction, and demolition activity. Frederick's preservation efforts have been successful.

A community's character is defined by both physical and intangible elements. It is the essence of a place and what one remembers long after leaving. The image of a Frederick is not static—it can and will change as the city grows and matures. Frederick has a positive image as an historic city with a vibrant downtown and urban neighborhoods. As the city develops and redevelops, there is a desire for new development to include characteristics of the older portions of the city – those that make it a distinct urban place and set it aside from other communities as well as the character of the surrounding development in the county. If the goal is to promoting walkable neighborhoods with access to civic spaces and institutions; intermingle residential, service and employment uses; and have new development exemplify a sense of place, then the city's regulations and land development policies need to be amended.

Research/Analysis:

A. Identify and define what types of land use and urban patterns the city would like to encourage in new as well as older portions of the city and for potential annexation areas.
B. Identify scenic features including additional roads that could be designated as scenic roads and views to the countryside that are worthy of preservation.
C. Identify alternative design and construction policies and standards for development projects that reinforce Frederick's historic and urban character and provide diverse, pedestrian-friendly neighborhoods.
D. Identify various ways to create a broad range of housing types in developing/redeveloping areas.
E. Identify potential criteria and procedures for infill development.

Potential Strategies:

A. In the Comprehensive Plan, document scenic features that should be preserved.
B. Create incentives that encourage the inclusion of public amenities into new developments.
C. During the update of the land development regulations, consider the development of design provisions, known as “Use Patterns” that would tie together the development standards and procedures for urban patterns that the city would like to encourage.
D. During the land development regulations update, consider the creation of alternative development standards, such as a Traditional Neighborhood Development Ordinance, which will enable the design and construction of neighborhoods and districts that fulfill the objectives for urban vitality, sense of community and the efficient provision of infrastructure.
E. Consider new approaches including new ordinances and programs to enhance the viability and attractiveness of neighborhoods.”

11.0 Sensitive Areas: Given the Strength of State Environmental Regulations, What Additional Local Efforts Are Needed To Ensure Environmental Sustainability?

Issue 11.1 Preserving environment quality

Maryland's Planning Act requires jurisdictions to address sensitive areas in their Comprehensive Plans. Sensitive areas include streams and their buffers; 100-year floodplains; habitats of threatened and endangered species; and steep slopes as well as other areas that the city determines are in need of protection.

The City of Frederick is in the process of working with the Federal Emergency Management Administration to revise and remap the Carroll Creek Floodplain based on the flood management improvements that are now in place.

Research/Analysis:

A. Review the Sensitive Areas element of the City of Frederick's 1995 Comprehensive Plan and assess if additional sensitive areas should be protected in addition to those outlined in the state's Planning Act.

Potential Strategies:

A. As part of the update of the land development regulations, review and revise the floodplain ordinance.

Issue 11.2 Annexation with water quality in mind

Annexation options are driven by many factors. Because the water quality of the Monocacy River is so important, the issue of watershed protection should be a significant factor in evaluating lands for annexation.

Watersheds vary in their environmental quality and value. When any watershed is covered by more than 10 percent imperious surfaces (i.e., roads, parking, buildings), its water quality begins to deteriorate. Above 20 percent imperious surface cover, water quality is seriously degraded and aggressive mitigation becomes essential if water quality is to be maintained.

The city must link its annexation options to the various surrounding sub-watersheds, their quality, and current levels of imperious surface cover. In some cases, the expansion option may be a choice between committing to the "loss" of certain watersheds while protecting other, hopefully, more valuable and important sub-watersheds.

Research/Analysis:

A. Identify watershed and sub-watershed boundaries around the perimeter of the city.
B. Develop indicators of watershed quality by sub-watershed based on existing, available data (e.g., tree cover, current water quality samplings and stream classifications, habitat value and species diversity, etc.). Relate this analysis to current or proposed sewer plans by sub-watershed and proposed development and county Regional Plan zoning classifications.
C. Assign a value to surrounding sub-watersheds from a water quality perspective as one factor in evaluating annexations and expansions to the city's annexation areas.

Potential Strategies:

A. Treat sub-watersheds as important boundaries in growth management planning.
B. Consider differential environmental protection measures by sub-watershed as part of annexation plan (e.g., overlay zones with impervious surface cover limits, no impact design requirements, different stormwater management regulations).
C. Create minimum buffers for floodplains and wetlands.

12.0 What City Government Resources are Needed to Address and Manage Growth?

Issue 12.1 How does the city's growth relate to city government staffing, resources, office facilities, and the ability to provide city services?

As the city continues to grow, there will be a need to review government staffing levels and resources to enable the city to continue to provide high quality services.

More specifically related to the planning functions and resources, the city lacks a Geographic Information System (GIS), which limits its ability to track and manage growth and perform basic planning analysis such as calculating the city's buildout capacity, easily tracking development from submission through approval, permitting, and development.

Research/Analysis:

A. Review the city staffing ratios to city population of other cities of similar size, function, location and demographics. If possible, compare the city's staffing ratios by department or city functional area to those of other like cities.
B. Assess current GIS needs and recommend an implementation strategy. It is recommended that this occur as a parallel study to the plan update process.
C. As part of this parallel study (see item B above) review how other jurisdictions have established their GIS systems, focusing on the benefits gained and applications employed in these jurisdictions. Interview GIS specialists and perhaps make site visits to nearby jurisdictions. Include City of Frederick department heads and representatives from the Board of Aldermen and Planning Commission in this process.

Potential Strategies:

A. Identify the need for staffing increases in the short- and long-term to meet the service needs of a growing city and regional service center. These staffing estimates can be used in detailed space planning studies that the city will need to undertake following the completion of the Comprehensive Plan.
B. Implement GIS to improve land use and development tracking as well as other uses to be determined through the GIS needs assessment (see research/analysis items B and C above).
C. Amend institutional arrangements related to the development and maintenance of GIS based on the research gleaned from comparable jurisdictions.

13.0 How Can Interjurisdictional and Inter-agency Coordination be Improved?

Issue 13.1 What are the major issues that need to be addressed through city and county coordination?

The City of Frederick is the largest municipality in the county. It is the cultural, higher education, service, and historic center of the county. The county provides citizen residents with public schools and fire protection among other services. The two jurisdictions are interdependent in many respects.

The Maryland Planning Act states that “Development is concentrated in suitable places.” This is one of eight “Visions” that must be addressed in the update of the Comprehensive Plan under Article 66B, the State’s Land Use Enabling Law. The 1997 Smart Growth and Neighborhood Conservation Initiatives (known as the Smart Growth legislation) allows the state to direct its programs and funding to support locally-designated growth areas and protect rural areas. The centerpiece of the Smart Growth legislation is the "Priority Funding Areas," which limits most state infrastructure funding and economic development, housing and other program monies to Smart Growth Areas, which local governments designate for growth.

The Priority Funding Areas legislation builds on the foundation created by the Visions adopted as State policy in the 1992 Growth Act. Smart Growth establishes a policy for the use of state funds that support communities and influences the location of development. State funding for projects in Maryland municipalities, other existing communities, industrial areas, and planned growth areas designated by counties will receive priority funding over other projects.

The state’s Planning Act and subsequent Smart Growth legislation serve to reinforce existing communities like the City of Frederick and sets the stage for the discussion of interjurisdictional coordination with the county as well as other levels of government.

While the Smart Growth legislation focuses state growth related infrastructure funding on municipalities and already developed communities, the annexation law under the state’s constitution for charter counties such as Frederick, provides the counties with considerable powers and influence related to annexation. Thus the city’s ability to grow in support of Smart Growth (new growth should be adjacent to existing development) is intertwined with the county’s overall control of the annexation process. This provides an important basis and impetus for coordination and cooperation between the City of Frederick and Frederick County.

The issues that will need to be addressed through interjurisdictional cooperation include:

- Land use policies and regulation in the county that are near the City of Frederick’s boundary or in areas that may one day be annexed into the city to ensure that the land use patterns and community design are compatible with city goals for urban development and in support of Smart Growth legislation mandates;
- Policies on infrastructure (water, sewer, roads);
- Stormwater management;

- Open space and parks;
- Since the county provides a number of important community services for city residents, how can the city and county better coordinate on county-provided community services including schools, fire and emergency services, and health? and
- The cultural and higher education life of the city is strong. What are the ways to build on these assets?

Relating to land use and annexation, it is important for the city and county to work together to develop policies that support the growth and preservation of already developed areas like the City of Frederick. The county's Comprehensive Plan recognizes the City of Frederick as the county's main growth center. A revised annexation agreement to replace the outdated 1988 accord needs to be negotiated and adopted.

Regarding sewer and water planning, the city and county need to work together to assure adequate capacity. The city also needs to establish a policy that will allow it to control where and when new sewer service is extended to serve city lands.

The city and county should continue to work together to preserve open space corridors that are home to wildlife and can provide opportunities for quiet contemplation and passive recreation for area residents. In addition, the City of Frederick should consider how it can continue to provide park resources for city residents and investigate how it can recoup the operating and maintenance costs of providing services to those park users that are not city residents.

In addition to county coordination, coordination with the State of Maryland on numerous items including water and wastewater permitting, environmental regulations, and smart growth initiatives is necessary. There are also issues that relate to coordination with the federal government including coordination with the Federal Aviation Administration in relation to airport planning and adjacent land use controls and the United States Department of Defense related to future growth and development of Ft. Detrick.

Research/Analysis:

A. Consider issues that require city, county, state and federal coordination and identify strategies that improve communication among these levels of government and that enhance coordination.
B. Research city/county tax differentials.
C. Explore potential improvements to county bus service to meet ridership needs, including employer shuttle services.
D. Review the county's APFO to understand how to position city initiatives to meet overall county and city goals.

Potential Strategies:

A. Update the 1988 city/county annexation agreement.
B. Brief regularly MDP staff on city/county coordination efforts related to land use policies and implementation tools to ensure that the city is able to implement the state's Smart Growth policies, and fulfill its role as the growth center of Frederick County.

C. Implement strategies that improve communication among the different branches of government, especially among transportation agencies.
D. Investigate potential improvements to the county's bus service within the city.
E. Develop an MOU with the county regarding city/county financial cooperation in the funding of mutually beneficial public and cultural facilities. Two examples would be joint funding for the Weinberg Center and the Harry Grove Stadium. Others might be for future joint sanitary sewer treatment or water supply projects.

Next Steps

The PAIR will be used to develop the scope of work for the Comprehensive Plan Update and subsequent update to the land development regulations. The PAIR provides both the context for the Comprehensive Plan Update and the specific problems and issues that the plan will need to address.

Attachment A: City of Frederick Issues Questionnaire Responses

Question A: Planning Issues

Steering Committee (Residential Representatives)

Economic Development

Revitalize the Golden Mile

Fiscal Policy

Property tax relief
Find additional source of tax revenue
Funding sources for adequate infrastructure must be found

Housing

Create quantify and quality of low and moderate income housing without putting burden on tax base
Balance need for more houses with need to keep sprawl under control

Infrastructure

Water
Make donated park areas into fully functioning facilities
Support growth with adequate infrastructure: water/sewer, traffic, transportation
Highways and school construction not controlled at local level

Regulatory/Policy Issues

Coordinate language and intent of comp plan, zoning ordinance, other documents
Smart growth strategies put growth pressures on city

Transportation

Traffic (MD 180/Butterfly Lane)
Parking downtown
Add commercial flights at airport
Redesign roads to overaccomodate traffic needs (15-20 years of growth)

Urban Design

Create mix of uses along Carroll Creek corridor without sacrificing downtown
Improve buffering between land uses
Establish and maintain buffer zones between industrial and residential uses
Make residential development coexist with commercial and industrial uses
Address land use conflicts/buffering

Visioning

Preserve city's heritage and history
Integrate city and county vision for future of city

Steering Committee (Business Representatives)

Infrastructure

Infrastructure funding
Lack of infrastructure planning hurts city

Regulatory/Policy Issues

Zoning decisions that benefit landowners and cost everybody else
Create opportunities for businesses to expand without undue restrictions: grandfathering
Coordinate land use goals with county

Visioning

Coordinate downtown vision

Steering Committee (Government Representatives)

Growth Trends

Managing growth and promoting redevelopment opportunities

Infrastructure

Changing government infrastructure: personnel, policies, systems, structure -- to large urban city without losing small town feel
Water issue: growth outpacing infrastructure

Regulatory/Policy Issues

Consistent zoning determinations due to weak structure of zoning ordinance

Transportation

Traffic: multijurisdictional authority
Lack of multimodal transportation alternatives
Traffic
Parking

Urban Design

Retaining sense of place
Land use conflicts/buffering
Aesthetics: poor signage, unattractive entrance corridors
Beautification (signage)

Planning Commission

Economic Development

Promotion of economic development and prosperity

Fiscal Policy

Lack of long-term commitment to the CIP

Housing

Density intensification of residentially zoned land

Infrastructure

City Reference Data (i.e., Geographic Information System)
City Immediate-Need Information (i.e., Water Sources and Road Traffic)

Regulatory/Policy Issues

Very short planning horizons
Parochial execution among government entities

City Regulatory Guidance (i.e., Zoning Ordinance, Subdivision Ordinance, and Adequate Public Facilities Ordinance)

Schools

School overcrowding

Transportation

Parking on mixed use properties
Roads and infrastructure

Urban Design

Industrial land adjacent to residential land

Mayor/Aldermen

Housing

Affordable housing (new and redevelopment)

Infrastructure

Park system far behind
Parking

Regulatory/Policy Issues

Developers willing to pay for infrastructure; city needs rules that are fair to them

Transportation

Road system so far behind, catching up will be difficult
Traffic

Urban Design

Aesthetics (signage, lighting, streetscape)

Question B: External Trends

Steering Committee (Residential Representatives)

Economic Development

Need to plan for economic downturns
Growth of businesses outside city limits

Fiscal Policy

City/county tax equity
Get no income from development outside city limits but it still taxes city services

Growth Trends

Development encroaching from DC area

Growth pressures that result in loss of ag land
Growth restrictions in other jurisdictions creating pressure on city

Housing

Overcrowding in single family units

Infrastructure

County citizens placing demands on city services
Lack of predictability from state for infrastructure (schools, roads)

Regulatory/Policy Issues

Better coordination and cooperation between city and county
More and more regulations imposed by other levels of government

Schools

Competitiveness of city schools v. county schools

Steering Committee (Business Representatives)

Fiscal Policy

Lack of predictability for state/fed funding

Regulatory/Policy Issues

State/fed mandates on smart growth and other restrictions

Transportation

Inadequate state/fed road funding

Visioning

Lack of cooperation/shared vision with county and state

Steering Committee (Government Representatives)

Fiscal Policy

City not getting proportional share of county taxes that city residents pay

Housing

Prosperity of DC metro results in housing unaffordable to "normal people"
Large residential development south of city will affect city traffic and schools

Infrastructure

City government needs to become more professional
Population growth and demand on water and facilities

Regulatory/Policy Issues

County zoning that allows large lots adjacent to city limits

Transportation

Lack of countywide traffic model

Urban Design

Newer subdivisions feel like "Any Town USA"

Visioning

City losing small town feel as growth continues

Planning Commission

Fiscal Policy

Increased tax burden may discourage residents from settling within the city

Growth Trends

City's only viable growth route, under county plan, is north along US 15

Migration of residents to the county outside city limits, using city resources without contributing to the tax base

City will experience severe difficulty in annexation due to county downzoning and R-1/ag zones

Housing

Densities on residentially zoned land not high enough to meet demand of growth

Regulatory/Policy Issues

County planning has become the antithesis of smart growth

Urban Design

Urban design criteria will be very difficult to meet given suburban design on the fringes

Mayor/Aldermen

Economic Development

National recession

Infrastructure

Water

Urban Design

Commercial development that gives no thought to pedestrians or surrounding areas

Question C: Useful Elements of Existing CP

Steering Committee (Residential Representatives)

Comprehensive
Provides glimpse into future
Complete
Emphasis on downtown historic area
Emphasis on downtown as vibrant place
Comprehensive
Open space and parkland dedication
Good base to build on

Steering Committee (Business Representatives)

Good base to build on

Steering Committee (Government Representatives)

Highway plan
Not much
Encouragement of PNDs over single family subdivisions

Planning Commission

Loop road around city
Understanding of need to coordinate efforts between city and county
Chapter Structure:
Goal Conciseness
Objective Specificity

Mayor/Aldermen

The map
Zoning designations
Planned road map

Question D: Weaknesses of CP

Steering Committee (Residential Representatives)

Relies too much on old data
Lack of current data
Lack of planning and direction for non downtown development
No plan for infrastructure improvements in advance of growth
Large scale annexation taken as likely when it may be unlikely
Participation from business community, especially realtors/developers, may be conflict of interest
Infrastructure design should focus on 15 to 20 year growth projections and build for the future
Inadequate environmental regulations
Zoning ordinance not updated to reflect CP
Inadequate buffering
Language too broad
Too old
Requires update

Steering Committee (Business Representatives)

Lack of distinction between historic and nonhistoric areas
Not user friendly, especially industry
Mimics county plan

Steering Committee (Government Representatives)

Not a daily reference for action
Very little material distinguishes from other jurisdictions
No action steps/priorities
No strategic action component
Lack of goal oriented policy statements
Inability to suggest different land use designations for existing businesses

Need for Carroll Creek overlay
Too general
Too feel good
Not practical
Pockets of improper zoning

Planning Commission

Residential properties with no buffer between them and other uses
Difficulty in implementing new urbanist designs

Mayor/Aldermen

Too general
Written in "plannerese"
Not specific enough
Does not meld old and new

Question E: Growth Management Qs

Steering Committee (Residential Representatives)

Is section 5.8 working?

Economic Development

Why does it seem like every piece of available land is slated for development?
Growth management vis a vis county
Discuss APFO with county
Is annexation agreement with county working and will it be flexible enough?

Infrastructure

Timing of infrastructure

Preservation (Historic)

Historic preservation supporters too inflexible

Regulatory/Policy Issues

Examine the district use matrix in zoning regs
Address nonconforming uses

Transportation

Determining transportation impacts and exactions so standards are consistent and equitable
More attention to neighborhood enhancements needed

Urban Design

What can be done to promote good neighbor policies, commercial/industrial v residential uses?

Steering Committee (Business Representatives)

Economic Development

Attracting industries

Fiscal Policy

Defining funding sources for roads and infrastructure

Regulatory/Policy Issues

Creating a process to guarantee to development industry that they have rights, timetables after project approved
Monitoring resources to allow consistency in the process

Urban Design

Value of infill projects

Steering Committee (Government Representatives)

Fiscal Policy

Capital Improvements element similar to Florida

Housing

How to encourage mix of housing styles (including apartments)
How to discourage development less than 3.5 dus/acre

Infrastructure

Directed policies related to financing of infrastructure

Regulatory/Policy Issues

Unified development code: minimize redundancy between functional areas, establishes specific standards, regs with flexibility
Continue implementing smart growth policies

Transportation

Avoid collector/arterial thinking of road planning
Adopting specific Levels of Service

Urban Design

Neighborhood shopping within easy walk/bicycle from housing

Planning Commission

Fiscal Policy

How to manage issues without increasing the tax burden

Growth Trends

APFOs
How to manage growth without diminishing the city's prosperity

Infrastructure

Core Level Planning Staff Empowerment
Quarterly Planning Commission/Staff “Catch-up” Week
Annual Planning Commission/Staff “Issues Review” Day

Regulatory/Policy Issues

Noise regulations

Enforcement procedures
Apply best practices in planning to enhance regulations
Development Review Process

Transportation

Minimum 20-year plan for infrastructure needed to handle 28K more residents, related to water supply, public transportation, sewer treatment, roads and paths, parks and facilities

Mayor/Aldermen

Growth Trends

Tools to slow development to allow us to catch up with necessary infrastructure

Infrastructure

Water: future availability
Parks
Infrastructure

Regulatory/Policy Issues

Developers willing to put money on table to help city catch up should be given priority

Transportation

Traffic patterns .. addressing issue with county and state

Urban Design

Spot development

Question F: Tools to Know

Steering Committee (Residential Representatives)

Economic Development

Redevelopment strategies for downtown, including nonresidential

Growth Trends

Feasibility of APFO

Housing

What other jurisdictions do to decentralize low income/subsidized housing

Infrastructure

Making donated park land into fully functioning facilities

Regulatory/Policy Issues

Implementing smart codes

Urban Design

Clustered housing and retail in village type settings: potential sites in city?
Balancing commercial/industrial with residential uses

Steering Committee (Business Representatives)

Infrastructure

Utility planning and process

Regulatory/Policy Issues

Master planning strategy

Visioning

Downtown strategy and vision

Steering Committee (Government Representatives)

Fiscal Policy

Cost of development v other jurisdictions
Land value taxation
Impact fees

Growth Trends

APFOs

Regulatory/Policy Issues

Difference between performance standards and performance zoning
Inclusionary zoning

Transportation

Traffic calming

Urban Design

Increased density downtown
TOD

Planning Commission

Infrastructure

GIS

Fiscal Policy

Impact Fees

Growth Trends

Smart Growth and how it saves ag land/creates green space
Adequate Public Facilities Ordinances
Urban Growth Boundaries

Regulatory/Policy Issues

Economic models to forecast housing across income categories
Overlay Zones
Density Bonuses

Minimum Density Zoning
Interim Development Standards
Regulatory Streamlining
Transferable Development Rights
Smart growth & alternatives to smart growth

Urban Design

Clustering

Urban design techniques to incorporate a "spider web" road system into new developments and enhance the road system
Strategies to retrofit the suburban ring to enhance the functionality of the urban center

Mayor/Aldermen

Transportation

Traffic info

Urban Design

Pedestrian needs: promoting bike paths, pedestrian friendly streets
Streetscape improvements
How to include an "architectural look" or standards into development

Question G: Expectations for CP

Steering Committee (Residential Representatives)

Understanding of accomplishments since last CP
Discussion current issues
Speculation on future needs
Creation of an action plan
Be more than a rewrite of 1995 plan
Should reflect that Frederick has become a large city in a suburban environment

Address livability: housing, jobs, transportation, leisure, human services, role of government and private sector in these
CP should put environment ahead of interests of developers
CP should accurately represent wishes of the people
Create policies that build loyalty and pride by bringing residents and businesses together for a common cause
Make best use of donated land
CP set future policies that can be implemented and measured
Fit today's circumstances
Better integration with county CP

Steering Committee (Business Representatives)

Final product results oriented
Infill regs
Greater differentiation between historic and nonhistoric district regs
More reasonable and workable set of regulations
More definitive direction on growth, zoning, land use, utilities and roads

Steering Committee (Government Representatives)

CP that provides daily direction to elected officials and staff
A document the public can understand
Realistic goals and policy statements
CP map with a vision, not just existing land use
Plan embraced by city as an effective tool
Annual updates to mayor and board concerning policy statements
Gateway design guidelines
Create useful document that citizens and decision makers can turn to for guidance

Planning Commission

Remedy problems in existing plan and move more in line with Smart Growth initiative
Grow under smart growth and PFA guidelines, predicated on a 50-year horizon and 20-year framework
CP should promote uniformity and consistency in application of site plan standards

CP should provide more clarity in differentiating land uses to make planning more predictable and reduce gray areas
CP should foster communication between HDC and the Planning Commission
CP should help coordinate city and county development

Mayor/Aldermen

City wide -- pedestrian friendly
Save historic properties

Question H: What CP Should Achieve

Steering Committee (Residential Representatives)

Enhanced quality of life in vibrant and lovely city
Prepare city for future generations
Not be a standalone document
Shape the future without requiring wholesale revisions every few years
Set stage for cooperation/coordination among government and private sector
Enhance economic and social status of citizens
Protect if not improve natural resources
Build upon accomplishments and help city become increasingly diverse and desirable
Preserve heritage
Preserve farmland
Preserve forests
Address needs of growing community while maintaining what makes Frederick Frederick
Grow commercial and industrially at controlled rate
Maintain and increase quality of life
Seek public participation and include it in CP
Better integration of historic district guidelines with development regs
Better utilization of land: minimum densities, not max
More variety of development opportunities
Integrate environmental issues into vision for community

Steering Committee (Business Representatives)

Realistic growth goals
Nonrestrictive policies based on financial realities

Balance between PC, HDC and other regulatory groups
Flexibility to mix commercial and residential uses in all districts
User friendly framework

Steering Committee (Government Representatives)

Blueprint for future legislation and programs
Establish accountability and prioritize limited resources
More citizen involvement: in government, neighborhood groups
Greater emphasis on urban design
Easy to read document that considers interests of developers and community at large
Protect quality of life

Planning Commission

More emphasis on mass transit to remedy congestion problems
Greater flexibility in zoning to adapt to changing needs
Greater protection for residential neighborhoods from competing uses through use of buffers
Concrete milestones to achieve visions
20-year framework to define the CIP for water supply, public transportation, sewer treatment, roads and paths, parks and facilities
Provide balance of economic and residential growth
Focus on expanding and enhancing downtown development and vitality
Focus on Francis Scott Key apartments to ensure they remain attractive
Address lack of parking at MARC depot
Evaluate need for redevelopment of the North East Street commercial area
Address redevelopment of Golden Mile
Focus on making Golden Mile entranceway more attractive to visitors entering from I-70
Address traffic considerations from the northwest end of the city
Reevaluate zoning classification for homes on Rosemont Avenue

Mayor/Aldermen

Integrate commercial and residential
Improve golden mile
Prevent retail decline in other areas of city
Firm zoning

Additional Comments Made at Steering Committee Work Session

Consensus of a vision for Frederick
Being reactive instead of proactive
Congestion: need better mobility for pedestrians and vehicles
How we integrate plan with vision of county master plan
Frederick regional zoning map
Development of CC corridor
Implementation needs teeth
Implementation needs to be achievable and measurable
Other jurisdictions putting growth pressure on us
Toolbox: good aggressive redevelopment strategy
Need an urban district in the city other than PND
How does ED happen here and other places?
Consistent delivery of adequate services
Need strategy to make processes more predictable

Aesthetics should be embraced, especially in commercial development
Affordable housing: community needs a lot of workers
Need a realistic look at the water supply, point where we won't be able to successfully manage more growth and development
Look at bike paths in tandem with parks
Water conservation issues
Predictability of infrastructure and transportation
Infill development outside HD
Not concerned about funding
Need realistic growth goals
Zoning should jibe with county
Have to look at fiscal mechanisms
APFOs: big ticket items like schools should be considered
MPDUs
parks: regional v. neighborhood
Streetscaping
Subregions: neighborhoods should be identified and their problems addressed
Residential v. commercial uses
City needs bigger parks
Parks used as buffers between residential and industrial uses
Need to draw businesses to city
Traffic along the golden mile
Commercial flights at airport
City should control schools
Parking
Neighborhood beautification
Safety
Vision is critical
Historic heritage
Don't need DC suburbs in Frederick
Balance needs of future with what we have today
Educate city on responsible growth: what % of res v nonres in a healthy community
Redundancy between city and county services
Make government accountable to the people
Several references to county in the existing comp plan
Change management, not growth management, is what we're talking about

Attachment B: Preliminary Assessment of Land Requirements

Table B1: City of Frederick, 2025, Preliminary Assessment of Land Requirements

Potential Population 2025 (Projection based on extrapolating 1970-2000 counts and growth rates)	100,000
Population 2000 (US Census Count)	53,816
Projected Population Growth (2000 to 2025)	**46,184**
Average Household Size	2.42
Number of New Households by 2025 assuming a constant household size (line 4)	19,084
Number of New Housing Units Needed by 2025 assuming 5% vacancy rate	20,039
Current Units Approved (but not yet built[1])	5,000
Housing Units needed by 2025 - (line 6-line 7)	**15,039**
Number of Units by 2025 assuming *1990-2000 average of 580 per year*	14,500
Average new units per year needed to meet projected housing need (from line 8)	602
LAND REQUIREMENT 2025: SCENARIO ONE (existing city wide density mix)	
Number of Units of Low Density (using a 35% share[2]) (line 8*.35)	5,263
Number of Acres needed (using a density of 4 DU/ acre[2]) (line 12 divided by 4)	**1,316**
Number of Units of Medium density (using a 35% share[2]) (line 8 * .35)	5,263
Number of Acres needed (using a density of 10 DU/acre[2]) (line 14 divided by 10)	526
Number of Units of High density (using a 30%[2]) (line 8 * .30)	4,512
Number of Acres needed (using a density of 24 DU/acre[2]) (line 16 divided by 24)	188
Total Number of Residential Acres Needed by 2025	2,030
Total Number of Residential Acres Needed by 2025 (using a multiplier or safety factor of 1.5)	**3,045**
LAND REQUIREMENT 2025: SCENARIO TWO (using city's assumed zoning for annexation areas)3	
Number of Residential Acres in Proposed Annexation Areas[3]	**1,627**
Number of Acres in R-2 Residential (4 DU/acre)	1,067
Number of Acres in R-3 Residential (7 DU/acre)	427
Number of Acres in R-4 Residential (12 DU/acre)	133
Total Number of Units in Proposed Annexation Areas (line 22* 4)+(line 23*7)+(line24*12)	8,853
Deficit of Residential Units to Meet Housing Demand[4]	6,186
Deficit of Residential Acres to Meet Housing Demand (assuming 65% R-2, 26% R-3, 9% R-4 based on annexation data)	1,699
Total Number of Residential Acres Needed by 2025 (line 21+line 27)	3,326
Total Number of Residential Acres Needed by 2025 (using a multiplier or safety factor of 1.5)	**4,989**

Table B1, Continued

LAND REQUIREMENT 2025: SCENARIO THREE (using Maryland Smart Growth minimum density 3.5 du/ac)	
Maryland Smart Growth Threshold (this also approximates the city's average gross density (in DU/acre)	4
Total Number of Residential Acres Needed by 2025 (line 8 divided by line 31)	4,297
Total Number of Residential Acres Needed by 2025 (using a multiplier or safety factor of 1.5)	**6,445**

LAND REQUIREMENT 2025: SCENARIO FOUR (County Master Plan designated density)	
Frederick County existing residential density for annexation areas (in DU/acre)	**3**
Total Number of Residential Acres Needed by 2025 (line 8 divided by line 35)	6,015
Total Number of Residential Acres Needed by 2025 (using a multiplier or safety factor of 1.5)	**9,023**

Total Potential Annexation Areas - Based on City's Growth and Development Report, March 2002	3,900
Employment Land Use Acres (assuming 20% of potential annexation area (line 38)	780

Total Acres Needed [4] (CASE ONE) (line 39+line19)	3,825
Total Acres Needed [4] (CASE TWO) (line 39+line29)	5,769
Total Acres Needed [4] (CASE THREE) (line 39+line33)	7,225
Total Acres Needed [4] (CASE FOUR) (line 39+line37)	9,803

Notes:

[1] Growth and Development Report, City of Frederick, March 2002, page 19 and as refined in conversations between HNTB and City Staff

[2] Growth and Development Report, City of Frederick, March 2020, page 36

[3] Growth and Development Report, City of Frederick, March 2002, pages 36-37

[4] Some of this deficit will be absorbed by vacant land within the city's current boundaries but data on vacant land are not currently available

Attachment C: What Makes a Good Plan?

To measure the effect the city's 1995 Comprehensive Plan has had on actions and outcomes as well as its internal validity, we turn to the Planning Department's plan assessment. Of the 58 policies listed on the plan, 4 (7%) have been completed, 19 (33%) are on-going, 23 (40%) have not been completed and 11 (19%) are not measurable.

The 1995 Plan's net benefit can be assessed by reviewing how the plan has been used to guide development within the city. The Plan's lack of specific measurable actions and regulatory strategies to address the issues raised are its major shortcoming. Of the major issues the 1995 Plan raises -- achieving concurrence between growth and infrastructure; balancing residential and employment growth; balancing growth and sensitive area protection; improving and enhancing our community; and interjurisdictional coordination – the most positive outcomes can be seen in interjurisdictional cooperation.

The 1995 Plan's external validity, the last of Hopkins' measures, can be measured against Maryland's Planning Act.

The seven visions articulated by the Planning Act (as in place at the time of the plan's development and adoption) are highlighted below, as is a brief analysis of how the 1995 Plan addressed them.

- **Development is concentrated in suitable areas.** The 1995 Plan provides "criteria" for why the plan map recommends various land uses. These criteria include projected land need, economic use of land, balanced tax base, environmentally responsible use of the land, the ability to capitalize on locational attributes, and county plan coordination. However, the analysis undertaken to meet these criteria is given short shrift in the plan so that the reader cannot ascertain why various lands are planned the way they are on the comprehensive plan map and if these are the most suitable locations for these land uses.

- **Sensitive Areas are protected.** The 1995 Plan does identify sensitive areas and features to be protected but offers few additional strategies or guidance.

- **In rural areas, growth is directed to existing population centers and resource areas are protected.** This is not really applicable to the City of Frederick.

- **Stewardship of the Chesapeake Bay and the land is a universal ethic.** This is addressed in the Plan's discussion of sensitive area protection.

- **Conservation of resources, including a reduction in resource consumption, is practiced.** The Plan addresses air and water quality protection and mineral resources and the need to increase water conservation and solid waste reduction.

- **To assure the achievement of these visions, economic growth is encouraged and regulatory mechanisms are streamlined.** The 1995 Plan provides little targeted guidance, analysis or recommendations related to potential growth industries and what efforts the city should make to

promote economic development. The Plan does not outline a strategy for the streamlining of development regulations or the regulatory process, issues that remain outstanding today.

- **Funding mechanisms are addressed to achieve these visions.** The 1995 Plan does not specifically recommend ways to monitor the impacts of growth on the city's economic long-term health, or the initiation of alternative ways to pay for growth-related infrastructure.

Table C1: Assessing the 1995 Frederick Comprehensive Plan

What Makes a Good Comprehensive Plan? Ratings: 1 = Not at all 5 = Very completely

Rating	
	A. Adequacy of Context. (Explain the context and setting: the **what** and the **why** of the document. They are not self-evident to the public.)
4	1. Is the political/legal context of the plan explained (e.g., meeting state mandates, public discussion and consideration, top priority issues)?
2	2. Is the administrative authority for preparation indicated (Council or Planning Commission resolution, state law, federal requirement, etc.)?
1	3. Is the role of the preparing agency or firm adequately explained (e.g., a letter of transmittal)?
2	4. Is background information presented (e.g., reasons for plan's presentation)?
3	5. Is it clear who the plan is for (e.g., citizens, agency head, city council, board)?
3	6. Is the purpose of the plan explained (e.g., study, information decision, action, conveyance of advice)?
4	7. Is the type of plan and its scope reported early on, to alert the reader about what to expect? (E.g., the reader is alerted that this plan is highly quantitative and analytic; far ranging or narrow; specific, and technical.)
1	8. Is an overview/summary provided (e.g., an "Executive Summary")? … which clearly articulates the plan's rationale and essence highlighting changes from the current plan or approach.
1	9. Is the source of funding for the plan shown (e.g., federal, state, local, private donor, agency)?
2	10. Is the amount of time in preparation shown (total person/hrs., weeks, etc.)?
1	11. Does new plan evaluate the strengths and weaknesses of the current general plan or current zoning (if in plan.)
	B. "Rational Model" Considerations. (Show basic planning considerations based on underlying theory and its criteria. Even beyond the list here, there are many theories and types of plans. The plan authors must be clear themselves about what they are doing, to transmit clarity to the reader).
1	1. Given the type of plan to be prepared, are the plan formulators clear about the criteria they will use to assess its progress while being formulated?
1	2. Have these criteria been made explicit in the plan?
2	3. Are problems specifically identified (or only implied?
3	4. Are goals and objectives explicitly identified?
3	5. Is the tone of the plan commensurate with the planning approach recommended (e.g., comprehensive, incremental, advocacy, etc.)?
4	a) If the plan is intended to be comprehensive, does it relate substantively to a larger whole (e.g., horizontal relation to other agencies and adjacent governing bodies)?
4	b) Does the plan consider the regional or next higher level of government or context (e.g., vertical relations)?
4	c) Is there planning for procedural coordination with other plans and agencies?
4	6. Is the capacity or adequacy of existing infrastructure and organizational systems described?
1	7. Are alternatives listed, or at least considered?
1	8. Are the alternatives identified as "variations on a theme," or as radically different?
1	9. Are tradeoffs permitted?
3	**C. Procedural Validity**. (Explain the **who** and the **how** of the plan-making; inform the reader about what went on in making the plan and what is going on by publishing it.)
1	1. Who was involved in the plan formulation (e.g., staff from different agencies or departments, citizen groups, politicians)?
2	2. How were they chosen (e.g., on the basis of expertise, interest, volunteering, or other self-selection)?
2	3. How were they involved (e.g., discussion groups, internal staff memos or papers, public meetings)?
2	4. How were data, models, goals, and other pertinent information used in recommending policy or action?
	5. How were technical matters transformed into recommended policy (e.g., through "ordinary knowledge," experience, "scientific" training, design training)?
4	6. Was an advisory group used?
4	7. Were preliminary drafts circulated for public comment?
2	8. Is the plan's evolution described, including effects of public or stakeholder input?
?	9. Does plan have the support and involvement of key public agencies (e.g., finance/budget, public works, economic development, recreation and parks)?
?	10. Does plan incorporate input from a broad spectrum of stakeholders?
?	11. Did the plan evolve and change during its development so that stakeholder-recommended versions are very similar to the finally adopted plan?
1	12. Did plan evolve and change during fiscal analysis?
?	13. Did plan workup proceed at conceptual and more detailed levels simultaneously and interactively?
3	**D. Adequacy of Scope.** (Show how the plan is connected to the larger world.)
3	1. Have all possible or pertinent issues been considered (e.g., physical, social, economic, political, psychological, cultural, or design)?
5	2. Have issues of efficiency and equity and predictability been considered?
1	3. Has the distribution of costs and benefits among different groups and interests been considered?
	4. Has the distribution of costs and benefits among different groups and interests been considered?

Rating	
2	1. Have relocation/displacement implications been considered?
2	2. Have financial/fiscal implications been considered?
3	3. Have the legal implications been considered?
2	4. Has feasibility in the larger political context been considered?
	E. Guidance for Implementation. (Most plans are intended to do something. Consider the instruments [ordinances, regulations, budgets, schedules, etc.] and the agencies and persons responsible for making the plan work. Should they be included? [A vision plan would not have an implementation aspect; rather, it would have a section dealing with "the next steps."])
2	1. Are implementation provisions appropriate in the plan?
1	2. Are there priorities for implementation?
1	3. Is cost of implementation vs. nonimplementation considered?
3	4. Is there a time span for plan implementation?
2	5. Is there provision for scheduling and coordinating of implementation proposals?
?	6. Can proposals accomplish their intended purpose if implemented?
2	7. Is there a program or proposal for an impact analysis?
?	8. Is the agency or person responsible for implementation identified?
1	9. Can the responsible agency realistically be expected to implement the plan?
5	10. Produces a future land use and transportation map.
2	11. Addresses a capital program need.
	F. Approach, Data and Methodology. (Make clear the technical basis, if any, of the plan; where the data come from and how they are used, so that others may check the plan's thinking by use of the same sources.)
3	1. Is the plan based on a wide spectrum of data where feasible?
2	2. Is the plan sufficiently flexible to permit new data and findings to be fed in?
4	3. Are the data sources cited?
2	4. Are the methodology sources cited?
4	5. Are the levels of data aggregation relevant or meaningful to the study?
3	6. Establishes adequate baseline spatial data, inventories, (e.g., existing land uses, pipeline development, current zoning, current plan data, etc.) and existing conditions (e.g., holding capacity based on current comprehensive plans or zoning.)
1	7. Critically scrutinizes and validates "received" projections.
2	8. Presents rationale for future projections and explicitly ties them back to the plan's recommendations so that they are consistent.
4	9. Explicitly addresses public sewer and water authority and capacity relationships to land use.
1	10. Tests plan alternatives for transportation impacts and relationships.
3	11. Are methodologies and assumptions internally consistent?
1	12. Does plan present key recommendations in terms of measurable objectives and specific strategies?
1	13. Does plan document incorporate enough technical analysis to support its recommendations?
2	**G. Quality of Communication.** (Clear communication above all else is necessary for a fair hearing from others.)
1	1. Is the client or reading public identified (e.g., public at large, other professionals)?
2	2. Are the ideas convincingly presented, given the nature of the audience?
2	3. Are the rationales behind the decisions effectively presented?
2	4. Are the proposals/recommendations/conclusions consistent with objectives?
3	5. Is the tone of the document consistent with the message conveyed (e.g., not presented in the past tense as an accomplished fact when the plan is for study and review)?
1	6. Are the criteria indicated by which the plan is intended to be judged?
4	7. Is plan written in understandable and clear language?
	H. Plan Format. (Other forms of communication are found in the plan format itself, as well as evidence on who takes professional responsibility for the plan's formulation, when it was adopted, and other seemingly incidental concerns that nevertheless communicate professional competence.)
4	1. The size and format conducive to the use intended? (For example, an oversize plan is hard to file and copy, hence does not lend itself to constant reference and day-to-day use.)
5	2. Is the date of publication shown?
5	3. Are the authors shown, to indicate professional responsibility (names of personnel who worked on the plan, as well as agency or firm names)?
5	4. Is there a table of contents?
5	5. Are pages numbered?
2	6. Are graphics used to best advantage?
2	7. Is the plan attractively laid out?

Source: Table developed by William C. Baer, JAPA, Summer 1997, pp.338-339.Table Includes all of Baer's criteria plus HNTB's additions (shown in italics). The rankings are HNTB's.

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX B

Architectural Survey

NOTE: THIS APPENDIX AVAILABLE THROUGH THE CITY OF FREDERICK PLANNING DEPARTMENT

Prepared by:

HNTB Corporation
Architects Engineers Planners

THE CITY OF FREDERICK

FOUNDED 1745

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX C

Comprehensive Plan 1995
Preliminary Assessment

2002

Prepared by:

HNTB Corporation
Architects Engineers Planners

1995 COMPREHENSIVE PLAN PRELIMINARY ASSESSMENT 2002

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THE City OF Frederick

Appendix C

I. Purpose & Introduction

The purpose of this report is to set the stage for the City of Frederick's Comprehensive Plan update now underway. The Comprehensive Plan is the short and long-range planning tool for guiding the orderly growth of the City of Frederick over the next twenty years. The Comprehensive Plan will address a variety of complex and dynamically interrelated issues in areas such as transportation and infrastructure, land use, economic development, housing, the environment, future growth, etc.

The City of Frederick is at a crossroads in determining its future quality of life. The information provided in this report is intended to be a starting point for the update of the City of Frederick's Comprehensive Plan. The information in this report is provided to help determine which goals and objectives from the 1995 Comprehensive Plan have been accomplished and which objectives may need to be considered for inclusion in the next plan.

Each chapter of the 1995 Comprehensive Plan was reviewed to determine if the objectives of the plan have been meet. Objectives that cannot be measured have been listed for the purpose of being assessed on whether they be rewritten in a more direct and objective form. Goals and objectives with words such as encourage, continue and support were generally considered items that could not be truly evaluated.

The first four chapters in the 1995 Comprehensive Plan are background material and do not have polices associated with them. Where possible supporting information was provided on how the City of Frederick has completed each objective. On-going objectives are considered items or processes that have no predetermined completion, but are generally part of the daily activity of the City of Frederick.

✓ Policies that have been completed
↻ Policies that are ongoing activities of the City of Frederick
✳ Policies that have not been completed
◈ Polices that cannot be measured

Appendix C

II. CHAPTER FIVE – LAND USE

5.1	✓ Comprehensive Rezoning. This task was completed on November 16, 1995 with the adoption of the Zoning Map by the Mayor and Board of Aldermen.
5.2	◈ Principles and Standards for land use patterns.
5.3	↻ Monitor Development Approvals. Phasing schedules are monitored by the Planning Department to ensure that developments are constructed in an orderly manor. The Planning Department also monitors the build-out of all residential developments with a bi annual spreadsheet.
5.4	◈ Underutilization of planned growth areas must be discouraged.
5.5	↻ Program Infrastructure to meet the needs of the City. The CIP is approved by the Mayor and Board of Aldermen after receiving input from staff and the citizens.
5.6	↻ Ensure that adequate public facilities are available. At the time of annexation, site plan review and building permit review, the City of Frederick reviews the project to ensure that services can be provided.
5.7	↻ Work to secure sites for parks, schools and other facilities. During the annexation and PND process, the City of Frederick secures sites that have been identified on the Comprehensive Plan.
5.8	✓ APFO is not recommended for the City of Frederick. The City of Frederick has not adopted an APFO.
5.9	✱ Review of Impact Fees to meet the demands of growth.
5.10	↻ Continue to support the City/County Annexation Agreement. The City of Frederick has annexed property that can be reasonability severed by City services. This is the essence of the 1988 City / County Annexation Agreement.
5.11	◈ The Area of Future Annexation Map supersedes the 1988 Annexation Agreement.
5.12	✱ Update 1998 City / County Annexation Agreement.
5.13	✓ Coordinate the City and Frederick Region Comprehensive Plans. The City and County Planning Commission had several workshops to discuss how the 2002 Frederick Region Plan will affect the City of Frederick.
5.14	◈ The land use map carries forward recommendations for downtown to accommodate mix use in the downtown area.
5.15 & 5.16	✱ Ensure that the Zoning Ordinance, HDC Guidelines and Carroll Creek Master Plan are not contradictory.
5.17	✱ Establish an overlay zone for the Carroll Creek.
5.18	✱ Use the Carroll Creek Master Plan in review of projects along Carroll Creek. The Carroll Creek Commission was disbanded shortly after the adoption of this plan. The City of Frederick has not established producers to determine if the Carroll Creek Master Plan (1991) is being adhered to.
5.19	◈ Frederick will continue to be guided by the Carroll Creek Park Master Plan.

5.20	↻ Continue to encourage cultural facilities & events downtown area. The downtown has the Weinberg Center and the Frederick Arts Council both located on West Patrick Street. The Office of Special Events provides the City numerous events in and around the downtown.
5.21	↻ Enforcement of the Livability Codes and Junk Car Ordinance. The Department of Permits and Code Inspections has two inspectors to ensure that the current codes are adhered to.
5.22	✳ Use Block Grants for repair to street infrastructure.
5.23	✳ Underground utilities in the downtown.
5.24	↻ Work with State, County, and Federal agencies to incorporate preservation considerations.
5.25	✓ Expand the Historic District. The Historic District was expanded in 1995 to include B&O, Water Street, 300 block of East Third Street and Fifth, Sixth and Seventh Street between East and Bentz Streets.
5.26	↻ Support cultural and historical events. The Office of Special Events coordinates with various organizations to promote the cultural and historical richness of the City of Frederick.
5.27	↻ Work to record and protect archaeological resources. The City of Frederick is aware of sites within the City that have been protected, but does retain records of locations or classification of sites.
5.28	✳ Historic Site Inventory should be completed downtown.
5.29	↻ Support the role of the HDC. The Planning Department has hired a full time Preservation Planner to address the needs of the Historic District Commission. The City of Frederick just adopted new guidelines for the Historic District along with a Welcome Brochure and General Information Handout. These items are also available on the City of Frederick's website.
5.30	✳ Monitor housing approvals and growth trends to ensure an ample inventory of zoned land.
5.31	◈ Encourage use of Planned Neighborhood Developments.
5.32	◈ Encourage creation of additional housing units in the downtown area.
5.33	✳ Further study, revision and review of the September 1992 Report by the Frederick City County Affordable Housing Commission.
5.34	◈ Frederick will continue to evaluate flexible development techniques.
5.35	↻ Use the Comprehensive Housing Affordability Strategy (CHAS) to prioritize the best use of Federal Funds.
5.36	↻ Continue to support non-profits in creating affordable housing. The Mayor and Board of Aldermen have reduced or removed fees for non-profits to help create affordable housing throughout the City of Frederick.
5.37	◈ Frederick City will continue to seek County, State & Federal support for hosing programs.
5.38	↻ Frederick will continue to home improvements projects which benefit low and moderate income households through CDBG.

5.39	↻ Enforce livability and building codes. The City of Frederick has two Code Management Officers that handle all code enforcement within the City.
5.40	◈ Frederick will seek ways to prevent displacement of renters as neighborhoods improve.
5.41	↻ Frederick will continue to target assistance in areas of greatest need where there are concentrations of moderate and low income families. The use of the CDBG funds target these areas.
5.42	◈ Frederick will continue to support the County Economic Development Commission.
5.43	↻ Utilize State programs. Maryland Industrial Land Act Maryland Industrial and Commercial Redevelopment Fund Community Development Block Grant State Action Loans for Targeted Areas The Department of Community Development is the lead agency that manages the City's loans and grants for redevelopment. The City of Frederick is an entitlement Community and working on the second fiver year plan, The Consolidate Plan 2000-2005 which was adopted May 2000.
5.44	↻ Continue to develop downtown and support GFDC. Currently one City site is being developed and two other sites are being considered for development. The downtown area has seen a recent increase in projects in the downtown area.
5.45	✳ Establish guidelines for industrial tax abatement.
5.46	✳ Review of the 1981 County Tax Equity Agreement.
5.47	↻ Frederick City will periodically examine and revise standards and specifications, zoning and subdivision requirements.
5.48	✳ Use Commission on Regulatory Response (CORR) recommendations to help streamline the development review process.

III. CHAPTER SIX - TRANSPORTATION

6.1	✓ Develop alternative standard details for major & minor arterials with medians. There are currently alternative standards in the Standard Design & Construction Details for major and minor arterials with and without medians.
6.2	✳ Develop with Frederick County the MINUTP Traffic Model. The City of Frederick is currently preparing a citywide traffic study using the Synchro software.
6.3	✳ Review of congested intersections. ✓Rosemont, Baughman's & Military Road The City of Frederick has acquired the shopping center at the corner and is redesigning the intersection. ✓MD180 & Butterfly Lane The Hargett Farm has provided the City of Frederick with a traffic study of this area. The developer is working with the City of Frederick to develop alternative improvement plans. ✳MD40A & Mt Phillip Road ✓N Market & Routzahn's Way (6.4) Recent intersection improvements have been completed to improve various movements at this intersection.
6.4	↻ Require developers to construct road improvements. During the plan review process, developers are required to construct road improvements that are shown on the Comprehensive Plan and any improvements required by the County or State.
6.5	◈ Ensure adequate roadway capacity through the development review process.

6.6	✓ Improving the road Network as outlined on page 6.4. <u>Short Term</u> ✓East Street Extension The City of Frederick has completed the first phase from Patrick to South Street and is currently working with SHA to design the second phase of this project. ✓I-70 Interchange & Other Improvements The SHA is currently working on improving the interchanges in the City of Frederick. ✓Shookstown Road / Montevue Lane This project has been completed. ✱Rosemont Avenue Reconstruction ✓Patrick Street Reconstruction This street has seen various improvements since the 1995 Comprehensive Plan. ✓McCain Drive to Key Parkway This project has been completed ✓Trading Lane to US 15 This project has been complete. The road needs to be widen to two lanes each direction from CSX's tracks to US 15. ✓East All Saints Street Extension This project is currently being designed and built. <u>Intermediate</u> ✱Airport Drive East Extension ✱Shookstown Road Improvements ✱Monocacy Boulevard Improvements ✱This project has been completed. ✱East Seventh Street Extension ✱Pine Avenue ✱Highland Street Extension ✱East Street Upgrades ✓Project has been designed but not constructed. This project used TEA-21 funds. ✓Western Arterial from MD 26 to Hughes Ford Road This project has the first phase built and the second phase is being designed. <u>Long Term</u> ✱East Arterial ✱Mt Phillip Road Relocation ✱Butterfly Lane Upgrade ✱Gas House Pike Upgrade
6.7 & 6.8	↻ Work cooperatively with other levels of government on transportation projects.
6.9	◈ The City Master Highway Plan reflects and supports the Frederick County Regional Plan and SHA projects.

6.10	✓ Alignment study of the Northwest Arterial. The City of Frederick has completed the first section of the Monocacy Boulevard from MD 26 to Gas House Pike. The second section is currently being designed that would connect Gas House Pike to Hughes Ford Road.
6.11	✱ Frederick City & Frederick should develop a design standard for Monocacy Boulevard and Christopher's Crossing.
6.12	↻ Require sidewalks in conjunction with all new street construction.
6.13	✓ Compliance with Maryland Building Code for the Handicapped and American with Disabilities Act.
6.14	↻ Work to strive to create pedestrian paths The City of Frederick works during the plan review process to ensure that pathways are created throughout developments to create an interconnected development. The Department of Permits and Code Management have two plan reviewers to ensure that the MD Code for the Handicapped regulations are being met. The City of Frederick has been upgrading intersections to meet the ADA standards.
6.15	✓ Prepare a Bike Path Plan. This plan was adopted by the Mayor and Board of Aldermen in Spring of 2002.
6.16	✓ Review of parking standards. The Mayor and Board of Aldermen approved revisions to the parking standards in 1992 and 2000.
6.17	↻ Monitor downtown parking needs. The City of Frederick has the daily numbers of the number of spaces that are being used in any of the four City parking garages. The last parking study was completed over ten years ago. The City of Frederick currently is currently hiring a consultant to complete a needs assessment study of the existing parking.
6.18, 6.19 & 6.23	✓ Extension of the MARC Train to downtown. The first train left downtown Frederick on 12/17/01. Currently there are three trains leaving in the morning and returning in the evening Monday through Friday.
6.20	✱Cooperate with State and County departments to expand carpool/vanpool matching programs, subscription bus service, carpool lots.
6.21	◈ Support transportation services by nonprofits.
6.22	↻ Cooperate with Frederick County in future updates of the Public Transportation Development Plan.
6.24	✱ Provide rail service from Walkersville. The Walkersville Southern Railroad currently has pleasure trains from Walkersville to MD 26. The tracks crossing MD 26 have been paved over with the last resurfacing of MD 26.
6.25	✓ Update of the Airport Master Plan. The Mayor and Board of Aldermen adopted the Airport Master Plan on January 1999
6.26	↻ Advise property owners of the Runway Protection Zone. The Planning Department with the assistance from the Airport Manager ensures that all proper forms are completed for any new construction near the airport. The airport just completed an obstacle removal phase for the runway protection zones.

IV. CHAPTER SEVEN – COMMUNITY SERVICES AND FACILITIES

7.1	↻ An update of the CIP program to reflect the Comp Plan. Each year the Mayor and Board of Aldermen adopt a CIP program that reflects the goals of the Administration. The Mayor and Board receive input from the staff and the citizens of the City of Frederick. The City of Frederick Water and Sewer Master Plan was last completed in February 2000.
7.2	↻Encourage reduction of water consumption. Water conservation is a key element in the Interim Water Study being prepared by staff.
7.3	✓Water and sewer operations will meet Maryland Department of the Environment requirements.
7.4	✓ Upgrade of Ballenger Creek Wastewater Treatment Plant. This plant was always designed to operate at 6 MGPD, but operated at 2 MGPD'S. The plant was upgrade and operating at 6 MGPD in 1996.
7.5	✳ Utilize the Potomac River as a long-term source of water. The City of Frederick and Frederick County are now exploring a joint partnership to bring water from the Potomac River to service the City of Frederick and Frederick County.
7.6	✓ Update the Water & Sewer Master Plans. The Mayor and Board of Aldermen adopted this report on February 2000.
7.7	✳ Work with the County to reach an agreement concerning the maximum draw from Lake Linganore Treatment Plant.
7.8	◈ Work with County and State agencies in planning water and sewer improvements.
7.9	✓ Require annexation as a condition of water and sewer line extension.
7.10	◈ Seek all available funding sources for expansion and upgrading of sewer lines.
7.11	✓ Fund water and sewer operations through user revenues.
7.12	✓ Require the developers to extend water & sewer to their sites. The City of Frederick has continued this policy of the extension of water and sewer lines since 1995.
7.13	✓ Parkland dedication areas abutting greenways should be required. The City of Frederick requires developers to dedicate floodplain and wetlands to the City of Frederick as part of the greenway concept.
7.14	✓ Develop a Pathway Master Plan. This project was started in Spring 2001 and will be ready for approval by the Mayor and Board of Aldermen in Spring 2002.
7.14	✓ Develop pathway standards. These standards were developed and approved by the City Engineer on July 16, 1999 and are in the Standard Detail and Construction Manual.
7.15	↻ Participate in the Monocacy Greenway study.
7.16	✳ Implement park improvements toutlined in the Carroll Creek Plan.
7.17	✳ Develop a Parks Master Plan.

7.18	✱ Expedite Parkland Development.
7.19	↻ Use Public Open Space Funds. The City of Frederick annually submits request for Public Open Space Funds. The most recent award was used to purchase the Hillcrest Park site of the City's third pool.
7.20	↻ Acquire parkland at the time of plan review. This is a requirement of the Zoning Ordinance.
7.21	✱ Examine parkland dedication requirements.
7.22	✱ Encourage the County to plan and develop district and community parks that benefit City and County residents.
7.23	✓ Joint use agreements with the Board of Education. The City works with the BoE in developing school site adjacent to parkland to enhance the overall recreational needs of the community. The City Recreation Department uses several school sites for local recreation centers.
7.24	↻ The City will provide assistance to the County and State agencies in planning community facilities.
7.25	↻ Secure public facilities sites during annexation. This is part of the annexation process to have the petitioner proffer sites that are outlined on the Comprehensive Plan.
7.26	✓ The Comprehensive Plan Map recommends sites for school construction. Only Whittier Elementary & TJ Middle has opened so far.
7.27	Support recommendations of the Frederick Region Plan for fire and rescue facilities. ✓ Provide a new fire station along Opossumtown Pike The Clover Ridge Development agreed to pay for $200,000 as a fee in lieu of placing a site on their development. The Mayor and Board of Aldermen approved this item on June 7, 2001. ✓ New Design Road ✓ Ballenger Creek Pike
7.28	✱ Airport fire station.
7.29	↻ Study the need to expand police services. This is an on-going function of the Police Department. The Mayor and Board of Aldermen approve the final adoption of their operating budget.
7.30	↻ Encourage cultural organizations.
7.31	↻ Support the Tourism Council.
7.32	✓ Expansion of the C B Artz Library. This project is scheduled to open Spring 2002.
7.33	↻ Work with State and County to keep government offices downtown.
7.34	↻ County cooperation in regional plan updates. The City and County Planning have recently held several meeting to discuss the effects of the Frederick Region Plan on the City of Frederick.
7.35	✱ Study other recycling options available to the City of Frederick.
7.36	✓ New homeowners will be placed on notice about the Frederick City Airport and Police practice range. New owners are given notices at the time of closing concerning both of these facilities.

V. CHAPTER EIGHT – NATURAL RESOURCES PROTECTION

8.1	✳ Work with State and regional agencies to reduce emissions as mandated by the Clean Air Act Amenments of 1990.
8.2	✳ Reduce vehicle miles traveled as the city grows.
8.3	◈ Discourage auto dependency through local job growth and neighborhood design.
8.4	✳ Encourage alternative fuels.
8.5	↻ Encourage practices that reduce erosion.
8.6	↻ Established a Greenway along the Monocacy River & its tributaries. The City of Frederick requires developers to dedicate floodplain and wetlands to the City of Frederick to continue this concept of a linear park system, provide protection against flooding, and maintain water quality.
8.7	✳ Improve Monocacy River water quality.
8.8	↻ City of Frederick will work with the Monocacy Scenic River Commission The Planning Staff receives agendas of all meetings and attend when issues arise concerning the City of Frederick.
8.9	✓ No mineral extraction to be planned for the City of Frederick.
8.10	✓ The City will meet mandated solid waste reduction targets.
8.11	↻ Continue and strengthen water conservation.
8.12	✳ Review "in house" practices to maximize environmental protection.
8.13	◈ Enforce storm water and floodplain management laws, and erosion control regulations.
8.14	✓ Modify land use regulations to allow for clustering and other development options to protect sensitive areas. Section 4.04 (13) of the Zoning Ordinance permits clustering of units as an alternative method to the traditional straight zoning techniques. The Mayor and Board of Aldermen adopted this on September 2, 1999.
8.15	↻ Protection of Streams and buffers. The City of Frederick requires developers to dedicate floodplain and wetlands to the City of Frederick to continue this concept of a linear park system, provide protection against flooding, and maintain water quality.
8.16	↻ Protection of Floodplains. The City of Frederick has a Floodplain Review Board to review the Floodplain Management Ordinance. The City of Frederick requires developers to dedicate floodplain and wetlands to the City of Frederick to continue this concept of a linear park system, provide protection against flooding, and maintain water quality.
8.17	↻ Protection of Rare and Endangered Species. The City of Frederick submits new plans to Department of Natural Resources to get comments concerning the inclusion of any critical habitats that should be preserved.
8.18	✳ Protection of Steep Slopes. The City of Frederick does not have any regulations concerning steep slopes.

8.19	↻ Work with other jurisdictions in watershed protection. The City of Frederick just completed a stream bank restoration project in Tasker's Chance and has been supporting the County's effort for Habitat & Stream Bank Restoration along Montevue Lane.
8.20	◈ The City will use the resources of the State, County, and Fedreal, governments in environmental protection.

VI. CHAPTER NINE – IMPLEMENTATION

9.1	↻ Data Collection and Annual Reports. The Planning Department prepares Annual Reports the reports on the major accomplishments of the City and the Planning Department. This report is required under Section 3.09 of the Annotated Code of Maryland.
9.2	✳ Six year review of the Comprehensive Plan.
9.3	↻ Participate actively in projects, studies and programming process The City participates in a wide varied of other studies that have direct impact on the City of Frederick at the staff and elected levels.
9.4	✳ Update of the 1988 City / County Annexation Study.
9.5	◈ Solicit comment and participation from all levels of government when conducting detailed plans and studies.
9.6	◈ Work with other levels of government when carrying out mandated programs.
9.7	◈ Frederick City will work with State officials to carry out the 1992 Maryland Planning Act.
9.8	✳ Review codes and regulations to meet the goals of this plan.
9.9	✳ Examine flexible zoning techniques.
9.10	↻ The City will continue to streamline the development review process.
9.11	✳ This plan will serve as a guide for determining CIP projects.

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX D
Existing Conditions Reports

Housing Assessment
Economic Assessment
LOS Factors, Cost & Revenue Factors
Capacity Analysis
Transportation Assessment
Parks and Recreation Resource Assessment

Prepared by:

HNTB Corporation
Architects Engineers Planners

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CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX D-1
Housing Assessment

August, 2003

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FREDERICK HOUSING ASSESSMENT

Introduction

This report provides an assessment of Frederick's housing with emphasis on a statistical description of Frederick's housing stock and recent trends. This is one a several reports that will provide background to the Comprehensive Plan Update. A separate report will address recent trends in Frederick's employment base.

In this report, all socioeconomic descriptions of the City of Frederick and Frederick County reflect one dominant theme: rapid growth. Between 1990 and 2000, the city's population and households increased by 31.4 and 33.3%, respectively, and the rest of Frederick County experienced similar gains. The employment report will show that employment has risen nearly as fast as population in the city and much faster in the rest of the county.

The city has achieved some of its recent growth at the county's expense through annexation. During the 1990s the land area in the City of Frederick increased by 12%, from 18.2 to 20.4 square miles, due to the annexation of small- and moderate-sized groups of parcels on the north, east and south sides of town. An exact demographic description of the annexation area cannot be obtained from census data, but this area apparently contained about 1,550 residents and 600 households in 2000. Arguably these figures overestimate the gains due to annexation per se, since they partly reflect residential construction that occurred after the time of annexation. Table 1 below shows how the treatment of annexation affects the city's computed growth rates. The table's middle and lower sections pertain to constant land areas and include some estimated figures.

Table 1. CITY AND COUNTY TRENDS IN POPULATION AND HOUSEHOLDS, WITH AND WITHOUT ALLOWANCE FOR ANNEXATION

	Population			Households		
	Frederick County	City of Frederick	Rest of County	Frederick County	City of Frederick	Rest of County
Prevailing City Boundary						
1990	150,208	40,148	110,060	52,570	15,671	36,899
2000	195,277	52,767	142,510	70,060	20,891	49,169
% Change	30.0%	**31.4%**	29.5%	33.3%	**33.3%**	33.3%
1990 City Boundary						
1990	150,208	40,148	110,060	52,570	15,671	36,899
2000	195,277	51,217	144,060	70,060	20,291	49,769
% Change	30.0%	**27.6%**	30.9%	33.3%	**29.5%**	34.9%
2000 City Boundary						
1990	150,208	40,846	109,362	52,570	15,937	36,633
2000	195,277	52,767	142,510	70,060	20,891	49,169
% Change	30.0%	**29.2%**	30.3%	33.3%	**31.1%**	34.2%

The resident population and households within the city's 1990 boundary increased by about 27.6% and 29.5%, respectively, during the ensuing decade. The estimated gains within the city's 2000 boundary were 29.2% and 31.1%. These constant-area growth rates were 1.1% to 5.4% below the corresponding percentage gains for the rest of the county. The impact of netting out annexation requires mention because, except for the multi-city tabulation in the next section, all of the trend analyses presented here will be constant-area comparisons based on the 2000 city boundary. This approach is chosen because it assists the meaningful description of trends in subareas of the city.

Regional Context

This report refers periodically to events beyond the City of Frederick and Frederick County because the growth pressures shaping local destinies are largely regional in scope. The need to establish a larger context is addressed here by making two points.

The first point is that the development pressures affecting Frederick are not just a consequence of explosive growth in the region as a whole. There is more to the story, starting with the fact that the region's growth is not really explosive. During 1990-2000, the Washington-Baltimore Consolidated Metropolitan Statistical Area (CMSA) gained population at a rate at slightly below the national rate, as shown by Table 2 below. The region became known as a hotbed of development during the 1980s, when its economy was shifting abruptly toward high technology and its population was indeed rising much faster than the nation's, but in the next decade its pace of expansion tapered off while national growth accelerated. The region has been retarded by its inclusion of metro Baltimore, which only achieved ten-year population gains of 5.3% to 8.3% in the past three decades. However, even with the inclusion of Baltimore, the region is fast-growing by northeastern standards. But still, its overall magnitude of expansion does not fully explain what has happened in Frederick.

Table 2. POPULATION GROWTH COMPARISONS

	Ten-Year % Rate of Population Change		
	1970-1980	1980-1990	1990-2000
United States	11.4%	9.8%	13.2%
Washington-Baltimore Region*	7.3%	16.2%	13.1%
Frederick County	35.2%	30.9%	30.0%
Regional Rate Minus U.S. Rate	-4.2%	6.4%	-0.1%
County Rate Minus U.S. Rate	23.7%	21.1%	16.9%

* The above regional figures all pertain to the Washington-Baltimore CMSA as defined in 2000.

The other part of the story is that development pressure has been directed towards Frederick by restrictive land use policies in counties located closer to the region's urban centers. Comparisons between Maryland and northern Virginia might even suggest that there is a "Maryland factor" applying to the state as a whole. It is difficult empirically to substantiate this claim, or to identify the specific policy mechanisms that make the state's

jurisdictions unusually restrictive, so attention focuses here on the two clearest cases: Baltimore County and Montgomery County.

Based on a conservation plan dating from the 1960s, virtually all of northern Baltimore County was placed under extremely tight zoning that remains in force today. The result is a district of more than 250 square miles that contains fewer than 250 persons per square mile (as of 2000). This level of residential development – within a county that wraps around one of the nation's oldest and most densely populated cities – is lower than the population density of any full county in Maryland between Allegany and the Chesapeake Bay. The activity that was turned away from northern Baltimore County did not simply disappear. It went elsewhere, and one of the places it went was Frederick.[1]

The development limits in Montgomery County result from an elaborate system of growth management rather than any single policy initiative, and their severity must be judged in terms of outcomes. The outcome during the 1990s was a lower percentage gain in number of households than occurred in the region as a whole. (Households are now the focus rather than population because they are more reflective of new construction.) It is by no means unknown for a suburban county to lag its metro area in terms of growth, but for a high-income county with a blue-chip economy and a population density still well under 2,000 persons per square, it is extraordinary. This can be demonstrated by comparisons with two nearby areas: Fairfax County, Virginia, and Montgomery County, Pennsylvania (containing Philadelphia's Main Line). Like Montgomery MD, both of these comparison areas are characterized by economic strength, ample geographic extent and very high relative income – which translates into prestige and residential desirability. Table 3 at the top of the next page gives the 1990-2000 household growth rates for these and a few other relevant areas.

Table 3 deals with suburban counties arranged in three categories: "outlying" counties separated from the urban core by other areas; close-in counties characterized by high income; and close-in counties with more modest income profiles. The first category compares Frederick and Howard counties in Maryland with Loudoun and Prince William in Virginia and Chester in Pennsylvania. The second category forms the comparisons just mentioned, namely Maryland's Montgomery County with Fairfax VA (including the independent city of that name) and Montgomery PA. The third category covers Baltimore and Prince George's counties in Maryland. Because these counties are both geographically large, no good comparisons are available on the Virginia side of the Washington-Baltimore region, and the best comparison area in metro Philadelphia is a combination of its suburban counties besides Montgomery and Chester. All the figures in Table 3 pertain to percentage household gains between 1990 and 2000. The table first presents overall growth rates for the two regions at issue, then gives the growth rates for individual counties, then shows the differences between county and regional rates.

[1] An HNTB study in 2001 was able to estimate the amount of development diversion from Baltimore County since 1970, but could not establish the receiving areas.

Table 3. COMPARISON OF PERCENT CHANGES IN HOUSEHOLDS, 1990-2000

	Washington-Baltimore CMSA (Including Hagerstown)		Philadelphia PMSA
Overall urban region	**15.3%**		**6.3%**
	Virginia Side	**Maryland Side**	**PA-NJ**
Dif. from Regional Change			
Outlying counties (not next to metro center)	Loudoun: 81.2% Pr. William: 21.4%	Frederick: 18.0% Howard: 16.5%	Chester: 12.2%
Close-in, high-income suburban counties	Fairfax (county and indep. city): **4.4%**	Montgomery MD: **-0.3%**	Montgomery PA: **5.9%**
Close-in, lower-income suburban counties		P. George's: -4.2% Baltimore: **-3.5%**	All other Philly Suburbs: **2.4%**

The objective is to gain a rough idea of the "Maryland factor" by examining the growth differences in the lower part of the table. The numbers do not suggest uniformly that such a factor has been operative in Frederick and Howard counties. The household gains in these areas failed to equal the growth rate in Prince William County or the out-of-sight rate in Loudoun, but Frederick and Howard both exceeded Pennsylvania's Chester County in terms of excess over regional growth. Among the close-in, lower-income counties, the Prince George's comparison is inconclusive because growth in PG has been affected by racial avoidance (though perhaps less during the 1990s than in prior decades). Hence attention is focused back on Montgomery and Baltimore counties. In terms of county-to-region growth differences, Montgomery MD fell 4.7 percentage points behind Fairfax-(4.4%, -0.3%) and 6.2 points behind Montgomery PA-(5.9%, -0.3%), while Baltimore County fell 5.9 percentage points behind its Pennsylvania comparison area.

Thus one might say as a rough guess that the unusually restrictive aspects of land use policies in Montgomery and Baltimore counties have been reducing household gains in each case at a rate of 5% per decade, or half a percentage point per year. In absolute terms, this implies a diversion of about 14,100 households from Montgomery and 13,400 from Baltimore during the 1990s[2]. Moreover, Howard County, one of the fastest growing counties in the state during the 1970s through 1990s has slowed down and is reaching its impending build-out. These factors have made Frederick the next target for higher income out-migration from the more affluent first-tier counties. The Central Maryland Mobility Study done by HNTB made clear the degree to which most affluent housing in the Baltimore-Washington region occurs west of I-95 and, for the most part, less affluent occurs east of I-95. With wealthy Howard and Montgomery counties closed out, Frederick becomes the next target, given Carroll County's middle-income profile. Frederick's location at the confluence of I-70 and I-270 makes it the county best tied to a

[2] If just one-sixth of these diverted households wound up in Frederick County, they would have accounted for over a quarter of the county's entire household gain between 1990 and 2000, or nearly half of its gain in excess of national growth.

rapid commute into the fast-growing outskirts of the D.C. region and the slower growing outskirts of Baltimore region.

The second point offered to place local events in perspective is that the City of Frederick has been relatively aggressive in accommodating the growth pressures bearing upon it and its home county. No longer do American cities routinely gain residents faster than their surrounding counties. Such would be the case in an ideal world, because cities specifically exist to provide the infrastructure and services that people require. But counties have gotten heavily into the population support business, with past assistance from federal subsidies, and now absorb disproportionate shares of residential growth for reasons ranging from land availability to fiscal advantage. So the City of Frederick's performance has been at least somewhat unusual.

A brief tabulation has been prepared to gauge how unusual. The focus again is percentage household growth during 1990-2000 (although the City of Frederick only led the rest of Frederick County by a hair in this regard). The tabulation covers cities in the twelve states located south of the Mason-Dixon Line and east of the Mississippi and Ohio rivers. It includes all incorporated areas in these states that had between 10,000 and 25,000 households in 1990 – when Frederick had 15,671 – and were the largest cities in their home counties. The tabulation targets southeastern states because their populations have been relatively dynamic, and its largest-city criterion serves to focus attention on municipalities that were not geographically constrained.

Table 4 describes 1990-2000 household growth rates for the 74 cities meeting the above criteria. (These include four independent cities in Virginia that have been treated as if part of their surrounding counties.) The columns of the table categorize cities by overall county household growth. They serve to isolate cities with home-county growth rates below 15%, between 15% and 30%, and above 30%. The rows of Table 4 indicate whether or not cities gained households at faster rates than the outlying portions of their counties, and if so, whether or not their growth was abetted by annexations that raised city land area by more than 20%.

Table 4. CITIES WITH 10,000 TO 25,000 HOUSEHOLDS IN SELECTED STATES, TABULATED BY RELATIVE 1990-2000 HOUSEHOLD GAINS*

	County HH Gain < 15%	County HH Gain 15%-30%	County HH Gain > 30%	Total
City Grew Slower Than Rest of County	20	26	8	54
City Grew Faster Than Rest of County:				
Land Area Increased 20+% by Annexation	5	5	3	13
Area Not Increased 20+% by Annexation	2	4	1**	7
Total	27	35	12	74

* The selected states are: Maryland, Delaware, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Kentucky and West Virginia. The tabulated cities include all incorporated areas in these states that: 1) had 10,000 to 25,000 households in 1990; 2) represented the largest cities in their home counties; and 3) did not change corporate form between 1990 and 2000 (e.g., through city-county consolidation).

** Frederick, MD.

Southern, county-dominating cities in the given size range have been relatively fast-growing as a group, with a median 1990-2000 household gain of 18.2% and an aggregate gain of 20.6%. Nevertheless, only 20 of the 74 cities gained households faster than their surrounding county areas, and 13 of these 20 cases involved large-scale land annexations. Of the remaining 7 cities, only one occupied a county with an overall household gain above 30%, and that city was Frederick.

The purpose here is not to harp upon Frederick's uniqueness, which is partly an artifact of the table, but just to point out that Frederick has done more than could be expected to accommodate the region's growth, including the housing demands that other jurisdictions have turned away. The same was true during 1980-1990, when Frederick grew even faster than in the 1990s. The questions now at hand are the extent to which Frederick wishes to play this role in the future and the extent to which further expansion is physically and fiscally viable.

Recent Housing Trends and Price Escalation

The present housing analysis must rely for the most part on 2000 census statistics that are now three years old. As it happens, not a lot has transpired in the City of Frederick housing market since then due to the water crisis that largely shut down new construction near the end of 2001.

The most current information consists of building permit data and findings from personal interviews. Table 5 gives a compilation of building permit data for the city since 1980. The table's first three rows present annual averages for multi-year periods, while the remaining rows pertain to individual years from 1996 through 2002. Except for the last two years, the statistics describe three categories of housing units: 1) single-family detached units; 2) single-family attached units, which in Frederick are almost always

townhouses with one or two common walls; and 3) units in multi-family structures, which with one exception have recently consisted of structures containing five or more units. Building permits do not guarantee that every authorized unit will be constructed and marketed, but under most circumstances building permit activity is highly indicative of actual construction.

The total number of housing units permitted in Frederick City averaged 552 per year during 1980-90 (inclusive). The average declined to 492 in 1991-1995, then jumped to 669 units per year during 1996-2000. The construction dip in the early 1990s reflected the overbuilt status of the regional housing market at that time, but was less pronounced than elsewhere. The upswing at the end of the decade culminated in the permitting of more than 940 units in both 1999 and 2000. The total then fell back to 619 units in 2001 and equaled only 41 units in all of 2002 due to the moratorium on new water connections. Even though the water situation began to impinge before the end of 2001, it appears that housing construction was due for a retrenchment at that point due to the national recession, and may have been higher in the two previous years than even good times could sustain. As shown later, the total housing units permitted in the unincorporated part of Frederick County declined by more than a quarter from 2000 to 2001.

Table 5. HOUSING UNITS AUTHORIZED BY BUILDING PERMITS SINCE 1980 IN THE CITY OF FREDERICK

	Single-Family			Multi-	Total
	Detached	Townhouse	Total S-F	Family*	Units
Annual Average, 1980-1985	111	127	238	283	521
Annual Average, 1986-1990	168	150	317	272	589
Annual Average, 1991-1995	192	202	394	99	492
Individual Years:					
1996	160	207	367	48	415
1997	173	224	397	48	445
1998	227	248	475	118	593
1999	244	314	558	388	946
2000	340	460	800	145	945
2001			535	84	619
2002			41	0	41

* Except for two duplex units in 1997, all multi-family housing units authorized since 1996 have been contained in structures with five or more units.

Source: "Growth and Development Report," City of Frederick, March 2002, and U.S. Census Bureau building permit website (for post-2000 data).

Beneath the general uptrend in housing activity over the past two decades, there was a marked shift in the mix of unit types constructed. Units in multi-family structures accounted for slightly over half of the total during 1980-1990, but the multi-family share fell to 20% in 1991-1995 and only rebounded to an average of 21% for the subsequent

years through 2001, despite the permitting of 388 multi-family units in 1999. Within the single-family category, half of the units permitted during 1980-1990 were detached homes and half were townhouses. The detached share fell slightly below half in the early 1990s, then fluctuated between 42% and 48% with no clear trend. The overall single-family split for 1996-2000 was 44% detached, 56% townhouse.

Some of the key issues confronting both the city and county in the future may involve housing affordability. Hence attention must be paid to reports of very rapid appreciation in home prices over the past several years (roughly since the last census date). The most detailed description of this trend has been obtained from a representative of Ausherman Homes, a company that builds between 250 and 350 housing units in the county per year.[3] The Ausherman products include detached homes, townhouses and condominium units, in most years divided evenly between Frederick City and the rest of the county. As is typical of the metro Washington suburbs, Ausherman builds somewhat larger homes than the national norm, with detached units most commonly measuring 2,600 to 2,900 square feet and townhouses measuring around 2,000 square feet.

According to this source, housing price appreciation has been "astronomical" since 2000. The same home that sold for $320,000-$360,000 in March of 2003 could have been bought for $220,000-$260,000 in 1999, or for about $185,000 in the mid-1990s. This and other information suggests that single-family home prices have recently been increasing by about 10% per year. In the late 1990s they were rising by perhaps 7% per year.

Reportedly the upswing in residential price appreciation was not initiated by Frederick's water crisis, since it began at least a year earlier. Responsibility is attributed instead to spiraling land costs. This would imply that there is a local scarcity of suitable, ready-to-build land parcels (which the moratorium in Frederick certainly has not helped). The impact of land cost has been dramatically illustrated by Ausherman advertisements pointing out that homebuyers can save $100,000 by living in Washington County rather than Frederick. The same Ausherman model that costs $350,000 in the Frederick area can be purchased for $250,000 in Boonsboro.

Notwithstanding this comparison, it is reasonable to ask whether some of the recent price appreciation has occurred because builders are moving upmarket – i.e., offering intrinsically more valuable products. Such moves can be rational in response to scarcity conditions, and there is evidence that they have occurred elsewhere in the region. Some perspective on this subject can be gained by looking at the construction cost statistics that accompany building permit data, since changes in product mix should be reflected in the magnitude of brick-and-mortar expenses.

The left-hand side of Table 6 presents building permit data for the unincorporated portion of Frederick County (without a breakdown of detached versus attached single-family units). The table's right-hand side is the main focus. It tabulates the average

[3] Interview with Stuart H. Terl, VP of Operations, Ausherman Homes, 3/27/03.

construction cost per housing unit for all single-family units permitted in Frederick City and the unincorporated portion of Frederic County since 1996. Also shown are percent changes in average construction cost from year to year, not adjusted for inflation.

Table 6 shows that the unincorporated portion of Frederic County has consistently received a higher-value mix of single-family housing than the City of Frederick, although the margin was small by 2001. As for the year-to-year changes in construction cost, the figures are somewhat hard to interpret given their random fluctuations and the shortness of the record. The City of Frederick reportedly experienced a major jump in construction cost between 1996 and 1997, but there are no prior statistics to show whether this change was permanent. Similarly, the city's relatively large gain from 2000 to 2001 receives little confirmation from the average cost figure for 2002 since it is based on only 41 units. (See Table 5.)

Table 6. HOUSING UNITS PERMITTED IN UNINCORPORATED FREDERICK COUNTY, AND TRENDS IN AVERAGE CONSTRUCTION COST

	Units Permitted in Un-incorporated Frederick County			Ave. Construction Cost of Single-Family Units			
				City of Frederick		Uninc. Frederick Co.	
	Single-F	Multi-F	Total	Amount	% Ch.	Amount	% Ch.
1996	1,162	162	1,324	$84,054		$104,336	
1997	1,105	305	1,410	$99,943	18.9%	$110,750	6.1%
1998	1,303	23	1,326	$105,041	5.1%	$113,689	2.7%
1999	1,579	48	1,627	$110,085	4.8%	$114,971	1.1%
2000	1,905	36	1,941	$112,630	2.3%	$123,758	7.6%
2001	1,169	250	1,419	$123,062	9.3%	$127,110	2.7%
2002	1,305	226	1,531	$124,592	1.2%	$130,923	3.0%

Source: U.S. Census Bureau building permit website.

The significant fact, however, is that since 1997 there have been no double-digit percent changes and only two above 5.1%. The situation since 1999 can best be judged from the following compound rates of change:

City of Frederick, 1999-2001:	5.7% per year
Unincorporated Frederick County, 1999-2002:	4.4% per year
City and County Combined, 1999-2002:	4.8% per year

These rates of increase are above the general rate of price inflation, but given recent trends in construction material prices, they are not implausible as descriptions of what it cost to build a given housing unit. Thus the data tend to confirm the Ausherman account. Rather than changes in product mix, the housing price gains have been largely accruing to the scarcity value of the land, plus perhaps the skill required to negotiate the development approval process.

City Subareas and Demographic Profile

The City of Frederick has been divided for purposes of housing analysis into five subareas. These zones are substantially different in terms of housing age, occupancy and other characteristics, and their differences help to illuminate the whole. The city subareas and other relevant districts are shown in Figure 1 on the next page and described below.

City Core. Consists of census tracts 7501, 7502, 7503 and 7506. The Core includes the Historic District and most of the city's old (pre-1940) housing. It is relatively small and extends primarily to the west and southwest of the city center.

Southwest. Consists of census tracts 7505.01 and 7505.02. In the partitioning of Frederick for analysis purposes, the area south of Fort Detrick has been isolated because up to 1980 it contained 95% or more of the city's housing. The two western census tracts have then been isolated from the rest of the southern area because they differ substantially from it in terms of housing type and occupancy.

Southeast. Consists of: census tract 7504; the portions of tracts 7509 and 7510 within the city; block groups 3, 4 and 5 of tract 7507; and block groups 3, 4, 6 and 5 (part) of tract 7508. The Southeast is the remainder of the city's southern area after deduction of the Core and the Southwest. It largely encircles the Core and thereby occupies much of the city's central area as well as extending to its eastern extremity.

Fort Detrick. Consists of the Fort Detrick Military Reservation (parts of block groups 2 and 5 of census tract 7512). Fort Detrick is isolated in the analysis because its small amounts of housing and population bear little relationship to trends in the surrounding community. This subarea is omitted from detailed statistical tables but is always covered by the city totals.

North. Consists of all land within Frederick's 2000 city limit that is not in any of the abovementioned four subareas. (It equals parts of census tracts 7507, 7508, 7512-7514 and 7517.) The North is highly convoluted geographically but has many common characteristics that distinguish it from the rest of the city.

Rest of Study Area. The current studies in support of the city's comprehensive planning program are addressing an area somewhat larger than Frederick as it now exists called the "Study Area." Hence some of the statistical tables present data for the total study area and the part of it outside the city.

Rest of Frederick County. The entire county and the portion not covered by the above districts are sometimes mentioned in the analysis as a reminder that the fortunes of the city and county are intertwined.

Figure 1. Study Area and Subareas, City of Frederick

Table 7 on the next page is an omnibus compilation of demographic data for all of the territories just described plus two additional areas for comparison purposes. The comparison areas are the Washington suburbs and the United States. The Washington suburbs are defined to include all jurisdictions within the Washington PMSA (as opposed to the Baltimore-Washington CMSA) except the District of Columbia. The table offers data for both 1990 and 2000, with percent changes in some cases. Like all other statistics in the rest of this document, the numbers have been obtained from the U.S. censuses of population and housing.

As shown by the first and third sections of Table 7 and Figure 2, the only two subareas of Frederick that experienced large-scale population and household gains during 1990-2000 were the Southwest and North districts. The North was far ahead in terms of percentage growth, with a 138% gain in population and a 175% increase in number of households. Meanwhile the Southeast was basically static and the Core declined slightly in terms of population, though not households. This part of the table also covers persons living in group quarters, i.e., in all arrangements besides households. As of 2000, four-fifths of the city's group-quarters population occupied college dormitories in the Core, military barracks at Fort Detrick and nursing homes in the Core, Southeast and North.

Population per household is relatively high in the North and Southwest subareas of the city and quite low in the Core and Southeast (See Figure 3). In all districts besides the Southwest, average household size declined during 1990-2000 at least twice as fast as it did in the U.S. as a whole. However, due to the net shift of city population toward the North, where population per household is high, the city's overall average household size moved in parallel with the national figure.

Figure 2. Population Change, 1990-2000

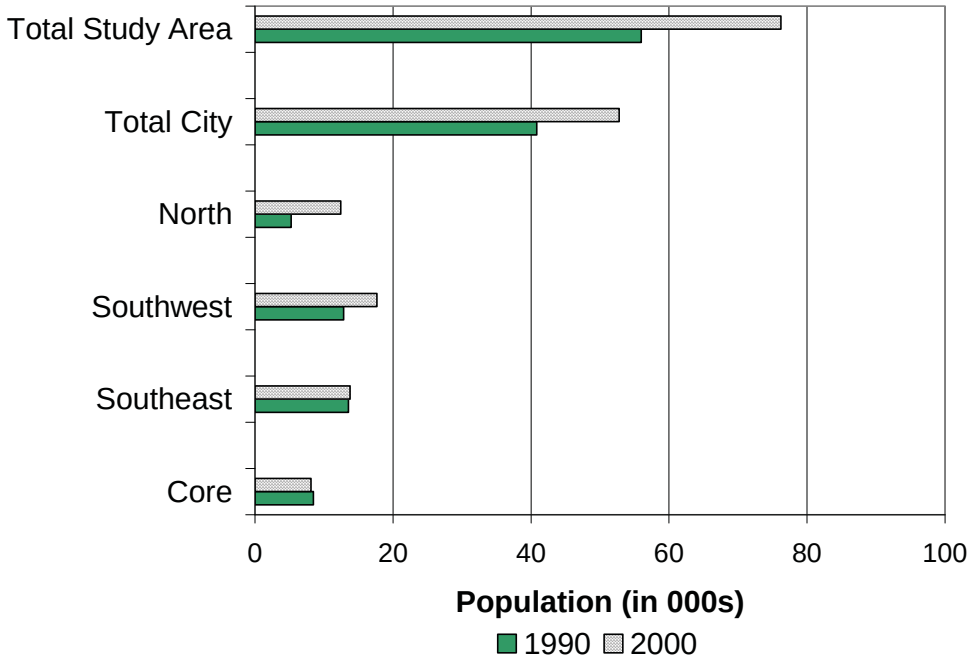
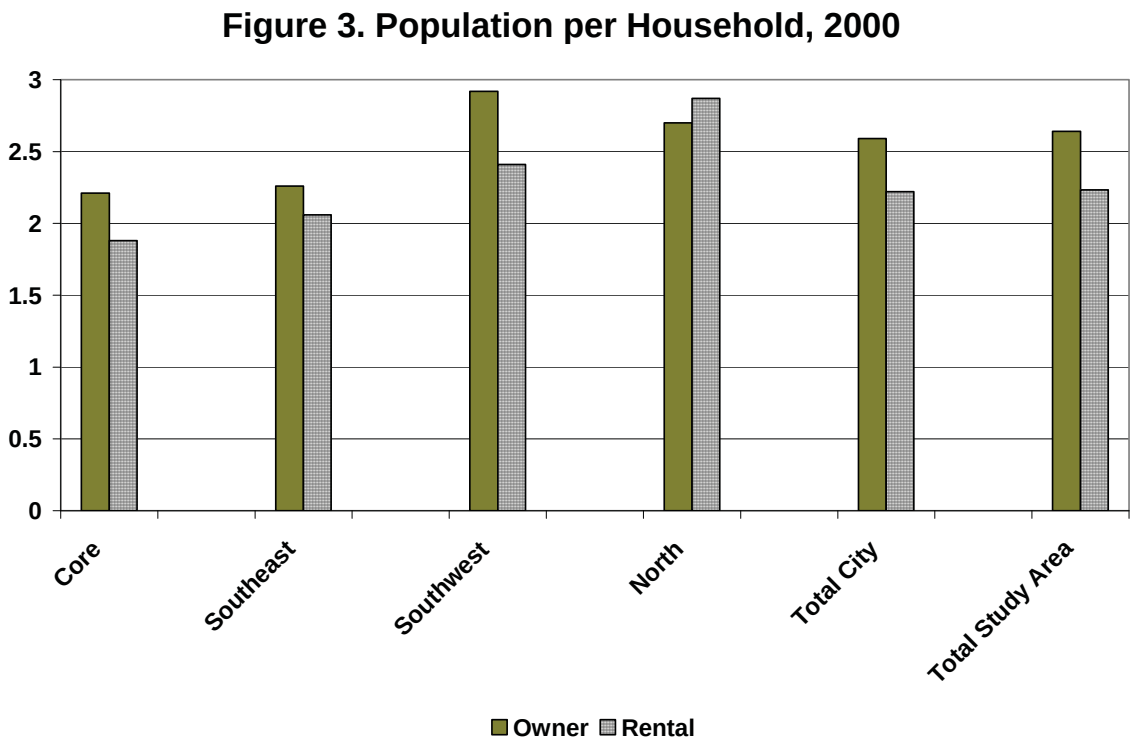


Table 7. DEMOGRAPHIC SUMMARY FOR FREDERICK AND COMPARISON AREAS

	City of Frederick (Based on 2000 Area Definitions)					
	Core	Southeast	Southwest	Fort Detrick	North	Total City
Population						
1990	8,449	13,524	12,851	793	5,229	40,846
2000	8,100	13,746	17,651	849	12,421	52,767
% Change	-4.1%	1.6%	37.3%	7.1%	137.6%	29.2%
Pop. In Group Quarters						
1990	819	272	0	238	371	1,700
2000	788	484	113	254	471	2,110
Number of Households						
1990	3,499	5,917	4,782	143	1,596	15,937
2000	3,618	6,140	6,587	158	4,388	20,891
% Change	3.4%	3.8%	37.8%	10.3%	174.9%	31.1%
Pop. Per Household*						
1990	2.18	2.24	2.69	3.88	3.04	2.46
2000	2.02	2.16	2.66	3.77	2.72	2.42
Median H'hold Income**						
1990	$38,244	$46,583	$56,532	N/A	$71,448	$50,605
2000	$41,044	$43,909	$53,507	$39,174	$70,716	$51,753
% Change	7.3%	-5.7%	-5.4%	N/A	-1.0%	2.3%
Home Ownership Rate						
1990	38.2%	46.7%	39.9%	0.0%	80.3%	45.7%
2000	43.1%	48.4%	49.1%	0.0%	87.8%	55.6%

		Study Area		Rest of	Total	All
	Total City	Outside Frederick	Total Study Area	Frederick County	Frederick County	Washington Suburbs
Population						
1990	40,846	15,115	55,961	94,247	150,208	
2000	52,767	23,450	76,217	119,060	195,277	
% Change	29.2%	55.1%	36.2%	26.3%	30.0%	20.3%
Number of Households						
1990	15,937	5,461	21,398	31,172	52,570	
2000	20,891	8,888	29,779	40,281	70,060	
% Change	31.1%	62.8%	39.2%	29.2%	33.3%	21.5%
Pop. Per Household*						
1990	2.46	2.70	2.52	2.97	2.78	2.70
2000	2.42	2.64	2.49	2.89	2.72	2.68
Median H'hold Income**						
1990	$50,605	$67,038	$54,830	$64,070	$60,193	$70,529
2000	$51,753	$68,281	$56,064	$71,975	$65,228	$71,377
% Change	2.3%	1.9%	2.3%	12.3%	8.4%	1.2%
Home Ownership Rate						
1990	45.7%	80.0%	54.5%	82.0%	70.8%	65.5%
2000	55.6%	78.5%	62.5%	85.8%	75.9%	67.6%

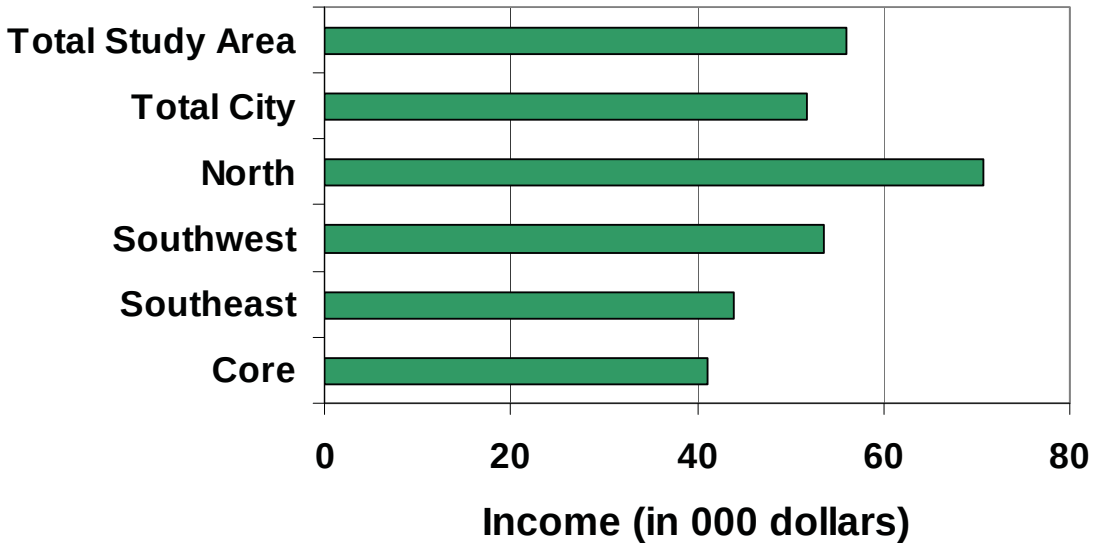
* Ratios cover only population living in households (as opposed to group quarters).
** Income has been converted to constant 2002 dollars using the Consumer Price Index.



The median income figures in Table 7 have been converted to constant 2000 dollars using the Consumer Price Index[4]. Based on the last census, Frederick City as a whole has a median household income about 13% above the national median (down from an excess of 16% in 1990). The differences among subareas resemble the pattern for average household size, with the North and Core representing the extremes, except that here the Southwest resembles the Southeast and Core districts more than the North (See Figure 4). Median income has also changed over time in a manner resembling household size. All subareas besides the Core experienced declines in constant-dollar median income between 1990 and 2000, but the net shift of households toward the prosperous North yielded a positive change for the city as a whole.

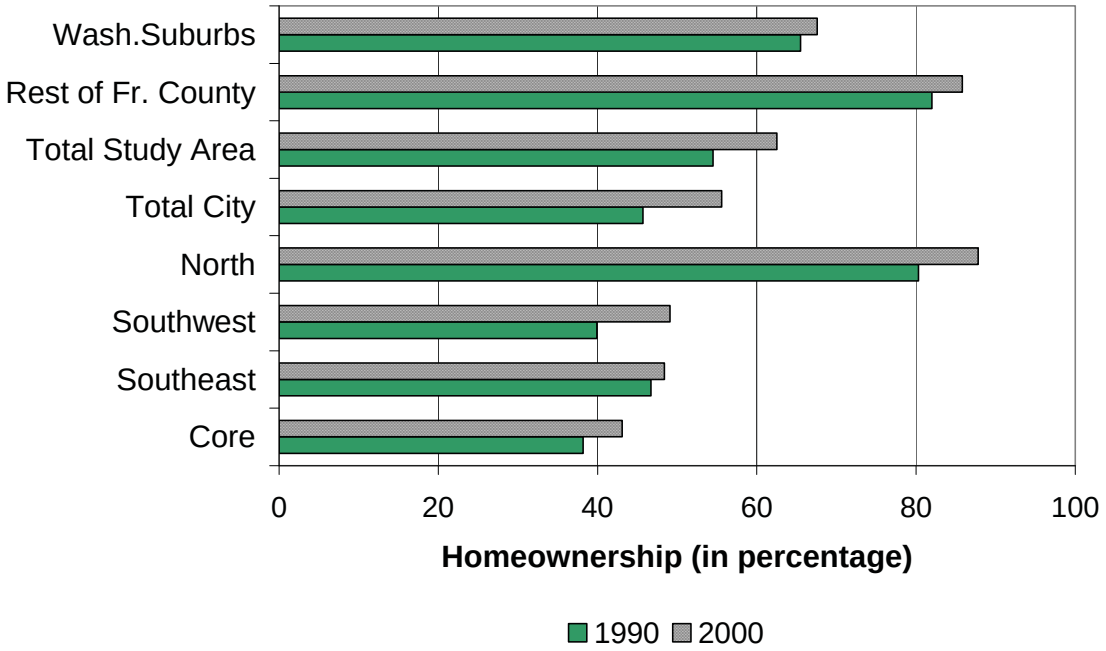
[4] Some observers have claimed that the CPI overstates actual price movements, in which case its present application would yield understatements of real income growth; but in any case the relative magnitudes are what matter

Figure 4. Median Houshold Income, 2000



The most striking trend in Frederick besides the North's recent growth has been the general increase in home ownership. The Figure 5 shows home ownership rates computed as the ratios of owner-occupied housing units to total occupied units (which equal numbers of households). Home ownership has been rising nationally for a half-century. The U.S. gain of two percentage points during 1990-2000 was considered particularly impressive. But over the same period Frederick's home ownership rate rose by ten percentage points. This was accomplished partly through the net shift of households toward the North, where ownership is very high, but also partly by increases in the ownership rates for all subareas (besides Fort Detrick). These increases were led by a gain of nine-plus percentage points in the Southwest. It is apparent that the overall rise in home ownership involved some changes in tenure of existing units as well as construction of new units for owner-occupancy, since otherwise the ownership rate for all new occupied units would have had to be unrealistically high (namely 87%).

Figure 5. Homeownership Rates, 1990-2000



The lower part of Table 7 covers demographic trends in areas outside the city. The study area that surrounds Frederick generally resembles the city's North subarea in terms of income, home ownership and present household size, but has been gaining residents at a more moderate pace. (Thirteen percent of the households in this territory occupy the enclave of Clover Hill, which has a median income of $95,637 and an astonishing owner-occupancy rate of 97%.) The part of Frederick County outside the study area has been growing about as fast as the city but is otherwise quite different, with a high level of home ownership and a very high average household size by today's standards. The most notable trend in this area during 1990-2000 was an unusual jump in median household income. Lastly, Frederick County resembles other Washington suburbs and has been drawing closer to the suburban profile, except for staying ahead in home ownership.

A general comment regarding median household income is that movements in this measure can be deceptive because they reflect changes in the shape of an area's income distribution as well as its overall level. Growth in the national median has been muted by the rise in income inequality, and this factor has also been operative for the City of Frederick and its subareas. But the vagaries of medians have worked the other way for outlying areas of the county, due to their growing "bulge" of upper-middle-class households.

Housing Unit Age and Structure Type

Table 8 looks at housing units classified by year built and structure type. As is true in later tables, Fort Detrick is not included as a subarea but is covered by the city totals. The census statistics on years in which housing units were built are believed to provide a reliable description of the city's development over time. (For example, the table shows a

total of 5,841 units constructed in 1990-1999 and the first three months of 2000, whereas the number of units authorized by building permits during 1990-1999 totaled 5,617.)

Table 8: Housing Unit Age and Structure Type, City, City Subareas, Study Area, County

	Core	Southeast	Southwest	North	Total City	Rest of Study Area	Rest of County
Housing Units by Year Built							
Number:							
Total	3,913	6,491	6,975	4,565	22,106	9,181	41,730
1995-2000 (5.25 years)	41	253	692	1,942	2,928	1,978	5,997
1990-1994 (5 years)	79	282	1,450	1,102	2,913	2,001	5,467
1980-1990 (10 years)	72	1,378	2,560	830	4,840	2,680	7,760
1970-1979 (10 years)	232	1,083	1,815	470	3,622	1,260	8,340
1940-1969 (30 years)	945	2,546	378	177	4,185	967	6,876
1939 or earlier	2,545	949	80	44	3,618	294	7,292
Percent Distribution:							
1990-2000	3.0%	8.2%	30.7%	66.7%	26.4%	43.3%	27.4%
1980-1990	1.8%	21.2%	36.7%	18.2%	21.9%	29.2%	18.6%
1970-1979	5.9%	16.7%	26.0%	10.3%	16.4%	13.7%	20%
1940-1969	24.2%	39.2%	5.4%	3.9%	18.9%	10.5%	16.5%
1939 or earlier	65.0%	14.6%	1.1%	1.0%	16.4%	3.2%	17.5%
H.U.s by Units in Structure							
Number							
1, detached*	987	2,687	2,056	1,901	7,635	4,609	35,028
1, attached (townhouse)	1,145	1,019	2,094	2,013	6,393	3,132	3,593
2 to 9	1,342	1,024	623	151	3,169	488	1,401
10 or more	439	1,761	2,202	500	4,908	950	1,711
Percent Distribution							
1, detached*	25.2%	41.4%	29.5%	41.6%	34.5%	50.2%	83.9%
1, attached (townhouse)	29.3%	15.7%	30.0%	44.1%	28.9%	34.1%	8.6%
2 to 9	34.3%	15.8%	8.9%	3.3%	14.3%	5.3%	3.3%
10 or more	11.2%	27.1%	31.6%	10.9%	22.2%	10.4	4.2%
Home Ownership Rates							
All Occupied Units	43.1%	48.4%	49.1%	87.8%	55.6%	76.2%	82.9%
1, detached*	86.0%	83.1%	89.4%	93.9%	87.9%	92.1%	89.1%
1, attached (townhouse)	61.3%	60.3%	63.1%	85.4%	68.2%	75.5%	69.7
2 to 9	4.7%	2.7%	4.1%	57.0%	6.6%	11%	13%
10 or more	8.2%	13.4%	6.6%	84.0%	17.6%	34.3%	39.9%

* Data include 6 mobile homes in the North subarea.

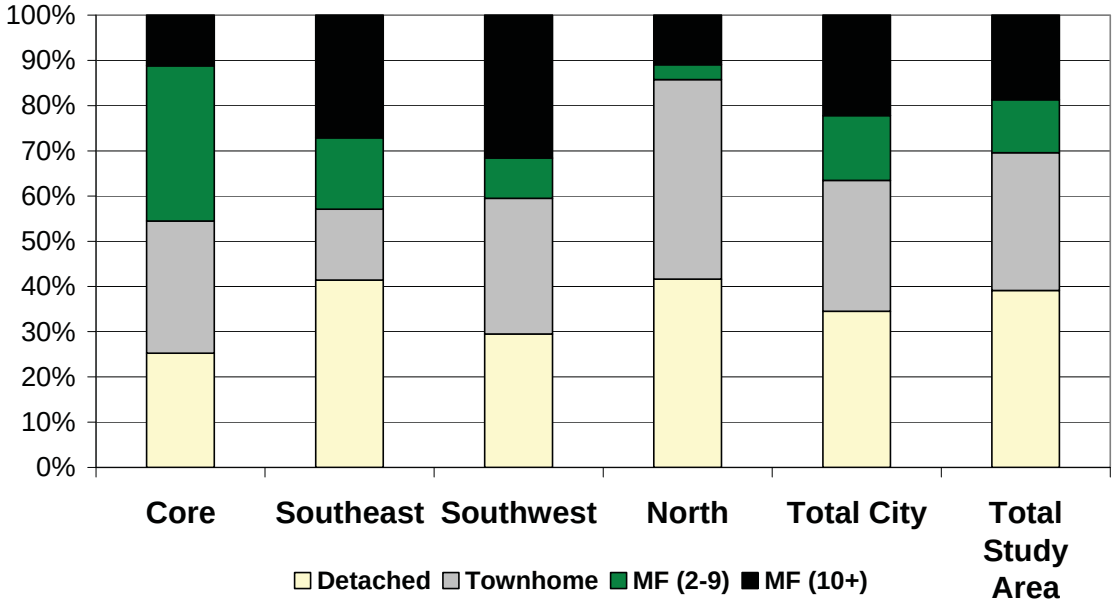
The development history of Frederick can be read by scanning the upper portion of Table 8 from left to right. Beyond the Core district, residential development first moved to the east and other immediately adjacent areas. Then it moved to the west, or what is now the city's Southwest, and then it moved north. Nearly two-thirds of all dwelling units in the Core were built before 1940, and this share would approach three-fourths if the subarea did not include the southwestern portion of census tract 7506. (Block group 3 of tract 7506 contains fewer than 12% of the Core's housing units but accounts for 35% of those built after 1960.) The largest share of housing units in the Southeast district arrived

between 1940 and 1970. Pre-1970 units account for over half of the Southeast total, versus only 6.5% of the Southwest total. The 1980s were the peak years for residential construction in the Southwest, though nearly equal numbers of units were built during the 1970s and 1990s. Two-thirds of all housing units found in the North subarea on April 1, 2000 were erected after the beginning of 1990. More than 70% of the housing units in the study area outside the city limits were built after 1980. The housing age for rest of Frederick County is comparable to the city.

The second and third lines of table 8 show that there was a shift of residential construction from the Southwest to the North during the course of the 1990s. The Southwest acquired fewer than half as many units in the late 1990s as in the early 1990s, whereas the reverse was nearly true in the North. This trend could have long-term implications for the city's overall housing stock if the North systematically serves a more upscale residential market than the Southwest, since it could contribute to a shortage of units for middle-income residents.

The Figure 6 shows 2000 housing stock by number of units in structure and gives separate ownership rates for the various structure types. Single-family housing predominates throughout Frederick, accounting for 86% of all units in the North and 54% to 60% elsewhere. The single family unit predominance of North is comparable to the high percentage of single family units in the study area outside the city and rest of Frederick County (more than 85%) Among single-family units there are slightly more townhouses than detached homes in all subareas but the Southeast, where townhouses are outnumbered more than two-to-one. The city's multi-family housing mainly occupies structures that contain 10 or more units. The Core is a sharp exception, however, having

Figure 6. Housing Structure Type by Subarea, 2000



an abundance of residential buildings with 2 to 9 units and not many larger structures.

The home ownership rates at the bottom of Table 8 obviously apply just to occupied dwellings. They show that the city's aggregate ownership rates (reproduced here from Figure 7) differ among subareas largely because of variations in structure mix. The ownership rates for single-family detached homes range upward from 83% in all subareas, while the rates for townhouses equal 85% in the North and 60% to 63% in other districts. Aggregate home ownership works out 39 to 45 percentage points higher in the North than elsewhere because the North has a far larger share of single-family units than other subareas and because its multi-family offerings – nearly all constructed since 1990 – consist largely if not exclusively of condominiums.

Housing Unit Vacancy

The condition of a housing market can be roughly inferred from the vacancy rates for various categories of units. This applies in Frederick as elsewhere, although the data now available can only tell about the condition of the market three years ago. Table 9 at the top of the next page summarizes these statistics.

Table 9. HOUSING VACANCY IN FREDERICK AND COMPARISON AREAS, 2000

	Core	Southeast	Southwest	North	Total City	Rest of Study Area	Rest of County	DC Suburbs	USA
Gross Vacancy Rates									
By Units in Structure									
All Units	7.5%	5.4%	5.6%	3.9%	5.5%	3.2%	3.5%	4.1%	9.0%
1, detached	3.5%	3.7%	2.0%	4.2%	3.3%	1.7%	2.7%	3.1%	7.3%
1, attached	7.3%	6.8%	3.4%	4.6%	5.0%	3.2%	5.2%	3.4%	8.4%
2 to 9	12.2%	9.2%	8.0%	0.0%	9.7%	5.9%	6.8%	5.9%	10.8%
10 or more	3.2%	5.0%	10.3%	0.6%	6.8%	7.3%	13%	6.1%	10.6%
Adjusted Gross Vacancy Rates*	6.3%	4.9%	4.9%	3.5%	4.9%	2.9%	3.1%	3.7%	8.4%
Net Vacancy Rates:**									
Ownership Units	2.4%	2.3%	2.9%	3.0%	2.7%	1.1%	1.2%	1.2%	1.7%
Rental Units	6.1%	5.2%	5.7%	0.7%	5.3%	5.1%	5.2%	3.6%	6.8%

* Adjusted gross vacancy is computed by setting aside housing units that were rented or sold but not occupied on the census date.

** Net vacancy for ownership housing equals vacant-for-sale units as a percent of same plus owner-occupied units; and rental vacancy is computed similarly using vacant-for-rent units.

The gross vacancy rates presented in the upper portion of Table 9 cover vacant units in all of the categories tabulated by the census, namely: vacant for sale; vacant for rent; rented or sold but not occupied; held for seasonal, recreational or occasional use; held for migratory workers; and other vacant. The gross vacancy rate for all Frederick housing units in 2000 was 5.5%, well below the national vacancy rate of 9.0% but above the prevailing average of 4.1% for the Washington suburbs, and 3.5% for rest of Frederick County. Among structure types, Frederick had its lowest gross vacancy rate for detached

homes. Vacancy was nearly twice as high for multi-family units as single-family units, and highest of all for multi-family housing in structures with fewer than ten units (except in the North subarea).

Notably low gross vacancy rates prevailed for detached homes in the Southwest (2.0%) and multi-family units in the North (under 1%). The former finding suggests that the slowdown in Southwest residential construction after 1995 was due to a lack of good building sites rather than any shortage of demand for the units being offered. (Well over a third of all units constructed in the Southwest during the 1990s were detached homes.) The low level of multi-family vacancy in the North was remarkable for its magnitude: only three vacancies among the subarea's 651 units in multi-family structures. By contrast, the study area outside the city and rest of Frederick County show high multi-family vacancy rates of 7.3% and 10% respectively.

The gross vacancy rates referenced in Table 9 as "adjusted" rates have been computed by setting aside housing units that were rented or sold on the census date but for some reason were not occupied. The thought was that this might provide a better perspective on vacancy in the Core, since a good many dwellings there might have been undergoing renovation, and indeed the adjustment made about twice as much difference in the Core as elsewhere. The adjusted gross vacancy of 6.3% for the Core is considered to describe a relatively strong market for downtown housing of mixed character.

The "net" vacancy rates appearing at the bottom of Table 9 cover only dwellings available for general occupancy. The net rates for ownership and rental units are based respectively on numbers of vacant-for-sale and vacant-for-rent units as described in the second footnote to the table. Net vacancy rates run quite low for ownership units. The ownership vacancy rates for Frederick and its subareas in 2000 ranged downward from 3.0%, yet were all above the corresponding rates for the Washington suburbs and the U.S. In the case of rental vacancy, Frederick and its component areas other than the North fell between the Washington suburban rate of 3.6% and the national rate of 6.8%. Overall, the Frederick housing market in 2000 could be described as comfortable: not painfully tight, as was the case in some parts of suburban Washington, but by no means slack.

Three data items for the North subarea of Frederick are considered significant: the extraordinarily low vacancy rate for multi-family units noted above; the North's rental vacancy rate of only 0.7% shown in the last line of Table 9; and the unusual fact that average household size in the North was higher for rental units than owner-occupied units (as documented later in Table 13). Given that an area's multi-family and rental dwellings tend to be its most affordable and that the financial burden of housing tends to increase with household size, these facts together suggest that the demand for housing in the North from households of limited income was very strong and not fully met. The consequences of meeting or not meeting this demand in the future cannot be judged on the basis of present data, but its existence should be acknowledged.

Housing Value and Rent Levels

The census statistics on housing value are obtained from homeowners themselves, who can only provide estimates based on tax appraisals and casual evidence unless they have engaged in recent transactions. Hence users of the data must acknowledge the possibility of error – in particular, understatement – and should limit comparisons to other figures from the same source. However, some assurance is available from studies showing that homeowners are reasonably well aware of what their dwellings are worth.

Table 10 at the top of the next page presents a summary of housing value data for the city of Frederick and its subareas, in the form of absolute and percentage distributions of owner-occupied units across value categories. (The census only covers "selected" units when reporting value and rent levels, so the totals differ from the numbers of owner- and renter-occupied units cited elsewhere.) Median housing values for 1990 and 2000 are presented at the bottom of the table, with comparison values appearing later in Table 11.

Remarkably, Table 10 indicates that the Core – Frederick's lowest subarea in terms of median household income – possesses the city's highest-valued ownership housing. One-seventh of all owner-occupied units in the Core were valued above $300,000 in 2000, and these constituted nearly three-fourths of the $300,000-plus dwellings in the city as a whole. The Core also had the largest share of units valued below $100,000, but still came out highest in median housing value with a 2000 figure just below $190,000 (when expressed in 2002 dollars). This outcome shows that the prominence of the downtown area extends well beyond the Historic District.

Table 10. OWNER-ESTIMATED VALUE OF SPECIFIED OWNERSHIP HOUSING UNITS IN FREDERICK CITY

	Core	South-	Southeast-	Southwest	Total City	Rest of Study Area	Rest of County
Total	1,380	2,600	3,300	4,015	10,207	6,220	29,916
Under $100,000	320	527	626	399	1,872	626	2,599
$100,000 to $149,999	267	1,327	1,353	1,380	4,327	2,212	8,582
$150,000 to $199,999	301	600	942	1,351	2,106	1,380	8,930
$200,000 to $299,999	296	132	357	851	1,636	1,664	7,815
$300,000 and over	196	13	22	35	266	337	1,991
Under $100,000	23.2%	20.3%	19.0%	9.9%	18.3%	10.1%	8.7%
$100,000 to $149,999	19.3%	51.0%	41.0%	34.4%	42.4%	35.6%	28.7%
$150,000 to $199,999	21.8%	23.1%	28.5%	33.6%	20.6%	22.2%	29.8%
$200,000 to $299,999	21.5%	5.1%	10.8%	21.2%	16.0%	26.8%	26.1%
$300,000 and over	14.2%	0.5%	0.7%	0.9%	2.6%	5.4%	6.7%
1990	$189,264	$153,476	$169,579	$174,617	$165,375		
2000	$189,967	$135,735	$143,039	$159,075	$149,066		
% Change	0.4%	-11.6%	-15.7%	-8.9%	-9.9%		

The other value distributions in Table 10 and the median housing values at the bottom show a downward progression from the North subarea to the Southwest and then the Southeast. The Southwest was closer to the North in housing value in 1990, but by 2000 bore greater resemblance to the Southeast. Outside the city, the study area and the rest of the county have higher owner-estimated housing values.

The median value figures are striking in that, after conversion to constant 2002 dollars using the Consumer Price Index, they describe significant declines in median real housing value between 1990 and 2000 for all subareas besides the Core. The candidate explanations for this could include the vagaries of medians, the alleged problems with the CPI and the possibility of systematic error in the owner-estimation of housing value. However, median values computed the same way reveal a similar decline for all of the Washington suburbs, though not the U.S. as a whole, as shown below.

Table 11. HOUSING VALUE AND RENT DATA FOR COMPARISON AREAS

	Median Value in 2002 Dollars			Median Cash Rent in 2002 Dollars		
	Washington Suburbs	United States	Ratio, W.S./U.S.	Washington Suburbs	United States	Ratio, W.S./U.S.
1990	$236,597	$114,755	2.06	$952	$559	1.70
2000	$194,687	$129,136	1.51	$865	$578	1.50
% Change	-17.7%	12.5%		-9.1%	3.5%	

In 1990 the median value of owner-occupied housing in suburban Washington was more than twice as high as the national median, whereas by 2000 the ratio of the two medians had fallen to just above 1.5. The main reason for this dramatic change is that the Washington area had experienced an unsustainable rate of property appreciation during the late 1980s, and the speculative value of real estate happened to be peaking at the time of the 1990 census. Observers may recall that residential values widely declined in current dollars as well as constant dollars during the extended slump that followed. (The comedown from the real-estate exuberance of the late 1980s gave rise to what were called "nebbies": negative-equity baby boomers.) It must also be remembered that changes in median value reflect changes in housing mix due to new construction as well as trends in the constant-dollar prices of existing homes. At any rate the comparisons suggest that Frederick actually outpaced the rest of the Washington suburbs in terms of housing value and that prices held up particularly well in the city's Core.

Table 12 tabulates renter-occupied housing units by monthly contract rent and gives inflation-adjusted median rents for 1990 and 2000. The figures point out a paradoxical aspect of the Core district. While boasting the city's highest ownership housing values, the Core has by far its lowest rent structure. Well over a third of the Core's rental units commanded less than $450 per month in 2000, and its median rent was 20% to 36% below the medians for other subareas and the city as a whole.

Table 12. RENT PAYMENTS FOR SPECIFIED RENTAL UNITS

	Core	South-east	South-west	North	Total City	Rest of Study Area	Rest of County
Number of Units by Cash Rent in Current Dollars							
Total	2,082	3,214	3,294	447	9,168	1,944	5,051
Under $450/month*	768	746	247	68	1,922	237	1,897
$450-$599/month	766	787	427	10	1,990	343	1,163
$600-$749/month	301	1,100	1,404	105	2,941	364	775
$750-$899/month	165	514	842	138	1,666	567	563
$900/month or over	82	67	375	125	649	433	652
Percent Distribution							
Under $450/month*	36.9%	23.2%	7.5%	15.1%	21.0%	12.2%	37.6%
$450-$599/month	36.8%	24.5%	13.0%	2.3%	21.7%	17.6%	23%
$600-$749/month	14.5%	34.2%	42.6%	23.6%	32.1%	18.7%	15.3%
$750-$899/month	7.9%	16.0%	25.5%	31.0%	18.2%	29.2%	11.2%
$900/month or over	3.9%	2.1%	11.4%	28.1%	7.1%	22.3%	12.9%
Median Rent in 2002 $ (Adjusted Using CPI)							
1990	$571	$726	$829	$963	$754		
2000	$541	$673	$755	$851	$698		
% Change	-5.3%	-7.3%	-8.9%	-11.6%	-7.3%		

* Category includes units with no cash rent.

Table 12 shows a clear difference in rent levels between the Southwest and Southeast districts. As of 2000, the Southwest had twice as many renter households as the Southeast paying $750 per month or more, and only a third as many paying less than $450 per month. More than half of the city's rental units that brought $900-plus per month were located in the Southwest. On a percentage basis, however, the city's highest rent profile belonged to the North subarea (despite a curious cluster of renters in the under-$450 category).

As in the case of value, the rent tabulation shows declines in median housing cost between 1990 and 2000 after adjustment for inflation, with Frederick declining a bit less than the Washington suburbs. The suburban trend did not diverge as sharply from the national trend for rent as for value, with the suburbs-to-U.S. ratio falling from 1.70 in 1990 to 1.50 in 2000 (as shown earlier in Table 11).

Household Characteristics and Housing Affordability

Figure 7 below tabulates households by income The income statistics supplement the medians presented in Table 7, which showed a downward progression from the North to the Southwest, Southeast and Core subareas.

Figure 7 reveals again the dual nature of the Core, in that this district had the lowest overall income profile in 2000 but surpassed all subareas besides the North in its share of $125,000-plus households. Regarding households with incomes over $75,000 – the contingent for which most new housing is built – the observed shares were: North, 41%; Southwest, 25%; Southeast, 15%; Core, 20%; and Frederick as a whole, 24%.

Figure 7. Households by Income, 1999 (in current 000 dollars)

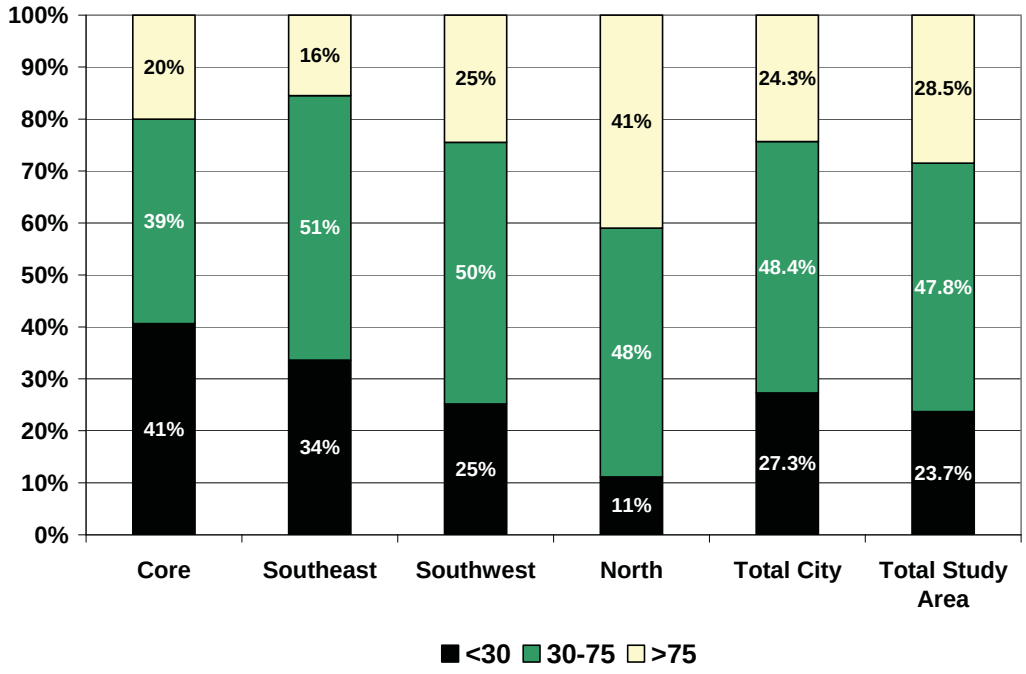


Table 13. HOUSEHOLD INCOME AND DEMOGRAPHIC MEASURES

	Core	Southeast	Southwest	North	Total City	Rest of Study Area	Rest of County
Percent of Households With Person(s) Aged 65 or Over	24.5%	26.7%	11.0%	14.2%	18.5%	19.1%	18.3%
Population Per Household:							
In Owner Housing Units	2.21	2.26	2.92	2.70	2.59	2.73	2.95
In Rental Housing Units	1.88	2.06	2.41	2.87	2.22	2.29	2.56

The second row of Table 13 describes the proportion of households in each subarea that contained at least one person aged 65 or over. Interestingly, the Southwest was lowest in this regard and had fewer than half as many households with elderly persons as either the Core or the Southeast (on a relative basis). The table's last two lines present separate household-size figures for owner and renter households, and show that the Southwest's owner-occupied housing contained an unusually high average of 2.92 persons per unit. This figure was well above the corresponding averages for other Frederick subareas and the U.S., and it even exceeded the average for the Washington suburbs (2.80, not shown).

These facts suggest that the Southwest is heavily oriented toward younger families with children. Previous discussion has already noted the other unusual finding from the household-size tabulation, namely the fact that the North had more persons per household in rental units than in owner-occupied units.

Table 14 shows the total number and percentage of households by race in the city, city subareas, the study area and the county. Overall, the City of Frederick is predominantly white with blacks being the largest minority with 13% of the total households. Within the city, the Core has the highest proportion of black households (17%) while the North has the highest proportion of white households (88%). By contrast, the Southwest has the lowest share of white households (76%) with about one-quarter minority households. The areas outside the city limits and the study area have even higher proportion of white households (more than 90%).

Table 14: Households by Race, 2000

	Total	White (alone)		Black (alone)		Other & Mixed Races	
		Number	%	Number	%	Number	%
Core	3,618	2,907	80%	610	17%	102	3%
Eastern Ring	6,140	5,089	83%	778	13%	273	4%
Southwest	6,587	4,975	76%	1,016	15%	596	9%
North	4,388	3,883	88%	332	8%	173	4%
City Total	20,891	16,939	81%	2,793	13%	1,159	6%
Rest of Study Area	8,888	8,059	91%	490	6%	339	4%
Study Area Total	29,779	24,998	84%	3,283	11%	1,498	5%
Rest of County	40,281	38,796	96%	850	2%	635	2%
County Total	70,060	63,794	91%	4,133	6%	2,133	3%

Concern about the issue of housing affordability has led the analysis to look at relationships between income and housing cost in Frederick and the comparison areas. Affordability must be analyzed separately for ownership and rental housing units – i.e., for the households occupying these units – because the costs of owning and renting a home are not fully comparable. The chosen ownership affordability measure is the ratio of median owner-estimated housing value to median household income; and the rental affordability measure is the ratio of median monthly rent to median household income (all multiplied by 100 to give the two measures the same order of magnitude). The key step in obtaining these measures is partitioning an area's income profile into separate distributions for owner and renter households to allow the computation of separate medians. This has required considerable estimation in the present case because the main census description of 2000 income by housing tenure is an imputed (HCT) tabulation that is unavailable below the tract level, and because a cruder source of information must be used for 1990.

The resulting affordability measures are shown in Tables 15 and 16. These figures are subject to the caveats offered earlier about possible inaccuracies in census-based financial magnitudes, with the exception that inflation adjustment is not an issue here. It should be

noted that census tabulations traditionally underreport income – by aggregate amounts on the order of 20% – relative to the statistics from other federal agencies that go into the national income and product accounts. This would imply that all of the affordability measures in Table 15 are too high. However, the biases in census-based median incomes tend to be far smaller than 20% because the underreporting problem mainly involves top-end households that receive much of their income from sources other than wages and salaries.

Table 15. INDEXES OF HOUSING AFFORDABILITY, 1990 AND 2000

	Owner Households: Ratio of Median Dwelling Unit Value to Median Household Income			Renter Households: Ratio of Median Monthly Rent (x100) to Median Household Income		
	1990	2000	Change	1990	2000	Change
City of Frederick:						
Core	2.87	2.87	-0.01	2.09	1.94	-0.16
Southeast	2.67	2.25	-0.42	1.92	2.06	0.14
Southwest	2.29	1.96	-0.33	1.87	2.00	0.13
North	2.33	2.11	-0.22	1.63	1.72	0.08
Total City	2.43	2.16	-0.28	1.94	2.02	0.08
Frederick County	2.71	2.33	-0.38	1.75	1.82	0.06
Washington Suburbs	2.80	2.28	-0.52	1.96	1.88	-0.08
United States	2.13	2.30	0.17	1.91	1.94	0.03

Starting at the bottom of Table 15, with conditions in the nation as a whole, housing became less affordable in the U.S. between 1990 and 2000 for both owners and renters. The change for owners – a relative increment in median value amounting to 0.17 times median income – was appreciable, whereas the change for renters was quite small. Even the change for owner households was within a range that could be compensated by differences in mortgage interest rates (which were lower in early 2000 than in early 1990).

But the measures in Table 15 state that housing became more affordable during the 1990s in the Washington suburbs, with a huge relative increment of –0.52 applying to ownership housing. As suggested by earlier discussion, this finding has been obtained because the 1990 census caught the Washington area at the waxing of a real estate bubble that deflated soon afterwards. The retrenchment of the Washington-area housing market had moderate repercussions on the rental side, causing the affordability index for renter households to change by –0.08. There is no convenient way to adjust for these trends when considering housing affordability in Frederick. One can only keep in mind that the Frederick changes took place in a context of declining relative housing cost in the region, and rising or static relative cost in the nation.

Ownership housing became more affordable in Frederick between 1990 and 2000, but by smaller margins than observed for the Washington suburbs in general. The only exception occurred in the city's Core subarea, where ownership affordability remained essentially unchanged across the decade. Table 15 confirms the hearsay accounts gained

in the present study that downtown Frederick is a very expensive place to own a home. By 2000, the index of housing affordability for owners in the Core was 23% to 46% above the index values for all other city districts and all comparison areas. Elsewhere in the city, ownership housing was most affordable in the Southwest and least affordable in the Southeast, but the differences were not profound.

On the rental side, Frederick bucked the regional trend by becoming slightly less affordable during the 1990s, and even changed a bit more than the U.S. in terms of relative cost. In 2000, the rental affordability index values for the city and its two most populous subareas were higher than the comparison values for the county, the suburban region and the nation, though the differences were all rather moderate. Perhaps surprisingly, rental housing affordability in the Core declined during the 1990s and by 2000 was equal to the national average. The North was the standout among the city's subareas in terms of rental cost, with affordability index values of only 1.63 in 1990 and 1.72 in 2000. The latter figure helps to explain the low rental vacancy rate cited for the North in the last line of Table 9. The apparent imbalance of supply and demand in this case can be expected to yield further relative cost increases for the North's rental housing (which accounts for only 12% of all occupied units in that area), but given the strength of demand for ownership housing, it remains to be seen whether this will be sufficient to promote construction of more rental units.

Table 16 depicts housing affordability in another manner. It shows the percentage of households with monthly housing expenses in excess of 25, 30 or 35% of their income for 1999 and compares the city, county and region. For both renters and owners, the city has a higher percentage of those households with monthly expenses in excess of 35%.

Table 16. Households by Monthly Housing Expenses as a Percentage of Income, 1999

% of Income	City of Frederick	Frederick County	Washington Region
Owners	**Percentage of Households**		
< 20%	44	48	49
20 to 24%	18	18	17
25 to 29%	12	12	11
30 to 34%	9	8	7
35 % or more	17	15	15
Renters			
< 20%	33	36	34
20 to 24%	14	14	15
25 to 29%	12	12	12
30 to 34%	8	7	8
35 % or more	29	25	25

Conclusion

The City of Frederick has been subject to high growth pressures in the last two decades. Overall, the city housing market, with a gross vacancy rate higher than the region, can be

regarded as comfortable but not slack. The statistics available for years through 2000 fail to confirm that scarcity/affordability problems are already serious or getting worse

The following is a summary of the key housing indicators:

- Moderate-income income households tend to be renters rather than homeowners. A majority of renters occupy housing units that have been built specifically for rental, and a majority of such units are contained in multi-family structures. In Frederick, the past dozen years brought a marked decline in multi-family construction. Half of all housing units authorized by building permits during 1980-1990 were multi-family units, but the multi-family share fell to 20% in 1991-1995 and has only rebounded to 21% in the seven years since then. For the City of Frederick and unincorporated Frederick County combined, the multi-family share of all housing units authorized since 1996 has been only 13%. The fact that about 29% of the renter households spend more than 35% of their monthly income on housing is a modest sign that rental housing is becoming less affordable in the city.
- Residential development in Frederick has been shifting toward areas with higher value profiles and greater marketability as "better" neighborhoods. This geographic progression – from the Southeast to the Southwest to the North – was underway two decades ago but accelerated in the late 1990s. Such patterns are widely observed in developing communities and need not change an area's overall housing profile so long its development-favored subareas are allowed and encouraged to broaden their housing mix. But if such broadening fails to occur, either by happenstance or design, the outcome can be a bifurcation of the housing stock and a shortage of medium-cost units.
- There are three pieces of evidence that the housing stock in Frederick's North subarea is failing to broaden adequately. These are the fact that the number of renter-occupied units in the North increased by only 71% during 1990-2000, while the number of owner-occupied units increased by 200%; the existence of a near-zero vacancy rate for rental units in 2000; and the fact that the North's rental units contained an unusual mixture of large households, many of which would presumably have become owners if moderately priced units had been available.

- The Core – with the city's oldest housing stock-has an income and housing value discrepancy. It is the city's lowest area in terms of median household income but has the city's highest valued ownership housing. By contrast, the Core's median rent value is 20% to 36% below the medians for other subareas and the city as a whole.

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX D-2
Economic Assessment

June, 2003

Appendix D

CITY OF FREDERICK ECONOMIC PROFILE

Like most of central Maryland, the City of Frederick has experienced strong employment growth during the past 30 years. Future growth in the city will be a central theme of the Comprehensive Plan Update. As the city wrestles with the issue of growth during the plan update process, an examination of employment data can help to frame several questions: What is the city and region's employment? What are the city and region's employment specialties? Which job sectors are growing? Which sectors should the city focus on as it expands its focus on economic development?

In this report, we answer some of these questions and attempt to provide analysis that can be used to better understand the implications of these answers.

Our analysis has uncovered several key findings:

- The City of Frederick has especially strong employment concentrations in health care and biotechnology. These sectors form the core of the city's specialization in the life sciences industry.

- The government sector provides approximately 18 percent of all jobs in the city, more than any other sector.

- The city's educational establishments provide about 2,000 more jobs per capita than would be expected when compared to the region (Washington-Baltimore CMSA), which points to the significance of Hood College and Frederick Community College in a city of 50,000.

- The city specializes in general merchandise retail and food and drinking places, which is consistent with its role as the retail and entertainment center of Frederick County.

- The city also specializes in machinery equipment, primary metal fabrication and apparel manufacturing.

- The city is deficient in jobs in managerial services, information (broadcast and print media, cellular technology, and data processing) and the utility sectors, as compared to the Baltimore-Washington region.

- The city contains almost half of all jobs in Frederick County, and has two jobs for every city household, indicating a very healthy employment base.

1.0 Employment in the City

To understand the city's economic profile, we examined employment in the city as a whole. But this provides only part of the picture. Therefore, we also examined sectors and sub-sectors of the city's economy.[5] This section of the report begins by looking at the city as a whole, and then discusses the city's employment sectors. This focus on sectors helps us understand the city's employment specializations and how the city's economy compares to the region and the nation as a whole.

1.1 Employment by Size of Industry

In 2002, the City of Frederick was home to 41,891 jobs and 2,729 establishments.[6] Of these, 5,300 jobs were located at Fort Detrick.

Historically, the City of Frederick has been the commercial, institutional and industrial center of Frederick County. This is reflected in the employment data. The government sector is the city's largest, with more than 7,400 jobs in Frederick, or 17.8 percent of the city's total jobs (see Table 1-1). Health care is close behind, with approximately 7,000 jobs (16.9 percent), followed by retail with more than 4,500 jobs (10.8 percent), accommodation and food with about 2,900 jobs (7.0 percent), manufacturing with approximately than 2,850 jobs (6.8 percent), and education with approximately 2,650 jobs (6.3 percent).

Table 1-1 summarizes the employment data by industry size and also includes the number of establishments in each industry sector.

Within the *government* sector, the large majority of the jobs fall within national security (4,000 jobs) and general government (2,100). The national security sub-sector includes jobs specifically assigned to Fort Detrick. Related jobs at the National Cancer Institute and similar institutions are included in the general government figure.

Within the *health care sector*, most jobs fall within ambulatory health care, which includes doctor's offices, dentists, clinics, and HMO facilities. Hospitals and nursing homes also support a large number of employees. The high number of ambulatory health care jobs reflects the presence of Mid Atlantic Medical Services, Inc. (MAMSI), an HMO with 1,400 employees. Even without MAMSI, however, there are more than 250 individual ambulatory health care establishments.

Given the city's proximity to two interstates, it is not surprising that the city has a significant number of *retail* jobs. More than one in six establishments in the City of Frederick is dedicated to retail activities. In addition to general merchandising, which includes big box retail, grocery stores and similar types of retail establishments, the city also has 49 motor vehicle parts stores that account for 836 jobs.

[5] Sectors are defined by the 2-digit level of the North American Industrial Classification System (NAICS), while sub-sectors represent 3-digit NAICS divisions.
[6] Source: InfoUSA database for Frederick County, 2002.

Of the approximately 2,900 jobs in the *accommodation and food* sector, almost all (94 percent) are at food and drinking places.

Manufacturing has been a significant part of the city's economy for many years. However, in 2002, it is only the city's fifth largest sector in terms of total jobs. The largest sub-sectors within this category are machinery manufacturing (672 jobs), printing (521) and apparel manufacturing (406). Four establishments, including the 400-employee H.L. Hartz & Sons factory, account for the apparel manufacturing jobs, which, as we will see later, is a specialization within the city's economy.

Educational services provide more than 2,600 jobs in the City of Frederick, the majority of which are found in primary and secondary education—public and private schools. The city is also home to Hood College and Frederick Community College. While neither employs more than 600 people, both institutions are large compared to the size of the city itself. More important, as will be discussed in Section 2.3, the curriculum of these institutions plays an important role in sustaining the city's economic strengths in biotechnology and business.

Of the 1,921 employees in the *professional services* category, more than 400 provide legal services, while the rest are spread among a variety of fields ranging from architecture to veterinary services. The *other services* category is equally diverse, comprising everything from automobile repair to beauty services to religious and non-profit enterprises.

These two sectors, along with health care, information, education, and arts and entertainment, were once considered part of the same economic sector, known simply as "services."[7] The splitting of the services sector reflects the nation's transition to a service-based economy. As Figure 2-4 will later show, services have become the dominant economic activity in the City of Frederick, following this trend.

Finance and insurance is not as large as the other sectors mentioned here, but it does represent approximately 2,400 jobs, including just shy of 1,500 at insurance carriers.

Construction also accounts for approximately 1,750 jobs, the majority of which (1,051) are within specialty trades.
The five industries with the largest number of employees (Government, Health Care Retail, Accommodation, and Education) are shown in bold in Table 1-1. Together, they comprise more than 24,500 jobs, or 59 percent of the city total. Moreover, the ten largest sub-sectors (National Security, Food and Drinking Places, General Government, Ambulatory Heath Care, Hospitals, Primary and Secondary Education, Religious and Nonprofit, Nursing Homes, Insurance Carriers, and General Merchandising) have nearly half of the total jobs in the city.[8]

[7] Under the Standard Industrial Classification (SIC) system, which was phased out in 2001.
[8] "Primary and Secondary Education," a 4-digit NAICS code, is used here as a sub-sector.

Table 1-1:
Industry Size in the City of Frederick

NAICS	Industry	Employees Number	Employees Share of Total	Establishments Number	Establishments Share of Total
92	***Government (All Levels)***	***7,445***	***17.8%***	***91***	***3.3%***
928	National Security [a]	4,007	9.6%	4	0.1%
921	General Government	2,110	5.0%	54	2.0%
922	Public Safety	595	1.4%	8	0.3%
62	***Health Care and Social Assistance***	***7,058***	***16.9%***	***349***	***12.8%***
621	Ambulatory Health Care	3,265	7.8%	256	9.4%
622	Hospitals	2,075	5.0%	25	0.9%
623	Nursing Homes	1,237	3.0%	11	0.4%
44	***Retail***	***4,534***	***10.8%***	***470***	***17.2%***
452	General Merchandising	957	2.3%	21	0.8%
441	Motor Vehicle Parts	832	2.0%	49	1.8%
453	Miscellaneous Stores	570	1.4%	110	4.0%
72	***Accommodation and Food***	***2,911***	***7.0%***	***180***	***6.6%***
722	Food and Drinking Places	2,749	6.6%	169	6.2%
31	***Manufacturing***	***2,849***	***6.8%***	***84***	***3.1%***
333	Machinery Manufacturing	672	1.6%	17	0.6%
323	Printing Activities	521	1.2%	18	0.7%
315	Apparel Manufacturing	406	1.0%	4	0.1%
61	*Education [b]*	*2,648*	*6.3%*	*43*	*1.6%*
6111	Primary and Secondary	1,492	3.6%	26	1.0%
6112	Junior Colleges	592	1.4%	3	0.1%
6113	Colleges and Universities	458	1.1%	2	0.1%
81	*Other Services*	*2,574*	*6.2%*	*353*	*12.9%*
813	Religious, Nonprofit	1,477	3.5%	120	4.4%
812	Personal Services	586	1.4%	128	4.7%
811	Repair and Maintenance	511	1.2%	105	3.8%
52	*Finance and Insurance*	*2,426*	*5.8%*	*178*	*6.5%*
524	Insurance Carriers	1,483	3.5%	49	1.8%
522	Credit Intermediation	497	1.2%	84	3.1%
54	*Professional Services*	*1,920*	*4.6%*	*358*	*13.1%*
23	*Construction*	*1,747*	*4.2%*	*143*	*5.2%*
233	Special Trades	1,051	2.5%	72	2.6%
231	General Contracting	517	1.2%	64	2.3%
42	*Wholesale*	*1,363*	*3.3%*	*103*	*3.8%*
51	*Information*	*897*	*2.1%*	*45*	*1.6%*
53	*Real Estate*	*852*	*2.0%*	*116*	*4.3%*
71	*Arts, Entertainment, and Recreation*	*749*	*1.8%*	*54*	*2.0%*
713	Amusement, Recreation	625	1.5%	36	1.3%
48	*Transportation/Warehousing*	*638*	*1.5%*	*25*	*0.9%*
56	*Administrative/Waste Management*	*565*	*1.4%*	*96*	*3.5%*
99	*Unclassified Establishments*	*245*	*0.6%*	*34*	*1.1%*
55	*Management of Companies*	*200*	*0.5%*	*2*	*0.1%*
11	*Agriculture and Ag Support*	*154*	*0.4%*	*3*	*0.1%*
22	*Utilities*	*50*	*0.1%*	*1*	*0.0%*
21	*Mining*	*6*	*0.0%*	*1*	*0.0%*
	All Industries	**41,831**	**100%**	**2,729**	**100.00%**

a: The National Security sub-sector includes jobs specifically assigned to Ft. Detrick. Related jobs at the National Cancer Institute and similar institutions are considered "Other Government"

b: Education and Professional Services have only one 3-digit NAICS subdivision. The categories above are 4-digit subdivisions.

Source: 2002 InfoUSA database.

1.2 Relative Employment Specialization

Listing the city's top employment sectors provides an important economic snapshot. However, to identify the strengths and weaknesses of the city's economy, we must compare it to the Baltimore-Washington region and to the nation as a whole. To make this comparison, we have calculated Location Quotients (LQ) for each sector as well as for many sub-sectors.

The LQ, expressed by Formula 1-1, compares the share of a place's jobs in a certain industry to the share of jobs in that industry at the regional or national level, normalized by population. In essence, the LQ describes the relative economic specialization of an area. A LQ greater than 1.0 indicates that a locality has more jobs per capita in a particular industry than the area to which it is being compared, in effect, "extra" jobs that support exports and bring wealth into the city.

$$LQ = \frac{(E_{ic}/P_c)}{(E_{it}/P_t)}$$

E_{ic} = Local employment in an industry
E_{it} = Total (regional or national) employment in an industry
P_c = Local population
P_t = Total (regional or national) population

Table 1-2 shows the LQ calculated for industries within the city, as compared to the same industries in the Washington D.C. Consolidated Metropolitan Statistical Area (CMSA).[9] When compared against both the CMSA and the United States as a whole, the city has a high concentration of activity in several economic sectors.

Aside from their value as ratios, LQs can also be converted into a more accessible measure of economic strength. Table 1-2 shows the "extra" or exportable jobs for each industry and sub-industry. Derived directly from the LQ, exportable jobs represent the number of jobs in excess of the CMSA or nation's per capita level. The higher the number of exportable jobs in a sector, the more specialized the city's economy is, relative to the area to which it is being compared.

[9] The CMSA includes the District of Columbia, and the following counties in Maryland: Anne Arundel, Baltimore, Calvert, Carroll, Charles, Frederick, Harford, Howard, Montgomery, Prince George's, Queen Anne's, Washington; Virginia: Arlington, Clarke, Culpeper, Fairfax, Fauquier, King George, Loudon, Prince William, Spotsylvania, Stafford, Warren; and West Virginia: Berkeley, Jefferson. It also includes Baltimore City and the Virginia cities of Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, and Manassas Park.

Table 1-2:

Economic Specialization (As Defined by Location Quotients), Year 2002

Industry		City vs. CMSA LQ:	City vs. CMSA Extra Jobs	City vs. USA LQ:	City vs. USA Extra Jobs	CMSA vs. USA LQ:
31	*Manufacturing*	*5.86*	*2,338*	*1.15*	*827*	*0.20*
315	Apparel Manufacturing	78.05	401	4.90	323	0.06
333	Machinery Manufacturing	26.34	646	2.69	422	0.10
336	Transportation Equipment Mfg.	10.95	195	0.65	-114	0.06
311	Food Manufacturing	10.69	338	1.35	97	0.13
325	Chemical Manufacturing	7.36	170	1.21	34	0.16
327	Nonmetallic Mineral Products	6.07	139	1.69	68	0.28
323	Printing Activities	4.41	403	3.54	374	0.80
332	Fabricated Metal Products	2.99	99	4.99	118	1.67
61	*Education* [b]	*5.48*	*2,165*	*5.41*	*2,158*	*0.99*
6111	Primary and Secondary	10.72	1,353	10.64	1,352	0.99
6112	Junior Colleges	341.42	590	36.73	576	0.11
6113	Colleges and Universities	1.90	217	1.80	203	0.95
62	*Health Care and Social Assistance*	*4.65*	*5,541*	*2.59*	*4,333*	*0.56*
621	Ambulatory Health Care	6.54	2,766	3.68	2,377	0.56
622	Hospitals	4.30	1,592	2.18	1,122	0.51
623	Nursing Homes	4.95	987	2.47	736	0.50
71	*Arts, Entertainment, and Recreation*	*3.50*	*535*	*6.72*	*638*	*1.92*
713	Amusement, Recreation	4.51	486	27.94	603	6.20
712	Museums, Hist. Sites	3.36	30	1.97	21	0.59
42	*Wholesale*	*2.77*	*871*	*1.18*	*211*	*0.43*
52	*Finance and Insurance*	*2.71*	*1,531*	*2.08*	*1,259*	*0.77*
524	Insurance Carriers	6.52	1,256	3.40	1,047	0.52
523	Securities, Commodities	3.38	289	2.31	232	0.68
522	Credit Intermediation	0.96	-23	0.91	(50)	0.95
44	*Retail*	*2.59*	*2,810*	*1.64*	*1,786*	*0.63*
443	Electronics and Appliances	5.83	320	4.84	306	0.83
453	Miscellaneous Stores	5.35	472	3.68	422	0.69
452	General Merchandising	4.25	827	2.28	608	0.54
441	Motor Vehicle Parts	3.83	618	2.41	489	0.63
442	Furniture/Home Furnishings	3.05	165	2.30	139	0.76
48	*Transportation/Warehousing*	*2.57*	*390*	*1.10*	*57*	*0.43*
53	*Real Estate*	*2.46*	*506*	*2.29*	*479*	*0.93*
72	*Accommodation and Food*	*2.26*	*1,621*	*1.56*	*1,041*	*0.69*
722	Food and Drinking Places	2.64	1,709	1.78	1,248	0.68
81	*Other Services*	*2.18*	*1,389*	*2.55*	*1,563*	*1.17*
813	Religious, Nonprofit	1.85	679	2.90	968	1.57
812	Personal Services	2.60	361	2.38	340	0.92
811	Repair and Maintenance	3.21	349	2.01	255	0.63
23	*Construction*	*1.71*	*736*	*1.46*	*556*	*0.85*
233	Special Trades	1.52	445	1.06	332	0.70
231	General Contracting	1.80	230	1.71	214	0.95
11	*Agriculture and Ag Support*	*1.16*	*21*	*0.25*	*-457*	*0.22*
92	*Government (All Levels)*	*1.11*	*739*	*1.72*	*3,119*	*1.55*
51	*Information*	*0.87*	*-140*	*1.27*	*193*	*1.47*
54	*Professional Services*	*0.75*	*-635*	*1.43*	*579*	*1.91*
22	*Utilities*	*0.75*	*-17*	*0.41*	*-73*	*0.54*
55	*Management of Companies*	*0.64*	*-112*	*0.37*	*-340*	*0.58*
21	*Mining*	*0.49*	*-6*	*0.16*	*-32*	*0.32*
56	*Administrative/Waste Management*	*0.38*	*-925*	*0.33*	*-1,134*	*0.88*

Source: HNTB Analysis

The data above have been simplified in Table 1-3, showing the extra jobs created by the city in each economic sector.

Table 1-3:
Extra Jobs by Industry
City of Frederick

Industry		City vs. CMSA	City vs. USA
62	Health Care and Social Assistance	5,541	4,333
44	Retail	2,810	1,786
31	Manufacturing	2,338	827
61	Education	2,165	2,158
72	Accommodation and Food	1,621	1,041
52	Finance and Insurance	1,531	1,259
81	Other Services	1,389	1,563
42	Wholesale	871	211
92	Government (All Levels)	739	3,119
23	Construction	736	556
71	Arts, Entertainment, and Recreation	535	638
53	Real Estate	506	479
48	Transportation/Warehousing	390	57
11	Agriculture and Ag Support	21	-457
21	Mining	-6	-32
22	Utilities	-17	-73
55	Management of Companies	-112	-340
51	Information	-140	193
54	Professional Services	-635	579
56	Administrative/Waste Management	-925	-1,134

Source: HNTB Analysis

In several sectors, Frederick exhibits a high degree of specialization compared to both the nation and the region. Health Care and Retail jobs are among the strongest examples of this category. The city has large number of extra per capita jobs in several sub-categories, including ambulatory health care, hospitals, insurance carriers, primary and secondary schools, general merchandise retail and food and drinking places.

Compared to the region, the city specializes in certain manufacturing activities. The top manufacturing enterprises include machinery, printing, apparel and food manufacturing. On the other hand, the city lags behind the region in the number of jobs in information, professional services, managerial services, and administrative services.

The high degree of specialization in certain sectors should be understood in light of Frederick's relatively small economic base (representing less than 1.5 percent of the CMSA's total job base). Because we are working with a small base, an analysis of economic specialization can be influenced greatly by the presence of a small number of large employers. Such is the case in many of the "strong" industries described above. For example:

- The National Cancer Institute, US Army Medical Research Institute of Infectious Diseases and related establishments, as cited above, together have 6,100 jobs (14.6 percent of the city total) at Fort Detrick, contributing to the city's strong government presence.

- Frederick Memorial Hospital, with 1,700 employees, and Mid Atlantic Medical Services, Inc. (MAMSI), a health care network with 1,400 employees, reinforce the strength of the Health Care industry.
- A major regional office of State Farm Insurance employs 1,100 workers, or three-quarters of the city's total employment in the insurance field.

Beyond the presence of large employment generators, the information in this section helps to define the city's role in the regional economy. Indeed, based on the data and discussions above, the city seems to specialize in a large number of activities not normally associated with the Baltimore-Washington region, including manufacturing, health care, wholesale, and agriculture.

The CMSA vs. USA column of Table 1-2 reinforces this point. Among the 20 sectors listed, the CMSA has a LQ value above 1.0 for only five. By comparison, the city has LQ values above 1.0 (vs. the nation) for all but five sectors. While not necessarily a regional or national leader in all fields, the city hosts a remarkably diverse economy.

1.3 Employment in Subareas of the City

For analysis purposes, the city has been divided into subareas (Figure 1-1). We now examine the distribution of employment and establishments in these subareas (see Table 1-4).

With high concentrations of *construction*, *manufacturing*, *retail*, and *health care*, the Southeast subarea has the city's largest number of jobs, while the Core, with a different mix of specializations, has by far the densest concentration of jobs, with more than 10 establishments and 115 employees per acre (See Table 1-5). Home to the State Farm offices, the North subarea has the largest concentration of finance and insurance employees, while the Southwest has the largest number of retail jobs and establishments.

Table 1-5 helps to further define these employment concentrations. From this information, we find:

- Aside from Fort Detrick, government functions are concentrated largely in the Core and North.
- The majority of Ambulatory Care employment and establishments are located in the North and Southwest subareas, not in the Core and Southeast subareas that surround Frederick Memorial Hospital.
- The Southwest, and not the Core, has the largest number of employees and establishments in the Eating and Drinking Places category. This is not surprising, since the southwest subarea is home to West Patrick Street (US 40), the city's "golden mile," which hosts no less than a half dozen shopping centers, including Frederick Towne Mall.
- The majority of construction, manufacturing and repair jobs are located in the Southeast.

- The Core has the largest number of primary and secondary school employees and establishments.

Table 1-4
Employment and Establishments by City Subarea

	Businesses		Employees	
Subarea	*Number*	*% of City*	*Number*	*% of City*
Core	859	31.5%	9,396	22.5%
North	534	19.6%	8,355	20.0%
Southeast	824	30.2%	11,637	27.8%
Southwest	502	18.4%	7,093	17.0%
Fort Detrick	10	0.4%	5,350	12.8%
Total	**2,729**	**100%**	**41,831**	**100%**

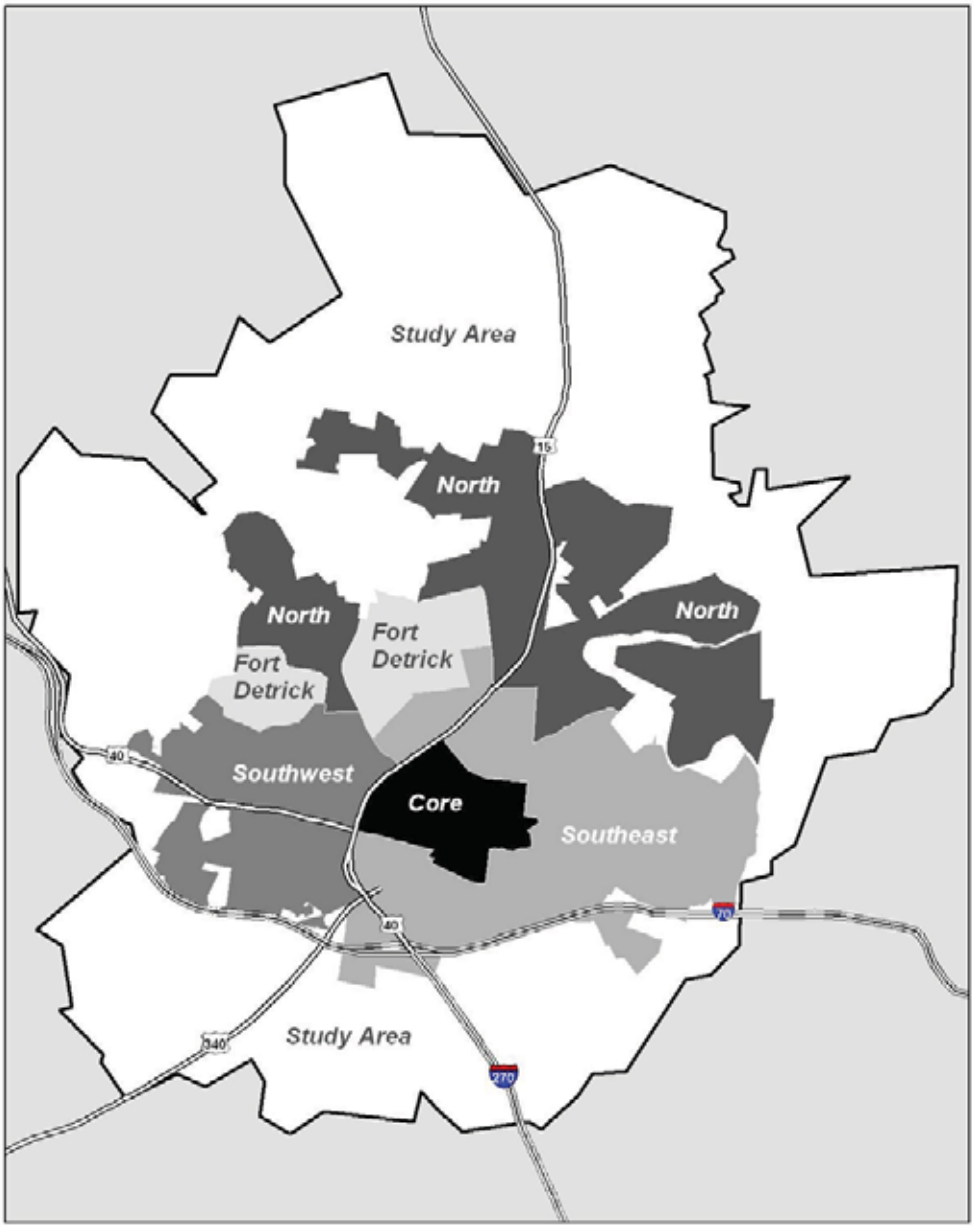


Figure 1-1: Subareas in the City of Frederick

Table 1-5
Industry Size and Establishment Distribution by City Subarea

		Core		North		Southeast		Southwest		Ft. Detrick	
NAICS	**Industry**	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.
11	*Agriculture*	*-*	*-*	*-*	*1*	*153*	*1*	*1*	*1*	*-*	*-*
21	*Mining*	*-*	*-*	*-*	*-*	*6*	*1*	*-*	*-*	*-*	*-*
22	*Utilities*	*-*	*-*	*50*	*1*	*-*	*-*	*-*	*-*	*-*	*-*
23	*Construction*	*141*	*30*	*406*	*34*	*1,154*	*62*	*46*	*17*	*-*	*-*
231	General Contracting	27	19	258	16	206	20	26	9	-	
233	Special Trades	114	11	148	18	179	7	-	-	-	-
31	*Manufacturing*	*229*	*22*	*347*	*16*	*2,237*	*38*	*36*	*8*	*-*	*-*
311	Food Manufacturing	39	4	208	3	154	5	2	2	-	-
315	Apparel Manufacturing	6	3	-	-	400	1	-	-	-	-
323	Printing Activities	15	4	13	4	473	8	20	2	-	-
325	Chemical Manufacturing	-	-	2	2	195	4	-	-	-	-
327	Nonmetallic Mineral Products	4	1	12	1	150	1	-	-	-	-
332	Fabricated Metal Products	132	2	-	-	16	2	-	-	-	-
333	Machinery Manufacturing	17	3	109	4	546	10	-	-	-	-
42	*Wholesale*	*80*	*15*	*514*	*20*	*746*	*63*	*23*	*5*	*-*	*-*
44	*Retail*	*710*	*129*	*384*	*51*	*1,439*	*145*	*1,984*	*143*	*17*	*2*
441	Motor Vehicle Parts	142	9	43	5	194	23	453	12	-	-
442	Furniture, Home Furnishings	10	3	61	3	80	9	94	10	-	-
443	Electronics and Appliances	97	11	58	10	218	12	13	7	-	-
452	General Merchandising	8	2	65	1	116	6	768	12	-	-
453	Miscellaneous Stores	263	54	50	12	146	22	111	22	-	-
48	*Transportation/Warehousing*	*378*	*5*	*1*	*2*	*193*	*13*	*66*	*5*	*0*	*0*
51	*Information*	*522*	*20*	*61*	*4*	*248*	*9*	*62*	*10*	*4*	*2*
52	*Finance and Insurance*	*503*	*58*	*1,321*	*35*	*394*	*46*	*218*	*39*	*-*	*-*
522	Credit Intermediation	134	20	112	17	116	22	135	25	-	-
523	Securities, Commodities	276	23	61	7	35	6	48	7	-	-
524	Insurance Carriers	62	15	1,148	12	238	15	35	7	-	-
53	*Real Estate*	*227*	*37*	*55*	*14*	*267*	*33*	*253*	*32*	*-*	*-*
54	*Professional Services*	*864*	*198*	*518*	*57*	*430*	*72*	*108*	*31*	*-*	*-*
55	*Management of Companies*	*-*	*1*	*200*	*1*	*-*	*-*	*-*	*-*	*-*	*-*
56	*Admin/Waste Management*	*158*	*41*	*170*	*21*	*104*	*23*	*133*	*11*	*-*	*-*
61	*Education*	*1,080*	*22*	*866*	*8*	*454*	*8*	*248*	*5*	*-*	*-*
6111	Primary, Secondary Schools	602	13	241	5	419	5	230	3	-	-
6112	Junior Colleges	-	-	592	1	-	-	-	-	-	-
6113	Colleges and Universities	423	1	-	-	-	-	35	1	-	-
62	*Health Care*	*2,427*	*64*	*1,777*	*157*	*904*	*83*	*1,941*	*42*	*9*	*3*
621	Ambulatory Health Care	176	21	1,044	136	452	64	1,581	32	9	3
622	Hospitals	1,997	15	52	5	29	5	-	-	-	-
623	Nursing Homes	210	27	85	11	121	11	65	8	-	-
71	*Arts, Recreation*	*135*	*15*	*126*	*8*	*440*	*21*	*48*	*10*	*-*	*-*
712	Museums, Historic Sites	42	5	-	-	-	-	-	-	-	-
713	Amusement, Recreation	70	6	125	7	387	15	43	8	-	-
72	*Hotel, Food*	*482*	*48*	*310*	*22*	*661*	*51*	*1,433*	*58*	*25*	*1*
722	Food and Drinking Places	480	46	308	20	593	47	1,343	55	25	1
81	*Other Services*	*461*	*98*	*186*	*50*	*1,533*	*130*	*394*	*75*	*-*	*-*
811	Repair and Maintenance	47	21	32	12	291	48	141	24	-	-
812	Personal Services	82	28	89	20	218	45	197	35	-	-
813	Religious, Nonprofit	332	49	65	18	1,024	37	56	16	-	-
92	*Government*	*893*	*56*	*1,046*	*25*	*106*	*9*	*100*	*7*	*5,300*	*2*
921	General Government	317	36	456	11	37	6	15	1	1,300	1
922	Public Safety	320	4	190	1	-	-	85	3	-	-
928	National Security	-		-		-		7	3	4,000	1
Totals		**9,396**	**859**	**8,356**	**534**	**11,637**	**824**	**7,094**	**502**	**5,355**	**10**

Warehousing In and Around the City of Frederick

The City of Frederick sits at the junction of two major interstates (I-70 and I-270) that link to Baltimore and Washington and to points west. Historically, intersections of major land routes have been home to businesses that specialize in the movement and storage of freight and goods. The question posed by this report is whether Frederick has cultivated these potential markets.

The table below attempts to answer that question by examining the employment and LQs for the Transportation and Warehousing industry, and its selected sub-industries in both Frederick and neighboring Washington Counties. Washington County is included because its county seat, Hagerstown, sits at the intersection of I-81 (a major north-south route on the east coast) and I-70, and is a known center for transportation activities. Whereas the LQ calculations show Frederick's level of specialization compared to the region and nation, comparing the two counties side-by-side permits us to compare Frederick County's performance against a known leader in the field.[A]

Transportation and Warehousing Functions in Frederick and Washington Counties

			Location Quotient			
	Employees		*vs. CMSA*		*vs. USA*	
Industry	**Fred.**	**Wash.**	**Fred.**	**Wash.**	**Fred.**	**Wash.**
Transportation and Warehousing	**1,459**	**2,071**	**1.52**	**3.31**	**0.65**	**1.42**
Air Transportation	60	50	0.18	0.23	0.14	0.17
Water Transportation	11	0	2.35	0.00	0.22	0.00
Truck Transportation	**872**	**1,571**	**2.71**	**7.50**	**0.86**	**2.38**
Transit/Passenger	84	89	0.61	0.99	0.30	0.48
Sightseeing	10	10	0.94	1.44	0.59	0.90
Transportation Support	**14**	**211**	**0.10**	**2.32**	**0.04**	**0.92**
Warehousing	**2**	**175**	**0.13**	**1.45**	**0.02**	**0.22**

The information in the table above shows that both counties host high concentrations of employment in the Transportation and Warehousing sector, and that Washington County has a significantly stronger presence in nearly every sub-industry. More important, whereas Frederick's LQ values remain below 1.0 for every sub-industry, Washington County emerges as a national leader in transportation employment, specifically Truck Transportation. Washington County also offers a regional specialization in warehousing, although that strength evaporates at the national level.

A number of hypotheses may explain these findings. First, Frederick County may be too close to Baltimore and Washington to serve as a major warehousing and distribution location. While important, I-270 also does not offer the kind of long-range accessibility afforded to I-81. In addition, the county's strong Retail and Wholesale industries indicate that, rather than a distribution point, the City of Frederick is more likely a final destination for a fair amount of long distance cargo.

[A] Employment data (from the US Census) are not available specifically for Hagerstown. More important, because transportation and warehousing functions often require large amounts of space, they do not always choose city locations for their activities. As such, the County level most appropriately captures data for the Transportation/Warehousing sector.

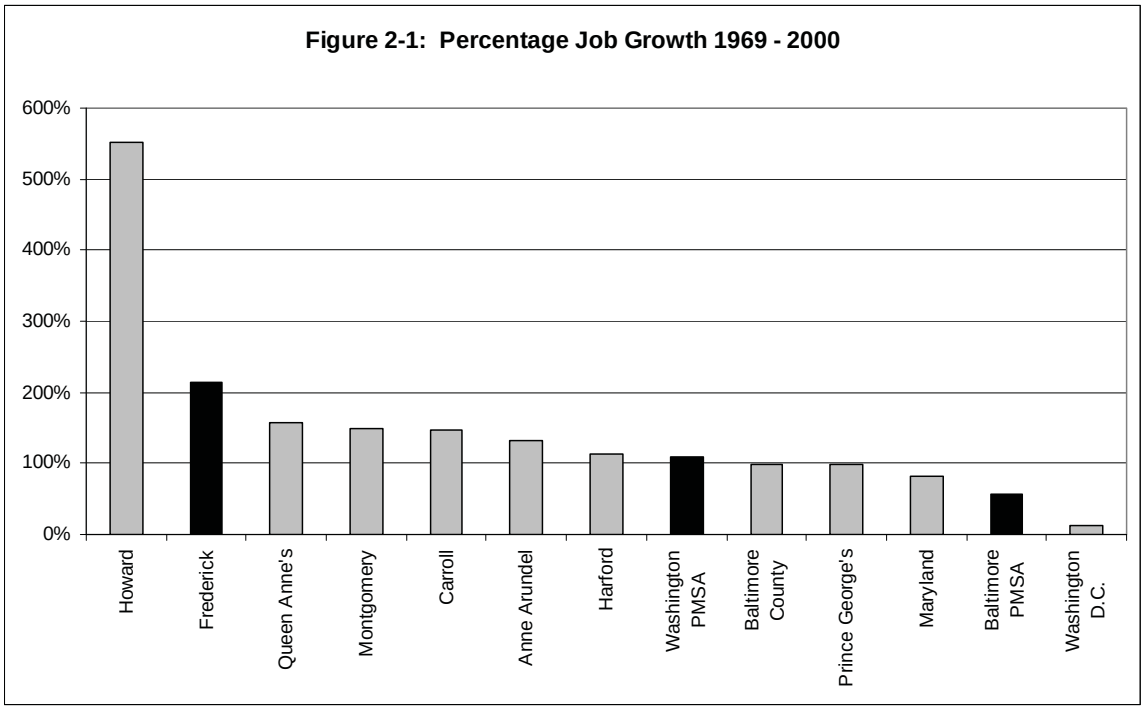
2.0 Regional Trends

The prior section of this report provided a snapshot the city's economy. Now we will supplement that information by highlighting important economic trends in Frederick County and the Baltimore-Washington region, and examining the relationships of these trends to the analysis above.

In this section, we use data on jobs in Frederick County, and not the city, because that is the geography for which historic job data is most readily available.

2.1 Employment Trends

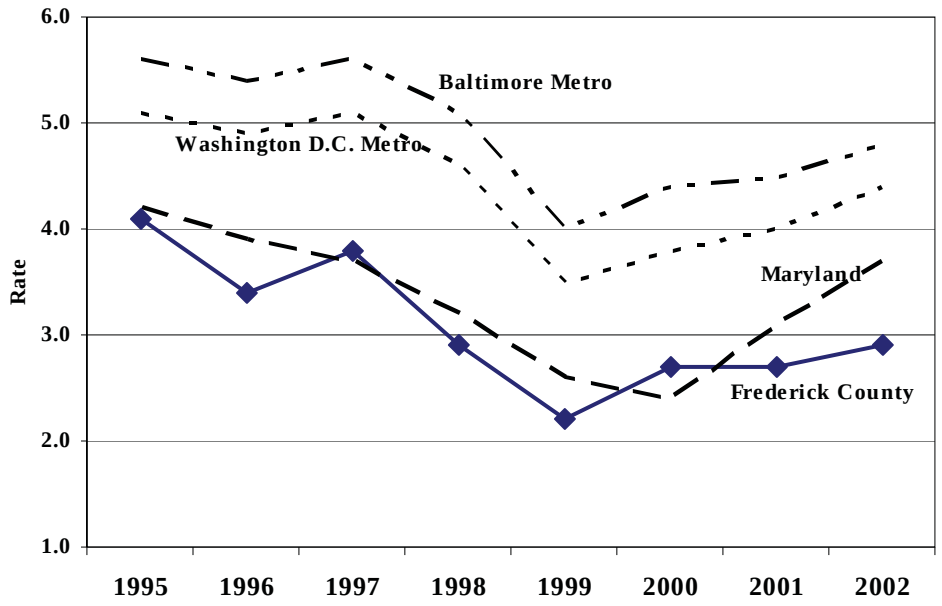
Between 1969 and 2000, Frederick County's job base grew by more than 200 percent, a rate of growth far above the Washington and Baltimore regional rates and exceeded only by Howard County among counties in the region (see Figure 2-1).[10]



While growth has been strong, unemployment has been low. The county's unemployment rate has been historically low compared to other nearby jurisdictions. Frederick County's 2002 rate of 2.9 percent is lower than that of the state or the region (see figure 2-2), and is the lowest of any jurisdiction in the region, equal to that of Howard County (see figure 2-3).

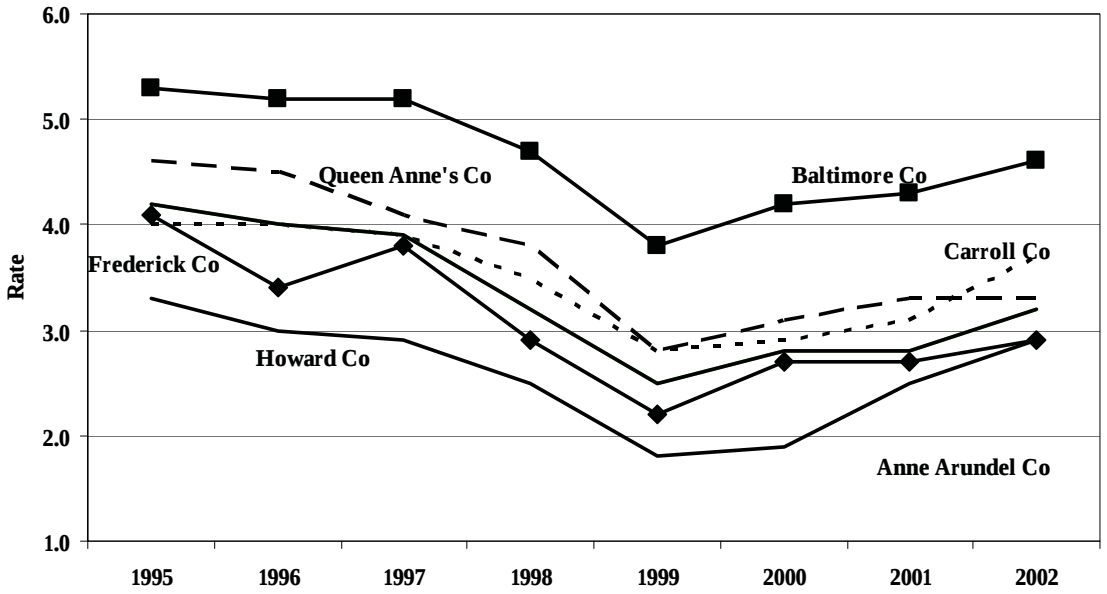
[10] Note: The Washington CMSA was not defined until 2000. Its predecessors were the Baltimore and Washington Primary Metropolitan Statistical Areas (PMSA). Accordingly, those definitions are used in this section.

Figure 2-2: Historic Unemployment Rates in the Baltimore-Washington Region



Source: Maryland Department of Labor, Licensing and Regulation

Figure 2-3: Historic Unemployment Rates of Selected Baltimore-Washington Area Counties



Source: Maryland Department of Labor, Licensing and Regulation

Frederick County has a reputation as a "bedroom community," where residents have commuted to jobs in the Washington and, to a lesser degree, Baltimore regions. Current commuting patterns point to more subtle changes in the role that the county, and by inference, the city, play in the region.

In 2000, county residents filled about 71 percent of the jobs in Frederick County (see the live-work share in Table 2-1). Although the number of county jobs held by county residents increased significantly between 1990 and 2000, given the county's strong employment growth, the 2000 live-work percentage is actually five percentage points lower than in 1990. This suggests that more workers are leaving the county to commute to jobs in other jurisdictions within the Baltimore-Washington region. While significant, a five percent drop is not out of line with regional trends, and is, in fact, more modest than the large drop experienced throughout the region.

To understand better the net effect of commuting, we calculated inflow-outflow ratios for 1990 and 2000. Table 2-1 shows the total number of workers commuting into Frederick County (the inflow), the total number of workers commuting out of the county (the outflow) and the net gain/loss of workers.

Table 2-1:
Frederick County Commuting Patterns

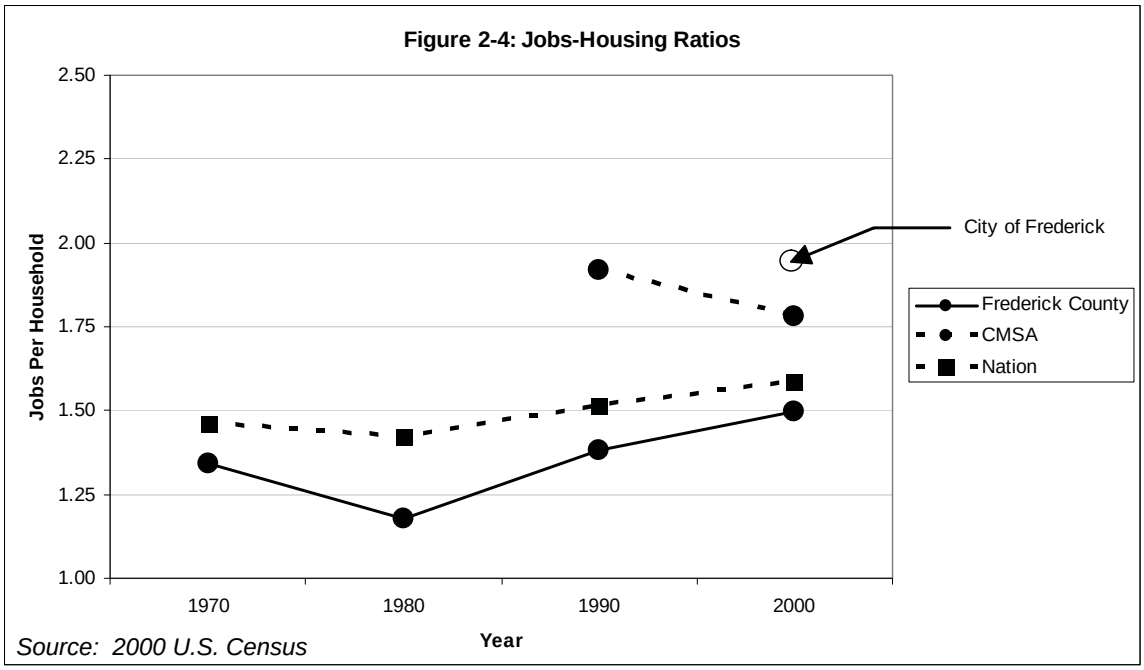
	1990	2000	Change	% Change
Live and Work in Frederick County	48,654	60,272	11,618	23.8%
Frederick County Live-Work Share	76%	71%	-5%	-
Other Live-Work Shares				
Montgomery County	*86%*	*59%*	*-27%*	-
Baltimore County	*52%*	*53%*	*1%*	-
Washington CMSA Average[11]	*66%*	*50%*	*-16%*	-
Inflow of Workers	15,106	24,459	9,353	61.9%
Outflow of Workers	32,196	42,046	9,850	30.6%
Net Gain/Loss	**-17,090**	**-17,586**	**-497**	**-2.9%**
Inflow/Outflow Ratio	**0.47**	**0.58**	**0.11**	**23.4%**

Source: 2002 U.S. Census

Between 1990 and 2000, the number of workers commuting into and out of Frederick County increased slightly, from 17,090 to 17,586. However, the number of inflow workers increased faster than the number of outflow workers, as reflected in the increased Inflow/Outflow ratio (from 0.47 to 0.58). (A ratio value greater than 1.0 would indicate that the county attracted more workers than it sent to other jurisdictions.) In fact, the number of people commuting into the county increased by more than 60 percent during the 1990s. This change indicates that more people are traveling to Frederick County for employment, and suggests that the county's traditional role as a bedroom community may be changing.

Such change is also bolstered by trends in the county's jobs-housing ratio. Figure 2-4 shows the ratio between 1970 and 2000. The county's ratio grew significantly between 1980 and 2000. During that period, every new Frederick County household was matched by 1.3 new jobs. City data is included only for the current period, since historical city-level at-place employment data are not available. The city is a job-rich environment, with two jobs for every existing household.

[11] For 1990, this represents a combination of the Washington and Baltimore PMSAs



The change in commuting patterns exhibits a distinct geographic trend. Table 2-2 shows the net exchanges of commuters between Frederick and the surrounding counties. Frederick County is still an exporter of workers to nearby Maryland and Virginia counties, with Montgomery County receiving more Frederick County commuters than any other jurisdiction. Frederick County residents also travel to Loudoun and Fairfax County in increasing numbers. Bold text indicates counties that were net "donors" of workers to Frederick County in 2000.

However, the "commute from" column shows that, during the 1990s, Frederick County received an increased number of commuters from every single jurisdiction. Washington (MD), Adams (PA), and the three counties in West Virginia increased their net export of workers to Frederick, while the net exchange of commuters with Carroll County reversed direction, with a net gain of 500 workers for Frederick County.

Table 2-2:
Net Exchange of Commuters To and From Frederick County, 1990-2000

	Year	Commute to	Commute from	Net Inflow	% Change in Net Inflow
District of Columbia	1990	2,619	56	-2,563	-13.3%
	2000	3,025	121	-2,904	
Montgomery County	1990	18,887	2,243	-16,644	-12.7%
	2000	22,867	4,104	-18,763	
Carroll County	**1990**	**1,688**	**1,490**	**-198**	**342.4%**
	2000	**2,004**	**2,484**	**480**	
Washington County	**1990**	**1,190**	**5,189**	**3,999**	**25.0%**
	2000	**2,153**	**7,150**	**4,997**	
Prince George's County	1990	1,144	135	-1,009	17.7%
	2000	1,188	358	-830	
Howard County	1990	890	428	-462	-97.6%
	2000	1,646	733	-913	
Baltimore City	1990	743	92	-651	-29.0%
	2000	960	120	-840	
Baltimore County	1990	636	257	-379	-4.5%
	2000	951	555	-396	
Anne Arundel County	1990	275	120	-155	-286.5%
	2000	804	205	-599	
Fairfax County, VA	1990	1,339	190	-1,149	-36.9%
	2000	1,786	213	-1,573	
Loudoun County, VA	1990	811	258	-553	-34.9%
	2000	1,151	405	-746	
Arlington County, VA	1990	324	23	-301	-64.8%
	2000	537	41	-496	
Adams County, PA	**1990**	**222**	**949**	**727**	**96.6%**
	2000	**293**	**1,722**	**1,429**	
Jefferson County, WV	**1990**	**188**	**1,014**	**826**	**57.6%**
	2000	**304**	**1,606**	**1,302**	
Franklin County, WV	**1990**	**180**	**1,063**	**883**	**35.8%**
	2000	**590**	**1,789**	**1,199**	
Berkeley County, WV	**1990**	**93**	**567**	**474**	**89.2%**
	2000	**182**	**1,079**	**897**	
Total Commute	**1990**	**32,196**	**15,106**	**-17,090**	**-2.9%**
	2000	**42,046**	**24,460**	**-17,586**	

2.2 Frederick County Employment Distribution and Specialization

In 2002, the City of Frederick had 41,695 jobs, or almost 50 percent of the total county employment of 85,378.[12] Tables 2-3 and 2-4 summarize the distribution of countywide jobs by sector and sub-sector, repeating the format used in the discussion of the city's economy.

By focusing on economic patterns in Frederick County (including the City of Frederick), we can relate city-level findings to broader trends in the County and the region. Not surprisingly, the data indicate that the county and city share many of the same economic patterns. Retail, manufacturing, government, professional services, and health care activities make up more than half of the county's jobs and more than 40 percent of the county's employment establishments.

Table 2-4 shows the LQs calculated for industries within Frederick County, as compared to the same industries in the CMSA and the nation. The city's strengths in manufacturing and education are maintained at the county level, in addition to a strong concentration in agriculture. These findings generally match the strengths and weaknesses identified in the city analysis.

While the city's high LQ values often reflect the presence of a few very large employers, the same cannot necessarily be said for the county. Outside of the city, only three companies employ more than 500 individuals: NVR Building Products (within the wood product manufacturing subsector), with 700 employees; Eastalco Aluminum Company (primary metal manufacturing subsector), with 700 employees; and Mount Saint Mary's College, with 500 employees.

A few sub-sectors, such as apparel manufacturing, wood products manufacturing, and junior colleges, generate inordinately high LQ values. In many cases, these indicate industries that have a small presence in the CMSA. For example, of the 746 primary metal manufacturing jobs in the region, 715 are employed in Frederick County (nearly all of them at Eastalco).

[12] InfoUSA

Table 2-3:

Year 2002 Employment in Frederick County by Industry Size and Number of Establishments

		Employees		*Establishments*	
NAICS	**Industry**	**Number**	**Share of Total**	**Number**	**Share of Total**
44	*Retail*	*10,573*	*12.6%*	*1,078*	*17.2%*
452	General Merchandising	2,784	3.3%	67	1.1%
441	Motor Vehicle Parts	1,672	2.0%	134	2.1%
444	Building Material/Garden Equipment	1,225	1.5%	105	1.7%
453	Miscellaneous Stores	960	1.2%	210	3.3%
62	*Health Care and Social Assistance*	*8,680*	*10.4%*	*498*	*7.9%*
621	Ambulatory Health Care	3,702	4.4%	332	5.3%
622	Hospitals	2,103	2.5%	28	0.5%
623	Nursing Homes	2,035	2.4%	27	0.4%
92	*Government (All Levels)*	*8,317*	*9.9%*	*138*	*2.2%*
928	National Security [a]	4,010	4.8%	6	0.1%
921	General Government	2,587	3.1%	77	1.2%
922	Public Safety	956	1.1%	22	0.4%
31	*Manufacturing*	*8,244*	*9.9%*	*232*	*3.7%*
333	Fabricated Metal Manufacturing	1,091	1.3%	20	0.3%
323	Machinery Manufacturing	988	1.2%	3	0.5%
315	Wood Product Manufacturing	970	1.2%	19	0.3%
54	*Professional Services*	*6,844*	*8.2%*	*738*	*11.7%*
72	*Accommodation and Food*	*6,647*	*7.9%*	*364*	*5.8%*
722	Food and Drinking Places	5,921	7.1%	324	5.2%
23	*Construction*	*6,281*	*7.5%*	*701*	*11.2%*
233	Special Trades	3,692	4.4%	395	6.3%
231	General Contracting	1,890	2.3%	269	4.3%
61	*Education [b]*	*6,096*	*7.3%*	*112*	*1.8%*
6111	Primary and Secondary	3,770	4.5%	65	1.0%
6113	Junior Colleges	592	0.7%	1	0.0%
6112	Colleges and Universities	958	1.1%	4	0.1%
52	*Finance and Insurance*	*5,942*	*7.1%*	*319*	*5.1%*
524	Insurance Carriers	1,709	2.0%	95	1.5%
522	Credit Intermediation	3,724	4.5%	160	2.5%
81	*Other Services*	*4,734*	*5.7%*	*861*	*13.7%*
813	Religious, Nonprofit	2,453	2.9%	340	5.4%
812	Personal Services	1,143	1.4%	259	4.1%
811	Repair and Maintenance	1,138	1.4%	262	4.2%
42	*Wholesale*	*2,928*	*3.5%*	*285*	*4.5%*
11	*Agriculture and Ag Support*	*2,251*	*2.7%*	*52*	*0.8%*
56	*Administrative/Waste Management*	*1,533*	*1.8%*	*257*	*4.1%*
53	*Real Estate*	*1,482*	*1.8%*	*245*	*3.9%*
71	*Arts, Entertainment, and Recreation*	*1,468*	*1.8%*	*121*	*1.9%*
713	Amusement, Recreation	1,316	1.6%	90	1.4%
48	*Transportation/Warehousing*	*1,459*	*1.7%*	*92*	*1.5%*
51	*Information*	*1,349*	*1.6%*	*104*	*1.7%*
99	*Unclassified Establishments*	*541*	*0.7%*	*79*	*1.3%*
55	*Management of Companies*	*203*	*0.2%*	*3*	*0.1%*
22	*Utilities*	*70*	*0.1%*	*2*	*0.0%*
21	*Mining*	*35*	*0.0%*	*6*	*0.1%*
All Industries [b,c]		**85,677**	**100%**	**6,287**	**100%**

a: The National Security sub-sector includes jobs specifically assigned to Ft. Detrick.

b: These sectors have only one 3-digit NAICS subdivision. The categories above represent 4-digit subdivisions.

c: Table 2-3 employment totals are derived from The US Department of Commerce County Business Pattern data. The information in Section 1.0 is from the InfoUSA database. This difference in sources accounts for the small variation in total county employment.

Source: 2002 InfoUSA Database

Table 2-4:
Economic Specialization (As Defined by Location Quotients)

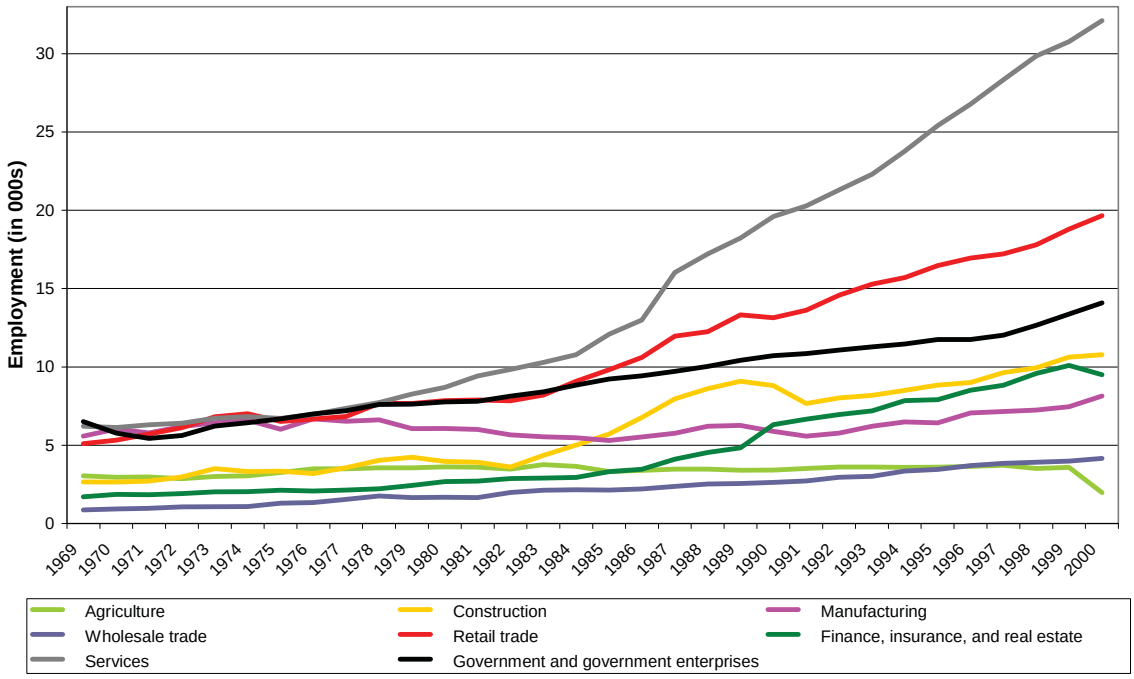
NAICS	Industry	County vs. CMSA LQ:	County vs. CMSA Extra Jobs	County vs. USA LQ:	County vs. USA Extra Jobs	LQ: CMSA vs. USA
31	*Manufacturing*	*4.43*	*6,385*	*0.87*	*-1,204*	*0.20*
321	Wood Product Manufacturing	11.75	887	2.40	566	*0.20*
331	Primary Metal Manufacturing	35.78	695	1.72	300	*0.05*
333	Machinery Manufacturing	10.03	889	1.02	23	0.10
315	Apparel Manufacturing	20.31	388	1.28	88	0.06
332	Fabricated Metal Products	5.71	900	9.53	977	1.67
336	Transportation Equipment Mfg.	2.86	141	0.17	-1,053	0.06
311	Food Manufacturing	4.47	467	0.57	-463	0.13
325	Chemical Manufacturing	5.98	515	0.98	-12	0.16
327	Nonmetallic Mineral Products	4.99	421	1.39	147	0.28
11	*Agriculture and Ag Support*	*4.40*	*1,739*	*0.95*	*-109*	*0.22*
61	*Education*	*3.27*	*4,229*	*3.22*	*4,204*	*0.99*
6111	Primary and Secondary	7.02	-537	6.96	-541	0.99
6113	Junior Colleges	88.40	-7	9.51	-62	0.11
6112	Colleges and Universities	1.03	-930	0.97	-983	0.95
71	*Arts, Entertainment, and Recreation*	*1.77*	*641*	*3.41*	*1,037*	*1.92*
713	Amusement, Recreation	2.46	781	15.23	1,230	6.20
712	Museums, Hist. Sites	0.95	-2	0.56	-36	0.59
52	*Finance and Insurance*	*1.72*	*2,485*	*1.32*	*1,434*	*0.77*
524	Insurance Carriers	1.95	830	1.01	25	0.52
523	Securities, Commodities	0.99	-3	0.68	-220	0.68
522	Credit Intermediation	1.85	1,715	1.76	1,611	0.95
23	*Construction*	*1.57*	2,274	*1.34*	1,580	*0.85*
233	Special Trades	1.51	1,250	1.28	814	0.70
231	General Contracting	1.70	780	1.61	719	0.95
44	*Retail*	*1.55*	*3,746*	*0.98*	*-210*	*0.63*
444	Building Material/Garden Equip	2.56	747	1.35	320	*0.53*
452	General Merchandising	2.83	1,801	1.52	955	0.54
441	Motor Vehicle Parts	1.98	828	1.25	332	0.63
453	Miscellaneous Stores	2.29	541	1.58	351	0.69
443	Electronics and Appliances	2.81	463	2.33	411	0.83
42	*Wholesale*	*1.54*	*1,026*	*0.66*	*-1,520*	*0.43*
48	*Transportation/Warehousing*	*1.52*	*500*	*0.65*	*-785*	*0.43*
62	*Health Care and Social Assistance*	*1.48*	*2,823*	*0.82*	*-1,845*	*0.56*
621	Ambulatory Health Care	1.92	1,773	1.08	272	0.56
622	Hospitals	1.13	237	0.57	1,579	0.51
623	Nursing Homes	2.11	1,071	1.05	100	0.50
72	*Accommodation and Food*	*1.33*	*1,665*	*0.92*	*-574*	*0.69*
722	Food and Drinking Places	1.47	1,903	0.99	-31	0.68
53	*Real Estate*	*1.11*	*147*	*1.03*	*42*	*0.93*
81	*Other Services*	*1.04*	*173*	*1.22*	*845*	*1.17*
813	Religious, Nonprofit	0.80	-627	1.25	486	1.57
812	Personal Services	1.31	272	1.20	193	0.92
811	Repair and Maintenance	1.87	528	1.17	165	0.63
21	*Mining*	*0.75*	*-12*	*0.24*	*-110*	*0.32*
54	*Professional Services*	*0.69*	*-3,029*	*1.32*	*1,662*	*1.91*
51	*Information*	*0.34*	*-2,655*	*0.50*	*-1,370*	*1.47*
92	*Government (All Levels)*	*0.32*	*-17,649*	*0.50*	*-8,457*	*1.55*
22	*Utilities*	*0.27*	*-188*	*0.15*	*-404*	*0.54*
56	*Administrative/Waste Management*	*0.27*	*-4,222*	*0.23*	*-5,029*	*0.88*
55	*Management of Companies*	*0.17*	*-1,002*	*0.10*	*-1,882*	*0.58*

Source: HNTB Analysis of 2002 InfoUSA database

An historical view of employment in Frederick County helps to explain some of the current patterns in the economic structure of the county. Those trends can also be extrapolated to the City of Frederick itself. Figure 2-4 shows the sector-level employment in Frederick County from 1969 through 2000. For the most part, these local trends match regional and national trends. For example, the dip in construction employment in the early 1990s coincides with the economic recession that hit the nation during that period.

Of particular interest is the growth in the services, retail, finance, and construction sectors since approximately 1987. Indeed, there was a veritable explosion in jobs in the service sector. As described in Section 1.1, the Service sector includes health, personal services, and educational services—some of the strengths of the city and county economies. Driven by these activities, Frederick County clearly kept pace with the nation's move toward a service-based economy.

Figure 2-4
Employment by Sectors 1969-2000
Frederick County



Source: County Business Patterns database

2.3 Industry Clusters

One drawback of the sector analysis described in previous sections is that it tends to obscure the presence and strength of industries whose activities cut across different sectors. These "industrial clusters" play an important role in the economic strength of the City of Frederick and Frederick County.

Clusters are groups of inter-related industries that represent the full life cycle of a product or activity, from raw materials to finished products. For example, an "automotive products" cluster might include auto parts manufacturers, car dealerships, auto supply stores, repair shops, and

even gasoline stations. Although such activities may be classified into different sectors, they often act as a single sector or sub-sector.[13]

The Frederick County Office of Economic Development has identified four industry groups or clusters as targets for economic development, including biotechnology, information technology, agriculture and manufacturing (metal products). These sectors have been identified because they provide the highest wages within the local economy, according to Marie Keegin, the county's economic development director. By encouraging growth within these high-wage sectors, the county believes it will enhance the ability of county residents to work in the county.

In July 2002, the city established a new Department of Economic Development and in November 2002, it issued a Draft Economic Development Priorities memorandum. This memo identifies the city's most important industries and clusters, including bioscience, manufacturing, information technology, services, and tourism. The bioscience cluster (as defined by the city), includes Fort Detrick and private biotech firms. The manufacturing cluster includes food, medicine, apparel, and machinery manufacturers. Information technology includes dot-com businesses, internet, and wireless providers. Services includes MAMSI, State Farm, and banking specialties. Finally, the tourism cluster includes "downtown Frederick—history, architecture, shopping, arts," Frederick Keys baseball, and Civil War battlefields and museums.

To translate these loose definitions into quantifiable information, we combined NAICS classifications to create clusters for four activities, based on city and county priorities and standards used in other economic analyses. Those clusters included biotechnology, metal fabrication, food and agriculture, and information technology. Appendix A provides a full list of the industries included in each cluster.

This analysis shows that the county has a specialization in three of its four targeted industries (all except for information technology) when compared to the region, but none of the four when compared to the nation. The county's specialization is most pronounced in metal fabrication and food and agriculture.

The region's strength in information technology, specifically in Montgomery County, shows up in this analysis, as the CMSA has 1.75 times the national average of jobs in this cluster. By comparison, Frederick County's information technology sector is rather small, a deficit of more than 5,000 per capita jobs in this sector when compared to the region. To the extent that jobs have been moving out of Montgomery County and into Frederick County, this is a good sign that employment growth in this sector in Frederick County is likely to expand over time, and that the county's hopes for this sector may be realized.

The city's industrial strengths are similar, as would be expected given that the city is a subset of the county in this context. The city has strong concentrations of jobs in the metal fabrication sectors (with an LQ of 15.09), biotechnology (LQ of 4.31) and food and agriculture, with ratios higher than the county in the first two sectors, but lower in food and agriculture (a consequence of the county's agricultural base). The city and county produce a significant number of exportable jobs in these industries, as Table 2.5 shows.

[13] *Adapted from* San Diego Association of Government (2001*) What are Industrial Clusters?*

Table 2-5:
Industrial Clusters, Frederick County and City of Frederick

LQ Comparison		Biotechnology	Metal Fabrication	Food and Agriculture	Information Technology
City vs. CMSA		4.31	15.09	2.95	0.21
City vs. USA		2.70	1.82	0.63	0.36
County vs. CMSA		1.20	5.18	3.72	0.11
County vs. USA		0.76	0.62	0.79	0.18
CMSA vs. USA		0.63	0.12	0.21	1.75
Exportable Jobs	City vs. CMSA	4,206	980	360	-1,181
	County vs. CMSA	1,006	1,122	1,939	-5,149

Frederick County has a strong manufacturing cluster when compared to the region, and the strength of this industry endures, according to Keegin. Anecdotal evidence suggests the construction manufacturing sector (wood and metal products) has been strong in the county, even during the recent economic slowdown, as local construction firms have benefited from a generally weak dollar in the global market.

The presence of Fort Detrick, the National Cancer Institute and some 35 individual biotech firms (10 percent of the all such establishments in the state) helps explain the county's strong regional presence in biotechnology. These companies have a diverse set of specializations, including biodefense, bioresearch and biomanufacturing. Some companies, such as Medimmune and DynePort Vaccine, have relocated from the existing biotech cluster in Montgomery County.

The County has used its location, quality of life, and educational resources as marketing tools for attracting technology companies, especially in the biotech field. As discussed in Section 1.1, local colleges play an especially important role in this effort. Hood College's specialization in biosciences provides opportunities for technical synergies, while Mount St. Mary's entrepreneurship program (which may soon include a Ph.D program) is attractive to the "new economy" mindset of a number of technology-related industries.

The 1995 City of Frederick Comprehensive Plan identifies tourism as one of the city's growth industries. The city's recent designation by the state as a regional arts and entertainment district also seeks to build on the city's cultural and historic resources and vibrant downtown. The high LQ scores for the city's recreation, historic, and museum activities relative to the CMSA and nation reflect the city's focus on these activities. Frederick County is the gateway to the recreational opportunities in the Catoctin Mountains, and contains a significant portion of the Appalachian Trail. The city and surrounding areas are also rich in historic resources, especially from the Civil War period.

Summary

The statistical portrait of the City of Frederick shows a diverse economic base with specialization in a variety of sectors. Even the sectors with the largest number of employees—Government, Health Care, Retail, and Manufacturing—represent a broad spectrum of economic activities.

Some areas of specialization represent local concentrations in already strong economic sectors in the Baltimore-Washington region. The city's biotechnology cluster benefits from access to local resources at Fort Detrick, Frederick Memorial Hospital, and Hood College. At the same time, the city's biotechnology industry is part of a larger cluster that spans the I-270 corridor (including the National Institutes of Health in Bethesda) and is one of the nation's foremost biotechnology centers.

At the same time, several of the city and county's strongest sectors are relatively weak in the region. Manufacturing, agriculture, and wholesale employment is relatively sparse in the CMSA, and Frederick is one of the few points of concentration for such activities. Such specializations can be both strengths and weaknesses. On one hand, sectors such as agriculture and manufacturing, whose overall strength has declined in recent years. On the other hand, the county's historic strengths in agriculture and manufacturing make it the CMSA's only destination of choice for such industries.

Economic information presented here about the City of Frederick has some clear implications for the revision of the city's Comprehensive Plan. Biotechnology, manufacturing, and educational facilities often have significant land, access, and infrastructure requirements. The Comprehensive Plan will need to define adequate lands to permit the appropriate expansion of these and other key industries and important economic sectors. The existing zoning ordinance should also be reviewed to assess where key industries are permitted, and whether non-residential zoning districts provide the appropriate level of differentiation. In addition, this analysis of the city's economy will be useful for the targeting of economic development efforts and Comprehensive Plan implementation strategies.

The city has recently added fiscal analysis requirements to the Comprehensive Plan update process. The fiscal analysis will help clarify the role that the city's non-residential economy plays in its overall fiscal status, and will help determine whether its desired future requires the creation or expansion of programs to promote job creation and to ascertain the desirable mix of additional households and employment.

Appendix A: Economic Cluster Definitions

Biotechnology and Health

NAICS Code	Description
32541	*Pharmaceutical & medicine manufacturing*
3391	*Medical equipment & supplies manufacturing*
334510	*Electromedical apparatus manufacturing*
334516	*Analytical laboratory instrument manufacturing*
334517	*Irradiation apparatus manufacturing*
54171	*R&D in physical, engineering & life sciences*
621	*Ambulatory Health Care*
622	*Hospitals*

Technology Industries

NAICS Code	Description
3341	*Computer & peripheral equipment manufacturing*
3342	*Communications equipment manufacturing*
3344	*Semiconductor & other electronic component manufacturing*
5112	*Software publishers*
5133	*Telecommunications*
514191	*On-line information services*
5142	*Data processing services*
5415	*Computer systems design & related services*
6114	*Business schools & computer & management training*

Food and Agriculture

NAICS Code	Description
REIS	*Agriculture*
311	*Food manufacturing*
4224	*Grocery & related product wholesale*
42251	*Grain & field bean wholesale*

Metal Fabrication and Industrial Machinery

NAICS Code	Description
3261	*Foundries*
311	*Fabricated metal product manufacturing*
331	*Primary metal manufacturing*
333	*Machinery manufacturing*

Apparel

NAICS Code	Description
315	*Apparel manufacturing*
4223	*Apparel, piece goods & notions wholesale*

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX D-3
LOS Factors, Cost & Revenue Factors

November, 2003

Prepared by:

Tischler & Associates, Inc.
Fiscal, Economic, and Planning Consultants

Appendix D

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Appendix D

Introduction

Tischler & Associates, Inc. (TA), in conjunction with HNTB of Columbia, Maryland, is under contract with The City of Frederick to conduct a fiscal impact analysis of two alternative development scenarios and a preferred scenario as a part of updating the City's Comprehensive Plan. The following Level of Service, Cost and Revenue Assumptions document describes the revenues, service and facility costs that will be impacted by the two development scenarios. ***All costs and revenues that are directly attributable to the new development only are included in the analysis. Both operating and capital costs are taken into consideration. Water and Sewer costs are not included in this analysis because they are considered self-supporting enterprise funds.*** A separate analysis is being conducted to look at the cost of providing water and sewer service to new growth. Costs and revenue factors and level of service assumptions for Frederick are based on the Fiscal Year 2004 (FY04) budget and on-site discussions and interviews with representatives from City departments. The revenue and cost projections are based on the assumption that current levels of tax rates, fees, and spending, as provided in the FY04 approved budget, will continue in the future. For capital costs, TA considered the City's current Capital Improvement Program, current capital levels of service, and capital financing policies.

Methodology

The impact of new growth on the City's finances is measured using a variety of demographic statistics and City characteristics. These are listed below:

Figure 1: Current Demographic Statistics and City Characteristics

Population: 53,047
Jobs: 43,158
Population and Jobs: 96,205
Total City Facility Square Footage: 119,000
Recreation Square Footage: 39,000
Park Acreage: 211
City Vehicles: 313
Road Miles: 240
Full Time-Equivalent City Employees: 789
Calls for Police Services (excluding road-related calls): 40,518

For example, if a cost or revenue is expected to vary with an increase in population, the budget amount is divided by the population to determine a cost per capita. This figure then represents the estimated annual cost or revenues generated per additional person. Likewise, some City revenues and costs will vary based on additions to the City's staffing levels and infrastructure (park acreage, roads, etc). The fiscal impact analysis calculates both the capital cost of these additions, but also calculates the operating cost of these facilities.

Where detailed information was available, a marginal approach was used. The two most common methodologies utilized in fiscal impact analyses are the average cost method and case study marginal cost method. The average cost approach is simple and more popular. Costs and revenues are calculated on the average cost per unit of service (often per capita or per employee). This method assumes a linear relationship and does not consider current available public service and capital capacities or the unique characteristics of a community. The case study marginal cost method is the most realistic method for evaluating fiscal impacts by taking the unique demographic characteristics and available public service and capital facility capacities into consideration.

Examples where the marginal approach is used in this analysis include revenues from real estate taxes, personal income taxes, and staffing levels and expenditures (these will all be discussed further below).

In some cases, the data used are average costs or revenues, based on the best information available at this time. Costs and revenues are calculated on the average cost per unit of service such as per capita, per job, etc.

Some costs and revenues are not expected to be impacted by demographic changes, and may be fixed in the analysis. Some examples of fixed factors include the number of elected officials, the number of department heads, revenues affected by factors beyond the City's control (interest rates, the fiscal health of the State).

Operating Revenues

General Fund revenues for FY04 are summarized in the table below. Each of the revenue sources and their associated projection methodologies in relation to the two development scenarios are discussed in the following sections and tables.

1. Real Estate Taxes

These revenues are the largest revenue source for the City, accounting for $23,000,000 or 44% of the FY04 budget. The FY04 rate of $.64 per $100 assessed value is used to estimate property tax revenue generated by the two development scenarios per FAZ. Property is assessed at 100 percent of estimated market value. The estimated market values by land use type as provided by the City are summarized in the table below.

Figure 2: General Fund Revenues Fiscal Year 2004

Revenue Source	FY04 Amount	%
General Property Taxes		
Real Estate	$23,000,000	44.1%
Railroad and Public Utilities	$1,038,500	2.0%
Ordinary Business - Domestic	$516,273	1.0%
Ordinary Business - Foreign	$941,006	1.8%
Ordinary Business - Unincorporated	$61,380	0.1%
Other General Property Tax Revenues	$155,000	0.3%
Personal Income Taxes		
Personal Income Taxes	$3,850,000	7.4%
Business Taxes		
Admissions and Amusements	$600,000	1.1%
Highway Users	$1,696,798	3.3%
Business Licenses and Permits		
Alcoholic Beverages	$60,000	0.1%
Traders Licenses	$140,000	0.3%
Professional and Occupational	$400	0.0%
Non-Business Licenses and Permits	$1,115,446	2.1%
Fees	$830,322	1.6%
Grants		
Grant for Public Safety	$613,916	1.2%
Tax Differential	$3,017,207	5.8%
Grants	$1,594,206	3.1%
Community Action Agency Grant	$1,276,731	2.4%
Miscellaneous Revenues	$6,257,789	12.0%
Beginning Fund Balance	$5,418,893	10.4%
TOTAL GENERAL FUND REVENUES	**$52,183,867**	**100.0%**

Figure 3: Estimated Market Value for Residential and Nonresidential Development by FAZ

FAZ =>	*1*	*2*	*3A*	*3B*	*3C*	*3D*	*3E*
Residential (per unit)							
Single Family	$220,000	$220,000	$196,000	$222,000	$235,000	$235,000	$220,000
Townhouse	$174,000	$174,000	$143,000	$188,000	$210,000	$210,000	$174,000
Multi-Family (condominium)	$110,000	$110,000	$135,000	$160,000	$160,000	$160,000	$110,000

FAZ =>	*1*	*2*	*3A*	*3B*	*3C*	*3D*	*3E*
Nonresidential (per square foot)							
Commercial	$96	$96	$96	$96	$96	$96	$96
Office	$73	$73	$73	$73	$73	$73	$73
Industrial / Flex	$52	$52	$52	$52	$52	$52	$78
Service	$155	$155	$155	$155	$155	$155	$155

2. Personal Income Taxes

Revenue from personal income taxes totals $3,850,000 or 7.4% of the FY04 budget. Personal Income tax revenues are calculated as a function of the market value of housing. It is assumed that approximately 32 percent of the market value of a housing unit

represents the adjustable gross household income. This is a typical mortgage industry standard which measures the affordability of the principal, interest, taxes, and insurance on a mortgage representing 80 percent of market value. It is estimated that about 70 percent of an adjustable gross income represents the net taxable income, accounting for typical homeowner income tax deductions of 30 percent. As an example, a house having a market value of $200,000 will necessitate a household income of $64,000 (32% of $200,000), which translates into a net taxable income of $44,800 (70% of $64,000). Multiplying this by .37 percent for the local income tax surcharge results in $237 in annual income tax revenue for the City.

The tables below summarize the demand bases and methodologies used to project the future operating revenues.

3. General Property Taxes

Real estate taxes account for the majority of revenues in this category. Personal property taxes generated by the Railroads and Public Utilities category are expected to increase with number of industrial jobs in the City. Personal property taxes in the Ordinary Business – Domestic category are expected to increase by the total number of jobs in the City. The remaining revenues are considered fixed to relative to new growth .

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
General Property Taxes											
Real Estate	X										
Railroad and Public Utilities			X								
Ordinary Business - Domestic			X								
Ordinary Business - Foreign					X						
Ordinary Business - Unincorporated					X						
Tax Credits					X						
Prior Year's Additions					X						
Prior Year's Abatements					X						
1999 TIF Bond					X						
Payment in Lieu of Taxes					X						

4. Business Taxes

Admissions and Amusement taxes are projected to increase with the number of commercial jobs in the City. The Highway Users tax is expected to increase as additional road miles are added to the City's road network.

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Business Taxes											
Admissions and Amusements			X								
Highway Users											X

5. Business Licenses and Permits

Alcoholic Beverages license and permit revenues are expected to increase with the population of the City. Total employment in the City is a good measure for Traders Licenses. Revenues from Professional and Occupational licenses and permits is a minor revenue source and is considered fixed relative to new growth.

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Buisiness Licenses and Permits											
Alcoholic Beverages		X									
Traders Licenses			X								
Professional and Occupational					X						

6. Non-business Licenses and Permits

Revenues from building, reinspection, grading, electrical, fire code, and fire protection permits are assumed to partially offset the costs incurred by the City to provide reciprocal services. These revenues are applied against the operating costs of the Departments which issue the permits. Revenues from cable television licenses and permits is projected to increase with the total number of housing units. Other revenues in this category are minor and considered fixed.

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Non-business Licenses and Permits											
Building						X					
Reinspection						X					
Grading						X					
Electrical						X					
Fire Code						X					
Fire Protection						X					
Vending					X						
Parade					X						
Peddlar					X						
Banner					X						
Cable Television							X				

7. Grants

Many of the grants in the category are non-recurring revenues in that they are one-time or are to be used for a specific, limited purpose. Thus, they are considered fixed relative to new growth. Revenues from the Community Action Agency Grant (Federal and State) are considered on-going and are applied against the costs of the Frederick Community Action Agency. Based on discussions with City staff and past financial data, revenues from the Grant for Public Safety are expected to grow with the City's population. Tax Differential revenues from the County are expected to increase as growth occurs in the City. Thus total population and jobs are used to project these revenues.

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile	Per FTE Employee
REVENUES												
Grants												
Federal Grants (Public Safety)					X							
Community Action Agency Grant						X						
Youth Services					X							
Grant for Public Safety		X										
Police Supplemental					X							
Police Municipal					X							
Police Equipment					X							
State Grants Project (Public Safety)					X							
Community Action Agency Grant						X						
Other State Grants (Public Safety)					X							
Payment in Lieu of Taxes					X							
Financial Corporation					X							
Tax Differential				X								
County Assumed Costs					X							
Community Center					X							
Other County Grants (Health)					X							

8. Fees

Similar to the Non-Business Licenses and Permits, revenues from fees are assumed to partially offset the costs incurred by the City to provide reciprocal services. These revenues are applied against the operating costs of the Departments which provide the services.

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Fees											
Planning and Zoning						X					
HDC Filing Fees						X					
Forest Conservation						X					
Development Review Fees						X					
Recording Fees						X					
Legal Review Fees						X					
Police Services (Water / Sewer / Airport Security)						X					
Development Inspection						X					
Maintenance of Memorial Grounds						X					
Equipment Rental						X					
Labor						X					
Overhead						X					
Waste Collection						X					
Trash Containers						X					
Swimming Pool Fees - Diggs Pool						X					
Swimming Pool Fees - Baker Pool						X					
Swim Instruction / team Fees						X					
Equipment Rental - Swimming Pools						X					
Swimming Pool Concessions						X					
Recreation Vending						X					
City Hall Concessions						X					
Special Activites						X					
Carriage Rides						X					
Skate Park Fees						X					
Participation ID Cards						X					
Whittier Open Gym						X					
TJ Open Gym						X					
Playground Program						X					
Whittier Recreation Center						X					
Angels in the Park Program						X					

9. Miscellaneous Revenues

These revenues are considered fixed relative to new growth because they are dependent on factors external to the City (such as interest rates), or one-time in nature (Sale of General Fund Assets), or are minor revenues.

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Miscellaneous Revenues											
Discount Allowance					X						
Penalties / Interest on Delinquient Taxes					X						
Municipal Infractions					X						
Investment Interest					X						
Other Interest					X						
Rents					X						
Community Action Agency					X						
Youth Services					X						
1854 Print Sales					X						
Other Miscellaneous Revenue					X						
Capital Leases					X						
Transfer from Parking					X						
Transfer from Airport					X						
Transfer from HCD					X						
Transfer from Water / Sewer					X						
Sale of General Fixed Assets					X						

10. Beginning Fund Balance

Revenues from the Beginning Fund Balance are considered fixed because they are from prior fiscal years and should not be considered a recurring revenue source.

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Beginning Fund Balance											
Beginning Fund Balance					X						

Operating Expenditures

General Fund expenditures for FY04 are summarized in the table below.

Figure 4: General Fund Expenditures Fiscal Year 2004

Expenditure Source	*FY04 Amount*	*%*
Administrative Departments	$5,516,680	10.6%
Public Safety	$16,281,444	31.2%
Planning and Community Development	$1,492,983	2.9%
Engineering	$2,415,979	4.6%
Public Works	$11,677,025	22.4%
Citizen Services	$4,493,667	8.6%
Nondepartment Expenditures	$10,306,089	19.7%
TOTAL GENERAL FUND EXPENDITURES	**$52,183,867**	**100.0%**

As with the operating revenues, TA evaluated the impact of new growth on the City's operating expenditures based on interviews with City staff and calculated cost factors using the current demographic and City characteristics listed in Figure 1.

The graphic below illustrates how the fiscal impact model projects operating costs using the Finance Department as an example. Starting at the top of the graphic, operating expenditures for each department were broken down into categories for personnel (salaries and benefits), operating expenditures, and capital outlay. This allows TA to use several projection methodologies to forecast each category of expenditures. Capital outlay costs are considered fixed relative to new growth as capital needs are considered separately and discussed below.

The next section of the graphic shows the staffing input section. The marginal cost approach is used to project staffing costs. Using data from the Human Resource department on the number and type of positions in each department and interviews with City staff, TA estimates the demand for additional staff for each position. This enables the fiscal impact analysis to vary the staffing demands of new growth on a position-by-position basis to account for:

- Positions that are fixed relative to new growth (such as department heads).
- Remaining staffing capacity before a new position needs to be added.
- Differential in demand between front-line employees and a subsequent need for supervisors.

Then using salary information from the City's grade and step schedule and a benefits multiplier of 35%, TA can calculate the personnel costs for additional employees needed to serve new growth. TA assumed that each position would be hired at the first step of each grade.

There is also a section at the bottom of each department's input area to account for any off-setting revenues.

Appendix D

BASE YEAR BUDGET AND FACTOR PROJECTION METHODOLOGY INPUTS

FINANCE DEPARTMENT

Expenditure Name	Base Year Budget Amount	Project Expenditure Factor Using:	Demand Unit Multiplier	Projection Methodology	Annual Change (pos. or neg.)	LOS Std $ per Demand Unit
Personnel	$669,040	SEE BELOW	1.00	CONSTANT	0%	$0
Operating Expenditures	$114,934	POP AND JOBS	1.00	CONSTANT	0%	$1.19
Capital Outlay	$0	FIXED	1.00	CONSTANT	0%	$0
Direct Entry Cost Type 1	$0	DIRECT ENTRY	1.00	CONSTANT	0%	$0.00
Direct Entry Cost Type 2	$0	DIRECT ENTRY	1.00	CONSTANT	0%	$0.00
Direct Entry Cost Type 3	$0	DIRECT ENTRY	1.00	CONSTANT	0%	$0.00
Direct Entry Cost Type 4	$0	DIRECT ENTRY	1.00	CONSTANT	0%	$0.00
TOTAL	$783,974					

FINANCE DEPARTMENT STAFFING INPUT

Category	Base Year FTE Positions	Project Using Which Demand Base?	Current Demand Units Served Per Position	% Estimate of Available Capacity	Remaining Capacity/ Initial Hire Threshold	Estimated Service Capacity Per Position
Director of Budget and Purchasing	1	FIXED	0	100%	0	0
Payroll/System Administrator	1	FTE's	789	10%	79	434
Accounting Clerk I	2	POP AND JOBS	48,103	10%	4,810	33,672
Accounting Clerk II	2	POP AND JOBS	48,103	20%	9,621	35,275
Accounting Clerk Senior	1	POP AND JOBS	96,205	30%	28,862	62,533
Comptroller	1	FIXED	0	100%	0	0
CFO	1	FIXED	0	100%	0	0
Network Systems Administrator	1	FTE's	789	100%	789	789
Accounting Manager	1	POP AND JOBS	96,205	100%	96,205	96,205
Information Systems Coordinator	1	FTE's	789	100%	789	789
Information Technology Mananger	1	FTE's	789	100%	789	789
Webmaster Developer	1	POP AND JOBS	96,205	100%	96,205	96,205
Staff Type 2	0	FIXED	0	0%	0	0
Staff Type 3	0	FIXED	0	0%	0	0
	14					

SALARIES

	Avg Salary / Staff Member	Benefits Multiplier	Inflation Adj (+/- Base)	LOS Std Total Cost
Director of Budget and Purchasing	$62,940	35%	0%	$84,969
Accounting Clerk I	$24,070	35%	0%	$32,495
Accounting Clerk II	$27,473	35%	0%	$37,089
Accounting Clerk Senior	$30,536	35%	0%	$41,224
Comptroller	$62,940	35%	0%	$84,969
CFO	$74,269	35%	0%	$100,263
Accounting Manager	$44,148	35%	0%	$59,600
Staff Type 2	$0	35%	0%	$0
Staff Type 3	$0	35%	0%	$0

FINANCE DEPARTMENT PROGRAM REVENUES INPUT

Revenue Name	Base Year Budget Amount	Revenue Calculation Based On:	Demand Unit Multiplier	Revenue Projection Methodology	Annual Change (pos. or neg.)	LOS Std $ per Demand Unit
Program Rev 1	$0	FIXED	1.00	CONSTANT	0%	$0.00
Program Rev 2	$0	FIXED	1.00	CONSTANT	0%	$0.00
Program Rev 3	$0	FIXED	1.00	CONSTANT	0%	$0.00
Program Rev 4	$0	FIXED	1.00	CONSTANT	0%	$0.00
Program Rev 5	$0	FIXED	1.00	CONSTANT	0%	$0.00
TOTAL	$0					

The tables below list the various demand bases used to project the future operating costs for City departments/divisions. As illustrated above, more than one projection methodology is often used for each departments' future staffing estimates. Except where noted below, the "Fixed" methodology often applies to capital expenditures or a few staffing positions such as department heads and/or senior management positions.

Administrative Departments

	Per Capita	Per Job	Per Capita and Job	Fixed	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile	Per FTE Employee
EXPENDITURES									
Administrative Departments									
Mayor Office			X	X					
Office Of Legal Services			X	X					
Election Board	X			X					
Finance Department			X	X					X
Purchasing			X	X					
Information Technology				X					X
Human Resources				X					X
Occupational Safety And Health Department				X					X
Facilities Administration Department				X	X				
Community Promotions				X					

Given the nature of these departments, expenditures for several of these departments will increase as the City adds employees and square footage to its facilities. Some department expenditures will increase as the City grows, thus total population and jobs are used to estimate future costs. Most of the fixed costs relate to staffing positions that will not increase as a result of new growth (elected officials and department heads).

Public Safety

Calls for service are used to project future operating expenditures for the Police Department. Based on call data from calendar year 2002, the Police Department responded to 59,586 calls for service. To determine the impact of new growth on calls for service, road-related calls for service are omitted since the origin and destination of the trips is unknown and thus should not be assigned to new growth. Based on sample data from two months, approximately 32% of calls are road-related. Of the 59,586 calls for service, approximately 19,068 calls for service were road-related (32%) with the remaining 40,518 calls used as the calls for service demand base.

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Public Safety										
Police Department				X				X		

3. Planning and Community Development

The demand for Planning and Code Enforcement services is expected to increase as the City grows. Thus, total population and jobs are used to project future costs for these departments. New growth is not expected to place additional demands on the Community Development Department. These costs are considered to be fixed.

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Planning and Community Development										
Planning Department			X	X						
Code Enforcement Department			X	X						
Community Development				X						

4. Engineering

Both new residential and nonresidential growth will place demands for additional Engineering services. Total population and jobs are used to project future costs.

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Engineering										
Engineering Department			X	X						
Permits And Inspections - Building			X	X						
Permits And Inspections - Electrical Inspection			X	X						
Permits And Inspections - Construction Inspection			X	X						
Permits And Inspections - Plumbing Inspection			X	X						

5. Public Works

Additional road mileage in the City will increase costs for several Public Works divisions including Street Sweeping, Street Maintenance, Snow Removal, Lights and Signals, Paint and Signs, and Storm Drains. Additional City facilities and vehicles are used to project future costs for Facility Maintenance and the Maintenance Shop respectively. Total population and jobs are used to forecast expenditures for General Administration, Waste Collection and Disposal, and Grounds Maintenance. New growth is not expected to impact Grove Stadium Maintenance costs which are considered fixed.

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Public Works										
General Administration			X	X						
Facility Maintenance				X			X			
Maintenance Shop				X					X	
Waste Collection And Disposal Department			X	X						
Street Sweeping				X						X
Street Maintenance				X						X
Snow Removal				X						X
Light And Signal Department				X						X
Paint And Sign Department				X						X
Storm Drains				X						X
Grounds Maintenance			X	X						
Grove Stadium Maintenance				X						

6. Citizen Services

Citizen Services will primarily be affected by population growth, with Economic Development being the lone exception.

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Citizen Services										
Office Of Special Events				X						
Recreation	X			X						
Summer Playground	X									
Swimming Pools	X									
Department Of Economic Development		X		X						
Frederick Community Action Agency	X			X						
Youth Centers	X									

7. Nondepartmental Expenditures

These expenditures are considered fixed relative to new growth. New growth has no impact on existing debt service as it will be repaid regardless of whether the City grows (Note: new debt from new capital facilities required by new growth is discussed under "Capital Expenditures" below). Contingency funds should be considered one-time in nature and not projected to recur in the future. New growth does not have a direct impact on operating transfers to other funds.

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Nondepartmental Expenditures										
Bonded Debt				X						
Bus Service				X						
Contingency				X						
Contribution to Volunteer Fire Rescue				X						
Fund Balance				X						
Operating Transfers				X						
TIF Bonds				X						
State Loans				X						

Capital Revenues

The City has a parks impact fee of $868 per residential unit without a pool provided by its homeowners association (HOA) and $586 per residential unit with a HOA pool. For the purposes of the fiscal impact model, it is assumed that 75% of the new residential units will have a HOA pool and 25% will not have a HOA pool.

Capital Expenditures

Capital expenditures to accommodate new growth were allocated into the categories of roads, parks and recreation, general government, and public safety. TA evaluated new growth's demand for additional capital facilities based on interviews with City staff as well as using data from the City's current five year Capital Improvement Program (CIP), current inventory of facilities and capital assets, and data on future road projects provided by City.

The graphic below illustrates how the fiscal impact model projects capital costs using Parks and Recreation as an example. Capital expenditures are divided into several categories which allows TA to use several projection methodologies to forecast each category of expenditures.

In reviewing the current CIP, only a handful of park improvement projects were identified as being the result of new growth (the majority of CIP projects were routine replacement or maintenance projects). These capacity projects are shown at the bottom of the graphic. These projects were directly entered in the fiscal impact model over the next five years based on the costs in the CIP. Additional parks projects beyond the next five years are projected using the growth in population (shown at the top of the graphic). Additional facilities include regional parks and recreation facilities.

The below graphic also illustrates the model's ability to project future capital facilities using various construction thresholds. For example, future community parks are assumed to be 10 acres in size, while regional parks are 15 acres. Future recreation facilities are assumed to be 15,000 square feet in size.

All capital expenditures included in this fiscal impact analysis follow the City's debt management policies and are assumed to be cash financed at 5% with the remaining 95% debt financed for 20 years at 5% interest. These bond terms can be seen in the graphic below.

Parks and Recreation Capital Facilities Factor-Based Inputs

Capital Facilities Standards and Costs

Facility Type	Base Year Inventory		Need For Facility Based On:	Citywide LOS by Capital Facility	Current Cost/Unit ($000's)	Inflation Adjustment (+/-)
Community Parks	Acres	117	POPULATION	0.0022	$835	0%
USEFUL			| PROTOTYPE			
FACILITY			| FACILITY SIZE (acres):		10	
LIFE:	New Facility (years):	30	| CONSTRUCTION THRESHOLD:		66%	
LAG/LEAD	Funding to Delivery (years):	0	| FUNDING METHOD:		Bond Rate:	5.00%
TIME:	Bond to 1st Year DS:	0	| Percent Bonded:	95%	Bond Term:	20
Regional Parks	Acres	94	POPULATION	0.0018	$6,175	0%
USEFUL			| PROTOTYPE			
FACILITY			| FACILITY SIZE (acres):		15	
LIFE:	New Facility (years):	30	| CONSTRUCTION THRESHOLD:		66%	
LAG/LEAD	Funding to Delivery (yrs):	0	| FUNDING METHOD:		Bond Rate:	5.00%
TIME:	Bond to 1st Year DS:	0	| Percent Bonded:	95%	Bond Term:	20
Recreation Facilities	Square Feet	39,000	POPULATION	0.735197	$1,500.000	0%
USEFUL			| PROTOTYPE			
FACILITY			| FACILITY SIZE (miles):		15,000	$100 per sf
LIFE:	New Facility (years):	30	| CONSTRUCTION THRESHOLD:		33%	
LAG/LEAD	Funding to Delivery (years):	0	| FUNDING METHOD:		Bond Rate:	5.00%
TIME:	Bond to 1st Year DS:	0	| Percent Bonded:	95%	Bond Term:	20
Parks - Capacity Projects		0	DIRECT	#N/A	$0	0%
USEFUL			| PROTOTYPE			
FACILITY			| FACILITY SIZE (acres):		0	
LIFE:	New Facility (years)	30	| CONSTRUCTION THRESHOLD:		100%	
LAG/LEAD	Funding to Delivery (years):	0	| FUNDING METHOD:		Bond Rate:	5.00%
TIME:	Bond to 1st Year DS	0	| Percent Bonded:	95%	Bond Term:	20

The table below lists the project methodologies used to forecast new growth's demand for capital facilities.

Capital Expenditures

Future road projects were provided by the City and broken down by scenario. These projects were directly entered in the model. It is important to note that the vast majority of the costs (90%) for these road projects are expected to be paid by the state, county, and developers with the City paying the remaining 10%. Changes to these cost sharing arrangements could have an impact on the City's fiscal viability. Other road-related

capital costs include vehicles and equipment used to maintain City streets. TA used the current fleet of vehicles and equipment to establish the current LOS. These costs vary with additional road mileage.

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES											
Capital Expenditures											
Roads	X										
Road-related Vehicles											X
Public Safety Facilities									X		
Public Safety Vehicles - Marked									X		
Public Safety Vehicles - Unmarked									X		
General Government Facilities				X							
General Government Vehicles - Population		X									
General Government Vehicles - Population and Jobs				X							
General Government Vehicles - City Vehicles										X	
General Government Vehicles - City Facilities								X			
Community Parks	X	X									
Regional Parks		X									
Recreation Facilities		X									

Capital expenditures for public safety include additional square footage, marked vehicles, and unmarked vehicles. Future public safety facilities are assumed to be 5,000 square feet in size (either substations or expansion of existing facilities). TA used the current fleet of marked and unmarked vehicles to establish the current LOS. Calls for service are used to determine the need for future public safety capital needs.

Additional general government facilities are projected to increase as the City grows so total population and jobs are used to forecast these facilities. Future general government facilities are assumed to be 20,000 square feet in size (either new facilities or expansion of existing facilities). The need for additional general government vehicles varies based on the department. For example, additional vehicles for Facilities Administration and Grounds Maintenance will vary with additional square footage added to City facilities.

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX D-4
Capacity Analysis

September, 2004

Prepared by:

The Maryland Department of Planning
In association with
The City of Frederick and
HNTB Corporation

Appendix D

City of Frederick's Capacity Analysis

Purpose

As requested by the City of Frederick's Mayor and Planning Department, in 2003 the Maryland Department of Planning (MDP) undertook a study of residential and non-residential development capacity. This analysis was undertaken in coordination with HNTB, the City's Comprehensive Plan consultant, as part of the City's update its 2004 Comprehensive Plan. This document includes the findings of this analysis of residential and non-residential development capacity for the City of Frederick.

Findings

Residential Development Capacity. Based on MDP's analysis, the total new household capacity for the City of Frederick is approximately 7,300 within the existing city limits based on existing zoning. Slightly less than half of this capacity is located within the Medium Density Residential Zoning Districts (R-2 and R-3).

This analysis was also completed for the Comprehensive Plan Study Area (see Figure 1). The study area includes the City of Frederick and an area around the City established for planning and analysis purposed during the Comprehensive Plan update. The study area encompasses approximately 58 square miles of which the City comprises approximately 20 square miles.

The capacity analysis for the study area found a total residential capacity of approximately 10,300 additional dwelling units based on existing zoning (this figure includes the City as well as the surrounding County study area).

Non-Residential Development Capacity. Using information prepared by the City's planning staff and HNTB, as well as industry standards, MDP was able to generate an approximate development capacity figure for employment. We found that the total capacity for new jobs in the City is approximately 24,000 based on the existing zoning of vacant lands. More than half of these jobs are on lands zoned M-1, which allows light industrial land uses.

For the study area the capacity analysis found there was a total non-residential capacity of 42,800 additional jobs (this figure includes the City as well as the surrounding County study area).

Summary Results. The summary of the capacity analysis for the City of Frederick is presented in Table 1. A more detailed compilation of the capacity analysis results by zoning district is presented in Table 2. Detailed development capacity results for the study area are presented in Attachment 1.

Table 1. Capacity Analysis Summary

Area	New Potential Dwelling Units[1]	New Potential Jobs
City	7,300	24,200
Rest of the Study Area	3,000	18,600
Total	10,300	42,800

[1] *Includes Infill*

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Table 2. City of Frederick Residential and Non-Residential Capacity Analysis

Zoning	Description	Total Acres[1]	Percent of Total Zoned Acres	Develop-able Acres (Res'l)[2]	Develop-able Acres as % of Total Acres by Zoning District	New DU Capacity [3]	Percent of Total New DUs by Zone	Develop-able Acres (Non-Res'l)[4]	Develop-able Acres as % of Total Acres by Zoning District	FAR	Sq.Ft/Em ployee	Total New Job Capacity	Percent of Total New Jobs by Zone
B-1	Neighborhood Commercial	30	0.3%	0.0	0%	0	0%	0.1	0%	0.25	500	3	0%
B-3	General Commercial	720	7.6%	0.0	0%	0	0%	132.2	18%	0.25	500	2,879	12%
B-O	General Commercial	80	0.8%	0.0	0%	0	0%	23.4	29%	0.25	300	848	3%
DB	Downtown Business/Mixed Use	175	1.9%	20.4	12%	620	9%	30.6	17%	1.10	300	4,892	20%
DB-O	Downtown Business/Mixed Use	15	0.2%	0.1	1%	7	0%	0.1	1%	1.00	300	20	0%
DR	Downtown Residential	186	2.0%	11.8	6%	563	8%	0.0	0%	N/A	N/A	0	0%
DR-B	Downtown Residential	7	0.1%	0.2	3%	11	0%	0.2	2%	0.70	250	18	0%
M-1	Light Industrial	2,787	29.5%	0.0	0%	0	0%	852.0	31%	0.30	800	13,917	57%
M-2	Heavy Industrial	347	3.7%	0.0	0%	0	0%	24.9	7%	0.30	500	650	3%
M-O	Planned Industrial District	281	3.0%	0.0	0%	0	0%	56.1	20%	0.20	500	978	4%
R-1	Low Density Res.	853	9.0%	378.5	44%	780	11%	0.0	0%				0%
R-2	Medium Density Res	1,446	15.3%	982.0	68%	2,895	40%	0.0	0%				0%
R-3	Medium Density Res	1,763	18.6%	196.3	11%	1,171	16%	0.0	0%				0%
R-4	High Density Res.	521	5.5%	90.0	17%	437	6%	0.0	0%				0%
R-5	High Density Res.	134	1.4%	14.2	11%	388	5%	0.0	0%				0%
R-6	High Density Res.	107	1.1%	27.7	26%	395	5%	0.0	0%				0%
R-O	Residential Office	8	0.1%	0.4	4%	1	0%	1.3	15%	0.20	300	37	0%
TOTALS		**9,461**	**100%**	**1,721**	**18%**	**7,268**	**100%**	**1,121**	**12%**			**24,242**	**100%**

Notes:

[1]Total Acres of all parcels in the City

[2]Vacant Residential Land (does not include acreage of infill)

[3]Output from MDP's Growth Model - including infill units

[4]Total Acres of Vacant commercial/industrial zoned areas

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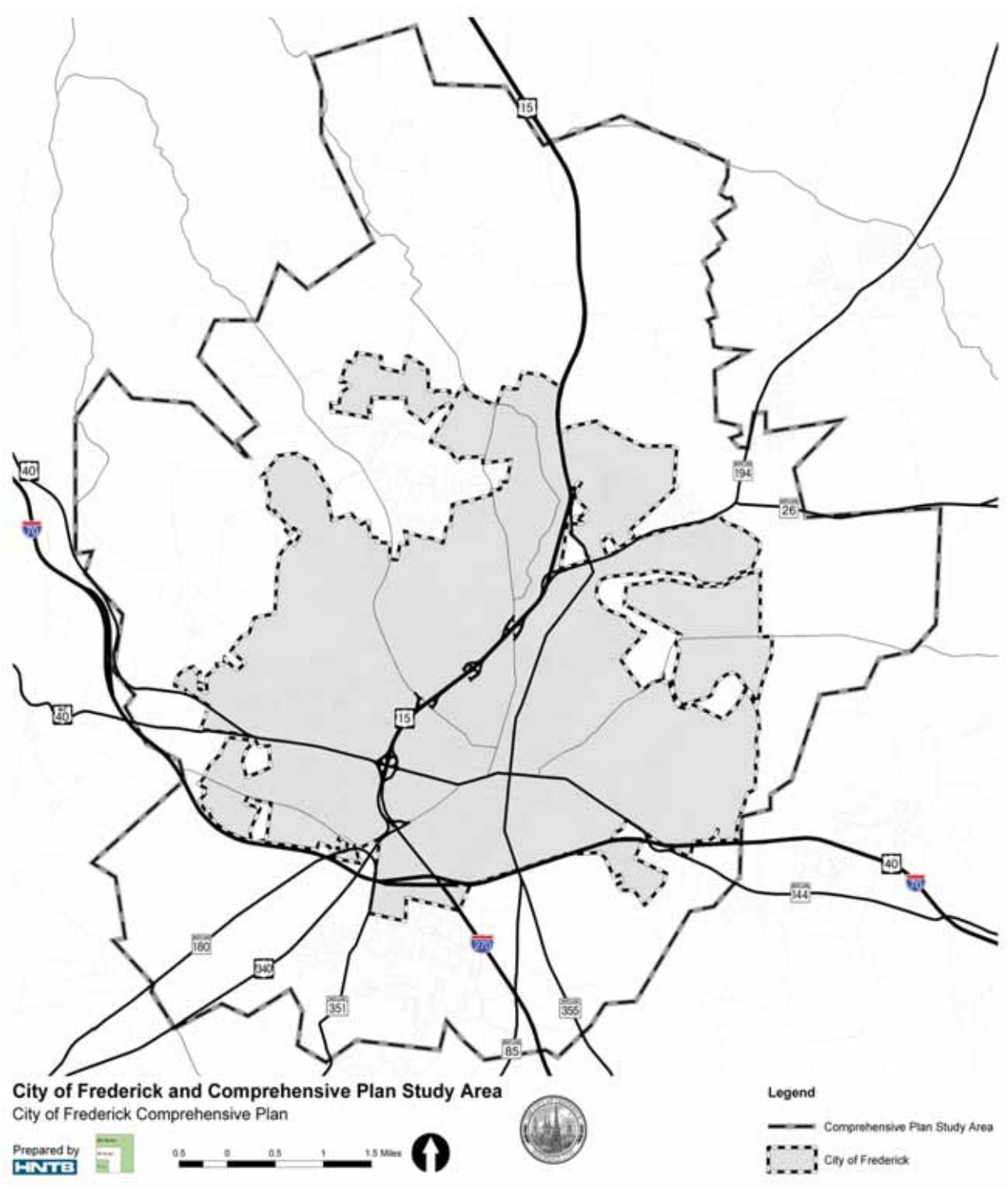
Figure 1. Comprehensive Plan Study Area



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Methodology

The following outlines MDP's capacity analysis model in general. This model was customized with local data and knowledge.

The model uses data from geographic information system (GIS) overlays. The GIS database includes information on land use, streams, watershed and county boundaries, zoning, sewer service, and protected lands (e.g., agricultural easements, parks, etc.). This database also includes Department of Assessments and Taxation parcel information in the form of point data.

All of this information is combined into a master parcel database. Once complete, this database includes the following data for every piece of land (i.e., parcel) in the study area.

- zoning
- acreage
- sewer service category
- existing land use
- 12-digit subwatershed
- topology
- number and date of improvement(s) (i.e., major structures)
- value of parcel and improvement(s)
- address and owner
- capacity for development

MDP analyzed residential and non-residential building capacities using several distinct techniques. The capacity of each parcel of developable land in each watershed is based on its size (number of acres), current land use/cover type, zoning, and sewer service category. This analysis results in information that includes growth capacity per parcel.

Residential Development Capacity. Land supply (i.e., capacity) is calculated using the parcel-specific information listed above. In this analysis, we used typical zoning yields obtained from the City of Frederick and County Planning Departments. This was done because development often does not build-out at its maximum allowable density. Attachment 2 includes the residential development yields by zoning district used in this capacity analysis for the City of Frederick.

In addition, residential development capacity for each parcel is not a straight division of the parcel's acreage by the permitted or yielded density of its zoning, plus any reductions due to existing development or environmental constraints that may be on the parcel. In attempt to be more realistic in estimating infill capacity, the model basically does the calculation mentioned above and then reduces that number by half. For example: if a ten-acre parcel is zoned for one dwelling unit per acre and it has one house on it, a simple capacity analysis would give a capacity for nine new houses. In this situation, the model would give a potential capacity of four new houses on this parcel. Some types of parcels are automatically given no development capacity. These include: wetlands, exempt properties (e.g., institutional and non-profit properties), cemeteries, parks, easements, and other protected lands. As with most of the model, this component was customized with input from local planners and others.

Non-Residential Development Capacity. Land supply (i.e., capacity) is calculated using the

parcel-specific information listed above. In this analysis, we used floor area ratio yields obtained from the City of Frederick and Frederick County Planning Departments, HNTB, as well as industry standard numbers for the amount of square feet per employee that corresponds to the allowed land uses in each zoning district. For instance, if you have a 40,000 square foot lot in the B-1 Zoning District, there is space for approximately 20 new jobs on the parcel. This result comes from multiplying the total land area of the parcel by the Floor Area Ratio (in this case, 0.25) to get the total buildable area of the parcel. The final step is to divide this number, in this case 10,000 square feet, by the number of square feet per employee (in this case, 500 square feet per employee). Attachment 3 includes the non-residential development yields by zoning district used in this capacity analysis for the City of Frederick.

There are several key differences between the non-residential capacity study and the residential capacity study. First, in-fill development opportunities on Commercial or Industrial Zoned lands were not calculated. We did, however, attempt to identify redevelopment opportunities by examining the ratio between a commercial or industrial improvement value and the parcel's corresponding land value (from parcel data). We calculated the average ratio for each specific land use and anything that was below the average ratio was considered to be available for redevelopment. This evaluation of redevelopment capacity increases the capacity number for jobs in Frederick City by approximately 3,800. These redevelopment figures should be used with caution given that MDP does not often produce non-residential development capacity figures and thus has not yet fully vetted the redevelopment methodology.

For Mixed Use Zoning Districts, the City of Frederick Planning Department provided MDP with a Land Use Mix table by zoning district that allowed us to estimate the possible number of new households and jobs by Zoning District. We assumed that these percentages remain constant within each Zoning District.

Issues Regarding the Development Capacity Analysis. Development capacity (land supply) can be defined in many different ways, depending on the intent of the particular study. MDP's capacity analysis is essentially an "intelligent build-out" study that does not measure development capacity in terms of infrastructure capacity, permitting, or APFO considerations. Alternative approaches can include a focus on infrastructure capacity and current development capacity (i.e., what could be developed now vs. what could eventually be developed). The MDP methodology also accounts for some infill and redevelopment potential. It is possible to limit the scope of a development capacity analysis to only "greenfield" developments, or it is possible to assume more infill and redevelopment potential than we have done in this analysis.

The MDP approach to calculating development capacity is a useful way to analyze development capacity at several scales: statewide, regional, county, watershed, sub-county, and zoning district. It implements a consistent methodology through Maryland's 23 counties. While our analysis is very useful at several scales, it should not be used at a parcel scale.

Key Data Layers

The capacity analysis process resulted in several enhanced GIS layers. These layers are listed below.

- Zoning – the City of Frederick provided digital zoning data that MDP incorporated into

the Frederick County's GIS data file. MDP also updated the Frederick County Zoning layer with data provided from the City through HNTB.

- Sewer Service Areas (sewer) – MDP maintained layer with input from the City of Frederick Planning Staff on updates and changes.
- Protected Lands (protlands) – MDP maintained layer with input from the City of Frederick Planning Staff on updates and changes.
- 2000 Generalized Land Use/Land Cover (landuse) – created and maintained by MDP.
- Priority Funding Areas (pfa) – created and maintained by MDP.

To review or gain access to these GIS layers and their associated metadata, please contact Stephanie Martins a MDP at (410)-767-4562. The maps that depict the location of the estimated capacity potential are available through the Frederick Planning Department and MDP.

Summary

The capacity analysis for the City of Frederick is important for a number of reasons:

- It provides a baseline understanding of how much vacant land is available in the City of Frederick, something previously not well understood or quantified.
- Through the capacity analysis process and the examination of the City's "pipeline" development, the City of Frederick determined that the amount of pipeline development would essentially consume all the City's available residential lands. This was important information to consider as part of the comprehensive plan update and influenced the development of the plan's recommendation for the City to annex additional lands.
- It identified the amount of available land by zoning category as a percentage of the total lands in that zoning category and thus the City was able to see how much of the capacity is in which zoning districts. This gave the City valuable information about where planning officials might need to adjust zoning and future land use and annexation.
- MDP, in cooperation with the City planning staff and HNTB, assessed ***non-residential development*** capacity in addition to residential capacity. This other half of the development equation is very important and not something MDP has routinely been undertaking for other Maryland jurisdictions. The MDP methodology for non-residential capacity analysis should continue to be refined with particular emphasis on the redevelopment portion of the method.
- This capacity analysis was integral to the Comprehensive Plan process and its development. HNTB used the vacant land analysis in the allocation of future growth by scenario. HNTB developed two alternative growth scenarios. The alternative scenarios illustrated two very different futures for the City of Frederick. The two land use scenarios were tested for impacts on transportation needs, fiscal feasibility and sewer and water costs. The testing was done at the both the citywide and subarea levels.
- The subarea testing involved the allocation of future jobs and households to TAZs (Traffic Analysis Zones) and FAZs (Fiscal Analysis Zones). HNTB used the capacity

analysis work done by MDP as one of the primary inputs in the land use allocation process for the City of Frederick. Vacant and redevelopable land estimates provided by MDP were aggregated at the subarea level and then used *as one of the factors* for computing each subarea's "development attractiveness" score. Other development attractiveness factors included proximity to growth attractors (for employment allocation only) such as the Downtown Core, Frederick Municipal Airport, major interchanges, and Ft. Detrick. Another growth attractor was agglomeration. In general, given the market conditions, development is attracted to areas that are already developed with similar types of uses. Therefore, an agglomeration ratio was also calculated for each of the TAZs. This was determined by each TAZ's share of the study area's jobs and households in 2000.

- The subareas with a relatively higher "development attractiveness" score received a higher allocation of future jobs/households and vice versa.
- The information learned through the development capacity analysis was critical to the development and evaluation of the scenarios for the future of Frederick. This scenario development process and its deep rooting in data and analysis were key to the widespread support of the planning process and the Comprehensive Plan's unanimous adoption.

Appendix D

Attachment 1. Study Area Residential and Non-Residential Capacity Analysis

Zoning[1]	Description[2]	Residential Developable Acres (excluding infill)	Assumed Res. Density (du/acre)	New DU Capacity[3]	New DU Capacity (Adjusted based on % Res.[4]	Total Acres[5]	Improved Parcels[6]	Acreage of Improved Parcels[7]	Acreage of Exempt Parcels[8]	Acreage of Preserved Parcels[9]	% Non-Res.[10]	Developable Acres (Non-Res.)[11]	Developable Sq. Ft. (Non-Res.)[12]	FAR[13]	Building Space in sq.ft[14]	Sq.Ft per employee[15]	New Jobs Capicity[16]
County Zoning within Study Area																	
GC	Commercial			0	0	521	131	437	15.37	2.31	1.00	67	2,907,325	0.20	581,465	500	1,163
HS	Commercial			0	0	6	4	5			1.00	1	31,799	0.20	6,360	500	13
VC	Commercial			0	0	30	15	27			0.60	3	133,424	0.50	66,712	300	222
R12	High Density Residential			0	0	43	580	43				0	1,699				
R16	High Density Residential			0	0	28	3	26	2.00			0	0				
GI	Industrial			0	0	632	22	526			1.00	107	4,644,106	0.25	1,161,026	500	2,322
LI	Industrial			0	0	422	106	363		29.90	1.00	30	1,301,050	0.25	325,263	800	407
MM	Industrial			0	0	145					1.00	145	6,319,249	0.25	1,579,812	500	3,160
ORI	Industrial			0	0	481	22	158	12.15	4.13	1.00	306	13,337,419	0.30	4,001,226	500	8,002
RC	Least Protective	512	0.2	229	229	2,648	61	309	4.07	1,139.00		1,196	52,085,999				
R1	Low Density Residential	502	0.75	1,040	1,040	3,889	1,711	2,354	61.65	1.36		1,472	64,129,947				
R3	Low Density Residential	143	2.25	430	430	936	1,218	672	10.14	1.01		252	10,997,942				
PUD	Medium Density Residential	139	3.5	514	514	580	2,516	336	19.81	1.50		223	9,693,407				
R5	Medium Density Residential	1	3.75	3	3	63	242	56				7	315,244				
R8	Medium Density Residential	0	6	1	1	106	1,364	94	0.95	1.78		10	430,286				
MXD	Mixed Use	0		0	0	204	45	83			0.75	91	3,958,461	0.25	989,615	300	3,299
A	Most Protective	2,530	0.05	768	768	11,559	272	1,009	6.81	581.41		9,962	433,928,080				
City Zoning																	
B-1	Neighborhood Commercial	0		0	0	30	24	27	2.22		1.00	0	6,186	0.25	1,546	500	3
B-3	General Commercial	0		0	0	720	423	563	24.74	0.43	1.00	132	5,757,151	0.25	1,439,288	500	2,879
B-O	General Commercial	0		0	0	80	152	57			1.00	23	1,017,605	0.25	254,401	300	848
DB	Downtown Business/Mixed Use	20.4	31.5	1,550	620	175	604	103	16	5.71	0.60	31	1,334,269	1.10	1,467,696	300	4,892
DB-O	Downtown Business/Mixed Use	0.1	31.5	18	7	15	92	14	0	0.48	0.60	0	6,011	1.00	6,011	300	20
DR	Downtown Residential	11.8	31.5	563	563	186	1,505	168	4	3.00							
DR-B	Downtown Residential	0.2	31.5	18	11	7	82	6	0		0.40	0	6,534	0.70	4,574	250	18
M-1	Light Industrial	0		0	0	2,787	240	1,401	517	16.45	1.00	852	37,112,075	0.30	11,133,622	800	13,917
M-2	Heavy Industrial	0		0	0	347	29	295	27		1.00	25	1,082,989	0.30	324,897	500	650
M-O	Planned Industrial District	0		0	0	281	40	171	18	36.33	1.00	56	2,445,850	0.20	489,170	500	978
R-1	Low Density Res.	378.5	2.91	780	780	853	410	265	67	142.83							
R-2	Medium Density Res	982.0	4.36	2,895	2,895	1,446	1,498	459	4	1.19							
R-3	Medium Density Res	196.3	7.26	1,171	1,171	1,763	6,719	1,495	32	39.83							
R-4	High Density Res.	90.0	10	437	437	521	4,088	396	18	16.54							
R-5	High Density Res.	14.2	13.75	388	388	134	426	119									
R-6	High Density Res.	27.7	17	395	395	107	363	54	26								
R-O	Residential Office	0.4	4.36	3	1	8	13	7		0.06	0.75	1	55,049	0.20	11,010	300	37
City OnlyTotal		**1,721**		**8,218**	**7,268**	**9,461**	**16,708**	**5,600**	**755**	**263**		**1,121**	**48,823,719**		**15,132,215**		**24,242**
Study Area Total (includes City)		5,549		11,203	10,253	31,755	25,020	12,098	888	2,025		14,992	653,039,153		23,843,694		42,830

[1]City of FrederickZoning Code based on Data received from City 2/03
[2]Description of City Zoning Code based on Info. Received from City 2/03
[3]First Cut New Household Capacity based on MDP's Growth Model 5/03
[4]Adjusted New Household Capacity based on land use mix data from HNTB 4/03
[5]Total Acreage based on Maryland Property View Parcel Point data for Frederick City 5/03
[6]Total Improved Parcels based on calculations in "Res and Nonres Improvements" sheet 5/03
[7]Total Improved Acreage based on calculations in "Res and Nonres Improvements" sheet 5/03
[8]Total Exempt Acreage based on calculations in "Unbuildable" sheet 5/03
[9]Total Preserved Acreage based on calculations in "Unbuildable" sheet 5/03
[10]From "lumix, FAR, Employee data" sheet 4/03
[11]From Calculated from subtracting Improved Acres, Protected Acres, and Exempt Acres from Total Acres 5/03
[12]Conversion of [11] into Square Feet 5/03
[13]Floor Area Ratio based on "lumix, FAR, Employee data" sheet 4/03
[14]Developable ft^2 * FAR to get potential building space 5/03
[15]Ft^2/Employee based on "lumix, FAR, Employee data" sheet 4/03
[16]Building Space / ft^2 per employee 5/03

Attachment 2

City of Frederick Zoning Yield Table - Residential				
Zoning District	**Description**	**Allowable Density and Notes**	**Permitted Density du/acre**	**Realized Density**
R-1	Low Density	15,000 sq ft SF lots	2.9	2.91
R-2	Low Density	10,000 sq ft SF lots	4.4	4.36
R-3	Medium Density	6,000 sq ft SF lots	7.3	7.26
R-4	Medium Density	6,000 sq ft SF lots	7.3	10
		3,500 sq ft TH unit regulator	12.4	
		3,630 sq ft MF unit regulator	12.0	
R-5	High Density	5,000 sq ft SF lots	8.7	13.75
		3,000 sq ft TH unit regulator		
		2,420 sq ft MF unit regulator	18.0	
R-6	High Density	5,000 sq ft SF lots	8.7	17
		3,000 sq ft TH unit regulator		
		1,815 sq ft MF unit regulator	24.0	
R-7	High Density	5,000 sq ft SF lots	8.7	19
		3,000 sq ft TH unit regulator	14.5	
		1,452 sq ft MF unit regulator	2.9	
DB	Downtown Business	2,000 sq ft SF lots	21.8	31.5
		1,500 sq ft TH unit regulator	29.0	
		1,000 sq ft MF unit regulator	43.6	
DR	Downtown Residential	2,000 sq ft SF lots	21.8	31.5
		1,500 sq ft TH unit regulator	29.0	
		1,000 sq ft MF unit regulator	43.6	
Most of the newer developments realize their maximum unit potential by using flexible zoning techniques such as clustering or planned unit developments.				
Smaller developments typically realize 70% of their unit potential.				

Appendix D

Attachment 3

City of Frederick Zoning Yield Table, Non-Residential									
Zoning District	**Description**	**Permitted uses**	**Mix**				**Average FAR[1]**	**Allowable Density and Notes**	**Employees/Sq Ft[2]**
			Office	**Commercial**	**Residential**	**Industrial**			
B-O	Office Commercial	office, with limited residential and retail uses; buffer between industrial/commercial districts and residential zones	85%	10%	5%	0%	0.25		300
B-1	Neighborhood Commercial	neighborhood retail	20%	80%	0%	0%	0.25		500
B-3	General Commercial	major retail and service	20%	80%	0%	0%	0.25		500
M-1	Limited Employment	office and light industrial	50%	0%	0%	50%	0.30		800
M-2	General Employment	heavy industry too heavy for M-1	50%	0%	0%	50%	0.30		500
M-O	Planned Industrial District	industrial parks on large tracts	75%	0%	0%	25%	0.20		500
DR-B	Downtown Business	mix of residential and business	40%	0%	60%	0%	0.70		250
DB	Downtown Commercial	primarily offices with limited supporting retail; high density res also permitted	30%	30%	40%	0%	1.10		300
DB-O	Downtown Office Commercial	primarily offices with limited supporting retail; high density res also permitted	30%	30%	40%	0%	1.00		300
R-O	Residential Office	converted residences along arterials, compatible with existing residential	75%	0%	25%	0%	0.20	10,000 sq ft lots	300

[1] Calculated from actual projects
[2] Based on industry standards

Appendix D

City of Frederick Zoning Yield Table, Non-Residential									
Zoning District	**Description**	**Permitted uses**	**Mix**				**Average FAR[1]**	**Allowable Density and Notes**	**Employees/Sq Ft[2]**
			Office	**Commercial**	**Residential**	**Industrial**			
B-O	Office Commercial	office, with limited residential and retail uses; buffer between industrial/commercial districts and residential zones	85%	10%	5%	0%	0.25		300
B-1	Neighborhood Commercial	neighborhood retail	20%	80%	0%	0%	0.25		500
B-3	General Commercial	major retail and service	20%	80%	0%	0%	0.25		500
M-1	Limited Employment	office and light industrial	50%	0%	0%	50%	0.30		800
M-2	General Employment	heavy industry too heavy for M-1	50%	0%	0%	50%	0.30		500
M-O	Planned Industrial District	industrial parks on large tracts	75%	0%	0%	25%	0.20		500
DR-B	Downtown Business	mix of residential and business	40%	0%	60%	0%	0.70		250
DB	Downtown Commercial	primarily offices with limited supporting retail; high density res also permitted	30%	30%	40%	0%	1.10		300
DB-O	Downtown Office Commercial	primarily offices with limited supporting retail; high density res also permitted	30%	30%	40%	0%	1.00		300
R-O	Residential Office	converted residences along arterials, compatible with existing residential	75%	0%	25%	0%	0.20	10,000 sq ft lots	300

[1] Calculated from actual projects
[2] Based on industry standards

Appendix D

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX D-5
Transportation Assessment
(Understanding Frederick's Transportation System)

2003

Appendix D

UNDERSTANDING FREDERICK'S TRANSPORTATION SYSTEM

1.0 Introduction

This report provides an assessment of Frederick's existing transportation system and highlights key issues and deficiencies. The report also discusses regional and local planned transportation improvements that would affect City of Frederick. This is one of several reports that will provide background analysis for the Comprehensive Plan Update.

Within the larger Baltimore-Washington metropolitan region, Frederick is strategically located at the confluence of two major interstates, I-270 and I-70. In addition, the City is served by other major US and State highways including US 15, US 40, US 340, MD 355 and MD 26. The municipal airport and MARC train connection also contribute to the strong regional accessibility of Frederick.

The City of Frederick was laid out on a basic grid network of streets. Over the years the street network has evolved into a combination of the traditional grid and other neighborhood street patterns such as cul-de-sacs and curvilinear streets. Currently, the city includes over 70 miles of public streets and roads, owned and maintained by various separate jurisdictions including the city, county and state. State highways account for 22 miles, county roads 6 miles, and city streets approximately 50 miles.

The Census 2000 "journey to work" data for Frederick County show the predominance of single occupied vehicles. In 2000, about 79 percent (compared to 73 percent in 1990) of the workers drove alone to work and less than two percent used public transportation. Between 1990 and 2000, the mean travel time to work increased from 28 minutes to 32 minutes[14]. The Census Bureau has not yet released commuting data at the city level. When data for the City of Frederick is published, later in 2003, it will be assessed as part of the Comprehensive Plan update.

Transportation issues have been high in the list of priorities for the stakeholders of the City of Frederick. The community-based *Aspire Frederick* process identified transportation as one of the most important issues facing the city. In the City of Frederick Comprehensive Plan Assessment and Investigation Report (PAIR) key issues facing the city were identified in conjunction with the inputs given by the Mayor, the Board of Aldermen, Planning Commission, and the plan update Steering Committee (comprising business, city, and county government, and residential representatives). Transportation was among the most cited issues by these stakeholders. Specific issues included inadequate funding for transport, lack of multi-modal infrastructure, planning for bicycles and pedestrians among others.

[14] In 2000, the mean travel time to work for Maryland was 31 minutes.

2.0 Road System Existing Capacity

The Master Highway Plan component of the City of Frederick Comprehensive Plan 1995 defines the functional classifications of existing and planned roads to serve the 20 year land use recommendations (See Map 1). These functional classifications are:

- Freeway/Expressway
- Major Arterial (100 ft right of way in rural areas, 80 ft in urban areas)
- Minor Arterial (80 ft right of way in rural areas, 70 ft in urban areas)
- Collector Streets (60 ft right of way)
- Local Streets (50 ft right of way)

As the Master Highway Plan map shows, the City of Frederick is connected by all of the interstate and primary highways in the county, including I-270, I-70, US 340, and US 15. These multi-lane divided freeways enhance regional accessibility but also create a traffic burden due to the amount of through traffic concentrated in the City. Data collected by the Traffic Monitoring System (TMS) team of the State Highway Administration (SHA) show an increase in the Annual Average Daily Traffic (AADT) from 1992 to 2002 at various locations on Frederick's roadways. Table 1 depicts the AADT for key roadway segments and Map 2 displays the same information.

Table 1. City of Frederick Traffic Counts, AADT

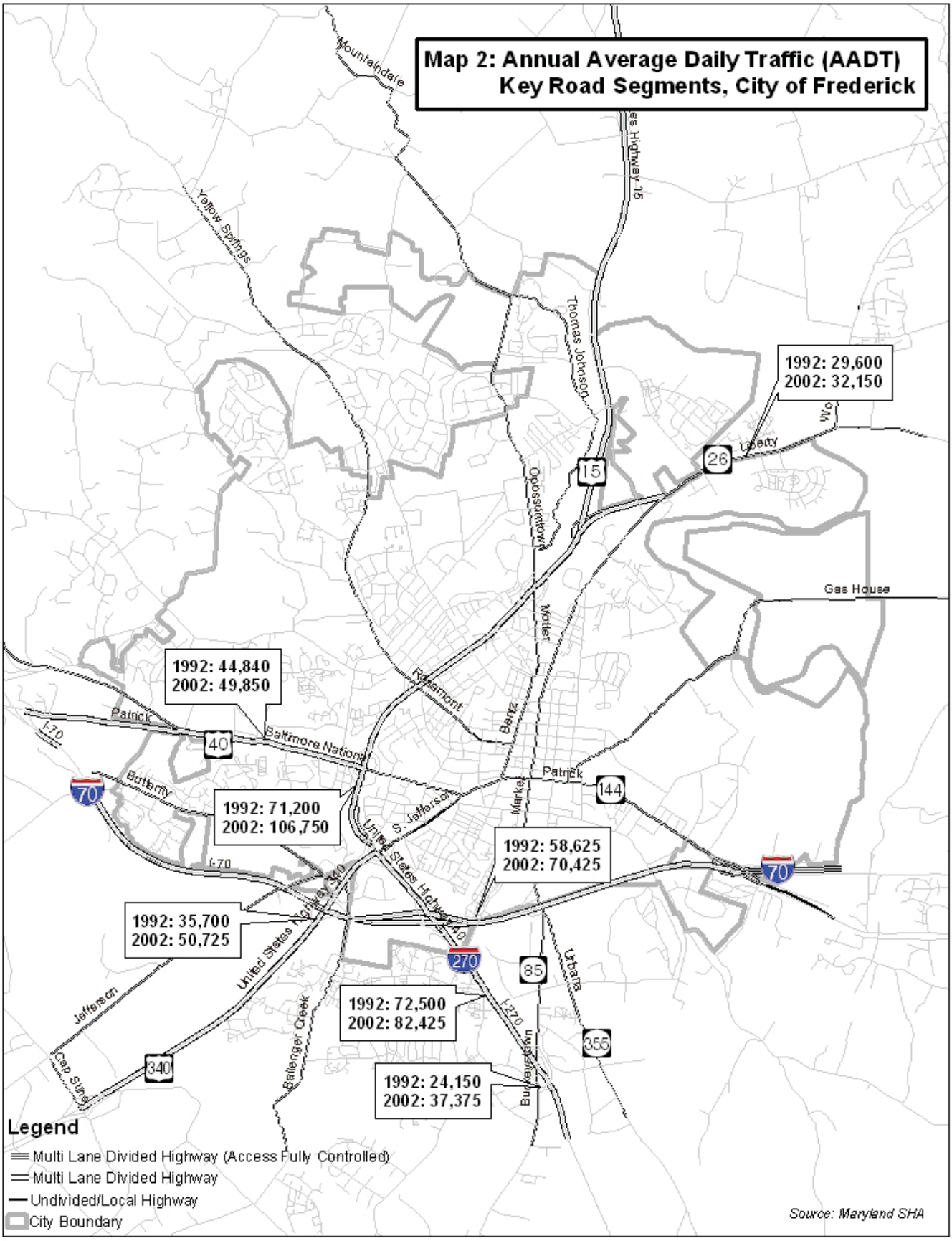
Roadway Segment	1992	2002
I-270 between 70 & MD 85	72,500	82,425
US 15 between US 40 & 340	71,200	106,750
I-70 between I-270 & MD 85	59,625	70,425
US 40 (Golden Mile)	44,800	49,850
MD 85 below I-270	24,150	37,375
MD 85 below I-70	N/A	27,285
US 340/I-70	35,700	50,725
MD 26 W/Monocacy	29,600	32,150

Source: Maryland SHA

A Citywide Traffic Study was done for the City of Frederick to evaluate existing (2001) roadways and intersection capacities. The study evaluated more than 70 miles of roadway and 150 intersections using the Synchro/SimTraffic computer model. The I-70, US 15, and I-270 corridors were not included in this study. The study reported measures of effectiveness including delays, travel times, average speeds and *Levels of Service* (See Box 1 for more on the concept of *Levels of Service*).

Map 1. 1995 Comprehensive Plan Road Classification

Appendix D


Map 2: Annual Average Daily Traffic (AADT)
Key Road Segments, City of Frederick
1992: 29,600
2002: 32,150
1992: 44,840
2002: 49,850
1992: 71,200
2002: 106,750
1992: 58,625
2002: 70,425
1992: 35,700
2002: 50,725
1992: 72,500
2002: 82,425
1992: 24,150
2002: 37,375
Mountaindale
Yellow Springs
Thomas Johnson
Opossumtown
Motter
Rosemont
Bentz
Market
Patrick
Baltimore National
Butterfly
S. Jefferson
United States Highway 340
Jefferson
Cap Shop
Ballenger Creek
Buckeystown
Urbana
Liberty
Gas House
I-70
I-270
15
26
40
144
70
270
85
355
340
Legend
Multi Lane Divided Highway (Access Fully Controlled)
Multi Lane Divided Highway
Undivided/Local Highway
City Boundary
Source: Maryland SHA

The study found that the majority of city intersections operate at an acceptable LOS "C" during the AM and PM peak periods. However, there are 17 intersections that operate at LOS "D" or worse during the AM and/or PM peak periods. Table 2 shows the LOS and Average Vehicle Delay for these intersections. According to the SHA, LOS "D" is the minimum acceptable operating condition for intersections in urban environments. LOS "E" and LOS "F" represent the worst operating conditions. The study shows that in the City of Frederick eight intersections are operating at LOS "E" or LOS "F". These intersections are shown on Map 3.

The study recommends short-term improvements such as adjusting signal timings and lane configurations to improve the existing level of service of congested intersections. Table 3 shows the recommended improvements and Table 4 shows the improved LOS for congested intersections with improvements. With the improvements, the number of intersections operating at LOS E or F drops to only three (from eight) as shown on Map 3. In addition, delay time[15] is significantly reduced at a number of intersections.

Box 1. Levels of Service

The Level of Service (LOS) is a rating system for roadways that measures operational conditions in traffic and perceptions of the motorists involved. The individual LOS is characterized by factors such as speed and travel time, freedom to maneuver, traffic interruptions and convenience.

Six LOS categories are commonly defined. Each is given a letter designation from A to F, with LOS "A" representing the best operating conditions and LOS "F" depicting the worst, as defined below:

"A" is the best operating condition with a free flow in which there is no restriction on speed or maneuverability. At intersections, there is little or no delay.

"B" represents condition of stable traffic flow, but operating speed is beginning to be restricted. Short traffic delays occur at intersections.

"C" is still a condition of stable flow, but most drivers are becoming restricted in their freedom to select speed, change lanes or pass other vehicles. Intersections experience average traffic delays.

"D" approaches unstable flow. Operating speeds are tolerable to the driver, but are subject to considerable and sudden variation. Freedom to maneuver is limited and driving comfort is low, as the probability of accidents has increased. Long traffic delays are experienced at intersections.

"E" represents a maximum roadway capacity for vehicles. Operation in this zone is unstable, speeds and flow rates fluctuate, and there is little independence of speed selection or maneuver. Driving comfort is low and accident potential high. The distance between vehicles is short and operating speeds are subject to rapid fluctuation. Very long traffic delays are experienced at intersections.

"F" is the worst operating condition. Speed and traffic flow may, for short time periods, drop to zero. Extreme delays are experienced at intersections. This may cause severe congestion affecting other adjacent roadways.

[15] Time motorists sit waiting at intersections

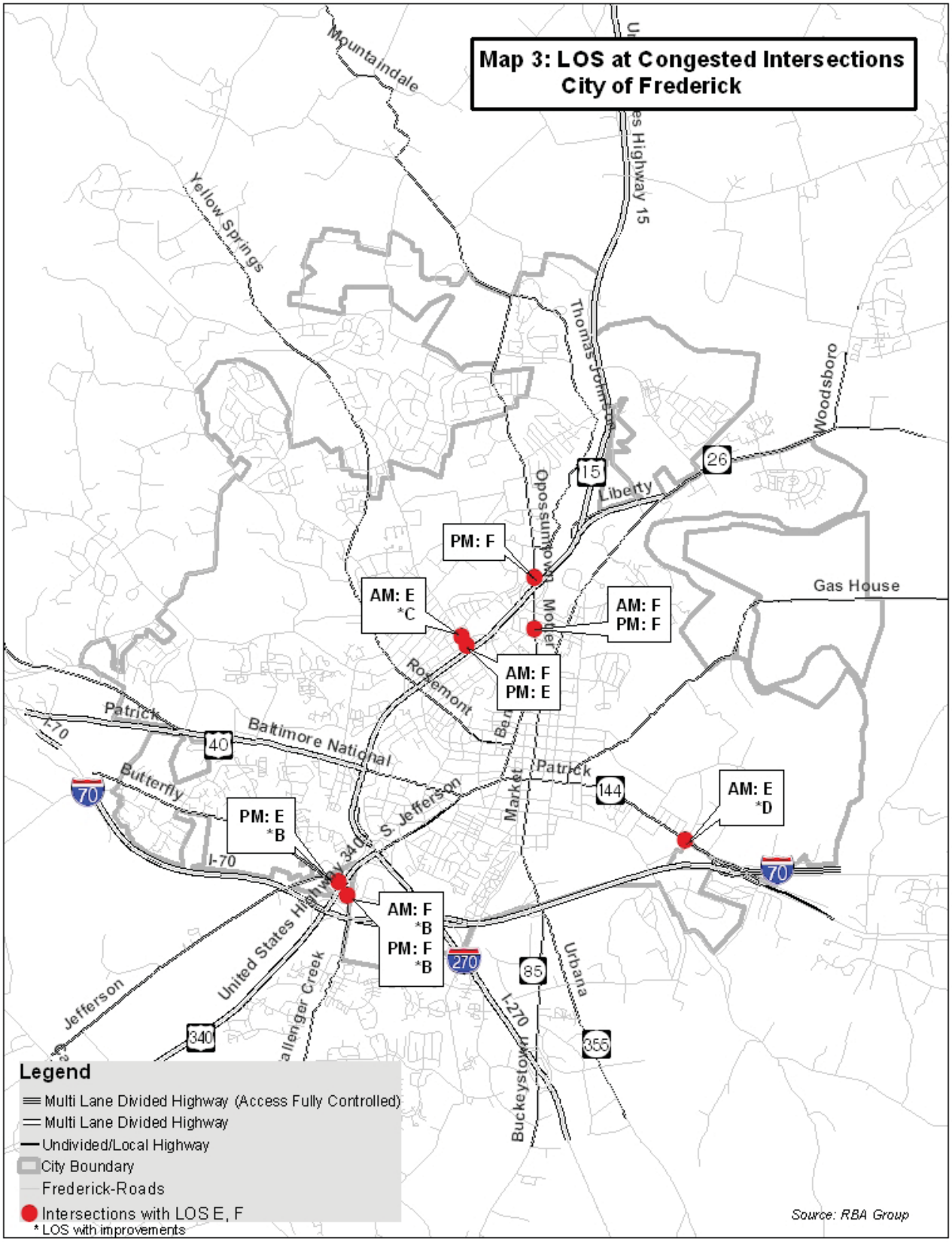

Map 3: LOS at Congested Intersections
City of Frederick
Mountaindale
Yellow Springs
Thomas Johnson
Woodsboro
Liberty
Opossumtown
Gas House
Rosemont
Baltimore National
Patrick
Butterfly
S. Jefferson
Market
Urbana
United States Highway 340
Jefferson
Buckeystown
I-70
I-270
PM: F
AM: E
*C
AM: F
PM: F
AM: F
PM: E
PM: E
*B
AM: E
*D
AM: F
*B
PM: F
*B
Legend
Multi Lane Divided Highway (Access Fully Controlled)
Multi Lane Divided Highway
Undivided/Local Highway
City Boundary
Frederick-Roads
Intersections with LOS E, F
* LOS with improvements
Source: RBA Group

Table 2. LOS and Delay at Congested Intersections

Intersection	Level of Service		Average Vehicle Delay* (in seconds)	
	AM	**PM**	**AM**	**PM**
7TH ST @ SB US 15 RAMPS	**F**	**E**	---	---
7TH ST @ SCHLEY AVE	**E**	D	58.1	46.1
EAST ST @ 7TH ST	D	D	---	---
US 40 @ BAUGHMANS LANE	D	C	41.0	35.0
MD 144 @ WEST COLLEGE TERRACE	D	**E**	35.1	75.8
MD 144 @ MONOCACY BLVD	**E**	C	67.9	32.1
MD 144 @ NORVA AVE/ KLINE BLVD	C	D	27.6	51.1
MD 180 @ HIMES AVE	C	**E**	24.8	66.2
MD 351 @ SOLAREX CT	**F**	**F**	101.2	101.6
MD 355 @ 16TH ST	D	A	---	---
MOTTER AVE @ 9TH ST	D	C	---	---
MOTTER AVE @ FAIRVIEW AVE	**F**	**F**	---	---
OPOSSUMTOWN PIKE @ SB US 15 RAMPS	D	**F**	---	---
OPOSSUMTOWN PIKE @ THOMAS JOHNSON DR	C	D	30.5	45.5
SOUTH ST @ CARROLL ST	B	D	17.0	44.2
ROSEMONT AVE @ MONTEVUE LANE	D	D	41.6	42.1
THOMAS JOHNSON DR @ HAYWARD RD	C	D	---	---

Source: The RBA GROUP

* Delay not calculated for unsignalized intersections

Table 3. Recommended Improvements for Congested Intersections

Intersection	Improvement and Resulting Level of Service
7th Street at Schley Avenue	Adjust signal timing splits between phases **AM peak LOS improves from "E" to "C"**
MD 144 at West College Terrace	Adjust signal timing splits between phases **AM peak LOS improves from "D" to "C"** **PM peak LOS improves from "E" to "D"**
MD 144 at Monocacy Boulevard	Adjust signal timing splits between phases **AM peak LOS improves from "E" to "D"**
South Street at Carroll Street	Change lane configuration on eastbound South Street from one shared travel lane to one exclusive left-turn lane and one shared through/ right-turn lane Change lane configuration on northbound Carroll Street from one shared travel lane to one exclusive left-turn lane and one shared through/ right-turn lane Adjust signal timing splits between phases **PM peak LOS improves from "D" to "C"**
Rosemont Avenue at Montevue Lane	Change phasing for left turns on northbound Rosemont Avenue from protected to protected/ permissive **AM peak LOS improves from "D" to "C"** **PM peak LOS improves from "D" to "C"**
MD 351 at *Solarex Court	*Alternative 1:* Addition of a left-turn lane NB at Solarex Court Two thru lanes NB from I-70 on-ramp extending underneath I-70 overpass Two thru lanes SB through intersection at Solarex and merging into one lane just north of I-70 overpass Restriping WB Solarex Court to one shared thru/ left-turn lane and one shared thru/ right-turn lane *Alternative 2:* Double left-turn lane and one shared thru/ right-turn lane NB at Solarex Court Two thru lanes SB through intersection at Solarex extending south past I-70 overpass Restriping WB Solarex Court to one shared thru/ left-turn lane and one shared thru/ right-turn lane **AM peak LOS improves from "F" to "B"** **PM peak LOS improves from "F" to "B"**

MD 180 at Himes Avenue/US 15 Off-Ramp [3]	Additional left-turn lane on US 15 off-ramp Addition of shared thru/right-turn lane on WB MD 180 extending to intersection of MD 180 and Butterfly Lane One left-turn lane and one shared left-turn/ right-turn lane on Himes Avenue **PM peak LOS improves from "E" to "B"**

*MD 351 at Solarex Court and MD 180 at Himes Avenue, were addressed in a traffic impact study for the Hargett Property conducted by The RBA Group on June 27, 2002.

Table 4. LOS and Delay at Congested Intersections with Improvements

Intersection	Level of Service		Average Vehicle Delay* (in seconds)	
	AM	PM	AM	PM
7TH ST @ SB US 15 RAMPS	**F**	**E**	---	---
7TH ST @ SCHLEY AVE	C	D	29.7	36.7
EAST ST @ 7TH ST	D	D	---	---
US 40 @ BAUGHMANS LANE	D	C	41.0	35.0
MD 144 @ WEST COLLEGE TERRACE	C	D	34.0	41.0
MD 144 @ MONOCACY BLVD	D	C	52.6	32.1
MD 144 @ NORVA AVE/ KLINE BLVD	C	D	27.6	51.1
MD 180 @ HIMES AVE	C	B	30.1	18.2
MD 351 @ SOLAREX CT	B	B	13.8	16.2
MD 355 @ 16TH ST	D	A	---	---
MOTTER AVE @ 9TH ST	D	C	---	---
MOTTER AVE @ FAIRVIEW AVE	**F**	**F**	---	---
OPOSSUMTOWN PIKE @ SB US 15 RAMPS	D	**F**	---	---
OPOSSUMTOWN PIKE @ THOMAS JOHNSON DR	C	D	30.5	45.5
SOUTH ST @ CARROLL ST	B	C	16.1	31.2
ROSEMONT AVE @ MONTEVUE LANE	C	C	31.2	27.9
THOMAS JOHNSON DR @ HAYWARD RD	C	D	---	---

Source: The RBA Group
* Delay not calculated for unsignalized intersections

2.2 Planned Roadway Improvements

The SHA, Frederick County, and the City of Frederick have planned long-term measures such as roadway improvements to accommodate current and future demands. These are listed below.

SHA Funded Improvements

1. Providing the missing movements in the US 15 and US 340 interchange
2. Providing the missing movements in the I-70 and I-270 interchange, including widening of I-70 ramps to and from US 15
3. Widening of I-70, extension of Walser Drive from South Street to MD 355, and construction of Walser Drive/ I-70 interchange
4. Reconstruction of the MD 355 and I-70 interchange ramps
5. Reconstruction of the MD 355 bridge over I-70, including widening of MD 355 from Walser Drive to I-70
6. Widening of I-70 from Mt. Phillip Road to west of US 40.
7. Mt. Philip Road and I-70 interchange
8. East Street - Extension from South Street to Walser Drive*
9. Westbound MD26 - Northbound ramp into US 15*

The County and City Funded Improvements

1. Monocacy Blvd – Extension to complete Gas House Pike and Hughes Ford Road
2. Christophers Crossing – Extension and grade separation over US 15

City of Frederick Planned Improvements

The City of Frederick Comprehensive Plan 1995 recommended highway and streets improvement priorities. Table 5 shows these improvement priorities and their status of completion to date.

** Some City/County funding contribution for design*

Table 5. City of Frederick Comprehensive Plan 1995, Highway and Streets Improvement Priorities and Current Status

Short Term 1994 to 2000	**Current Status of Completion**
• East Street Extension –I-70 to East Patrick Street	Not in SHA 6-yr CTP
• I-70 interchange and other improvements	I-270 all movements complete. Rte 355/85 temporary interchange complete. Relocation of 355/85 intersection & connection to EB I-70 due to be completed 4/04. No other projects in SHA CTP.
• Shookstwon Road/Montevue Lane Upgrade-Rosemont to Willowdale	Complete
Intermediate 2000-2005	
• Airport Drive East-Extension from current ending point just north of DPW to loop around and connect to Bowman Farm Road	Begin approximately in 4 years (2007), minimum of two year construction schedule. Developer and Airport development (FAA funded) time frame
• Shookstown Road Upgrade-Willowdale to Old Camp Road Extended	Developer driven
• Monocacy Boulevard-South Street to Hughes Ford Road	Patrick to South – not in City CIP. Patrick to Hughes complete.
• East 7th Street Extension-Gas House Pike to East Street	Developer driven
• Pine Avenue-Patrick Street to East 7th Street Extended	Not in City CIP
• Highland Street Extension-Monroe Avenue to Monocacy Blvd.	Not in City CIP
• South Street Upgrade-Franklin Street to Reichs Ford Road	South of I-70 complete. North of I-70 not in City CIP
• East Street-Patrick Street to North Market Street Upgrade	Ph. I to 4th St complete 2003. Ph. II to Market not in City CIP or State CTP
• MD 26 Westbound to US 15 Northbound-Ramp	Begin Construction 2006, End 2008
• Western Arterial-Old Camp Road to US 15	Begin after 2005 with a minimum of two year construction schedule. Developer driven time frame
Long Term 2005 and Beyond	
• Mt. Philip Road-Align opposite Old Camp Road near US40A	Developer driven
• Butterfly Lane-upgrade to closed section, storm water management, sidewalks and street trees	Developer driven
• Gas House Pike-upgrade (Monocacy to City/County Line)	Construction to begin late summer 2003

Other Plans

The highway plan of the Frederick Region Plan 2002 includes the following recommendations on road and intersection improvements in the City of Frederick:

- A full interchange at I-70/US 40A. This interchange would provide access to the western side of the City of Frederick via Mt. Phillip Road, Old Camp Road, and Christophers Crossing and would serve as an alternative to US-15 in accessing I-270 and I-70.
- Coordinate new arterial connection with the City of Frederick.
- Maintain the rural character of US 15 through the protection of scenic views.

Some of the regional transportation studies also affect highway improvements in the City of Frederick. For example, the ongoing SHA-sponsored *I-270/US 15 Multi-Modal Corridor Study* addresses several roadway improvement needs for the portion of US 15 through the City and up to Biggs Ford Road (See Box 2).

The *US 15/MD 26 Interchange Improvement Study*, a breakout project from the *I-270/US 15 Multi-Modal Corridor Study* is looking at alternatives for enhancing access to and from the local network, and improving safety at the US-15/ Hayward Road-Worman's Mill Road at-grade intersection. The study has proposed a no-build alternative and five build alternatives that include the provision of additional ramps, and reconfiguration of the interchange.

Box 2. I-270/US 15 Multi-Modal Corridor Study Highway Alternatives Affecting the City of Frederick

- Addition of one general-purpose lane to the inside and one auxiliary lane connecting interchange ramps to the outside from US 15/US 340/Jefferson Street to MD 26.
- Addition of one northbound and southbound general-purpose lane through inside widening from I-70 to US 15/US 240/Jefferson Street.
- New interchanges at US15/Trading Lane and US 15/Biggs Ford Road

Preferred Interchange Alternative: The build alternative with northbound ramp was selected by the SHA, the Mayor and Board of Aldermen of the City of Frederick, and the Board of County Commissioners as the preferred interchange alternative

3.0 Parking

The parking supply in downtown Frederick is presently dominated by numerous small private/restricted parking lots and the on-street parking system (metered and non-metered). In addition, the city owns three parking garages with a total capacity of 1,369 spaces. A recent comprehensive parking assessment study for the downtown found a total of 8,818 parking spaces with peak occupancy of about 59 percent. The study concluded that while the downtown has an overall surplus of parking spaces, the surplus is either limited to specific parking lots and properties or, in the case of public supply, located on the periphery of the downtown. With the exception of Carroll Creek Garage, all public off-street lots and garages have reached or exceeded their operational capacity.

Based on the parking needs assessment, and the evaluation of alternative parking sites, the study recommended that the City focus on two particular sites to address immediate and mid-term parking needs: the Delphey's/Courthouse site and the Patrick Street/East Street site. In addition, based on the study's recommendation to minimize the demand for parking, a satellite lot and shuttle service connecting the Harry Grove Stadium lot with the downtown core is being implemented.

4.0 Public Transportation

The census-based commuting pattern data (as discussed in the Introduction) show that the vast majority of commuters in Frederick County use single occupancy automobiles. The Comprehensive Plan for the City of Frederick 1995 in a way acknowledges the pre-imminence of automobiles and does not include strong and detailed recommendations for public transportation. The stakeholders of the city, however, identify the need for multi-modal alternatives as one of the transportation priorities for the Comprehensive Plan update. The following section discusses the existing transit service available in the City of Frederick.

4.1 Regional Rail

In December 2001, Maryland Rail Commuter Service (MARC) began service on a 13.5-mile extension of its Brunswick Line to the City of Frederick. The $56 million project, began in 1996, encompassed the rebuilding of CSX's 3-mile Frederick Industrial Track, a connection at Point of Rocks, and two new stations: one in downtown Frederick and the other at Monocacy (across from Francis Scott Key Mall).

Service from the City of Frederick includes trains into Union Station in Washington each morning and return service in the evening. All Frederick trains stop at the key job centers along the I-270 corridor in Montgomery County (Germantown, Gaithersburg, Silver Spring and Rockville). This service also provides connections to *Metrorail* and other transit providers.

4.2 Regional and Local Bus

In 1993 the City of Frederick and Frederick County consolidated their bus operations into a single subsystem operated by the County. This consolidated system is called *TransIT Services of Frederick County* and includes fixed and flexible routes in the City of Frederick, countywide paratransit for senior citizens and persons with disabilities, and commuter shuttle service between Frederick and neighboring towns.

"Connector" Routes operate in the City of Frederick and urbanized areas of Frederick County serving medical, employment, education, and shopping centers. Six routes operate Monday through Friday 5:30 a.m. - 9:30 p.m. (until 9:45 p.m. on Friday). Four routes operate on Saturday 7:30 a.m. - 9:45 p.m. The Midtown Connector operates Monday through Friday 7:15 a.m. - 6:45 p.m.

Four of the "Connector" Routes provide deviated-fixed route service. These routes operate on a regular schedule and can also deviate within a 3/4 mile corridor of the route for passengers who are unable to board the bus at a regular bus stop because of a disability.

Five commuter shuttle routes operate each weekday between the City of Frederick and the Route 85 business corridor, Walkersville/Woodsboro, Emmitsburg/Thurmont,

Brunswick/Jefferson, and the Point of Rocks train station (Meet-the-MARC shuttle). Three additional Meet-the-MARC shuttles have been added to serve the downtown Frederick MARC Station. These shuttles link the Frederick MARC station with Walkersville Village Shopping Center, Frederick Towne Mall, and Frederick Shopping Center. Map 4 shows these transit routes.

During Fiscal Year 2002, TransIT reported a total system ridership of 313,238 one-way passenger trips countywide. The ridership of Meet-the-MARC shuttle increased by 37 percent between 2001 and 2002**.** TransIT's five-year plan to improve the public transportation system in Frederick County includes increasing service frequency to 30 minutes during peak travel times, adding bus routes to serve new areas of development, and expanding commuter shuttle service in the regional communities of Frederick County**.**

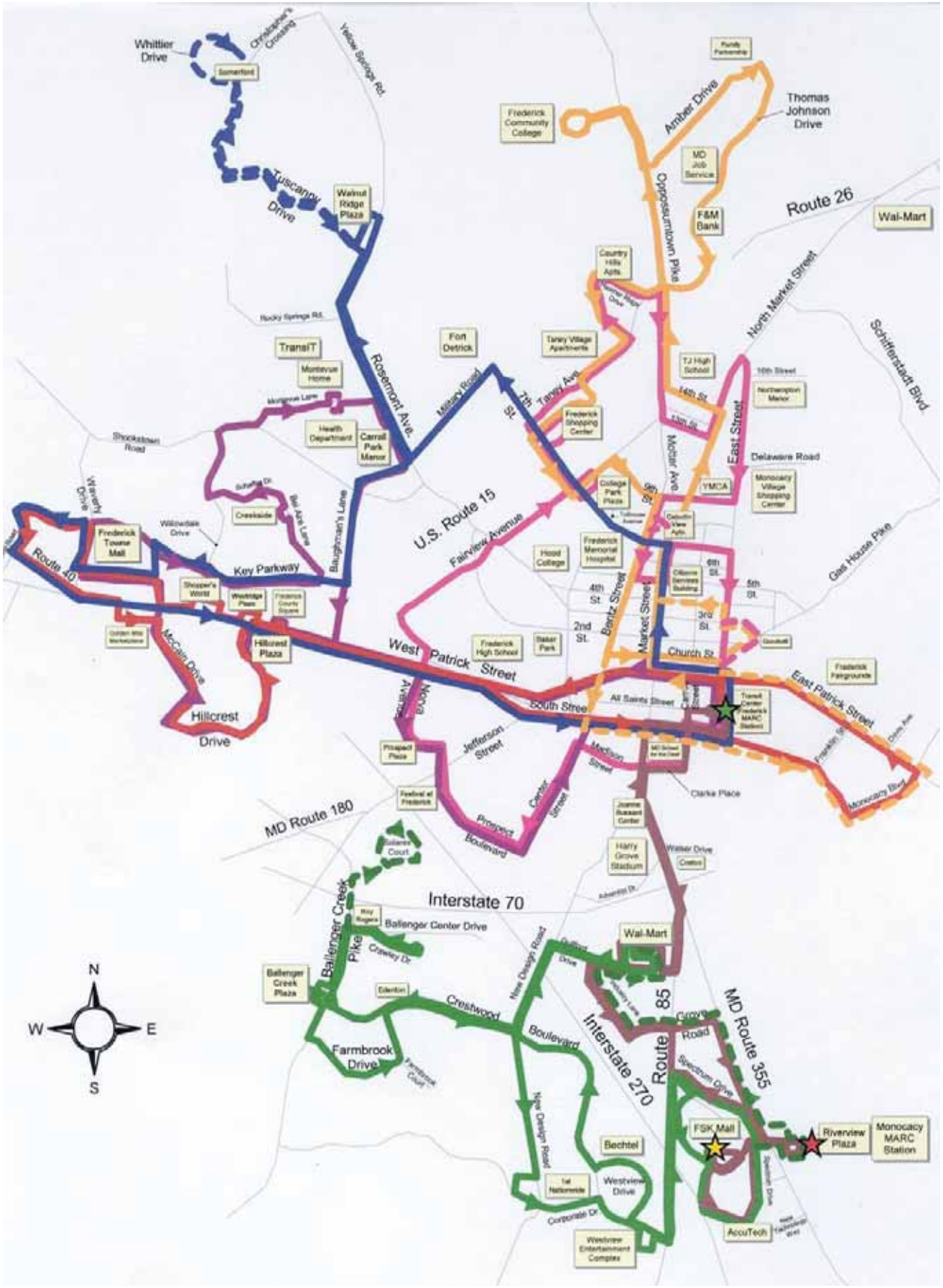
One of the alternatives identified by the *I-270/US 15 Multi-Modal Corridor Study* proposes HOV direct access ramps to service high occupancy vehicles and buses to access the Shady Grove Metro Station (via I-270), Metropolitan Grove MARC Station (via Watkins Mill Road), Germantown Transit Center (via MD 118), COMSAT (via Newcut Road), and the MARC Monocacy Station (via MD 85/Shockley Drive). Express bus service, which offers non-stop connection between origins and destinations, would be provided along the I-270 HOV lanes, as would an extended feeder bus system.

4.3 Airport

The City of Frederick owns and operates the Frederick Municipal Airport, a general aviation airport near the City's eastern edge. The Federal Aviation Authority (FAA) has classified Frederick Municipal Airport as a "reliever" airport for BWI, Reagan National and Dulles Airports. Currently, Frederick Municipal Airport is the second busiest airport after BWI in Maryland in terms of annual aircraft operations. According to the most recent counts, the airport has over 130,000 annual operations.

The 1999 Airport Master Plan Study recommended that the main runway be extended to 7,000 feet from its current length of 5,220 to better serve the existing fleet of jet aircraft during all weather conditions. However, the FAA refused financial support because the proposed design only provided additional pavement for take-off operations and not landings. In 2000, the FAA funded a design only grant to upgrade the main runway and the construction is to be completed by end of 2003. In 2003 another study was performed to analyze the operation deficiencies of the runway and airfield system at the Frederick Municipal Airport. This study recommended the extension of the main runway 5-23 to a total length of 6,000 feet in order to qualify for FAA funding. In July 2003, these recommendations were adopted by the Mayor and Board of Aldermen.

Appendix D


Whittier Drive
Christopher's Crossing
Yellow Springs Rd.
Tuscany Drive
Walnut Ridge Plaza
Rosemont Ave.
Military Road
7th St.
Tanyard Ave.
Fort Detrick
Frederick Community College
Amber Drive
Thomas Johnson Drive
MD Job Service
Opposumtown Pike
F&M Bank
Route 26
Wal-Mart
North Market Street
Schifferstadt Blvd
Country Hills Apts.
Tanyard Village Apartments
TJ High School
10th Street
Northampton Manor
14th St.
East Street
Delaware Road
Monocacy Village Shopping Center
YMCA
Motter Ave.
9th St.
College Park Plaza
Frederick Shopping Center
Rocky Springs Rd.
TransIT
Montevue Home
Montevue Lane
Health Department
Carroll Park Manor
Shookstown Road
Baughman's Lane
U.S. Route 15
Fairview Avenue
Hood College
Frederick Memorial Hospital
Gas House Pike
Creekside
Bel Air Lane
Willowdale Drive
Frederick Towne Mall
Key Parkway
Route 40
Shopper's World
Westridge Plaza
Frederick County Square
Hillcrest Plaza
McCain Drive
Hillcrest Drive
West Patrick Street
Frederick High School
Baker Park
4th St.
2nd St.
Bentz Street
Market Street
6th St.
5th St.
3rd St.
Church St.
Goodwill
Frederick Fairgrounds
East Patrick Street
South Stree
All Saints Street
Transit Center Frederick MARC Station
Monocacy Blvd.
Prospect Place
Jefferson Street
Madison Street
Clarke Place
Festival at Frederick
Prospect Boulevard
Center Street
MD Route 180
Joanne Russard Center
Harry Grove Stadium
Weiner Drive
Creative
Adventist Dr.
Interstate 70
Ballenger Creek Pike
Ballenger Center Drive
Crawley Dr.
Wal-Mart
Ballenger Creek Plaza
Edenton
Crestwood Boulevard
New Design Road
Interstate 270
Route 85
Grove Road
MD Route 355
Farmbrook Drive
Farmbrook Court
Spectrum Drive
FSK Mall
Riverview Plaza
Monocacy MARC Station
Bechtel
Westview Drive
1st Nationwide
Corporate Dr.
Westview Entertainment Complex
AccuTech
N
W
E
S

5.0 Pedestrians and Bicyclists

The *City of Frederick Comprehensive Plan* (1995) does not include separate recommendations for improving pedestrians' mobility and safety. However, the City's Subdivision Regulations require four foot wide sidewalks throughout the city.

The City of Frederick's strategic location at the confluence of Rock Creek, Carroll Creek, Tuscarora Creek, and the Monocacy River presents opportunities for planning bikeways and trails. However, the city's off-road bicycle networks are, in general, undeveloped.

In March 2002 the City of Frederick adopted the *Shared Use Path Plan* with an objective to provide safe non-motorized access to recreational, cultural, employment, and commercial areas throughout the city. When complete, the off-road path system will provide about 35 miles of paths to be shared by pedestrians and bicyclists.

The *Shared Use Path Plan* identifies six major corridors for the proposed path system. Some of these routes are more fully implemented than others. (See Map 5 and associated Table 6)

Table 6. Major Corridors - The Shared Use Path Plan

Name	Total Length (feet)	Percentage Complete (2002)	Residential Units Served
Carroll Creek	32,400	20%	4,091
East Street	22,800	0%	525
Fredericktowne Village	6,650	60%	1,160
Monocacy River/Tuscarora Creek	55,200	28%	6,239
Monocacy Blvd.	54,000	6%	8,366
Rock Creek	13,200	49%	4,626

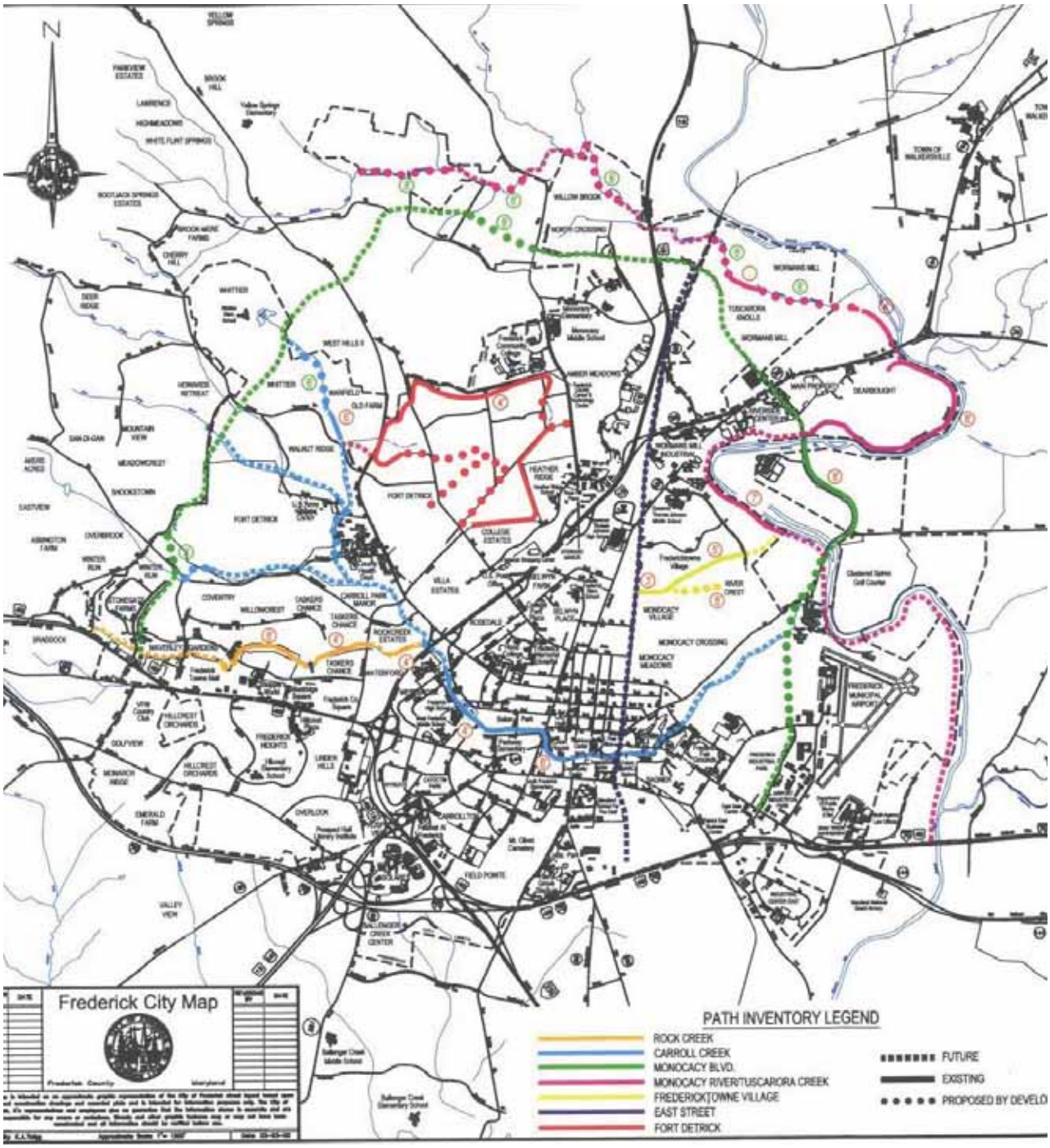
Source: City of Frederick Shared Use Path Plan, 2002

The Shared Use Path Plan also includes design standards and implementation strategies for these paths.

6.0 Conclusions

Highways: The City of Frederick has more than 70 miles of roadway and 150 intersections, of which eight intersections are operating below the acceptable minimum SHA level of service standards. The majority of the intersections in the downtown area operate at an acceptable level of service. However, there are areas within the city that experience considerable congestion. These areas include the MD 180/ MD 351 corridor in the vicinity of US 15/340, 7th Street in the vicinity of US 15, MD 144 east and west of the downtown area, and US 40 in the vicinity of Baughmans Lane and US 15. Several roadway improvements are planned and/or recommended that will help to alleviate these conditions. These range from minor improvements such as adjusting signal timings to the construction of missing interchange connections along I-70. Some of these improvements will help accommodate future traffic demands in and around the City. At

Map 5. Shared Use Path Plan



the same time, there are a number of intersections that are approaching congestion and would need to be improved to accommodate future development. The new transportation model being developed for the city will help understand the impact of future development in the city and the region. The City of Frederick's road grid is constrained by abutting historic buildings especially in the downtown.

Public Transportation: The recent Census Bureau data indicate the predominance of motorized single occupancy vehicles in Frederick. The City of Frederick is served by regional rail and bus transit; however, there is a need to examine the ridership numbers and measures to improve access to public transit.

Bikes and Pedestrians: The *Shared Use Path Plan* makes provisions for off road, planned pathways for bicycles and pedestrians. However, there is a need to examine on-road bike facilities such as shoulder lanes.

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX D-6
Parks and Recreation Resource Assessment

July, 2003

Appendix D

PARKS AND RECREATION ASSESSMENT

Introduction

This report provides an assessment of City of Frederick's existing parks and recreation facilities and highlights key issues and deficiencies. This is one of several reports that will provide background analysis for the Comprehensive Plan Update.

Existing Inventory

The City of Frederick includes 440 acres of public parks distributed in 56 parks with an average size of 7.8 acres. The National Recreation and Park Association (NRPA) has developed community standards for parks and active recreation. Table 1 summarizes the NRPA parkland classification system guidelines.

Table.1 NRPA Parkland Classification System Guidelines

Type	Service Area	Desirable Size	Acres/1000 Residents	Desirable Site Characteristics and Facilities
Community Parks	1-2 Miles	25+ Acres	5 to 8 Acres	May include areas suited for intense recreation facilities such as athletic complexes and large swimming pools. Easily accessible to nearby neighborhoods and other neighborhoods
Neighborhood Parks	¼ to ½ Mile	5-15 Acres	1 to 2 Acres	Serve the surrounding neighborhoods with open space and facilities such as basketball courts, children's play equipment and picnic tables
Regional Parks	Several Communities	200+ Acres	5 to 10 Acres	Contiguous to or encompassing natural resources
Special Use Areas	No Applicable Standards	Variable Depending on Desired Size	Variable	Area for specialized or single purpose recreation activities such as campgrounds, golf courses etc.

Source: NRPA, 1983

Based on the NRPA guidelines, the City of Frederick's park inventory can be broken down into neighborhood parks, community parks, and special facilities (See Table 2). At the regional scale, the City of Frederick is located close to a number of county, state and national parks, which provide facilities such as camping grounds and trails. These include Gambrill State Park, Cunningham Falls State Park, Pinecliff Park, Shookstown Park, Braddock Heights Park, Ballenger Creek Park, Catoctin Mountain Park, and Monocacy National Battlefield.

Table 2. Public Parks-Size and Facilities, City of Frederick

Park/Facility	Acreage	Facilities Available
Community Parks		
Taskers Chance	20.0	Ball field complex (2 fields), 1 basketball court
Amber Meadows	10.0	1 basketball court, 2 tennis courts, 1 Little League field
Baker	53.0	Amphitheater, 11 tennis courts, 2 softball fields, 1 Little league, 1 T-ball field, 1 multi-purpose field
Max Kehne	9.1	2 tennis courts, 1 softball field, 1 Little League and 1 multi-purpose field
McCurdy	6.2	1 basketball court, 1 baseball field, 1 in-line court, 1 football
Monocacy Village	10.4	1 basketball court, 2 tennis courts, 3 T-ball fields
Riverwalk @ FTV	9.2	1 softball field, 1 little league field, 1 in-line court
Walnut Ridge	18.0	1 tennis court, 1 T-ball field
Fredericktowne Village	33.3	1 basketball court
Rivermist	34.8	Not Developed
Willowdale	13.2	No facilities
Waterford	18.2	No facilities
Hill Street	18	2 multi-purpose fields, 2 in-line courts
Riverside Center	23	4 multi-purpose fields
Linear Greenway	12	No facilities
Loats Park	33	1 baseball field, 1 T-ball field
Total	**321.5**	
Neighborhood Parks		
Staley	7.0	1 basketball court, 1 little league field, 1 T-ball field
Grove	4.5	1 Little League field, 1 multi-purpose field
Rock Creek	2.0	Passive
Carrollton	3.7	1 basketball court, 2 tennis courts, 1 T-ball field
Catoctin	0.9	Passive
Clerestory	2.3	1 multi-purpose field
Cobblestone	3.6	1 basketball court
College Estates	2.1	2 basketball courts, 1 In-line court
David Lane	2.3	No facilities
Emerald Farms	3.2	1 multi-purpose field
Golfview	3.0	No facilities
Harmon Field	2.0	1 T-ball field
Hillcrest	2.3	1 basketball court, 1 tennis court, 1 T-ball field
Jimmy McGee Memorial	6.8	No facilities
Maryvale	4.5	No facilities
Monarch Ridge	3.3	1 basketball court, 1 tennis court, 1 T-ball field
Mullinix	2.3	1 basketball court
North Crossing	3.1	No facilities
Overlook	4.7	1 basketball court, 2 tennis court
Rosedale	2.9	2 basketball courts, 1 T-ball field
Sagner	4.3	2 basketball courts, 1 Little League field, 1 multi-purpose field
South End	3.2	2 basketball courts
Stonegate	2.0	1 basketball court
Wetherburne	4.5	1 basketball court, 1 tennis court
Willowbrook	3.6	Not developed
Total	**115.6**	Includes passive recreation parks
Total City Owned Public Parks	**437**	

Level of Service

Park Acreage

The top portion of Table 3 includes the city's 1995 Comprehensive Plan level of service standards for parks expressed as acres per 1,000 population and it includes NRPA level of service standards. The city's standards included in the Comprehensive Plan provide for a higher level of service standard than do the NRPA standards.

The remainder of Table 3 applies both sets of standards to the city's existing park inventory. The analysis shows a deficit in total park acreage as well as community and neighborhood park acreage based on the city's 2000 population of 52,767.

Based on NRPA and the 1995 Comprehensive Plan for Frederick recommendations, the City of Frederick shows an overall deficit of local developed open space at 2000 population (See Table 3).

Table 3. Parks Level of Service Per 1000 Population Standards and 2000 Assessment

		Comprehensive Plan	NRPA
Standards	Total Parkland	15 acres/1000	10 acres/1000
	Community Parks	10 acres/1000	8 acres/1000
	Neighborhood Parks	5 acres/1000	2 acres/1000
Assessment	Total Parks Need	792	528
	Existing	437	437
	Deficit	355	91
	Level of Service	8.2 acres/1000	8.2 acres/1000
	Community Parks Need	528	424
	Existing	321.5	321.5
	Deficit	207.5	102.5
	Level of Service	6.1 acres/1000	6.1 acres/1000
	Neighborhood Parks Need	264	106
	Existing	115.6	115.6
	Deficit	148.4	+8.4
	Level of Service	2.2 acres/1000	2.2 acres/1000

Park Facilities

The NRPA provides guidelines for assessing the adequacy of specific recreational facilities such as ball fields and tennis courts. These guidelines are presented in Table 4.

NRPA also gives guidelines for estimating special facilities. These guidelines are presented in Table 4.

Table 4. NRPA Recreation Facilities Guidelines

Recreation Facilities	Guidelines Per Resident
Baseball Fields	1/5,000
Soccer Fields	1/10,000
Football Fields	1/10,000
Basketball Courts	1/2,000
Tennis Courts	1/2,000
Multi-Purpose Courts	1/10,000
Swimming Pool	1/20,000
Golf Course	1/50,000
Gold Driving Ranges	1/50,000
¼ mile / 400 Meter Track	1/20,000
Archery Range	1/50,000

Source: NRPA, 1983

Table 5 compares the City of Frederick's existing facilities to the standards shown in Table 3. Based on this analysis, the city is in good shape for its current population, except for soccer, football fields and archery range facilities.

Table 5. Existing Recreation Facilities vs. NRPA Guidelines

Recreational Facilities	Existing Total	Surplus/Deficit at 2000 Population
Baseball (including Little League)/Softball Fields	19	9
Soccer/Football Fields	2	-3
Basketball Courts	32	7
Tennis Courts	25	0
Swimming pool	2	-1
Golf Course	1	0
Archery Range	0	-1

Source: City of Frederick Parks and Recreation Department
HNTB Corporation

Distribution of Parks

To understand the distribution of public parks and identify areas that may be under-served, service areas of neighborhood and community parks were mapped based on NRPA standards shown in Table 2. Map 1 shows the location of community and

neighborhood parks along with their service areas at radii of 1and 1/4 mile respectively. Community parks are well distributed but neighborhood parks are in and around the urban core and neighborhoods to the west. Northern neighborhoods, where the city has experienced substantial growth, are under-served by neighborhood parks.

Conclusions

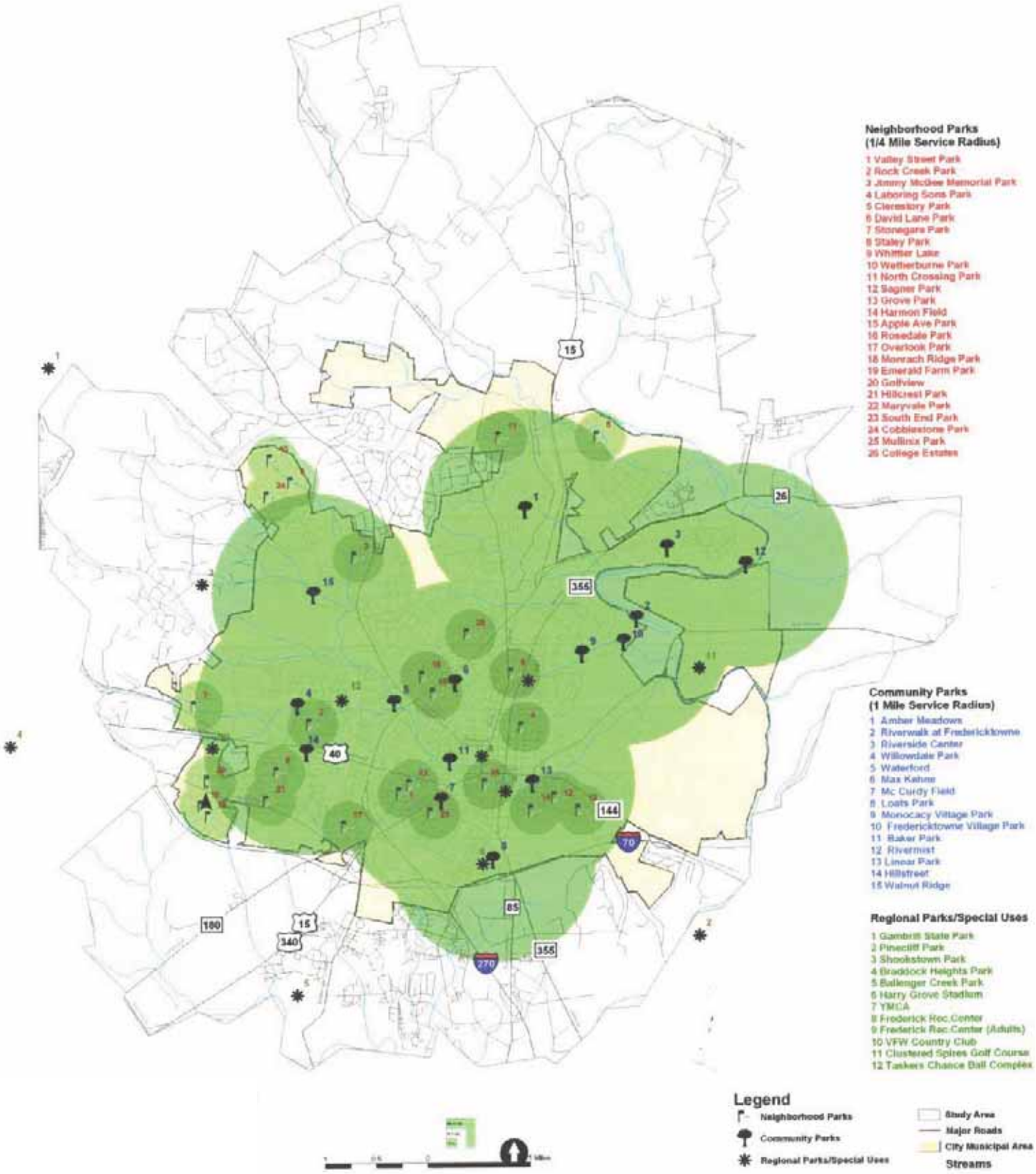
The analysis here focused on the city's parks and facilities. Of course, the city's location also allows for city residents' use of county, state and federal parks. These are not reflected in the level of service standards but do provide other parks and recreation opportunities for the citizens of Frederick.

The city has recently instituted a Parks Facilities Development Impact Fee with the purpose of requiring new residential development to pay for park development and improvement serving such new residential areas.

As part of the Comprehensive Plan update, additional sites for local and community parks should be identified so that additional parklands can be acquired – either purchased by the city or through the development review process.

Appendix D

Map 1



CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

City of Frederick Economic Profile

June, 2003

Prepared by:

HNTB Corporation.
Architects Engineers Planners

CITY OF FREDERICK ECONOMIC PROFILE

Like most of central Maryland, the City of Frederick has experienced strong employment growth during the past 30 years. Future growth in the city will be a central theme of the Comprehensive Plan Update. As the city wrestles with the issue of growth during the plan update process, an examination of employment data can help to frame several questions: What is the city and region's employment? What are the city and region's employment specialties? Which job sectors are growing? Which sectors should the city focus on as it expands its focus on economic development?

In this report, we answer some of these questions and attempt to provide analysis that can be used to better understand the implications of these answers.

Our analysis has uncovered several key findings:

- The City of Frederick has especially strong employment concentrations in health care and biotechnology. These sectors form the core of the city's specialization in the life sciences industry.

- The government sector provides approximately 18 percent of all jobs in the city, more than any other sector.

- The city's educational establishments provide about 2,000 more jobs per capita than would be expected when compared to the region (Washington-Baltimore CMSA), which points to the significance of Hood College and Frederick Community College in a city of 50,000.

- The city specializes in general merchandise retail and food and drinking places, which is consistent with its role as the retail and entertainment center of Frederick County.

- The city also specializes in machinery equipment, primary metal fabrication and apparel manufacturing.

- The city is deficient in jobs in managerial services, information (broadcast and print media, cellular technology, and data processing) and the utility sectors, as compared to the Baltimore-Washington region.

- The city contains almost half of all jobs in Frederick County, and has two jobs for every city household, indicating a very healthy employment base.

1.0 Employment in the City

To understand the city's economic profile, we examined employment in the city as a whole. But this provides only part of the picture. Therefore, we also examined sectors and sub-sectors of the city's economy.[1] This section of the report begins by looking at the city as a whole, and then discusses the city's employment sectors. This focus on sectors helps us understand the city's employment specializations and how the city's economy compares to the region and the nation as a whole.

1.1 Employment by Size of Industry

In 2002, the City of Frederick was home to 41,891 jobs and 2,729 establishments.[2] Of these, 5,300 jobs were located at Fort Detrick.

Historically, the City of Frederick has been the commercial, institutional and industrial center of Frederick County. This is reflected in the employment data. The government sector is the city's largest, with more than 7,400 jobs in Frederick, or 17.8 percent of the city's total jobs (see Table 1-1). Health care is close behind, with approximately 7,000 jobs (16.9 percent), followed by retail with more than 4,500 jobs (10.8 percent), accommodation and food with about 2,900 jobs (7.0 percent), manufacturing with approximately than 2,850 jobs (6.8 percent), and education with approximately 2,650 jobs (6.3 percent).

Table 1-1 summarizes the employment data by industry size and also includes the number of establishments in each industry sector.

Within the *government* sector, the large majority of the jobs fall within national security (4,000 jobs) and general government (2,100). The national security sub-sector includes jobs specifically assigned to Fort Detrick. Related jobs at the National Cancer Institute and similar institutions are included in the general government figure.

Within the *health care sector*, most jobs fall within ambulatory health care, which includes doctor's offices, dentists, clinics, and HMO facilities. Hospitals and nursing homes also support a large number of employees. The high number of ambulatory health care jobs reflects the presence of Mid Atlantic Medical Services, Inc. (MAMSI), an HMO with 1,400 employees. Even without MAMSI, however, there are more than 250 individual ambulatory health care establishments.

Given the city's proximity to two interstates, it is not surprising that the city has a significant number of *retail* jobs. More than one in six establishments in the City of Frederick is dedicated to retail activities. In addition to general merchandising, which

[1] Sectors are defined by the 2-digit level of the North American Industrial Classification System (NAICS), while sub-sectors represent 3-digit NAICS divisions.

[2] Source: InfoUSA database for Frederick County, 2002.

includes big box retail, grocery stores and similar types of retail establishments, the city also has 49 motor vehicle parts stores that account for 836 jobs.
Of the approximately 2,900 jobs in the *accommodation and food* sector, almost all (94 percent) are at food and drinking places.

Manufacturing has been a significant part of the city's economy for many years. However, in 2002, it is only the city's fifth largest sector in terms of total jobs. The largest sub-sectors within this category are machinery manufacturing (672 jobs), printing (521) and apparel manufacturing (406). Four establishments, including the 400-employee H.L. Hartz & Sons factory, account for the apparel manufacturing jobs, which, as we will see later, is a specialization within the city's economy.

Educational services provide more than 2,600 jobs in the City of Frederick, the majority of which are found in primary and secondary education—public and private schools. The city is also home to Hood College and Frederick Community College. While neither employs more than 600 people, both institutions are large compared to the size of the city itself. More important, as will be discussed in Section 2.3, the curriculum of these institutions plays an important role in sustaining the city's economic strengths in biotechnology and business.

Of the 1,921 employees in the *professional services* category, more than 400 provide legal services, while the rest are spread among a variety of fields ranging from architecture to veterinary services. The *other services* category is equally diverse, comprising everything from automobile repair to beauty services to religious and non-profit enterprises.

These two sectors, along with health care, information, education, and arts and entertainment, were once considered part of the same economic sector, known simply as "services."[3] The splitting of the services sector reflects the nation's transition to a service-based economy. As Figure 2-4 will later show, services have become the dominant economic activity in the City of Frederick, following this trend.

Finance and insurance is not as large as the other sectors mentioned here, but it does represent approximately 2,400 jobs, including just shy of 1,500 at insurance carriers.

Construction also accounts for approximately 1,750 jobs, the majority of which (1,051) are within specialty trades.
The five industries with the largest number of employees (Government, Health Care Retail, Accommodation, and Education) are shown in bold in Table 1-1. Together, they comprise more than 24,500 jobs, or 59 percent of the city total. Moreover, the ten largest sub-sectors (National Security, Food and Drinking Places, General Government, Ambulatory Heath Care, Hospitals, Primary and Secondary Education, Religious and Nonprofit, Nursing Homes, Insurance Carriers, and General Merchandising) have nearly half of the total jobs in the city.[4]

[3] Under the Standard Industrial Classification (SIC) system, which was phased out in 2001.

[4] "Primary and Secondary Education," a 4-digit NAICS code, is used here as a sub-sector.

Table 1-1:
Industry Size in the City of Frederick

NAICS	Industry	Employees Number	Employees Share of Total	Establishments Number	Establishments Share of Total
92	***Government (All Levels)***	***7,445***	***17.8%***	***91***	***3.3%***
928	National Security [a]	4,007	9.6%	4	0.1%
921	General Government	2,110	5.0%	54	2.0%
922	Public Safety	595	1.4%	8	0.3%
62	***Health Care and Social Assistance***	***7,058***	***16.9%***	***349***	***12.8%***
621	Ambulatory Health Care	3,265	7.8%	256	9.4%
622	Hospitals	2,075	5.0%	25	0.9%
623	Nursing Homes	1,237	3.0%	11	0.4%
44	***Retail***	***4,534***	***10.8%***	***470***	***17.2%***
452	General Merchandising	957	2.3%	21	0.8%
441	Motor Vehicle Parts	832	2.0%	49	1.8%
453	Miscellaneous Stores	570	1.4%	110	4.0%
72	***Accommodation and Food***	***2,911***	***7.0%***	***180***	***6.6%***
722	Food and Drinking Places	2,749	6.6%	169	6.2%
31	***Manufacturing***	***2,849***	***6.8%***	***84***	***3.1%***
333	Machinery Manufacturing	672	1.6%	17	0.6%
323	Printing Activities	521	1.2%	18	0.7%
315	Apparel Manufacturing	406	1.0%	4	0.1%
61	*Education [b]*	*2,648*	*6.3%*	*43*	*1.6%*
6111	Primary and Secondary	1,492	3.6%	26	1.0%
6112	Junior Colleges	592	1.4%	3	0.1%
6113	Colleges and Universities	458	1.1%	2	0.1%
81	*Other Services*	*2,574*	*6.2%*	*353*	*12.9%*
813	Religious, Nonprofit	1,477	3.5%	120	4.4%
812	Personal Services	586	1.4%	128	4.7%
811	Repair and Maintenance	511	1.2%	105	3.8%
52	*Finance and Insurance*	*2,426*	*5.8%*	*178*	*6.5%*
524	Insurance Carriers	1,483	3.5%	49	1.8%
522	Credit Intermediation	497	1.2%	84	3.1%
54	*Professional Services*	*1,920*	*4.6%*	*358*	*13.1%*
23	*Construction*	*1,747*	*4.2%*	*143*	*5.2%*
233	Special Trades	1,051	2.5%	72	2.6%
231	General Contracting	517	1.2%	64	2.3%
42	*Wholesale*	*1,363*	*3.3%*	*103*	*3.8%*
51	*Information*	*897*	*2.1%*	*45*	*1.6%*
53	*Real Estate*	*852*	*2.0%*	*116*	*4.3%*
71	*Arts, Entertainment, and Recreation*	*749*	*1.8%*	*54*	*2.0%*
713	Amusement, Recreation	625	1.5%	36	1.3%
48	*Transportation/Warehousing*	*638*	*1.5%*	*25*	*0.9%*
56	*Administrative/Waste Management*	*565*	*1.4%*	*96*	*3.5%*
99	*Unclassified Establishments*	*245*	*0.6%*	*34*	*1.1%*
55	*Management of Companies*	*200*	*0.5%*	*2*	*0.1%*
11	*Agriculture and Ag Support*	*154*	*0.4%*	*3*	*0.1%*
22	*Utilities*	*50*	*0.1%*	*1*	*0.0%*
21	*Mining*	*6*	*0.0%*	*1*	*0.0%*
	All Industries	**41,831**	**100%**	**2,729**	**100.00%**

a: The National Security sub-sector includes jobs specifically assigned to Ft. Detrick. Related jobs at the National Cancer Institute and similar institutions are considered "Other Government"

b: Education and Professional Services have only one 3-digit NAICS subdivision. The categories above are 4-digit subdivisions.

Source: 2002 InfoUSA database.

1.2 Relative Employment Specialization

Listing the city's top employment sectors provides an important economic snapshot. However, to identify the strengths and weaknesses of the city's economy, we must compare it to the Baltimore-Washington region and to the nation as a whole. To make this comparison, we have calculated Location Quotients (LQ) for each sector as well as for many sub-sectors.

The LQ, expressed by Formula 1-1, compares the share of a place's jobs in a certain industry to the share of jobs in that industry at the regional or national level, normalized by population. In essence, the LQ describes the relative economic specialization of an area. A LQ greater than 1.0 indicates that a locality has more jobs per capita in a particular industry than the area to which it is being compared, in effect, "extra" jobs that support exports and bring wealth into the city.

$$LQ = \frac{(E_{ic}/P_c)}{(E_{it}/P_t)}$$

E_{ic} = Local employment in an industry
E_{it} = Total (regional or national) employment in an industry
P_c = Local population
P_t = Total (regional or national) population

Table 1-2 shows the LQ calculated for industries within the city, as compared to the same industries in the Washington D.C. Consolidated Metropolitan Statistical Area (CMSA).[5] When compared against both the CMSA and the United States as a whole, the city has a high concentration of activity in several economic sectors.

Aside from their value as ratios, LQs can also be converted into a more accessible measure of economic strength. Table 1-2 shows the "extra" or exportable jobs for each industry and sub-industry. Derived directly from the LQ, exportable jobs represent the number of jobs in excess of the CMSA or nation's per capita level. The higher the number of exportable jobs in a sector, the more specialized the city's economy is, relative to the area to which it is being compared.

[5] The CMSA includes the District of Columbia, and the following counties in Maryland: Anne Arundel, Baltimore, Calvert, Carroll, Charles, Frederick, Harford, Howard, Montgomery, Prince George's, Queen Anne's, Washington; Virginia: Arlington, Clarke, Culpeper, Fairfax, Fauquier, King George, Loudon, Prince William, Spotsylvania, Stafford, Warren; and West Virginia: Berkeley, Jefferson. It also includes Baltimore City and the Virginia cities of Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, and Manassas Park.

Table 1-2:

Economic Specialization (As Defined by Location Quotients), Year 2002

Industry		City vs. CMSA LQ:	City vs. CMSA Extra Jobs	City vs. USA LQ:	City vs. USA Extra Jobs	CMSA vs. USA LQ:
31	*Manufacturing*	*5.86*	*2,338*	*1.15*	*827*	*0.20*
315	Apparel Manufacturing	78.05	401	4.90	323	0.06
333	Machinery Manufacturing	26.34	646	2.69	422	0.10
336	Transportation Equipment Mfg.	10.95	195	0.65	-114	0.06
311	Food Manufacturing	10.69	338	1.35	97	0.13
325	Chemical Manufacturing	7.36	170	1.21	34	0.16
327	Nonmetallic Mineral Products	6.07	139	1.69	68	0.28
323	Printing Activities	4.41	403	3.54	374	0.80
332	Fabricated Metal Products	2.99	99	4.99	118	1.67
61	*Education* [b]	*5.48*	*2,165*	*5.41*	*2,158*	*0.99*
6111	Primary and Secondary	10.72	1,353	10.64	1,352	0.99
6112	Junior Colleges	341.42	590	36.73	576	0.11
6113	Colleges and Universities	1.90	217	1.80	203	0.95
62	*Health Care and Social Assistance*	*4.65*	*5,541*	*2.59*	*4,333*	*0.56*
621	Ambulatory Health Care	6.54	2,766	3.68	2,377	0.56
622	Hospitals	4.30	1,592	2.18	1,122	0.51
623	Nursing Homes	4.95	987	2.47	736	0.50
71	*Arts, Entertainment, and Recreation*	*3.50*	*535*	*6.72*	*638*	*1.92*
713	Amusement, Recreation	4.51	486	27.94	603	6.20
712	Museums, Hist. Sites	3.36	30	1.97	21	0.59
42	*Wholesale*	*2.77*	*871*	*1.18*	*211*	*0.43*
52	*Finance and Insurance*	*2.71*	*1,531*	*2.08*	*1,259*	*0.77*
524	Insurance Carriers	6.52	1,256	3.40	1,047	0.52
523	Securities, Commodities	3.38	289	2.31	232	0.68
522	Credit Intermediation	0.96	-23	0.91	(50)	0.95
44	*Retail*	*2.59*	*2,810*	*1.64*	*1,786*	*0.63*
443	Electronics and Appliances	5.83	320	4.84	306	0.83
453	Miscellaneous Stores	5.35	472	3.68	422	0.69
452	General Merchandising	4.25	827	2.28	608	0.54
441	Motor Vehicle Parts	3.83	618	2.41	489	0.63
442	Furniture/Home Furnishings	3.05	165	2.30	139	0.76
48	*Transportation/Warehousing*	*2.57*	*390*	*1.10*	*57*	*0.43*
53	*Real Estate*	*2.46*	*506*	*2.29*	*479*	*0.93*
72	*Accommodation and Food*	*2.26*	*1,621*	*1.56*	*1,041*	*0.69*
722	Food and Drinking Places	2.64	1,709	1.78	1,248	0.68
81	*Other Services*	*2.18*	*1,389*	*2.55*	*1,563*	*1.17*
813	Religious, Nonprofit	1.85	679	2.90	968	1.57
812	Personal Services	2.60	361	2.38	340	0.92
811	Repair and Maintenance	3.21	349	2.01	255	0.63
23	*Construction*	*1.71*	*736*	*1.46*	*556*	*0.85*
233	Special Trades	1.52	445	1.06	332	0.70
231	General Contracting	1.80	230	1.71	214	0.95
11	*Agriculture and Ag Support*	*1.16*	*21*	*0.25*	*-457*	*0.22*
92	*Government (All Levels)*	*1.11*	*739*	*1.72*	*3,119*	*1.55*
51	*Information*	*0.87*	*-140*	*1.27*	*193*	*1.47*
54	*Professional Services*	*0.75*	*-635*	*1.43*	*579*	*1.91*
22	*Utilities*	*0.75*	*-17*	*0.41*	*-73*	*0.54*
55	*Management of Companies*	*0.64*	*-112*	*0.37*	*-340*	*0.58*
21	*Mining*	*0.49*	*-6*	*0.16*	*-32*	*0.32*
56	*Administrative/Waste Management*	*0.38*	*-925*	*0.33*	*-1,134*	*0.88*

Source: HNTB Analysis

The data above have been simplified in Table 1-3, showing the extra jobs created by the city in each economic sector.

Table 1-3:
Extra Jobs by Industry
City of Frederick

Industry		City vs. CMSA	City vs. USA
62	Health Care and Social Assistance	5,541	4,333
44	Retail	2,810	1,786
31	Manufacturing	2,338	827
61	Education	2,165	2,158
72	Accommodation and Food	1,621	1,041
52	Finance and Insurance	1,531	1,259
81	Other Services	1,389	1,563
42	Wholesale	871	211
92	Government (All Levels)	739	3,119
23	Construction	736	556
71	Arts, Entertainment, and Recreation	535	638
53	Real Estate	506	479
48	Transportation/Warehousing	390	57
11	Agriculture and Ag Support	21	-457
21	Mining	-6	-32
22	Utilities	-17	-73
55	Management of Companies	-112	-340
51	Information	-140	193
54	Professional Services	-635	579
56	Administrative/Waste Management	-925	-1,134

Source: HNTB Analysis

In several sectors, Frederick exhibits a high degree of specialization compared to both the nation and the region. Health Care and Retail jobs are among the strongest examples of this category. The city has large number of extra per capita jobs in several sub-categories, including ambulatory health care, hospitals, insurance carriers, primary and secondary schools, general merchandise retail and food and drinking places.

Compared to the region, the city specializes in certain manufacturing activities. The top manufacturing enterprises include machinery, printing, apparel and food manufacturing. On the other hand, the city lags behind the region in the number of jobs in information, professional services, managerial services, and administrative services.

The high degree of specialization in certain sectors should be understood in light of Frederick's relatively small economic base (representing less than 1.5 percent of the CMSA's total job base). Because we are working with a small base, an analysis of economic specialization can be influenced greatly by the presence of a small number of large employers. Such is the case in many of the "strong" industries described above. For example:

- The National Cancer Institute, US Army Medical Research Institute of Infectious Diseases and related establishments, as cited above, together have 6,100 jobs (14.6 percent of the city total) at Fort Detrick, contributing to the city's strong government presence.

- Frederick Memorial Hospital, with 1,700 employees, and Mid Atlantic Medical Services, Inc. (MAMSI), a health care network with 1,400 employees, reinforce the strength of the Health Care industry.
- A major regional office of State Farm Insurance employs 1,100 workers, or three-quarters of the city's total employment in the insurance field.

Beyond the presence of large employment generators, the information in this section helps to define the city's role in the regional economy. Indeed, based on the data and discussions above, the city seems to specialize in a large number of activities not normally associated with the Baltimore-Washington region, including manufacturing, health care, wholesale, and agriculture.

The CMSA vs. USA column of Table 1-2 reinforces this point. Among the 20 sectors listed, the CMSA has a LQ value above 1.0 for only five. By comparison, the city has LQ values above 1.0 (vs. the nation) for all but five sectors. While not necessarily a regional or national leader in all fields, the city hosts a remarkably diverse economy.

1.3 Employment in Subareas of the City

For analysis purposes, the city has been divided into subareas (Figure 1-1). We now examine the distribution of employment and establishments in these subareas (see Table 1-4).

With high concentrations of *construction*, *manufacturing*, *retail*, and *health care*, the Southeast subarea has the city's largest number of jobs, while the Core, with a different mix of specializations, has by far the densest concentration of jobs, with more than 10 establishments and 115 employees per acre (See Table 1-5). Home to the State Farm offices, the North subarea has the largest concentration of finance and insurance employees, while the Southwest has the largest number of retail jobs and establishments.

Table 1-5 helps to further define these employment concentrations. From this information, we find:

- Aside from Fort Detrick, government functions are concentrated largely in the Core and North.
- The majority of Ambulatory Care employment and establishments are located in the North and Southwest subareas, not in the Core and Southeast subareas that surround Frederick Memorial Hospital.
- The Southwest, and not the Core, has the largest number of employees and establishments in the Eating and Drinking Places category. This is not surprising, since the southwest subarea is home to West Patrick Street (US 40), the city's "golden mile," which hosts no less than a half dozen shopping centers, including Frederick Towne Mall.
- The majority of construction, manufacturing and repair jobs are located in the Southeast.

- The Core has the largest number of primary and secondary school employees and establishments.

Table 1-4
Employment and Establishments by City Subarea

	Businesses		Employees	
Subarea	*Number*	*% of City*	*Number*	*% of City*
Core	859	31.5%	9,396	22.5%
North	534	19.6%	8,355	20.0%
Southeast	824	30.2%	11,637	27.8%
Southwest	502	18.4%	7,093	17.0%
Fort Detrick	10	0.4%	5,350	12.8%
Total	**2,729**	**100%**	**41,831**	**100%**

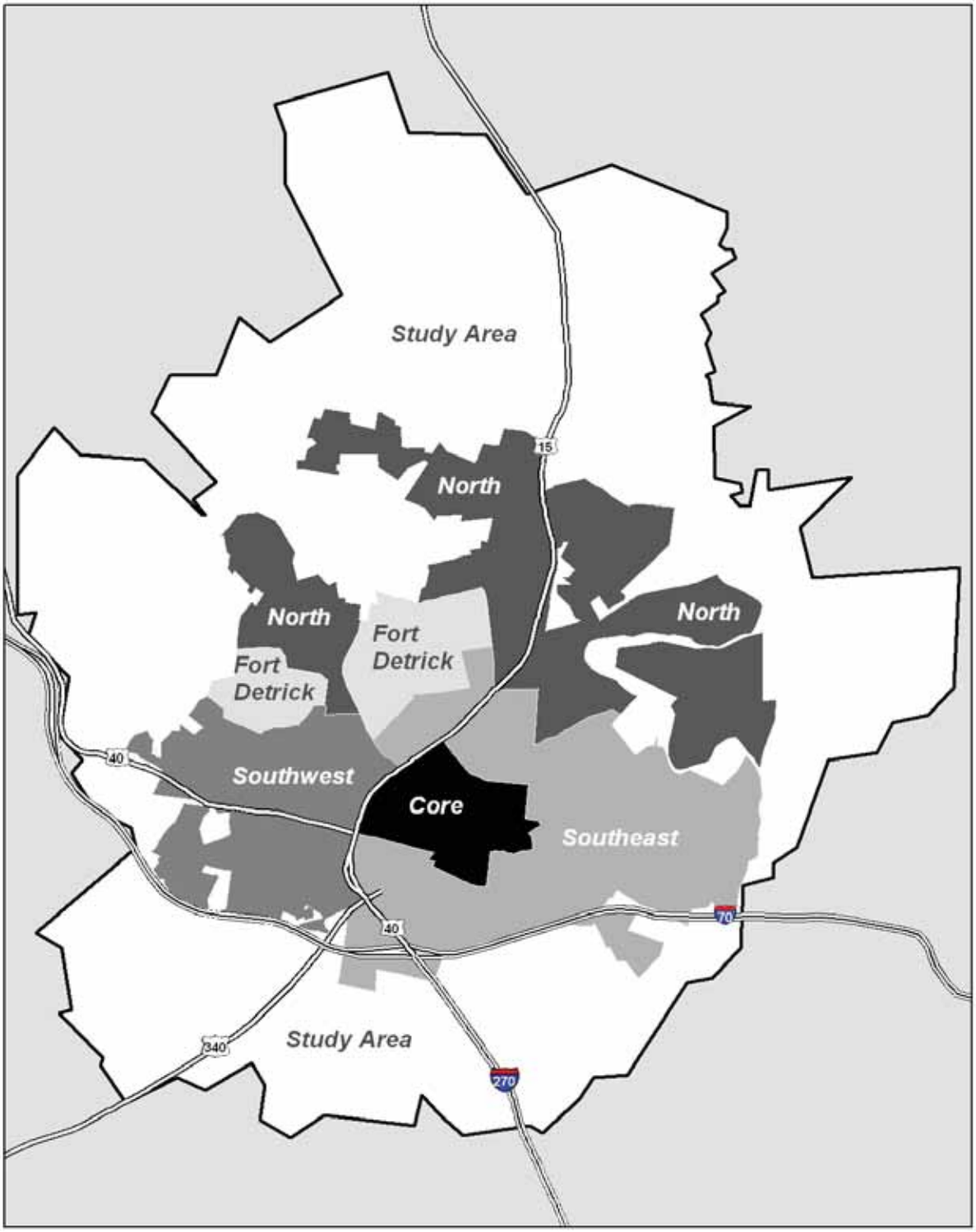


Figure 1-1: Subareas in the City of Frederick

Table 1-5
Industry Size and Establishment Distribution by City Subarea

		Core		North		Southeast		Southwest		Ft. Detrick	
NAICS	**Industry**	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.
11	*Agriculture*	-	-	-	*1*	*153*	*1*	*1*	*1*	-	-
21	*Mining*	-	-	-	-	*6*	*1*	-	-	-	-
22	*Utilities*	-	-	*50*	*1*	-	-	-	-	-	-
23	*Construction*	*141*	*30*	*406*	*34*	*1,154*	*62*	*46*	*17*	-	-
231	General Contracting	27	19	258	16	206	20	26	9	-	
233	Special Trades	114	11	148	18	179	7	-	-	-	-
31	*Manufacturing*	*229*	*22*	*347*	*16*	*2,237*	*38*	*36*	*8*	-	-
311	Food Manufacturing	39	4	208	3	154	5	2	2	-	-
315	Apparel Manufacturing	6	3	-	-	400	1	-	-	-	-
323	Printing Activities	15	4	13	4	473	8	20	2	-	-
325	Chemical Manufacturing	-	-	2	2	195	4	-	-	-	-
327	Nonmetallic Mineral Products	4	1	12	1	150	1	-	-	-	-
332	Fabricated Metal Products	132	2	-	-	16	2	-	-	-	-
333	Machinery Manufacturing	17	3	109	4	546	10	-	-	-	-
42	*Wholesale*	*80*	*15*	*514*	*20*	*746*	*63*	*23*	*5*	-	-
44	*Retail*	*710*	*129*	*384*	*51*	*1,439*	*145*	*1,984*	*143*	*17*	*2*
441	Motor Vehicle Parts	142	9	43	5	194	23	453	12	-	-
442	Furniture, Home Furnishings	10	3	61	3	80	9	94	10	-	-
443	Electronics and Appliances	97	11	58	10	218	12	13	7	-	-
452	General Merchandising	8	2	65	1	116	6	768	12	-	-
453	Miscellaneous Stores	263	54	50	12	146	22	111	22	-	-
48	*Transportation/Warehousing*	*378*	*5*	*1*	*2*	*193*	*13*	*66*	*5*	*0*	*0*
51	*Information*	*522*	*20*	*61*	*4*	*248*	*9*	*62*	*10*	*4*	*2*
52	*Finance and Insurance*	*503*	*58*	*1,321*	*35*	*394*	*46*	*218*	*39*	-	-
522	Credit Intermediation	134	20	112	17	116	22	135	25	-	-
523	Securities, Commodities	276	23	61	7	35	6	48	7	-	-
524	Insurance Carriers	62	15	1,148	12	238	15	35	7	-	-
53	*Real Estate*	*227*	*37*	*55*	*14*	*267*	*33*	*253*	*32*	-	-
54	*Professional Services*	*864*	*198*	*518*	*57*	*430*	*72*	*108*	*31*	-	-
55	*Management of Companies*	-	*1*	*200*	*1*	-	-	-	-	-	-
56	*Admin/Waste Management*	*158*	*41*	*170*	*21*	*104*	*23*	*133*	*11*	-	-
61	*Education*	*1,080*	*22*	*866*	*8*	*454*	*8*	*248*	*5*	-	-
6111	Primary, Secondary Schools	602	13	241	5	419	5	230	3	-	-
6112	Junior Colleges	-	-	592	1	-	-	-	-	-	-
6113	Colleges and Universities	423	1	-	-	-	-	35	1	-	-
62	*Health Care*	*2,427*	*64*	*1,777*	*157*	*904*	*83*	*1,941*	*42*	*9*	*3*
621	Ambulatory Health Care	176	21	1,044	136	452	64	1,581	32	9	3
622	Hospitals	1,997	15	52	5	29	5	-	-	-	-
623	Nursing Homes	210	27	85	11	121	11	65	8	-	-
71	*Arts, Recreation*	*135*	*15*	*126*	*8*	*440*	*21*	*48*	*10*	-	-
712	Museums, Historic Sites	42	5	-	-	-	-	-	-	-	-
713	Amusement, Recreation	70	6	125	7	387	15	43	8	-	-
72	*Hotel, Food*	*482*	*48*	*310*	*22*	*661*	*51*	*1,433*	*58*	*25*	*1*
722	Food and Drinking Places	480	46	308	20	593	47	1,343	55	25	1
81	*Other Services*	*461*	*98*	*186*	*50*	*1,533*	*130*	*394*	*75*	-	-
811	Repair and Maintenance	47	21	32	12	291	48	141	24	-	-
812	Personal Services	82	28	89	20	218	45	197	35	-	-
813	Religious, Nonprofit	332	49	65	18	1,024	37	56	16	-	-
92	*Government*	*893*	*56*	*1,046*	*25*	*106*	*9*	*100*	*7*	*5,300*	*2*
921	General Government	317	36	456	11	37	6	15	1	1,300	1
922	Public Safety	320	4	190	1	-	-	85	3	-	-
928	National Security	-		-		-		7	3	4,000	1
Totals		**9,396**	**859**	**8,356**	**534**	**11,637**	**824**	**7,094**	**502**	**5,355**	**10**

Warehousing In and Around the City of Frederick

The City of Frederick sits at the junction of two major interstates (I-70 and I-270) that link to Baltimore and Washington and to points west. Historically, intersections of major land routes have been home to businesses that specialize in the movement and storage of freight and goods. The question posed by this report is whether Frederick has cultivated these potential markets.

The table below attempts to answer that question by examining the employment and LQs for the Transportation and Warehousing industry, and its selected sub-industries in both Frederick and neighboring Washington Counties. Washington County is included because its county seat, Hagerstown, sits at the intersection of I-81 (a major north-south route on the east coast) and I-70, and is a known center for transportation activities. Whereas the LQ calculations show Frederick's level of specialization compared to the region and nation, comparing the two counties side-by-side permits us to compare Frederick County's performance against a known leader in the field.[A]

Transportation and Warehousing Functions in Frederick and Washington Counties

	Employees		*Location Quotient vs. CMSA*		*Location Quotient vs. USA*	
Industry	**Fred.**	**Wash.**	**Fred.**	**Wash.**	**Fred.**	**Wash.**
Transportation and Warehousing	**1,459**	**2,071**	**1.52**	**3.31**	**0.65**	**1.42**
Air Transportation	60	50	0.18	0.23	0.14	0.17
Water Transportation	11	0	2.35	0.00	0.22	0.00
Truck Transportation	**872**	**1,571**	**2.71**	**7.50**	**0.86**	**2.38**
Transit/Passenger	84	89	0.61	0.99	0.30	0.48
Sightseeing	10	10	0.94	1.44	0.59	0.90
Transportation Support	**14**	**211**	**0.10**	**2.32**	**0.04**	**0.92**
Warehousing	**2**	**175**	**0.13**	**1.45**	**0.02**	**0.22**

The information in the table above shows that both counties host high concentrations of employment in the Transportation and Warehousing sector, and that Washington County has a significantly stronger presence in nearly every sub-industry. More important, whereas Frederick's LQ values remain below 1.0 for every sub-industry, Washington County emerges as a national leader in transportation employment, specifically Truck Transportation. Washington County also offers a regional specialization in warehousing, although that strength evaporates at the national level.

A number of hypotheses may explain these findings. First, Frederick County may be too close to Baltimore and Washington to serve as a major warehousing and distribution location. While important, I-270 also does not offer the kind of long-range accessibility afforded to I-81. In addition, the county's strong Retail and Wholesale industries indicate that, rather than a distribution point, the City of Frederick is more likely a final destination for a fair amount of long distance cargo.

[A] Employment data (from the US Census) are not available specifically for Hagerstown. More important, because transportation and warehousing functions often require large amounts of space, they do not always choose city locations for their activities. As such, the County level most appropriately captures data for the Transportation/Warehousing sector.

2.0 Regional Trends

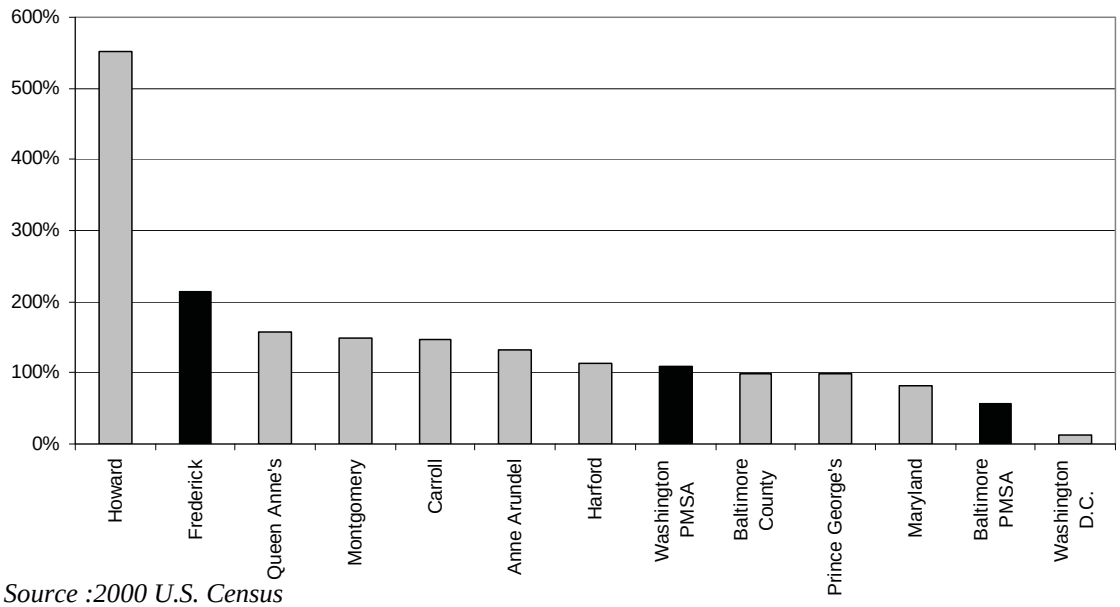
The prior section of this report provided a snapshot the city's economy. Now we will supplement that information by highlighting important economic trends in Frederick County and the Baltimore-Washington region, and examining the relationships of these trends to the analysis above.

In this section, we use data on jobs in Frederick County, and not the city, because that is the geography for which historic job data is most readily available.

2.1 Employment Trends

Between 1969 and 2000, Frederick County's job base grew by more than 200 percent, a rate of growth far above the Washington and Baltimore regional rates and exceeded only by Howard County among counties in the region (see Figure 2-1).[6]

Figure 2-1: Percentage Job Growth 1969 - 2000

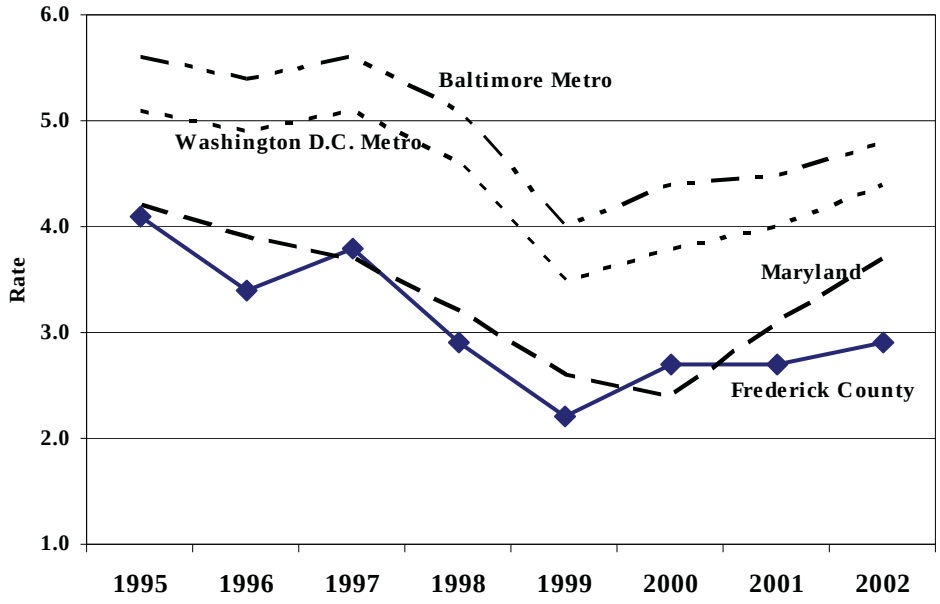


Source :2000 U.S. Census

While growth has been strong, unemployment has been low. The county's unemployment rate has been historically low compared to other nearby jurisdictions. Frederick County's 2002 rate of 2.9 percent is lower than that of the state or the region (see figure 2-2), and is the lowest of any jurisdiction in the region, equal to that of Howard County (see figure 2-3).

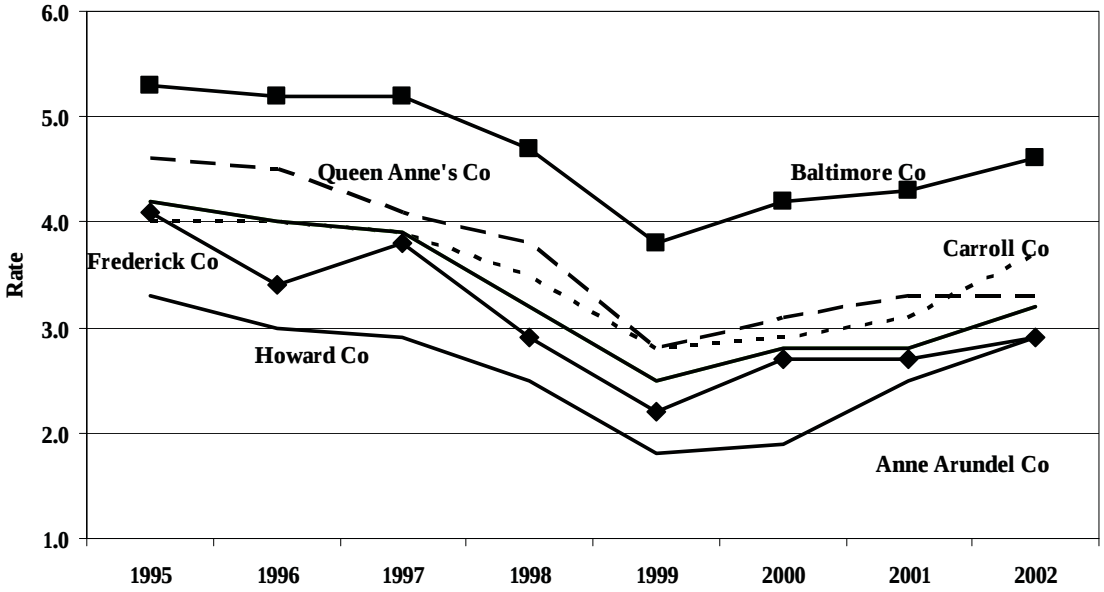
[6] Note: The Washington CMSA was not defined until 2000. Its predecessors were the Baltimore and Washington Primary Metropolitan Statistical Areas (PMSA). Accordingly, those definitions are used in this section.

Figure 2-2: Historic Unemployment Rates in the Baltimore-Washington Region



Source: Maryland Department of Labor, Licensing and Regulation

Figure 2-3: Historic Unemployment Rates of Selected Baltimore-Washington Area Counties



Source: Maryland Department of Labor, Licensing and Regulation

Frederick County has a reputation as a "bedroom community," where residents have commuted to jobs in the Washington and, to a lesser degree, Baltimore regions. Current commuting patterns point to more subtle changes in the role that the county, and by inference, the city, play in the region.

In 2000, county residents filled about 71 percent of the jobs in Frederick County (see the live-work share in Table 2-1). Although the number of county jobs held by county residents increased significantly between 1990 and 2000, given the county's strong employment growth, the 2000 live-work percentage is actually five percentage points lower than in 1990. This suggests that more workers are leaving the county to commute to jobs in other jurisdictions within the Baltimore-Washington region. While significant, a five percent drop is not out of line with regional trends, and is, in fact, more modest than the large drop experienced throughout the region.

To understand better the net effect of commuting, we calculated inflow-outflow ratios for 1990 and 2000. Table 2-1 shows the total number of workers commuting into Frederick County (the inflow), the total number of workers commuting out of the county (the outflow) and the net gain/loss of workers.

Table 2-1:
Frederick County Commuting Patterns

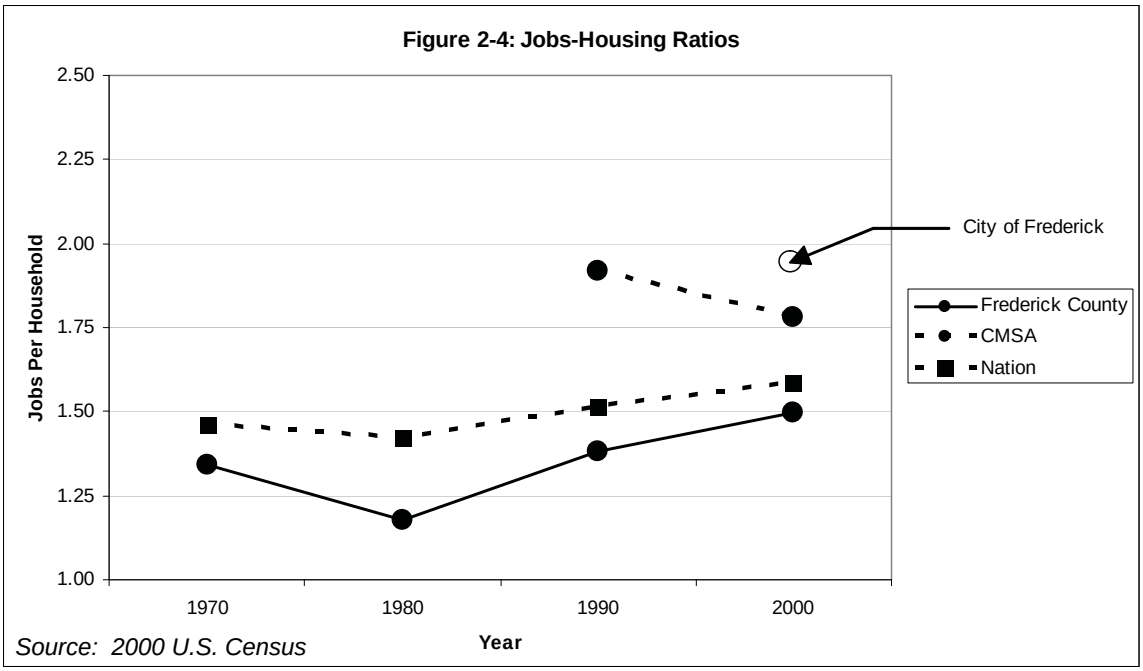
	1990	2000	Change	% Change
Live and Work in Frederick County	48,654	60,272	11,618	23.8%
Frederick County Live-Work Share	76%	71%	-5%	-
Other Live-Work Shares				
Montgomery County	*86%*	*59%*	*-27%*	-
Baltimore County	*52%*	*53%*	*1%*	-
Washington CMSA Average[7]	*66%*	*50%*	*-16%*	-
Inflow of Workers	15,106	24,459	9,353	61.9%
Outflow of Workers	32,196	42,046	9,850	30.6%
Net Gain/Loss	**-17,090**	**-17,586**	**-497**	**-2.9%**
Inflow/Outflow Ratio	**0.47**	**0.58**	**0.11**	**23.4%**

Source: 2002 U.S. Census

Between 1990 and 2000, the number of workers commuting into and out of Frederick County increased slightly, from 17,090 to 17,586. However, the number of inflow workers increased faster than the number of outflow workers, as reflected in the increased Inflow/Outflow ratio (from 0.47 to 0.58). (A ratio value greater than 1.0 would indicate that the county attracted more workers than it sent to other jurisdictions.) In fact, the number of people commuting into the county increased by more than 60 percent during the 1990s. This change indicates that more people are traveling to Frederick County for employment, and suggests that the county's traditional role as a bedroom community may be changing.

Such change is also bolstered by trends in the county's jobs-housing ratio. Figure 2-4 shows the ratio between 1970 and 2000. The county's ratio grew significantly between 1980 and 2000. During that period, every new Frederick County household was matched by 1.3 new jobs. City data is included only for the current period, since historical city-level at-place employment data are not available. The city is a job-rich environment, with two jobs for every existing household.

[7] For 1990, this represents a combination of the Washington and Baltimore PMSAs



The change in commuting patterns exhibits a distinct geographic trend. Table 2-2 shows the net exchanges of commuters between Frederick and the surrounding counties. Frederick County is still an exporter of workers to nearby Maryland and Virginia counties, with Montgomery County receiving more Frederick County commuters than any other jurisdiction. Frederick County residents also travel to Loudoun and Fairfax County in increasing numbers. Bold text indicates counties that were net "donors" of workers to Frederick County in 2000.

However, the "commute from" column shows that, during the 1990s, Frederick County received an increased number of commuters from every single jurisdiction. Washington (MD), Adams (PA), and the three counties in West Virginia increased their net export of workers to Frederick, while the net exchange of commuters with Carroll County reversed direction, with a net gain of 500 workers for Frederick County.

Table 2-2:
Net Exchange of Commuters To and From Frederick County, 1990-2000

	Year	Commute to	Commute from	Net Inflow	% Change in Net Inflow
District of Columbia	1990	2,619	56	-2,563	-13.3%
	2000	3,025	121	-2,904	
Montgomery County	1990	18,887	2,243	-16,644	-12.7%
	2000	22,867	4,104	-18,763	
Carroll County	**1990**	**1,688**	**1,490**	**-198**	**342.4%**
	2000	**2,004**	**2,484**	**480**	
Washington County	**1990**	**1,190**	**5,189**	**3,999**	**25.0%**
	2000	**2,153**	**7,150**	**4,997**	
Prince George's County	1990	1,144	135	-1,009	17.7%
	2000	1,188	358	-830	
Howard County	1990	890	428	-462	-97.6%
	2000	1,646	733	-913	
Baltimore City	1990	743	92	-651	-29.0%
	2000	960	120	-840	
Baltimore County	1990	636	257	-379	-4.5%
	2000	951	555	-396	
Anne Arundel County	1990	275	120	-155	-286.5%
	2000	804	205	-599	
Fairfax County, VA	1990	1,339	190	-1,149	-36.9%
	2000	1,786	213	-1,573	
Loudoun County, VA	1990	811	258	-553	-34.9%
	2000	1,151	405	-746	
Arlington County, VA	1990	324	23	-301	-64.8%
	2000	537	41	-496	
Adams County, PA	**1990**	**222**	**949**	**727**	**96.6%**
	2000	**293**	**1,722**	**1,429**	
Jefferson County, WV	**1990**	**188**	**1,014**	**826**	**57.6%**
	2000	**304**	**1,606**	**1,302**	
Franklin County, WV	**1990**	**180**	**1,063**	**883**	**35.8%**
	2000	**590**	**1,789**	**1,199**	
Berkeley County, WV	**1990**	**93**	**567**	**474**	**89.2%**
	2000	**182**	**1,079**	**897**	
Total Commute	**1990**	**32,196**	**15,106**	**-17,090**	**-2.9%**
	2000	**42,046**	**24,460**	**-17,586**	

2.2 Frederick County Employment Distribution and Specialization

In 2002, the City of Frederick had 41,695 jobs, or almost 50 percent of the total county employment of 85,378.[8] Tables 2-3 and 2-4 summarize the distribution of countywide jobs by sector and sub-sector, repeating the format used in the discussion of the city's economy.

By focusing on economic patterns in Frederick County (including the City of Frederick), we can relate city-level findings to broader trends in the County and the region. Not surprisingly, the data indicate that the county and city share many of the same economic patterns. Retail, manufacturing, government, professional services, and health care activities make up more than half of the county's jobs and more than 40 percent of the county's employment establishments.

Table 2-4 shows the LQs calculated for industries within Frederick County, as compared to the same industries in the CMSA and the nation. The city's strengths in manufacturing and education are maintained at the county level, in addition to a strong concentration in agriculture. These findings generally match the strengths and weaknesses identified in the city analysis.

While the city's high LQ values often reflect the presence of a few very large employers, the same cannot necessarily be said for the county. Outside of the city, only three companies employ more than 500 individuals: NVR Building Products (within the wood product manufacturing subsector), with 700 employees; Eastalco Aluminum Company (primary metal manufacturing subsector), with 700 employees; and Mount Saint Mary's College, with 500 employees.

A few sub-sectors, such as apparel manufacturing, wood products manufacturing, and junior colleges, generate inordinately high LQ values. In many cases, these indicate industries that have a small presence in the CMSA. For example, of the 746 primary metal manufacturing jobs in the region, 715 are employed in Frederick County (nearly all of them at Eastalco).

[8] InfoUSA

Table 2-3:

Year 2002 Employment in Frederick County by Industry Size and Number of Establishments

		Employees		*Establishments*	
NAICS	**Industry**	**Number**	**Share of Total**	**Number**	**Share of Total**
44	*Retail*	*10,573*	*12.6%*	*1,078*	*17.2%*
452	General Merchandising	2,784	3.3%	67	1.1%
441	Motor Vehicle Parts	1,672	2.0%	134	2.1%
444	Building Material/Garden Equipment	1,225	1.5%	105	1.7%
453	Miscellaneous Stores	960	1.2%	210	3.3%
62	*Health Care and Social Assistance*	*8,680*	*10.4%*	*498*	*7.9%*
621	Ambulatory Health Care	3,702	4.4%	332	5.3%
622	Hospitals	2,103	2.5%	28	0.5%
623	Nursing Homes	2,035	2.4%	27	0.4%
92	*Government (All Levels)*	*8,317*	*9.9%*	*138*	*2.2%*
928	National Security [a]	4,010	4.8%	6	0.1%
921	General Government	2,587	3.1%	77	1.2%
922	Public Safety	956	1.1%	22	0.4%
31	*Manufacturing*	*8,244*	*9.9%*	*232*	*3.7%*
333	Fabricated Metal Manufacturing	1,091	1.3%	20	0.3%
323	Machinery Manufacturing	988	1.2%	3	0.5%
315	Wood Product Manufacturing	970	1.2%	19	0.3%
54	*Professional Services*	*6,844*	*8.2%*	*738*	*11.7%*
72	*Accommodation and Food*	*6,647*	*7.9%*	*364*	*5.8%*
722	Food and Drinking Places	5,921	7.1%	324	5.2%
23	*Construction*	*6,281*	*7.5%*	*701*	*11.2%*
233	Special Trades	3,692	4.4%	395	6.3%
231	General Contracting	1,890	2.3%	269	4.3%
61	*Education [b]*	*6,096*	*7.3%*	*112*	*1.8%*
6111	Primary and Secondary	3,770	4.5%	65	1.0%
6113	Junior Colleges	592	0.7%	1	0.0%
6112	Colleges and Universities	958	1.1%	4	0.1%
52	*Finance and Insurance*	*5,942*	*7.1%*	*319*	*5.1%*
524	Insurance Carriers	1,709	2.0%	95	1.5%
522	Credit Intermediation	3,724	4.5%	160	2.5%
81	*Other Services*	*4,734*	*5.7%*	*861*	*13.7%*
813	Religious, Nonprofit	2,453	2.9%	340	5.4%
812	Personal Services	1,143	1.4%	259	4.1%
811	Repair and Maintenance	1,138	1.4%	262	4.2%
42	*Wholesale*	*2,928*	*3.5%*	*285*	*4.5%*
11	*Agriculture and Ag Support*	*2,251*	*2.7%*	*52*	*0.8%*
56	*Administrative/Waste Management*	*1,533*	*1.8%*	*257*	*4.1%*
53	*Real Estate*	*1,482*	*1.8%*	*245*	*3.9%*
71	*Arts, Entertainment, and Recreation*	*1,468*	*1.8%*	*121*	*1.9%*
713	Amusement, Recreation	1,316	1.6%	90	1.4%
48	*Transportation/Warehousing*	*1,459*	*1.7%*	*92*	*1.5%*
51	*Information*	*1,349*	*1.6%*	*104*	*1.7%*
99	*Unclassified Establishments*	*541*	*0.7%*	*79*	*1.3%*
55	*Management of Companies*	*203*	*0.2%*	*3*	*0.1%*
22	*Utilities*	*70*	*0.1%*	*2*	*0.0%*
21	*Mining*	*35*	*0.0%*	*6*	*0.1%*
All Industries [b,c]		**85,677**	**100%**	**6,287**	**100%**

a: The National Security sub-sector includes jobs specifically assigned to Ft. Detrick.

b: These sectors have only one 3-digit NAICS subdivision. The categories above represent 4-digit subdivisions.

c: Table 2-3 employment totals are derived from The US Department of Commerce County Business Pattern data. The information in Section 1.0 is from the InfoUSA database. This difference in sources accounts for the small variation in total county employment.

Source: 2002 InfoUSA Database

Table 2-4:

Economic Specialization (As Defined by Location Quotients)

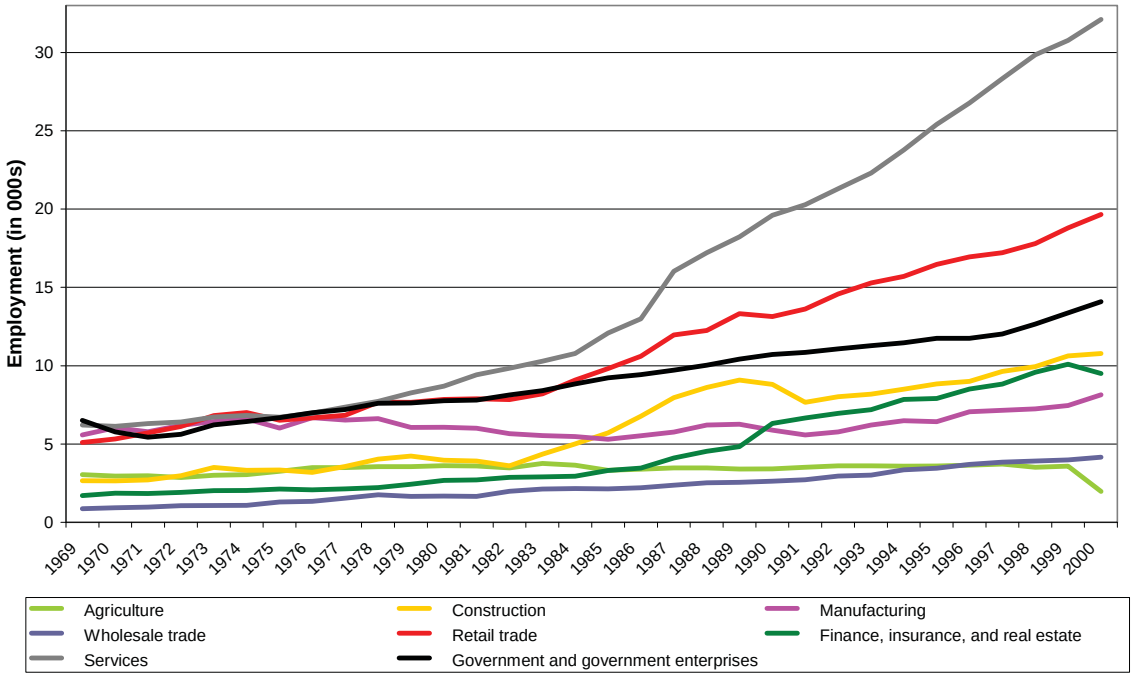
NAICS	Industry	County vs. CMSA LQ:	County vs. CMSA Extra Jobs	County vs. USA LQ:	County vs. USA Extra Jobs	LQ: CMSA vs. USA
31	*Manufacturing*	*4.43*	*6,385*	*0.87*	*-1,204*	*0.20*
321	Wood Product Manufacturing	11.75	887	2.40	566	*0.20*
331	Primary Metal Manufacturing	35.78	695	1.72	300	*0.05*
333	Machinery Manufacturing	10.03	889	1.02	23	0.10
315	Apparel Manufacturing	20.31	388	1.28	88	0.06
332	Fabricated Metal Products	5.71	900	9.53	977	1.67
336	Transportation Equipment Mfg.	2.86	141	0.17	-1,053	0.06
311	Food Manufacturing	4.47	467	0.57	-463	0.13
325	Chemical Manufacturing	5.98	515	0.98	-12	0.16
327	Nonmetallic Mineral Products	4.99	421	1.39	147	0.28
11	*Agriculture and Ag Support*	*4.40*	*1,739*	*0.95*	*-109*	*0.22*
61	*Education*	*3.27*	*4,229*	*3.22*	*4,204*	*0.99*
6111	Primary and Secondary	7.02	-537	6.96	-541	0.99
6113	Junior Colleges	88.40	-7	9.51	-62	0.11
6112	Colleges and Universities	1.03	-930	0.97	-983	0.95
71	*Arts, Entertainment, and Recreation*	*1.77*	*641*	*3.41*	*1,037*	*1.92*
713	Amusement, Recreation	2.46	781	15.23	1,230	6.20
712	Museums, Hist. Sites	0.95	-2	0.56	-36	0.59
52	*Finance and Insurance*	*1.72*	*2,485*	*1.32*	*1,434*	*0.77*
524	Insurance Carriers	1.95	830	1.01	25	0.52
523	Securities, Commodities	0.99	-3	0.68	-220	0.68
522	Credit Intermediation	1.85	1,715	1.76	1,611	0.95
23	*Construction*	*1.57*	2,274	*1.34*	1,580	*0.85*
233	Special Trades	1.51	1,250	1.28	814	0.70
231	General Contracting	1.70	780	1.61	719	0.95
44	*Retail*	*1.55*	*3,746*	*0.98*	*-210*	*0.63*
444	Building Material/Garden Equip	2.56	747	1.35	320	*0.53*
452	General Merchandising	2.83	1,801	1.52	955	0.54
441	Motor Vehicle Parts	1.98	828	1.25	332	0.63
453	Miscellaneous Stores	2.29	541	1.58	351	0.69
443	Electronics and Appliances	2.81	463	2.33	411	0.83
42	*Wholesale*	*1.54*	*1,026*	*0.66*	*-1,520*	*0.43*
48	*Transportation/Warehousing*	*1.52*	*500*	*0.65*	*-785*	*0.43*
62	*Health Care and Social Assistance*	*1.48*	*2,823*	*0.82*	*-1,845*	*0.56*
621	Ambulatory Health Care	1.92	1,773	1.08	272	0.56
622	Hospitals	1.13	237	0.57	1,579	0.51
623	Nursing Homes	2.11	1,071	1.05	100	0.50
72	*Accommodation and Food*	*1.33*	*1,665*	*0.92*	*-574*	*0.69*
722	Food and Drinking Places	1.47	1,903	0.99	-31	0.68
53	*Real Estate*	*1.11*	*147*	*1.03*	*42*	*0.93*
81	*Other Services*	*1.04*	*173*	*1.22*	*845*	*1.17*
813	Religious, Nonprofit	0.80	-627	1.25	486	1.57
812	Personal Services	1.31	272	1.20	193	0.92
811	Repair and Maintenance	1.87	528	1.17	165	0.63
21	*Mining*	*0.75*	*-12*	*0.24*	*-110*	*0.32*
54	*Professional Services*	*0.69*	*-3,029*	*1.32*	*1,662*	*1.91*
51	*Information*	*0.34*	*-2,655*	*0.50*	*-1,370*	*1.47*
92	*Government (All Levels)*	*0.32*	*-17,649*	*0.50*	*-8,457*	*1.55*
22	*Utilities*	*0.27*	*-188*	*0.15*	*-404*	*0.54*
56	*Administrative/Waste Management*	*0.27*	*-4,222*	*0.23*	*-5,029*	*0.88*
55	*Management of Companies*	*0.17*	*-1,002*	*0.10*	*-1,882*	*0.58*

Source: HNTB Analysis of 2002 InfoUSA database

An historical view of employment in Frederick County helps to explain some of the current patterns in the economic structure of the county. Those trends can also be extrapolated to the City of Frederick itself. Figure 2-4 shows the sector-level employment in Frederick County from 1969 through 2000. For the most part, these local trends match regional and national trends. For example, the dip in construction employment in the early 1990s coincides with the economic recession that hit the nation during that period.

Of particular interest is the growth in the services, retail, finance, and construction sectors since approximately 1987. Indeed, there was a veritable explosion in jobs in the service sector. As described in Section 1.1, the Service sector includes health, personal services, and educational services—some of the strengths of the city and county economies. Driven by these activities, Frederick County clearly kept pace with the nation's move toward a service-based economy.

Figure 2-4
Employment by Sectors 1969-2000
Frederick County



Source: County Business Patterns database

2.3 Industry Clusters

One drawback of the sector analysis described in previous sections is that it tends to obscure the presence and strength of industries whose activities cut across different sectors. These "industrial clusters" play an important role in the economic strength of the City of Frederick and Frederick County.
Clusters are groups of inter-related industries that represent the full life cycle of a product or activity, from raw materials to finished products. For example, an "automotive

products" cluster might include auto parts manufacturers, car dealerships, auto supply stores, repair shops, and even gasoline stations. Although such activities may be classified into different sectors, they often act as a single sector or sub-sector.[9]

The Frederick County Office of Economic Development has identified four industry groups or clusters as targets for economic development, including biotechnology, information technology, agriculture and manufacturing (metal products). These sectors have been identified because they provide the highest wages within the local economy, according to Marie Keegin, the county's economic development director. By encouraging growth within these high-wage sectors, the county believes it will enhance the ability of county residents to work in the county.

In July 2002, the city established a new Department of Economic Development and in November 2002, it issued a Draft Economic Development Priorities memorandum. This memo identifies the city's most important industries and clusters, including bioscience, manufacturing, information technology, services, and tourism. The bioscience cluster (as defined by the city), includes Fort Detrick and private biotech firms. The manufacturing cluster includes food, medicine, apparel, and machinery manufacturers. Information technology includes dot-com businesses, internet, and wireless providers. Services includes MAMSI, State Farm, and banking specialties. Finally, the tourism cluster includes "downtown Frederick—history, architecture, shopping, arts," Frederick Keys baseball, and Civil War battlefields and museums.

To translate these loose definitions into quantifiable information, we combined NAICS classifications to create clusters for four activities, based on city and county priorities and standards used in other economic analyses. Those clusters included biotechnology, metal fabrication, food and agriculture, and information technology. Appendix A provides a full list of the industries included in each cluster.

This analysis shows that the county has a specialization in three of its four targeted industries (all except for information technology) when compared to the region, but none of the four when compared to the nation. The county's specialization is most pronounced in metal fabrication and food and agriculture.

The region's strength in information technology, specifically in Montgomery County, shows up in this analysis, as the CMSA has 1.75 times the national average of jobs in this cluster. By comparison, Frederick County's information technology sector is rather small, a deficit of more than 5,000 per capita jobs in this sector when compared to the region. To the extent that jobs have been moving out of Montgomery County and into Frederick County, this is a good sign that employment growth in this sector in Frederick County is likely to expand over time, and that the county's hopes for this sector may be realized.

The city's industrial strengths are similar, as would be expected given that the city is a subset of the county in this context. The city has strong concentrations of jobs in the

[9] *Adapted from* San Diego Association of Government (2001*) What are Industrial Clusters?*

metal fabrication sectors (with an LQ of 15.09), biotechnology (LQ of 4.31) and food and agriculture, with ratios higher than the county in the first two sectors, but lower in food and agriculture (a consequence of the county's agricultural base). The city and county produce a significant number of exportable jobs in these industries, as Table 2.5 shows.

Table 2-5:
Industrial Clusters, Frederick County and City of Frederick

LQ Comparison		Biotechnology	Metal Fabrication	Food and Agriculture	Information Technology
City vs. CMSA		4.31	15.09	2.95	0.21
City vs. USA		2.70	1.82	0.63	0.36
County vs. CMSA		1.20	5.18	3.72	0.11
County vs. USA		0.76	0.62	0.79	0.18
CMSA vs. USA		0.63	0.12	0.21	1.75
Exportable Jobs	City vs. CMSA	4,206	980	360	-1,181
	County vs. CMSA	1,006	1,122	1,939	-5,149

Frederick County has a strong manufacturing cluster when compared to the region, and the strength of this industry endures, according to Keegin. Anecdotal evidence suggests the construction manufacturing sector (wood and metal products) has been strong in the county, even during the recent economic slowdown, as local construction firms have benefited from a generally weak dollar in the global market.

The presence of Fort Detrick, the National Cancer Institute and some 35 individual biotech firms (10 percent of the all such establishments in the state) helps explain the county's strong regional presence in biotechnology. These companies have a diverse set of specializations, including biodefense, bioresearch and biomanufacturing. Some companies, such as Medimmune and DynePort Vaccine, have relocated from the existing biotech cluster in Montgomery County.

The County has used its location, quality of life, and educational resources as marketing tools for attracting technology companies, especially in the biotech field. As discussed in Section 1.1, local colleges play an especially important role in this effort. Hood College's specialization in biosciences provides opportunities for technical synergies, while Mount St. Mary's entrepreneurship program (which may soon include a Ph.D program) is attractive to the "new economy" mindset of a number of technology-related industries.

The 1995 City of Frederick Comprehensive Plan identifies tourism as one of the city's growth industries. The city's recent designation by the state as a regional arts and entertainment district also seeks to build on the city's cultural and historic resources and vibrant downtown. The high LQ scores for the city's recreation, historic, and museum activities relative to the CMSA and nation reflect the city's focus on these activities. Frederick County is the gateway to the recreational opportunities in the Catoctin Mountains, and contains a significant portion of the Appalachian Trail. The city and surrounding areas are also rich in historic resources, especially from the Civil War period.

Summary

The statistical portrait of the City of Frederick shows a diverse economic base with specialization in a variety of sectors. Even the sectors with the largest number of employees—Government, Health Care, Retail, and Manufacturing—represent a broad spectrum of economic activities.

Some areas of specialization represent local concentrations in already strong economic sectors in the Baltimore-Washington region. The city's biotechnology cluster benefits from access to local resources at Fort Detrick, Frederick Memorial Hospital, and Hood College. At the same time, the city's biotechnology industry is part of a larger cluster that spans the I-270 corridor (including the National Institutes of Health in Bethesda) and is one of the nation's foremost biotechnology centers.

At the same time, several of the city and county's strongest sectors are relatively weak in the region. Manufacturing, agriculture, and wholesale employment is relatively sparse in the CMSA, and Frederick is one of the few points of concentration for such activities. Such specializations can be both strengths and weaknesses. On one hand, sectors such as agriculture and manufacturing, whose overall strength has declined in recent years. On the other hand, the county's historic strengths in agriculture and manufacturing make it the CMSA's only destination of choice for such industries.

Economic information presented here about the City of Frederick has some clear implications for the revision of the city's Comprehensive Plan. Biotechnology, manufacturing, and educational facilities often have significant land, access, and infrastructure requirements. The Comprehensive Plan will need to define adequate lands to permit the appropriate expansion of these and other key industries and important economic sectors. The existing zoning ordinance should also be reviewed to assess where key industries are permitted, and whether non-residential zoning districts provide the appropriate level of differentiation. In addition, this analysis of the city's economy will be useful for the targeting of economic development efforts and Comprehensive Plan implementation strategies.

The city has recently added fiscal analysis requirements to the Comprehensive Plan update process. The fiscal analysis will help clarify the role that the city's non-residential economy plays in its overall fiscal status, and will help determine whether its desired future requires the creation or expansion of programs to promote job creation and to ascertain the desirable mix of additional households and employment.

Appendix A: Economic Cluster Definitions

Biotechnology and Health

NAICS Code	Description
32541	*Pharmaceutical & medicine manufacturing*
3391	*Medical equipment & supplies manufacturing*
334510	*Electromedical apparatus manufacturing*
334516	*Analytical laboratory instrument manufacturing*
334517	*Irradiation apparatus manufacturing*
54171	*R&D in physical, engineering & life sciences*
621	*Ambulatory Health Care*
622	*Hospitals*

Technology Industries

NAICS Code	Description
3341	*Computer & peripheral equipment manufacturing*
3342	*Communications equipment manufacturing*
3344	*Semiconductor & other electronic component manufacturing*
5112	*Software publishers*
5133	*Telecommunications*
514191	*On-line information services*
5142	*Data processing services*
5415	*Computer systems design & related services*
6114	*Business schools & computer & management training*

Food and Agriculture

NAICS Code	Description
REIS	*Agriculture*
311	*Food manufacturing*
4224	*Grocery & related product wholesale*
42251	*Grain & field bean wholesale*

Metal Fabrication and Industrial Machinery

NAICS Code	Description
3261	*Foundries*
311	*Fabricated metal product manufacturing*
331	*Primary metal manufacturing*
333	*Machinery manufacturing*

Apparel

NAICS Code	Description
315	*Apparel manufacturing*
4223	*Apparel, piece goods & notions wholesale*

Frederick City's Residential and Non-Residential Capacity Analysis Using Maryland Department of Planning's Growth Model

Draft May 30, 2003; Finalized September 28, 2004

I. Purpose

As requested by the City of Frederick's Mayor and Planning Department, the Maryland Department of Planning developed this study of residential and non-residential development capacity. This analysis was undertaken in coordination with HNTB, the City's Comprehensive Plan consultant, as part of the City's update its comprehensive plan. This document includes the findings of this analysis of residential and non-residential development capacity for the City of Frederick. Limitations and caveats for this analysis are also outlined in this document.

II. Findings

A. Residential Development Capacity

Based on MDP's analysis, the total new household capacity for the City of Frederick is approximately 7,300 within the existing city limits based on existing zoning. Slightly less than half of this capacity is located within the Medium Density Residential Zoning Districts (R-2 and R-3). The summary of capacity analysis for the City of Frederick is presented in Table 1. The complete breakdown of the capacity results is presented in Table 2.

This analysis was also completed for the Comprehensive Plan Study Area (see Figure 1). The study area is an area around the City established for planning and analysis purposed during the Comprehensive Plan update. The capacity analysis for the Study area found a total residential capacity of approximately10,250 additional dwelling units based on existing zoning (this figure includes the City as well as the surrounding County study area). A complete breakdown of the total study area residential capacity is presented in Table 3.

B. Non-Residential Development Capacity

The non-residential capacity analysis is somewhat more complicated and not used as often as the residential development capacity piece. Using information prepared by the City's Planning Staff and HNTB, as well as industry standards, MDP was able to generate an approximate development capacity figure for employment. We found that the total capacity for new jobs in the City is approximately 28,000 based on existing zoning of vacant and redevelopable lands. More than half of these jobs are on lands zoned M-1, which allows light industrial land uses. The summary of capacity analysis is presented in Table 1. The complete breakdown of the non-residential capacity analysis results is presented in Table 2**.**

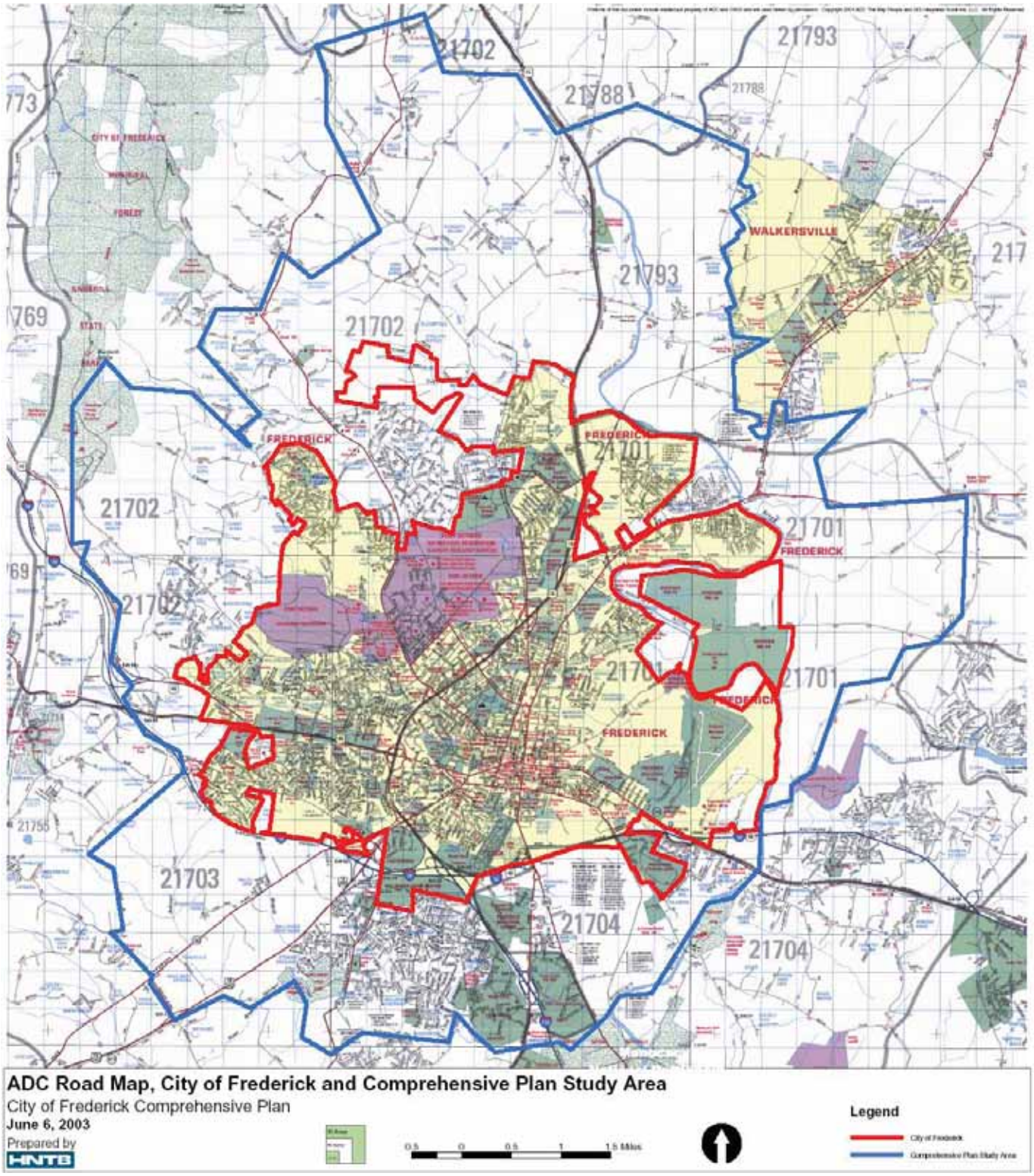
This analysis was also completed for the Comprehensive Plan Study Area, resulting in a total non-residential capacity of 62,775 additional jobs (this figure includes the City as well as the surrounding County study area). A complete breakdown of the total study area non-residential capacity is presented in Table 3.

Table 1. Capacity Analysis Summary

Area	**New Potential DUs***	**New Potential Jobs** (add'l redevelopment potential shown in brackets)
City	7,300	24,200 (3,800)
Rest of Study Area	3,000	18,500 (22,500)
Total	10,300	42,700 (26,300)

* Includes Infill

Figure 1. Comprehensive Plan Study Area



III. Methodology

MDP uses several analysis tools to simulate the effects of future development under different management scenarios. The Growth Simulation Model (GSM) focuses on future landscape changes and development patterns.

The following outlines MDP's growth model in general. This model is usually customized with local data and knowledge.

The growth model projects the existing landscape into a series of possible "future landscapes", each a function of different land management scenarios. The model estimates land use change using population, household, and employment projections along with other inputs that are part of the growth scenarios. New development is calculated as a function of household demand. Existing or hypothetical management scenarios (e.g., clustering, transfer of development rights, infill growth areas, and agricultural land preservation), as well as other factors, simulate local concerns and policies that may influence the type and locations of future development.

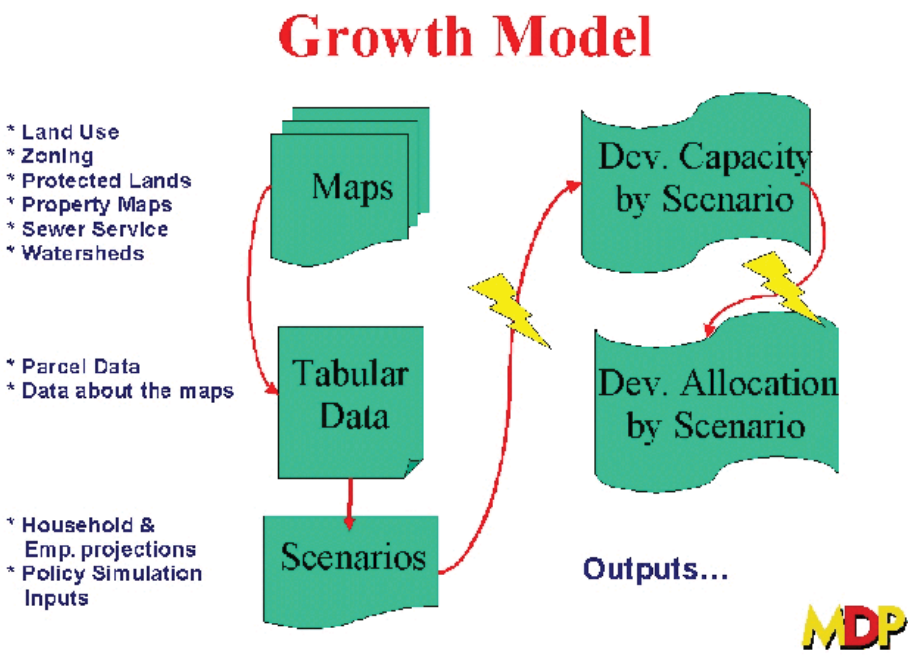
The model uses data from geographic information system (GIS) overlays. The GIS database includes information on land use, streams, watershed and county boundaries, zoning, sewer service, and protected lands (e.g., agricultural easements, parks, etc.). This database also includes Department of Assessments and Taxation parcel information in the form of point data.

All of this information is combined into a master parcel database. Once complete, this database includes the following data for every piece of land (i.e., parcel) in the study area.

1. zoning
2. acreage
3. sewer service category
4. existing land use
5. 12 digit subwatershed
6. topology
7. number and date of improvement(s) (i.e., major structures)
8. value of parcel and improvement(s)
9. address and owner
10. capacity for development
11. new land use per each scenario

Small-Area forecasts are used for population, household, and employment projections for jurisdictions with Transportation Analysis Zones (TAZs). For non-TAZ counties, recent (10 years) growth patterns using parcel data were analyzed for trends. Future growth was assumed to follow a similar pattern (with in constraints) unless otherwise altered by a scenario. Figure 1 displays a simple flow chart of MDP's growth model.

Figure 1



MDP analyzed residential and non-residential building capacities using several distinct techniques. The capacity of each parcel of developable land in each watershed is based on its size (number of acres), current land use/cover type, zoning, and sewer service category. Simulated land management options are unique to each scenario. This analysis results in information that includes growth capacity per parcel.

Residential Development Capacity - Land supply (i.e., capacity) is calculated using the parcel-specific information listed above. In this analysis, we used zoning yields obtained from the Frederick City and County Planning Departments. This was done because development often does not build-out at its maximum allowable density.

In addition, residential development capacity for each parcel is not a straight division of the parcel's acreage by the permitted or yielded density of its zoning, plus any reductions due to existing development or environmental constraints that may be on the parcel. In attempt to be more realistic in estimating infill capacity, the model basically does the calculation mentioned above and then reduces that number by half. For example: if a ten acre parcel is zoned for one dwelling unit per acre and it has one house on it, a simple capacity analysis would give a capacity for nine new houses. In this situation, the model would give a potential capacity of four new houses on this parcel. Some types of parcels are automatically given no development capacity. These include: wetlands, exempt properties (e.g., institutional and non-profit properties), cemeteries, parks, easements, and other protected lands. As with most of the model, this component can be customized with input from local planners and others.

Non-Residential Development Capacity – Land supply (i.e., capacity) is calculated using the parcel-specific information listed above. In this analysis, we used Floor Area Ratio yields obtained from the Frederick City and County Planning Departments, HNTB, as well as industry standard numbers for the amount of square feet per employee that corresponds to the allowed

land uses in each zoning district (see Table 2). For instance, if you have a 40,000 square foot lot in the B-1 Zoning District, there is space for approximately 20 new jobs on the parcel. This result comes from multiplying the total land area of the parcel by the Floor Area Ratio (in this case, 0.25) to get the total buildable area of the parcel. The final step is to divide this number, in this case 10,000 square feet, by the number of square feet per employee (in this case, 500 sq. ft./employee).

There are several key differences between the non-residential capacity study and the residential capacity study. First, it was difficult to measure most types of in-fill development opportunities in Commercial or Industrial Zoned lands. We did, however, attempt to identify redevelopment opportunities by examining the ratio between a commercial or industrial improvement value and the parcel's corresponding land value (from parcel data). We calculated the average ratio for each specific land use and anything that was below the average ratio was considered to be available for redevelopment. This increased the capacity number for jobs in Frederick City by approximately 4,000. Second, MDP does not often produce non-residential development capacity figures.

For Mixed Use Zoning Districts, the City of Frederick Planning Department provided MDP with a Land Use Mix table by zoning district that allowed us to estimate the possible number of new households and jobs by Zoning District. We assumed that these percentages remain constant within each Zoning District.

Key Issues Regarding Development Capacity Analyses – Development capacity (land supply) can be defined in many different ways, depending on the intent of the particular study. MDP's capacity analysis is essentially an "intelligent build-out" study that does not measure development capacity in terms of infrastructure capacity, permitting, or APFO considerations. Alternative approaches can include a focus on infrastructure capacity and current development capacity (i.e. what could be developed now vs. what could eventually be developed). The MDP methodology also accounts for some infill and redevelopment potential. It is possible to limit the scope of a development capacity analysis to only "greenfield" developments, or it is possible to assume more infill and redevelopment potential than we have done in our method.

The MDP approach to calculating development capacity is a useful way to analyze development capacity at several scales: statewide, regional, county, watershed, sub-county, and zoning district. It implements a consistent methodology through Maryland's 23 counties. While our analysis is very useful at several scales, it should not be used at a parcel scale.

IV. Key Data Layers

MDP has included a CD that contains several important GIS layers. These layers are listed below. A metadata file for each of the layers is included on the CD. If additional information about these data layers is needed, please contact Stephanie Martins a MDP at (410)-767-4562.

1. Zoning – the City of Frederick provided digital zoning data that MDP incorporated into the Frederick County's GIS data file. MDP also updated the Frederick County Zoning layer with data provided from the City through HNTB.

2. Sewer Service Areas (sewer) – MDP maintained layer with input from the City of Frederick Planning Staff on updates and changes.
3. Protected Lands (protlands) – MDP maintained layer with input from the City of Frederick Planning Staff on updates and changes.
4. 2000 Generalized Land Use/Land Cover (landuse) – created and maintained by MDP
5. Priority Funding Areas (pfa) – created and maintained by MDP

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

Understanding Frederick's Transportation System

October, 2003

Prepared by:

HNTB Corporation
Architects Engineers Planners

UNDERSTANDING FREDERICK'S TRANSPORTATION SYSTEM

1.0 Introduction

This report provides an assessment of Frederick's existing transportation system and highlights key issues and deficiencies. The report also discusses regional and local planned transportation improvements that would affect City of Frederick. This is one of several reports that will provide background analysis for the Comprehensive Plan Update.

Within the larger Baltimore-Washington metropolitan region, Frederick is strategically located at the confluence of two major interstates, I-270 and I-70. In addition, the City is served by other major US and State highways including US 15, US 40, US 340, MD 355 and MD 26. The municipal airport and MARC train connection also contribute to the strong regional accessibility of Frederick.

The City of Frederick was laid out on a basic grid network of streets. Over the years the street network has evolved into a combination of the traditional grid and other neighborhood street patterns such as cul-de-sacs and curvilinear streets. Currently, the city includes over 70 miles of public streets and roads, owned and maintained by various separate jurisdictions including the city, county and state. State highways account for 22 miles, county roads 6 miles, and city streets approximately 50 miles.

The Census 2000 "journey to work" data for Frederick County show the predominance of single occupied vehicles. In 2000, about 79 percent (compared to 73 percent in 1990) of the workers drove alone to work and less than two percent used public transportation. Between 1990 and 2000, the mean travel time to work increased from 28 minutes to 32 minutes[1]. The Census Bureau has not yet released commuting data at the city level. When data for the City of Frederick is published, later in 2003, it will be assessed as part of the Comprehensive Plan update.

Transportation issues have been high in the list of priorities for the stakeholders of the City of Frederick. The community-based *Aspire Frederick* process identified transportation as one of the most important issues facing the city. In the City of Frederick Comprehensive Plan Assessment and Investigation Report (PAIR) key issues facing the city were identified in conjunction with the inputs given by the Mayor, the Board of Aldermen, Planning Commission, and the plan update Steering Committee (comprising business, city, and county government, and residential representatives). Transportation was among the most cited issues by these stakeholders. Specific issues included inadequate funding for transport, lack of multi-modal infrastructure, planning for bicycles and pedestrians among others.

[1] In 2000, the mean travel time to work for Maryland was 31 minutes.

2.0 Road System Existing Capacity

The Master Highway Plan component of the City of Frederick Comprehensive Plan 1995 defines the functional classifications of existing and planned roads to serve the 20 year land use recommendations (See Map 1). These functional classifications are:

- Freeway/Expressway
- Major Arterial (100 ft right of way in rural areas, 80 ft in urban areas)
- Minor Arterial (80 ft right of way in rural areas, 70 ft in urban areas)
- Collector Streets (60 ft right of way)
- Local Streets (50 ft right of way)

As the Master Highway Plan map shows, the City of Frederick is connected by all of the interstate and primary highways in the county, including I-270, I-70, US 340, and US 15. These multi-lane divided freeways enhance regional accessibility but also create a traffic burden due to the amount of through traffic concentrated in the City. Data collected by the Traffic Monitoring System (TMS) team of the State Highway Administration (SHA) show an increase in the Annual Average Daily Traffic (AADT) from 1992 to 2002 at various locations on Frederick's roadways. Table 1 depicts the AADT for key roadway segments and Map 2 displays the same information.

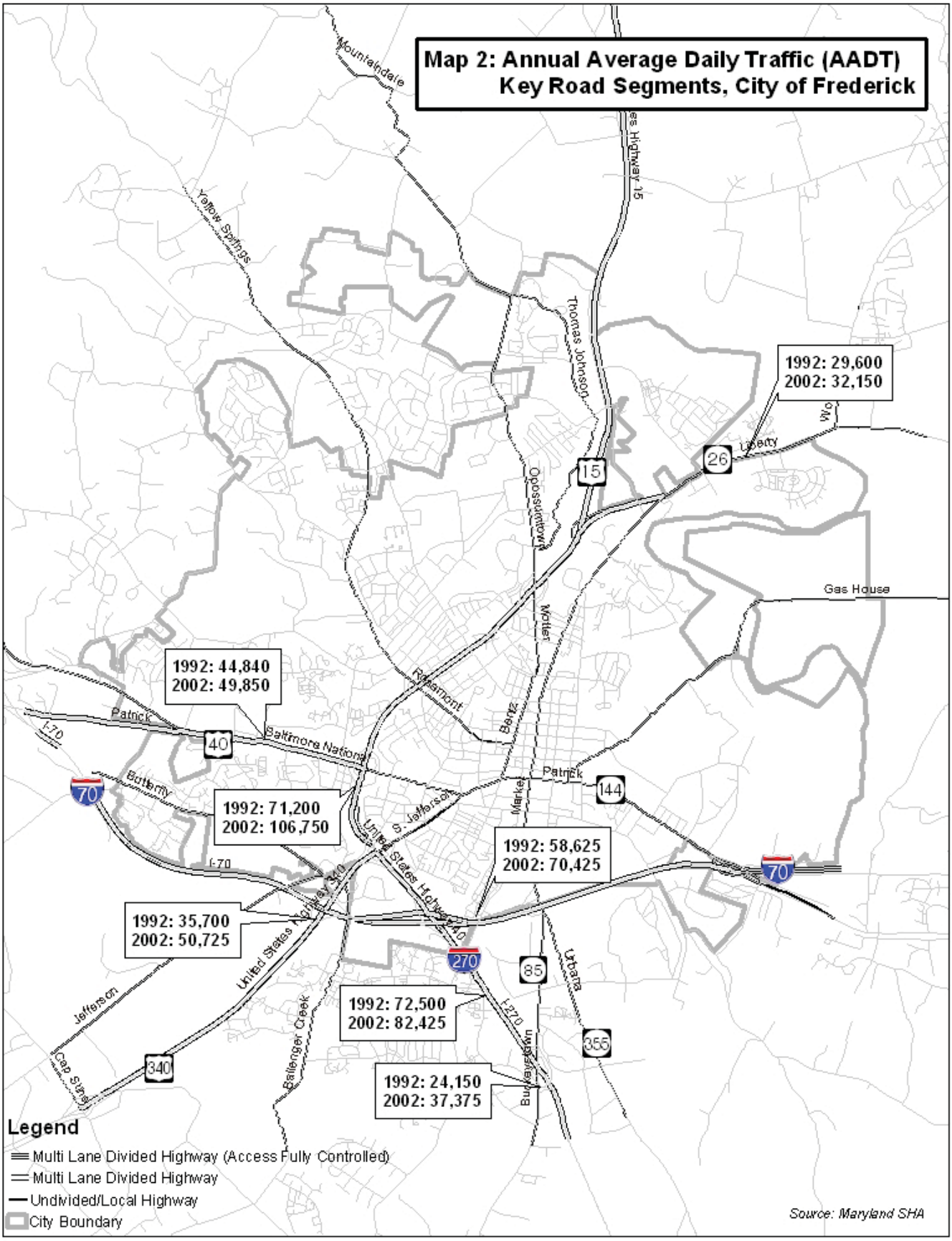
Table 1. City of Frederick Traffic Counts, AADT

Roadway Segment	1992	2002
I-270 between 70 & MD 85	72,500	82,425
US 15 between US 40 & 340	71,200	106,750
I-70 between I-270 & MD 85	59,625	70,425
US 40 (Golden Mile)	44,800	49,850
MD 85 below I-270	24,150	37,375
MD 85 below I-70	N/A	27,285
US 340/I-70	35,700	50,725
MD 26 W/Monocacy	29,600	32,150

Source: Maryland SHA

A Citywide Traffic Study was done for the City of Frederick to evaluate existing (2001) roadways and intersection capacities. The study evaluated more than 70 miles of roadway and 150 intersections using the Synchro/SimTraffic computer model. The I-70, US 15, and I-270 corridors were not included in this study. The study reported measures of effectiveness including delays, travel times, average speeds and *Levels of Service* (See Box 1 for more on the concept of *Levels of Service*).

Map 1. 1995 Comprehensive Plan Road Classification


Map 2: Annual Average Daily Traffic (AADT)
Key Road Segments, City of Frederick
1992: 29,600
2002: 32,150
1992: 44,840
2002: 49,850
1992: 71,200
2002: 106,750
1992: 58,625
2002: 70,425
1992: 35,700
2002: 50,725
1992: 72,500
2002: 82,425
1992: 24,150
2002: 37,375
Mountaindale
Yellow Springs
Thomas Johnson
Opossumtown
Motter
Rosemont
Bentz
Market
Patrick
Baltimore National
Butterfly
S. Jefferson
United States Highway 40
Jefferson
Cap Street
Ballenger Creek
Buckeystown
Urbana
Gas House
Liberty
15
26
40
70
144
270
85
355
340
Legend
Multi Lane Divided Highway (Access Fully Controlled)
Multi Lane Divided Highway
Undivided/Local Highway
City Boundary
Source: Maryland SHA

The study found that the majority of city intersections operate at an acceptable LOS "C" during the AM and PM peak periods. However, there are 17 intersections that operate at LOS "D" or worse during the AM and/or PM peak periods. Table 2 shows the LOS and Average Vehicle Delay for these intersections. According to the SHA, LOS "D" is the minimum acceptable operating condition for intersections in urban environments. LOS "E" and LOS "F" represent the worst operating conditions. The study shows that in the City of Frederick eight intersections are operating at LOS "E" or LOS "F". These intersections are shown on Map 3.

The study recommends short-term improvements such as adjusting signal timings and lane configurations to improve the existing level of service of congested intersections. Table 3 shows the recommended improvements and Table 4 shows the improved LOS for congested intersections with improvements. With the improvements, the number of intersections operating at LOS E or F drops to only three (from eight) as shown on Map 3. In addition, delay time[2] is significantly reduced at a number of intersections.

Box 1. Levels of Service

The Level of Service (LOS) is a rating system for roadways that measures operational conditions in traffic and perceptions of the motorists involved. The individual LOS is characterized by factors such as speed and travel time, freedom to maneuver, traffic interruptions and convenience.

Six LOS categories are commonly defined. Each is given a letter designation from A to F, with LOS "A" representing the best operating conditions and LOS "F" depicting the worst, as defined below:

"A" is the best operating condition with a free flow in which there is no restriction on speed or maneuverability. At intersections, there is little or no delay.

"B" represents condition of stable traffic flow, but operating speed is beginning to be restricted. Short traffic delays occur at intersections.

"C" is still a condition of stable flow, but most drivers are becoming restricted in their freedom to select speed, change lanes or pass other vehicles. Intersections experience average traffic delays.

"D" approaches unstable flow. Operating speeds are tolerable to the driver, but are subject to considerable and sudden variation. Freedom to maneuver is limited and driving comfort is low, as the probability of accidents has increased. Long traffic delays are experienced at intersections.

"E" represents a maximum roadway capacity for vehicles. Operation in this zone is unstable, speeds and flow rates fluctuate, and there is little independence of speed selection or maneuver. Driving comfort is low and accident potential high. The distance between vehicles is short and operating speeds are subject to rapid fluctuation. Very long traffic delays are experienced at intersections.

"F" is the worst operating condition. Speed and traffic flow may, for short time periods, drop to zero. Extreme delays are experienced at intersections. This may cause severe congestion affecting other adjacent roadways.

[2] Time motorists sit waiting at intersections

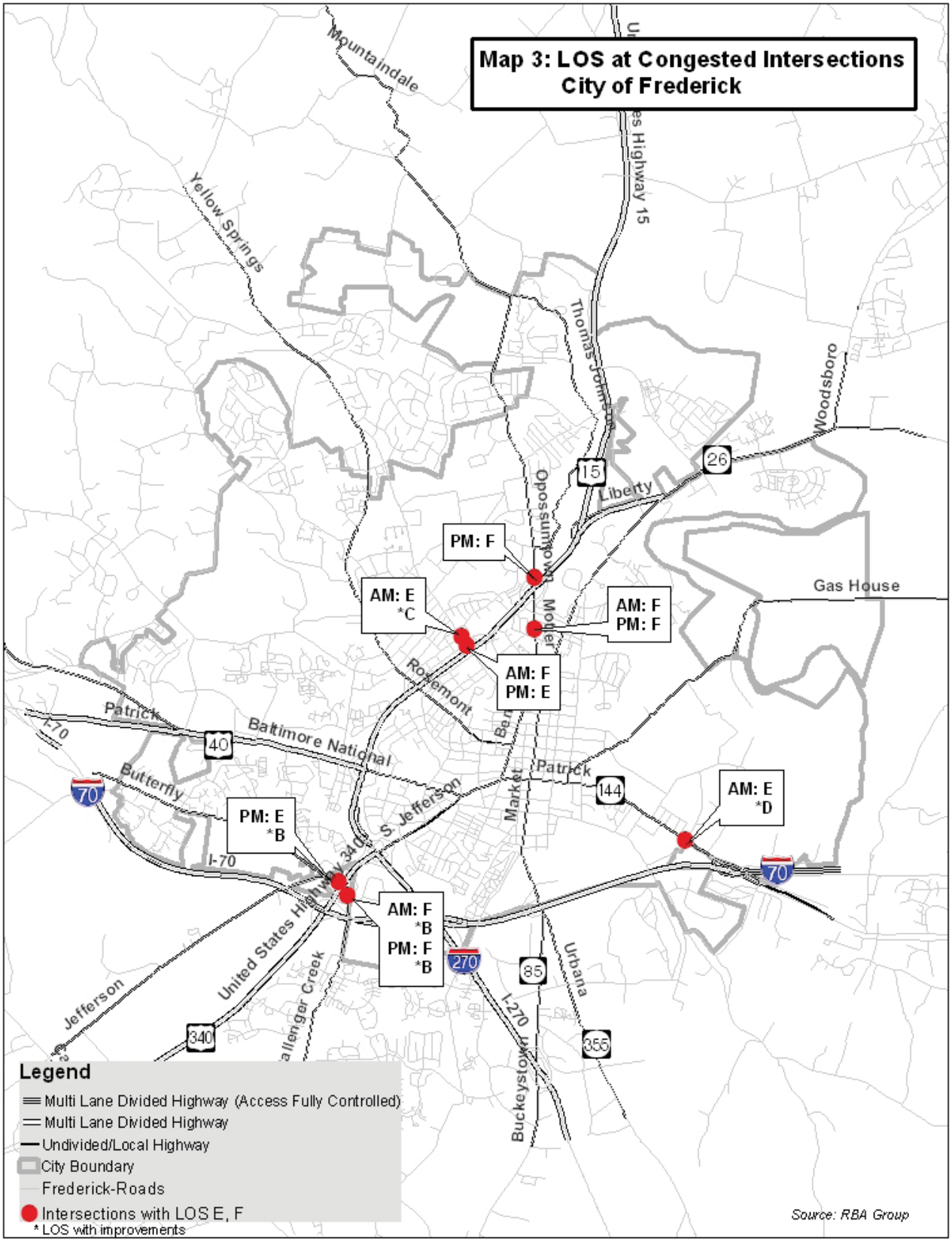

Map 3: LOS at Congested Intersections
City of Frederick
Mountaindale
Yellow Springs
Thomas Johnson
Highway 15
Woodsboro
Liberty
Opossumtown
Gas House
Rosemont
Baltimore National
Patrick
Butterfly
I-70
S. Jefferson
Market
Urbana
United States Highway 340
Jefferson
Buckeystown
I-270
PM: F
AM: E
*C
AM: F
PM: F
AM: F
PM: E
PM: E
*B
AM: E
*D
AM: F
*B
PM: F
*B
15
26
40
144
70
270
85
340
355
Legend
Multi Lane Divided Highway (Access Fully Controlled)
Multi Lane Divided Highway
Undivided/Local Highway
City Boundary
Frederick-Roads
Intersections with LOS E, F
* LOS with improvements
Source: RBA Group

Table 2. LOS and Delay at Congested Intersections

Intersection	Level of Service		Average Vehicle Delay* (in seconds)	
	AM	**PM**	**AM**	**PM**
7TH ST @ SB US 15 RAMPS	**F**	**E**	---	---
7TH ST @ SCHLEY AVE	**E**	D	58.1	46.1
EAST ST @ 7TH ST	D	D	---	---
US 40 @ BAUGHMANS LANE	D	C	41.0	35.0
MD 144 @ WEST COLLEGE TERRACE	D	**E**	35.1	75.8
MD 144 @ MONOCACY BLVD	**E**	C	67.9	32.1
MD 144 @ NORVA AVE/ KLINE BLVD	C	D	27.6	51.1
MD 180 @ HIMES AVE	C	**E**	24.8	66.2
MD 351 @ SOLAREX CT	**F**	**F**	101.2	101.6
MD 355 @ 16TH ST	D	A	---	---
MOTTER AVE @ 9TH ST	D	C	---	---
MOTTER AVE @ FAIRVIEW AVE	**F**	**F**	---	---
OPOSSUMTOWN PIKE @ SB US 15 RAMPS	D	**F**	---	---
OPOSSUMTOWN PIKE @ THOMAS JOHNSON DR	C	D	30.5	45.5
SOUTH ST @ CARROLL ST	B	D	17.0	44.2
ROSEMONT AVE @ MONTEVUE LANE	D	D	41.6	42.1
THOMAS JOHNSON DR @ HAYWARD RD	C	D	---	---

SOURCE: THE RBA Group

* Delay not calculated for unsignalized intersections

Table 3. Recommended Improvements for Congested Intersections

Intersection	Improvement and Resulting Level of Service
7th Street at Schley Avenue	Adjust signal timing splits between phases **AM peak LOS improves from "E" to "C"**
MD 144 at West College Terrace	Adjust signal timing splits between phases **AM peak LOS improves from "D" to "C"** **PM peak LOS improves from "E" to "D"**
MD 144 at Monocacy Boulevard	Adjust signal timing splits between phases **AM peak LOS improves from "E" to "D"**
South Street at Carroll Street	Change lane configuration on eastbound South Street from one shared travel lane to one exclusive left-turn lane and one shared through/ right-turn lane Change lane configuration on northbound Carroll Street from one shared travel lane to one exclusive left-turn lane and one shared through/ right-turn lane Adjust signal timing splits between phases **PM peak LOS improves from "D" to "C"**
Rosemont Avenue at Montevue Lane	Change phasing for left turns on northbound Rosemont Avenue from protected to protected/ permissive **AM peak LOS improves from "D" to "C"** **PM peak LOS improves from "D" to "C"**
MD 351 at *Solarex Court	*Alternative 1:* Addition of a left-turn lane NB at Solarex Court Two thru lanes NB from I-70 on-ramp extending underneath I-70 overpass Two thru lanes SB through intersection at Solarex and merging into one lane just north of I-70 overpass Restriping WB Solarex Court to one shared thru/ left-turn lane and one shared thru/ right-turn lane *Alternative 2:* Double left-turn lane and one shared thru/ right-turn lane NB at Solarex Court Two thru lanes SB through intersection at Solarex extending south past I-70 overpass Restriping WB Solarex Court to one shared thru/ left-turn lane and one shared thru/ right-turn lane **AM peak LOS improves from "F" to "B"** **PM peak LOS improves from "F" to "B"**
MD 180 at Himes Avenue/US 15 Off-Ramp [3]	Additional left-turn lane on US 15 off-ramp Addition of shared thru/right-turn lane on WB MD 180 extending to intersection of MD 180 and Butterfly Lane One left-turn lane and one shared left-turn/ right-turn lane on Himes Avenue **PM peak LOS improves from "E" to "B"**

*MD 351 at Solarex Court and MD 180 at Himes Avenue, were addressed in a traffic impact study for the Hargett Property conducted by The RBA Group on June 27, 2002.

Table 4. LOS and Delay at Congested Intersections with Improvements

Intersection	Level of Service		Average Vehicle Delay* (in seconds)	
	AM	**PM**	**AM**	**PM**
7TH ST @ SB US 15 RAMPS	**F**	**E**	---	---
7TH ST @ SCHLEY AVE	C	D	29.7	36.7
EAST ST @ 7TH ST	D	D	---	---
US 40 @ BAUGHMANS LANE	D	C	41.0	35.0
MD 144 @ WEST COLLEGE TERRACE	C	D	34.0	41.0
MD 144 @ MONOCACY BLVD	D	C	52.6	32.1
MD 144 @ NORVA AVE/ KLINE BLVD	C	D	27.6	51.1
MD 180 @ HIMES AVE	C	B	30.1	18.2
MD 351 @ SOLAREX CT	B	B	13.8	16.2
MD 355 @ 16TH ST	D	A	---	---
MOTTER AVE @ 9TH ST	D	C	---	---
MOTTER AVE @ FAIRVIEW AVE	**F**	**F**	---	---
OPOSSUMTOWN PIKE @ SB US 15 RAMPS	D	**F**	---	---
OPOSSUMTOWN PIKE @ THOMAS JOHNSON DR	C	D	30.5	45.5
SOUTH ST @ CARROLL ST	B	C	16.1	31.2
ROSEMONT AVE @ MONTEVUE LANE	C	C	31.2	27.9
THOMAS JOHNSON DR @ HAYWARD RD	C	D	---	---

Source: The RBA Group

* Delay not calculated for unsignalized intersections

2.2 Planned Roadway Improvements

The SHA, Frederick County, and the City of Frederick have planned long-term measures such as roadway improvements to accommodate current and future demands. These are listed below.

SHA Funded Improvements

1. Providing the missing movements in the US 15 and US 340 interchange
2. Providing the missing movements in the I-70 and I-270 interchange, including widening of I-70 ramps to and from US 15
3. Widening of I-70, extension of Walser Drive from South Street to MD 355, and construction of Walser Drive/ I-70 interchange
4. Reconstruction of the MD 355 and I-70 interchange ramps
5. Reconstruction of the MD 355 bridge over I-70, including widening of MD 355 from Walser Drive to I-70
6. Widening of I-70 from Mt. Phillip Road to west of US 40.
7. Mt. Philip Road and I-70 interchange
8. East Street - Extension from South Street to Walser Drive*
9. Westbound MD26 - Northbound ramp into US 15*

The County and City Funded Improvements

1. Monocacy Blvd – Extension to complete Gas House Pike and Hughes Ford Road
2. Christophers Crossing – Extension and grade separation over US 15

City of Frederick Planned Improvements

The City of Frederick Comprehensive Plan 1995 recommended highway and streets improvement priorities. Table 5 shows these improvement priorities and their status of completion to date.

** Some City/County funding contribution for design*

Table 5. City of Frederick Comprehensive Plan 1995, Highway and Streets Improvement Priorities and Current Status

Short Term 1994 to 2000	Current Status of Completion
• East Street Extension –I-70 to East Patrick Street	Not in SHA 6-yr CTP
• I-70 interchange and other improvements	I-270 all movements complete. Rte 355/85 temporary interchange complete. Relocation of 355/85 intersection & connection to EB I-70 due to be completed 4/04. No other projects in SHA CTP.
• Shookstwon Road/Montevue Lane Upgrade-Rosemont to Willowdale	Complete
Intermediate 2000-2005	
• Airport Drive East-Extension from current ending point just north of DPW to loop around and connect to Bowman Farm Road	Begin approximately in 4 years (2007), minimum of two year construction schedule. Developer and Airport development (FAA funded) time frame
• Shookstown Road Upgrade-Willowdale to Old Camp Road Extended	Developer driven
• Monocacy Boulevard-South Street to Hughes Ford Road	Patrick to South – not in City CIP. Patrick to Hughes complete.
• East 7th Street Extension-Gas House Pike to East Street	Developer driven
• Pine Avenue-Patrick Street to East 7th Street Extended	Not in City CIP
• Highland Street Extension-Monroe Avenue to Monocacy Blvd.	Not in City CIP
• South Street Upgrade-Franklin Street to Reichs Ford Road	South of I-70 complete. North of I-70 not in City CIP
• East Street-Patrick Street to North Market Street Upgrade	Ph. I to 4th St complete 2003. Ph. II to Market not in City CIP or State CTP
• MD 26 Westbound to US 15 Northbound-Ramp	Begin Construction 2006, End 2008
• Western Arterial-Old Camp Road to US 15	Begin after 2005 with a minimum of two year construction schedule. Developer driven time frame
Long Term 2005 and Beyond	
• Mt. Philip Road-Align opposite Old Camp Road near US40A	Developer driven
• Butterfly Lane-upgrade to closed section, storm water management, sidewalks and street trees	Developer driven
• Gas House Pike-upgrade (Monocacy to City/County Line)	Construction to begin late summer 2003

Other Plans

The highway plan of the Frederick Region Plan 2002 includes the following recommendations on road and intersection improvements in the City of Frederick:

- A full interchange at I-70/US 40A. This interchange would provide access to the western side of the City of Frederick via Mt. Phillip Road, Old Camp Road, and Christophers Crossing and would serve as an alternative to US-15 in accessing I-270 and I-70.
- Coordinate new arterial connection with the City of Frederick.
- Maintain the rural character of US 15 through the protection of scenic views.

Some of the regional transportation studies also affect highway improvements in the City of Frederick. For example, the ongoing SHA-sponsored *I-270/US 15 Multi-Modal Corridor Study* addresses several roadway improvement needs for the portion of US 15 through the City and up to Biggs Ford Road (See Box 2).

The *US 15/MD 26 Interchange Improvement Study*, a breakout project from the *I-270/US 15 Multi-Modal Corridor Study* is looking at alternatives for enhancing access to and from the local network, and improving safety at the US-15/ Hayward Road-Worman's Mill Road at-grade intersection. The study has proposed a no-build alternative and five build alternatives that include the provision of additional ramps, and reconfiguration of the interchange.

Box 2. I-270/US 15 Multi-Modal Corridor Study Highway Alternatives Affecting the City of Frederick

- Addition of one general-purpose lane to the inside and one auxiliary lane connecting interchange ramps to the outside from US 15/US 340/Jefferson Street to MD 26.
- Addition of one northbound and southbound general-purpose lane through inside widening from I-70 to US 15/US 240/Jefferson Street.
- New interchanges at US15/Trading Lane and US 15/Biggs Ford Road

Preferred Interchange Alternative: The build alternative with northbound ramp was selected by the SHA, the Mayor and Board of Aldermen of the City of Frederick, and the Board of County Commissioners as the preferred interchange alternative

3.0 Parking

The parking supply in downtown Frederick is presently dominated by numerous small private/restricted parking lots and the on-street parking system (metered and non-metered). In addition, the city owns three parking garages with a total capacity of 1,369 spaces. A recent comprehensive parking assessment study for the downtown found a total of 8,818 parking spaces with peak occupancy of about 59 percent. The study concluded that while the downtown has an overall surplus of parking spaces, the surplus is either limited to specific parking lots and properties or, in the case of public supply, located on the periphery of the downtown. With the exception of Carroll Creek Garage, all public off-street lots and garages have reached or exceeded their operational capacity.

Based on the parking needs assessment, and the evaluation of alternative parking sites, the study recommended that the City focus on two particular sites to address immediate and mid-term parking needs: the Delphey's/Courthouse site and the Patrick Street/East Street site. In addition, based on the study's recommendation to minimize the demand for parking, a satellite lot and shuttle service connecting the Harry Grove Stadium lot with the downtown core is being implemented.

4.0 Public Transportation

The census-based commuting pattern data (as discussed in the Introduction) show that the vast majority of commuters in Frederick County use single occupancy automobiles. The Comprehensive Plan for the City of Frederick 1995 in a way acknowledges the pre-imminence of automobiles and does not include strong and detailed recommendations for public transportation. The stakeholders of the city, however, identify the need for multi-modal alternatives as one of the transportation priorities for the Comprehensive Plan update. The following section discusses the existing transit service available in the City of Frederick.

4.1 Regional Rail

In December 2001, Maryland Rail Commuter Service (MARC) began service on a 13.5-mile extension of its Brunswick Line to the City of Frederick. The $56 million project, began in 1996, encompassed the rebuilding of CSX's 3-mile Frederick Industrial Track, a connection at Point of Rocks, and two new stations: one in downtown Frederick and the other at Monocacy (across from Francis Scott Key Mall).

Service from the City of Frederick includes trains into Union Station in Washington each morning and return service in the evening. All Frederick trains stop at the key job centers along the I-270 corridor in Montgomery County (Germantown, Gaithersburg, Silver Spring and Rockville). This service also provides connections to *Metrorail* and other transit providers.

4.2 Regional and Local Bus

In 1993 the City of Frederick and Frederick County consolidated their bus operations into a single subsystem operated by the County. This consolidated system is called *TransIT Services of Frederick County* and includes fixed and flexible routes in the City of Frederick, countywide paratransit for senior citizens and persons with disabilities, and commuter shuttle service between Frederick and neighboring towns.

"Connector" Routes operate in the City of Frederick and urbanized areas of Frederick County serving medical, employment, education, and shopping centers. Six routes operate Monday through Friday 5:30 a.m. - 9:30 p.m. (until 9:45 p.m. on Friday). Four routes operate on Saturday 7:30 a.m. - 9:45 p.m. The Midtown Connector operates Monday through Friday 7:15 a.m. - 6:45 p.m.

Four of the "Connector" Routes provide deviated-fixed route service. These routes operate on a regular schedule and can also deviate within a 3/4 mile corridor of the route for passengers who are unable to board the bus at a regular bus stop because of a disability.

Five commuter shuttle routes operate each weekday between the City of Frederick and the Route 85 business corridor, Walkersville/Woodsboro, Emmitsburg/Thurmont,

Brunswick/Jefferson, and the Point of Rocks train station (Meet-the-MARC shuttle). Three additional Meet-the-MARC shuttles have been added to serve the downtown Frederick MARC Station. These shuttles link the Frederick MARC station with Walkersville Village Shopping Center, Frederick Towne Mall, and Frederick Shopping Center. Map 4 shows these transit routes.

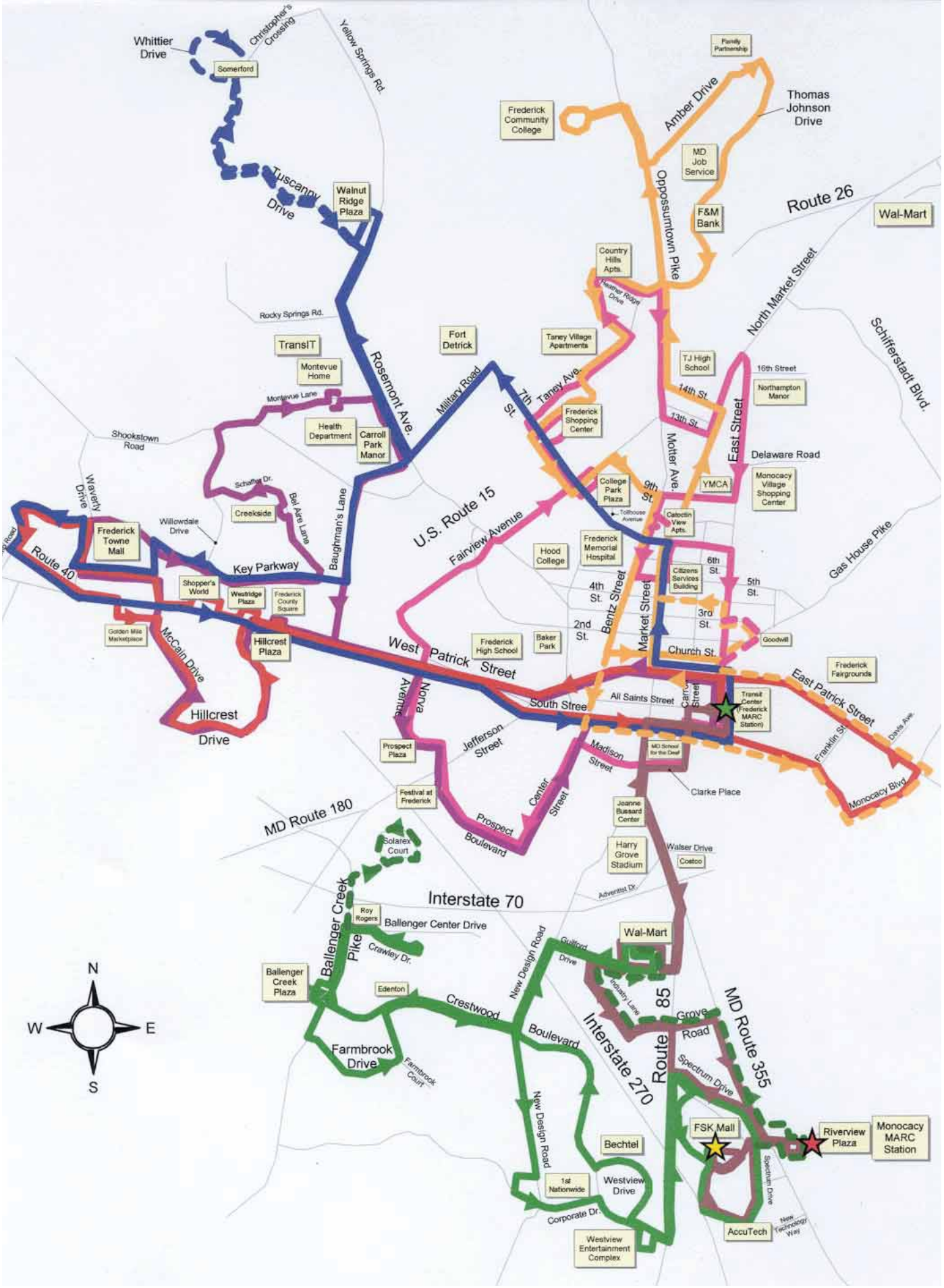
During Fiscal Year 2002, TransIT reported a total system ridership of 313,238 one-way passenger trips countywide. The ridership of Meet-the-MARC shuttle increased by 37 percent between 2001 and 2002**.** TransIT's five-year plan to improve the public transportation system in Frederick County includes increasing service frequency to 30 minutes during peak travel times, adding bus routes to serve new areas of development, and expanding commuter shuttle service in the regional communities of Frederick County**.**

One of the alternatives identified by the *I-270/US 15 Multi-Modal Corridor Study* proposes HOV direct access ramps to service high occupancy vehicles and buses to access the Shady Grove Metro Station (via I-270), Metropolitan Grove MARC Station (via Watkins Mill Road), Germantown Transit Center (via MD 118), COMSAT (via Newcut Road), and the MARC Monocacy Station (via MD 85/Shockley Drive). Express bus service, which offers non-stop connection between origins and destinations, would be provided along the I-270 HOV lanes, as would an extended feeder bus system.

4.3 Airport

The City of Frederick owns and operates the Frederick Municipal Airport, a general aviation airport near the City's eastern edge. The Federal Aviation Authority (FAA) has classified Frederick Municipal Airport as a "reliever" airport for BWI, Reagan National and Dulles Airports. Currently, Frederick Municipal Airport is the second busiest airport after BWI in Maryland in terms of annual aircraft operations. According to the most recent counts, the airport has over 130,000 annual operations.

The 1999 Airport Master Plan Study recommended that the main runway be extended to 7,000 feet from its current length of 5,220 to better serve the existing fleet of jet aircraft during all weather conditions. However, the FAA refused financial support because the proposed design only provided additional pavement for take-off operations and not landings. In 2000, the FAA funded a design only grant to upgrade the main runway and the construction is to be completed by end of 2003. In 2003 another study was performed to analyze the operation deficiencies of the runway and airfield system at the Frederick Municipal Airport. This study recommended the extension of the main runway 5-23 to a total length of 6,000 feet in order to qualify for FAA funding. In July 2003, these recommendations were adopted by the Mayor and Board of Aldermen.


Whittier Drive
Christopher's Crossing
Somerford
Yellow Springs Rd.
Tuscany Drive
Walnut Ridge Plaza
Rocky Springs Rd.
TransIT
Montevue Home
Montevue Lane
Rosemont Ave.
Military Road
Fort Detrick
Shookstown Road
Health Department
Carroll Park Manor
Schaffer Dr.
Bel Aire Lane
Creekside
Baughman's Lane
Waverly Drive
Willowdale Drive
Frederick Towne Mall
Route 40
Key Parkway
Shopper's World
Westridge Plaza
Frederick County Square
Golden Mile Marketplace
McCain Drive
Hillcrest Plaza
Hillcrest Drive
U.S. Route 15
Fairview Avenue
West Patrick Street
Nova Avenue
Prospect Plaza
Jefferson Street
Prospect Boulevard
Festival at Frederick
MD Route 180
Solarex Court
Interstate 70
Ballenger Creek Pike
Roy Rogers
Ballenger Center Drive
Crawley Dr.
Ballenger Creek Plaza
Edenton
Crestwood Boulevard
Farmbrook Drive
Farmbrook Court
New Design Road
Interstate 270
Bechtel
1st Nationwide
Westview Drive
Corporate Dr.
Westview Entertainment Complex
Frederick Community College
Amber Drive
Thomas Johnson Drive
Family Partnership
MD Job Service
F&M Bank
Oppossumtown Pike
Route 26
Wal-Mart
Country Hills Apts.
Heather Ridge Drive
Taney Village Apartments
7th St.
Taney Ave.
Frederick Shopping Center
TJ High School
14th St.
13th St.
16th Street
Northampton Manor
North Market Street
Schifferstadt Blvd.
East Street
Delaware Road
Monocacy Village Shopping Center
YMCA
Motter Ave.
College Park Plaza
9th St.
Tollhouse Avenue
Catoctin View Apts.
Frederick Memorial Hospital
Hood College
Citizens Services Building
6th St.
5th St.
4th St.
3rd St.
2nd St.
Bentz Street
Market Street
Gas House Pike
Frederick High School
Baker Park
Goodwill
Church St.
Frederick Fairgrounds
East Patrick Street
South Stree
All Saints Street
Carroll Street
Transit Center (Frederick MARC Station)
Franklin St.
Davis Ave.
Monocacy Blvd.
Madison Street
MD School for the Deaf
Clarke Place
Joanne Bussard Center
Harry Grove Stadium
Walser Drive
Costco
Adventist Dr.
Wal-Mart
Guilford Drive
Industry Lane
Grove Road
MD Route 355
Spectrum Drive
FSK Mall
Riverview Plaza
Monocacy MARC Station
AccuTech
New Technology Way
N
W
E
S

5.0 Pedestrians and Bicyclists

The *City of Frederick Comprehensive Plan* (1995) does not include separate recommendations for improving pedestrians' mobility and safety. However, the City's Subdivision Regulations require four foot wide sidewalks throughout the city.

The City of Frederick's strategic location at the confluence of Rock Creek, Carroll Creek, Tuscarora Creek, and the Monocacy River presents opportunities for planning bikeways and trails. However, the city's off-road bicycle networks are, in general, undeveloped.

In March 2002 the City of Frederick adopted the *Shared Use Path Plan* with an objective to provide safe non-motorized access to recreational, cultural, employment, and commercial areas throughout the city. When complete, the off-road path system will provide about 35 miles of paths to be shared by pedestrians and bicyclists.

The *Shared Use Path Plan* identifies six major corridors for the proposed path system. Some of these routes are more fully implemented than others. (See Map 5 and associated Table 6)

Table 6. Major Corridors - The Shared Use Path Plan

Name	Total Length (feet)	Percentage Complete (2002)	Residential Units Served
Carroll Creek	32,400	20%	4,091
East Street	22,800	0%	525
Fredericktowne Village	6,650	60%	1,160
Monocacy River/Tuscarora Creek	55,200	28%	6,239
Monocacy Blvd.	54,000	6%	8,366
Rock Creek	13,200	49%	4,626

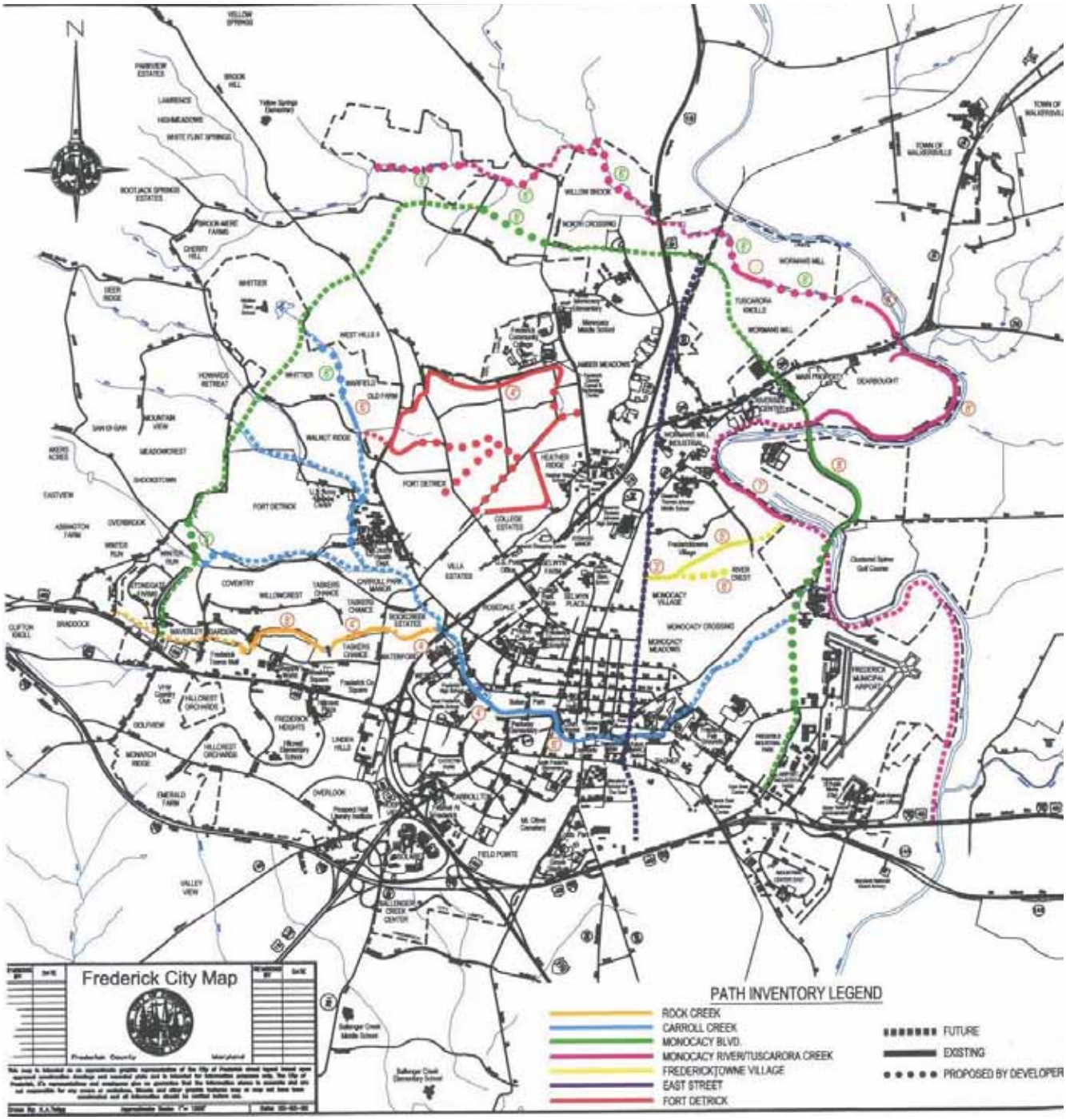
Source: City of Frederick Shared Use Path Plan, 2002

The Shared Use Path Plan also includes design standards and implementation strategies for these paths.

6.0 Conclusions

Highways: The City of Frederick has more than 70 miles of roadway and 150 intersections, of which eight intersections are operating below the acceptable minimum SHA level of service standards. The majority of the intersections in the downtown area operate at an acceptable level of service. However, there are areas within the city that experience considerable congestion. These areas include the MD 180/ MD 351 corridor in the vicinity of US 15/340, 7th Street in the vicinity of US 15, MD 144 east and west of the downtown area, and US 40 in the vicinity of Baughmans Lane and US 15. Several roadway improvements are planned and/or recommended that will help to alleviate these conditions. These range from minor improvements such as adjusting signal timings to the construction of missing interchange connections along I-70. Some of these improvements will help accommodate future traffic demands in and around the City. At

Map 5. Shared Use Path Plan



the same time, there are a number of intersections that are approaching congestion and would need to be improved to accommodate future development. The new transportation model being developed for the city will help understand the impact of future development in the city and the region. The City of Frederick's road grid is constrained by abutting historic buildings especially in the downtown.

Public Transportation: The recent Census Bureau data indicate the predominance of motorized single occupancy vehicles in Frederick. The City of Frederick is served by regional rail and bus transit; however, there is a need to examine the ridership numbers and measures to improve access to public transit.

Bikes and Pedestrians: The *Shared Use Path Plan* makes provisions for off road, planned pathways for bicycles and pedestrians. However, there is a need to examine on-road bike facilities such as shoulder lanes.

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

Parks and Recreation Assessment

July, 2003

Prepared by:

HNTB Corporation
Architects Engineers Planners

PARKS AND RECREATION ASSESSMENT

Introduction

This report provides an assessment of City of Frederick's existing parks and recreation facilities and highlights key issues and deficiencies. This is one of several reports that will provide background analysis for the Comprehensive Plan Update.

Existing Inventory

The City of Frederick includes 440 acres of public parks distributed in 56 parks with an average size of 7.8 acres. The National Recreation and Park Association (NRPA) has developed community standards for parks and active recreation. Table 1 summarizes the NRPA parkland classification system guidelines.

Table.1 NRPA Parkland Classification System Guidelines

Type	Service Area	Desirable Size	Acres/1000 Residents	Desirable Site Characteristics and Facilities
Community Parks	1-2 Miles	25+ Acres	5 to 8 Acres	May include areas suited for intense recreation facilities such as athletic complexes and large swimming pools. Easily accessible to nearby neighborhoods and other neighborhoods
Neighborhood Parks	¼ to ½ Mile	5-15 Acres	1 to 2 Acres	Serve the surrounding neighborhoods with open space and facilities such as basketball courts, children's play equipment and picnic tables
Regional Parks	Several Communities	200+ Acres	5 to 10 Acres	Contiguous to or encompassing natural resources
Special Use Areas	No Applicable Standards	Variable Depending on Desired Size	Variable	Area for specialized or single purpose recreation activities such as campgrounds, golf courses etc.

Source: NRPA, 1983

Based on the NRPA guidelines, the City of Frederick's park inventory can be broken down into neighborhood parks, community parks, and special facilities (See Table 2). At the regional scale, the City of Frederick is located close to a number of county, state and national parks, which provide facilities such as camping grounds and trails. These include Gambrill State Park, Cunningham Falls State Park, Pinecliff Park, Shookstown Park, Braddock Heights Park, Ballenger Creek Park, Catoctin Mountain Park, and Monocacy National Battlefield.

Table 2. Public Parks-Size and Facilities, City of Frederick

Park/Facility	Acreage	Facilities Available
Community Parks		
Taskers Chance	20.0	Ball field complex (2 fields), 1 basketball court
Amber Meadows	10.0	1 basketball court, 2 tennis courts, 1 Little League field
Baker	53.0	Amphitheater, 11 tennis courts, 2 softball fields, 1 Little league, 1 T-ball field, 1 multi-purpose field
Max Kehne	9.1	2 tennis courts, 1 softball field, 1 Little League and 1 multi-purpose field
McCurdy	6.2	1 basketball court, 1 baseball field, 1 in-line court, 1 football
Monocacy Village	10.4	1 basketball court, 2 tennis courts, 3 T-ball fields
Riverwalk @ FTV	9.2	1 softball field, 1 little league field, 1 in-line court
Walnut Ridge	18.0	1 tennis court, 1 T-ball field
Fredericktowne Village	33.3	1 basketball court
Rivermist	34.8	Not Developed
Willowdale	13.2	No facilities
Waterford	18.2	No facilities
Hill Street	18	2 multi-purpose fields, 2 in-line courts
Riverside Center	23	4 multi-purpose fields
Linear Greenway	12	No facilities
Loats Park	33	1 baseball field, 1 T-ball field
Total	**321.5**	
Neighborhood Parks		
Staley	7.0	1 basketball court, 1 little league field, 1 T-ball field
Grove	4.5	1 Little League field, 1 multi-purpose field
Rock Creek	2.0	Passive
Carrollton	3.7	1 basketball court, 2 tennis courts, 1 T-ball field
Catoctin	0.9	Passive
Clerestory	2.3	1 multi-purpose field
Cobblestone	3.6	1 basketball court
College Estates	2.1	2 basketball courts, 1 In-line court
David Lane	2.3	No facilities
Emerald Farms	3.2	1 multi-purpose field
Golfview	3.0	No facilities
Harmon Field	2.0	1 T-ball field
Hillcrest	2.3	1 basketball court, 1 tennis court, 1 T-ball field
Jimmy McGee Memorial	6.8	No facilities
Maryvale	4.5	No facilities
Monarch Ridge	3.3	1 basketball court, 1 tennis court, 1 T-ball field
Mullinix	2.3	1 basketball court
North Crossing	3.1	No facilities
Overlook	4.7	1 basketball court, 2 tennis court
Rosedale	2.9	2 basketball courts, 1 T-ball field
Sagner	4.3	2 basketball courts, 1 Little League field, 1 multi-purpose field
South End	3.2	2 basketball courts
Stonegate	2.0	1 basketball court
Wetherburne	4.5	1 basketball court, 1 tennis court
Willowbrook	3.6	Not developed
Total	**115.6**	Includes passive recreation parks
Total City Owned Public Parks	**437**	

Level of Service

Park Acreage

The top portion of Table 3 includes the city's 1995 Comprehensive Plan level of service standards for parks expressed as acres per 1,000 population and it includes NRPA level of service standards. The city's standards included in the Comprehensive Plan provide for a higher level of service standard than do the NRPA standards.

The remainder of Table 3 applies both sets of standards to the city's existing park inventory. The analysis shows a deficit in total park acreage as well as community and neighborhood park acreage based on the city's 2000 population of 52,767.

Based on NRPA and the 1995 Comprehensive Plan for Frederick recommendations, the City of Frederick shows an overall deficit of local developed open space at 2000 population (See Table 3).

Table 3. Parks Level of Service Per 1000 Population Standards and 2000 Assessment

		Comprehensive Plan	NRPA
Standards	Total Parkland	15 acres/1000	10 acres/1000
	Community Parks	10 acres/1000	8 acres/1000
	Neighborhood Parks	5 acres/1000	2 acres/1000
Assessment	Total Parks Need	792	528
	Existing	437	437
	Deficit	355	91
	Level of Service	8.2 acres/1000	8.2 acres/1000
	Community Parks Need	528	424
	Existing	321.5	321.5
	Deficit	207.5	102.5
	Level of Service	6.1 acres/1000	6.1 acres/1000
	Neighborhood Parks Need	264	106
	Existing	115.6	115.6
	Deficit	148.4	+8.4
	Level of Service	2.2 acres/1000	2.2 acres/1000

Park Facilities

The NRPA provides guidelines for assessing the adequacy of specific recreational facilities such as ball fields and tennis courts. These guidelines are presented in Table 4.

NRPA also gives guidelines for estimating special facilities. These guidelines are presented in Table 4.

Table 4. NRPA Recreation Facilities Guidelines

Recreation Facilities	Guidelines Per Resident
Baseball Fields	1/5,000
Soccer Fields	1/10,000
Football Fields	1/10,000
Basketball Courts	1/2,000
Tennis Courts	1/2,000
Multi-Purpose Courts	1/10,000
Swimming Pool	1/20,000
Golf Course	1/50,000
Gold Driving Ranges	1/50,000
¼ mile / 400 Meter Track	1/20,000
Archery Range	1/50,000

Source: NRPA, 1983

Table 5 compares the City of Frederick's existing facilities to the standards shown in Table 3. Based on this analysis, the city is in good shape for its current population, except for soccer, football fields and archery range facilities.

Table 5. Existing Recreation Facilities vs. NRPA Guidelines

Recreational Facilities	Existing Total	Surplus/Deficit at 2000 Population
Baseball (including Little League)/Softball Fields	19	9
Soccer/Football Fields	2	-3
Basketball Courts	32	7
Tennis Courts	25	0
Swimming pool	2	-1
Golf Course	1	0
Archery Range	0	-1

Source: City of Frederick Parks and Recreation Department
HNTB Corporation

Distribution of Parks

To understand the distribution of public parks and identify areas that may be under-served, service areas of neighborhood and community parks were mapped based on NRPA standards shown in Table 2. Map 1 shows the location of community and neighborhood parks along with their service areas at radii of 1and 1/4 mile respectively.

Community parks are well distributed but neighborhood parks are in and around the urban core and neighborhoods to the west. Northern neighborhoods, where the city has experienced substantial growth, are under-served by neighborhood parks.

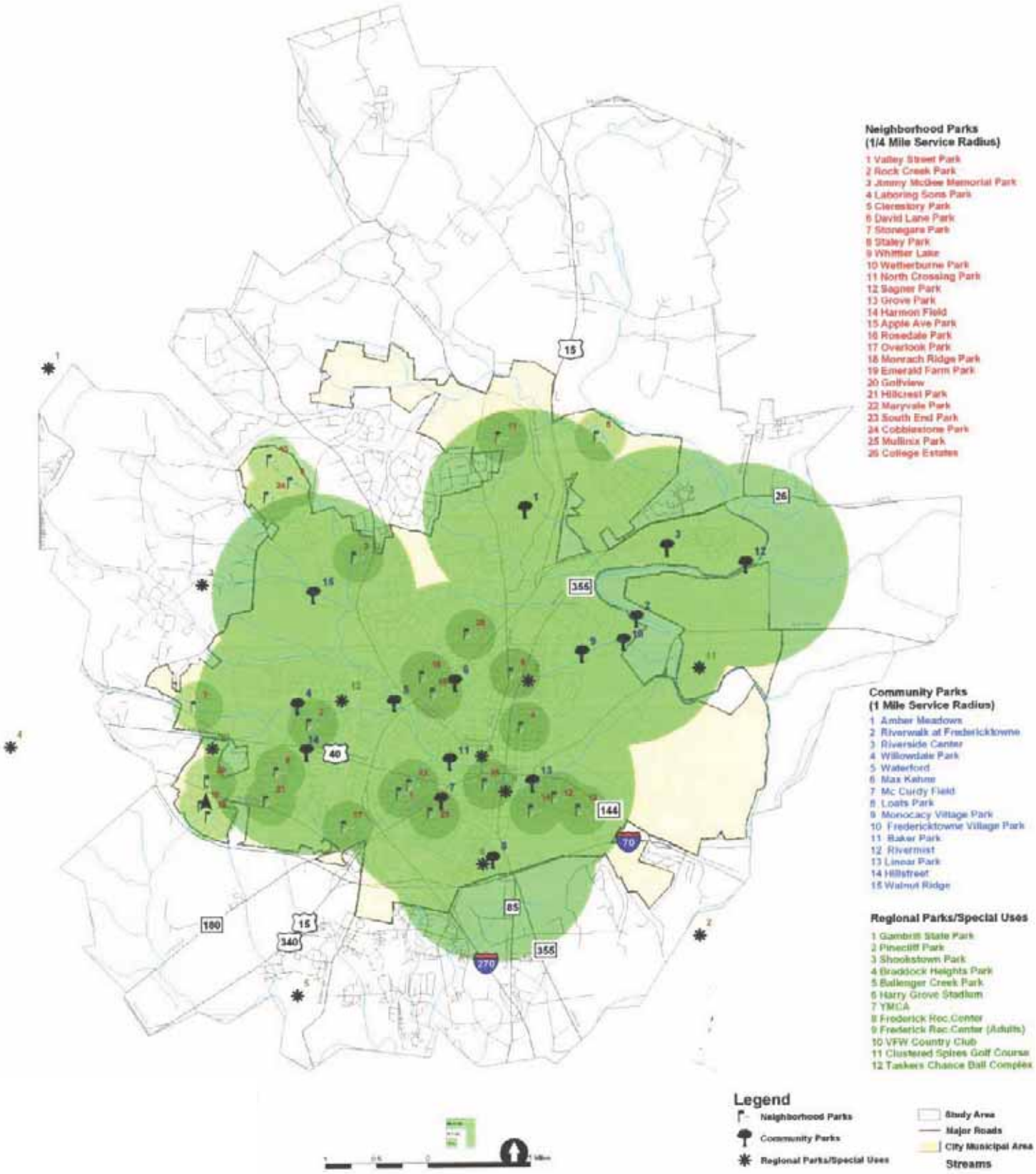
Conclusions

The analysis here focused on the city's parks and facilities. Of course, the city's location also allows for city residents' use of county, state and federal parks. These are not reflected in the level of service standards but do provide other parks and recreation opportunities for the citizens of Frederick.

The city has recently instituted a Parks Facilities Development Impact Fee with the purpose of requiring new residential development to pay for park development and improvement serving such new residential areas.

As part of the Comprehensive Plan update, additional sites for local and community parks should be identified so that additional parklands can be acquired – either purchased by the city or through the development review process.

Map 1


Neighborhood Parks
(1/4 Mile Service Radius)
1 Valley Street Park
2 Rock Creek Park
3 Jimmy McGee Memorial Park
4 Laboring Sons Park
5 Clerestory Park
6 David Lane Park
7 Stonegate Park
8 Staley Park
9 Whittier Lake
10 Wetherburne Park
11 North Crossing Park
12 Sagner Park
13 Grove Park
14 Harmon Field
15 Apple Ave Park
16 Rosedale Park
17 Overlook Park
18 Monrach Ridge Park
19 Emerald Farm Park
20 Golfview
21 Hillcrest Park
22 Maryvale Park
23 South End Park
24 Cobblestone Park
25 Mullinix Park
26 College Estates
Community Parks
(1 Mile Service Radius)
1 Amber Meadows
2 Riverwalk at Fredericktowne
3 Riverside Center
4 Willowdale Park
5 Waterford
6 Max Kehne
7 Mc Curdy Field
8 Loats Park
9 Monocacy Village Park
10 Fredericktowne Village Park
11 Baker Park
12 Rivermist
13 Linear Park
14 Hillstreet
15 Walnut Ridge
Regional Parks/Special Uses
1 Gambrill State Park
2 Pinecliff Park
3 Shookstown Park
4 Braddock Heights Park
5 Ballenger Creek Park
6 Harry Grove Stadium
7 YMCA
8 Frederick Rec.Center
9 Frederick Rec.Center (Adults)
10 VFW Country Club
11 Clustered Spires Golf Course
12 Taskers Chance Ball Complex
Legend
Neighborhood Parks
Community Parks
Regional Parks/Special Uses
Study Area
Major Roads
City Municipal Area
Streams
15
26
355
40
144
70
85
180
340
270

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX E

Demographic and Economic Forecasts
For the Frederick Study Area

August 2003

Prepared by:
Thomas Hammer, Ph.D. for
HNTB

Appendix E

Appendix E

DEMOGRAPHIC AND ECONOMIC FORECASTS FOR THE FREDERICK STUDY AREA

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Appendix E

I. OVERVIEW OF THE FORECASTING PROGRAM

Introduction

The City of Frederick and its hinterland are an integral part of a highly integrated region. Frederick is a strategic place from which to do business or hold a job in the rest of the region, so its economic and demographic gains are strongly determined by regional events. These include not only the growth trajectory of the region as a whole but also the evolving distribution of activity among the region's component areas near and far from Frederick. Consequently the development of forecasts to support the Frederick planning effort has proceeded from a premise that local trends can only be understood and reliably predicted when placed in a larger context.

The larger context is the officially defined Washington-Baltimore Consolidated Metropolitan Statistical Area. This 9,580-square-mile region extends from Aberdeen and Queenstown on the east to Hagerstown and Martinsburg on the west and Fredericksburg and Culpeper on the south. Its components include twenty-seven counties and six independent cities as listed below.

Constituent Areas of the Washington-Baltimore CMSA

Maryland	Montgomery Co.	Culpeper Co.	Alexandria City
Anne Arundel Co.	Pr. George's Co.	Fairfax Co.	Fairfax City
Baltimore Co.	Queen Anne Co.	Fauquier Co.	Falls Church City
Calvert Co.	Washington Co.	King George Co.	Fredericksburg City
Carroll Co.	Baltimore City	Loudoun Co.	Manassas City
Charles Co.	District of Columbia	Pr. William Co.	Manassas Park City
Frederick Co.	Virginia	Spotsylvania Co.	West Virginia
Harford Co.	Arlington Co.	Stafford Co.	Berkeley Co.
Howard Co.	Clarke Co.	Warren Co.	Jefferson Co.

Forecasts for this entire region through 2030 have been prepared using a hierarchical approach. Its steps have consisted of first developing a national forecast, then preparing a regional forecast linked to national trends, then allocating the regional magnitudes to smaller areas using a calibrated mathematical model. For purposes of analysis and allocation, the region has been partitioned into 78 component districts. These consist of 7 independent cities, 59 sub-areas of counties and 12 whole counties (all but one located on the suburban fringe). The outputs of the forecasting process include detailed forecasts for all 78 districts. This feature lets reviewers judge whether the results for Frederick County and its component areas are part of a plausible regional scenario.

Figure 1 on the next page is a map showing the 78 districts utilized as observation units for modeling and forecasting. Many districts are referenced by compass points (with "C" standing for "central"), which can be matched with the names shown in the two appendix tables. Below the county level, the forecasting process has necessarily relied upon employment data for zip codes, so the county divisions have been guided in large part by zip-code boundaries. This is why the sub-area borders tend to be irregular.

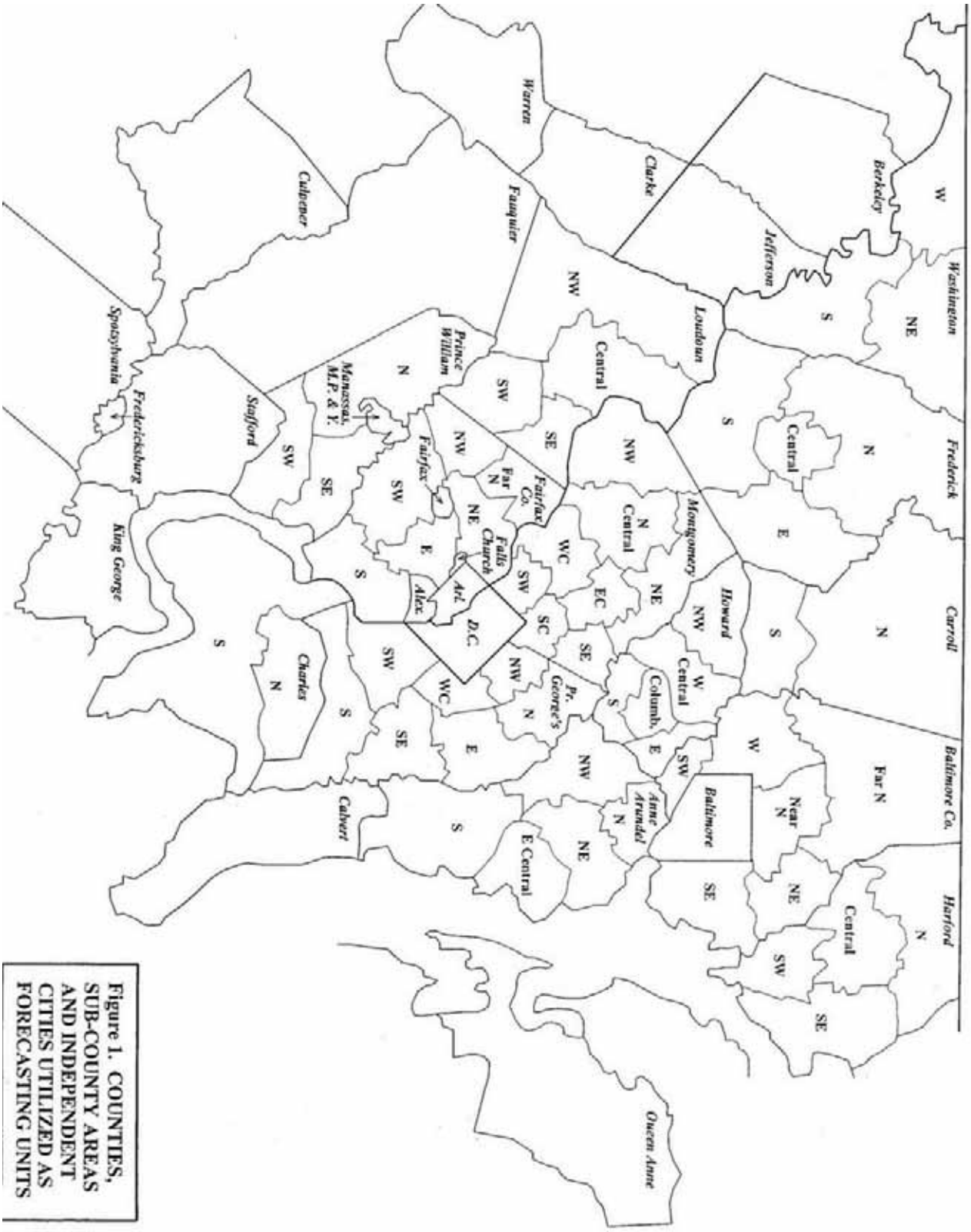


Figure 1. COUNTIES, SUB-COUNTY AREAS AND INDEPENDENT CITIES UTILIZED AS FORECASTING UNITS

The ultimate focus is the Frederick Study Area, a district that includes the City of Frederick plus some surrounding territory as defined in other planning documents. This district is referenced in later presentations of county and regional forecasts as Central Frederick. The rest of Frederick County has been partitioned for forecasting purposes into three districts called Frederick South, Frederick East and Frederick North. A more detailed map of these districts appears elsewhere in the planning documentation.

Leading Variables

The chosen forecasting approach has been developed over a number of past studies and emphasizes the importance of linkages between economic and demographic variables. At the regional level, this emphasis is expressed in an assumption that the region's overall growth is economically driven. At the sub-regional level, it leads to a focus upon capturing and projecting the manner in which economic and demographic variables interact over space.

Economic trends and relationships involving small areas must usually be analyzed in terms of employment since few other descriptors are available. The present study has addressed employment in a number of separate industries, for the purpose of capturing behavioral differences among industries and spreading the risk of modeling errors by subdividing the analytical problem. The twenty industry categories used throughout the study are shown below.

Industry Groups Utilized for Economic Analysis and Forecasting

Farming, ag. Services & mining
Construction
Industrial & electrical equipment and instruments mfg. (SIC 35,36,38)
Other durable goods mfg.
Printing & publishing
Other nondurable goods mfg.
Transportation and utilities
Wholesale trade
Eating & drinking places
Other retail trade
Finance & insurance carriers
Insurance & real estate agents
Health services
Other consumer services (SIC 72,75,76,78,79,83)
Business services
Legal, engineering and mgmt. serv. & membership org.s (SIC 81,86,87)
Other services (SIC 70,82,84,89)
Administrative & auxiliary establishments plus communication
Federal & state government
Local government

Industries have been defined in terms of SIC rather than NAICS designations because the allocation modeling process has relied extensively upon historical data. The industry list highlights printing and three categories of durable goods manufacturing because these are relatively important in the Washington-Baltimore region. The industry choices in the finance-insurance-real-estate and service sectors attempt to differentiate between economic functions that are oriented toward local consumers and those that address larger markets. (Membership organizations are ordinarily local-serving functions but constitute a basic industry in the Washington area.) The forecasting effort has used a data source that provides separate employment statistics for administrative and auxiliary

establishments, and these have been highlighted because they are important in the region. They have been combined with communication (which is poorly accommodated in the SIC system) due to similarities in locational behavior and space usage.

On the demographic side, the key variables are population at the regional level and households at the district level. Detail is utilized in both cases. Regional forecasting requires a breakdown of population into age/sex categories so the demographic impacts of employment changes can be computed via employment participation rates. Attention shifts to households when allocating the regional forecasts to districts because there is a need to capture the influence of household income. Past studies have demonstrated that households at different income levels respond differently to locational inducements, encounter different levels of housing opportunity in any given area, and have different effects on an area's subsequent economic development. It is convenient to classify households by relative rather than absolute income (to avoid the distraction of very large future magnitudes), with the regional income distribution serving as the basis of comparison. Three categories are normally adequate for analytical purposes. Therefore the key demographic variables in district forecasting are the numbers of households in the lower third, the middle third and the upper third of the regional income distribution. Population is derived from household size relationships for the purpose of computing density measures, but is otherwise a secondary consideration below the regional level.

Thus the leading variables – the only ones generated directly by the forecasting sequence for the region's 78 component districts – consist of employment by industry, households by relative income, and population by type of residence (in households versus group quarters). This report only presents forecasts of these variables. If needed, other demographic descriptors can be estimated using supplementary relationships.

The year 2000 has served as the takeoff point, or baseline year, for the preparation of forecasts. The factors underlying this choice were that: 1) employment statistics for zip codes (needed to obtain economic profiles for sub-county districts) were only available through 2000 until a few weeks before the present writing; 2) the use of 2000 ruled out the need for NAICS-to-SIC conversions of data from one of the major sources; and 3) a 2000 baseline could directly incorporate information from the decennial census. It seems unlikely that using a later baseline would have changed the forecasts very much, since 2000-2003 has been a period of economic retrenchment and since the degree of stagnation has been rather uniform across the eastern U.S.

The requisite national and regional forecasts have been obtained through a series of conceptually simple steps as described in the next two sections. The most demanding task has been the calibration of a mathematical model to allocate the regional forecasts among districts. This model is a system of equations that operates incrementally and recursively. That is, it allocates changes rather than absolute amounts, and the results for a given time period are used as predictors of district-level changes in the next period (and/or the same period). The time periods consist of the ten-year intervals between 2000, 2010, 2020 and 2030. Thus the forecasting sequence has yielded complete district profiles for 2010 and 2020 in the process of estimating conditions in 2030.

Outline of Document and Findings

Sections II and III of this report deal respectively with the national and regional forecasts developed for purposes of the study, with the principal results presented in context. Section IV describes the methods used to allocate forecasts across the region's 78 component districts. Section V then presents and examines the findings for the Frederick Study Area and the larger regional setting. Lastly, Section VI discusses the similarities and differences between these results and two sets of county-level forecasts prepared by other parties. Any reader interested only in outcomes should skip directly to Section V, after perhaps skimming the tables in sections II and III.

The results of this forecasting exercise have not turned out entirely as expected. One of the motivations for undertaking an especially rigorous forecasting program was the possibility that the growth of Frederick and surrounding areas – extremely strong in the 1980s and 1990s – might continue unabated or even accelerate in the future, due to a combination of land scarcity and restrictive land use policies in areas closer to the urban core. The economically driven growth in the region's suburban ring would have to go somewhere, and Frederick might become an even more inviting target as the alternatives diminished. Hence the allocation modeling process was specifically structured to capture this possibility through its inclusion of land availability measures and policy-reflective adjustment factors.

But the results indicate that the Frederick Study Area may have already seen its greatest demographic and economic gains. Strong increases in population, households and employment should continue through 2030, and some acceleration of growth will occur in outlying areas of Frederick County, but the forecasts call for a progressive moderation of gains in the Frederick Study Area and Frederick County as a whole. This will apply not only in percentage terms but also in absolute terms (except for countywide demographic gains during 2020-2030).

One reason for this outcome is an expected slowdown in overall regional growth. As explained in the next section, this slowdown will derive from national trends. The Census Bureau predicts that the nation's rate of population change will decline in each of the next three decades. The aging of the population means that employment change must taper off by greater amounts than population change (after 2010). The expansion of the Washington-Baltimore region is employment-driven, and the region closely follows the nation in this regard. (The outpacing of the U.S. that established the region's reputation for growth occurred in the 1980s, not the 1990s.) Hence the region will register almost the full impact of the national slowdown, both economically and demographically. Since the region's closer-in areas can and will continue to absorb some new activity despite policy restrictions, the overall slowdown will yield a reduction in development pressures on Frederick.

The second major reason is that differences in land use and infrastructure policies are having long-term impacts on the distribution of growth among the region's major sectors. Observers began noting years ago that variations across the Potomac River in space cost and development opportunity were shifting new activity toward Virginia. The analysis here suggests that there is also a systematic difference between western suburban

Maryland (Howard County and west) and eastern suburban Maryland. The latter area was something of a "sleeper" during the 1990s due to the depressing influence of special employment losses, but if rated on a policy scale, eastern suburban Maryland would be approximately neutral by regional standards. Hence its shares of regional gains should be higher from now on. These net shifts away from western Maryland are shaping the distribution of economic activity and hence the future pattern of housing demand. So while the western Maryland suburbs will remain both highly desirable and faster-growing than the region as a whole, the collision between residential demand and supply in the vicinity of Frederick should gradually abate.

Nevertheless, between 2000 and 2030 the Frederick Study Area will experience more than enough growth – from 59,000 to 97,000 jobs, and from 76,000 to about 119,000 residents – to challenge the current comprehensive planning effort.

II. NATIONAL FORECAST

Assumptions and Definitions

The present study uses a top-down forecasting approach as already described. This approach proceeds from a national forecast to a regional forecast to a series of forecasts for 78 component districts within the region. The key questions about this strategy revolve around the need to interpose the region as a forecasting unit.

The regional focus follows from an assumption that long-term demographic trends are economically driven. That is, population and household changes are ultimately determined by what happens to employment. In the U.S. it seems obvious to assume that people will follow jobs, but this is not obvious elsewhere. For example, there are parts of Europe where people live in the same places for centuries and governments feel obliged to arrange jobs for them. In such circumstances it might be possible to project local population independently and then estimate employment on a derivative basis. But in America, jobs and money come first, and nowhere does this hold more strongly than the Washington-Baltimore region. Washington may be a nice place to visit, but the people who settle in the region come to work and not to play.

The premise of economic determinism yields a requirement for an intermediate forecasting unit that is nearly closed with respect to economic-demographic linkages – i.e., a region sufficiently large and self-contained that internal interactions far outnumber those taking place across its boundaries. It happens that many Americans compensate for economic determinism and meet the needs of two-worker households by commuting long distances to their jobs. For this and other reasons, U.S. metropolitan areas of all sizes tend to be highly integrated. (In the present case, even separating the Washington and Baltimore spheres of influence would be problematic, given the resultant difficulty of dealing with Howard and Anne Arundel counties.) The indicated forecasting strategy is thus to estimate future trends in the conurbation as a whole on the basis of economics, then allocate changes within the region using the best possible expressions of mutually determinate linkages among economic and demographic variables. Only by stepping down from a reference area in this fashion can one hope to capture the nonlinear local trends often produced by the dynamics of urban expansion, such as the jump in Frederick County's population growth rate from 18% during the 1960s to 35% during the 1970s.

The question then is how to predict events in the region, which leads back to the need for a national forecast. Two general rules come into play, namely that: 1) the variables used as predictors in any forecasting scheme should themselves be maximally predictable; and 2) forecasting procedures should be kept as simple as logic and known relationships will allow. These precepts both argue for linking the regional economy in a straightforward fashion to the national economy. When looking ahead three decades, the most predictable variables pertain to the nation as a whole, because events at that level are demographically constrained and because the national population can be anticipated with some reliability. So as described in the next section, the regional forecasting process consists of establishing historical relationships between regional industries and national industries; extrapolating these into the future; applying them to a national forecast; and translating the resultant estimates of future regional employment into demographic terms.

The subject of the present section is the development of a national economic forecast to drive this process.

As already noted, "economics" means employment, since little other economic information is available for the small areas of ultimate concern here. Another important point is the definition of employment. This study has used a Bureau of Labor Statistics (BLS) definition in which each worker is counted only once, at his or her primary job. This is the definition involved in the familiar press releases that cite an area's labor force and the shares consisting of employed and unemployed persons. Due to the need for geographic detail, most of the statistics used in the present study have been obtained from sources other than BLS, but all have been adjusted to reflect the BLS definition of at-place employment.

Other data series maintained by the federal system tend to report higher or lower employment magnitudes than BLS. For example, statistics from the Bureau of Economic Analysis (BEA) run much higher since they count all part-time jobs no matter how minor or short-term, whereas statistics from County Business Patterns tend to run lower because they omit self-employed persons. Source-related choices are important because in some cases reported employment has not moved in step with demographic magnitudes (either because of changes in part-time work or other factors). A consequence, for example, is that forecasts of BEA employment sometimes reach unrealistically if not impossibly high levels when extended far into the future.

What the one-job-per-person BLS definition offers is a direct peg of employment to population and an ability to translate back and forth reliably between them, via rates of labor force or employment participation for age-sex groups. This ability is critical to the present study given its reliance upon linkages of national employment to national demographics and regional demographics to regional employment.

Development of National Forecast

The ideal means of describing future national employment would be simply to utilize an existing national forecast prepared by some unimpeachable source outside the project. But the relevant federal agencies no longer engage in long-term forecasting, and private sources have various liabilities, which leads to a requirement for an in-house forecast.

The best available economic projection series is a biennial forecast of national employment prepared by the BLS to support labor market analyses. This series extends ten years into the future and provides more than adequate industry detail. The chosen procedure here has consisted of extrapolating the BLS forecast forward and then pegging the totals to the employment levels supportable by the expected national population. Specifically, the steps have been to: 1) adopt the BLS series with minor modifications; 2) extrapolate the given employment trends to 2030 (again with some modifications); and 3) scale the extrapolated numbers so that the total employment levels in 2010, 2020 and 2030 are consistent with expected population magnitudes in those years.

This procedure rests on an assumption that in the long run the nation's economic growth – expressed in terms of jobholding if not output – will be demographically constrained. Jobs will increase only to the extent that people are available to hold them (keeping in mind the present definition of employment). Demographic limits are likely to become binding for two reasons. First, the nation's overall rate of population growth is expected to taper off in the coming decades. And second, the future will bring large and persistent increases in the share of persons beyond working age. Around 2010, members of the huge baby-boom generation will start reaching the traditional age of retirement. Even if many of them choose to work past 65, the overall labor force participation rate will decline. This will eventually constrain jobholding unless the entire world economy slows down in a way that cannot be realistically predicted (although such a scenario may seem plausible at the moment).

Future population magnitudes are thus pivotal. The Census Bureau did not release a national population projection based on the latest census until mid-2003, and the final version will be in progress until 2004. However, verbal communications with the Bureau suggest that the aspects subject to revision primarily involve racial categories and that the existing projection is otherwise adequate. Its leading features are summarized in Table 1 below.

Table 1. National Population Forecast

	Total Population	Ten-Year % Change	Share Aged 65 & Over
Census (April 1)			
1990	248,709,873		12.6%
2000	281,421,906	13.15%	12.4%
Forecast (July 1)			
2000	282,339,000		12.4%
2010	309,163,000	9.50%	13.0%
2020	336,032,000	8.69%	16.3%
2030	363,811,000	8.27%	19.6%

The first column of Table 1 contains two population figures for 2000 because the forecast series addresses midyear population while the comparison figures pertain to April 1 census dates. The percentages occupying the other two columns address different subjects. Those in the second column describe changes in total population over the preceding ten years, while those in the third column give the actual or projected share of population consisting of persons aged 65 and over.

After increasing by about 10% per decade before 1990, the U.S. population rose by over 13% between 1990 and 2000 (perhaps due in part to a relatively complete census count in 2000). The Census Bureau does not expect this higher growth rate to continue. Instead the national population is projected to increase by 9.5% during the present decade and less than 9% in each subsequent decade. Meanwhile the share of population over age 65 will start to rise as already described. This share did not increase at all during the 1990s and will only register a mild gain in the present decade, but after 2010 the elderly

component of the population will rise by one-third of a percentage point per year. Table 2 below shows the manner in which this population projection has been translated into a forecast of total employment. The translation has been implemented via the employment participation rates shown in the table's central columns. (Economists tend to use rates of labor force participation rather than employment participation, but since unemployment cannot be projected long-term, there would be no gain here from interposing labor force.)

Table 2. Demographic Estimation of Total U.S. Employment

	Midyear Population in Thousands		Employment Participation Rates		Projected Employment in Thousands		
	Male	Female	Male	Female	Male	Female	Total
2000							
0-15	32,964	31,396					
16-20	10,295	9,742	0.4576	0.4681	4,710	4,560	9,271
21-64	80,886	81,994	0.8082	0.6927	65,369	56,798	122,167
65-74	8,307	10,077	0.2665	0.1545	2,214	1,557	3,770
75+	6,145	10,533					
Total	138,596	143,743	(0.5216)	(0.4377)	72,293	62,915	135,208
2010							
0-15	33,821	32,348					
16-20	10,986	10,443	0.4576	0.4681	5,027	4,888	9,915
21-64	90,194	91,128	0.7981	0.7159	71,986	65,237	137,223
65-74	9,797	11,473	0.2931	0.1924	2,872	2,208	5,080
75+	7,214	11,760					
Total	152,011	157,152	(0.5255)	(0.4603)	79,884	72,333	152,218
2020							
0-15	36,635	35,073					
16-20	10,924	10,432	0.4576	0.4681	4,999	4,883	9,882
21-64	93,991	94,345	0.7931	0.7348	74,545	69,328	143,873
65-74	14,754	17,025	0.3225	0.2320	4,758	3,950	8,707
75+	8,985	13,868					
Total	165,289	170,743	(0.5100)	(0.4578)	84,301	78,161	162,462
2030							
0-15	38,981	37,322					
16-20	11,995	11,458	0.4576	0.4681	5,489	5,364	10,852
21-64	96,438	96,163	0.7906	0.7496	76,244	72,086	148,330
65-74	17,754	20,194	0.3547	0.2735	6,298	5,523	11,821
75+	13,589	19,916					
Total	178,758	185,053	(0.4925)	(0.4484)	88,030	82,973	171,003
2000-30 % Ch.							
0-15	18.3%	18.9%					
16-20	16.5%	17.6%			16.5%	17.6%	17.1%
21-64	19.2%	17.3%			16.6%	26.9%	21.4%
65-74	113.7%	100.4%			184.5%	254.8%	213.5%
75+	121.1%	89.1%					
Total	29.0%	28.7%			21.8%	31.9%	26.5%

During the 1990s, employment participation among persons of prime working age declined significantly for males while continuing its long-term rise for females. The recent trends for other age groups are somewhat unclear due to disagreement between the main data sources – the decennial census and the Current Population Survey – but overall employment participation apparently did not change much for either persons aged 16 through 20 or those aged 65 through 74. (The present analysis assumes that all workers aged 65 and over have been and will be below age 75.) The assumptions used here to project employment participation into the future involve a continuation of past trends but impart a more upward drift to the rates, especially for elderly persons. They are that: 1) the participation rates for males and females aged 16-20 will remain at their 2000 levels; 2) the rate for males aged 21-64 will decline by half as much in each decade as in the preceding decade; 3) the rate for males aged 65-74 will increase by 10% per decade; and 4) the differences between male and female rates for persons aged 21-64 and 65-74 will diminish during each decade by the same percentages as they diminished during 1990-2000. Under these assumptions, the gains in employment participation for females aged 21-64 will exceed the male losses in that age group by about 0.013 per decade, while participation will increase rapidly for elderly persons of both sexes.

The employment figures in the right-hand columns of Table 2 have been obtained by applying the employment participation rates for age-sex groups to the projected population levels for those groups. The results have then been summed to yield total employment. For evaluation purposes the table contains overall participation rates for each sex, but these are shown in parentheses because they are derived figures (obtained as ratios of total employment to total population) rather than part of the employment estimation process.

The aging of the national population will cause overall employment participation to decline after 2010 even while the participation rates for age-sex groups are generally going up. The result will be an expected 2000-30 employment gain of only 26.5% while the national population is rising by 28.9%. The forecasted national employment in 2030 works out at 171 million workers, as compared with 135.2 million in 2000.

Table 3 on the next page shows the outcome of extrapolating the BLS employment forecast to 2030 and pegging the totals to the figures just derived. This process was conducted using a full employment breakdown by two-digit SIC industry, but the results are aggregated here to the twenty employment categories used in all further forecasting tasks. The last column of the table shows the expected percent changes in employment from 2000 to 2030.

National employment in farming, agricultural services and mining is expected to increase, but only by virtue of rising urban demand for landscape and veterinary services. Total manufacturing employment will remain flat – as it has since the 1970s – with modest gains in durable goods production offset by losses in nondurable goods. Federal and state government will also be a relatively slow-growth sector due in part to increasing reliance on outside contractors. All of the other sectors covered by Table 3 are forecasted to expand by at least 15% over the next three decades.

Table 3. Forecast of National Employment by Industry

	U.S. Employment in Thousands				% Change,
	2000	2010	2020	2030	2000-30
Farming, ag. services & mining	3,479	3,629	3,639	3,621	4.1%
Construction	6,825	7,493	7,855	8,135	19.2%
Manufacturing SIC 35,36,38	4,363	4,537	4,581	4,579	4.9%
Other durable goods mfg.	6,013	6,268	6,319	6,319	5.1%
Printing & publishing	1,446	1,457	1,439	1,408	-2.7%
Other nondurable goods mfg.	5,380	5,126	4,896	4,669	-13.2%
Transportation and utilities	5,204	5,955	6,481	6,923	33.0%
Wholesale trade	6,628	7,228	7,551	7,796	17.6%
Eating & drinking places	8,169	9,395	10,129	10,749	31.6%
Other retail trade	14,358	15,571	16,224	16,717	16.4%
Finance & insurance carriers	5,258	5,609	5,879	6,076	15.6%
Insurance & real estate agents	2,302	2,585	2,742	2,864	24.4%
Health services	9,999	12,198	13,575	14,783	47.8%
Other consumer services	8,671	10,295	11,291	12,150	40.1%
Business services	9,803	13,641	16,169	18,470	88.4%
Legal & E/M serv. & memb. org.	6,963	8,332	9,177	9,911	42.3%
Other services	4,297	4,921	5,287	5,593	30.2%
Communication and admin./aux.	5,349	5,755	6,099	6,446	20.5%
Federal & state government	7,563	7,874	8,135	8,312	9.9%
Local government	13,139	14,350	14,994	15,482	17.8%
Total Employment	135,208	152,218	162,462	171,003	26.5%

Services will lead the way as in the past, with a majority of service sectors achieving employment gains above 40%. The fastest growth will again occur in business services, a hodgepodge of activities that range from employment agencies to computer systems design (and are properly sorted out in NAICS). Retail establishments besides eating places will be relatively slow-growing, and construction, wholesale trade, finance-related activities, communication and administrative/auxiliary functions will also be somewhat below average.

III. REGIONAL FORECAST

Employment

Like the national forecast, the regional forecasting process merits description in some detail even though it seems a long way from Frederick, since the results have a strong bearing on the findings of ultimate concern.

The previous section has explained the decision to link regional employment to national employment and then use the resulting economic forecast as the basis for estimating regional demographics. The linkages employed in the former step have been established by assembling an employment database for the nation and region going back to 1969. Regional employment has been expressed as a ratio to national employment for each of the 20 subject industries in each of the 32 historical years. (Local government has been an exception as noted below.) Regional-national linkages have then been developed simply by drawing trend lines through these ratios, i.e., by running simple regressions that express the ratio values as functions of time. Forecasts have been obtained by extrapolating these relationships into the future and applying the predicted ratios to the forecasted values of national employment.

Other applications of this general approach have often used input-output analysis to assure that the forecasts of local-serving activity will remain consistent with overall economic conditions. (This involves breaking out the local-serving activity in each industry and relating only the remainder to national employment, with an input-output table used both to accomplish the partitioning and to translate the forecasts of non-local-serving industry employment into overall economic profiles.) The use of input-output has been considered an unnecessary complication in the present study, however, due to the scale of the Washington-Baltimore economy and the maturity of its local-serving component.

The extreme simplicity of this procedure has the advantage that the regional-national ratios can be plotted, and the forecasting relationships based on them can be inspected visually. Figures 2 through 6 present such plots for all the industries now at issue. Various highlights are noted in the intervening text.

Each point in each plot is a ratio of regional employment in the given industry to national employment in the same industry, with the latter expressed in thousands to avoid fractional ratio values. The straight line extending through the points is the estimated time trend followed by the ratios. The relationship used for forecasting is not actually the trend line itself but a translated version – i.e., another line with the same slope – that passes through the most recent data point. This adjustment has been made so that the resultant forecasts would dovetail with the baseline employment profile. In each graph the forecasting relationship is represented by an arrow that departs from the last data point into the blank space on the graph's right-hand side.

The time trends for most industries have been estimated using all data in the 32-year historical record, on the notion that long-term forecasts should rest upon long-term

relationships. For three industries, however, the trends are based only on the last 18 years of data. This choice substantially affects the forecasts obtained in two cases, both of which involve manufacturing industries. The rationale in these cases is a belief that after the mid-1980s the region permanently lost attraction as a context for physical production (due to rising costs and competition for labor). There is also a case in which long-term and shorter-term time trends are so divergent that neither is used.

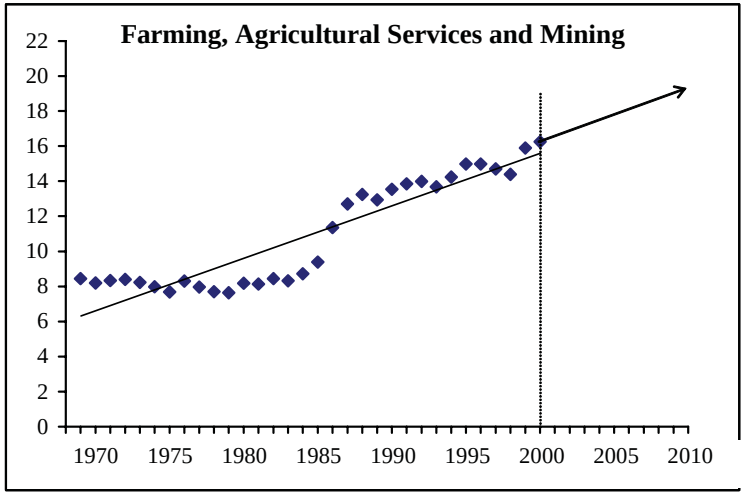
Figures 2 and 3 on the next two pages address the first eight industries on the standard list, with the four categories of manufacturing covered together in Figure 3.

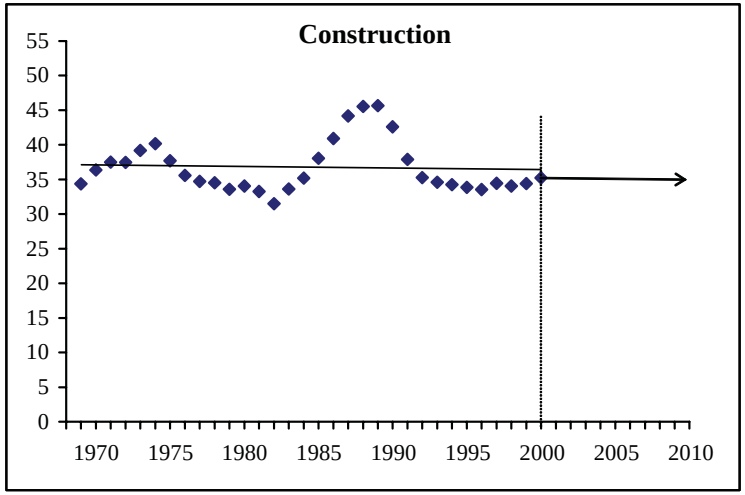
The upper-left panel of Figure 2 reveals a strong uptrend in the region's farming, agricultural service and mining employment relative to national conditions in that sector. This pattern merely reflects strength in the urban-oriented components of agricultural services (namely landscape maintenance and veterinary medicine) and is unimportant in absolute terms. The upper-right panel of Figure 2 addresses the construction industry and says that despite Washington-Baltimore's building boom in the late 1980s, the long-term regional trend has been very slightly downward relative to the U.S. The lower panels of Figure 2 show a stronger downward trend for transportation-utilities and a mildly rising pattern for wholesale trade, both relative to the nation. A downtrend of some magnitude could have been obtained instead for wholesale trade by using only the more recent data points, but this option was rejected due to the wholesaling rebound in the late 1990s.

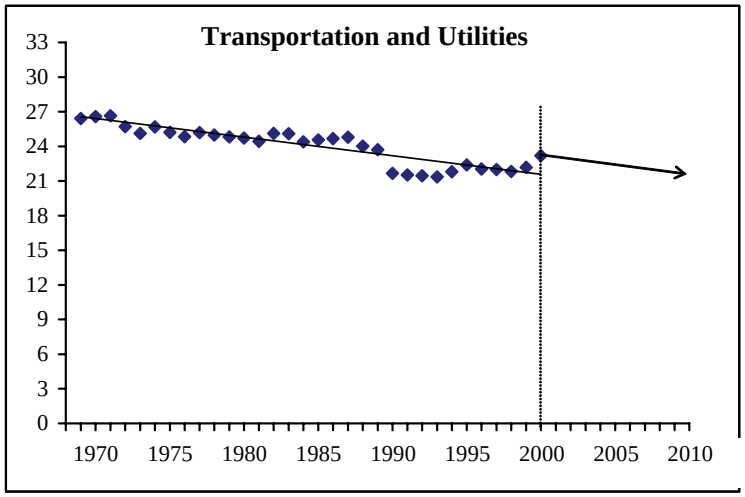
The upper-left panel of Figure 3 addresses industrial machinery, electrical equipment and instruments manufacturing. These industries have been grouped together because they are somewhat important in the region and because this grouping minimizes NAICS-to-SIC conversion errors. The data points describe a rising trend relative to the nation up until the mid-1980s and a falling trend thereafter. The latter trend is considered more descriptive of future conditions because the mid-1980s were probably a watershed at which the region's expertise-related advantages began to be outweighed by its status as a high-cost area. Similar watersheds have been observed elsewhere, and the trends that follow are rarely reversed in the same industries. (The "Massachusetts miracle" comes to mind.) Hence the forecasting relationship for the given sector has been based on only the last 18 of the data points.

The upper-right panel of Figure 3 addresses other durable goods manufacturing, for which it reveals an even stronger downward relationship than the one just mentioned. This finding occasioned a second special feature of the manufacturing analysis, namely that the data points for all four manufacturing sectors were converted to logarithmic form. (The vertical scales in Figure 3 express natural logs of ratios, not ratio values per se.) Along with generally smoothing the data, logarithmic conversion has the advantage that logarithmic relationships decline asymptotically rather than plunging to unrealistically low values. For other durable goods manufacturing, the regional-national ratios yielded by a linear relationship would go negative before the end of the forecast period, whereas the logarithmic relationship shown in Figure 3 yields a 53% decline between 2000 and 2030.

Figure 2. PLOTS OF REGIONAL EMPLOYEES PER THOUSAND NATIONAL EMPLOYEES, WITH HISTORICAL AND FORECASTING RELATIONSHIPS -- Part 1







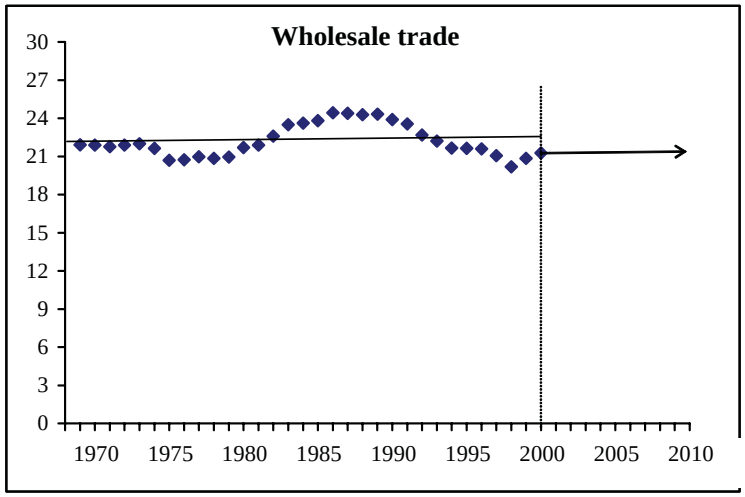
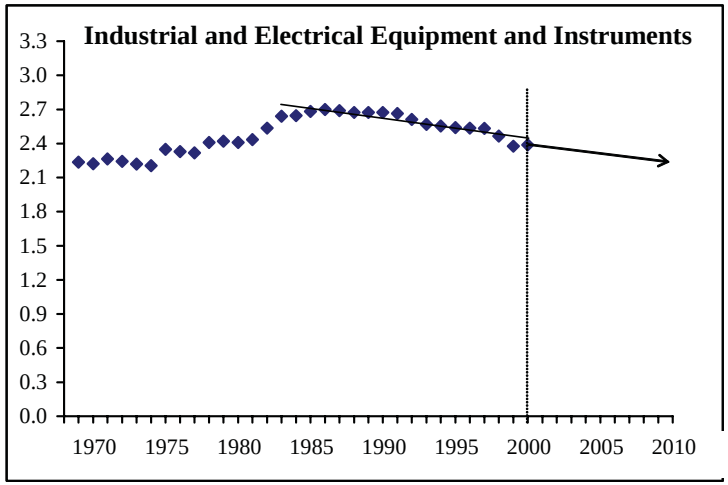
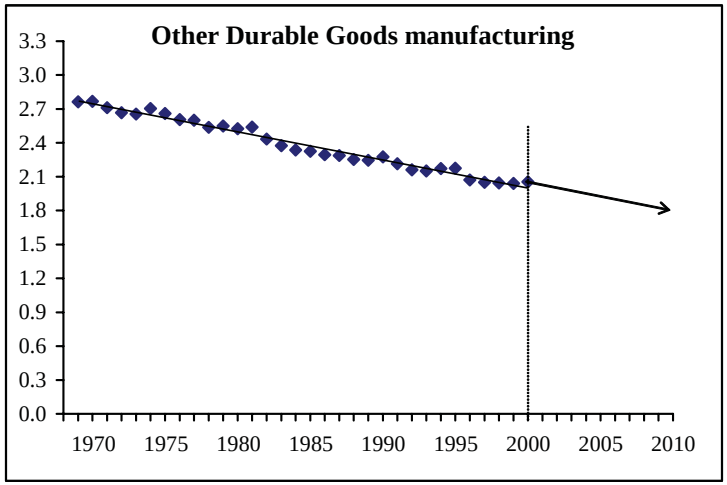
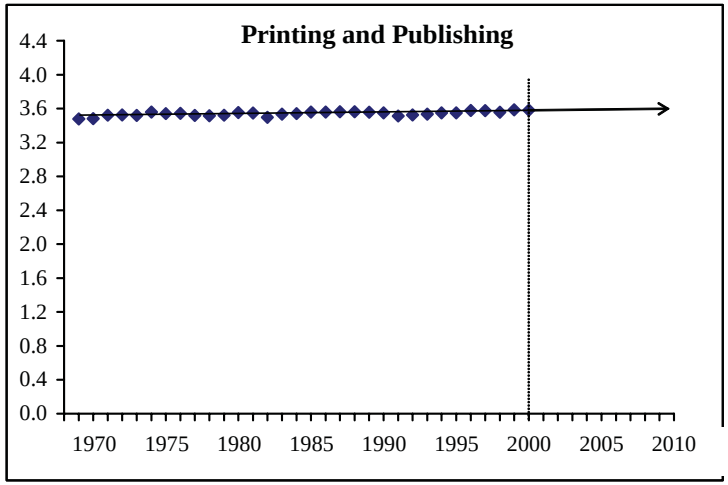
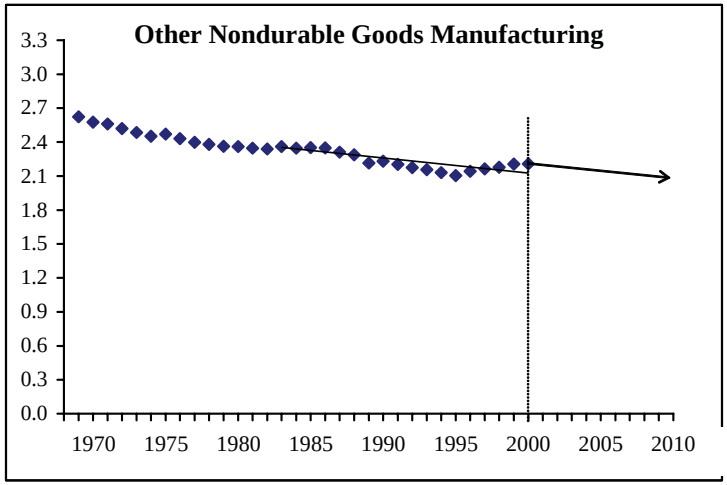


Figure 3. PLOTS OF REGIONAL EMPLOYEES PER THOUSAND NATIONAL EMPLOYEES (IN LOGARITHMS), WITH HISTORICAL AND FORECASTING RELATIONSHIPS -- Part 2









The lower panels of Figure 3 address printing and publishing – quite prominent in the Washington-Baltimore region – and other nondurable goods manufacturing. Printing has been very stable and has shown a slight tendency to gain relative to the U.S., whereas other nondurable goods production has presented another declining situation. (The use of an 18-year time trend makes little difference in this case.)

Figure 4 on the next page addresses the four industry groups used here to cover retail trade and finance-insurance-real-estate. Figure 5 on the second following page then deals with four of the five service categories.

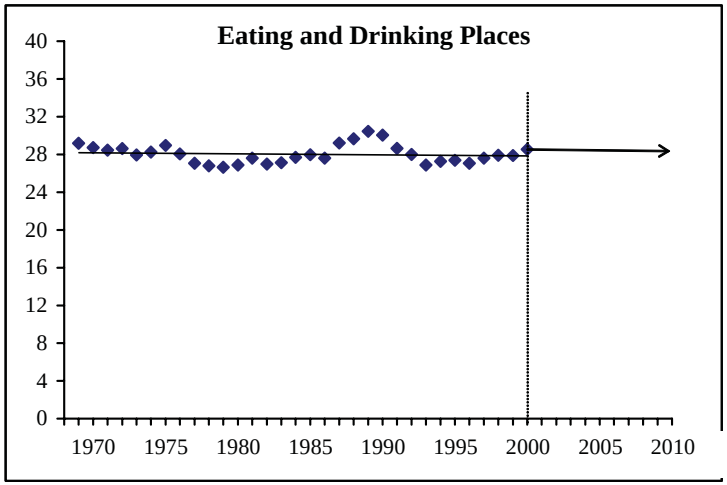
Regional employment in eating places and other retail trade has shown no long-run tendency to outpace or fall behind national employment in these sectors. Hence the trend lines and forecasting relationships in the upper panels of Figure 4 are virtually flat. The lower-left panel of Figure 4 shows that the region has gained slightly relative to the nation in finance (including security dealers and trusts) and insurance carriers. The lower-right panel reveals a reverse trend for insurance agents and real estate agents, which have been broken out from other FIRE in the study because they are relatively consumer-oriented. Of these opposing patterns, the downtrend is sharper but involves smaller absolute numbers.

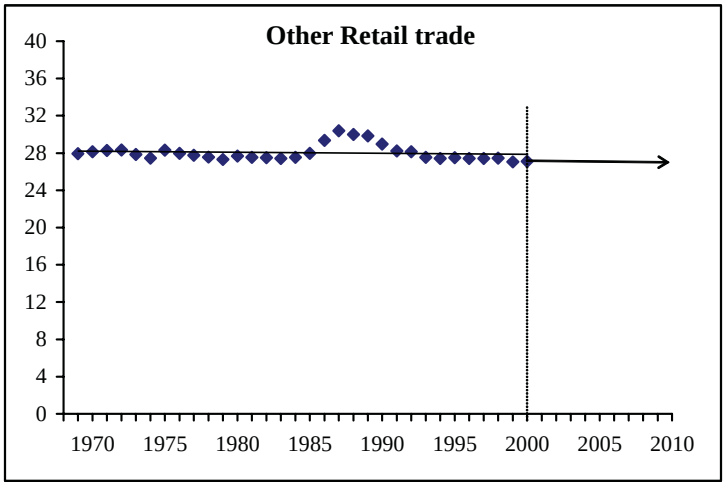
The upper panels of Figure 5 show mildly declining trends in health services and other consumer services for the region vis-à-vis the nation. (Other consumer services consist of personal, automotive, repair, entertainment and social services.) As in the case of wholesale trade, a sharply downward-sloping trend line could have been obtained for health services by using only the more recent data points, but the longer-term trend line is considered a more reliable indicator of future directions.

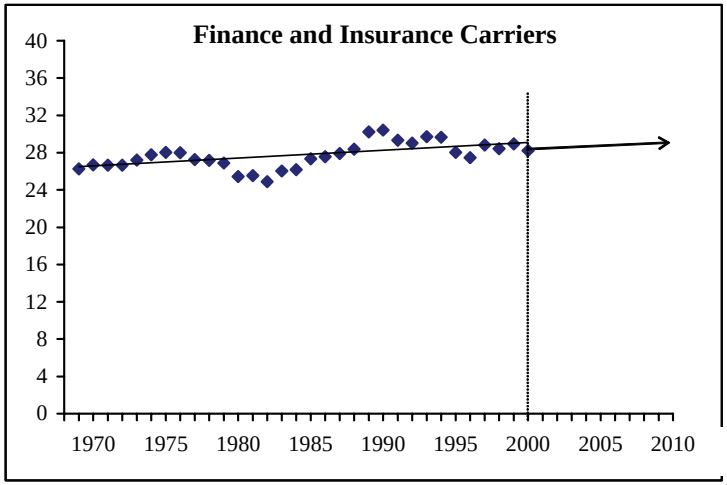
The sectors addressed by the lower panels of Figure 5 are especially important and somewhat problematic. For both the region and the nation, the business service sector is not far from becoming the largest of the twenty industries in terms of absolute employment, and this sector's exceptionally high rate of change magnifies its influence on overall employment growth. The regional-national employment ratios for business services exhibit a mild uptrend when analyzed across the entire historical period, but a shorter-term analysis would yield a downtrend of somewhat greater magnitude. Given the divergence between these trend lines – both of which are shown in Figure 5 – and the importance of the sector, it has been considered prudent to assume a flat relationship (no future change in ratios) for forecasting purposes.

The lower-right panel of Figure 5 addresses the sector that combines legal services (SIC 81), engineering and management services (SIC 87), and membership organizations (SIC 86). Due in part to its concentration of headquarters and lobbying offices for membership organizations, the Washington-Baltimore region has an unusually large share of total employment in this category. (The regional-national employment ratio for this sector has been nearly twice as high as the average for all other industries since the late 1980s.)

Figure 4. PLOTS OF REGIONAL EMPLOYEES PER THOUSAND NATIONAL EMPLOYEES, WITH HISTORICAL AND FORECASTING RELATIONSHIPS -- Part 3







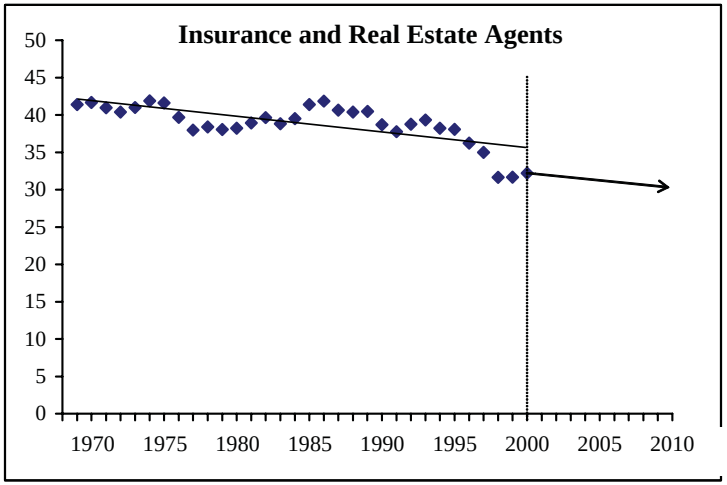
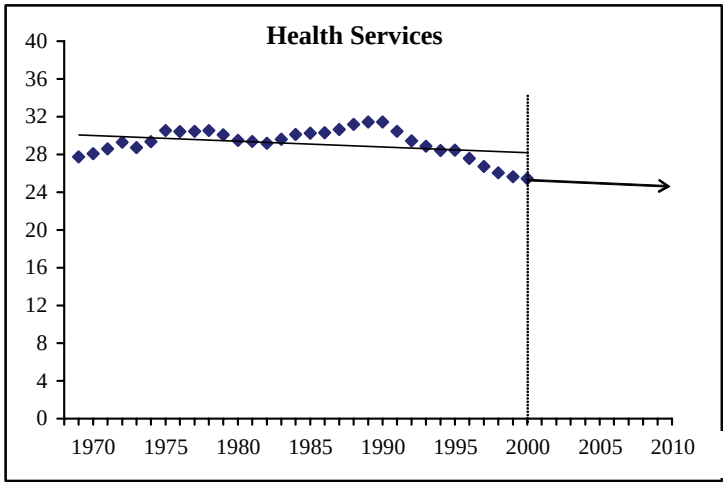
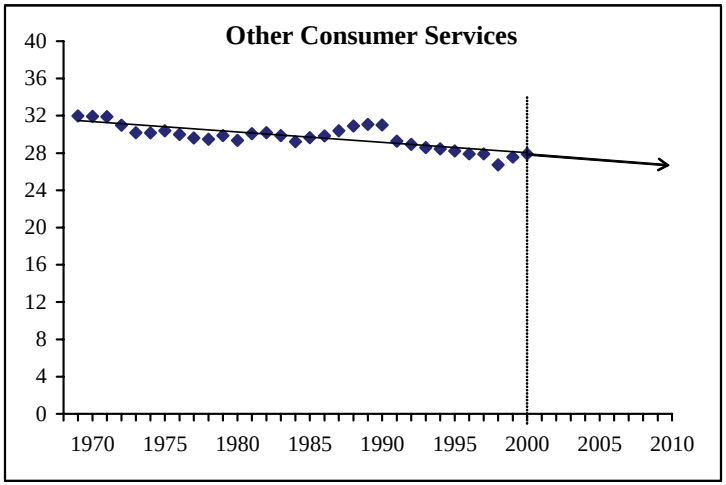
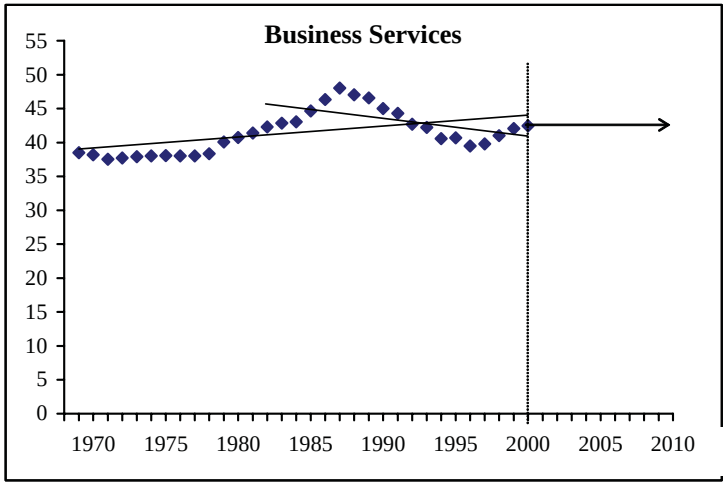
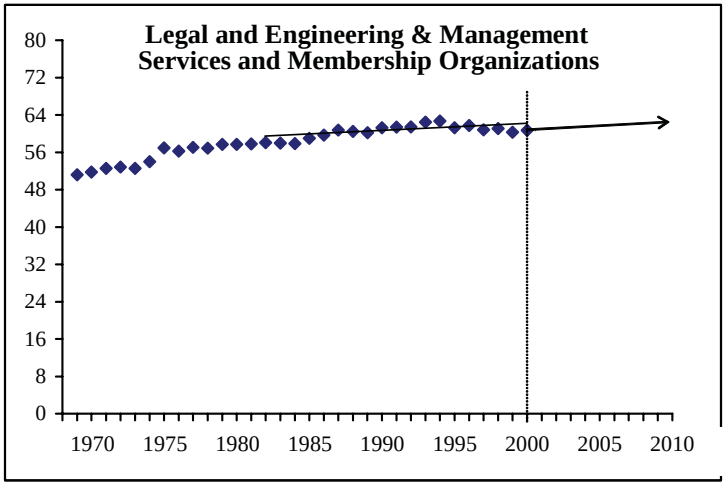


Figure 5. PLOTS OF REGIONAL EMPLOYEES PER THOUSAND NATIONAL EMPLOYEES, WITH HISTORICAL AND FORECASTING RELATIONSHIPS -- Part 4









The data points in the lower-right panel of Figure 5 yield an upward-sloping trend line whether analyzed across 18 years or 32 years. The 18-year trend is somewhat less pronounced, however, and has thus been considered a safer choice for use in forecasting. This exercise of discretion exerts a pessimistic influence on forecasted total employment that roughly offsets the optimism of the choices for wholesale trade and health services.

Figure 6 on the next page deals with the remaining sectors of the regional economy. The "other services" covered by its upper-left panel are a mixed assortment (hotel/motel accommodations, education services, museums and miscellaneous services) that collectively have moved in step with national employment. The upper-right panel of Figure 6 addresses administrative and auxiliary (A&A) establishments plus the communications industry. In the Washington-Baltimore region, this sector is dominated by A&A functions and has consistently grown faster than its national counterpart.

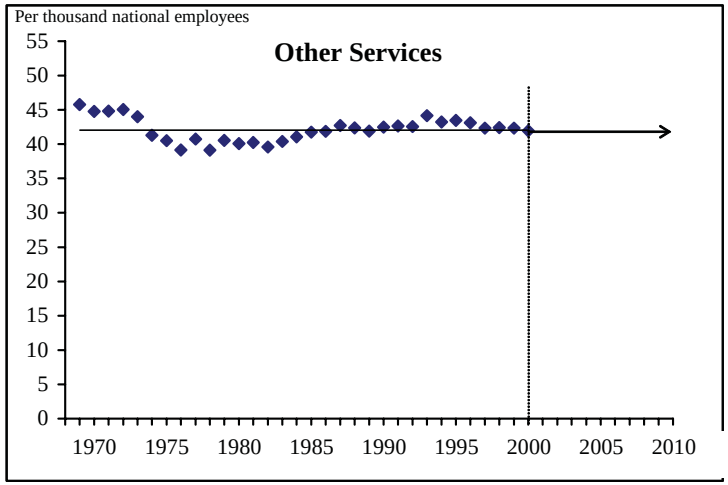
The lower-left panel of Figure 6 addresses federal and state government. This sector is of course huge in the Washington-Baltimore area, but the region's employment has declined relative to national employment as federal functions have become more geographically dispersed. There seems no reason not to expect a continuation of this trend. (A countertrend prevails in Frederick, however, due to the technical nature and presumably rising importance of activities at Fort Detrick.)

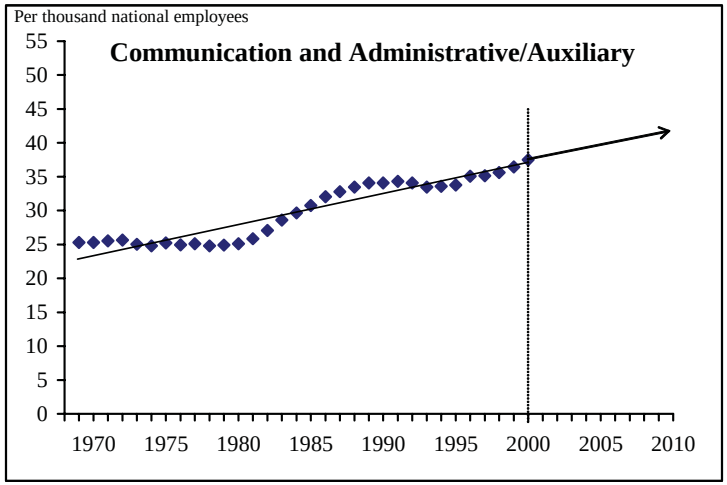
Local government, the subject of the last graph, is a special case in that the data points utilized for forecasting purposes are ratios of regional employment to regional population, not regional employment to national employment. (All the vertical axes in Figure 6 have been labeled to prevent confusion in this regard.) The trend line and the forecasting relationship specify a slight uptrend in local government employment per capita. This treatment of local government has made it necessary to solve for future employment as part of the demographic forecasting process discussed momentarily.

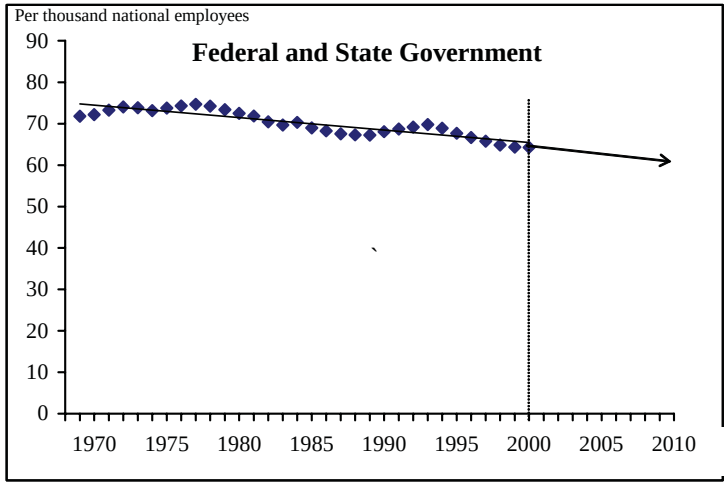
Regional employment has been forecasted from the data in these figures simply by extrapolating the linear forecasting relationship for each sector to obtain ratio values for 2010, 2020 and 2030, then applying these to the respective forecasted values of national employment shown earlier in Table 3.

The results of this regional forecasting process are presented in Table 4 on the second following page. (Local government is included even though its derivation occurred in a later step.) Total employment in the Washington-Baltimore region is expected to increase from just over 4.2 million jobs in 2000 to just over 5.4 million jobs in 2030. These are at-place jobs defined on a one-job-per-worker basis as elsewhere. Resident employment in the region runs about 1.2% lower than at-place employment due a relatively small volume of net in-commuting.

Figure 6. PLOTS OF REGIONAL EMPLOYEES PER THOUSAND NATIONAL EMPLOYEES (OR REGIONAL RESIDENTS), WITH HISTORICAL AND FORECASTING RELATIONSHIPS -- Part 5







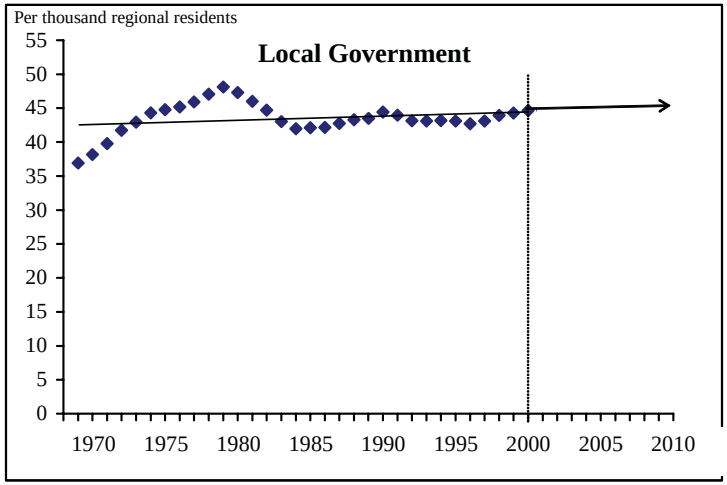


Table 4. Forecast of Regional Employment by Industry

	Washington-Baltimore Employment				% Change,
	2000	2010	2020	2030	2000-30
Farming, ag. services & mining	37,308	46,151	53,547	60,501	62.2%
Construction	233,152	254,456	265,191	272,996	17.1%
Manufacturing SIC 35,36,38	46,564	40,922	34,921	29,503	-36.6%
Other durable goods mfg.	49,488	40,117	31,442	24,447	-50.6%
Printing & publishing	51,441	52,821	53,175	53,030	3.1%
Other nondurable goods mfg.	49,039	41,067	34,473	28,891	-41.1%
Transportation and utilities	119,801	127,727	128,802	126,699	5.8%
Wholesale trade	139,728	153,258	161,021	167,192	19.7%
Eating & drinking places	232,252	266,410	286,462	303,189	30.5%
Other retail trade	385,369	416,639	432,797	444,564	15.4%
Finance & insurance carriers	146,407	161,032	173,867	184,970	26.3%
Insurance & real estate agents	72,968	76,517	75,412	72,776	-0.3%
Health services	253,892	301,928	327,328	347,005	36.7%
Other consumer services	222,766	254,029	267,122	275,113	23.5%
Business services	410,956	571,853	677,844	774,306	88.4%
Legal & E/M serv. and m. org.	413,528	507,681	573,332	634,446	53.4%
Other services	181,067	207,219	222,518	235,244	29.9%
Communication & admin./aux.	200,939	242,235	284,366	329,733	64.1%
Federal & state government	621,040	616,037	604,868	585,820	-5.7%
Local government	339,616	380,398	415,126	456,867	34.5%
Total Employment	4,209,321	4,760,508	5,105,634	5,409,321	28.5%

This forecast can be regarded as slightly optimistic, in that the projected regional employment gain of 28.5% for the thirty-year period is two percentage points above the forecasted national gain of 26.5%, even though the region failed to exceed the nation in employment growth during 1990-2000. A summary table highlighting this and other comparisons will be presented following the demographic discussion.

A notable aspect of the forecast is that the region manages to lead the U.S. in overall employment growth despite failing to keep up with the nation in a majority of individual industries. This comes about because Washington-Baltimore has a relatively favorable industry mix, even with its federal government overburden. Service industries have recently supplied 35% of the region's jobs as compared with only 29% of national employment, and the resulting differential in expected growth accounts for the entire margin between the percentage gains forecasted for the region and the U.S.

Demographics

Demographic profiles for the region have been established by determining the future populations necessary to staff the regional economy given the employment levels already determined. This matching process has been conducted using cohort-survival

analysis. The economic-demographic linkages were formed by employment participation rates like those shown earlier for the U.S., and the quantities that were adjusted to obtain economically consistent demographic profiles were actually levels of net migration rather than population per se.

Cohort-survival analysis looks at the transition of age-sex groups across ten-year time intervals (or other periods that needn't be of concern). The groups are "cohorts" of people occupying one age bracket in the initial year and another bracket ten years older in the end year. The operative equation says that for each cohort, the number of persons in the end year equals the number in the initial year, minus deaths, plus net migration. For cohorts involving end-year ages below ten, births during the interval are substituted for initial-year population. The equation in this form is a truism that basically serves to define net migration. It acquires substantive content when estimates of net migration are developed for a past time interval and become the basis for assumptions about future migration. These assumptions then drive a process of obtaining projections by "aging" the population across future time intervals.

This review of the subject is occasioned by the fact that the Washington-Baltimore region has exhibited an unusual and noteworthy pattern of net migration. Regional values of net migration during 1990-2000 have been computed for five-year age cohorts, by sex, using data from the decennial censuses and the best available county-level information on births and deaths over the decade. Table 5 gives a condensed description of the resulting figures. This table expresses each migration value in two ways: as a percentage rate (equaling net migration divided by the average of cohort population in 1990 and 2000), and as a share of the total net migration that occurred during the decade, which equaled 343,392 persons.

Table 5. Summary of Computed 1990-2000 Net Migration for the Region

Definition of Cohort		Net Migration Rate (Ratio to Average of 1990 and 2000 Pop.)			Share of Region's Total Net Migration During 1990-2000		
Age in 1990	Age in 2000	Male	Female	Total	Male	Female	Total
Unborn-4	0-14	6.4%	6.6%	6.5%	10.1%	10.0%	20.1%
5-14	15-24	9.9%	12.7%	11.3%	13.4%	16.6%	30.1%
15-24	25-34	17.2%	21.3%	19.3%	26.5%	33.5%	59.9%
25-34	35-44	3.0%	3.7%	3.4%	5.7%	7.2%	13.0%
35-44	45-54	-0.5%	-0.2%	-0.3%	-0.8%	-0.3%	-1.1%
45-54	55-64	-6.4%	-5.4%	-5.9%	-6.4%	-5.6%	-12.0%
55-64	65-74	-8.1%	-4.3%	-6.1%	-5.2%	-3.2%	-8.4%
65+	75+	-2.8%	0.1%	-1.0%	-1.6%	0.1%	-1.5%
All Age Brackets		4.1%	5.4%	4.8%	41.7%	58.3%	100.0%

Given the economic and social characteristics of the region, we expected to see a huge influx of young adults. This should have involved the male and female cohorts moving from ages 15-24 in 1990 to ages 25-34 in 2000, plus to a lesser extent those

moving from 5-14 to 15-24; and so it did. What we didn't expect was that the region's net migration would turn negative in the middle-age years. Retirement-related migration (off to Florida or wherever) tends to register most in cohorts aged 55-64 to 65-74, and indeed the region had negative net migration rates for males and females of these ages. But the largest negative migration flows involved persons ten years younger, averaging around age 55, and there were even slightly negative rates for persons ten years younger than that. The latter fact is especially surprising given the region's in-migration of children, a large share of whom should be accompanying parents aged 35-44 to 45-54. One is tempted to infer a pattern in which young singles descend upon the region in large numbers, but those who don't pair up by middle age tend to move out, while being partially replaced by new families with children.

Error can be a factor in the computation of net migration rates. The birth and death statistics used here were unreconciled with the last census and did seem to involve some error in the case of births. But for most of the age categories of interest, births are not relevant and death rates are too low to impart serious bias, so the pattern described above had to exist unless the decennial censuses were wrong. Washington-Baltimore is simply a young person's area (which on reflection it always was) and exerts an especially strong attraction for young women (which it always did).

The region's population has been projected into the future using a cohort-survival tableau in which future birth and death rates were assumed to bear the same relationships to the corresponding national rates as during 1990-2000. Net migration was handled using the distribution of total migration appearing in the right-hand columns of Table 5 rather than the rates appearing to the left. This distribution was assumed to hold in all future time intervals, meaning that a full end-year population profile for an interval could be derived by specifying a single number – total net migration – for the interval.

Employment participation runs higher in the Washington-Baltimore region than the nation as a whole, particularly for persons of prime working age and particularly for females. Future employment participation rates have been obtained by assuming that the regional-national gaps observed in 2000 would hold throughout the forecast period. (This convention minimized the sensitivity of the regional demographic projections to employment participation rates, since the national and regional forecasting processes moved in opposite directions and any errors at the national level would be offset at the regional level.) Among other things, this assumption meant that by 2030 over 40% of all males aged 65 through 74 would still be working.

The demographic forecasting process then proceeded as follows for each of the ten-year time intervals. Values were assumed for two numbers: total net migration during the interval and local government employment at the end of the interval (to obtain an end-year employment total, given the earlier employment forecasts for all other sectors). A population profile was generated on this basis from the cohort-survival tableau, and the appropriate employment participation rates were applied to obtain a value of total resident employment. This was adjusted for net regional in-commuting to yield at-place employment, and the result was compared with the total employment level

assumed by the computation. Meanwhile local government employment was calculated from total population using the relationship in Figure 6, and the result was compared with the assumed value. Then the whole process was repeated using different assumed values of net migration and local government employment until the outputs from the tableau were exactly consistent with the inputs. This iterative process always went fast and converged to a unique solution (with no issues relating to local optima). Attention then shifted to the next time interval with the prior results available as inputs.

The problem of translating between population and households was addressed by fitting an equation that linked changes in household population to changes and absolute numbers of households by relative income. This equation was fit by multiple regression to 1990-2000 data for the 78 sub-regional districts. It was used most often to estimate population from the district-level household forecasts discussed in the next section, but it was also applied in reverse at the regional level to estimate households on the basis of population. Regional values of all the leading demographic variables have been obtained by way of this step and the application of additional relationships dealing with population in group quarters.

These regional demographic profiles are summarized in Table 6 below and in the two subsequent tables. The regional population is expected to increase from just over 7.6 million persons in 2000 to 9.9 million persons in 2030, a gain slightly exceeding 30%. The share of population living in group quarters is expected to decline slightly in the present decade, continuing a prior trend, but then will increase in subsequent decades due to the rapidly rising share of elderly persons.

Table 6. Forecast of Regional Population and Households

	Total	Pop. in Group Quarters		Pop. in	Number of	Pop. Per
	Population	Number	% of Total	Households	Households	Household
1990	6,727,050	173,593	2.58%	6,553,457	2,491,041	2.631
2000	7,608,070	178,310	2.34%	7,429,760	2,871,861	2.587
2010	8,425,285	195,031	2.31%	8,230,254	3,220,398	2.556
2020	9,091,614	219,566	2.42%	8,872,048	3,506,281	2.530
2030	9,895,097	247,178	2.50%	9,647,919	3,849,172	2.506

The number of households in the region will increase by 34%, from 2.87 million to 3.85 million, with the excess over the population growth rate resulting from a decline in average household size from 2.587 to 2.506 persons. By the end of the forecast period, however, average household size will be falling by less than 0.1% per year, as compared with 0.17% per year during 1990-2000.

Regional-National Comparisons

Tables 7 and 8 on the next two pages compare the expected regional and national trends in employment, population and age distribution. To provide a basis for historical

comparisons, Table 7 goes back to 1980 and provides growth rates for two intervals prior to the forecast period.

Table 7. Summary of National and Regional Forecasts

	United States		Wash-Balt Region	
	Number (000)	Percent Change	Number	Percent Change
Employment				
1980	98,882		2,829,706	
1990	118,793	20.1%	3,716,934	31.4%
2000	135,208	13.8%	4,207,321	13.2%
2010	152,218	12.6%	4,758,498	13.1%
2020	162,462	6.7%	5,103,614	7.3%
2030	171,003	5.3%	5,407,291	6.0%
Population*				
1980	227,397		5,790,490	
1990	249,812	9.9%	6,727,050	16.2%
2000	282,339	13.0%	7,608,070	13.1%
2010	309,163	9.5%	8,425,285	10.7%
2020	336,032	8.7%	9,091,614	7.9%
2030	363,811	8.3%	9,895,097	8.8%

* Populations are midyear estimates for the U.S. and April 1 figures for the Washington-Baltimore region.

As already mentioned, the Washington-Baltimore region gained its reputation for rapid growth during the 1980s. Though the Reagan era was maligned by some observers for mostly creating low-paid service jobs, it created vast numbers of them, filled in large part by women. Yet the Washington-Baltimore region still managed to exceed the U.S. in 1980-90 employment growth by eleven percentage points. (The top figures in Table 7 are a bit indefinite due to conflicts among data sources, but the region clearly outpaced the nation by a double-digit percentage.) At the same time the region outgained the U.S. in population by more than six percentage points. The region's boomtown image became somewhat outdated in the 1990s, however, when the nation gained employment at a slightly higher rate and the region barely managed to stay ahead in terms of population.

The forecasts specify that the Washington-Baltimore region will return to leading the nation in percentage growth, but only by fractions of a percentage point per decade and not for population during 2010-20. The national pattern will involve an abrupt reversal of the relationship between employment and population gains after 2010, with the difference between employment and population growth rates dropping from plus 3.1 percentage points to minus 2.0 percentage points. This will reflect the squeeze on labor availability caused by the retirement of baby-boomers. But the younger age structure of the Washington-Baltimore population will delay this effect somewhat, with the result that a population gain of only 7.9% in 2010-20 will be sufficient to accommodate the region's economic growth during that interval. There will have to be a larger population gain in the next decade, however, as the region falls in line with the national pattern.

Table 8 compares the national and regional age distributions on a percentage basis. In 2000 the region had a substantially younger population than the U.S., with an elderly population share of only 10.1% as compared with the national share of 12.4%. (Surprisingly little of this gap was attributable to a regional excess of persons aged 20-34.) Over the coming decades, high in-migration of young adults will keep the region's 20-34 population share roughly constant while the corresponding national share declines, but population aged 35-64 will thin out even faster in the region than the U.S., with the result that the region will gain elderly persons no less rapidly than the nation. The 17.6% elderly population share attained by the region in 2030 will roughly equal the U.S. share attained in 2024.

Table 8. Forecasted National and Regional Age Distributions

	Under Age 20	Ages 20-34	Ages 35-64	Age 65 and Over	Total
United States					
2000	28.5%	20.9%	38.1%	12.4%	100.0%
2010	26.9%	20.5%	39.5%	13.0%	100.0%
2020	26.5%	19.6%	37.7%	16.3%	100.0%
2030	26.1%	18.8%	35.5%	19.6%	100.0%
Wash-Balt Region					
2000	27.8%	21.4%	40.6%	10.1%	100.0%
2010	26.7%	21.1%	41.2%	11.0%	100.0%
2020	25.2%	21.4%	38.9%	14.5%	100.0%
2030	25.3%	21.1%	36.1%	17.6%	100.0%

IV. REGIONAL FORECASTING METHODOLOGY

Overview

Allocating regional forecasts to component areas within a region is particularly challenging because the dynamics of urban growth are multifaceted and self-referential. Basically, the location of everything depends on the location of everything else. This means that for each local area, the change over time in any demographic or economic variable can be shaped by the past and current trends in all other demographic variables and employment levels – not only in the given area but in every other part of the region. There is a need to capture a wide range of inter-area influences, which decline over space and can only be expressed for each area by forming regional sums of distance-weighted factors. There is also a need to capture the limiting influence of land availability, which is the countervailing factor that causes urban development to disperse with the passage of time despite the advantages of proximity. Any serious attempt to describe and simulate how the real world operates must therefore consider a multiplicity of potential predictors for each target variable.

Prior forecasting studies have yielded two premises about the proper approach to this task, namely that: 1) a forecasting project should address all components of an urban region rather than one or a few areas in isolation, even if regionwide events are not of ultimate concern; and 2) the process of allocating activities – usually meaning increments of activity – to component areas of a region should be accomplished using mathematical relationships calibrated to real-world data. The argument underlying the first premise is that an investigator cannot credibly claim to understand the prospects of any locality in a metropolis without analyzing the dynamics of the larger region, since departures from past trends are common and typically due to larger forces. (An example cited earlier was the near-doubling of Frederick County's population growth rate when the suburbanizing wave from Washington first struck the area in the 1970s.) And having been analyzed, the larger region might as well be forecasted, since this allows comparative evaluation of forecasts and invites observers to judge whether local results form part of a plausible regional scenario.

Calibrated relationships mean equations fitted to empirical data using multivariate statistical methods. They are considered essential for sub-regional allocation because the number and diversity of potential causal factors make it nearly impossible to establish reliable predictive relationships through other means. The advantages of statistically based mathematical modeling and its outputs consist of procedural rigor, objectivity, comprehensiveness, replicability and interpretability (in concept if not in detail). One disadvantage is a need to assume that the historical behavioral patterns embedded in the model calibration data will continue to hold in the future. The other main disadvantage will be discussed momentarily.

Past studies have fitted allocation equations using county-level data for large numbers of metro areas in the eastern U.S. The use of such equations required an assumption that urban growth forces operated similarly in different regions as well as different time periods. In the present study, however, the size of the subject region

created an opportunity to calibrate predictive relationships using only internal data. Two objectives could thus be served by partitioning the region's 33 political jurisdictions (listed on page 1) into 78 generally smaller districts. This reduced the geographic units to a scale more relevant for Frederick, while at the same time creating enough observations for statistical calibration of predictive relationships. Whether or not the advantages of internal calibration justified the extremely laborious process of developing sub-county employment profiles, the resulting model was unquestionably reflective of urban growth dynamics in Washington-Baltimore.

The principal weakness of this forecasting approach is the existence of severe limits on the types of variables that can feasibly be obtained for use in large-sample statistical analysis. These limits mean that a calibrated model must omit whole classes of predictors. Essentially the predictive factors must be limited to earlier (and sometimes contemporaneous) values of the target variables themselves – i.e., to demographic and economic descriptors – plus functions of distance, land area and density. The model cannot explicitly take into account policy-related influences such as land use controls and infrastructure availability, because such factors are inherently difficult to quantify and hence cannot feasibly be measured for large numbers of geographic units. Model applications can cover these factors implicitly to the extent that their future impacts resemble their past impacts (because the model equations operate in part by extrapolating past trends, and are pegged to replicate past conditions exactly). But the model has no mechanisms to capture the effects of future changes such as shifts toward more or less stringent development controls. It basically assumes that the tendency of public actions to restrict or encourage growth will resemble the conditions prevailing in the calibration period. For this reason the outputs are sometimes called "trend" forecasts.

Another way of describing this limitation is that allocation modeling primarily yields "demand-side" forecasts. An allocation model that considers detailed linkages among activities and areas can describe with some reliability the new development that the market will want to place in each area. Given special efforts, the model can crudely reflect supply-side factors insofar as they involve amounts of available land. But model applications must simply average across other supply-side factors, which largely involve infrastructure support and other policy interventions. The present model calibration process has suggested, for example, that the Frederick Study Area had a mildly pro-growth posture by regional standards during the 1990s. The forecasts presented here assume that such a posture will prevail in the future. But more or less growth could undoubtedly occur in the Study Area if different policies were pursued in the city and/or its immediate surroundings. This aspect of the forecasts must be remembered in what follows.

Measurement and Grouping of Variables

The partitioning of the region into 78 districts has involved the division of major counties into as many as eight subareas. (See Figure 1 and the two tables in the appendix to this document.) The divisions were guided in large part by zip code boundaries, because the process of breaking down employment data from the county level to the district level had to rely primarily upon County Business Patterns data for zip codes.

This process was extremely laborious and involved some estimation for earlier years. In contrast, demographic information was assembled from the decennial censuses in a process complicated only by changes in census tract and block group definitions.

For each district, the resulting database included 1980, 1990 and 2000 values of the leading variables already described, namely: employment in 20 industry categories; households in three relative income categories (defined with reference to the regional income distribution in the given year); and population broken down by type of residence (in households or group quarters). Other inputs included latitude/longitude data for use in calculating straight-line distances among districts, plus two measures of land area. The latter consisted of total land area (excluding permanently inundated land) and a measure of developable land that was obtained by subtracting obviously unusable areas. Because the region's topography presented relatively few natural land constraints, developable land generally equaled total land minus the area of military bases. A third land measure, called "available" land, was estimated as a function of existing development in a manner to be described.

The model calibration period was the interval from 1990 to 2000. The calibration process consisted of relating the 1990-2000 change in each employment or household variable to past changes, initial conditions and sometimes contemporaneous changes in other variables, plus the subject variable's own past change and initial magnitude. Equations of this nature were fitted for all employment and household categories using multiple regression analysis, and adjustment factors were inserted for purposes to be discussed. The equations then became the "model" used to forecast employment and household changes in each future interval, given the regional totals already established. Population changes were addressed in a supplementary step.

The twenty employment variables were arranged for modeling purposes into three groups, referenced here as groups X, Y and Z. A grouping of some sort was necessitated by the knowledge from past studies that individual industries would be too unwieldy for use as predictors in the model equations (and would create too many opportunities for spurious results). Economic predictors in the model equations were thus limited to the overall employment levels and changes in each of the three groups, and functions thereof, with the exception that past and initial conditions in an individual industry would be available as predictors of current change in the same industry.

The assignments of industries to the three groups had strategic significance because they determined which industries could serve as contemporaneous predictors of change in which other industries. When applied to any future time interval, the model would generate forecasts for the industries in group X, then those in group Y, then those in group Z. So in the earlier calibration of the model's equations, the factors available to predict employment change in group-Y industries included the 1990-2000 change in group-X employment (since current events in group X would always be established by the time the forecasting process addressed group Y) as well as the 1980-90 changes and 1990 employment levels in all groups. Similarly, the factors available as predictors of

employment change in group-Z industries included the same-period changes in both group-X and group-Y employment.

The industries placed in group X were those in which employment change was considered least likely to depend on current events in other industries, meaning they could be placed first in the forecasting sequence with the smallest penalty in terms of predictive accuracy. Not coincidentally, these consisted of industries that largely played "basic" roles in the regional economy (although what mattered was their independence at the district level rather than the region level). The given industries were: farming plus agricultural services and mining; the four categories of manufacturing; transportation and utilities; and federal and state government.

At the opposite extreme, the industries placed in group Z were those considered most sensitive to current trends in other sectors. These were the relatively consumer-oriented industries, namely: eating and drinking places; other retail trade; insurance and real estate agents; health services; other consumer services; local government; and construction. The construction industry has special characteristics (to such an extent that it is considered "basic" in some conceptual schemes), and only part of this activity is consumer-oriented. However, the future-oriented nature of construction mandated its placement near the end of the forecasting sequence in group Z. Group Y then included the six remaining industries, which consisted largely of producer services. These were: wholesale trade; finance and insurance carriers; business services; legal, engineering and management services plus membership organizations; and administrative & auxiliary establishments plus communication.

The three household categories – lower-income, middle-income and upper-income households – were also treated as a group from the standpoint of sequencing, but they were allowed to serve as separate predictors in the model equations. An important decision involved the placement of households in the forecasting sequence relative to the three groups of industries. This would determine how many industries could serve as current predictors of household changes and how many could be predicted by current household changes. Some past studies have placed households after producer services (group Y), but the present investigation found that households served best in a causally antecedent role to that group. Hence households were placed between groups X and Y in the forecasting sequence. (The ordering of variables would not have been an issue if the study had built a model using simultaneous-equation estimation methods, but this was infeasible given the nature of the database and the forecasting problem.)

Structure of Equations

The equations that were fitted statistically and used for forecasting were identical in form. That is, for all of the twenty industries and three household categories, the dependent variables were computed in the same way and the eligible independent variables (predictors) were the same, with the exception that four independent variables pertained to the specific industry under analysis and the values of others could vary due to a weighting factor discussed later.

In every case the dependent variable in a regression analysis was simply the change between 1990 and 2000 in employment or households in the category under analysis. Table 9 below describes the independent variables that were tested for inclusion in each equation. The items in the table are referenced by letter and usually cover sets of variables rather than individual predictors (with the number of different versions noted in parentheses). The dates cited in the definitions refer to the calibration data and were subject to change when the fitted equations were used in forecasting. When addressing the 2010-20 interval, for example, all the dates would advance by 20 years from those shown, and the inputs would consist of forecasts already established for 2010 plus the predetermined regional totals for 2020.

Table 9. Variables Analyzed to Obtain Allocation Model Equations

Dependent Variable:

1990-2000 change in employment (for one of the 20 industries) or households (for one of the 3 income-based household categories)

Independent Variables:

Constant term (regression intercept)

A 1990 employment or number of households in the category under analysis

B 1980-90 change in employment or households in the category under analysis

C 1990 shortfall in employment or households in the category under analysis relative to the average relative size of that category

D * Variable C weighted by available land factor

E * Relative concentration of 1990 households in an income category (3 variables for 3 household categories)

F * 1980-90 change in measure of proximity to employment or households (24 variables: 8 for 3 employment groups plus total employment and 3 household categories plus total households, times 3 for alternative sets of parameters in the distance function)

G * 1990 measure of proximity to employment or households (24 variables as as in set F)

H * 1990-2000 change in measure of proximity to employment or households (24 variables as above minus those ruled out by sequencing considerations, yielding none in equations addressing industries in group X, 3 in household equations, 15 in group-Y industry equations, and 18 in group-Z industry equations)

I * variable in group F weighted by 1990 employment or households in the category under analysis (24 variables)

J * variable in group G weighted by 1990 employment or households in the category under analysis (24 variables)

K * variable in group H weighted by 1990 employment or households in the category under analysis (0 to 18 variables)

* Weighted by available land factor, to an exponent determined during calibration

In every regression equation, the factors eligible to explain the 1990-2000 change in a given category of employment or households included the 1990 value and the 1980-

90 change in the same category. Past studies had shown that these variables frequently worked in tandem, because a negative coefficient for the former and a positive coefficient for the latter gave an equation flexibility in describing growth and decline scenarios. Such an outcome was again observed for these two same-category variables, with 1990 employment or households playing an important negative role in most equations and 1980-90 change contributing positively in nearly as many. (The need for most equations to include the initial-year variable in a negative role was reinforced by the fact that all other variables were constrained to exert positive influences, as discussed below.)

The "shortfall" variables C and D were also same-category variables. Their values were computed for a district by subtracting its 1990 number of employees or households in the category under analysis from the number that the district would have had if its activities were distributed across categories in the same fashion as the regional averages. Positive coefficients for such variables were observed in many employment equations and reflected a common tendency for undersized industries to grow faster than sectors with high existing concentrations of employment. (These predictors also tended to work in tandem with past-change variables.) The three variables in set F were descriptors that pertained only to households but were intended to serve as predictors of employment. They described a district's relative shares of lower-income, middle-income and upper-income households, which had been found in previous studies to influence local employment growth in some sectors.

All of the remaining predictors were composite measures that expressed a district's proximity to past growth, initial-year activity or current growth throughout the region. These variables covered inter-industry relationships and employment-household relationships within a district, as well as relationships across a district's boundaries, because their region-wide summations included the home districts for which values were being computed. The computation and purpose of these "proximity" variables are described in the next subsection.

The proximity variables were all eligible as predictors in two forms, namely with and without being weighted (multiplied) by 1990 employment or households in the category being analyzed. These forms were about equally represented in the statistically significant results. In addition, all of the explanatory variables other than those labeled A, B and C above were weighted by an available land factor that is explained in the second following section.

Proximity Variables

The proximity variables were predictors embodying the old dictum that the three important things in real estate are location, location and location. For real estate divisions ranging from single land parcels to whole counties, what matters most to development potential is relative location – i.e., where the given land is located relative to everything else in the built environment. Relative location can only be expressed via composite variables that consider the entire metropolitan distribution of the influence ("attractor") under consideration and include weightings by distance from the subject area.

As used in the present study, each proximity variable pertained to an attractor consisting of households in one of the three income categories or employment in one of the three major groups (X, Y and Z), or else total households or total employment. The value of an access variable was computed for each district by summing the values of the attractor across all districts in the region, when weighted by an inverse function of distance to the district in question. The inverse function was the reciprocal of adjusted distance between districts raised to an exponent of 2 or 2.5. The distances were straight-line miles between district centroids (based upon latitude and longitude). Distances were adjusted by adding two factors as shown in the following formula:

Access measure expressing the influence of attractor S on activities in district j = Sum across all districts i (including i = j) of:

$$S_i / (D_{ij} + Q_j + T)^P$$

where:
- S_i = The value of the given attractor for district i;
- D_{ij} = Distance from district i to district j;
- Q_j = Intra-district impedance for district j (expressed in miles);
- T = Terminal impedance (constant); and
- P = An exponent equaling 2 or 2.5.

Intra-district impedance referred to distance of travel within a district. It was estimated using a geometrically based function that varied as the square root of district land area and equaled K at 100 square miles. Terminal impedance, T, was a constant for all observations and expressed the cost of travel regardless of distance. It was most easily understandable as terminal time (i.e., the time required to walk to one's car and so forth), but was expressed in the formula as a distance. The proximity variables were computed using two alternative sets of values for these parameters, namely K=3, T=3 and K=5, T=5. In the first case a proximity variable would be strongly reflective of events within the subject district itself (i.e., the district's own level of the given attractor or change therein), whereas the higher values of K and T would place more emphasis on events outside the district's boundaries. A reverse situation held for lower and higher values of the exponent P. Hence the lower values of K and T were always paired with the higher exponent to maximize the range of describable situations. Each proximity measure submitted for consideration in each regression analysis was offered in three versions based on P, K and T values of: 2,5,5; 2.5,5,5; and 2.5,3,3.

The use of proximity variables to express intra-district as well as inter-district relationships was a strategic choice designed to minimize scale effects. Any partitioning of a region into component areas must be arbitrary to some extent, and there is a danger that the relative sizes of sub-areas will influence the roles assigned to variables describing their internal conditions. But proximity variables automatically compensate for sub-area (district) sizes. The smaller the geographic extent of an observation unit, the closer it will lie to its neighbors on a centroid-to-centroid basis, hence the more its values of proximity variables will reflect conditions in surrounding areas. This reduces the sensitivity of an analysis to where boundaries happen to be drawn.

Land Availability

Simulating urban expansion realistically requires special attempts to express what might be called greenfield effects. The constraining role of land availability cannot be handled simply by asserting that a district has some given capacity for development (however determined) and that it will grow freely until this capacity is reached. In U.S. suburbs, land-related limits start to dampen growth long before all of an area's available parcels are utilized, or even half the parcels are utilized. The real estate market operates in such a way that land prices begin to rise – i.e., start to acquire a location premium – when an area's development is still at a relatively early stage (or what planners would like to consider an early stage). This motivates both land developers and land users to look elsewhere for cheaper alternatives, resulting in the familiar syndrome of leapfrog development and urban sprawl. The phenomenon is difficult to pin down analytically because it depends on land use policies and infrastructure availability in both the sending and receiving areas, and because almost no direct information is available on the primary driver, land prices. The present study has not prejudged the nature and extent of greenfield effects in the Washington-Baltimore region, but taken pains to structure the allocation model so that their operation could be captured at least crudely.

The plan was to address this need in the model calibration process by weighting nearly all of the candidate explanatory variables by a function of available land. This function would express the hypothesis that gains in employment or households of the type under analysis were positively related to the amount of land available for new development. When variables containing this function were used in forecasting, the model would tend to predict progressively smaller gains over time as the amount of available land declined, even if the supply was not close to exhaustion. However, the magnitude of this effect would be established in the calibration process rather than asserted beforehand. The data would determine the importance of land availability for each employment and household sector, and would be able to reject this factor entirely as an influence on growth. But land availability would at least be given maximal exposure as a possible causal factor.

The immediate problem was obtaining a measure of available land. As noted above, developable land was defined as any land that could accommodate employment or households, whether already developed or not, and for the most part equaled total land minus military reservations. Available land was then defined as developable land that was not currently in any use that required physical improvements. Collecting data on available land in all 78 districts would clearly have been infeasible if not impossible. Consequently it was necessary to develop a surrogate measure of available land based upon developable land and existing levels of activity.

The information on existing activity consisted of the employment and household statistics already at issue, which could be used to compute development density. So the strategy was to posit a functional form linking available land to development density. Specifically, the ratio of available land to developable land would be expressed as a one-parameter or two-parameter function of density, perhaps with the parameters held

constant across all employment and household sectors (implying that available land was the same for all land uses). Absolute amounts of available land would be estimated from the ratios yielded by this function, and the quantity used to multiply predictive variables in the allocation model would consist of these estimates raised to an exponent. The exponent would be allowed to vary among model equations and would be determined in the calibration process by iteratively finding the value that maximized R-square. Each exponent would then express the relative importance of land availability to the given industry or household group.

The first task was to select a measure of development density, preferably one that reflected both population and employment. The chosen measure was based on the facts that: 1) employment is about half as great as population on average; and 2) about 20% of all developed urban land is used by sources of employment. (See: Harris, Christopher, "Bringing Land Use Ratios into the '90s," PAS Memo, American Planning Association, August 1992.) These facts imply that land consumption per employee equals about half of land consumption per resident (since 0.2/0.5 is half of 0.8/1). So the density measure has simply equaled population plus one-half of employment, all divided by land area in square miles. This quantity expresses development density in "population/employment" or "pop/empl" units.

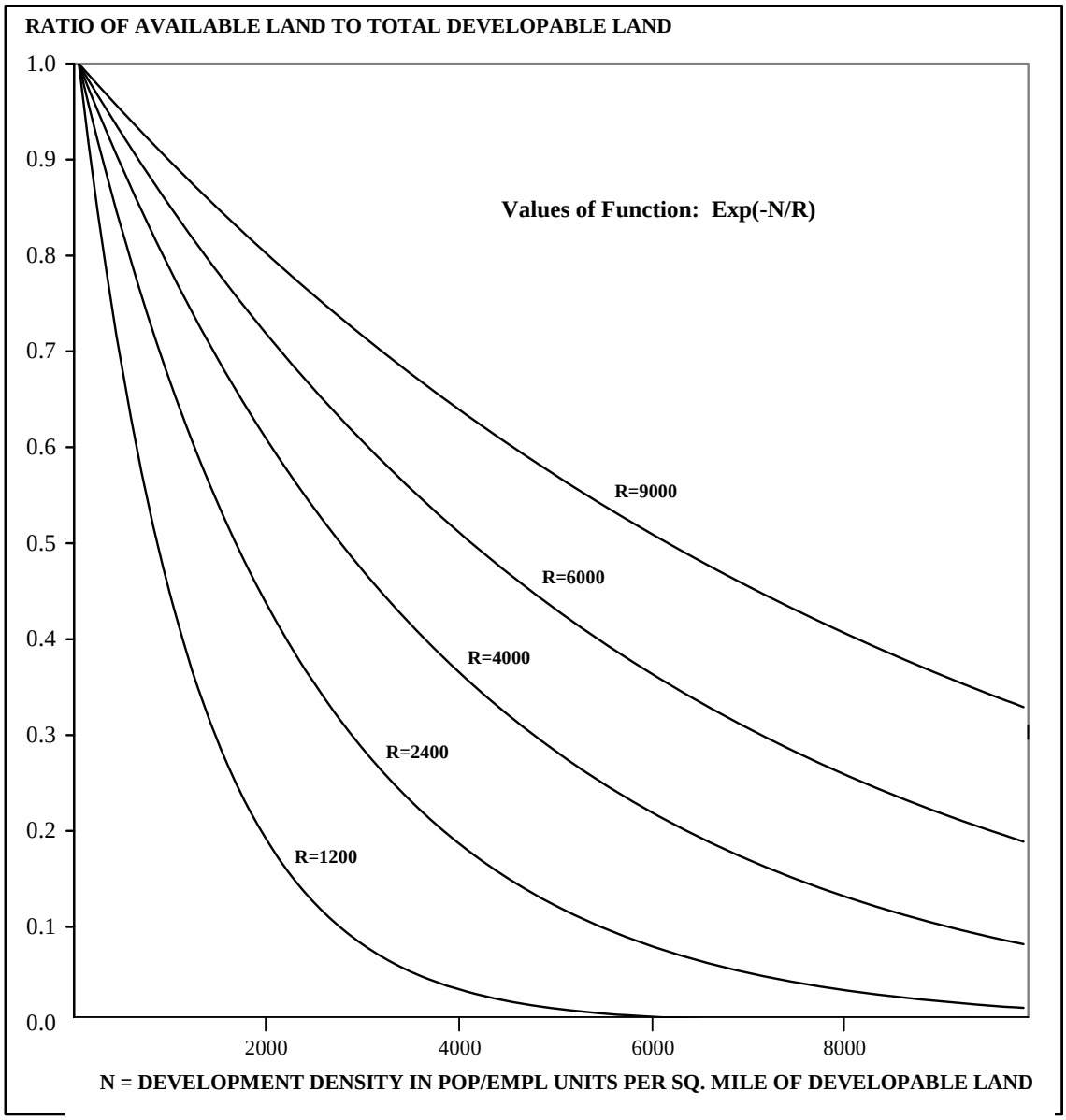
The designation of a functional form for available land followed the principle that a model should have interpretable parameters even if the interpretation rests on a highly idealized scenario. The chosen scenario was one in which an area develops from scratch (zero density) at progressively higher marginal densities. After experimentation with other options, the chosen functional form was one based on the assumption that marginal development density varies in inverse proportion to the share of developable land remaining available. Letting N = average density, N' = marginal density, V = available land, W = total developable land, and R = a parameter to be determined, this function and its evaluated integral are as shown in the first two lines below. The third line gives the solution for the available land ratio (V/W) as a function of average density in population/employment units.

$$N' = R/(V/W)$$
$$N = -R*\ln(V/W)$$
$$V/W = \exp(-N/R)$$

Figure 7 on the next page shows the available land ratios yielded by the above relationship given different values of the parameter R, which determines how fast the available land ratio approaches zero as density rises.

This approach and functional form were used in a prior study for a smaller metro area, wherein a value of 4,000 was chosen for the parameter R based on experimentation outside the main analysis. The results were positive, but two factors have prevented the present study from proceeding in identical fashion. First, the R-value of 4,000 was criticized for being two high given its interpretation in the above scenario. It implied that residential development in an area would "start" at about three dwelling units per acre,

Figure 7. ALTERNATIVE VALUES OF AVAILABLE LAND FUNCTION



SCENARIO YIELDING AN "R" VALUE OF APPROXIMATELY 2,400

Initial net residential density @ 2 units per net acre	= 1,280 dwellings per square mile
Initial gross res. density: net density times 75% of land developable (excl. r.o.w.) times 80% in residential use	= 768 dwellings per square mile
Population density @ 2.5 persons per dwelling unit	= 1,920 persons per square mile
Employment @ one job per two residents	= 960 jobs per square mile
Population/employment units: pop. plus 0.5 times jobs	= 2,400 pop./empl. units per sq.mi.

whereas any initial net density over two units per acre was considered unrealistic. And second, the higher densities encountered in the present study rendered the functional form problematic without the use of a high R-value. As shown in Figure 7, this form with an R-value of 2,400 would virtually rule out the possibility of growth in any area having more than a four-figure density in population/employment units, whereas the present study had four districts with present densities outside this range (topped by the District at 15,000+ units). What these considerations meant was that we could no longer get along with a one-parameter function. A second parameter had to be inserted by adding a constant, referenced as F, to the exponential term. This yielded the following revised version of the land-ratio formula:

$$V/W = F + \exp(-N/R)$$

The constant basically softened the impact of the formula, for any given values of the other parameters, by asserting that some land was always available for development regardless of existing density. For example, an F-value of 0.1 would say that 10% of developable land was always available, and its impact on relative magnitudes could be represented visually by adding a 10% margin onto the bottom of the graph in Figure 7. Meanwhile, the parameter R was given a value of 2,400 to make the underlying scenario more realistic. As shown beneath the graph in Figure 7, this assumption is consistent with an initial residential development density of 2 units per net acre.

The values of available land estimated by the formula were taken to an exponent as already indicated. With the exponent referenced as E and the 2,400 value inserted for R, this yielded the weighting factor shown below. An E-value of unity would mean that the growth impact of the variable being weighted was directly proportional to available land, all else being equal. An exponent of zero would mean that the weighted variable exerted the same influence regardless of available land (as estimated by the formula).

$$\text{Available-land weighting factor} = (W*(F+\exp(-N/2400)))^{E}$$

In each regression analysis, a weighting factor of this form was applied to all of the independent variables indicated by asterisks in Table 9 – which is to say, all but the three variables A, B and C. The same weighting factor was applied to all variables, meaning that the parameters E and F stayed the same within an equation. However, to assure that the analysis could reflect a wide range of situations, it was necessary to let both E and F vary among equations. This meant that the best-fitting values of both E and F had to be found iteratively in each analysis.

Values of the available-land weighting factor were always computed using density in the initial year of the time interval at issue. Thus the weightings used in the regression analysis all pertained to 1990. In the forecasting process, new weightings were computed at the end of each round (e.g., computed using 2010 data after all 2000-10 changes had been forecasted) for predictive use in the next round. The process was thereby able to simulate the progressive tightening of land-availability constraints as development densities increased.

Calibration Procedures and Results

Each regression analysis began with the available-land parameters E and F set at typical values (most often 0.5 and 0.1). The first variables tested were the same-sector variables A through C, which were not weighted by the available-land factor, and at least one of these was always retained. Then other independent variables were brought into the equation on the basis of their correlations with residuals from prior regressions. The criterion for retention of a variable in an equation was always 5% significance in a two-tailed t-test. At intervals in the process, the values of E and F were incrementally adjusted to maximize the R-square obtained with the given set of variables. Once an optimum was reached, any variables rendered less than 5%-significant by the parameter adjustment were deleted from the equation and the search for a better-fitting combination resumed.

The process of obtaining a final set of explanatory variables and parameter values was laborious but less arbitrary than might appear. With any given set of independent variables in an equation, the "surface" of R-square as a function of E and F was always smooth and lacking in local optima, so the only issue when searching for the maximum value was how much to change the value of E or F at each step. The final results of the process were arbitrary only to the extent that it was possible to miss the best overall combination of predictors because they only became best with E and F values different from those found optimal under other circumstances. There was no assurance against such outcomes, but the likelihood was considered small because: 1) the explanatory power of variables rarely exhibited high sensitivity to E and F values; 2) there were usually dominant variables that established the necessary range of E and F and ruled out the possibility that distant solutions might be better; 3) the process was conducted with much experimentation and checking-out of remote prospects for improvement; and 4) the best and possibly-best solutions never involved large numbers of independent variables, which moderated the complexity of the problem. No final equation contained more than six independent variables, and the significance requirement limited most equations to three or four.

Spurious results are a danger in any regression analysis that tests large numbers of explanatory factors. The present study attempted to limit such results by structuring the analysis in ways that went beyond significance testing. In particular, all independent variables other than the initial-value variable (A) were formulated so that they should affect employment or household change positively if at all. Then they were retained in equations only if they entered with positive coefficients. All other relationships, no matter how strong numerically, were dismissed as counterintuitive.

The regression results are summarized in Table 10 on the next page. Since the independent variables are hard to reference and most of the regression coefficients lack simple interpretations, the table just lists R-square values and indicates which sets of independent variables – as labeled in Table 9 – are represented in each equation. Also shown are the best-fitting values of the two parameters in the available-land weighting function (namely the constant F and the exponent E).

Table 10. Summary of Regression Results

	R-square	Independent Variables (as ref. in Table 9)	Av.-Land Parameters Constant (F)	Av.-Land Parameters Exponent (E)
Farming, ag. services & mining	0.564	A,E,F	0.00	0.32
Construction	0.661	A,B,D	0.00	0.30
Manufacturing SIC 35,36,38	0.885	A,F,I	0.00	0.54
Other durable goods mfg.	0.850	A,E,I	0.20	0.73
Printing & publishing	0.757	A,B,E,F,I	0.03	0.26
Other nondurable goods mfg.	0.907	A,E,I	0.00	0.35
Transportation and utilities	0.291	B,F,I	0.00	0.00
Wholesale trade	0.524	A,E,H	0.00	0.24
Eating & drinking places	0.341	C,E,H	0.20	0.43
Other retail trade	0.712	A,B,C,E,F,H	0.20	0.17
Finance & insurance carriers	0.537	A,B,E	0.14	0.35
Insurance & real estate agents	0.804	A,C,I,K	0.00	0.76
Health services	0.906	A,B,E,H,I	0.20	0.16
Other consumer services	0.844	C,E,J,K	0.20	0.39
Business services	0.870	A,B,C,H,K	0.00	0.31
Legal & E/M serv. and m. org.	0.690	B,H	0.20	0.26
Other services	0.805	A,B,E,F	0.20	0.17
Communications & admin./aux.	0.480	A,C,F	0.00	0.26
Federal & state government	0.953	A,D,I	0.02	0.34
Local government	0.915	A,E,H,I	0.20	0.16
Lower-income households	0.802	A,B,E,H,I	0.00	0.13
Middle-income households	0.717	A,B,K	0.17	0.91
Upper-income households	0.592	A,B,H	0.20	0.75

Good overall statistical explanation was achieved in most of the equations, with nearly half of the R-square values equaling 0.8 or more and only four falling below 0.5. The available-land exponents followed a pattern seen elsewhere, with relatively low values for employment categories and high values for households. Only four of the twenty exponents for industry groups exceeded 0.35. (It is likely that the variation among these exponents was partly spurious, but not to an extent that created problems for forecasting.) Non-residential land uses are not expected to be highly sensitive to land availability – at least when crudely measured – because they can outbid households for land and are often driven by locational imperatives that have no equivalent for residential land users.

An unexpected finding, however, was the small available-land exponent obtained in the equation for lower-income households. The lower-income exponent is normally lower than those for middle-income and upper-income households – here estimated at 0.91 and 0.75 – for two reasons. First, in established areas new lower-income housing consists largely of apartments and hence is not land-intensive (though the opposite can be

true for far-flung development). And second, gains in lower-income households tend to involve movement into existing dwellings rather than new housing. But nevertheless, the observed lower-income exponent of 0.13 was outside the expected range and might have reflected some unidentified source of bias.

Adjustment factors

As discussed earlier, the statistically calibrated equations did not capture the influence of many supply-side factors – in particular, land use policies and infrastructure availability – because variables expressing these factors were not available for inclusion in the analysis. If the same factors were operative during both the 1980s and the 1990s, their effects would be partly captured in the relationships linking current change to same-sector past change (variable B), but such relationships were only established in about half of the regression equations.

The effects of omitted supply-side variables could still be covered, at least in theory, by computing the differences between actual and model-predicted changes for 1990-2000 and including these in the equations as adjustment factors for future years. This step has been employed in past investigations and repeated here in a modified form. (The differences between actual and predicted changes are interesting in their own right and are examined at the start of the next section.)

Adjustment factors are hazardous, however. There is no guarantee that deviations from the predictions of a demand-side model will reflect enduring supply-side influences, policy-related or not, as opposed to non-recurring and essentially random events. For example, if a factory closure during 1990-2000 has created a negative deviation for some industry, the use of an adjustment factor based straightforwardly on the deviation can cause the model to predict that another factory (or in effect the same factory) will close in each future interval. Such possibilities make it easy to over-adjust a forecasting model.

Thus the deviations between actual and model-predicted changes have been run through several filters before being added to the model equations as adjustment factors. The modifications dealt with the implications of unequal 1980-90 and 1990-2000 growth rates and allowed for two ways in which same-sector past-change variables affected the proper magnitude of adjustments. The results were two sets of adjustment factors, one applying to 2000-10 and one for use in later intervals.

A final comment involves the scaling of forecasts. The purpose of the model was to allocate predetermined regional values of variables among districts, on an incremental basis. Past models that were calibrated to data for multiple regions had used complicated functional forms that accomplished exact allocations. The reliance on internal data in the present project made it possible to use simpler functions offering various advantages; but a consequence was that the district forecasts for each variable did not sum exactly to the regional total. Hence a scaling step was required after the application of each equation. Rather than a multiplication of forecasted increments or end-year values, this step was accomplished by adding or subtracting some fraction of the variable's initial-year values, so the predicted differences among districts were neither muted nor amplified.

V. SMALL-AREA FORECASTS

Implications of the Model Calibration Process

Previous discussion has indicated that a forecasting model of the type used here mainly captures demand-side influences on growth, and in particular that it fails to cover differential effects of land use policies and infrastructure availability. (For convenience these factors are collectively referenced as policy-related influences since infrastructure is a matter of policy as well.) The equations of the unadjusted model only register policy-related impacts to the extent that these are transmitted from interval to interval through the past-change variables used as predictors of current change.

The extent to which regional growth has been shaped by policy differences can be estimated, however, by looking at the deviations between actual and predicted values of variables for the 1990-2000 period used as the model calibration interval. Table 11 does this for total households. The table's first column describes households in 1990. The next three columns deal with 1990-2000 household changes, respectively showing: the changes that actually occurred; the changes that were predicted by the model equations when fitted to data for the same interval; and the deviations between these magnitudes (computed as actual-minus-predicted). The last three columns give these changes as percentages of 1990 households. The predictions described by the table were generated by the model equations before adjustment factors were added for forecasting purposes as described in the previous section.

Table 11. Comparison of Actual and Predicted 1990-2000 Changes in Total Households

	1990	1990-2000 Change in HH			Change as % of 1990 HH		
	House-Holds	Actual	Pre-dicted	Devia-Tion	Actual	Pre-dicted	Devia-tion
Frederick County							
Central Frederick	21,398	8,381	7,548	832	39.2%	35.3%	3.9%
Rest of Frederick Co.	31,172	9,109	12,004	-2,895	29.2%	38.5%	-9.3%
Total Frederick Co	52,570	17,490	19,553	-2,063	33.3%	37.2%	-3.9%
Major Regional Divisions							
Western Maryland	490,145	96,752	118,592	-21,840	19.7%	24.2%	-4.5%
Eastern Maryland	801,023	126,231	118,285	7,946	15.8%	14.8%	1.0%
Baltimore City & DC	526,118	-19,784	-19,541	-243	-3.8%	-3.7%	0.0%
Northeastern Virginia	547,564	133,378	120,798	12,580	24.4%	22.1%	2.3%
Outlying VA & WV	126,191	44,243	42,687	1,556	35.1%	33.8%	1.2%
Total Region	2,491,041	380,820	380,820	0			

Definitions

Western Maryland: Montgomery, Howard, Carroll, Frederick and Washington counties.
Eastern MD: Baltimore, Harford, Anne A., Pr. Georges, Charles, Calvert & Q. Anne counties
Northeastern Virginia: Loudoun, Arlington, Fairfax and Prince William counties and Alexandria, Fairfax, Falls Church, Manassas and Manassas Park cities.
Outlying VA & WV: Clarke, Culpeper, Fauquier, King George, Stafford, Spotsylvania and Warren counties and Fredericksburg city, VA, and Berkeley and Jefferson counties, WV.

Table 11 reveals substantial deviations between actual and predicted household growth during 1990-2000, for Frederick County districts and for major divisions of the region. The present remarks will address the regional divisions first. The discrepancies observed at this level are remarkable given the sizes of the divisions and the fact that the model equations fit the data fairly well overall. The figures shown in Table 11 for Western Maryland, Eastern Maryland and Northeastern Virginia are all sums of values for 18 to 26 individual districts, which should enough cases to let most random errors cancel out. The persistence of the deviations and their general agreement with prior expectations suggest that the findings reflect real conditions rather than eccentricities of the model.

Observers of the Washington-Baltimore region tend to contrast all of Maryland with Virginia in terms of policy-related constraints on land development, but Table 11 suggests that there is an important distinction between the western Maryland suburbs (Howard County and west) and the rest of suburban Maryland. Residential growth in western Maryland during 1990-2000 fell nearly 22,000 households short of expectations. Based on all the past trends and economic interactions covered by the model, western Maryland should have been the region's fastest-growing division with a 24.2% household gain, but instead its rate of change was 4.5% lower. Meanwhile eastern Maryland gained about 8,000 more households than expected, thereby exceeding its anticipated rate of change by 1%. The household growth that shifted away from Maryland went primarily to the closer Virginia suburbs, namely the northeastern area bounded by Loudoun and Prince William counties. The outlying counties of Virginia and West Virginia also captured a share that was small in absolute terms but significant on a percentage basis.

Frederick County shared in the western Maryland pattern, but not uniformly. The data suggest that Central Frederick – the present Study Area – was relatively hospitable to development. This district gained 832 households, or 3.9% of its 1990 total, more than expected if its housing demand had met with policy responses that were average for the region. Yet the rest of Frederick County lost nearly one-quarter of the household growth expected in an average policy context. Its shortfall relative to expectations may have involved a lack of proactive support for development that was not a deliberate matter of policy, and the exceptionally high level of demand can be viewed as an extenuating factor in this regard. But in any case, the findings suggest strongly that the rest of the county was well below average in responding to housing demand while Central Frederick was neutral if not pro-growth by regional standards.

It is also interesting to consider similar figures for households broken down by relative income. (Keep in mind that the three income categories are based on an even partitioning of the regional income distribution, which is high by national standards, and that the grouping of households in relative terms can yield a lot of shifting among groups over time. For example, a stagnant district can gain lower-income households by virtue of its stagnation even if nobody moves.) Table 12 on the next page addresses 1990-2000 household changes using the same percentage descriptors as those the last three columns of Table 11, except that the percentages now pertain to households in specific income categories. The figures of special interest are presented in bold type.

Table 12. Actual Versus Predicted 1990-2000 Changes in Households by Income, as Percentages of 1990 Households in the Same Income Categories

	Lower-Income HH			Middle-Income HH			Upper-Income HH		
	Act.	Pred.	Dev.	Act.	Pred.	Dev.	Act.	Pred.	Dev.
Frederick County									
Central Frederick	35%	31%	**4.2%**	35%	30%	**4.8%**	51%	50%	**1.9%**
Rest of Frederick Co.	10%	25%	**-15.0%**	27%	36%	**-9.2%**	49%	53%	**-4.4%**
Total Frederick Co	22%	28%	-6.0%	30%	34%	-3.4%	50%	52%	-2.3%
Major Regional Divisions									
Western Maryland	23%	26%	**-3.7%**	21%	26%	**-4.6%**	17%	21%	**-4.8%**
Eastern Maryland	22%	22%	-0.4%	16%	13%	**3.4%**	10%	10%	-0.3%
Baltimore City & DC	-1%	-1%	0.2%	-8%	-7%	-0.9%	-6%	-7%	0.6%
Northeastern Virginia	29%	27%	2.1%	22%	22%	-0.2%	24%	20%	**4.2%**
Outlying VA & WV	26%	20%	**5.8%**	35%	36%	-1.8%	52%	53%	-1.8%

During the 1990-2000 period, Central Frederick seems to have been relatively accommodating to households at all income levels (though this may come as a surprise to recent participants in the housing market). In contrast, Table 12 suggests that the rest of the county was not only growth-averse in general but also highly income-selective. The percentage gain in lower-income households predicted for this area was mild by local standards at 25%, yet only two-fifths of this expectation was fulfilled. Meanwhile the out-county area was considerably less forbidding to middle-income households, and was just a bit inhospitable to upper-income households. The discrepancy of –4.4% in the latter case was modest given that the expected upper-income gain was 53%.

Western Maryland as a whole was apparently discouraging to residential development across the board. This finding may surprise observers expecting an upper-income slant like that in outer Frederick County, but perhaps it makes sense because upper-income development is the most land-intensive. In any case the interesting aspect of Table 12 is the selective manner in which the rest of the region accommodated the net household diversions from western Maryland. The eastern Maryland suburbs selected for middle-income households and were no more inviting than average for households at other income levels. Northeastern Virginia absorbed western Maryland's entire overflow of upper-income households (around 10,000, not shown by Table 12 in absolute terms), and also embraced some of the net lower-income diversion. But the primary locus of redirected lower-income household growth was the region's outlying territory in Virginia and West Virginia. This was a step toward a pattern found in many big cities outside the U.S., wherein the persons with the least money commute the longest distances.

No assurance exists that these deviations between actual and predicted changes were entirely the result of policy-related factors, but there is a presumption that such factors were mainly responsible. As described in the last section, the model equations have been adjusted under the assumption that the 1990-2000 deviations were largely reflective of enduring area characteristics. Hence the forecasts are intended to represent

best estimates of actual future conditions given a continuation of the present policy regime.

District-Level and County-Level Forecasts

The forecasts for the Frederick Study Area – the Central Frederick district – are best approached from a regional perspective. Tables 13 and 14 on the next two pages summarize the forecasts through 2030 for the entire region, with Frederick County listed first. Table 13 addresses population, households and employment for Central Frederick, the rest of Frederick County and the five major divisions of the region defined above in Table 11. Table 14 covers only population and employment, but presents a county-level breakdown of forecasts for all parts of the region except its outlying portion in Virginia and West Virginia. Both tables include 1990 data for comparison purposes. Table 13 shows the absolute change in each variable across each decade, and both tables include percentage growth rates in their last two columns. These are annual compound rates of change covering the 1990-2000 decade and the 2000-30 forecast period as a whole.

The forecasts call for a slowdown in growth relative to the 1990-2000 decade, in both absolute and percentage terms, for both the Central Frederick district and Frederick County as a whole. The Central Frederick population is expected to rise by ten-year increments ranging from about 17,400 persons during 2000-10 to about 12,100 persons during 2020-30, as compared with a 1990-2000 gain of 20,256 persons. The district's employment will follow a similar pattern, with ten-year gains tapering off from about 13,900 jobs to under 9,000 in the future after equaling 17,259 jobs in the past decade. The easing of growth will be less pronounced in the county as a whole, with ten-year population gains staying near 40,000 – as compared with 45,069 during 1990-2000 – and turning upward slightly after 2020. (The upturn will be a regionwide phenomenon linked to population aging as explained in the discussion of regional forecasts.)

The contention that demographic and economic growth in Central Frederick will slow down markedly – while still remaining high – should be interpreted in terms of larger events. The Central District's share of countywide activity will logically decline because Central Frederick only accounts for 7% of the county's developable land area. The fact that the Central District gained population faster than the rest of the county during 1990-2000 by nearly eight-tenths of a percentage point per year was an anomaly produced by the less-than-encouraging context for growth in outlying areas. The sheer amounts of land available outside Central Frederick will assume progressively greater importance even under the present assumption that the policy context will not change.

Growth in Frederick County as a whole will abate because this will be the trend in the region as a whole and because activity gains will level off in the western Maryland suburbs to a greater extent than in other areas. As shown by the compound growth rates in the last column of Table 13, the regional rate of population change will decline from 1.24% per year during the 1990s to 0.88% per year during the thirty-year forecast period, and western Maryland's margin above the region is expected to fall from 0.55% per year in the past decade to 0.15% per year in the future.

Table 13. Summary of Forecasts for Frederick County and Major Divisions of the Region

	Number					Change				Annual Compound Rate of Change	
	1990	2000	2010	2020	2030	1990-00	2000-10	2010-20	2020-30	1990-00	2000-30
POPULATION											
Frederick County											
Central Frederick	55,961	76,217	93,625	106,681	118,735	20,256	17,409	13,055	12,054	3.14%	1.49%
Rest of Frederick Co.	94,247	119,060	143,944	170,081	200,426	24,813	24,884	26,137	30,345	2.36%	1.75%
Total Frederick Co	150,208	195,277	237,569	276,761	319,161	45,069	42,292	39,192	42,399	2.66%	1.65%
Major Regional Divisions											
Western Maryland	1,339,328	1,599,280	1,819,708	1,987,800	2,176,907	259,952	220,428	168,092	189,106	1.79%	1.03%
Eastern Maryland	2,217,252	2,499,725	2,790,590	3,024,371	3,285,017	282,473	290,865	233,781	260,646	1.21%	0.91%
Baltimore City & DC	1,342,914	1,223,213	1,144,329	1,077,585	1,041,028	-119,701	-78,884	-66,744	-36,557	-0.93%	-0.54%
Northeastern Virginia	1,466,409	1,815,197	2,102,032	2,331,758	2,592,393	348,788	286,835	229,726	260,636	2.16%	1.20%
Outlying VA & WV	361,147	470,655	568,626	670,100	799,752	109,508	97,971	101,473	129,652	2.68%	1.78%
Total Region	6,727,050	7,608,070	8,425,285	9,091,614	9,895,097	881,020	817,215	666,329	803,483	1.24%	0.88%
HOUSEHOLDS											
Frederick County											
Central Frederick	21,398	29,779	36,953	42,488	47,724	8,381	7,174	5,535	5,237	3.36%	1.58%
Rest of Frederick Co.	31,172	40,281	49,751	59,787	71,674	9,109	9,470	10,036	11,886	2.60%	1.94%
Total Frederick Co	52,570	70,060	86,704	102,275	119,398	17,490	16,644	15,571	17,123	2.91%	1.79%
Major Regional Divisions											
Western Maryland	490,145	586,897	676,360	746,355	826,125	96,752	89,463	69,995	79,770	1.82%	1.15%
Eastern Maryland	801,023	927,254	1,048,856	1,151,274	1,267,549	126,231	121,602	102,418	116,275	1.47%	1.05%
Baltimore City & DC	526,118	506,334	490,653	470,235	457,900	-19,784	-15,681	-20,418	-12,334	-0.38%	-0.33%
Northeastern Virginia	547,564	680,942	793,000	884,173	988,811	133,378	112,058	91,173	104,639	2.20%	1.25%
Outlying VA & WV	126,191	170,434	211,529	254,245	308,786	44,243	41,095	42,716	54,541	3.05%	2.00%
Total Region	2,491,041	2,871,861	3,220,398	3,506,281	3,849,172	380,820	348,537	285,884	342,891	1.43%	0.98%
EMPLOYMENT											
Frederick County											
Central Frederick	41,816	59,076	72,985	83,574	92,424	17,259	13,910	10,589	8,850	3.52%	1.50%
Rest of Frederick Co.	17,306	26,289	32,077	36,441	41,535	8,984	5,788	4,364	5,094	4.27%	1.54%
Total Frederick Co	59,122	85,365	105,063	120,016	133,959	26,243	19,698	14,953	13,943	3.74%	1.51%
Major Regional Divisions											
Western Maryland	670,677	827,510	955,897	1,038,604	1,099,426	156,832	128,388	82,706	60,822	2.12%	0.95%
Eastern Maryland	996,674	1,090,830	1,203,475	1,294,095	1,384,168	94,155	112,646	90,620	90,073	0.91%	0.80%
Baltimore City & DC	1,100,351	1,024,794	1,058,282	1,062,911	1,067,926	-75,557	33,487	4,629	5,016	-0.71%	0.14%
Northeastern Virginia	827,072	1,096,494	1,340,090	1,472,703	1,572,800	269,421	243,596	132,613	100,097	2.86%	1.21%
Outlying VA & WV	122,159	167,694	200,753	235,302	282,971	45,535	33,060	34,548	47,669	3.22%	1.76%
Total Region	3,716,934	4,207,321	4,758,498	5,103,614	5,407,291	490,386	551,177	345,116	303,677	1.25%	0.84%

Appendix E

Table 14. Summary of County-Level Forecasts

	Number					Annual % Change	
	1990	2000	2010	2020	2030	1990-00	2000-30
POPULATION							
Western MD							
Frederick	150,208	195,277	237,569	276,761	319,161	2.66%	1.65%
Washington	121,393	131,923	144,124	153,496	166,962	0.84%	0.79%
Montgomery	757,027	873,341	969,712	1,035,155	1,108,877	1.44%	0.80%
Carroll	123,372	150,897	174,954	196,174	220,813	2.03%	1.28%
Howard	187,328	247,842	293,348	326,214	361,094	2.84%	1.26%
Eastern MD							
Baltimore	692,134	754,292	803,068	829,062	861,973	0.86%	0.45%
Harford	182,132	218,590	254,046	283,181	316,476	1.84%	1.24%
Anne Arundel	427,239	489,656	562,232	626,102	696,335	1.37%	1.18%
Prince Georges	729,268	801,515	885,507	952,630	1,020,903	0.95%	0.81%
Charles	101,154	120,546	145,810	169,367	196,376	1.77%	1.64%
Calvert & Q. Anne	85,325	115,126	139,926	164,030	192,954	3.04%	1.74%
Baltimore & DC							
Baltimore City	736,014	651,154	582,510	525,516	489,040	-1.22%	-0.95%
Washington, DC	606,900	572,059	561,819	552,069	551,988	-0.59%	-0.12%
Northeastern VA							
Loudoun	86,129	169,599	222,933	270,018	318,974	7.01%	2.13%
Fairfax*	847,784	1,001,624	1,141,254	1,250,939	1,369,085	1.68%	1.05%
Arlington	170,936	189,453	208,435	218,285	234,706	1.03%	0.72%
Alexandria City	111,183	128,283	137,173	140,870	149,646	1.44%	0.51%
Prince William*	250,377	326,238	392,237	451,646	519,982	2.68%	1.57%
Outlying VA & WV	361,147	470,655	568,626	670,100	799,752	2.68%	1.78%
Total Region	6,727,050	7,608,070	8,425,285	9,091,614	9,895,097	1.24%	0.88%
EMPLOYMENT							
Western MD		1.355099	1.229631		92,447		
Frederick	59,122	85,365	105,063	120,016	133,959	3.74%	1.51%
Washington	51,807	65,594	72,591	78,439	83,845	2.39%	0.82%
Montgomery	419,443	478,415	542,372	585,599	613,375	1.32%	0.83%
Carroll	42,603	50,624	55,789	61,090	68,222	1.74%	1.00%
Howard	97,702	147,512	180,082	193,459	200,025	4.21%	1.02%
Eastern MD							
Baltimore	344,185	362,011	385,634	404,650	425,200	0.51%	0.54%
Harford	59,927	77,685	86,712	91,057	95,727	2.63%	0.70%
Anne Arundel	213,057	253,880	286,460	311,422	330,135	1.77%	0.88%
Prince Georges	329,871	330,125	369,010	403,848	439,354	0.01%	0.96%
Charles	30,324	37,112	41,442	45,592	51,093	2.04%	1.07%
Calvert & Q. Anne	19,311	30,015	34,218	37,526	42,658	4.51%	1.18%
Baltimore & DC							
Baltimore City	388,311	371,311	379,504	378,364	378,050	-0.45%	0.06%
Washington, DC	712,040	653,484	678,778	684,547	689,876	-0.85%	0.18%
Northeastern VA							
Loudoun	40,677	80,606	110,933	128,838	136,414	7.08%	1.77%
Fairfax*	444,369	633,540	797,381	874,328	932,966	3.61%	1.30%
Arlington	165,817	168,107	184,372	196,639	205,976	0.14%	0.68%
Alexandria City	92,414	100,093	110,298	116,854	123,630	0.80%	0.71%
Prince William*	83,796	114,147	137,107	156,042	173,814	3.14%	1.41%
Outlying VA, WV	122,159	167,694	200,753	235,302	282,971	3.22%	1.76%
Total Region	3,716,934	4,207,321	4,758,498	5,103,829	5,407,291	1.25%	0.84%

* Fairfax and Prince William data include Fairfax, Falls Church, Manassas and Manassas Park cities.

Given this context, the growth expectations for Frederick County are quite high. The county's shares of western Maryland activity (not shown in the tables) will rise during the course of the forecast period from 12.2% to 14.7% of population and from 10.3% to 12.2% of employment. As shown by Table 14, Frederick County will retain its growth momentum to a much greater extent than Montgomery County, which is expected to gain population during 2000-30 less rapidly than the region as a whole, and Howard County, which is expected to outgain the region by a factor of 1.4 as compared with a 1990s factor of 2.3. But the cumulative effect of land use policy over the past quarter-century is that the region's main growth vector no longer points to the northwest. So the pressures on Frederick County will moderate, and the burden of accommodating them will shift away somewhat from Central Frederick.

The figures in tables 13 and 14 are summations of district-level forecasts that have been prepared for the entire region as described earlier. Tables A1 and A2 in the appendix to this document list the 78 individual districts and present their forecasted levels of population and total employment.

Frederick Study Area Forecasts

Tables 15 on the next page and tables 16 and 17 appearing later present the forecasts for Central Frederick and other Frederick County districts in more detail. As described in Section I, the forecasting process involved a four-way division of Frederick County into a South district, an East district and a North district as well as the Central Frederick area of primary interest. The South, East and North districts respectively account for 26%, 22% and 45% of the county's developable land.

In terms of population, the pattern of growth during the 1990s was extreme in that 64% of the county's population gain outside Central Frederick was absorbed by the East district, the area that borders Montgomery County and lies closest to Washington. This district was reportedly the only part of the county where aggressive steps were taken to meet housing demand. The fact that population growth rates were below 2% per year in the South and North districts must be considered remarkable given their geographic positions. In any case, the distribution of population change among outlying areas of Frederick county is expected to become more balanced in the future, with the East and North populations converging by 2010 and following the same track thereafter.

In terms of employment, Central Frederick dominates the county and is expected to remain dominant. The Study Area's share of total county employment declined by 1.5% during the 1990s but is expected to remain essentially constant over the forecast period. The main explanation for this finding is that the county's outlying areas have a much higher concentration of employment in "industrial" sectors (SIC categories 02 through 51, excluding 48) than Central Frederick. In 2000 the out-county and Study Area shares of employment in these sectors were 45% and 17%, respectively. The outlying areas will thus be laboring under a much less positive industry mix, because future employment gains will be overwhelmingly provided by service-producing activities.

Table 15. Forecasts of Total Population, Households and Employment for Districts of Frederick County

	Number or Share of Regional Number					Change or Share of Regional Change				Annual % Chg.	
	1990	2000	2010	2020	2030	1990-00	2000-10	2010-20	2020-30	1990-00	2000-30
NUMBER											
Population											
Central Frederick	55,961	76,217	93,625	106,681	118,735	20,256	17,409	13,055	12,054	3.14%	1.49%
South District	24,354	28,791	35,152	41,921	49,113	4,437	6,361	6,769	7,192	1.69%	1.80%
East District	27,060	42,922	53,875	64,210	75,979	15,862	10,953	10,336	11,769	4.72%	1.92%
North District	42,833	47,347	54,918	63,949	75,333	4,514	7,570	9,032	11,384	1.01%	1.56%
Total Fred. Co.	150,208	195,277	237,569	276,761	319,161	45,069	42,292	39,192	42,399	2.66%	1.65%
Households											
Central Frederick	21,398	29,779	36,953	42,488	47,724	8,381	7,174	5,535	5,237	3.36%	1.58%
South District	8,380	10,161	12,593	15,191	17,979	1,781	2,432	2,598	2,788	1.95%	1.92%
East District	8,642	13,891	18,105	22,155	26,858	5,249	4,214	4,051	4,703	4.86%	2.22%
North District	14,149	16,229	19,054	22,441	26,836	2,080	2,825	3,387	4,395	1.38%	1.69%
Total Fred. Co.	52,570	70,060	86,704	102,275	119,398	17,490	16,644	15,571	17,123	2.91%	1.79%
Employment											
Central Frederick	41,816	59,076	72,985	83,574	92,424	17,259	13,910	10,589	8,850	3.52%	1.50%
South District	5,333	9,953	12,078	13,092	13,763	4,619	2,126	1,014	671	6.44%	1.09%
East District	3,437	4,678	6,539	7,990	9,749	1,242	1,861	1,451	1,758	3.13%	2.48%
North District	8,536	11,658	13,460	15,359	18,023	3,123	1,801	1,899	2,665	3.17%	1.46%
Total Fred. Co.	59,122	85,365	105,063	120,016	133,959	26,243	19,698	14,953	13,943	3.74%	1.51%
SHARE OF REGION											
Population											
Central Frederick	0.83%	1.00%	1.11%	1.17%	1.20%	2.30%	2.13%	1.96%	1.50%		
South District	0.36%	0.38%	0.42%	0.46%	0.50%	0.50%	0.78%	1.02%	0.90%		
East District	0.40%	0.56%	0.64%	0.71%	0.77%	1.80%	1.34%	1.55%	1.46%		
North District	0.64%	0.62%	0.65%	0.70%	0.76%	0.51%	0.93%	1.36%	1.42%		
Total Fred. Co.	2.23%	2.57%	2.82%	3.04%	3.23%	5.12%	5.18%	5.88%	5.28%		
Households											
Central Frederick	0.86%	1.04%	1.15%	1.21%	1.24%	2.20%	2.06%	1.94%	1.53%		
South District	0.34%	0.35%	0.39%	0.43%	0.47%	0.47%	0.70%	0.91%	0.81%		
East District	0.35%	0.48%	0.56%	0.63%	0.70%	1.38%	1.21%	1.42%	1.37%		
North District	0.57%	0.57%	0.59%	0.64%	0.70%	0.55%	0.81%	1.18%	1.28%		
Total Fred. Co.	2.11%	2.44%	2.69%	2.92%	3.10%	4.59%	4.78%	5.45%	4.99%		
Employment											
Central Frederick	1.13%	1.40%	1.53%	1.64%	1.71%	3.52%	2.52%	3.07%	2.91%		
South District	0.14%	0.24%	0.25%	0.26%	0.25%	0.94%	0.39%	0.29%	0.22%		
East District	0.09%	0.11%	0.14%	0.16%	0.18%	0.25%	0.34%	0.42%	0.58%		
North District	0.23%	0.28%	0.28%	0.30%	0.33%	0.64%	0.33%	0.55%	0.88%		
Total Fred. Co.	1.59%	2.03%	2.21%	2.35%	2.48%	5.35%	3.57%	4.33%	4.59%		

Dependence on manufacturing activities will be especially inhibiting to future growth in the South district, which accounted for over half of the county's employment gain outside Central Frederick during the 1990s. Two other factors that will support the dominant economic position of the Study Area are the lack of other commercial centers competitive with Frederick and the fact that the Central district has been defined to include nearly all of the important job locations surrounding the city. (Possibly the forecasts are remiss in failing to posit the emergence of a new commercial center in the East district, but the allocation model could not do this.)

The percentages in the lower half of Table 15 express the absolute levels and changes in district descriptors as shares of the respective regional totals. The figures show among other things that Central Frederick will account for progressively rising shares of regional population and employment. The Central district will absorb declining shares of the region's population change, but its shares of the regional increments in employment will stabilize after a dip in the present decade.

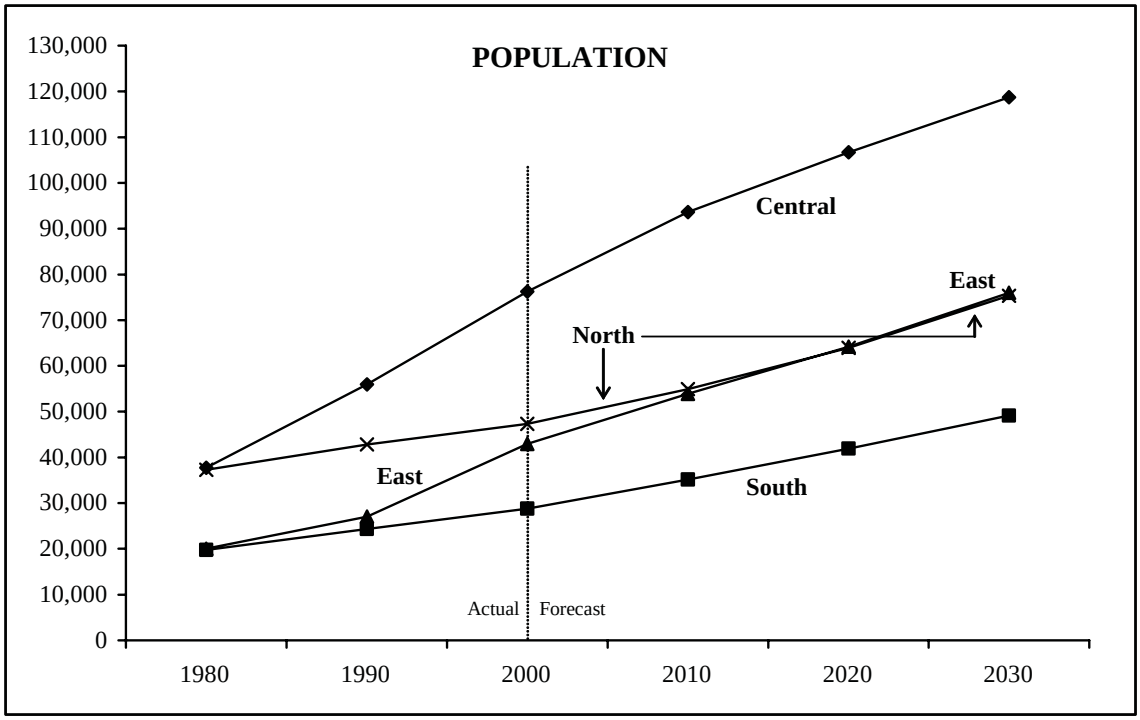
The foregoing patterns and trends are shown graphically in Figure 8 on the next page. The upper panel of this figure describes population in Frederick County districts and the lower panel addresses employment, with both descriptions starting in 1980.

Table 16 on the second following page breaks down the employment forecast for Central Frederick into the twenty industry categories utilized in the present study, with regional shares provided at the bottom. The results for individual industries leave open some windows for skepticism but are considered generally realistic. Multi-industry forecasting is used in cases such as this to gain many perspectives on growth trends and provide opportunities for averaging of errors, rather than to obtain pinpoint estimates for individual sectors, and hence the industry-specific results have not been groomed to reflect any subjective judgments.

Table 17 on the third following page offers additional detail on the demographic side, breaking down the population forecasts by type of residence and the household forecasts by relative income.

Some facts to be kept in mind when regarding the present income data are that: 1) the regional shares of households in the lower-income, middle-income and upper-income categories are always one-third, one-third and one-third; 2) the income levels covered by each category move upward over time in both current and constant dollars, which means that any given household can move downward; 3) with income defined in relative terms, gains or losses of households in any given income category by any given area need not reflect additions to or subtractions from the area's housing stock; and 4) the prevailing level of prosperity in the region is such that "lower-income" does not necessarily mean poverty-level, or anything close.

Figure 8. Population and Employment Forecasts for Frederick County Districts



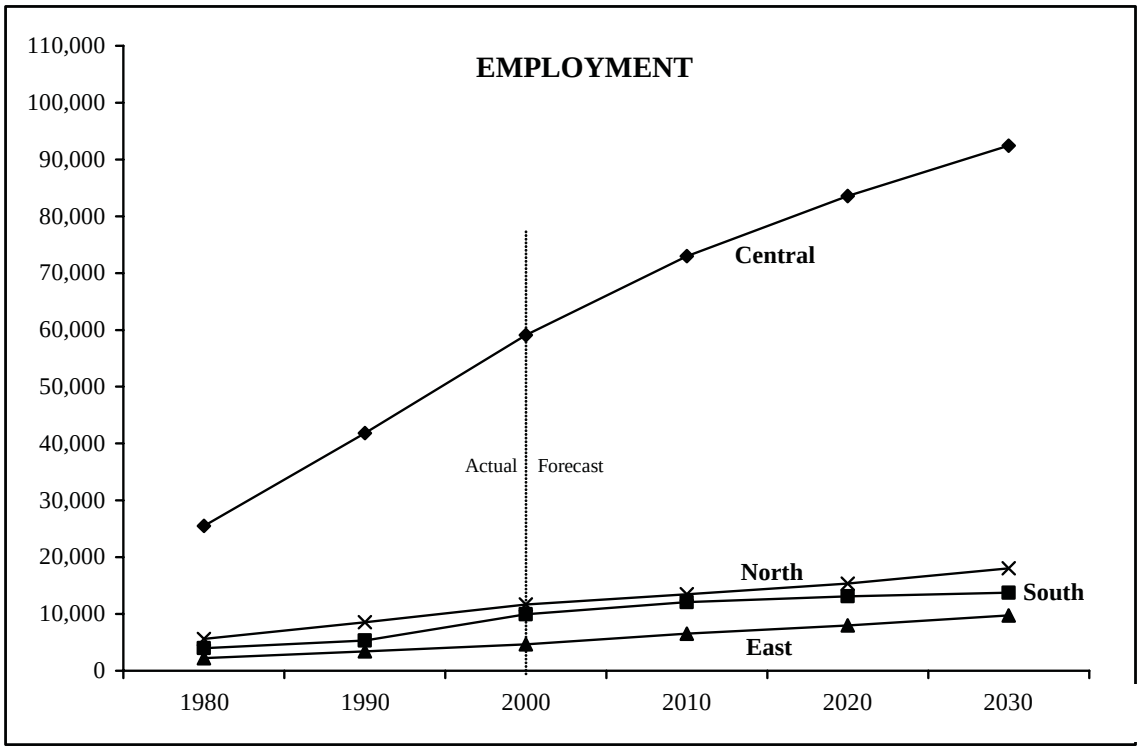


Table 16. Forecasts of Employment by Industry for Central Frederick

	Number					Annual % Change	
	1990	2000	2010	2020	2030	1990-00	2000-30
Central Frederick Employment							
Farming, ag. services & mining	240	370	571	680	744	4.42%	2.36%
Construction	2,950	3,087	3,450	4,013	4,711	0.46%	1.42%
Manufactuing SIC 35,36,38	648	1,132	1,381	1,391	1,234	5.74%	0.29%
Other durable goods mfg.	902	900	852	674	405	-0.03%	-2.62%
Printing & publishing	957	878	1,022	1,084	1,106	-0.86%	0.77%
Other nondurable goods mfg.	559	995	1,006	948	840	5.93%	-0.56%
Transportation and utilities	474	533	550	537	514	1.18%	-0.12%
Wholesale trade	1,711	1,964	2,367	2,767	2,976	1.39%	1.39%
Eating & drinking places	3,262	4,098	4,966	5,482	5,695	2.31%	1.10%
Other retail trade	6,170	7,582	7,930	7,269	7,342	2.08%	-0.11%
Finance & insurance carriers	2,513	6,283	7,599	8,745	9,420	9.59%	1.36%
Insurance & real estate agents	616	1,120	1,211	1,235	1,247	6.16%	0.36%
Health services	2,815	4,646	5,256	5,567	5,623	5.14%	0.64%
Other consumer services	2,549	3,563	4,136	4,536	4,772	3.41%	0.98%
Business services	774	2,570	5,370	9,087	12,711	12.74%	5.47%
Legal & E/M serv. and m. org.	3,387	5,240	6,747	7,724	8,492	4.46%	1.62%
Other services	1,498	1,445	1,718	2,063	2,348	-0.36%	1.63%
Admin./aux. & communication	1,623	1,916	3,639	4,798	5,794	1.67%	3.76%
Federal & state government	5,654	6,875	8,273	9,278	10,114	1.97%	1.29%
Local government	2,514	3,879	4,940	5,694	6,337	4.43%	1.65%
Total Employment	41,816	59,076	72,985	83,574	92,424	3.52%	1.50%
Share of Regional Employment							
Farming, ag. services & mining	0.83%	0.99%	1.24%	1.27%	1.23%		
Construction	1.36%	1.32%	1.36%	1.51%	1.73%		
Manufactuing SIC 35,36,38	1.01%	2.43%	3.37%	3.98%	4.18%		
Other durable goods mfg.	1.55%	1.82%	2.12%	2.14%	1.66%		
Printing & publishing	1.88%	1.71%	1.93%	2.04%	2.09%		
Other nondurable goods mfg.	1.00%	2.03%	2.45%	2.75%	2.91%		
Transportation and utilities	0.53%	0.45%	0.43%	0.42%	0.41%		
Wholesale trade	1.23%	1.41%	1.54%	1.72%	1.78%		
Eating & drinking places	1.67%	1.76%	1.86%	1.91%	1.88%		
Other retail trade	1.74%	1.97%	1.90%	1.68%	1.65%		
Finance & insurance carriers	1.82%	4.29%	4.72%	5.03%	5.09%		
Insurance & real estate agents	0.83%	1.53%	1.58%	1.64%	1.71%		
Health services	1.17%	1.83%	1.74%	1.70%	1.62%		
Other consumer services	1.49%	1.60%	1.63%	1.70%	1.73%		
Business services	0.34%	0.63%	0.94%	1.34%	1.64%		
Legal & E/M serv. and m. org.	1.06%	1.27%	1.33%	1.35%	1.34%		
Other services	1.06%	0.80%	0.83%	0.93%	1.00%		
Admin./aux. & communication	0.98%	0.95%	1.50%	1.69%	1.76%		
Federal & state government	0.82%	1.11%	1.34%	1.53%	1.73%		
Local government	0.84%	1.14%	1.30%	1.37%	1.39%		
Total Employment	1.13%	1.40%	1.53%	1.64%	1.71%		

Table 17. Demographic Forecasts for Frederick County Districts

	Number					Change	
	1990	2000	2010	2020	2030	1990-00	2000-30
POPULATION BY STATUS							
Central Frederick							
Total population	55,961	76,217	93,625	106,681	118,735	20,256	42,519
Population in group quarters	2,069	2,127	2,366	2,616	2,872	58	745
Population in households	53,892	74,090	91,259	104,065	115,863	20,198	41,773
Population per household	2.519	2.488	2.470	2.449	2.428	-0.031	-0.060
South Frederick							
Total population	24,354	28,791	35,152	41,921	49,113	4,437	20,322
Population in group quarters	41	522	652	844	1,059	481	537
Population in households	24,313	28,269	34,500	41,077	48,055	3,956	19,786
Population per household	2.901	2.782	2.740	2.704	2.673	-0.119	-0.109
East Frederick							
Total population	27,060	42,922	53,875	64,210	75,979	15,862	33,057
Population in group quarters	0	9	12	15	19	9	10
Population in households	27,060	42,913	53,863	64,195	75,960	15,853	33,047
Population per household	3.131	3.089	2.975	2.897	2.828	-0.042	-0.261
North Frederick							
Total population	42,833	47,347	54,918	63,949	75,333	4,514	27,986
Population in group quarters	1,670	1,997	2,369	2,995	3,777	327	1,780
Population in households	41,163	45,350	52,549	60,954	71,556	4,187	26,206
Population per household	2.909	2.794	2.758	2.716	2.666	-0.115	-0.128
Total Frederick County							
Total population	150,208	195,277	237,569	276,761	319,161	45,069	123,884
Population in group quarters	3,780	4,655	5,398	6,470	7,727	875	3,072
Population in households	146,428	190,622	232,171	270,291	311,434	44,194	120,812
Population per household	2.785	2.721	2.678	2.643	2.608	-0.065	-0.112
HOUSEHOLDS BY INCOME							
Central Frederick							
Lower-Income	7,863	10,650	13,311	15,488	17,567	2,787	6,917
Middle-Income	8,426	11,394	13,793	15,574	17,305	2,967	5,911
Upper-Income	5,109	7,735	9,849	11,426	12,853	2,626	5,118
South Frederick							
Lower-Income	2,787	2,773	3,105	3,674	4,636	-13	1,863
Middle-Income	3,149	3,764	4,630	5,632	6,733	615	2,969
Upper-Income	2,445	3,624	4,858	5,885	6,610	1,179	2,987
East Frederick							
Lower-Income	1,555	2,205	2,987	4,066	5,685	650	3,480
Middle-Income	3,329	4,853	6,293	7,723	9,326	1,524	4,474
Upper-Income	3,759	6,834	8,824	10,366	11,847	3,075	5,013
North Frederick							
Lower-Income	4,657	4,887	5,720	7,031	8,942	230	4,055
Middle-Income	5,410	6,474	7,641	8,865	10,376	1,063	3,903
Upper-Income	4,082	4,868	5,693	6,545	7,518	787	2,649
Total Frederick County							
Lower-Income	16,861	20,515	25,123	30,259	36,830	3,653	16,315
Middle-Income	20,314	26,484	32,358	37,794	43,740	6,170	17,256
Upper-Income	15,395	23,061	29,223	34,222	38,828	7,667	15,767

The main points about income in Frederick County are illustrated graphically by Figure 9 on the next page, which plots the shares of households in each district that occupy the regionally defined lower-income, middle-income and upper-income groups.

Prior to this forecasting exercise, there was an expectation that income levels in Central Frederick and adjacent areas might move relentlessly upscale under pressure of housing scarcity, to such an extent that Frederick County might become unable to house much of its own labor force. Residential market conditions may in fact cause housing expenses to account for unusually high shares of disposable income (as to some extent they already do). But the forecasts do not indicate that Central Frederick, or the other Frederick districts, or the western Maryland suburbs as a whole will move any further upscale than they already are.

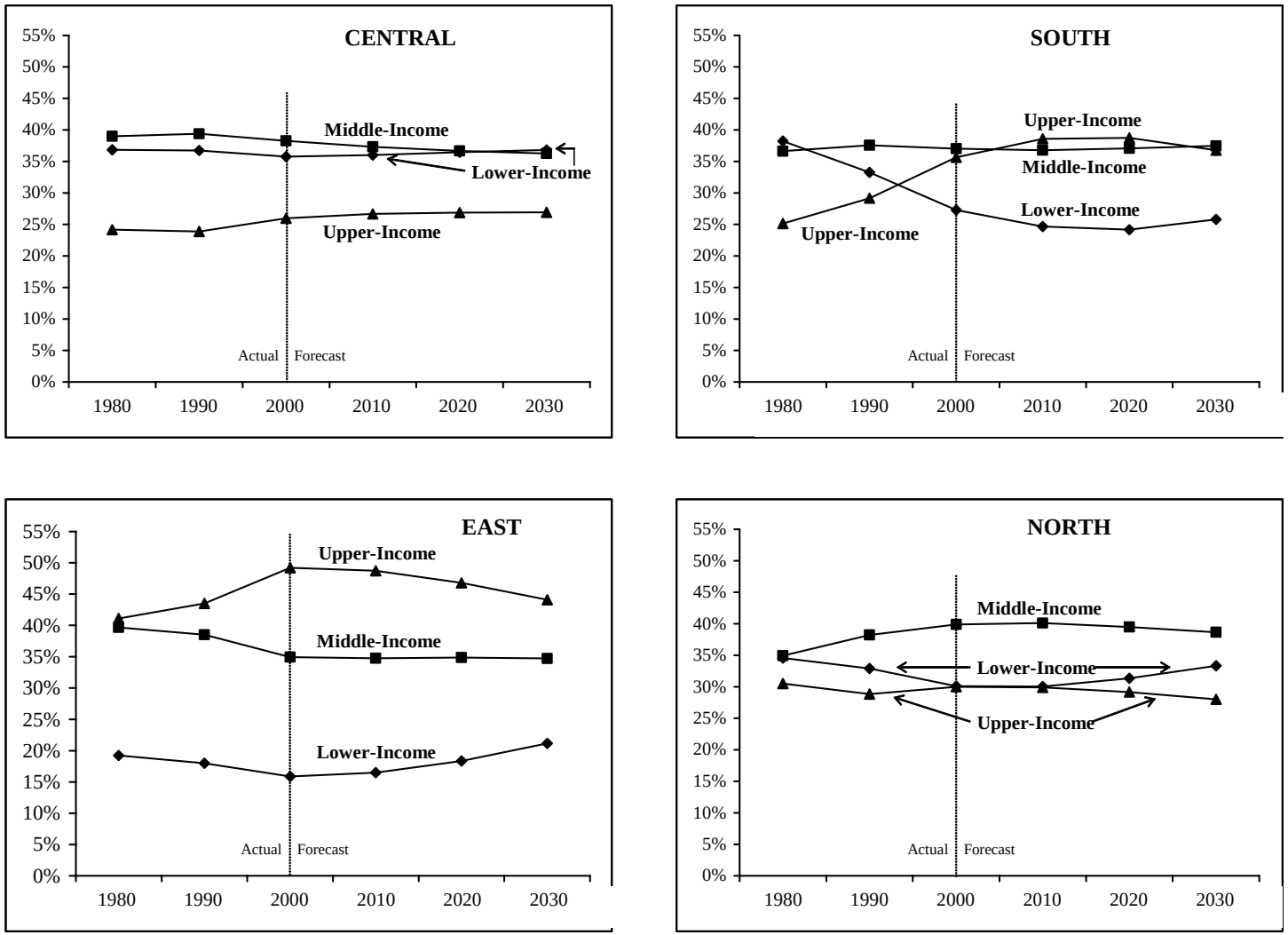
During the 1990s all four districts of Frederick County gained upper-income households at the expense of lower-income households (in relative terms), as shown by the four panels of Figure 9. This trend was especially pronounced in the South district, and in all cases it was accentuated in the 1990s relative to the 1980s if it existed then at all. Meanwhile only the North district increased its share of middle-income households. So Frederick County seems to be headed for a high degree of economic exclusivity. But the forecasts suggest that such a scenario will not develop. Instead the district income distributions will stabilize, with upper-income household shares eventually declining in all districts except Central Frederick. The retrenchment will be especially pronounced in the East district, where half of all households now occupy the top category. (The East and South districts will still be gaining their greatest numbers of households at the top, however, as shown in Table 17.) The overall share of Frederick County households in the upper-income group is expected to end the forecast period very near the present level of 33%, while the upper-income share for western Maryland as a whole is expected to decline from 40% to 38%. As noted earlier, the reason would be that under the impetus of housing cost differences, the region's well-to-do are increasingly finding other places to go.

Detailed Results

The model-based forecasting process has focused upon the Central Frederick district – the planning Study Area – as a whole because this was an appropriate target for region-to-district allocation. The limitations of the chosen approach tend to become increasingly problematic when addressing smaller areas than this (although the present investigation has used a few smaller areas as calibration and forecasting units). But there is an obvious interest in the future of Frederick City per se, so the district-level forecasts have been broken down to smaller geographic units in a supplementary process.

The smaller geographic units consist of the four divisions of Frederick City defined elsewhere, plus the portion of the Study Area outside Frederick City. The units are thus: 1) the Core area (the city's downtown plus some residential land to the west); 2) Southeast Frederick (which borders the Core on the north, east and south sides); 3) Southwest Frederick; 4) North Frederick; and 5) the rest of the Study Area.

Figure 9. Lower-Income, Middle-Income and Upper-Income Shares of Households in Frederick County Districts



Frederick is defined for present purposes to include Fort Detrick. All references here to Frederick City, and to past and future trends for the city, apply to the municipal jurisdiction as it existed on April 1, 2000. The forecasts may therefore understate actual future conditions if the city government is amenable to annexation.

The methods utilized to break down the Central Frederick forecasts have been necessarily less rigorous than those involved in model-based forecasting, and the results must therefore be accorded wider margins of percentage error. The procedure has largely relied upon modified versions of the results from district-level modeling. The leading predictors for demographic variables have been past trends and available-land measures, while those for employment have been initial activity levels and available-land measures (with different parameters). Households have been forecasted collectively rather than by income group, but industries have been addressed on an individual basis. A major shortcoming in the latter case has been the lack of any information on past trends. (The historical descriptions of district-level employment were based on zip-code statistics that could not isolate the city or its components.) Due to this lack, the employment forecasts must be regarded as less reliable than the demographic estimates.

The resulting forecasts for the city and its component areas are summarized in Table 18 below and stated more fully in Table 19 on the next page. Table 19 repeats the forecasts for districts outside the Study Area for comparison purposes, and it introduces values of forecast variables for future years ending in 5 as well as 0. These additional values have been interpolated for each forecast series by fitting a third-degree polynomial equation to the data points for 2000, 2010, 2020 and 2030. (Third-degree polynomial interpolation resembles quadratic or linear interpolation, but uses an additional year or years and can yield a curve with changing slope and an inflection point.)

Table 18. Summary of City and Study Area Forecasts

	2000	2010	2020	2030	2000-30 Chg.
Population					
City of Frederick	52,767	62,089	68,791	74,857	41.9%
Rest of Study Area	23,450	31,536	37,889	43,878	87.1%
Total Study Area	76,217	93,625	106,681	118,735	55.8%
Employment					
City of Frederick	41,774	49,425	54,365	58,066	39.0%
Rest of Study Area	17,302	23,560	29,210	34,358	98.6%
Total Study Area	59,076	72,985	83,574	92,424	56.4%

Frederick City is expected to gain inhabitants and jobs within its existing boundaries at considerably lower percentage rates than the rest of the Study Area, although the absolute gains inside and outside the city will be comparable. The city as now defined is expected to have about 75,000 inhabitants in 2030, up from fewer than 53,000 in 2000. It will remain the principal employment center for the Study Area and the county with about 58,000 jobs in 2030, equaling 43% of the county total.

Table 19. Forecasts for Districts of Frederick City and County, by Five-Year Increments

	2000	2005	2010	2015	2020	2025	2030	00-10 %	10-20 %	20-30 %	00-30 %
Population											
Fred. City (2000 bdry.):											
Frederick Core	8,100	8,096	8,114	8,145	8,181	8,214	8,234	0.2%	0.8%	0.6%	1.7%
Southeast Frederick	13,746	14,183	14,705	15,307	15,984	16,730	17,540	7.0%	8.7%	9.7%	27.6%
Southwest Frederick	17,651	19,254	20,492	21,457	22,242	22,939	23,641	16.1%	8.5%	6.3%	33.9%
N Fred. (incl Ft. D.)	13,270	16,347	18,779	20,735	22,384	23,897	25,441	41.5%	19.2%	13.7%	91.7%
Total City	52,767	57,880	62,089	65,644	68,791	71,779	74,857	17.7%	10.8%	8.8%	41.9%
Rest of Study Area	23,450	27,795	31,536	34,844	37,889	40,844	43,878	34.5%	20.1%	15.8%	87.1%
Central Fred. Co. Total	76,217	85,675	93,625	100,488	106,681	112,623	118,735	22.8%	13.9%	11.3%	55.8%
South Frederick County	28,791	31,921	35,152	38,484	41,921	45,464	49,113	22.1%	19.3%	17.2%	70.6%
East Frederick County	42,922	48,604	53,875	58,991	64,210	69,787	75,979	25.5%	19.2%	18.3%	77.0%
North Frederick County	47,347	51,006	54,918	59,195	63,949	69,292	75,333	16.0%	16.4%	17.8%	59.1%
Total Frederick County	195,277	217,205	237,569	257,159	276,761	297,166	319,161	21.7%	16.5%	15.3%	63.4%
Households											
Fred. City (2000 bdry.):											
Frederick Core	3,618	3,653	3,677	3,692	3,702	3,708	3,714	1.6%	0.7%	0.3%	2.7%
Southeast Frederick	6,140	6,412	6,703	7,013	7,347	7,705	8,089	9.2%	9.6%	10.1%	31.7%
Southwest Frederick	6,587	7,261	7,793	8,221	8,581	8,909	9,242	18.3%	10.1%	7.7%	40.3%
N Fred. (incl Ft. D.)	4,546	5,691	6,618	7,385	8,053	8,679	9,324	45.6%	21.7%	15.8%	105.1%
Total City	20,891	23,017	24,791	26,312	27,682	29,001	30,369	18.7%	11.7%	9.7%	45.4%
Rest of Study Area	8,888	10,637	12,162	13,529	14,805	16,058	17,355	36.8%	21.7%	17.2%	95.3%
Central Fred. Co. Total	29,779	33,654	36,953	39,841	42,488	45,059	47,724	24.1%	15.0%	12.3%	60.3%
South Frederick County	10,161	11,358	12,593	13,870	15,191	16,560	17,979	23.9%	20.6%	18.4%	76.9%
East Frederick County	13,891	16,069	18,105	20,100	22,155	24,374	26,858	30.3%	22.4%	21.2%	93.3%
North Frederick County	16,229	17,599	19,054	20,649	22,441	24,485	26,836	17.4%	17.8%	19.6%	65.4%
Total Frederick County	70,060	78,680	86,704	94,460	102,275	110,478	119,398	23.8%	18.0%	16.7%	70.4%
Employment											
Fred. City (2000 bdry.):											
Frederick Core	7,749	8,238	8,612	8,899	9,126	9,324	9,519	11.1%	6.0%	4.3%	22.8%
Southeast Frederick	13,403	14,583	15,545	16,319	16,940	17,440	17,853	16.0%	9.0%	5.4%	33.2%
Southwest Frederick	6,782	7,438	7,926	8,294	8,593	8,872	9,181	16.9%	8.4%	6.8%	35.4%
N Fred. (incl Ft. D.)	13,840	15,770	17,343	18,630	19,706	20,643	21,513	25.3%	13.6%	9.2%	55.4%
Total City	41,774	46,030	49,425	52,142	54,365	56,278	58,066	18.3%	10.0%	6.8%	39.0%
Rest of Study Area	17,302	20,514	23,560	26,454	29,210	31,840	34,358	36.2%	24.0%	17.6%	98.6%
Central Fred. Co. Total	59,076	66,544	72,985	78,596	83,574	88,118	92,424	23.5%	14.5%	10.6%	56.4%
South Frederick County	9,953	11,202	12,078	12,676	13,092	13,423	13,763	21.4%	8.4%	5.1%	38.3%
East Frederick County	4,678	5,705	6,539	7,271	7,990	8,786	9,749	39.8%	22.2%	22.0%	108.4%
North Frederick County	11,658	12,589	13,460	14,355	15,359	16,553	18,023	15.5%	14.1%	17.3%	54.6%
Total Frederick County	85,365	96,040	105,063	112,899	120,016	126,880	133,959	23.1%	14.2%	11.6%	56.9%

As shown by Table 19, growth in Frederick is expected to be heavily concentrated in the North area, which will absorb about half of the city's absolute gains in population, households and employment over the forecast period. The Southeast and Southwest areas will experience more moderate but quite substantial gains in all forecast variables. The Core area – which is residentially desirable but measures less than 1.4 square miles – is expected to gain employment but very few residents or households. Core employment is forecasted to rise by 22.8% across the forecast period, or by about 0.7% per year on average. The lack of past-trend data may have yielded an overestimation of growth in this case, but the Core results have been left as they emerged.

There is also local interest in the future of biotechnology employment. The present study is poorly suited to highlight this sector because its employment categories are far too broad, but a biotechnology forecast has been prepared using the available numbers and best judgment.

Even with detailed data, biotechnology is hard to isolate statistically from other pharmaceutical and life-science industries, so the employment category of interest is referenced here as biotechnology/pharmaceuticals. It should be noted that this category – while heavily emphasized in economic-development circles for its growth potential – is nationally quite small. Today it supplies fewer than 400,000 jobs in the U.S. as a whole, or under 0.3% of national employment. On the other hand, biotechnology is much more prominent in Montgomery County and other nearby areas than in most of the country.

A survey of the establishment file assembled in the Frederick planning project has identified 13 existing biotechnology companies in the Study Area, which collectively employ 367 workers as of 2002. (These do not include any pharmaceutical companies, but the double name is retained to cover growth in that area.) The rest of Frederick County has another 406 biotech jobs, almost all located at a diagnostic substances manufacturing plant in Walkersville.

The biotechnology/pharmaceuticals industry includes two distinct types of operations: manufacturing of products for sale, and research-and-development activity plus related office functions. The Frederick Study Area now has a bit more employment on the manufacturing side than the R&D side (203 jobs versus 164 jobs). However, given the limits on manufacturing growth in relatively high-cost areas such as metro Washington, R&D operations offer stronger prospects for local job gains. The area's existing base of scientific, engineering, national-defense and central-administrative activity, plus its access to a high-skill labor force and its proximity to major life-science research functions, should create strong opportunities to capture such growth.

Of the twenty employment categories used here for forecasting purposes, the one that covers the production side of biotechnology/pharmaceuticals is "other nondurable goods manufacturing," where "other" refers to the exclusion of printing and publishing. Biotechnology now accounts for only about 20% of the Study Area's employment in this category, but the biotechnology/pharmaceutical share could rise to half by 2030 because

a downtrend is expected in the category's other employment. All of the biotech R&D that now exists in the Study Area falls in the employment category used here to cover professional services. (This is the category appearing fifth from last in Table 16 and in the list on page 2.) But future growth is also likely to involve establishments classed as "administrative & auxiliary" in the present CBP-based system. (The category that includes A&A employment appears third from last in the two lists just mentioned.) We estimate that biotechnology/pharmaceutical establishments will supply 10% to 15% of the Study Area's future employment growth in these two employment categories. The specific percentages assumed in both cases are 10% during the present decade, 12.5% in 2010-20 and 15% in 2020-30.

Table 20 below shows the resulting forecast of biotechnology/pharmaceutical employment in the Study Area. The percentages in the table's second line have been derived by applying the ones just cited to the relevant forecasts of employment change.

Table 20. Biotechnology/Pharmaceutical Employment in the Study Area

	2000	2010	2020	2030
Biotech./pharm. shares of industry totals:				
Nondurable goods mfg. except printing	20%	25%	35%	50%
Prof. services, admin./auxiliary & other	2.2%	4.6%	6.0%	7.1%
Biotechnology/pharmaceutical employment:				
Manufacturing	200	250	330	420
R&D labs and office support functions	160	480	750	1,010
Total	360	730	1,080	1,430
Total Study Area employment	59,076	72,985	83,574	92,424
Biotechnology/pharmaceutical share	0.6%	1.0%	1.3%	1.5%

The finding is that biotechnology/pharmaceutical employment will approximately quadruple in the Study Area over the next three decades, reaching more than 1,400 jobs by 2030. Over three-quarters of the gain will involve R&D and related office functions rather than physical production. The biotechnology/pharmaceutical share of total Study Area employment will rise from 0.6% at present to about 1.5% in 2030. Scenarios involving higher growth than this are hard to justify on the basis of information now available. It should be kept in mind, however, that a single large new establishment – such as the Study Area has gained over the years in several other industries – could easily trump this forecast.

VI. COMPARISONS WITH OTHER FORECASTS

Introduction

For as long as the future remains the future, there is no such thing as a right or wrong forecast. Disagreements are inevitable. Resolution can sometimes be approached by identifying the sources of difference and subjecting them to tests of reasonableness, but definitive outcomes are rare because reasonableness exists in the eye of the beholder.

The present section offers brief comparisons between the forecasts developed in this study and those offered by two other parties: the Maryland Department of Planning (Planning Data Services) and the Metropolitan Washington Council of Governments. The Maryland Planning forecasts have been obtained from the Department's website and reportedly were prepared in October of 2002. The Metro Washington COG forecasts are entitled Intermediate Round 6.3 Cooperative Forecasts and are dated March 4, 2003.

The comparisons focus on population and employment, with primary attention paid to differences between the present results and the Maryland Planning forecasts. On the economic side, the Maryland Planning figures describe past and future conditions in terms of BEA employment, which typically runs 20+% higher than BLS employment (the one-job-per-worker definition utilized in this study). So for purposes of comparison, the employment magnitudes forecasted here for each county have been scaled up to a BEA basis by applying whatever BEA-to-BLS ratio prevailed for the county in 2000. The historical data included with the converted forecasts also express BEA employment. The figures from Metro Washington COG have not been converted, however, because they incorporate an intermediate definition of employment and sometimes involve different past trends. The extent to which the COG forecasts agree or disagree with the other series can still be discerned from the graphical presentations.

There are no definitional differences on the demographic side, but interpolations between midyear population estimates have been required to obtain April 1 figures for past years ending in 5 (thus maintaining consistency with populations from the decennial censuses). Also, since the comparison forecasts are available at five-year intervals, the forecasts from the present study have been interpolated to years ending in 5 using third-degree polynomial equations.

County-Level Comparisons

The four panels of Figure 10 on the next page present graphical comparisons of forecasts for three counties and the entire Maryland portion of the Washington-Baltimore consolidated metropolitan area (CMSA). Table 21 on the second following page gives the data underlying these graphs, plus some percentages to support the text discussion.

The upper-left panel of Figure 10 addresses Frederick County. The three forecast series agree strongly in the case of Frederick County population, with no differences exceeding 2.2%. The county's 2030 population will equal 325,600 persons according to Maryland Planning, 324,600 persons according to the Metro Washington COG, and 319,161 persons according to the present study.

Figure 10. COMPARISON OF FORECASTS FROM THIS STUDY, THE MD. DEPT. OF PLANNING AND THE METRO WASHINGTON COG

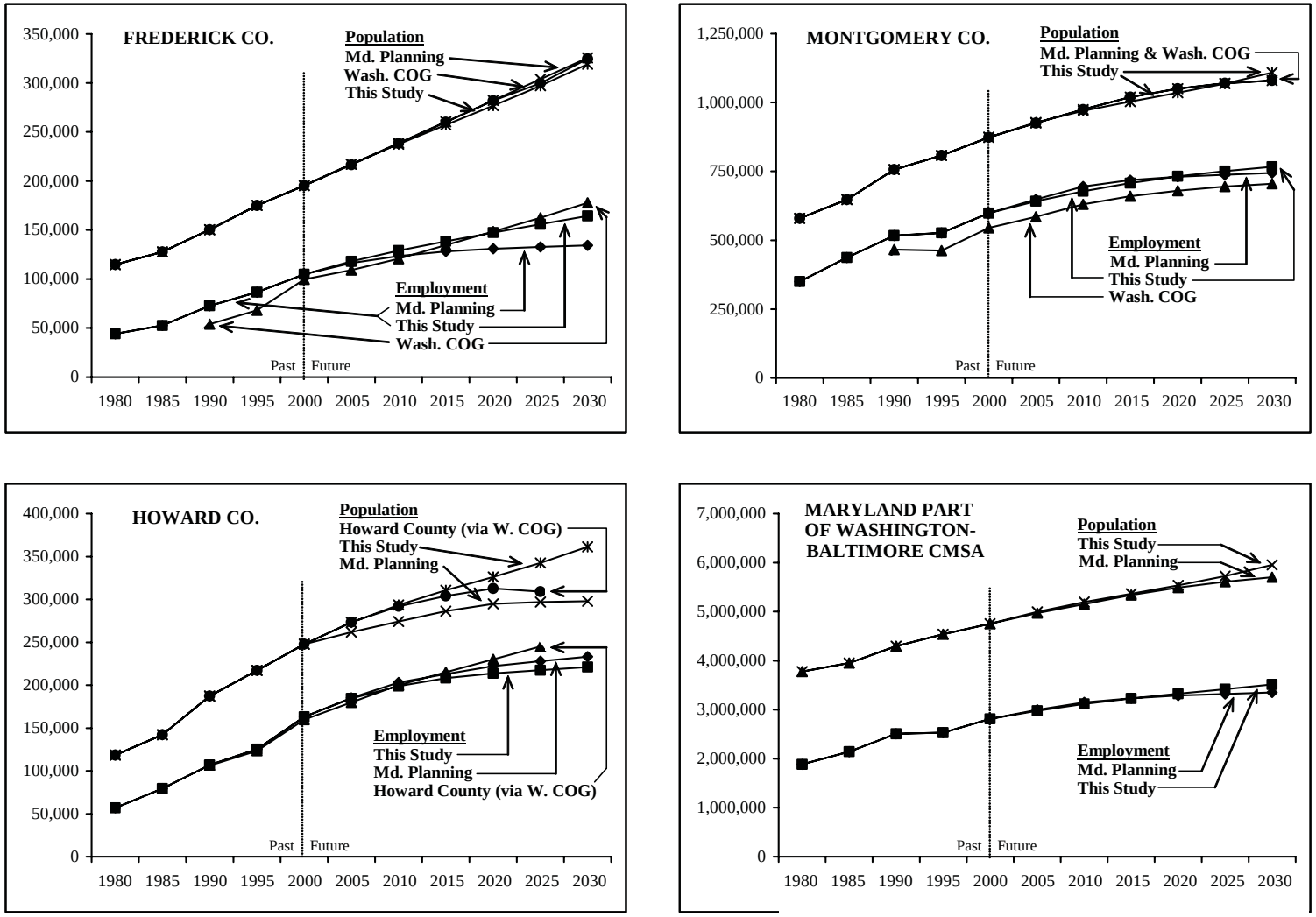


Table 21. FORECAST COMPARISONS

	Population Forecasts				Employment Forecasts			
	Maryland Planning	This Study	Percent Diff.	Metro W. COG	Maryland Planning	This Study	Percent Diff.	Metro W. COG
Frederick Co.								
1990	150,208	150,208		150,208	72,622	72,622		54,000
1995	174,893	174,893		174,893	86,560	86,560		68,000
2000	195,277	195,277	0.0%	195,277	104,818	104,818	0.0%	99,700
2005	217,000	217,205	0.1%	216,600	116,300	117,926	1.4%	109,200
2010	238,700	237,569	-0.5%	238,300	123,600	129,004	4.4%	120,700
2015	260,400	257,159	-1.2%	260,000	128,100	138,626	8.2%	134,600
2020	282,100	276,761	-1.9%	281,900	130,900	147,365	12.6%	148,500
2025	303,800	297,166	-2.2%	299,600	132,800	155,794	17.3%	162,500
2030	325,600	319,161	-2.0%	324,600	134,300	164,486	22.5%	177,800
1990-00 % ch.	30.0%	30.0%		30.0%	44.3%	44.3%		84.6%
2000-10 % ch.	22.2%	21.7%		22.0%	17.9%	23.1%		21.1%
2010-20 % ch.	18.2%	16.5%		18.3%	5.9%	14.2%		23.0%
2020-30 % ch.	15.4%	15.3%		15.1%	2.6%	11.6%		19.7%
Montgomery Co.								
1990	757,027	757,027		757,027	517,188	517,188		466,000
1995	807,545	807,545		807,545	526,404	526,404		462,500
2000	873,341	873,341	0.0%	873,341	598,008	598,008	0.0%	545,000
2005	925,000	927,843	0.3%	925,000	648,600	641,632	-1.1%	585,000
2010	975,000	969,712	-0.5%	975,000	695,100	677,953	-2.5%	630,000
2015	1,020,000	1,003,849	-1.6%	1,020,000	718,200	707,796	-1.4%	660,000
2020	1,050,000	1,035,155	-1.4%	1,050,000	730,400	731,986	0.2%	680,000
2025	1,070,000	1,068,531	-0.1%	1,070,000	738,400	751,347	1.8%	695,000
2030	1,080,000	1,108,877	2.7%	1,080,000	744,900	766,705	2.9%	705,000
1990-00 % ch.	15.4%	15.4%		15.4%	15.6%	15.6%		17.0%
2000-10 % ch.	11.6%	11.0%		11.6%	16.2%	13.4%		15.6%
2010-20 % ch.	7.7%	6.7%		7.7%	5.1%	8.0%		7.9%
2020-30 % ch.	2.9%	7.1%		2.9%	2.0%	4.7%		3.7%
Howard Co.								
1990	187,328	187,328		187,328	106,898	106,898		106,300
1995	217,165	217,165		217,165	125,253	125,253		123,600
2000	247,842	247,842	0.0%	247,842	163,009	163,009	0.0%	160,000
2005	261,700	273,091	4.4%	273,300	185,300	184,511	-0.4%	180,000
2010	274,150	293,348	7.0%	291,700	203,100	199,001	-2.0%	200,000
2015	286,200	310,446	8.5%	304,000	213,000	208,188	-2.3%	215,000
2020	294,600	326,214	10.7%	312,600	222,100	213,783	-3.7%	230,000
2025	296,810	342,487	15.4%	308,900	227,900	217,497	-4.6%	245,000
2030	297,900	361,094	21.2%		233,200	221,039	-5.2%	
1990-00 % ch.	32.3%	32.3%		32.3%	52.5%	52.5%		50.5%
2000-10 % ch.	10.6%	18.4%		17.7%	24.6%	22.1%		25.0%
2010-20 % ch.	7.5%	11.2%		7.2%	9.4%	7.4%		15.0%
2020-30 % ch.	1.1%	10.7%		(neg.)	5.0%	3.4%		
Md. Part of CMSA								
1990	4,292,594	4,292,594			2,508,532	2,508,532		
1995	4,539,393	4,539,393			2,530,101	2,530,101		
2000	4,750,159	4,750,159	0.0%		2,811,287	2,811,287	0.0%	
2005	4,970,390	4,994,090	0.5%		2,994,700	2,978,894	-0.5%	
2010	5,155,060	5,192,808	0.7%		3,147,800	3,114,855	-1.0%	
2015	5,336,600	5,367,083	0.6%		3,233,100	3,227,650	-0.2%	
2020	5,491,900	5,537,688	0.8%		3,286,400	3,325,759	1.2%	
2025	5,609,130	5,725,391	2.1%		3,321,000	3,417,663	2.9%	
2030	5,700,390	5,950,964	4.4%		3,350,800	3,511,842	4.8%	
1990-00 % ch.	10.7%	10.7%			12.1%	12.1%		
2000-10 % ch.	8.5%	9.3%			12.0%	10.8%		
2010-20 % ch.	6.5%	6.6%			4.4%	6.8%		
2020-30 % ch.	3.8%	7.5%			2.0%	5.6%		

There is great disagreement, however, about Frederick County employment. After conversion to a BEA basis, the forecast from the present study says that Frederick County will reach an employment level of 164,486 jobs in 2030. But the Maryland Planning estimate for that year is only 134,300 jobs. Given the actual 2000 employment level of 104,818, the thirty-year gain predicted by Maryland Planning is only half as great as the gain predicted here. To complete the divergence of opinion, the Metro Washington COG expects Frederick County to reach 177,800 jobs in 2030 – starting from a base 5% lower than the 2000 BEA employment level. With any reasonable scaling of the COG series, its 2030 employment figure would be at least 20,000 jobs above the estimate from the present study, while Maryland Planning was 30,000 below.

The Maryland Planning forecast involves a remarkable slowdown in Frederick County employment gains. The county's employment growth is expected to decelerate with enough G-force to test a returning astronaut, with a three-fifths reduction in percent change from the 1990s to the present decade, then another two-thirds reduction in 2010-20, then a further half-plus reduction in 2020-30. (The ten-year percent changes starting in the 1990s are: 44.3%, 17.9%, 5.9% and 2.6%; see Table 21.) After 2020 the county will allegedly be gaining only 340 employees per year, as compared with 3,220 per year during the 1990s. The present study predicts a good deal of deceleration, but a much softer landing. The reasons for this difference are probed further below.

The upper-right and lower-left panels of Figure 10 deal respectively with the forecasts for Montgomery and Howard counties. In the case of Montgomery there is good agreement all around. The population and employment forecasts from Maryland Planning and the present study are all within 3% of each other and usually within 2%. The Maryland Planning numbers involve more rapid deceleration of growth, with the result that the forecasts developed here are lower for more than half of the forecast period but appreciably higher at the end. The Montgomery population forecast offered by the Metro Washington COG is identical to the Maryland Planning forecast (presumably not by coincidence). As for employment, the COG forecast is a good deal lower than the others, but the difference is consistent. A reasonable scaling would put the COG employment figure for 2030 just above the one developed here.

The forecasts disagree sharply for Howard County, but in a generally opposite fashion from the differences for Frederick County. Instead of predicting the lowest 2030 population by a small margin, the present study is now highest in population by a very large margin. And instead of predicting far more employment than Maryland Planning, the present study calls for less employment. The respective differences from Maryland Planning for Howard County are plus 21.2% and minus 5.2%. As for the Metro COG forecasts, the figures cited for Howard have been obtained from a county agency and only extend through 2025. (Figure 10 and Table 21 omit the COG's extrapolations to 2030.) This agency's population forecast involves a peak of 312,600 persons in 2020 and a downtrend thereafter. So even though Howard was gaining 6,000 persons per year up until 2000, the county intends to start losing population after 2020. Yet Howard's job gains will allegedly keep rolling at a rate of 3,000 per year, yielding a 2025 employment level well above those predicted by Maryland Planning and the present study.

The large population discrepancy for Howard County may involve the weakness of the present forecasting approach discussed earlier, namely that the allocation model could only acknowledge the influence of land use controls and infrastructure policies to the extent that these factors affected development during the 1990s. Perhaps in the Howard case the model has been fooled into underestimating the restrictiveness of the future policy regime and hence overpredicting the county's growth. But if so, the market has been fooled as well.

The situation is as follows. The Maryland Planning forecast of Howard County population looks like an illustration of Xeno's Paradox. In each five-year period after 2010, the county is expected to move about halfway across the gap from its starting point to a population of 300,000 persons. (The ratios range from 0.34 to 0.61, with the lowest occurring last.) The implication is that the county will never get there – i.e., that it has a fixed population limit of 300,000 persons. The paradox here is that the real estate market has not behaved as if such a limit existed. What happens in any developing area as land becomes increasingly scarce is that prices rise enough to divert more and more potential growth elsewhere. This rationing process starts early and is responsible for the familiar "leapfrog" development pattern. In 1990, Howard County had 187,328 residents. So if a 300,000 limit applied, the available growth increment was only 112,672 persons. Yet the market proceeded to burn 54% of this opportunity in just ten years, adding 60,514 residents by 2000. (This was the basis on which the allocation model decided that the county could absorb another 113,252 people over the following 30 years, which would still leave the county with a population density below 1,500 persons per square mile.)

The contention is that this wouldn't have happened if the market had believed in the existence of a limit anywhere near 300,000 persons, because the rationing process would have turned away more development before the limit was approached. No matter if growth limits are hard or soft, one doesn't see ten-year population gains for entire suburban counties declining from 32% to 1% in the space of three decades, as forecasted by Maryland Planning for Howard County. It's theoretically possible, but most unlikely.

Comparisons for the Sub-Region and Baltimore City

The lower-right panel of Figure 10 addresses a summation of each forecast series for the dozen counties plus Baltimore City that comprise the Maryland portion of the Washington-Baltimore CMSA. In terms of population, these counties comprise the bulk of the CMSA (62.4% in 2000) but are slower-growing than the rest (10.7% during 1990-2000 as compared with a regional average of 13.1%). No comparison figures from the Washington COG are available because it doesn't cover some of the given counties.

In terms of both population and employment, the present study's forecasts for the Maryland portion of the CMSA are significantly higher than the forecasts from Maryland Planning. The differences stay within about 1% through 2020, but then widen to the 4%-5% range in 2030. Part of the late population difference can be attributed to the fact that the present forecasts are economically driven. As discussed in Section III (and illustrated for Maryland in the last two lines of Table 21), the regional forecasts developed here call

for a slight upturn in population growth during the 2020-30 decade even though employment gains will be declining. This happens because: A) employment is taken as given; and B) aging of the population will require net migration to rise in order for the region to staff even a slowing economy. Forecasts obtained by projecting population independently or linking growth to carrying capacity would lack such a feature.

Even though they mainly apply after 2020, the forecast differences deserve attention since they are bigger than might appear. The differences only equal 4.4% and 4.8% of total population and employment (as forecasted by Maryland Planning), but when expressed as shares of Maryland Planning's 2000-30 gains, they work out to 26% and 30%. And even larger percentages apply to suburban counties because this study's forecasts are relatively low for Baltimore City (as shown below). With the City of Baltimore excluded, the 2000-30 changes in population and employment forecasted here are respectively 45% and 33% higher than the changes predicted by Maryland Planning.

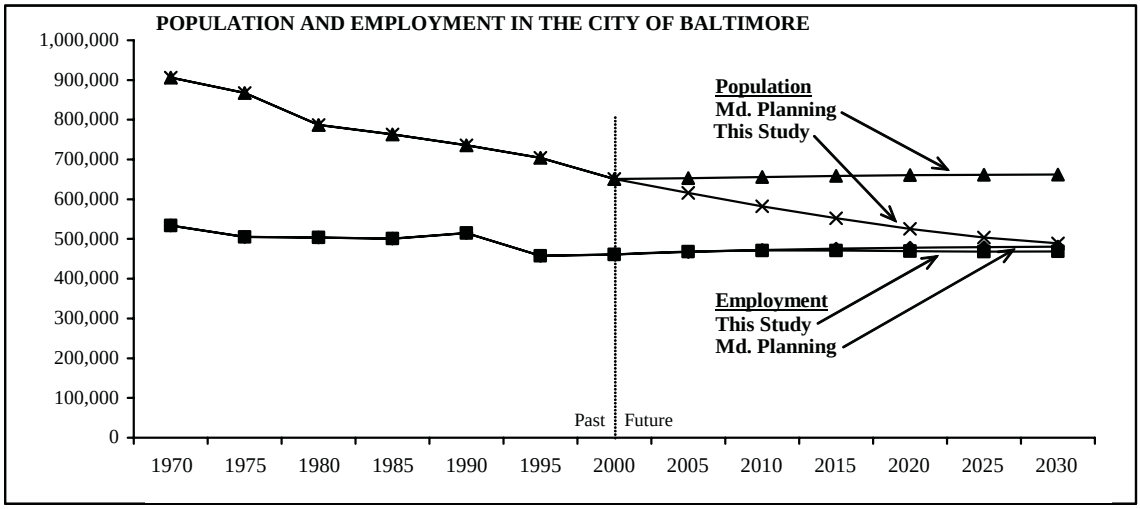
The Baltimore City situation is shown in the top panel of Figure 11 on the next page. The significant difference involves population and can be partly attributed to the moving-V paradigm of urban forecasting. For reasons that need no elaboration, public agencies are disinclined to forecast decline, regardless of past events or future prospects. So when confronting an older city with a history of losses, the forecaster meditates until the city's position becomes recognizable as the bottom of a V – a point from which what came down must go up. Once his job is done, cosmic forces move the V forward in time so its bottom is ready for occupancy at the next forecast.

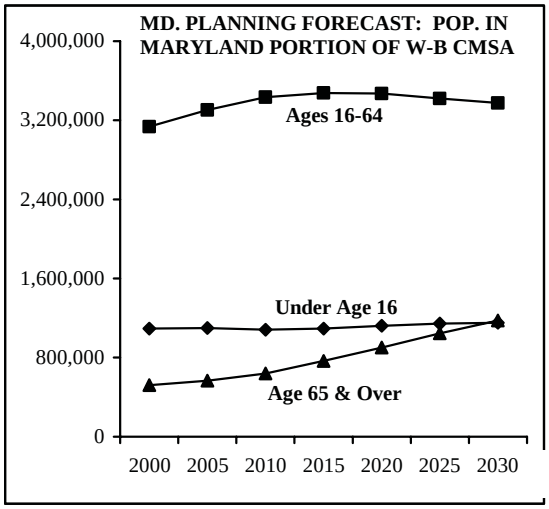
The population of Baltimore City has declined by a quarter-million people since 1970. The losses have occurred relentlessly, averaging 8,500 persons per year during the most recent decade and the 30-year period as a whole. So Maryland Planning expects the Baltimore City population to rise by more than 400 persons per year in all future intervals through 2020. (This projection shows admirable restraint. The District of Columbia lost 185,000 people over the last three decades, so the Metro Washington COG predicts a gain of 130,000 over the next three.) Meanwhile the Baltimore City forecast developed here calls for population losses averaging 6,300 persons per year through 2020 and 3,600 per year thereafter, despite the progressive slowing of regional population growth. As for jobs, there are empirically sound reasons for expecting Baltimore employment to stabilize and even increase a bit, with the result that the two forecast series agree within 2.5%.

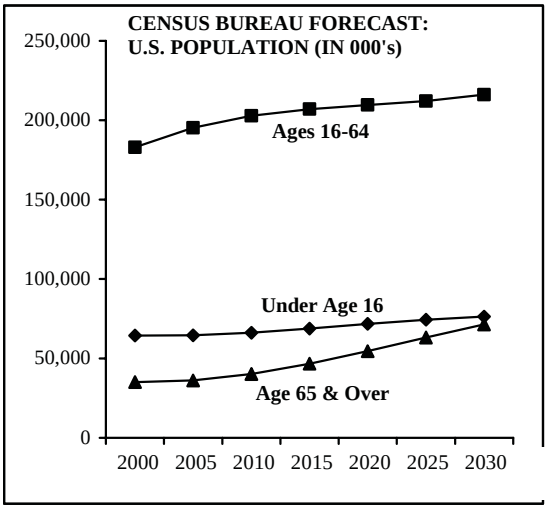
Sources of Difference

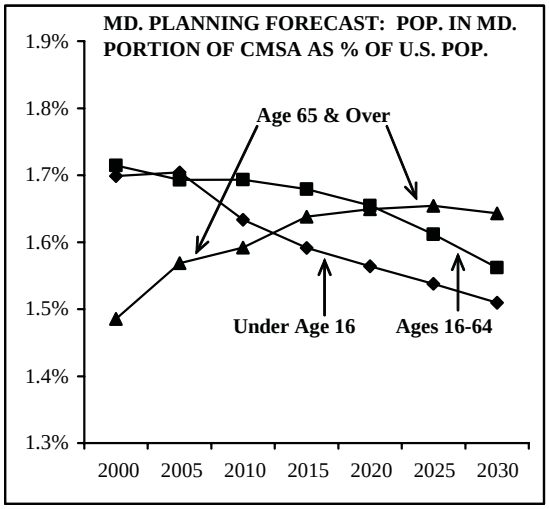
Little can be gained from further examination of the population differences per se. The forecasts offered here are based on regional-national economic linkages and call for regional growth at rates slightly exceeding the national rates. These future changes have been allocated among 78 districts in such a way that the Maryland portion of the CMSA gains 25% in population during 2000-30 while the rest of the region gains 38%. Relative to this scenario, the Maryland Planning forecasts either assume slower regional growth or greater diversion of development from Maryland to the rest of the CMSA. Not much more can be done with the numbers to explain why this outcome occurred.

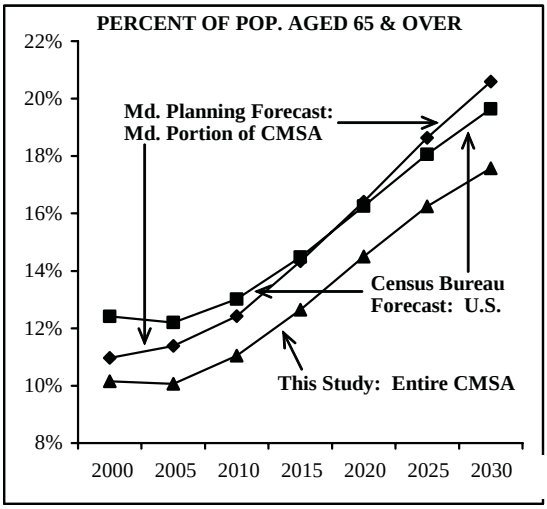
Figure 11. INVESTIGATION OF FORECAST DIFFERENCES











Further attention focuses on employment, partly because this is the area where disagreement exists for Frederick County. The main questions involve the relationships between population and employment in the Maryland Planning forecasts and the reasons why some of these projections involve such lurching slowdowns in employment growth.

The Maryland Planning forecasts cover quite a few variables besides total population and employment. The ones of greatest relevance here pertain to labor force and population by age. These have been tabulated and summed across the thirteen jurisdictions comprising the Maryland portion of the Washington-Baltimore CMSA (sometimes called the "sub-region"). A notable finding is that Maryland Planning expects a virtual halt in labor force growth after the middle of the forecast period. According to its figures, the sub-region's labor force will increase by 13.9% (346,008 people) between 2000 and 2015, then change by 0.0% (60 people) between 2015 and 2030. This pattern is even more dramatic than that forecasted for sub-regional at-place employment – a slowdown from 15.0% growth during 2000-15 to 3.6% growth during 2015-30 – and points to the role of assumptions about population aging.

Sure enough, it turns out that Maryland Planning expects the sub-region's population to age considerably faster than predicted by the Census Bureau for the nation as a whole. The relevant figures are shown in Table 22 below and examined graphically in the lower two-thirds of Figure 11 on the previous page.

Table 22. Summary of Employment and Demographic Forecasts

	Md. Planning Forecasts for Sub-Region (CMSA pt.)					Census Bureau Projections of U.S. Pop. By Age (000)		
	At-Place Empl.	Labor Force	Population by Age: Under 16	16-64	65 & Up	<16	16-64	65+
2000	2,811,287	2,496,742	1,093,411	3,135,887	520,861	64,360	182,917	35,062
2005	2,994,700	2,637,850	1,099,330	3,305,070	565,990	64,506	195,215	36,079
2010	3,147,800	2,762,330	1,080,940	3,433,510	640,610	66,169	202,750	40,244
2015	3,233,100	2,842,750	1,094,350	3,477,060	765,190	68,764	207,063	46,711
2020	3,286,400	2,862,480	1,121,430	3,469,340	901,130	71,708	209,692	54,632
2025	3,321,000	2,848,960	1,144,430	3,419,760	1,044,940	74,416	212,176	63,162
2030	3,350,800	2,842,810	1,151,720	3,374,730	1,173,940	76,303	216,055	71,453
% Chg:								
2000-15	15.0%	13.9%	0.1%	10.9%	46.9%	6.8%	13.2%	33.2%
2015-30	3.6%	0.0%	5.2%	-2.9%	53.4%	11.0%	4.3%	53.0%

Maryland Planning expects population aged 65 and over to increase considerably faster in the sub-region than the nation as a whole, with the difference oddly concentrated in the first half of the forecasting period when the baby-boomer generation is just starting to reach 65. But persons in the two younger age groups are expected to increase at lower – generally much lower – rates in the sub-region than the nation throughout the forecast period. A particularly arresting fact is that persons of prime working age, 16 through 64, are expected to decline by nearly 3% in the sub-region during 2015-30 while increasing

more than 4% in the U.S. This difference is shown clearly by the upper curves in the two central panels of Figure 11.

The two lower panels in Figure 11 offer some further perspective. The left-hand panel gives a plot of forecasted sub-regional population as a percent of projected national population for each of the three age groups. The curves for the two younger groups head downward across the forecast period while the 65-plus curve rises until 2025. The lower-right panel addresses elderly population as a percent of total population and includes data from the present study. Directly comparable numbers are not available because this study did not develop age profiles for individual counties or subcounty districts, but the graph includes a curve showing the elderly population share predicted here for the region (CMSA) as a whole. As discussed in section III, this share is expected to remain well below the national elderly share, gaining on it by less than half a percentage point during the forecast period as a whole. In contrast, the elderly population share predicted for the sub-region by Maryland Planning moves across most of the regional-national gap during 2000-15 and rises briskly above the national relationship after 2020. Granted, Maryland Planning was at a disadvantage when preparing these numbers because the Census Bureau's national projections based on the 2000 census were not yet available. With or without this information, however, there seems little reason for assuming that the sub-regional population will age so rapidly, unless Maryland wants not only slower growth but a more geriatric future.

Some other factors may have contributed to the predicted slowdown in sub-regional employment growth. Maryland Planning may have underestimated the future gains in labor force participation by persons aged 65 through 74, which promise to offset somewhat the employment effects of population aging. Also, there are intimations of a disconnect between the estimates of resident labor force and at-place employment. (If county unemployment rates are assumed to hold constant, the Maryland Planning figures imply that net commuting out of the sub-region will shift abruptly after 2015.) But the assumption of very rapid population aging seems to be the main operative factor. It presumably bears much of the responsibility for Maryland Planning's prediction that Frederick County will add only 6,200 jobs in the second half of the forecast period while gaining 65,200 inhabitants.

In conclusion, we can only repeat the earlier point that forecasts resist conclusion. If obliged to compromise, this study would bow or at least nod to other opinion regarding the populations of Howard County and Baltimore City, but would stick with the present figures for Frederick County notwithstanding the disagreement about employment. But again, the reasonableness of this or any other posture exists only in the eye of the beholder.

APPENDICES

Table A1. Population Forecasts for Counties and Subcounty Districts
Table A2. Employment Forecasts for Counties and Subcounty Districts

Table A1. Population Forecasts for Counties and Subcounty Districts

	1990	2000	2010	2020	2030
Anne Arundel Co.					
North	100,004	103,868	109,709	112,266	114,943
Northwest	86,828	118,154	147,452	176,445	206,809
Northeast	98,695	108,304	121,469	132,288	144,623
E. Central	98,219	108,876	122,642	133,433	145,743
South	43,493	50,454	60,960	71,670	84,217
Baltimore City	736,014	651,154	582,510	525,516	489,040
Baltimore County					
Southwest	77,718	83,225	87,657	89,342	91,847
West	144,173	176,386	197,724	213,615	228,989
Near North	177,211	189,651	196,728	195,731	195,089
Far North	55,370	63,938	73,379	82,231	93,337
Northeast	47,295	53,744	62,353	68,450	74,923
Southeast	190,367	187,348	185,228	179,694	177,787
Calvert County	51,372	74,563	92,267	109,258	129,106
Carroll County					
South	36,781	47,827	55,999	62,788	70,159
North	86,591	103,070	118,955	133,386	150,654
Charles County					
North	56,760	73,188	89,567	104,190	120,343
South	44,394	47,358	56,243	65,177	76,032
Frederick County					
Central	55,961	76,217	93,625	106,681	118,735
South	24,354	28,791	35,152	41,921	49,113
East	27,060	42,922	53,875	64,210	75,979
North	42,833	47,347	54,918	63,949	75,333
Harford County					
Southwest	51,807	63,397	74,732	84,515	94,768
Southeast	41,442	42,842	46,368	48,531	50,640
Central	64,821	86,718	104,435	118,725	135,824
North	24,062	25,633	28,511	31,410	35,245
Howard County					
South	28,663	38,624	45,977	51,285	56,503
East	30,874	50,425	63,047	71,619	81,331
Columbia	79,839	96,527	109,405	117,397	125,028
W. Central	36,743	46,976	56,108	64,281	73,589
Northwest	11,209	15,290	18,811	21,633	24,643
Montgomery Co.					
Southwest	97,619	103,647	108,999	113,118	119,931
S. Central	156,241	173,982	181,089	183,510	189,640
Southeast	69,994	76,341	88,927	97,597	105,712
W. Central	117,287	131,294	145,908	157,010	169,490
E. Central	116,524	130,194	142,267	151,248	160,823
N. central	161,144	210,876	244,659	265,740	287,296
Northeast	30,967	38,533	48,462	57,309	66,443
Northwest	7,252	8,474	9,402	9,624	9,541

	1990	2000	2010	2020	2030
Prince Georges Co.					
Northwest	177,202	184,357	183,168	178,768	173,983
North	125,144	131,453	145,377	155,613	166,180
East	78,315	112,799	143,970	173,624	204,050
W. Central	157,239	161,162	165,161	163,629	161,105
Southeast	35,615	45,331	60,412	75,149	90,413
Southwest	141,149	150,170	167,045	182,283	198,458
South	14,603	16,243	20,374	23,564	26,715
Queen Anne Co.	33,953	40,563	47,659	54,773	63,848
Washington Co.					
West	10,212	10,882	12,532	14,673	18,565
South	29,227	32,621	38,751	45,063	52,611
Northeast	81,954	88,420	92,841	93,760	95,786
Alexandria City	111,183	128,283	137,173	140,870	149,646
Arlington County	170,936	189,453	208,435	218,285	234,706
Clarke County	12,101	12,652	13,911	15,370	17,524
Culpeper County	27,791	34,262	39,130	43,818	49,504
Fairfax County					
Northwest	76,651	117,519	146,941	167,376	185,431
Far North	90,786	110,854	128,067	139,411	150,058
Northeast	133,435	148,776	165,554	178,485	194,269
East	191,198	217,048	232,103	241,152	250,390
Southwest	179,813	210,393	242,989	274,189	311,807
South	146,701	165,159	191,232	214,612	239,656
Fairfax City	19,622	21,498	23,410	24,874	26,658
Falls Church City	9,578	10,377	10,958	10,840	10,816
Fauquier County	48,741	55,139	69,104	85,119	105,629
Fredericksburg Cit.	19,027	19,279	20,155	19,824	19,601
King George Co.	13,527	16,803	20,732	24,428	28,894
Loudoun County					
Southwest	2,366	8,942	16,342	23,906	32,210
Southeast	43,926	99,275	127,590	150,141	171,651
Central	23,758	39,488	51,819	63,872	77,316
Northwest	16,080	21,894	27,182	32,098	37,797
Manassas & MP cit. (+Yorksh.)	38,510	50,107	57,864	62,786	69,240
Prince William Co.					
North	51,228	72,232	96,132	123,851	158,489
Southwest	32,367	42,487	52,366	62,048	72,893
Southeast	128,272	161,412	185,874	202,962	219,361
Spotsylvania Co.	57,403	90,395	115,298	142,005	176,812
Stafford County	61,236	92,446	115,439	138,309	165,014
Warren County	26,142	31,584	35,293	38,458	42,567
Berkeley Co., WV	59,253	75,905	90,414	106,697	129,338
Jefferson Co., WV	35,926	42,190	49,151	56,072	64,869
Washington, DC	606,900	572,059	561,819	552,069	551,988

Table A2. Employment Forecasts for Counties and Subcounty Districts

	1990	2000	2010	2020	2030
Anne Arundel Co.					
North	65,451	72,618	76,427	79,551	81,818
Northwest	63,442	77,168	92,188	106,568	119,005
Northeast	21,096	27,481	31,542	34,748	37,040
E. Central	55,334	65,759	73,118	75,859	76,424
South	7,734	10,855	13,186	14,695	15,849
Baltimore City	388,311	371,311	379,504	378,364	378,050
Baltimore County					
Southwest	52,370	45,849	44,646	42,986	41,312
West	60,287	70,993	84,047	98,747	115,184
Near North	129,845	140,925	147,720	149,658	148,241
Far North	13,927	16,011	17,555	19,406	22,154
Northeast	17,961	27,652	30,931	30,385	29,099
Southeast	69,795	60,580	60,735	63,468	69,212
Calvert County	11,466	18,127	21,105	23,393	27,027
Carroll County					
South	10,263	12,800	13,951	14,210	14,523
North	32,340	37,824	41,839	46,880	53,698
Charles County					
North	15,838	21,560	23,947	26,196	29,389
South	14,486	15,551	17,494	19,396	21,704
Frederick County					
Central	41,816	59,076	72,985	83,574	92,424
South	5,333	9,953	12,078	13,092	13,763
East	3,437	4,678	6,539	7,990	9,749
North	8,536	11,658	13,460	15,359	18,023
Harford County					
Southwest	9,037	13,559	15,404	17,130	19,680
Southeast	27,601	29,629	31,785	33,022	33,271
Central	19,708	29,257	34,096	35,686	37,497
North	3,581	5,241	5,427	5,218	5,280
Howard County					
South	22,164	33,749	41,273	44,577	45,085
East	16,894	19,892	23,688	25,879	26,890
Columbia	47,849	78,007	95,258	101,028	105,008
W. Central	7,996	11,709	14,923	17,097	18,069
Northwest	2,799	4,155	4,939	4,879	4,973
Montgomery Co.					
Southwest	82,642	111,576	119,365	121,011	122,751
S. Central	78,991	73,229	78,019	82,493	85,156
Southeast	21,279	28,059	34,767	40,180	43,172
W. Central	127,594	136,297	150,349	158,893	162,742
E. Central	29,439	34,600	41,752	48,347	55,136
N. central	69,853	82,719	102,400	116,440	125,000
Northeast	7,272	9,398	12,357	14,716	15,796
Northwest	2,373	2,538	3,362	3,518	3,620

	1990	2000	2010	2020	2030
Prince Georges Co.					
Northwest	67,345	62,807	69,279	76,090	81,532
North	104,977	109,042	119,753	125,357	130,768
East	17,833	27,963	37,350	45,869	53,085
W. Central	67,845	64,194	67,912	71,698	76,850
Southeast	33,389	29,940	32,648	35,973	39,775
Southwest	34,558	32,878	38,366	44,920	53,116
South	3,923	3,302	3,703	3,941	4,229
Queen Anne Co.	7,845	11,888	13,113	14,133	15,631
Washington Co.					
West	3,584	3,926	3,669	3,233	3,028
South	7,135	9,180	10,192	10,724	11,591
Northeast	41,088	52,488	58,730	64,483	69,225
Alexandria City	92,414	100,093	110,298	116,854	123,630
Arlington County	165,817	168,107	184,372	196,639	205,976
Clarke County	3,030	4,218	4,095	3,776	3,630
Culpeper County	10,077	13,254	15,517	17,367	19,426
Fairfax County					
Northwest	41,157	91,331	127,301	144,068	151,870
Far North	48,215	81,481	108,110	119,370	129,440
Northeast	119,450	173,340	220,081	235,521	247,054
East	101,471	131,129	155,092	162,924	169,020
Southwest	39,989	48,799	64,193	79,085	92,300
South	42,918	50,684	62,511	74,255	85,932
Fairfax City	38,505	41,906	44,412	44,028	43,654
Falls Church City	12,663	14,870	15,680	15,078	13,696
Fauquier County	15,704	16,849	18,957	21,445	25,577
Fredericksburg Cit.	20,466	25,938	26,766	25,944	24,982
King George Co.	7,723	9,441	11,338	13,064	15,095
Loudoun County					
Southwest	1,975	3,056	6,145	8,231	9,379
Southeast	24,279	53,510	74,447	86,504	90,165
Central	10,819	18,838	24,061	27,647	29,951
Northwest	3,604	5,202	6,279	6,457	6,919
Manassas & MP cit. (+Yorksh.)	23,868	32,995	37,020	37,796	35,943
Prince William Co.					
North	16,012	23,523	32,294	41,712	53,409
Southwest	14,379	18,166	22,355	26,584	31,138
Southeast	29,536	39,464	45,438	49,950	53,325
Spotsylvania Co.	12,252	22,225	29,997	38,776	51,819
Stafford County	15,188	25,987	32,490	38,326	45,989
Warren County	7,246	9,751	11,026	12,303	14,407
Berkeley Co., WV	20,039	25,991	33,592	44,241	58,700
Jefferson Co., WV	10,433	14,041	16,975	20,061	23,348
Washington, DC	712,040	653,484	678,778	684,547	689,876

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX F

Scenario Allocation Method

October, 2003

Prepared by:

HNTB Corporation
Architects Engineers Planners

HOUSEHOLD AND EMPLOYMENT FORECASTS AND ALLOCATION FOR TRANSPORTATION, FISCAL AND WATER AND WASTEWATER TESTING

Technical Documentation

This memorandum describes the process developed by HNTB to allocate projected 2030 households and jobs (for two alternative scenarios) to analysis areas including Traffic Analysis Zones (TAZs) for the City of Frederick Comprehensive Plan modeling area. It also explains the process used to aggregate the data for the Fiscal Analysis Zones (FAZs) by 5-year increments as well as aggregate the forecast for sewer and water analysis. The process was accomplished through stages involving future land use designation, GIS modeling, and manual iterations.

Links to County and Regional Forecasts

Thomas Hammer, PhD under contract to HNTB, prepared regional demographic and economic forecasts for 2030 for the entire Baltimore-Washington Region with a focus on Frederick County, the City of Frederick Comprehensive Plan Study Area and the City of Frederick.[1]

The City of Frederick and its hinterland are an integral part of a highly integrated region. Frederick is a strategic place from which to do business or hold a job in the rest of the region, so its economic and demographic gains are strongly determined by regional events. These include not only the growth trajectory of the region as a whole but also the evolving distribution of activity among the region's component areas near and far from Frederick. Consequently the development of forecasts to support the Frederick planning effort has proceeded from a premise that local trends can only be understood and reliably predicted when placed in a larger context.

The larger context is the officially defined Washington-Baltimore Consolidated Metropolitan Statistical Area. This 9,580-square-mile region extends from Aberdeen and Queenstown on the east to Hagerstown and Martinsburg on the west and Fredericksburg and Culpeper on the south. Its components include twenty-seven counties and six independent cities.

Forecasts for this entire region through 2030 were prepared using a hierarchical approach. Its steps have consisted of first developing a national forecast, then preparing a regional forecast linked to national trends, then allocating the regional magnitudes to smaller areas using a calibrated mathematical model. For purposes of analysis and allocation, the region was partitioned into 78 component districts. These consist of 7 independent cities, 59 sub-areas of counties and 12 whole counties (all but one located on the suburban fringe). The outputs of the forecasting process included detailed forecasts for all 78 districts.

[1] The full text of the regional forecasts is documented in a separate document entitled "Demographic and Economic Forecasts for the Frederick Study Area," August 2003.

The resulting forecasts for the city, study area, and county are summarized below in Table 1.

Table 1. Summary of City, Study Area and County Forecasts, 2000-2030

	2000	2010	2020	2030	2000-30 Chg.
Population					
City of Frederick*	52,767	62,089	68,791	74,857	41.9%
Rest of Study Area	23,450	31,536	37,889	43,878	87.1%
Total Study Area	76,217	93,625	106,681	118,735	55.8%
Frederick County	195,277	237,569	276,761	319,161	63.4%
Households					
City of Frederick*	20,891	24,791	27,682	30,369	45.4%
Rest of Study Area	8,888	12,162	14,805	17,355	95.3%
Total Study Area	29,779	36,953	42,488	47,724	60.3%
Frederick County	70,060	86,704	102,275	119,398	70.4%
Employment					
City of Frederick*	41,774	49,425	54,365	58,066	39.0%
Rest of Study Area	17,302	23,560	29,210	34,358	98.6%
Total Study Area	59,076	72,985	83,574	92,424	56.4%
Frederick County	85,365	105,063	120,016	133,959	56.9%

* based on 2000 boundary with no annexation

It is important to note that Dr. Hammer's forecasting methodology primarily yields "demand-side" forecasts. It has no mechanism to capture the effects of shifts of more or less development controls or infrastructure polices except to the extent that the model captures prevailing conditions and trends that inherently reflect these policies. Thus the model may over allocate development in places like Howard County or Montgomery County, which have seen significant growth in recent decades but where these jurisdictions have essentially capped development (supply) because of their land development policies. Some of this growth could be deflected to Frederick County. Another important caveat with the forecasts for the City of Frederick shown in Table 1 are that they are only for the city's existing boundaries and do not take into account annexation.

This next step of identifying potential annexation areas for the City of Frederick and then forecasting employment and demographics gains is discussed below in the next section of this memorandum.

Scenario Forecasts

Two scenarios were developed and approved for evaluation by the Mayor and Board of Aldermen. The first scenario -- (1) "**Upgrading in Place**" -- tells a story of focusing on the urban enhancement of Frederick. Capital dollars and political energies are focused on this inward-looking effort. The second scenario -- (2) "**Expanding Horizons**" -- is a story of Frederick becoming an expanded regional employment center. Capital dollars and political energies are focused on expanding infrastructure to accommodate expansive

growth and preparing for the long-term future. Both have many facets in common including mixed-use development, retaining the special qualities that make Frederick attractive, e.g., the vitality of downtown, preservation of historic resources and a high value placed on the environment. These alternative scenarios differ in areas of emphasis and illustrate a range of futures for the City of Frederick. The **Upgrading in Place** scenario focuses on enhancement of the existing city accompanied by limited growth and annexation while **Expanding Horizons** outlines a city with expansive growth that expands Frederick's role into a major employment center.

Based on growth assumptions for the two alternative scenarios, HNTB developed a demographic and employment forecast for each scenario. HNTB used the Hammer forecasts as a starting point for the scenario forecasts and revised them[2]. These scenario forecasts are presented in Table 2.

HNTB then used these forecasts for the study area and city as control totals in allocating households and employment to the TAZ level. In addition, Thomas Hammer's estimates for employment by industry (for the study area) were also used as proportional control totals for distributing total employment among four sectors[3].

Table 2. Summary of City, Study Area and County Forecasts, 2000-2030

	2000	Scenario 1 2030	Scenario 2 2030	Scenario 1 2000-30 Chg.	Scenario 2 2000-30 Chg.
Population					
City of Frederick*	52,767	82,000	104,000	55.4%	97.1%
Total Study Area	76,217	118,700	138,000	55.7%	81.1%
Frederick County	195,277	319,161	336,375	63.4%	72.3%
Households					
City of Frederick*	20,891	33,400	42,300	59.9%	102.5%
Total Study Area	29,800	47,400	56,500	59.1%	89.6%
Frederick County	70,060	119,400	129,000	70.4%	84.1%
Employment					
City of Frederick*	41,774	64,100	85,400	53.4%	104.4%
Total Study Area	59,076	93,100	111,600	57.6%	88.9%
Frederick County	85,365	134,000	154,000	57.0%	80.4%

* includes annexation areas for 2030

[2] For Scenario 1, county and study area control totals were maintained but the city's share of the incremental growth was enhanced to account for annexation. For Scenario 2, both county control totals and City of Frederick's share were increased.

[3] Dr. Hammer's employment forecasts reported jobs for 7 sectors. For transportation modeling efforts, these sectors were transformed to 4 broad sectors (retail, office, industry, and services) using SIC codes.

Allocation Process and Structure

In simple terms, the households and jobs were allocated to TAZs based on a number of suitability factors and constraints such as the amount of developable land, existing and planned land use, and accessibility. The process was accomplished in the following three stages:

1. TAZ Planning District Designation and Future Land Use Assessment
2. Suitability Modeling
3. Iterations and Adjustments

The following sections discuss each of the above stages in detail.

TAZ District Designation

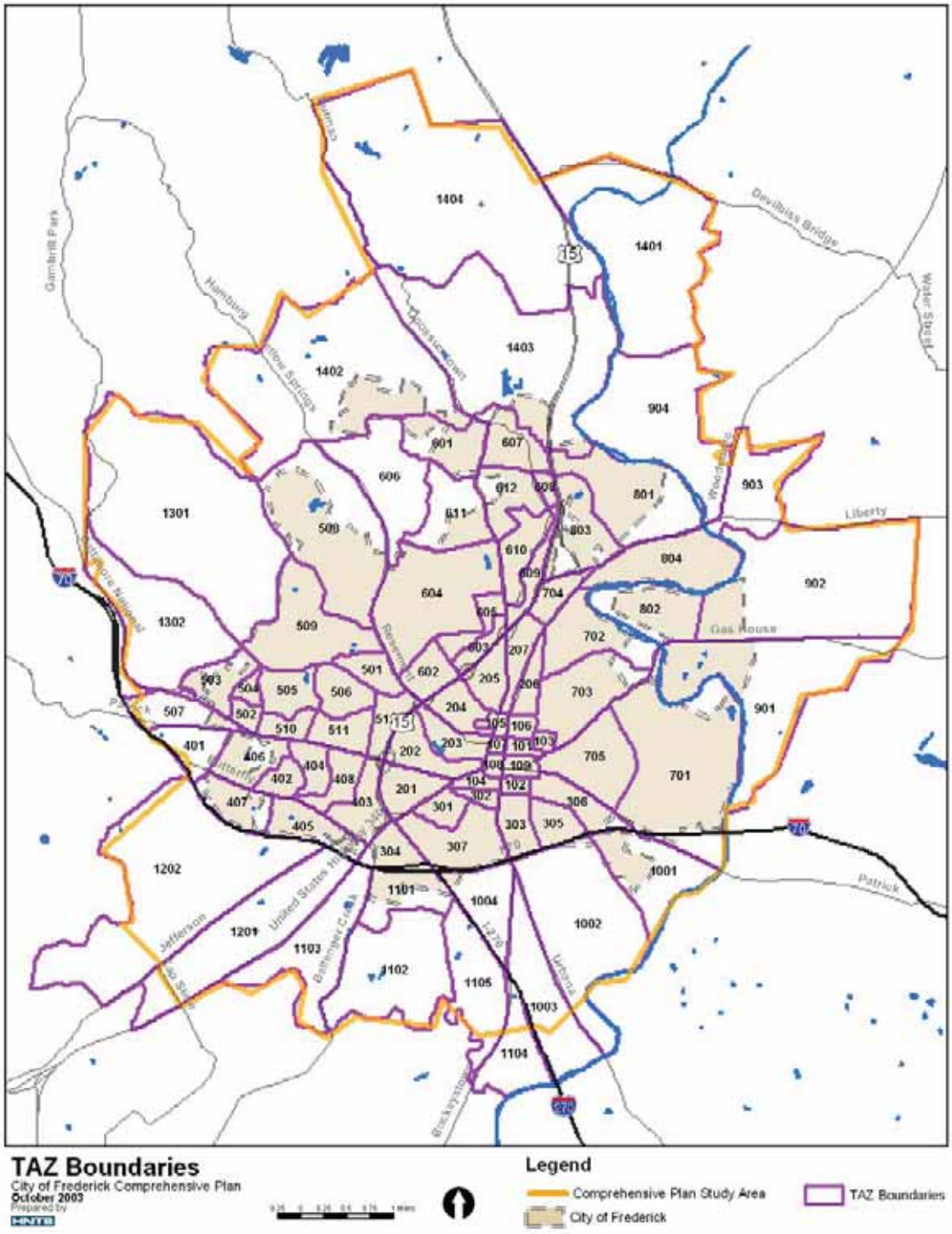
The City of Frederick Comprehensive Study Area was divided into 84 Traffic Analysis Zones (TAZ) for the purpose of transportation modeling. Map 1 depicts the study area as divided into TAZs. It also shows the City of Frederick's corporate boundaries for reference. To assess the future land use mix for the Study Area, HNTB grouped these 84 TAZs into 34 districts. The grouping was based on homogeneity of existing land use, existing transportation network and HNTB's understanding of future land use. HNTB assigned a future land use designation[4] for each of the TAZ districts and for both alternative scenarios. These decisions were based on existing development, environmental features, and assumptions about future growth and development.

Following these preliminary designations, HNTD had a work session with the City of Fredrick planning staff to finalize the future land use designations for all 34 districts. This involved the assessment of future residential densities as well as the mix of residential and non-residential uses. Pipeline development (development approved but not yet built) was also used as an input for designating future land use mix. Potential redevelopment areas were also identified.

The land use mix obtained through this exercise was used as one of the inputs for suitability modeling as explained in the following section.

[4] The land use designations were based on HNTB's understanding of predominant future land use for the districts. For example, if a TAZ district was designated "Residential with some non-residential", it implied that the district would be predominantly residential with some auxiliary commercial uses. At this stage, the exact mix and density of use was not prescribed.

Map 1: Study Area Traffic Analysis Areas (TAZs)



Suitability Modeling

The development suitability of TAZs was determined based on the following factors:

a) Proximity to "Growth Attractors"

Proximity to "Growth Attractors" such as transportation spines, interchanges and activity centers can greatly influence the development potential of land. "Growth Attractors" are especially relevant for determining employment location. For the City of Frederick, HNTB identified the following four "growth attractors" for employment uses:

- Downtown Core
- Frederick Municipal Airport
- Major Interchanges
- Ft. Detrick

HNTB created a raster-based GIS model to compute the relative accessibility score for all the TAZs. First, the TAZ GIS layer was converted into a data format consisting of 30-meter grid cells. The "roads" GIS layer was also converted into a 30-meter raster and reclassified to convert all cell values (except those that had no data) into the value 1. This raster became the cost surface for our cost weighted distance measures. In other words, the reclassified "roads" layer provided the "network route" to the identified "growth attractors."[5]

Using ArcGIS "Spatial Analyst", network distance to all "growth attractors" was computed. If a cell was within the identified distance band it was reclassified with the value 1, otherwise it received a value of 0. The following "distance bands" were identified:"

- 1 mile for the downtown
- ½ mile for the Frederick Municipal Airport
- 1 mile for Ft. Detrick
- ½ mile for major interchanges (existing and planned)[6].

The cells with the value 1 were summed up for all the 84 TAZs. This was done individually for the four "growth attractors" to enable relative weighting of these attractors.

[5] This is a better approach than creating a buffer ring, which might not yield the most accurate distance measure. For example, when measuring distance to a major interchange, distance along a road network is obviously the more accurate measure than a buffer.

[6] The number of interchanges varied across the two scenarios. In Scenario 2 a new parallel north-south highway was also assumed. The potential interchange locations along this route were identified and added to the list of "growth attractors".

b) Developable Land

The GIS layer provided by the Maryland Department of Planning[7] was used to identify developable acreage. The developable acreage was summed for each TAZ. The redevelopment potential of all TAZs was also factored in the summation of developable land. Accordingly, the total developable acreage for a TAZ with identified redevelopment potential was enhanced.

c) Agglomeration

In general, given the market conditions, development is attracted to areas that are already developed with similar types of uses. Therefore, an agglomeration ratio was also calculated for each of the TAZs. This was given by each TAZ's share of the study area's jobs and households in 2000.

Iterations and Adjustments

The final stage of the allocation process was accomplished in Excel where relative suitability scores were used to assign jobs and households to each TAZ (for the two alternative scenarios). First, future land use designations were used to divide developable land into employment and residential acreage. Second, jobs and households were allocated for each of the two scenarios based on relative suitability scores.

Employment Allocation

For employment allocation, a composite "growth attractors" suitability score was calculated by assigning relative weights to the "growth attractors". These weights were varied for the two alternative scenarios. For example, for Scenario 2, proximity to Ft. Detrick was weighted relatively higher given the assumed expansion of Ft. Detrick-related employment uses under Scenario 2.

To account for different intensities of employment uses, the floor area ratio (FAR) value of 0.5 was used as a pivot[8]. The amount of developable acreage was accordingly adjusted. An FAR of higher than 0.5 was reflected in higher developable acreage and vice versa. The relative developable acreage score for each TAZ was calculated as a ratio of the total developable acreage for all TAZs. The TAZs with no developable acreage or redevelopment potential were flagged and removed from the allocation process. The developable acreage score was combined with the relative accessibility score for each TAZ to create a composite suitability score.

Finally, the relative suitability score for each TAZ was calculated by dividing each TAZ's suitability score by the total suitability score for all TAZs. These relative scores were used to allocate 90 percent of the forecasted employment growth. Thus, TAZs with

[7] MDP undertook a capacity analysis of the city and the study area

[8] For example, if a TAZ was mainly planned for high intensity office employment with a FAR of 0.75. Its developable acreage was increased by 1.5 (0.75/0.5).

higher relative suitability score got a larger share of employment growth and vice versa. The remaining ten percent of the forecasted employment growth was allocated using relative agglomeration ratios for each TAZ. The above process was accomplished for both the alternative scenarios.

The first round of results was also tested for the distribution of total employment between the city and the rest of the study area (study area minus city figures shown in Table 2). The test showed the model over-allocated the number of jobs inside the city. To adjust for this, the model was recalibrated with a substantially higher weight for developable land to account for high concentration of developable lands in the TAZs outside the city. The results obtained through this round were again tested for the city and rest of study area's share of total jobs. The model was iterated (by changing the weights and density assumptions) until the distribution of total jobs met the control totals shown in Table 2.

Thereafter, a few TAZs' employment allocation was manually adjusted to reflect the two alternative scenario assumptions. The total employment allocated was divided into retail, office, industrial, and service jobs based on the assumed employment mix for each TAZ (as obtained through the work session with the city's planning staff discussed previously). The resulting employment mix was compared with the employment mix given by Dr. Hammer's forecast. The employment mix assumptions were refined to meet these control totals.

Residential Allocation

Unlike employment, residential allocation was only based on the amount of developable land and agglomeration. The amount of developable acreage was adjusted to reflect various intensities of residential use and redevelopment potential. The first round of residential allocation was tested for the distribution between the city and the rest of the study area. Density assumptions were adjusted to meet the expected share. Like employment, a few TAZs were manually adjusted to reflect the two alternative scenario assumptions. In addition, in a few cases, residential units in the pipeline were also added and the total allocation adjusted accordingly. Finally, the total household allocation was divided into single family, townhouses, and multi-family households.

Attachment A includes the household and jobs forecasts by TAZ by scenario.

Fiscal Analysis Zones Forecasts

For the purpose of fiscal testing of alternative scenarios, HNTB, in consultation with the city's planning staff, divided the Comprehensive Plan Study Area into the following three Fiscal Analysis Zones (FAZs):

- FAZ 1: This area is the land within the existing city boundary. It is anticipated that during the next thirty years, portions of this area will become further developed. Although this will not entail annexation, vacant land will be developed and some developed lands may be converted to more intensive uses.

- FAZ 2: This includes areas that may be annexed. These are fill-in areas adjacent to the city's current boundaries. This group of relatively small areas together comprises an approximately 12 percent increase in the city's land area.
- FAZ 3A-E[9]: This includes additional areas that may be annexed to the city's west, northwest, east and southwest.

Map 2 shows the location of these FAZs.

The employment and household allocation for each of these FAZs was estimated. Allocation by five-year increments was also computed by assuming growth trends of residential and employment uses. The City of Frederick Planning Department provided the assumed growth rate of residential development for the city (FAZ 1) to reflect issues such as the water moratorium. Accordingly, for the first five-year period (2000-2005), a slower rate of residential construction was assumed. For each period, thereafter, HNTB assumed an average rate of residential development for the city. The timing of annexation areas was estimated in consultation with the city planning staff and the city's fiscal consultants.

Employment uses such as retail and services were generally allocated incrementally in concert with the amount of residential allocation. Office and industrial jobs were allocated based on the timing of annexation areas. The assumed 2000 to 2030 change in the City's household/employment ratio (as shown in Table 1) was used as a check for these five-year increments. The five-year increments were adjusted until a plausible trend in household/employment ratio was achieved. Finally, total population by five-year intervals was also estimated by assuming a rate of change of average household size.

Table 3 and 4 show the population and job forecasts by fiscal analysis area by scenario.

Table 3: Scenario 1

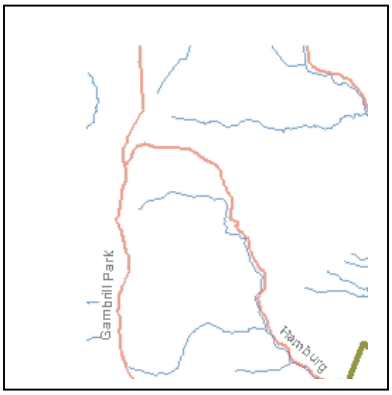
FAZ	*2000 Population*	*2030 Population*	*Net Increase*	*2000 Employment*	*2030 Employment*	*Net Increase*
1	52,766	74,493	21,727	41,774	59,645	17,871
2	2,404	5,471	3,067	1,094	3,528	2,434
3A	799	1,645	846	396	649	253
3B	120	373	253	66	277	211

[9] Scenario1 includes FAZ 1, 2, 3A and 3B. Scenario 2 includes FAZ 1,2,3A-E.

Table 4: Scenario 2

FAZ	*2000 Population*	*2030 Population*	*Net Increase*	*2000 Employment*	*2030 Employment*	*Net Increase*
1	52,766	84,383	31,616	41,774	72,237	30,463
2	2,404	6,063	3,659	1,094	4,579	3,484
3A	799	2,672	1,873	396	773	377
3B	120	418	298	66	381	315
3C	776	6,165	5,388	307	3,269	2,962
3D	370	1,122	752	24	1,120	1,096
3E	684	3,213	2,529	162	2,991	2,829

Map 2: Fiscal Analysis Areas (FAZs)



Sewer and Water Service Area Analysis

The same employment and household forecasts used in the fiscal and transportation analysis were analyzed for their location within (or outside) the city's planned sewer and water service area, as defined by the city's 2000 Water and Sewer Master Plan. The resulting forecasts were then used to assess water demand as well as needs for wastewater treatment capacity. Map 2 shows the location of the service area as it relates to the fiscal analysis zone

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX G

Scenario Evaluation Reports
Alternative Scenarios Summary
Transportation Analysis
Fiscal Results
Water and Sewer Analysis

Prepared by:

HNTB Corporation
Architects Engineers Planners

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX G-1

Alternative Scenarios Summary

November, 2003

Appendix G

Introduction to the Summary of Scenario Evaluation Results

The attached table presents the summary results of the testing of the two alternative scenarios for the City of Frederick as part of the Comprehensive Plan Update. The first scenario -- (1) "**Upgrading in Place**" -- tells a story of focusing on the urban enhancement of Frederick. This scenario forecasts an additional 29,200 persons and 22,300 jobs between 2000 and 2030.

The second scenario -- (2) "**Expanding Horizons**" -- is a story of Frederick becoming an expanded regional employment center. This scenario forecasts an additional 51,200 persons and 43,600 jobs between 2000 and 2030.

The **Upgrading in Place** scenario focuses on enhancement of the existing city accompanied by limited growth and annexation while **Expanding Horizons** outlines a city with expansive growth that expands Frederick's role into a major employment center.

The attached summary table is supplemented by a number of background and technical memos that explain how the evaluation was undertaken. These papers are available through the City of Frederick's Department of Planning. They include:

- Scenario Allocation Method (Household and Employment Forecasts and Allocation Methodology) – (HNTB)
- Water and Sewer Evaluation – (HNTB)
- Fiscal Results of Scenarios 1 and 2 – (Tischler & Associates, Inc.)
- Transcad Results (Transportation Evaluation) – (Gallop Corporation, City of Frederick, HNTB)

Please note that this evaluation includes only selected indicators or evaluation criteria that could be measured based on the analysis and testing that was done. Considered together, the indicators evaluated provide a picture of the future quality of life of the City of Frederick.

Next Steps

- November 5: The Mayor, Board of Aldermen and Planning Commission will be briefed on the results of the scenario testing at a joint work session.
- November 5: The Plan Steering Committee reviews the results of the scenario testing.
- November 12: Public Forum on the alternative scenarios and evaluation results. Public will be asked for their views on a preferred scenario.
- November 19: Plan Steering Committee Meeting. Plan Steering Committee will be asked to make a recommendation to the Planning Commission on a preferred scenario.
- November 20: Planning Commission Special Meeting to consider and make a recommendation to the Mayor and Board on a preferred scenario.
- December 3: Mayor and Board work session on the scenario testing results and Planning Commission recommendation for a preferred scenario.
- December 18: Mayor and Board to adopt a preferred scenario. This preferred scenario will be evaluated for its impacts. The development of the Comprehensive Plan polices and recommendations will be the outcome of this process.

Appendix G

Goals and Evaluation Measures		Year 2000	Upgrading in Place	Expanding Horizons
Goal 1: To become a major mixed-use urban center				
EVALUATION MEASURES	A. New jobs added	41,774 (existing)	22,300 (53% increase)	43,600 (1.04% increase)
	B. Gross residential density in 2030 (households/acre)	1.6	2.1	2.0
	C. Gross employment density in 2030 (jobs/acre)	3.1	4.0	4.1
Goal 2: To preserve and enhance downtown Frederick				
EVALU ATION	A. Total number of jobs downtown	8,430	10,610	11,720
	B. Total number of households downtown	4,033	5,700	6,460
Goal 3: To encourage the development of a variety of housing types throughout Frederick				
EVALUATION MEASURES	A. Percentage of multi-family units per TAZ (Average)		36%	36%
	B. Percent of TAZs with less than 20% non-SF units		13%	14%

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Goals and Evaluation Measures		Year 2000	Upgrading In Place	Expanding Horizons
Goal 4: To develop a safe and efficient transportation network				
EVALUATION MEASURES	A. Total Vehicle **Miles** of Travel	See details below		
	➢ On Existing Road Network	2.6 Million		
	➢ On Base Planned Network *		4.4 Million	
	➢ Enhanced Network *		4.4 Million	4.7 Million
	B. Percentage of congested Vehicle **Miles** of Travel (VMT)/day:	See details below		
	➢ On Existing Road Network	15%		
	➢ On Base Planned Network *		30%	
	➢ Enhanced Network *		20%	24%
	C. Percentage of congested Vehicle **Miles** of Travel (VMT)/day **(excluding freeways)**	See details below		
	➢ On Existing Road Network	13%		
	➢ On Base Planned Network		19%	
	➢ Enhanced Network		19%	20%
	D. Total **Hours** of Travel	See details below		
	➢ On Existing Road Network	60,504		
	➢ On Base Planned Network *		109,814	
	➢ Enhanced Network *		103,235	113,390
	E. Percentage of congested Vehicle **Hours** of Travel (VHT)/day	See details below		
	➢ On Existing Road Network	8%		
	➢ On Base Planned Network		20%	
	➢ Enhanced Network		13%	16%
	F. Percentage of congested Vehicle **Hours** of Travel (VHT)/day **(excluding freeways)**	See details below		
	➢ On Existing Road Network	11%		
	➢ On Base Planned Network		21%	
	➢ Enhanced Network		18%	21%
	G. Annual hours of delay per capita	See details below		
	➢ On Existing Road Network	12		
	➢ On Base Planned Network		27	
	➢ Enhanced Network		14	17
	H. Average trip time (minutes)	See details below		
	➢ On Existing Road Network	8.21		
	➢ On Base Planned Network		8.06	
	➢ Enhanced Network		7.57	7.54
	I. Average trip length (miles)	See details below		
	➢ On Existing Road Network	5.85		
	➢ On Base Planned Network		5.40	
	➢ Enhanced Network		5.43	5.28
	J. Change from year 2000 (roadways becoming congested)	See maps in transportation evaluation report		

* Note: The **Planned Network** is the existing roadway network with the planned improvements included in the 1995 Comprehensive Plan with the addition of East Street Extended and the new I-70 interchange. The **Enhanced Network** includes all of the improvements in the Planned Network plus a number of network enhancements.

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Goals and Evaluation Measures		Year 2000	Upgrading in Place	Expanding Horizons
Goal 5: To promote the use of transit				
EVALUATIN MEASURES	A. Jobs/households ratio in TAZs around MARC station (average)	6.0	3.6	3.5
	B. Percent of households served by existing TransIT routes	77%	68%	63%
	C. Percent of jobs served by existing TransIT routes	70%	70%	61%
Goal 6: To enhance the fiscal health of the city				
EVALUATIO N MEASURES	A. Net Revenues? Yes/No (from new growth only)		Yes	Yes, ~2X more than Scenario 1
	B. Average annual results (net revenues)		$4,091,000	$7,814,000
	C. Cumulative results (net revenues)		$110,478,000	$210,722,000
Goal 7: To provide for adequate water supply and wastewater treatment to support the growth and development of the City of Frederick				
EVALUATION MEASURES	A. Amount of additional water supply needed (MGD)		3.8	6.3
	B. Portion of water supply from the Potomac system	0%	35%	47%
	C. Amount of additional wastewater treatment capacity required (MGD)		4.2	6.9
	D. New wastewater treatment plant needed (Yes/No)		Yes or upgrade	Yes
	E. Portion of treatment provided by county WWTP	0%	Uncertain	Uncertain but some must be done by the county
	F. Are additions needed to water storage and transmission mains?		Yes	Yes
	G. Are additions needed to wastewater interceptor system?		Yes	Yes
H. **Goal 8: To preserve scenic views of mountains and spires**				
	A. Extent to which the scenarios protect scenic views		√	√-
Goal 9: To enhance and maintain a system of parks, trails and other recreation and open space resources				
EVALUATION MEASURES	A. Percent of households within neighborhood park service areas	34%	32%	28%
	B. Percent of households within community park service areas	90%	87%	78%
	C. Acres of additional neighborhood parkland needed to meet national per capita parks standards	8	48	93
	D. Acres of additional community parkland needed to meet national per capita parks standards	103	334	512

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Goals and Evaluation Measures		Year 2000	Upgrading in Place	Expanding Horizons
Goal 10: To protect and enhance historic resources				
	A. Extent to which the scenarios protect historic resources outside the downtown historic district		√	√ -
Goal 11: To promote city/county interjurisdictional coordination				
	A. Extent to which the scenarios preserve/protect the rural character of outlying areas to the city's north, west and east.			
Goal 12: To protect natural resources				
EVALUATION MEASURES	A. Percent of impervious surface cover by watershed	See results below		
	Tuscarora Creek	11%	17%	18%
	Muddy Run	8%	9%	9%
	Carroll Creek	22%	25%	31%

Appendix G

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX G-2

Transportation Analysis

November, 2003

Appendix G

Appendix G

TRANSPORTATION ANALYSIS OF THE ALTERNATIVE SCENARIOS

Introduction

This memo presents the preliminary findings of the evaluations of the Frederick region's roadway system to accommodate growth as defined by two alternative growth scenarios for the City of Frederick as part of the Comprehensive Plan update. The two scenarios are:

- Scenario 1: "Upgrading in Place" that focuses on enhancements of the existing city accompanied by limited growth and annexation. This scenario forecasts an additional 29,200 persons and 22,300 jobs between 2000 and 2030; and
- Scenario 2: "Expanding Horizons," which outlines a city with expansive growth becoming a regional employment center. This scenario forecasts an additional 51,200 persons and 43,600 jobs between 2000 and 2030.

The transportation testing was undertaken using a travel demand model called TransCAD. A travel demand models employs a set of mathematical relationships. It first estimates the travel patterns in a region based on the number of trips between various origin and destination pairs and then assigns the trips to the highway network to estimate the traffic volumes. It simulates the traffic flow on transportation facilities given the physical and operation characteristics of the roadway facilities and forecasted population and employment.

Travel demand modeling is the most commonly used and the most effective approach for estimating traffic demand on a transportation network. Instead of just looking at the individual transportation facility under study, a travel demand model considers the interaction of traffic on various transportation facilities in the study area. It is particularly useful for evaluating the impacts of alternative land use development scenarios on the transportation facilities.

The TransCAD model area for Frederick is the Comprehensive Plan Study Area, which encompasses approximately 58 square miles including the City of Frederick. The area was further divided into analysis areas called Traffic Analysis Areas (TAZs). All results presented in this analysis are for the Study Area.

The Gallup Corporation, under contract to the RBA Group, performed preliminary runs of the transportation model. The two alternative growth scenarios have been evaluated. Two roadway networks were also evaluated. In addition, a run of the current roadway network with 2000 population and employment data was analyzed for comparison purposes. Table 1 below shows the land use scenarios and road network combinations that were evaluated.

Table 1: Scenarios and Roadway Networks Evaluated

Scenario/Year	Existing Roadway Network	Planned Network	Enhanced Network
Existing Conditions (2000)	X		
1: Upgrading in Place (2030)		X	X
2: Expanding Horizons (2030)			X

The findings by Gallup and the preliminary analysis by HNTB and City Staff are summarized in this memo.

Alternative Networks

The base "Planned Network" is the existing roadway network plus the improvements included in the 1995 Comprehensive Plan with the addition of East Street Extended and the new I-70 interchange. The network improvements assumed under this network are listed below.

- Rosemont Avenue five-lanes from US15 to Wilson, and upgrade between Christopher's Crossing and Wilson
- Opossumtown Pike /Willowbrook Road extension to US15
- Butterfly Lane to four lanes / closed section from Alt. US40 to MD180
- Widen East South Street between East Street and Monocacy Blvd.
- Bowman Farm Road upgrade to closed section from Frederick Airpark Associates to MD144
- Widen US40 between Mt. Phillip and US 15
- Western Arterial (new southern segment) between Mt. Phillip and New Design Road New Design, Adventist Drive, Walser Drive and Monocacy Blvd. upgrade (between Crestwood and MD144)
- Gas House Pike four lanes of closed section from County Lane to Monocacy River Bridge and four lanes from Monocacy Blvd to Frederick County Line.
- Shookstown Road to four lane closed section between Kemp Lane and Rosemont Avenue.
- Baughmans Lane upgrade between and Shookstown Road and Rosemont Avenue.
- Tuscanney Drive upgrade between Kemp Lane & Rosemont Avenue.
- Yellow Springs Road upgrade between Christopher's Crossing & Bethel Road.
- Extend Opossumtown Pike/Willowbrook Road between Walter Martz and US15
- Walter Martz Road upgrade between Opossumtown Pike & Christopher's Crossing
- Highland Street extension from East Street to Monocacy Blvd.

- US15/Christopher's Crossing (Western Loop) Interchange
- US15 widening from four to six lanes from Jefferson to Monocacy Blvd

The “Enhanced Network” includes all of the improvements in the Planned Network plus a number of network enhancements including the following:

- A new North-South Parallel Highway east of the city
- Interchange at I-70 at Mt. Phillip
- A Western Arterial (new southern segment) between Mt. Phillip and New Design Road
- A new Northwest Ring Road (an outer ring arterial NW of Monocacy Blvd.)
- A North-South Connector from the New Ring Road to Monocacy Blvd.

These potential enhancements to the road network were included to provide alternative north-south as well as east-west roadways to an existing roadway network that is heavily dependent on US15, I-70 and Monocacy Blvd. Some of these improvements to the system have been shown on city and county plans as far back as 1956.

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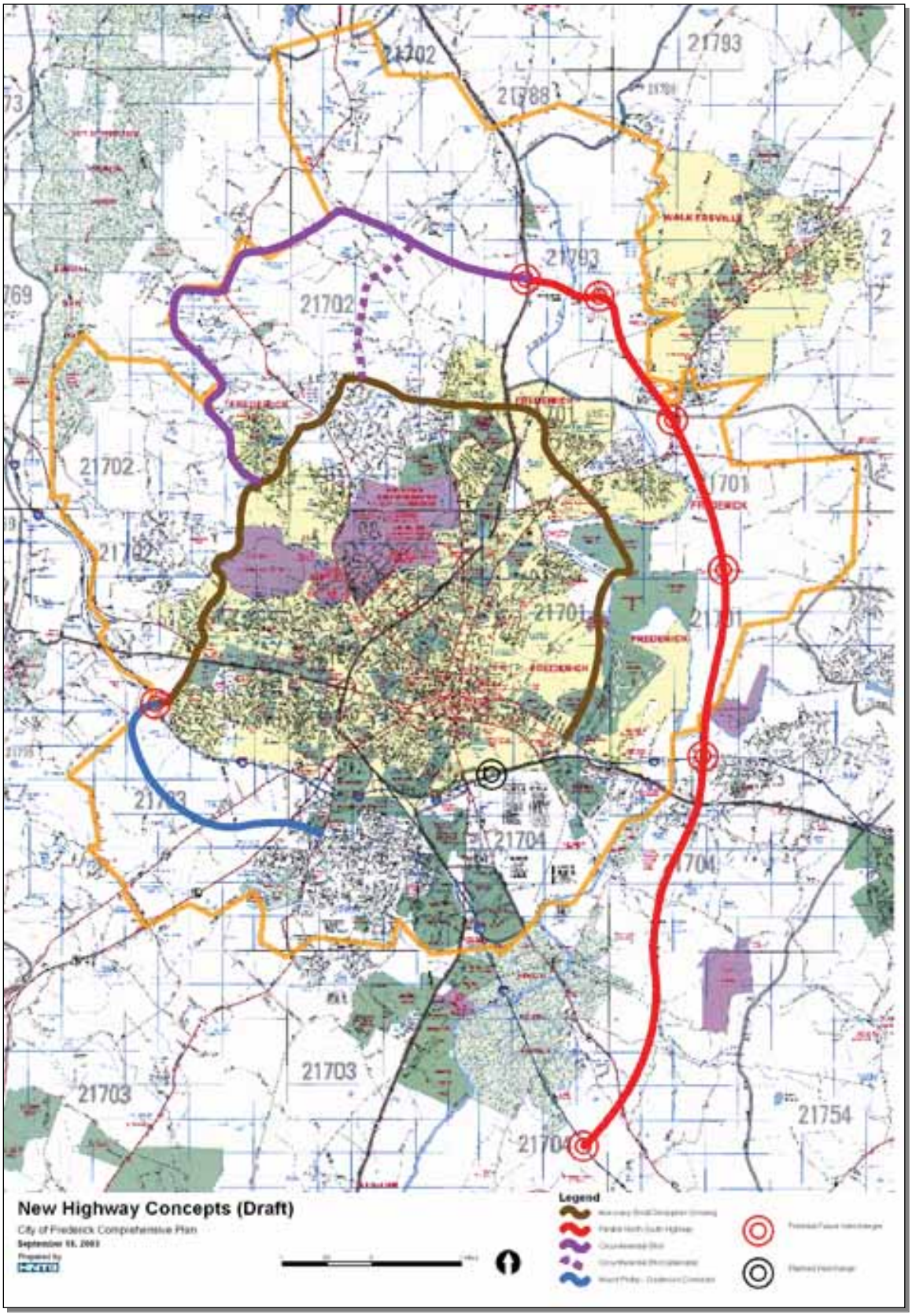
Map 1: Enhancements to the Planned Network



Analysis

Our evaluation of the City road network output focused first on Volume to Capacity Ratio (V/C). This number is attained by knowing the size and capacity of a given road segment, and knowing the average volume on that segment at a given time. In our case, The V/C ratio reflects the traffic condition of average peak period, which is assumed to account for 10 percent of total daily traffic.

To gain an understanding of the performance of our road system today and in the future, the V/C ratio provides a very clear and understandable measure to compare the scenarios. Consider the numbers as a percent of congestion on the roadway. If the V/C = .60, 40 percent of the roadway is not congested. If the V/C = 1.0, 100 percent of the roadway is congested. For instance:

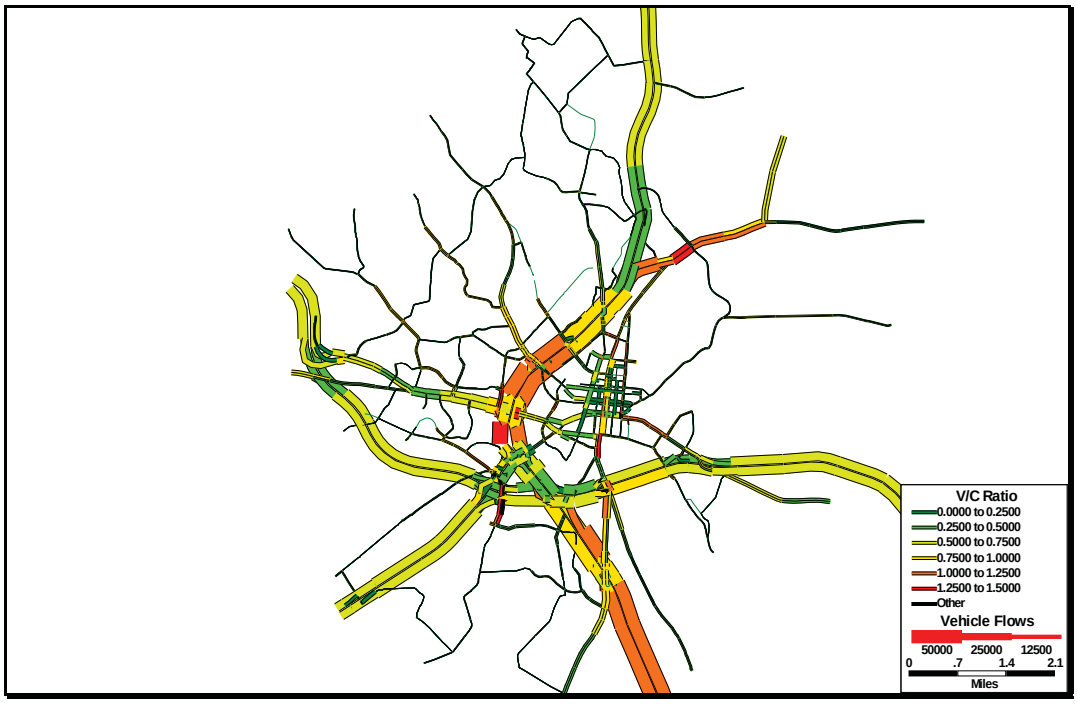
Table 2.		
Traffic Flow		**V/C Ratio**
Free Flow	=	.60
Stable Flow	=	.70
Less Stable Flow	=	.80
Approaching Unstable Flow	=	.90
Unstable Flow	=	1.00

In our TransCAD Model, the V/C is depicted graphically by color, simply put – red is bad (unstable – congested) and green is good (free flow – no congestion). These colors are used in Maps 2-5.

Existing Conditions

As with any study, an understanding of the current conditions is necessary. Using a variety of inputs already described, our 2000 (or current) traffic patterns as expressed by V/C ratios are shown on Map 2:

Map 2. V/C Ratios, 2000 Population and Employment and Existing Network



Note the areas of greatest congestion are found in five major segments in the City network. It is important to note that three of the five segments are freeways that carry significant amounts of through traffic that is the result of Frederick's central location and a fourth is at an interchange with a freeway (I-70). The segments are listed in Table 3.

Table 3. Current Congested Roadways

Lane Segment	Volume / Capacity Ratio	Congestion Level
SB US15 south of US40	1.25-1.50	Unstable Flow
MD26 (both directions) west of Monocacy Blvd	1.25-1.50	Unstable Flow
Route 355(both directions) @ I-70	1.25-1.50	Unstable Flow
US15 (both directions) between US40 & Rosemont	1.0-1.25	Unstable Flow
I-270 (both directions) south of MD85	1.0-1.25	Unstable Flow

Now that we briefly understand the current conditions of the City's road network, and where the areas of congestion are today, let us look at the results of the future scenario preliminary tests performed by Gallup Corporation using TransCAD.

Scenario Evaluation

We evaluated Scenario 1 "Upgrading in Place" with the base Planned Network. The model results show a situation that goes from bad for freeways today to gridlock on those freeways as well as the interstate interchange gateways of the City. As seen in the graphic below, TransCAD found that US15 has a V/C of 1.25-1.50 for the entire stretch

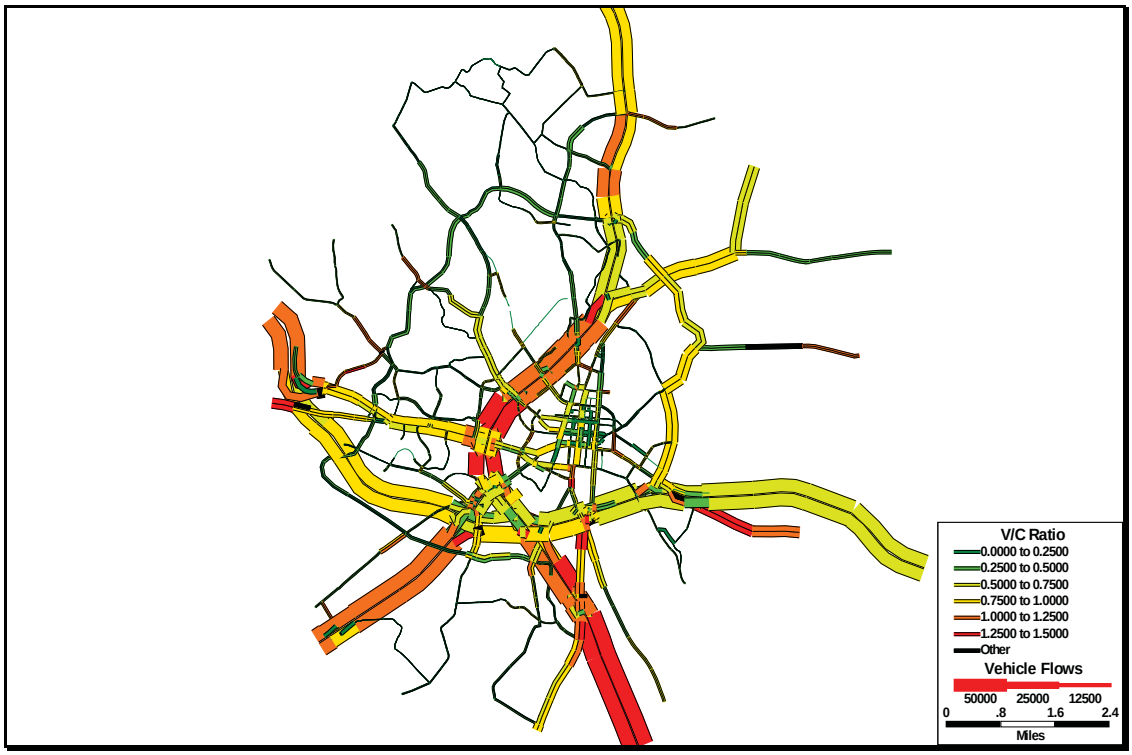
from MD26 to MD340 / Jefferson. Gateways into the City from nearly all directions are found to be (at a minimum) "approaching unstable flow." These are:

- I-70 Eastbound
- US15 / MD340 Northbound
- East Patrick Street
- US15 Southbound

Another point to note is that the addition of the Monocacy Blvd. link (central section) does not assist US15 at all. In fact, it comes on-line performing at an "approaching unstable flow' (V/C .75-1.0) level. There are other considerations for assisting both US15 and Monocacy Blvd. that are addressed in the Enhanced Network explained on the next page in the discussion of Scenario 2.

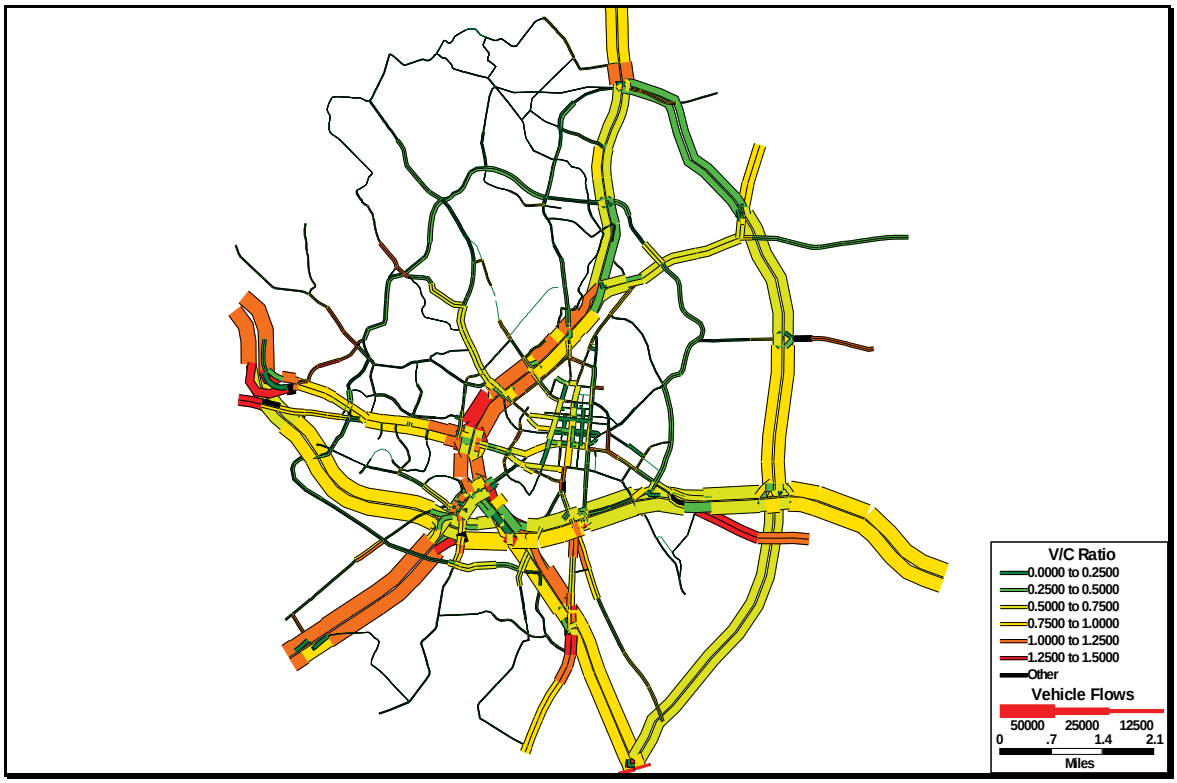
Below, Map 3 provides the graphical TransCAD output for Scenario 1, "Upgrading in Place" with the base Planned Network.

Map 3. V/C Ratios, Scenario 1 with Base Planned Network



Continuing with Scenario 1, we next evaluated Scenario 1 with the Enhanced Network intended to relieve congestion on US15, provide better circulation by the establishment of a parallel north-south road to US15 as well as the other improvements listed previously. The relief to US15 is noticeable, yet there remain unacceptable levels of congestion (V/C ratio at or above 1.0 in almost the entire City-segment of US15). Where the impact is most notable from a relief standpoint is on Monocacy Blvd., and on the gateways into the City on I-270, SB US15 north of Biggs Ford Road, and on MD26 at US15. Below, Map 4 is a graphical representation of the network.

Map 4. V/C Ratios, Scenario 1 with Enhanced Network



In addition to the graphical output, the following tables provide additional modeling results. Table 4 shows the daily trips for existing conditions and compares that to Scenario 1 and Scenario 2. Scenario 2 generates approximately 10 percent more daily trips than Scenario 1.

Table 4: Daily Vehicle Trips by Scenario

Alternative	Daily Vehicle Trips
Existing Conditions (yr 2000)	442,301
Scenario 1, Planned Network	817,231
Scenario 1, Enhanced Network	817,914
Scenario 2, Enhanced Network	902,167

Next we evaluated Scenario 2 “Expanding Horizons”, using the Enhanced Network. As a reminder the expected population and employment growth in Scenario 2 is substantially higher than Scenario 1 and nearly double the population and employment in the City than we have today. One might expect that traffic congestion would worsen considerably from Scenario 1. Yet the difference between the two is relatively small. The parallel road makes its biggest impact on US15, US40, MD355, and portions of Monocacy Blvd. It is important to note that most local roads through Frederick remain at acceptable levels. Map 5 shows the V/C ratios for Scenario 2, enhanced Network.

Map 5. V/C Ratios, Scenario 2 with Enhanced Network

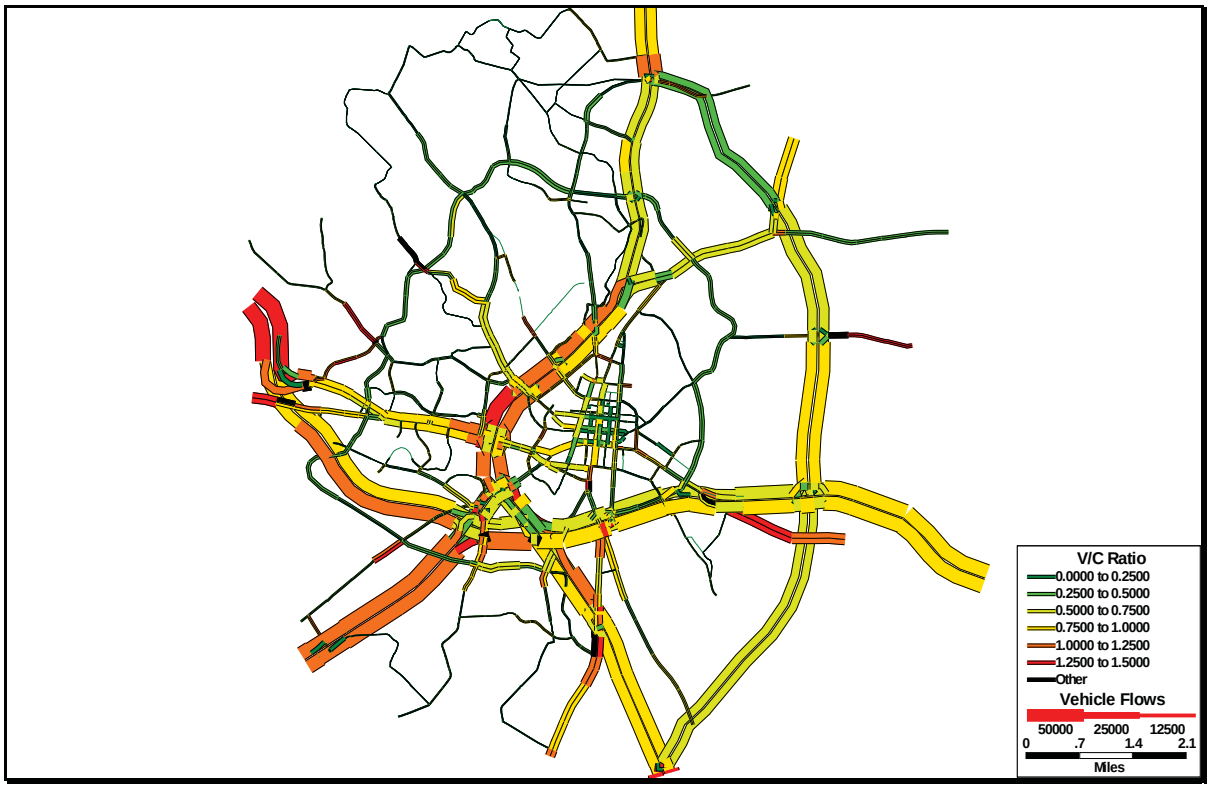


Table 5 shows the percent of congested non-freeway lane miles for Scenario 1 (with the Planned Network) and Scenario 2 (with the Enhanced Network) are very similar (7.8 percent vs. 7.5 percent), but the percentage of congested freeway lane miles are quite different -- 30.5 percent congested for Scenario 1 with the Planned Network as compared to 16.2 percent congested for Scenario 2.

Table 5. Lane Miles by Scenario

Scenario	Lane-miles		Non-Freeway Lane Miles Only		Freeway Lane Miles Only	
	Total	% Congested	Total	% Congested	Total	% Congested
Existing Conditions (yr 2000)	464.6	5.3	359.6	3.9	105.0	10.2
Scenario 1, Planned Network	603.6	12.2	488.1	7.8	115.5	30.6
Scenario 1, Enhanced Network	685.7	8.0	507.7	6.6	178.0	12.0
Scenario 2, Enhanced Network	685.7	9.7	507.7	7.5	178.0	16.2

Table 6 shows the total miles of travel and highlights the proportion of those miles that are congested. The proportion of congested non-freeway miles for both scenarios is similar at between 18 and 20 percent. However, a substantial improvement for congested freeway miles is seen with the Enhanced Network, and either Scenario.

Table 6. Vehicle Miles of Travel by Scenario

Scenario	Vehicle Miles		Non-Freeway Vehicle Miles		Freeway Vehicle Miles	
	Total	% Congested	Total	% Congested	Total	% Congested
Existing Conditions (yr 2000)	2,586,775	15.2	1,232,048	12.6	1,354,727	17.5
Scenario 1, Planned Network	4,412,823	30.0	2,442,633	19.3	1,970,190	43.2
Scenario 1, Enhanced Network	4,444,022	20.0	2,187,111	18.8	2,256,911	21.2
Scenario 2, Enhanced Network	4,762,747	23.7	2,387,862	19.9	2,374,885	27.5

Table 7 shows the total and congested hours of travel. Scenario 2 is projected to have a reduction of total congested hours of travel versus Scenario 1 with the Planned Network and slightly more than Scenario 1 with the Enhanced Network. However, the real story is the reduction in congested freeway hours evident with the Enhanced Network for both scenarios.

Table 7. Vehicle Hours of Travel by Scenario

Scenario	Vehicle Hours		Non-Freeway Vehicle Hours		Freeway Vehicle Hours	
	Total	% Congested	Total	% Congested	Total	% Congested
Existing Conditions (yr 2000)	60,504	8.4	35,496	10.8	25,008	5.1
Scenario 1, Planned Network	109,814	19.7	70,072	20.5	39,742	18.2
Scenario 1, Enhanced Network	103,235	13.0	61,696	18.1	41,539	5.5
Scenario 2, Enhanced Network	113,390	16.0	69,119	21.0	44,271	8.4

Table 8 presents the average speed, average trip time and annual delay per capita for the scenarios. It is clear from the results that the Enhanced Network results in lower hours of delay per capita than the other Planned Network. This is true for both scenarios.

Table 8. Average Speed, Trip Time and Hours of Delay

Scenario	Average Speed	Avg. Trip Time (Min.)	Annual Delay Per Capita (Hrs.)
Existing Conditions (yr 2000)	42.75	8.21	11.87
Scenario 1, Planned Network	40.18	8.06	26.69
Scenario 1, Enhanced Network	43.05	7.57	13.96
Scenario 2, Enhanced Network	42.00	7.54	16.91

A number of origin – destination pairs were examined to see how travel time between points changed from today's conditions to those forecast for each scenario. Table 9 shows that the changes in travel time among the scenarios are marginal. This is worth noting since there are more trips on the roadway network in Scenario 2 than 1. Scenario 2 is better than Scenario 1 on the Planned Network (due to the North – South parallel highway), and travel times for Scenario 2 are marginally worse than Scenario 1 with the Enhanced Network (due to the increase of population and employment assumed in this alternative).

Table 9. Travel Times, by Specific Location

Origin-Destination (Description)	(A) Scenario 1, Planned Network	(B) Scenario 1, Enhanced Network	% Chg A->B	(C) Scenario 2, Enhanced Network	% Chg A->C
McCain/Key --- Baughman/US40	2.35	2.35	0.0%	2.35	0.0%
Butterfly/McCain --- Waverly/Key	2.20	2.19	-0.5%	2.20	0.0%
Sabastian/MD26 --- 7th Street Gate	7.26	6.90	-5.2%	7.03	-3.3%
Mill Pond/Monocacy --- Market/Patrick	6.60	6.18	-6.8%	6.25	-5.6%
Himes/Butterfly --- Grove/MD85	7.47	7.36	-1.5%	7.60	1.7%
Crestwood/Ballinger --- Market/Patrick	6.29	6.12	-2.8%	6.39	1.6%
Gas House/Linganore --- Moncacy/MD26	5.99	5.61	-6.8%	6.13	2.3%
7th/Market --- Thomas Johnson/Oppossumtown	4.37	4.34	-0.7%	4.36	-0.2%
Whittier/Christophers Xing --- MD26/Market	7.37	7.37	0.0%	7.40	0.4%
Butterfly/Mt. Phillip --- 351/Solerex	4.15	4.13	-0.5%	4.29	3.3%

TransCAD was used to project the significant change in daily traffic flow from one scenario to another in the following pairs:

- Current Conditions to Scenario 1 (Planned)
- Scenario 1 (Planned) to Scenario 1 (Enhanced)
- Scenario 1 (Planned) to Scenario 2 (Enhanced)
- Scenario 1 (Enhanced) to Scenario 2 (Enhanced)

TransCAD maps (Maps 6-9) highlight these significant changes in traffic flow. In addition to the maps, Table 10 lists the roadway segments that correspond to the red and green on Map 8 – the change from Scenario 1 with the Planned Network to Scenario 2 with the Enhanced Network, the main point of comparison. It is clear from Map 8 and Table 10 that there are major reductions in north-south and east-west trips on US 15, US40, MD355, Gashouse Pike and portions of Monocacy Blvd. even with the addition trips on the overall road network.

Table 10

Significant Change in Daily Traffic Flow
From Scenario 1, Base Network to Scenario 2, Enhanced Network

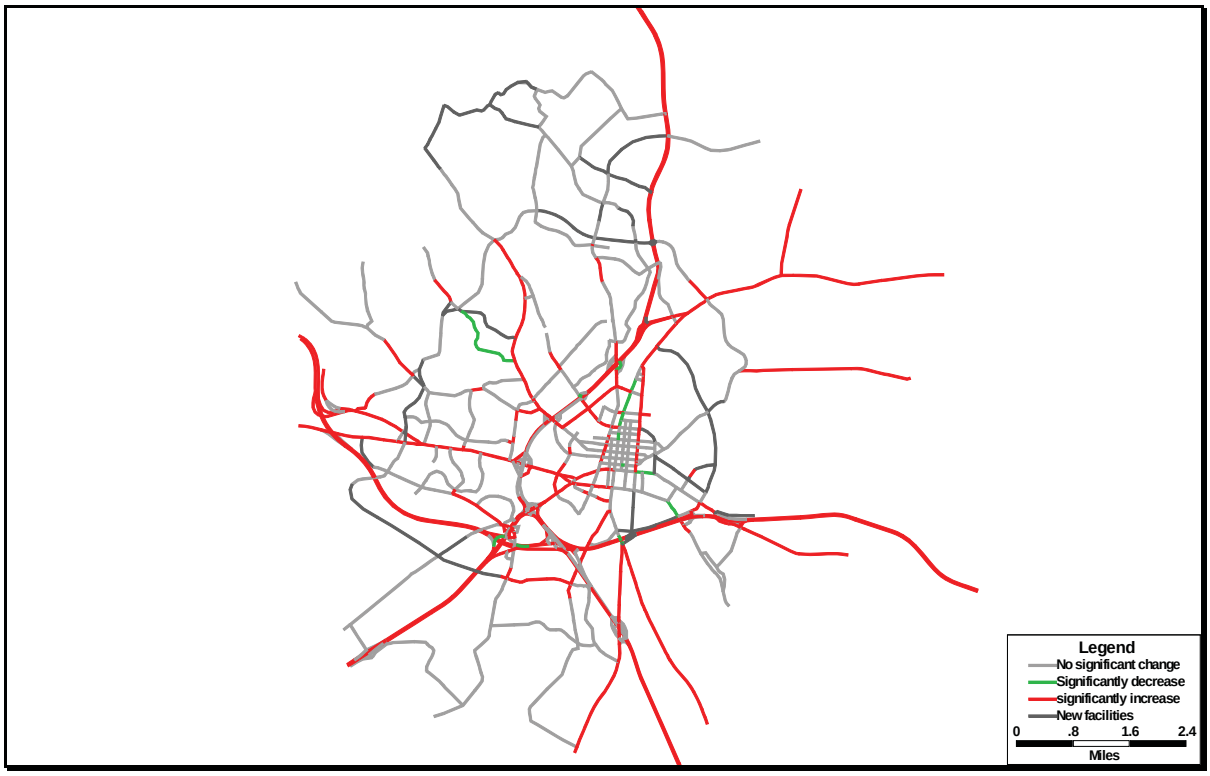
Segments with significant increase in traffic

- New Design Road-.20 Mi. N. of Crestwood Blvd.
- MD144 -.30 Mi E. of Franklin St.
- I-70 0.10 Mi. W. STRUC#10184(Linganore Road)
- I-270 0.20 Mi. S. of Baker Valley Rd.
- Christopher's Crossing E. of Opossumtown Place
- Christopher's Crossing W. of Yellow Spring Rd.
- Mt. Phillip Rd N. of Butterfly Lane
- Crestwood Blvd. E. of MD 351

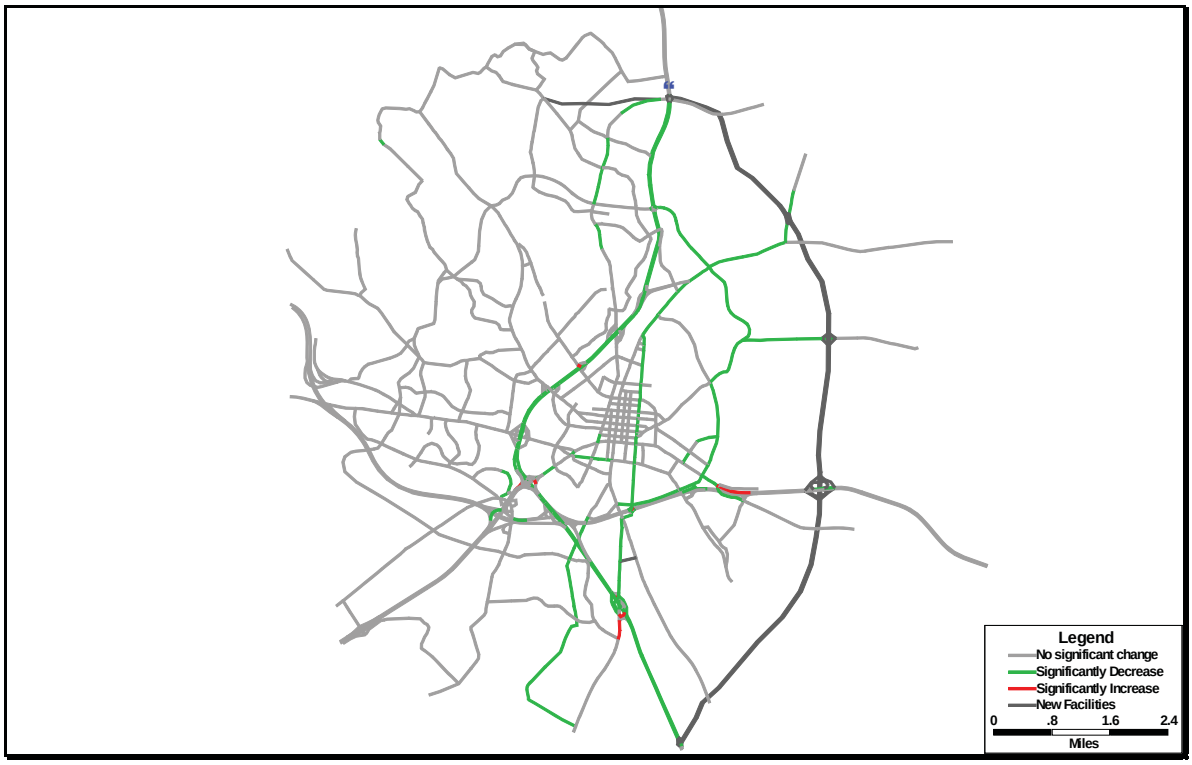
Segments with significant decrease in traffic

- Gas House Pike 0.1 Mi S. of Monocacy River
- US15-.40 Mi. N. of US40/MD144 (Patrick St)
- US15-.20 Mi. N. of Rosemont Ave.
- US15-.40 Mi. N. of W. 7th Street
- US40-.20 Mi. S. of US15/MD144
- US40-.40 Mi. N. of I70/270
- MD355 0.10 Mi. N. of East Street
- Monocacy Blvd. S. of Gas House Pike
- Monacacy Blvd. S. of MD 26
- Trading Lane E. of US15
- Adventist Dr. E. of MD 355

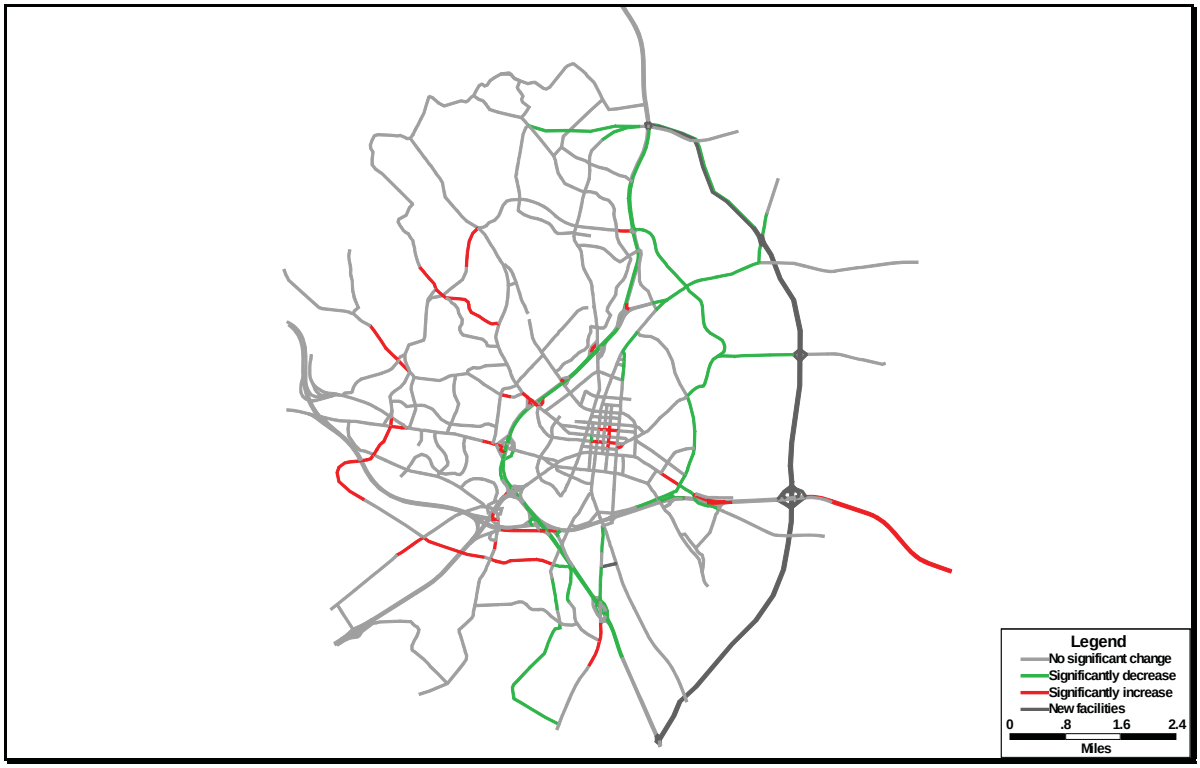
Map 6. Current Conditions to Scenario 1 (Planned Network)



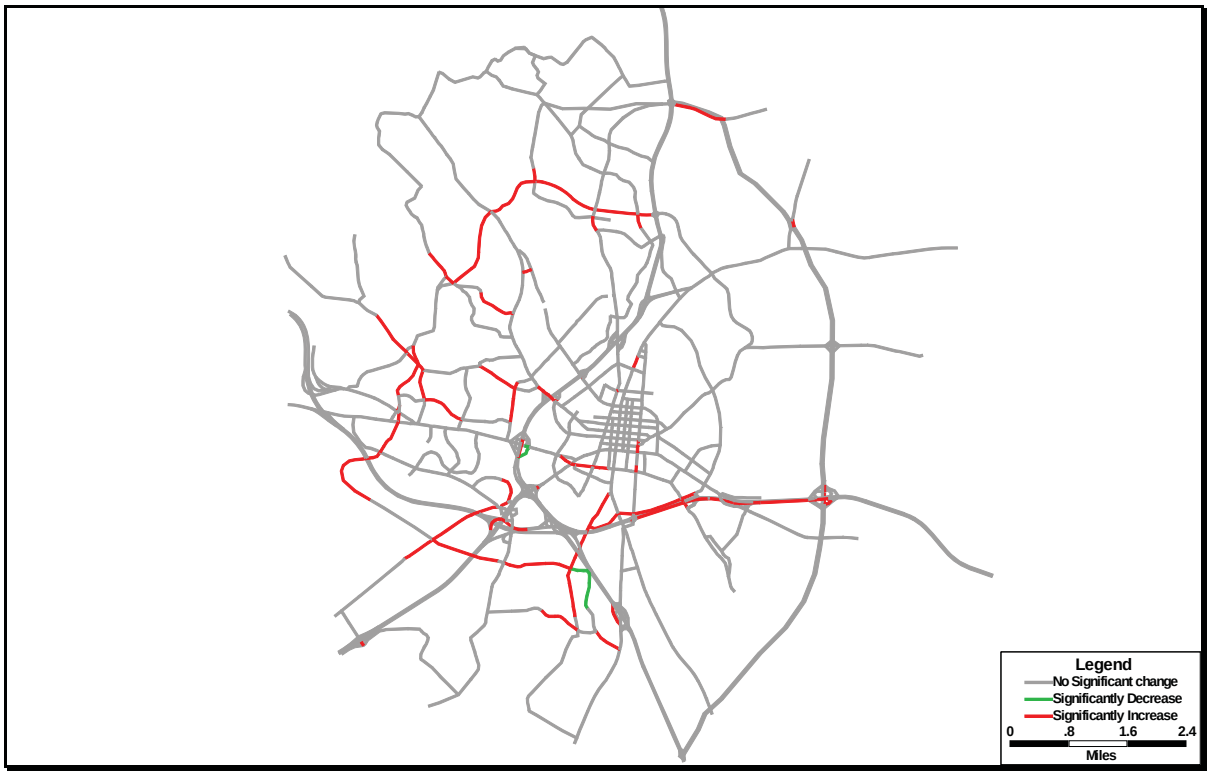
Map 7. Scenario 1 (Planned Network) to Scenario 1 (Enhanced Network)



Map 8. Scenario 1 (Planned) to Scenario 2 (Enhanced)



Map 9. Scenario 1 (Enhanced) to Scenario 2 (Enhanced)



CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX G-3
Fiscal Results

November, 2003

Prepared by:

Tischler & Associates, Inc.

Appendix G

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Appendix G

EXECUTIVE SUMMARY

Background & Methodology

Tischler & Associates, Inc. (TA), in conjunction with HNTB of Columbia, Maryland, is under contract with The City of Frederick to conduct a fiscal impact analysis of two alternative development scenarios and a preferred scenario as a part of updating the City's Comprehensive Plan. ***All costs and revenues that are directly attributable to the new development only are included in the analysis. Both operating and capital costs are taken into consideration. Water and Sewer costs are not included in this analysis because they are considered self-supporting enterprise funds.*** Water and Sewer costs are discussed at the end of this report. Costs and revenue factors and level of service assumptions for Frederick are based on the Fiscal Year 2004 (FY04) budget and on-site discussions and interviews with representatives from City departments. The revenue and cost projections are based on the assumption that current levels of tax rates, fees, and spending, as provided in the FY04 approved budget, will continue in the future. For capital costs, TA considered the City's current Capital Improvement Program, current capital levels of service, and capital financing policies.

Where detailed information was available, a marginal approach was used. The two most common methodologies utilized in fiscal impact analyses are the average cost method and case study marginal cost method. The average cost approach is simple and more popular. Costs and revenues are calculated on the average cost per unit of service (often per capita or per employee). This method assumes a linear relationship and does not consider current available public service and capital capacities or the unique characteristics of a community. The case study marginal cost method is the most realistic method for evaluating fiscal impacts by taking the unique demographic characteristics and available public service and capital facility capacities into consideration.

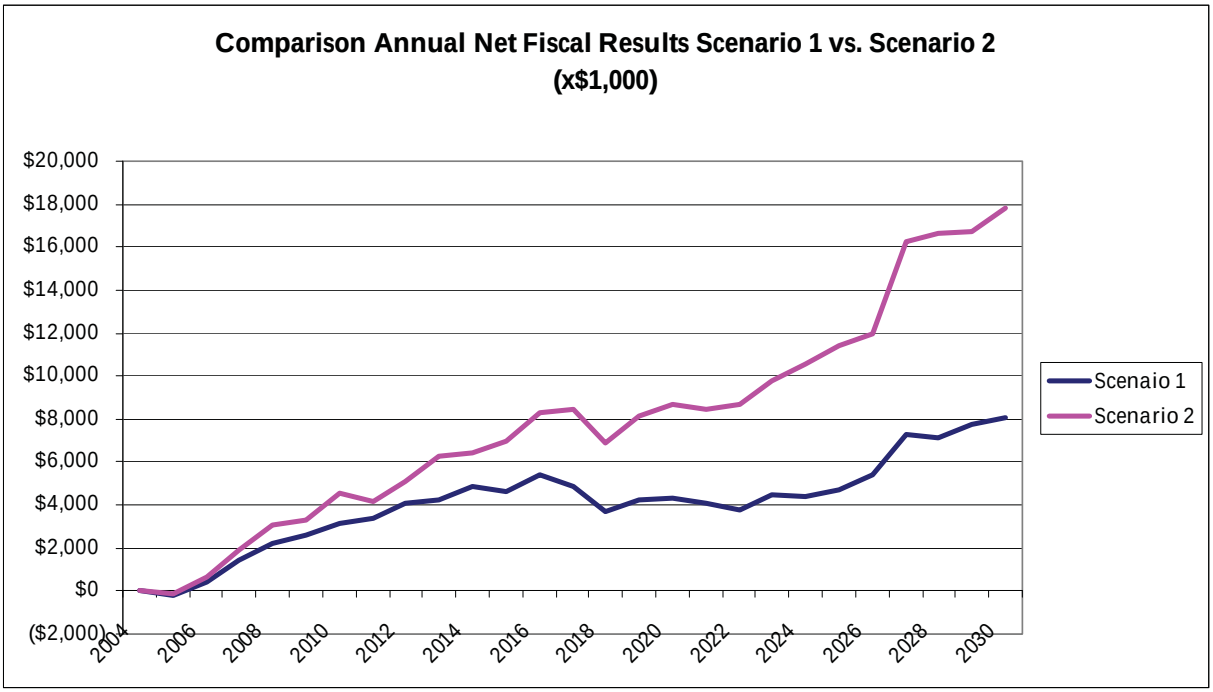
Some costs and revenues are not expected to be impacted by demographic changes, and may be fixed in the analysis. Some examples of fixed factors include the number of elected officials, the number of department heads, revenues affected by factors beyond the City's control (interest rates, the fiscal health of the State).

Fiscal Impact Results

The chart below shows the total annual net results to the City for each of the two scenarios over the 26-year planning period. By showing the results annually, the magnitude, rate of change, and timeline of fiscal results can be observed over time. The "bumpy" nature of the annual results during particular years represent the addition of capital facilities or major operating expenses.

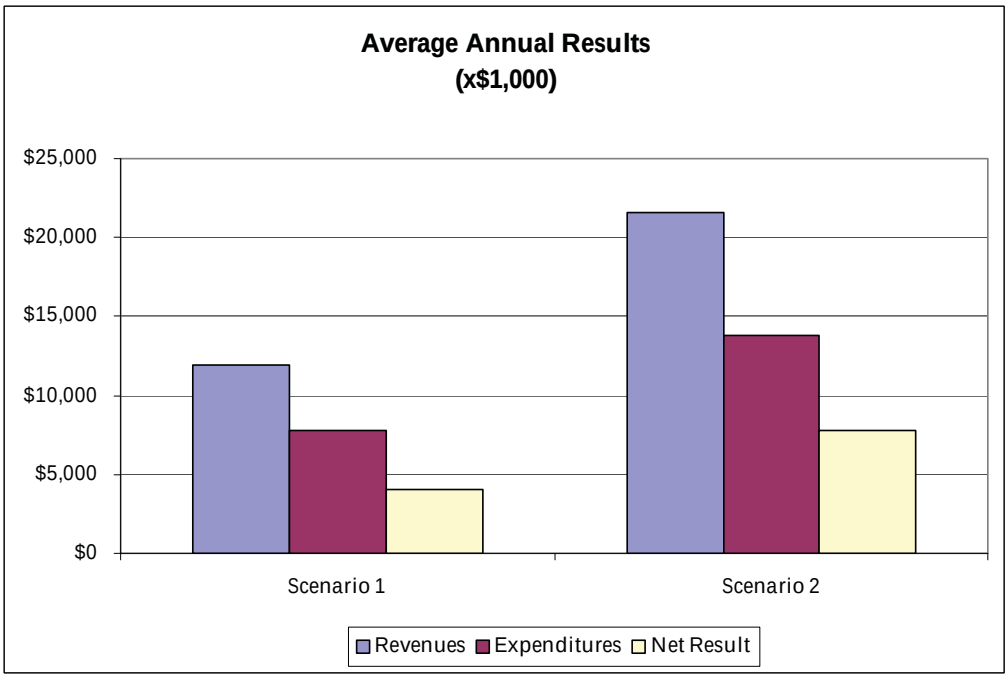
Appendix G

Figure 1: Annual Net Results



Both scenarios produce small deficits in the first year of the analysis (-$174,000 for Scenario 1, and -$147,000 for Scenario 2), but then produce positive net results to the City over the next 25 years. By 2030, Scenario 2 produces almost double the annual net results of Scenario 1. The chart below shows the average annual results of each scenario over the 26 years planning period.

Figure 2: Average Annual Results by Scenario



Conclusions

Aside from the first year, positive annual results occur 25 out of the 26 years of the planning period. The best annual results for each scenario occur in the period 2020-2030. Surpluses are brought about by several factors:

- High assessed values for residential and nonresidential development and subsequent property tax revenue.
- High assessed values for residential development also produce significant personal income tax revenues.
- This is especially true for Scenario 2 where FAZ 3C, 3D, and 3E have higher assessed values for residential units than the other FAZ in Scenario 1. The additional higher value units result in higher property tax and income tax revenues to the City under Scenario 2 per units and in total.
- Industrial development in FAZ 3E has higher assessed values than the other FAZ in the two scenarios due to projected growth in research & development and high technology businesses. These higher assessed values generate additional property tax revenues to the City under Scenario 2.
- Scenario 2 has a greater amount of residential and nonresidential development than Scenario 1 which also accounts for the higher results of Scenario 2.
- The City does not have operating and capital expenses associated with schools and fire/EMS services.
- The City will debt finance 95% of the capital costs for new growth.
- The City will pay an average of only 11% of future road projects with the State, County, and developers paying the majority of costs. Given the magnitude of these projects, changes to these funding assumptions could have an impact on the overall fiscal results of the scenarios.
- Because the City currently provides a full range of municipal services, there are some “savings” on operating and capital expenditures as a result of economies of scale.

MAJOR ASSUMPTIONS

- The revenue and cost projections are based on the assumption that the current level of spending, as provided in the City's FY04 Adopted Budget (with roads being the notable exception) will continue through the twenty-six year planning period.

- Enterprise operations such as the City's water and sewer utilities are not included in this analysis since it is assumed that these services continue to be self-funded; that is, revenues generated from fees are sufficient to cover related expenses. A separate analysis is being conducted to determine new growth's utility costs.

- The rate of inflation is assumed to be zero throughout the projection period, and cost and revenue projections are in constant 2004 dollars. This assumption is in accord with current budget data and avoids the difficulty of forecasting as well as interpreting results expressed in inflated dollars. In general, including inflation is very complicated and unpredictable. This is particularly the case given that some costs, such as salaries, increase at different rates than other operating and capital costs such as contractual and building construction costs. And these costs, in turn, almost always increase in variation to the appreciation of real estate. Using constant 2004 dollars avoids these problems.

- The impact of new growth on the City's finances is measured using a variety of demographic statistics and City characteristics. These are listed below:

  Population: 53,047
  Jobs: 43,158
  Population and Jobs: 96,205
  Total City Facility Square Footage: 119,000
  Recreation Square Footage: 39,000
  Park Acreage: 211
  City Vehicles: 313
  Road Miles: 240
  Full Time-Equivalent City Employees: 789
  Calls for Police Services (excluding road-related calls): 40,518

- For this analysis, costs and revenues that are directly attributable to new growth are included. Both *operating and capital* costs are taken into consideration. Where detailed information was available, a marginal approach was used. The two most common methodologies utilized in fiscal impact analyses are the average cost method and case study marginal cost method. The average cost approach is simple and more popular. Costs and revenues are calculated on the average cost per unit of service (often per capita or per employee). This method assumes a linear relationship and does not consider current available public service and capital capacities or the unique characteristics of a community. The case study marginal cost method is the most realistic method for evaluating fiscal impacts by taking the unique demographic characteristics and available public service and capital facility capacities into consideration.

- Real estate tax revenues for residential and nonresidential development are based on the following assessed value information provided by the City. Personal Income Tax revenues are also based on the residential values.

Figure 3: Estimated Assessed Values for Residential and Nonresidential Development by FAZ

FAZ =>	*1*	*2*	*3A*	*3B*	*3C*	*3D*	*3E*
Residential (per unit)							
Single Family	$220,000	$220,000	$196,000	$222,000	$235,000	$235,000	$220,000
Townhouse	$174,000	$174,000	$143,000	$188,000	$210,000	$210,000	$174,000
Multi-Family (condominium)	$110,000	$110,000	$135,000	$160,000	$160,000	$160,000	$110,000

FAZ =>	*1*	*2*	*3A*	*3B*	*3C*	*3D*	*3E*
Nonresidential (per square foot)							
Commercial	$96	$96	$96	$96	$96	$96	$96
Office	$73	$73	$73	$73	$73	$73	$73
Industrial / Flex	$52	$52	$52	$52	$52	$52	$78
Service	$155	$155	$155	$155	$155	$155	$155

- It should be noted that while a fiscal impact analysis is an important consideration in planning decisions, it is only one of several issues that should be considered. Environmental and social issues, for example, should also be considered when making planning and policy decisions. The above not withstanding, this analysis will enable interested parties to understand the fiscal implications of future development.

Fiscal Impact Results

Annual results are discussed first and show the impacts from one year to the next. Average annual results are discussed next and provide an easy way to compare scenarios and summarize the general impacts over time.

Annual Results

The charts below shows the total annual net results to the City for each of the two scenarios over the planning period. Both General Fund and Capital Improvement revenues and costs are included in these calculations. By showing the results annually, the magnitude, rate of change, and timeline of fiscal results can be observed over time. The "bumpy" nature of the annual results during particular years represents the opening of capital facilities and/or major operating costs being incurred.

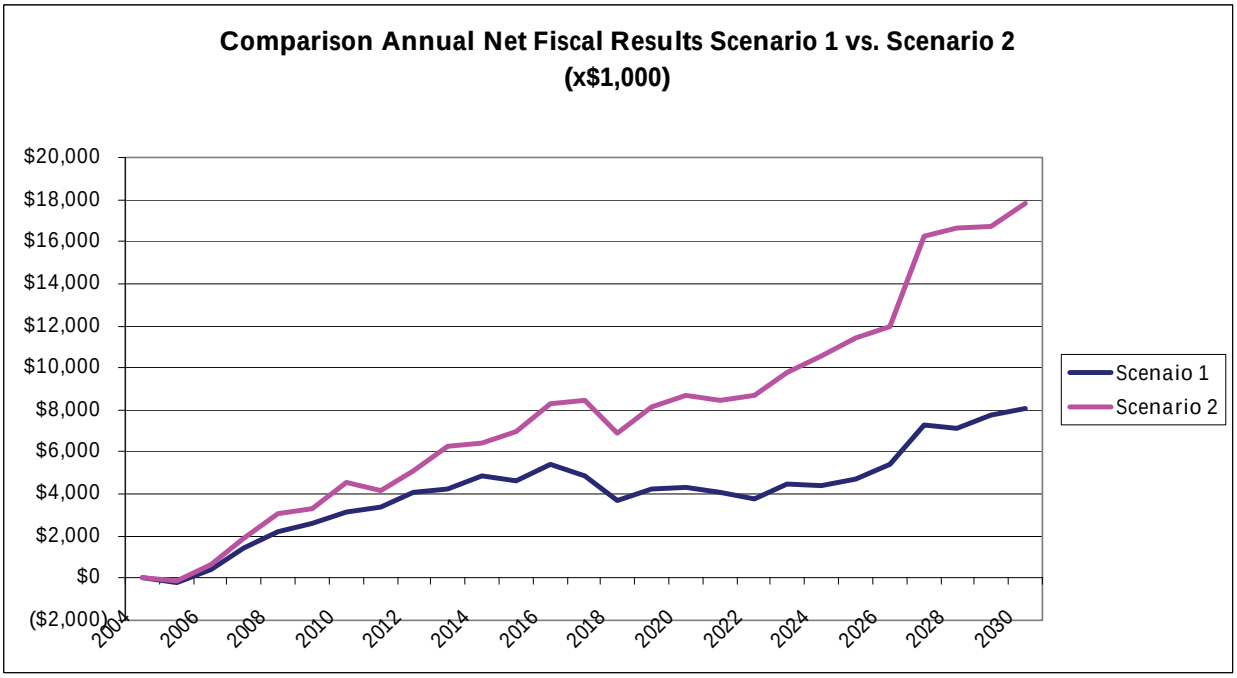
It is important to note that TA assumed all capital improvements to be 95% debt financed over 20 years at 5% interest (per City debt management policies) with the remaining 5% directly funded (Pay-Go). It is also assumed that the vast majority of road capital costs (89%) will be funded by other entities (State, County, developers) with the City paying an the remaining 11%.

Each year's fiscal result is *not* carried forward into the next year. This enables a comparison from year-to-year of the net results without distorting the revenue or cost side of the equation. In reality, surpluses would be carried forward and deficits would be funded through other means such as debt financing for capital improvements where there is a shortfall.

Capital improvement revenues and expenditures are shown starting in the first projection year. It is assumed that capital revenues and expenditures are in balance for the base year. Existing debt is not included in this analysis since the City is obligated to repay it regardless of new growth.

Data points above the $0 line represent annual surpluses; points below the $0 line represent annual deficits.

Figure 4: Annual Results

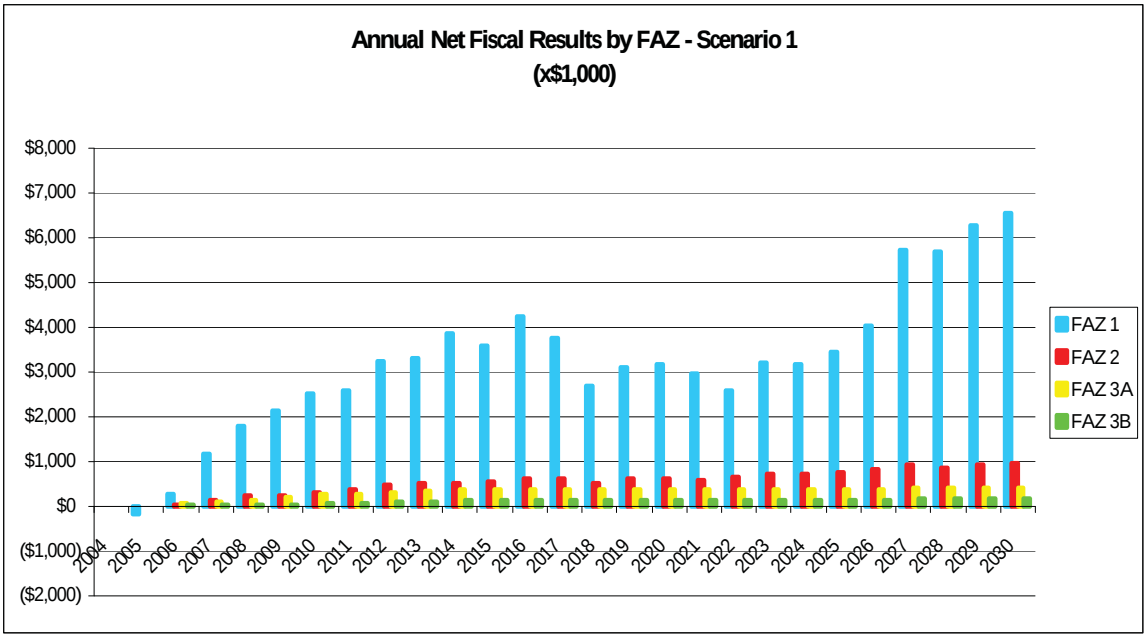


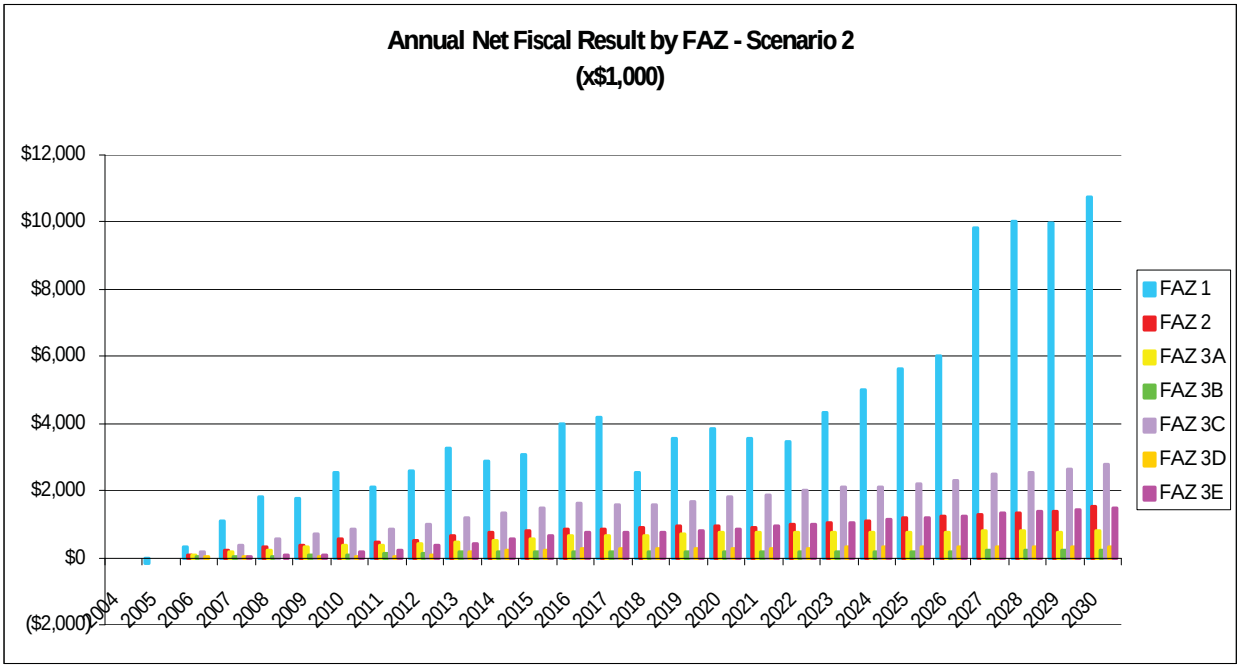
Both scenarios produce small deficits in the first year of the analysis (-$174,000 for Scenario 1, and -$147,000 for Scenario 2), but then produce positive net results to the City over the next 25 years. By 2030, Scenario 2 produces almost double the annual net results of Scenario 1. The annual results by FAZ are discussed in the next section.

Annual Results by FAZ

The charts below illustrate the annual results for each scenario by FAZ.

Figure 5: Annual Results by FAZ



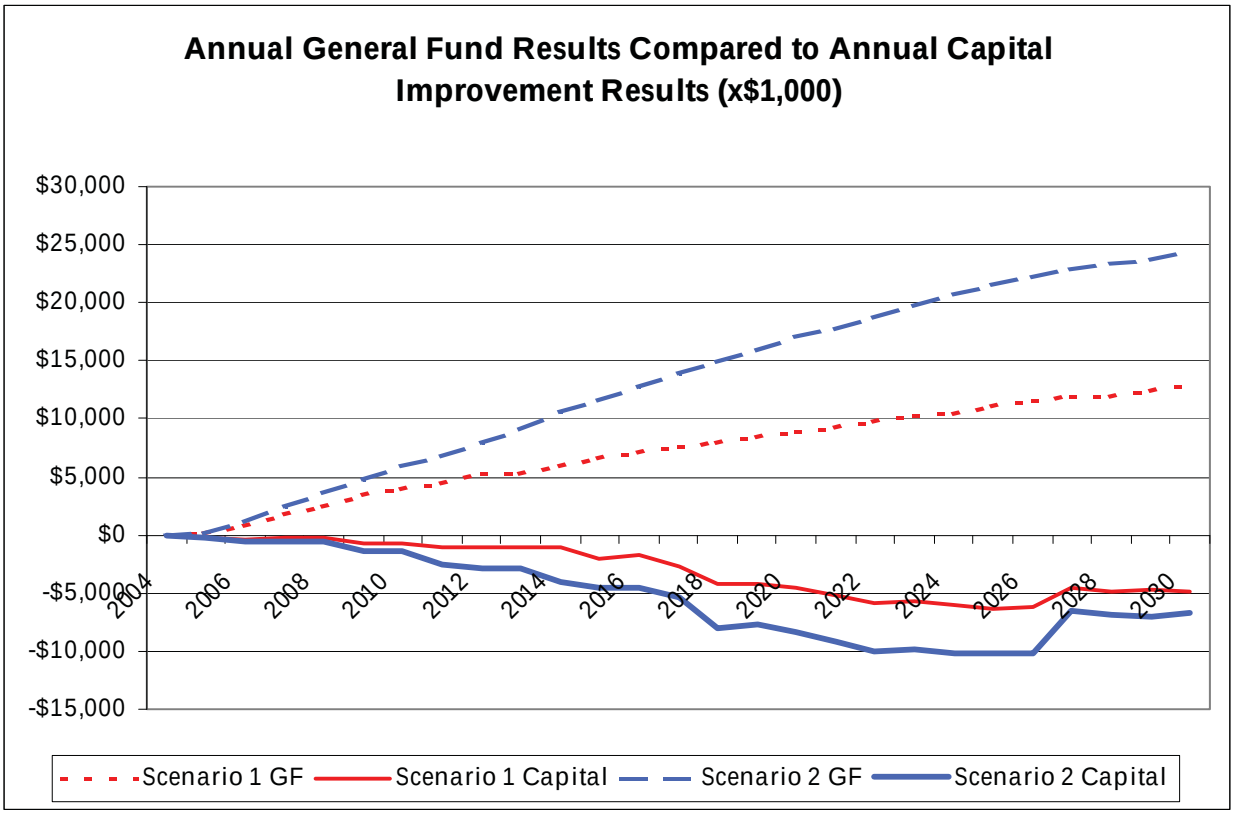


FAZ 1 generates a small deficit in FY05 under both scenarios, but then all FAZ in both scenarios produce positive fiscal results through 2030. FAZ 1 produces the greatest annual results in both scenarios because it contains the greatest amount of development. In Scenario 1, FAZ 2 produces the next highest results, followed by FAZ 3A and 3B. For Scenario 2, FAZ 3C produces the second highest results followed in order by FAZ 2, 3E, 3A 3D, and 3B.

General Fund and Capital Improvement Annual Results

To further illustrate the results of the fiscal impact analysis, the below chart shows net results separately for General Fund and Capital Improvements for both scenarios. General Fund net results represent General Fund revenues minus General Fund expenditures. Capital net results represent revenue from dedicated capital revenues (Park impact fees are the only dedicated revenue source for capital improvements) minus debt service and Pay-Go expenditures for capital costs.

Figure 6: General Fund and Capital Improvement Annual Results by Scenario

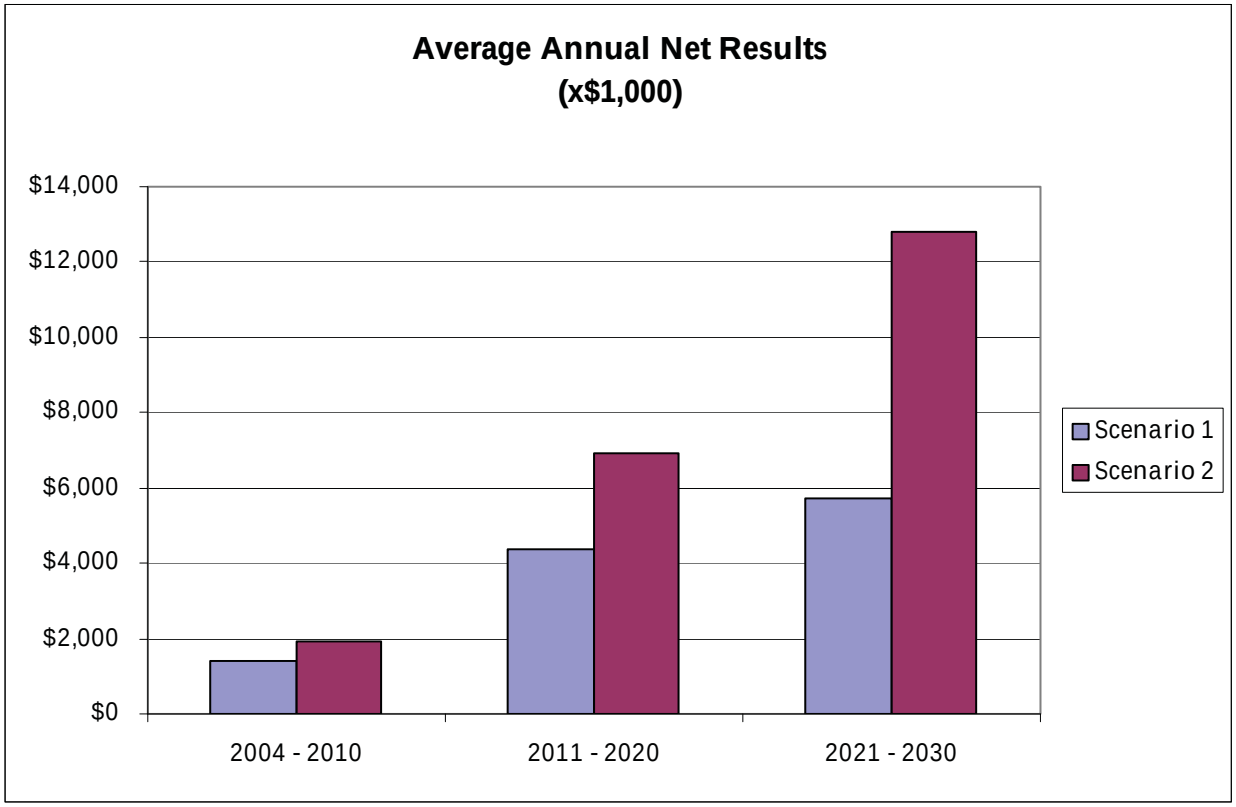


The Capital Improvement annual results are negative for both scenarios because there is only one source of revenue dedicated for capital improvements (the Parks Impact Fee). Fortunately the General Fund results produce sufficient net revenues to both cover the Capital Improvement deficits and also produce overall positive fiscal results for both scenarios.

Average Annual Results

The chart and table below summarizes the average annual net fiscal results (General Fund and Capital Improvement) for three time periods—(1) 2004 – 2010; (2) 2011- 2020; and (3) 2021 - 2030.

Figure 7: Average Annual Results



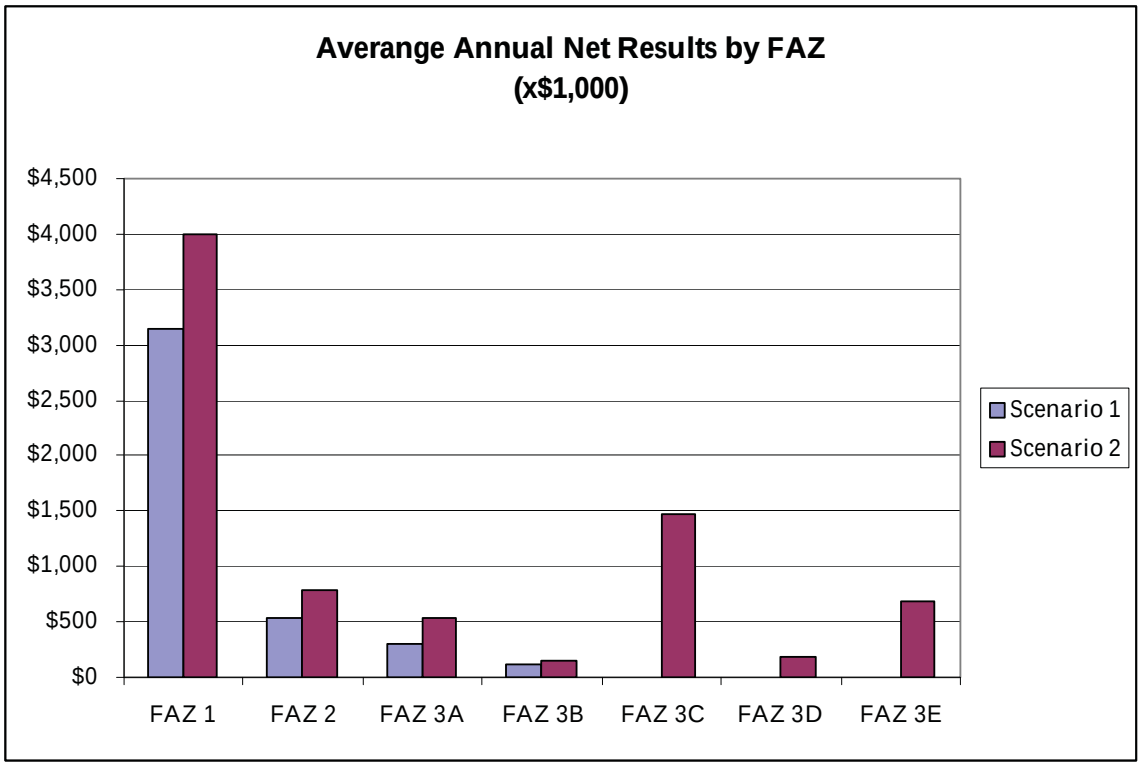
The highest average annual results for both scenarios occur in the years 2021-2030 as development reaches completion and maximum revenues are produced. This is especially the case with Scenario 2 as it average annual results for the years 2021-2030 are almost double its average annual results for the previous 10 year period.

The chart below shows the average annual results by FAZ.

Average Annual Results (x$1,000)
City of Frederick, Maryland

	2004 -2010			2011 - 2020			2021 -2030		
	Revenues	Expenditures	Net Result	Revenues	Expenditures	Net Result	Revenues	Expenditures	Net Result
Scenario 1	$3,145	$1,766	$1,379	$11,345	$6,967	$4,378	$18,576	$12,871	$5,704
Scenario 2	$4,844	$2,928	$1,916	$20,172	$13,240	$6,932	$34,813	$21,988	$12,825

Figure 8: Average Annual Results by FAZ



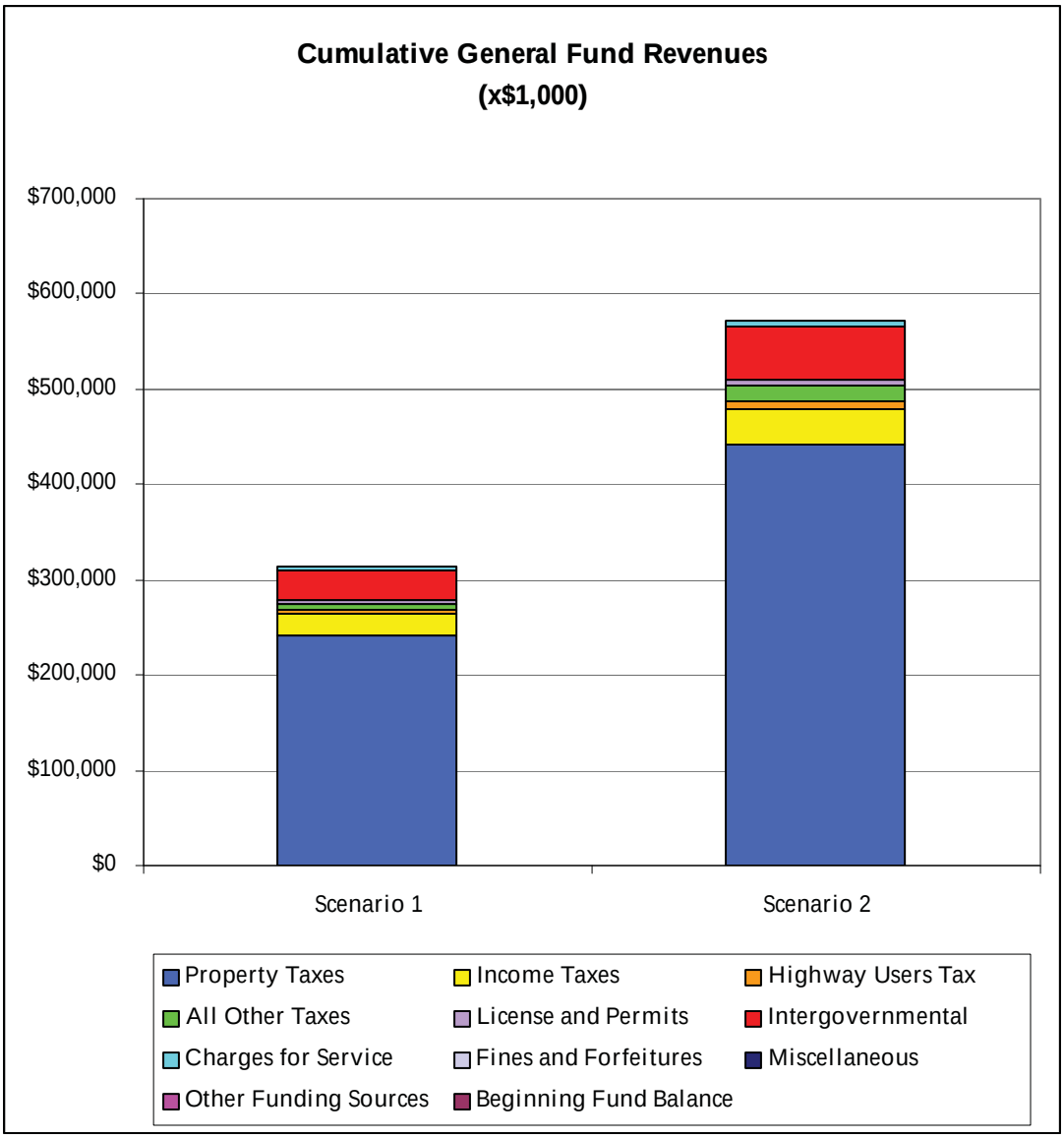
All FAZ in both scenarios produce positive average annual results, with FAZ 1 producing the highest average results for both scenarios.

Cumulative Results

1. Revenues

The table below shows the cumulative General Fund revenues generated by each scenario over the 26 year planning period.

Figure 9: Cumulative General Fund Revenue by Source



Property tax revenues account for the largest source of revenue under both scenarios. In the current FY04 budget, property taxes are also the largest revenue source and account for 44% of General Fund revenues. This analysis highlights the importance of property taxes as a growth-related revenue and the importance of the assessed values of future development.

Personal Income Tax revenues account for 7.2% of General Fund revenues in Scenario 1 and 6.7% in Scenario 2. The lower percentage in Scenario 2 is the result of a few of the FAZ having a greater focus on nonresidential development than residential development. These FAZ also account for the reason that Scenario 2 "All Other Taxes" is a higher percentage of General Fund revenues than Scenario 1 as the majority of the "All Other Taxes" are business personal property taxes.

The Intergovernmental category account for the second largest source of revenues in this analysis. The largest revenue source in this category is the Tax Differential paid by the County to the City. Other significant revenues include Community Action Agency Grants and Grant for Public Safety.

Fines and Forfeitures, Miscellaneous, Other Funding Sources, and Beginning Fund Balance are considered fixed relative to new growth. These revenues are considered fixed because they are dependent on factors external to the City (such as interest rates and investment income), or one-time in nature (Beginning Fund Balance, Sale of General Fund Assets), or are minor revenues.

Revenues from Park Impact Fees are the only revenue source for Capital Improvements. These fees are imposed on residential development only. This analysis assumes that 75% of new residential development will have a HOA pool (and pay the $586 per unit fee) with the remaining 25% paying the $868 per unit fee for units without a HOA pool.

Figure 10: Cumulative Capital Improvement Revenue by Source

Cumulative Capital Revenue (x$1,000)
City of Frederick, Maryland

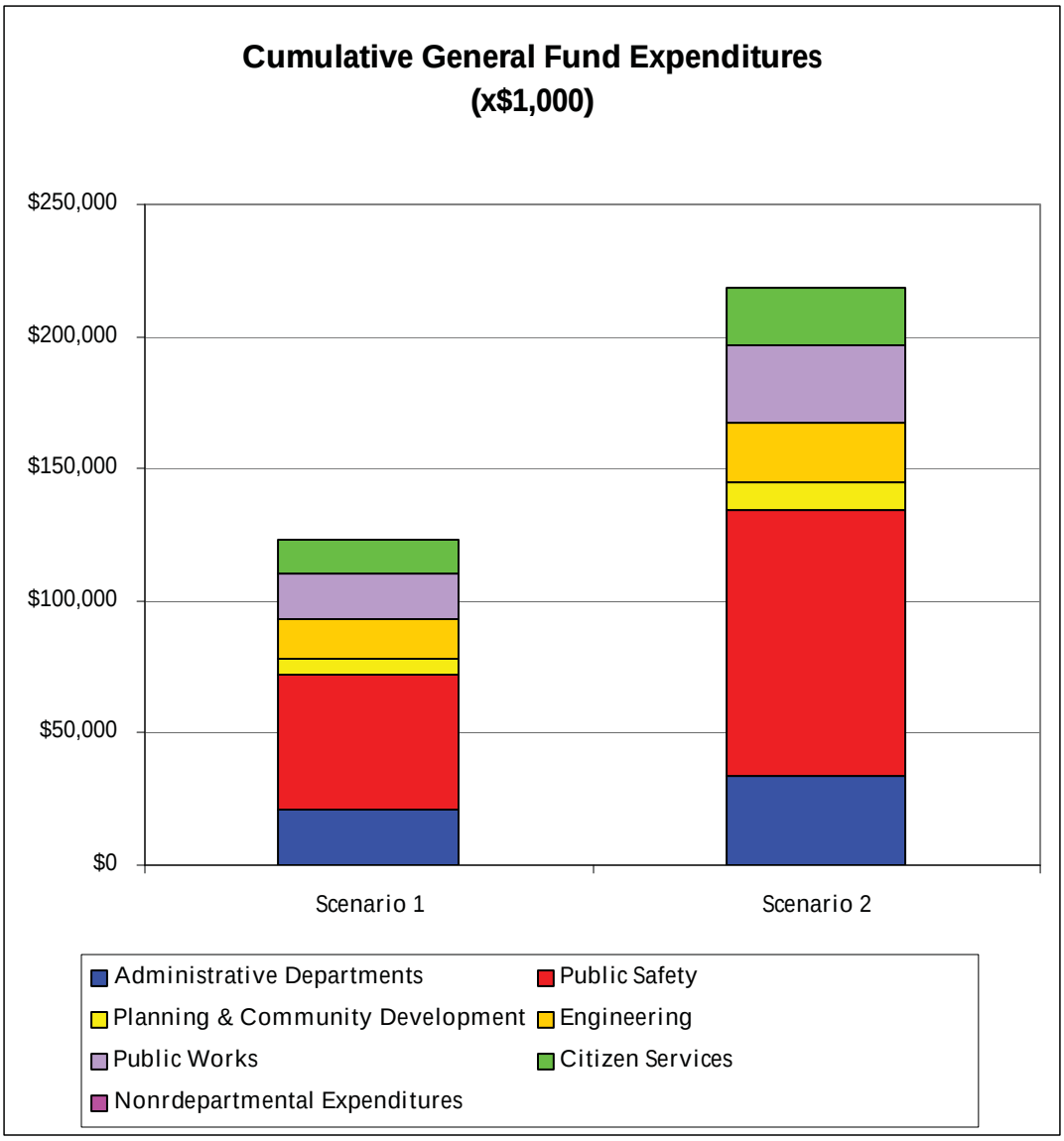
Category	Scenario 1 Revenue	%	Scenario 2 Revenue	%
Park Impact Fee Revenue	$6,928	100.0%	$11,922	100.0%
TOTAL	**$6,928**	**100.0%**	**$11,922**	**100.0%**

The park impact fees are the only dedicated revenues for new growth's share of Capital Improvements. The rest of the funding for Capital Improvements come from the General Fund either in the form of debt service payments or Pay-Go cash payments.

2. Expenditures

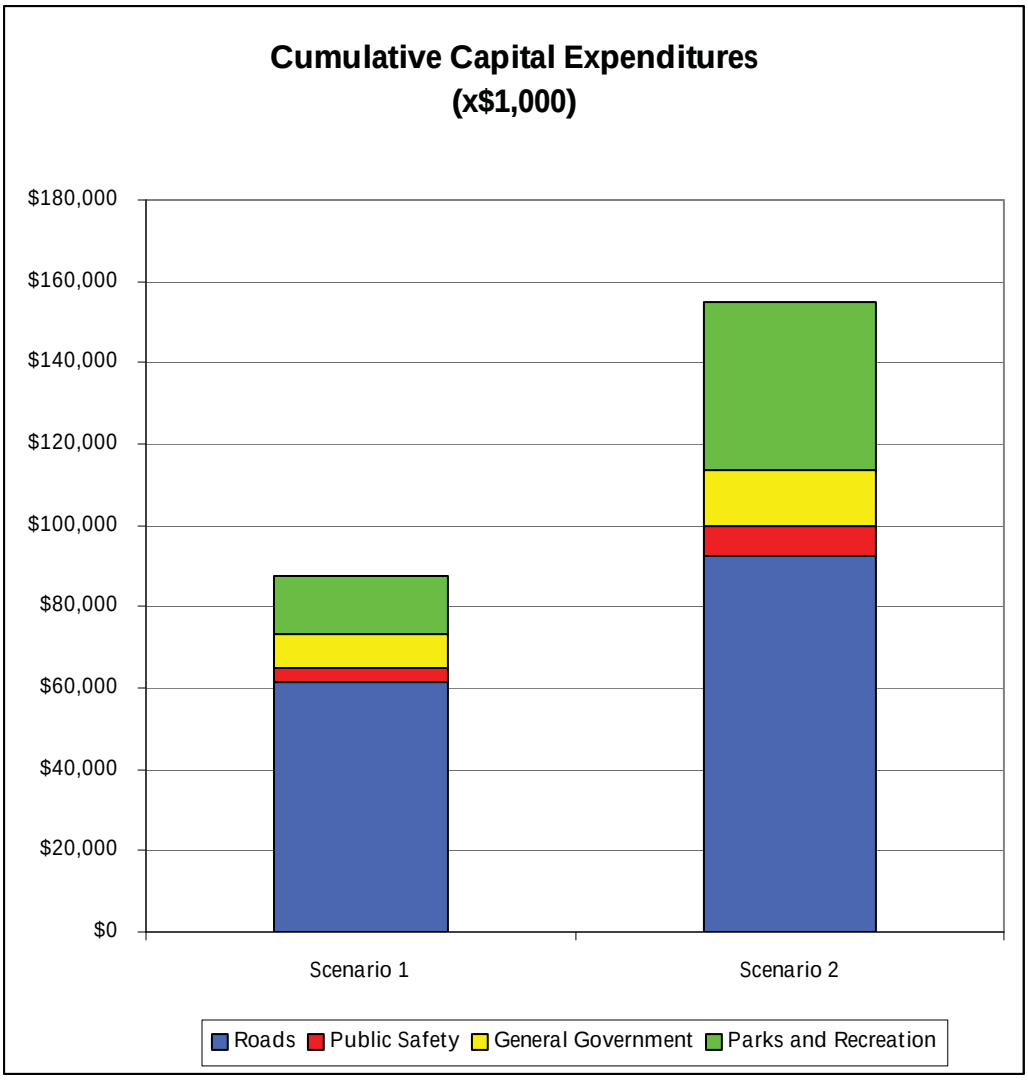
The table below shows the cumulative General Fund revenues generated by each scenario over the 26 year planning period.

Figure 11: Cumulative General Fund Expenditures by Source



Public Safety accounts for the largest source of General Fund expenditures in both scenarios. Administrative Departments are the second largest category of expenses as a result of growth in other City departments as well as growth in the City. The next largest category of General Fund expenditures is Public Works, followed in order by Engineering, Citizen Services, and Planning and Community Development. Nondepartmental expenditures are considered fixed relative to new growth. These expenditures are considered fixed because they are not dependent on new growth (such as existing debt service which the City is obligated to pay regardless of growth), or not expected to recur (Contingency Funds), or are minor expenses.

Figure 12: Cumulative Capital Expenditures by Source



These expenditures reflect debt/Pay-Go financing of 95%/5% under both scenarios. Roads account for the largest category of Capital Improvements followed by Parks and Recreation, General Government, and Public Safety respectively.

The road costs reflect the City's share of the capital costs. It is assumed that the City will fund an average of 11% of road projects with the remaining 89% being funded by the State, County, and developers. Given the magnitude of these projects, changes to these funding assumptions could have an impact on the overall fiscal results of the scenarios.

The debt financing does not take the City's current debt service or planned debt issues. Nor does it consider the City's debt management thresholds as this sort of analysis would have to consider both new growth as well as the City's existing development.

Appendix G

Utility Costs

The table below lists the cumulative utility costs of new growth by FAZ provided by HNTB. These costs do not reflect any revenues.

Figure 13: Cumulative Utility Costs

Cumulative Utility Costs by FAZ (x$1,000)
City of Frederick, Maryland

	Scenario 1			Scenario 2		
FAZ	**Water**	**Sewer**	**TOTAL**	**Water**	**Sewer**	**TOTAL**
FAZ 1	$30,245	$32,906	$63,151	$42,679	$45,872	$88,551
FAZ 2	$3,676	$3,955	$7,631	$4,823	$5,225	$10,048
FAZ 3A	$945	$975	$1,920	$2,101	$2,145	$4,246
FAZ 3B	$317	$337	$654	$413	$453	$866
FAZ 3C	$0	$0	$0	$6,444	$6,771	$13,215
FAZ 3D	$0	$0	$0	$1,301	$1,437	$2,737
FAZ 3E	$0	$0	$0	$3,633	$3,988	$7,620
TOTAL	$35,183	$38,174	$73,356	$61,393	$65,891	$127,284

These costs are not included in the fiscal impact results because the City operates its water and sewer utilities as self-supporting enterprise funds financed with revenues from utility rates.

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX G-4

Water and Sewer Analysis

October, 2003

Appendix G

1.0 INTRODUCTION

1.1 Purpose

The purpose of this technical memorandum is to summarize impacts of two alternative scenarios for the City of Frederick, Maryland on the city's water and wastewater facilities. The results of this evaluation will be compiled with the transportation and fiscal evaluations, to enable the city to consider the overall impacts of the scenarios.

Increased water and sewer demands due to future growth, development, and potential annexations are evaluated in this memo to determine if the existing facilities can accommodate growth to the year 2030. Where the existing facilities cannot accommodate growth expectations, this memo identifies the new facilities required, the issues associated with potential new service areas, and the associated order-of-magnitude costs for expanded service options.

2.0 EXISTING CONDITIONS

Based on the 2000 census, the City of Frederick's population in 2000 was 52,767. The City of Frederick's planned sewer and water service boundary (Service Area) is approximately 20 square miles and serves residential, commercial, and industrial users. Public water and sewer is provided to the entire City of Frederick.

2.1 Water Service – Current and Planned Capacity

Firm Capacity

According to "10 States Standards"[1] and best engineering practices in general, the firm capacity of a utility is determined with the largest treatment plant process units out of service. In addition, the firm capacity should be assessed with the water supply resources being at low flow. Based on the 2000 Water and Sewer Master Plan and this definition, the City of Frederick has a firm capacity of 10.7 million gallons per day (MGD) from the three water treatment plants, of which, under a Maryland Department of the Environment consent order, 10.12 MGD is available during drought conditions.

The city's one groundwater well has a capacity of 0.365 MGD,.

"Adequate Supply Model"

Based upon the consent decree, the city has developed the concept that "adequate supply" is the safe yield flow plus additional flow due to operational management during drought

[1] Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (1997). *Recommended Standards for Wastewater Facilities*. Albany, New York: Health Education Services.

conditions. Using available data and modeling techniques, Malcolm Pirnie[2] developed a mass flow model of the Monocacy River and WTP, using the worst draught on record (1966). This model, combined with other operational practices and a long term simulation model, resulted in an "adequate supply" figure of about 9.6 MGD for record drought conditions occurring in 1964 through 1967.

It is noted that the Malcolm Pirnie simulation model included the new well capacity of 0.365 MGD in the modeled result of 9.6 MGD and that this "adequate supply" analysis is the basis for the city's current water supply and allocation.

However, given the concept of "safe yield" and operational management, the inclusion of the well in the "adequate supply" is questionable for future planning purposes. It is advised that the model be rerun to determine what impact the well has on the "adequate supply" value. For purposes of this report, it is assumed that the well is not included, and the "adequate supply" value is estimated to be 9.2 MGD. This is only an estimate, as the model would have to be rerun to determine exactly what impact the well has on the "adequate supply" figure.

It is also noted that the Malcolm Pirnie model also used operational management techniques to obtain a greater amount of flow from the Fishing Creek system. In conjunction with the consent order and operational strategies for the Monocacy River, the total affects of these techniques on increased flow capacity is not clear. This element of the modeled "adequate supply" should also be evaluated for future water planning purposes, but the effect that this technique has on the 9.6 MGD figure cannot be estimated. Thus, for this report the 9.2 MGD estimate will be used.

Water Supplied by County

The City of Frederick obtains approximately 2.0 MGD from Frederick County on an as need basis. The amount that may be transferred cannot exceed 3.0 MGD, and is outlined in the consent order. These limits govern until either December 31, 2006 or when a new agreement is established.

Currently, the city is negotiating a contract to obtain 12.0 MGD max daily flow from Frederick County, (which would provide approximately 8.6 MGD average daily flow based on the city's Water Allocation Ordinance that stipulates a peaking factor of 1.4), to increase the amount of water available for city allocation. When this agreement is complete and the actual facilities are constructed, the city's "adequate supply" would be the 9.2 MGD existing, plus the additional 8.6 MGD from the county for a total of approximately 17.8 MGD.

The first phase of this agreement will include expansion of the county WTP and construction of a transmission line. This phase is anticipated to be completed within three years and will convey approximately 5.0 MGD to the city. The remaining additional capacity will come at a later time.

[2] Malcolm Pirnie, Task 2 Report, 2003

The completion of this agreement is critical for determining the amount of planned population and employment growth that the city can accommodate; the amount of land that should be annexed into the city; and the city's ability to serve a growing population to the year 2030. It is also noted that with this agreement, the city will be obtaining nearly half of its water from the county. For further details regarding the existing water supply capacity, see Figure 1.

2.2 Wastewater Service

The City of Frederick Wastewater Treatment Plant (WWTP) has a design average daily flow capacity of 8.0 MGD, a maximum (24-hour) flow of 12.0 MGD, and a peak instantaneous flow of 16.0 MGD. The city also sends a portion of its wastewater to the Frederick County WWTP, but then treats the same amount of county wastewater so this transfer has no net impact on treatment capacity. The treatment capacity is 8.0 MGD, and requires a permit modification to exceed 8.0 MGD. The 1998-99 Engineering Study by O'Brien & Gere, *Frederick WWTP BNR Upgrade*, shows a current design of 8.0 MGD for the recently installed BNR System upgrades. The City has recently retained an engineering firm to evaluate the capacity of the current WWTP, given the new Maryland/Chesapeake Bay guidelines for total nitrogen removal. For purposes of this evaluation, a capacity of 8.0 MGD will be used.

The City of Frederick's sewer system serves the area generally corresponding to the city boundaries, according to the 2000 Water and Sewer Master Plan. But, there are areas of the city that the sewer service is provided by other providers as mentioned below.

- The Fort Detrick area has its own collection system.
- A small portion of the city lies in the Ballenger Creek Basin (south of I-70) and is served by a sewer system that discharges into the county's Ballenger Creek collection system and the Ballenger Creek WWTP.

The Monocacy collection system serves portions of Frederick County flows to the City of Frederick's WWTP where it can be treated on-site or diverted to Frederick County's Ballenger Creek WWTP for ultimate treatment through the Monocacy bypass interceptor. Normal practice is to divert this flow to the Monocacy bypass interceptor and on to the county's Ballenger Creek WWTP.

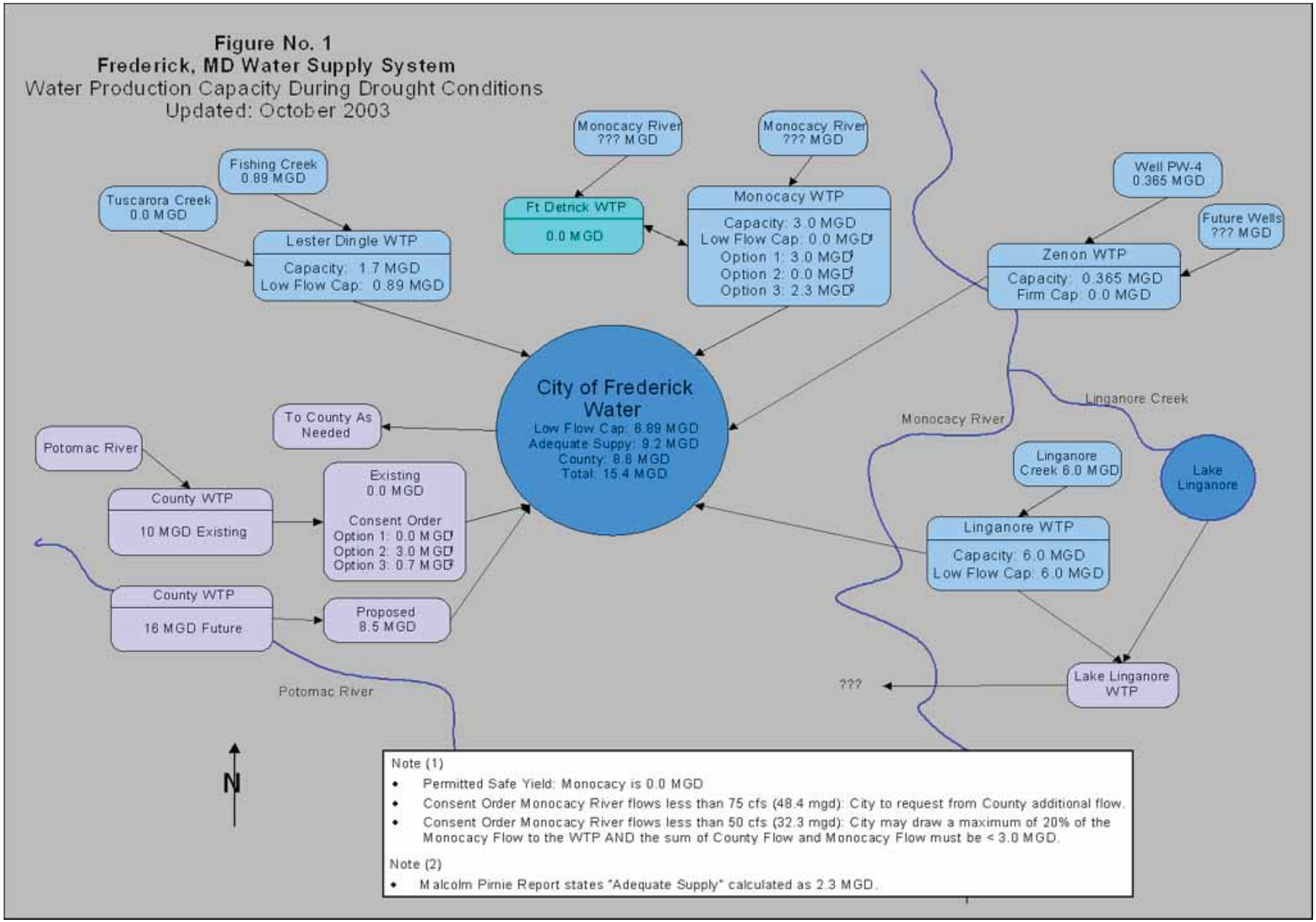


Figure No. 1
Frederick, MD Water Supply System
Water Production Capacity During Drought Conditions
Updated: October 2003
Monocacy River ??? MGD
Monocacy River ??? MGD
Fishing Creek 0.89 MGD
Tuscarora Creek 0.0 MGD
Ft Detrick WTP
0.0 MGD
Monocacy WTP
Capacity: 3.0 MGD
Low Flow Cap: 0.0 MGD
Option 1: 3.0 MGD
Option 2: 0.0 MGD
Option 3: 2.3 MGD
Well PW-4 0.365 MGD
Future Wells ??? MGD
Lester Dingle WTP
Capacity: 1.7 MGD
Low Flow Cap: 0.89 MGD
Zenon WTP
Capacity: 0.365 MGD
Firm Cap: 0.0 MGD
City of Frederick Water
Low Flow Cap: 8.89 MGD
Adequate Suppy: 9.2 MGD
County: 8.8 MGD
Total: 15.4 MGD
To County As Needed
Potomac River
Monocacy River
Linganore Creek
Linganore Creek 6.0 MGD
Lake Linganore
County WTP
10 MGD Existing
Existing 0.0 MGD
Consent Order
Option 1: 0.0 MGD
Option 2: 3.0 MGD
Option 3: 0.7 MGD
Linganore WTP
Capacity: 6.0 MGD
Low Flow Cap: 6.0 MGD
County WTP
16 MGD Future
Proposed 8.5 MGD
Lake Linganore WTP
???
Potomac River
N
Note (1)
• Permitted Safe Yield: Monocacy is 0.0 MGD
• Consent Order Monocacy River flows less than 75 cfs (48.4 mgd): City to request from County additional flow.
• Consent Order Monocacy River flows less than 50 cfs (32.3 mgd): City may draw a maximum of 20% of the Monocacy Flow to the WTP AND the sum of County Flow and Monocacy Flow must be < 3.0 MGD.
Note (2)
• Malcolm Pirnie Report states "Adequate Supply" calculated as 2.3 MGD.

3.0 SCENARIOS EVALUATED

The City of Frederick today and the land surrounding the city, which may be annexed in the future, has been divided into large areas as depicted on Map 1. Each area is called a Fiscal Analysis Zones (FAZ) and is further described below.

FAZ 1 This area is the land within the existing city boundary and lies completely within the city's planned Service Area. It is anticipated that during the next thirty years, portions of this area will become further developed. Although this will not entail annexation, vacant land will be developed and some developed lands may be converted to more intensive uses, thus expanding the water and sewer services needed.

FAZ 2 This includes areas that may be annexed that lie completely within the Service Area. These are fill-in areas adjacent to the city's current boundaries. This group of relatively small areas together comprises an approximately 12 percent increase in the city's land area.

FAZ 3 This includes areas both in and outside of the Service Area. These areas have been further subdivided into FAZ 3A through 3E. The feasibility of annexing and providing water and sewer services to each of these areas will play a part in developing the recommended scenario and identifying the combination of areas to be included within the city's boundaries by the year 2030.

Two alternative scenarios for the city's growth and development have been developed as part of the Comprehensive Plan update process. Scenario 1 – Upgrading in Place – includes future growth within the existing city limits (FAZ 1), along with the additional annexation areas FAZ 2, 3A, and 3B. Scenario 2 – Expanding Horizons – includes the Scenario 1 areas plus FAZs 3C, 3D, and 3E. In addition, the second scenario assumes a higher level of development for all FAZs.

Table 1.1 indicates the size of the annexation areas for each scenario.

Appendix G

Map 1: Fiscal Analysis Zones and Planned City Service Area Boundary Map

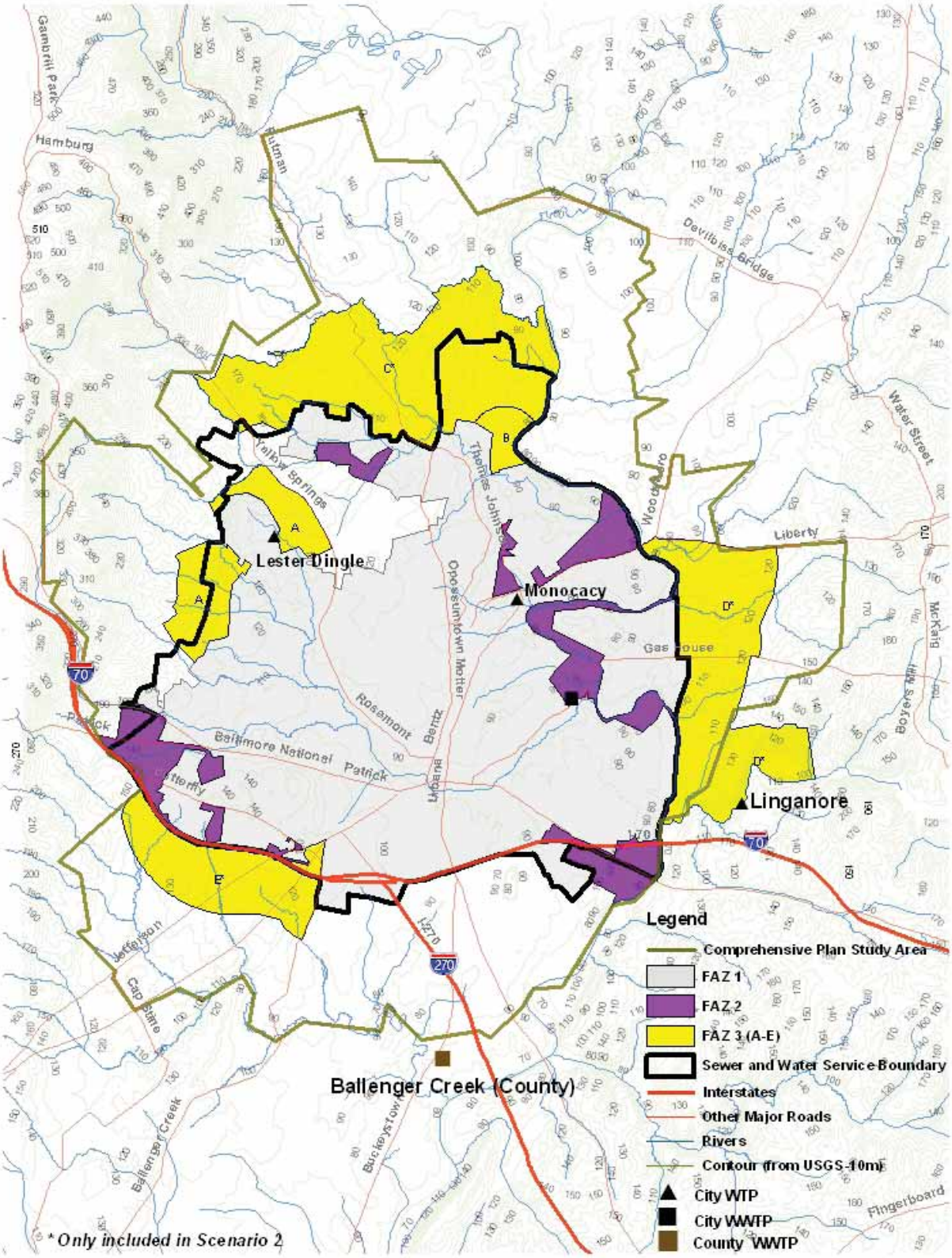


Table 1.1
Annexation Area Size

Area Name	Inside Service Area (acres)	Outside Service Area (acres)	Total (acres)
Scenario 1			
FAZ 1	13,339	0	13,339
FAZ 2	1,393	250	1,643
FAZ 3A	558	240	798
FAZ 3B	174	0	174
Total	**15,464**	**490**	**15,954**
Scenario 2			
FAZ 1	13,339	0	13,339
FAZ 2	1,393	250	1,643
FAZ 3A	558	240	798
FAZ 3B	174	0	174
FAZ 3C	400	1,870	2,270
FAZ 3D	0	1,387	1,387
FAZ 3E	0	1,060	1,060
Total	**15,864**	**4,807**	**20,671**

Population, household, and non-residential growth has been estimated for each FAZ for the period 2000 to 2030, and is summarized in Table 1.2.

Table 1.2

Number of Households and Acres of Non-Residential Development Growth Summary for 2030

Area Name	Households (units)	Non-Residential Development (acres)
Existing Development Served		
FAZ1	20,891	4,046
Scenario 1 – Total for 2030		
FAZ 1	30,480	5,022
FAZ 2	2,120	161
FAZ 3A	638	25
FAZ 3B	144	11
Total	**33,382**	**5,219**
Scenario 2 – Total for 2030		
FAZ 1	34,442	5,199
FAZ 2	2,416	207
FAZ 3A	1,065	29
FAZ 3B	172	18
FAZ 3C	2,456	127
FAZ 3D	447	45
FAZ 3E	1,280	132
Total	**42,278**	**5,757**

4.0 WATER AND SEWER SERVICES

For purposes of this memo, the year 2000 was established as the base existing condition. The incremental amount of growth and development occurring in and around the City of Frederick from 2000 to 2030 was then forecast. The same forecasts are being used in the fiscal and transportation testing of the two growth scenarios for the city.

4.1 Water Demand Estimates for Non-Residential Growth

The increased amount of water and sewer service demand due to non-residential growth and annexation can be estimated in a number of ways. Two methods were evaluated for this analysis and the one that used the city's Water Allocation Ordinance standards (and which projected the higher water demands) was selected to determine future water demand. An explanation of the two methods, along with the results, is outlined below.

The first analysis method was based on employment projections and assumes 20 gallons of water use per day (GPD) per employee, and no additional "process wastewater" component. This analysis assumes that non-residential development is composed solely of employment operations with minimal water use – typically referred to as "dry" versus "wet" industries. The results using this method are shown in Table 1.3.

The second analysis method used the City of Frederick's Water Allocation Ordinance values for non-residential acreage. As outlined in this ordinance, new non-residential development of various lot sizes is to be assessed using water demand values as follows:

Lot size 4.99 acre or less:	1,800 GPD/acre
Lot size 5.0 – 19.99 acre:	1,350 GPD/acre
Lot size 20.0 acre or more:	900 GPD/acre

For this analysis, we have assumed the lower value of 900 GPD/acre.

As shown in Table 1.4, this second analysis results in higher planned water/ sewer needs, and was used for this planning effort, since it is based on the city's Water Allocation Ordinance standards.

4.2 Water Demand Estimates for Residential Growth

The increased amount of water and sewer service demand due to potential residential growth in the city and within potential annexation areas was determined based on the growth in the number of housing units between 2000 and 2030. According to the city's Water Allocation Ordinance, the following water values should be used:

Single Family Unit:	250 GPD / unit
Townhouse Unit:	225 GPD / unit
Multi-family Unit:	180 GPD / unit

4.3 Results – Water Demand

Employing the two analysis methods, the estimated water demand was tabulated as shown below in Tables 1.3 and 1.4. While checking the existing water demand estimated versus 7.0 MGD existing water demand from data, the second method produces a more accurate, yet conservative estimate for future water demand.

Table 1.3

Estimated Future Average Day Water Demand
Analysis No. 1 – Using Employment at 20 GPD /Employee

	Scenario 1 (GPD)	Scenario 2 (GPD)
Demand for Employment		
Existing[1]	835,000	835,000
New Service + Increment	446,000	872,000
Total 2030	*1,281,000*	*1,707,000*
Demand for Residential Units		
Existing[1]	4,554,000	4,554,000
New Service + Increment	2,723,000	4,724,500
Total 2030	*7,277,000*	*7,724,500*
Employment + Residential	*8,558,000*	*9,431,500*

[1] Using this method – existing water use would be estimated at 835,000 plus 4,554,000 or 5,389,000 which is less than existing water usage of 7.0 MGD.

Table 1.4

Estimated Future Average Day Water Demand
Analysis No. 2 – Using Non-Residential Acreage
And Water Allocation Ordinance Values

	Scenario 1 (GPD)	Scenario 2 (GPD)
Demand for Non-Residential Acreage		
Existing[1]	3,641,000	3,641,000
New Service + Increment	1,056,000	1,540,100
Total 2030	*4,697,000*	*5,181,000*
Demand for Residential Units		
Existing[1]	4,554,000	4,554,000
New Service + Increment	2,723,000	4,724,000
Total 2030	*7,277,000*	*9,278,000*
Acreage + Residential	*11,974,000*	*14,459,000*

[1] Using this method – existing water use would be estimated at 3,641,000 plus 4,554,000 or 8,195,000 which is more than existing water usage of 7.0 MGD..

Using the Water Allocation Ordinance (Analysis No. 2) as the basis for estimating employment acreage and the residential housing units, and factoring the existing water demand of 7.0 MGD, the estimated total average water supply demand for the City of Frederick in 2030 is indicated in Table 1.5. The estimated water demand is 10.8 MGD for Scenario No. 1 and 13.3 MGD for Scenario No. 2. A detailed breakdown of the existing and new water service demand by FAZ area is also shown.

Table 1.5

Estimated Water Demand – Detailed
Based on Analysis No. 2

Area Name	Existing Served[1] (MGD)	Existing New Service[2] (MGD)	Increment New Service[3] (MGD)	Total New Service (MGD)	Total 2030 Service (MGD)
Scenario 1					
FAZ 1	7.0		2.963	2.963	9.963
FAZ 2		0.250	0.355	0.606	0.606
FAZ 3A		0.085	0.082	0.167	0.167
FAZ 3B		0.014	0.028	0.042	0.042
Total	**7.0**	**0.35**	**3.4**	**3.8**	**10.8**
Scenario 2					
FAZ 1	7.0		4.009	4.009	11.009
FAZ 2		0.251	0.463	0.714	0.714
FAZ 3A		0.085	0.179	0.264	0.264
FAZ 3B		0.014	0.040	0.054	0.054
FAZ 3C		0.087	0.576	0.662	0.662
FAZ 3D		0.036	0.114	0.150	0.150
FAZ 3E		0.070	0.342	0.412	0.412
Total	**7.0**	**0.54**	**5.72**	**6.3**	**13.3**

[1] *Existing values are assumed based on existing water usage of 7.0 MGD.*
[2] *Existing development requiring new service*
[3] *Increment – new growth from 2000 – 2030*

Further details, regarding water demand implications for each individual annexation area, are located in the Attachment A tables[3].

4.4 Results - Sewer Service Demand

The sewer service values for average day service are assumed to be 110 percent of the above water values. This is based on the comparison of annual average water use (7.0 MGD) and average annual wastewater flow (8.0 MGD). The calculated 110% factor is very reasonable, given that a utility's wastewater volume will typically be higher due to infiltration/ inflow (I/I) entering the sewer service system. This additional I/I flow can range to 30 % or higher. The Frederick sewer system is only 110%, which indicates that

[3] Attachment A is provided in a separate Excel file called "SewerWater Att A,B 102803.xls"

the city is doing a good job at combating I/I. Using this method, the results for Analysis No. 2 are indicated in Table 1.6. The new sewer service demand, revised to consider the existing sewer flow of 8.0 MGD, is shown in Table 1.7

Table 1.6

Estimated Sewer Service Demand
Analysis No. 2 – Using Forecast Non-Residential Acreage
And Water Allocation Ordinance Values

	Scenario No. 1 (GPD)	Scenario No. 2 (GPD)
Demand for Non-Residential Acreage		
Existing	4,005,000	4,005,000
New Service + Increment	1,161,900	1,694,100
Total 2030	*5,166,900*	*5,699,100*
Demand for Residential Units		
Existing	5,009,400	5,009,400
New Service + Increment	2,994,900	5,197,000
Total 2030	*8,004,300*	*10,206,400*
Total Demand	**13,171,000**	**15,906,000**

Table 1.7

Estimated Wastewater Demand – Detailed
Based on Analysis No. 2

Area Name	Existing Served[1] (MGD)	Existing New Service[2] (MGD)	Increment New Service[3] (MGD)	Total New Service (MGD)	Total 2030 Service (MGD)
Scenario 1					
FAZ 1	8.0		3.259	3.259	11.259
FAZ 2		0.280	0.390	0.670	0.670
FAZ 3A		0.093	0.090	0.183	0.183
FAZ 3B		0.015	0.031	0.046	0.046
Total	**8.0**	**0.39**	**3.8**	**4.2**	**12.2**
Scenario 2					
FAZ 1	8.0		4.410	4.410	12.410
FAZ 2		0.276	0.509	0.785	0.785
FAZ 3A		0.093	0.197	0.290	0.290
FAZ 3B		0.015	0.044	0.059	0.059
FAZ 3C		0.096	0.634	0.730	0.730
FAZ 3D		0.040	0.125	0.165	0.165
FAZ 3E		0.077	0.376	0.453	0.453
Total	**8.0**	**0.60**	**6.3**	**6.9**	**14.9**

[1] *Existing values are assumed based on existing water usage of 7.0 MGD.*
[2] *Existing development requiring new service*
[3] *Increment – new growth from 2000 – 2030*

5.0 COSTS

Table 1.8 and 1.9 show the major costs and service values for the various FAZs for Scenario 1 and Scenario 2.

The sewer and water system improvement costs for FAZ 1 and 2 are based upon the project descriptions from the 2000 Water and Sewer Master Plan, but have been re-estimated based upon 2003 dollars. The 2000 estimated costs for interceptor sewer-related projects typically changed by 40% by this re-estimation. This re-estimation caused the water main costs to change by about 10%. These costs should be considered with a +/- 50% contingency at this point.

The costs for FAZ 3A, 3B, 3C, 3D and 3E are very rough estimates, given that no preliminary planning has been done for water or sewer service to these areas. These costs should be considered with a +/- 100% contingency at this point.

Appendix G

Table 1.8
Flow and Cost Estimates by FAZ
Scenario 1

STUDY AREA	Water and Wastewater Requirements[1]	Local Development Costs, Water and Sewer [2]	Sewer Service Costs (interceptors)	Wastewater Treatment	Water Service Costs (mains)	Water Treatment
Baseline	• Water: Existing 7.0 MGD • Wastewater (WW): Existing 8.0 MGD	• None (Existing Service)	• 2000 Water & Sewer Master Plan developed upgrade and expansion plan/cost	• 8.0 MGD (Existing Plant Capacity)	• 2000 Water & Sewer Master Plan developed upgrade and expansion plan/cost	• 9.2 MGD ("adequate supply" model)
FAZ 1[3]	• Water: Additional 3.0 MGD • WW: Additional 3.3 MGD	• $63.2 M	• In city service area • Upgrades planned • Capital $2.1 M	• Add 3.2 MGD capacity • Expand city WWTP or transfer more to county	• In existing city service area • Upgrades planned • Capital $5.5 M	• Need 7.0 plus 3.0 for a total of 10.0 MGD. • Provide 0.8 MGD additional with initial county 5.0 MGD
FAZ 2[3]	• Water: Additional 0.61 MGD • WW: Additional 0.67 MGD	• $13.4 M	• Planned service areas • Capital $9.3 M	• Add 0.67 MGD capacity • Expand city WWTP or transfer more to county	• In city's planned service area • Capital $11.0 M	• Need 10.0 plus 0.61 for a total of 10.6 MGD • Provide 1.4 additional water with initial county 5.0 MGD
FAZ 3A[3]	• Water: Additional 0.17 MGD • WW: Additional 0.18 MGD	• $4.1 M	• Some planning done • In city service area • Requires some interceptor extensions beyond FAZ 2 - Estimated $0.75 M	• Add 0.18 MGD capacity • Expand city WWTP or transfer more to county	• Some planning done • In city's planned service area • Requires main extension • Requires main extensions beyond FAZ 2 – Estimated $0.5 M	• Need 10.6 plus 0.17 for a total of 10.77 MGD • Provide 1.57 additional water with initial county 5.0 MGD
FAZ 3B[3]	• Water: Additional 0.04 MGD • WW: Additional 0.046	• $1.0 M	• Some planning done • In county service area • Interceptor needs in FAZ 2	• Add 0.04 MGD capacity • Expand city contract with County WWTP for more flow	• Some planning done • In city's planned Service Area • Main extension in FAZ 2	• Need 10.77 plus 0.04 for a total of 10.8 MGD • Provide 1.6 additional water with initial county 5.0 MGD
TOTAL	• Total Water Demand: 7.0 + 3.8 = 10.8 MGD • Total Wastewater Produced: 8.0 + 4.2 = 12.2 MGD	• Total Cost: $81.7 M	• Total Cost: $12 M	• Wastewater Capacity Needed: 8.0 + 4.2 MGD = 12.2 MGD • Transfer minimum 0.04 MGD to maximum 4.2 MGD to county • Capacity cost of $16 M for 4.2 MGD	• Total Cost: $17 M	• County Water at 5.0 MGD at cost of $27.0 M, covers the 3.8 MGD additional demand

[1] *FAZ wastewater (WW) values are based on 110% of water values.*
[2] *Assumed to be costs borne by the developer including costs of extensions from the main to lateral; laterals; hydrants; and manholes. See Attachment B for detailed analysis* (see separate Excel file called "SewerWater Att A,B 102803.xls")
[3] *The costs for FAZ 1 and 2 are based upon the project descriptions from the 2000 Master Water and Sewer Plan, but have been re-estimated based upon 2003 dollars. The 2000 estimated costs for interceptor sewer-related projects typically changed by 40% by this re-estimation. The water main costs typically changed by 10%. These costs should be considered with a +/-50% contingency at this point.*
The costs for FAZ 3A and 3B are rough estimates, given that no preliminary planning has been done for water or sewer service to these areas. These costs should be considered with a +/- 100% contingency at this point

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Table 1.9
Flow and Cost Estimates by FAZ
Scenario 2

STUDY AREA	Water and Wastewater Requirements[1]	Local Development Costs, Water and Sewer[2]	Sewer Service Costs (interceptors)	Wastewater Treatment	Water Service Costs (force mains)	Water Treatment
Baseline	• Water: Existing 7.0 MGD • Wastewater (WW): Existing 8.0 MGD	• None (Existing Service)	• 2000 Master Water & Sewer Plan developed upgrade and expansion plan/cost	• 8.0 MGD (existing plant capacity)	• 2000 Master Plan developed upgrade and expansion plan/cost	• 9.2 MGD ("adequate supply" model)
FAZ 1[3]	• Water: Additional 4.0 MGD • WW: Additional 4.4 MGD	• $88.6 M	• In existing city service area • Upgrades planned • Capital $2.0 M	• Add 4.4 MGD capacity • Expand city WWTP or transfer more to county	• In city's existing service area • Upgrades planned • Capital $5.0 M	• Need 7.0 plus 4.0 for a total of 11.0 MGD. • Provide 1.8 MGD additional with initial county 5.0 MGD
FAZ 2[3]	• Water: Additional 0.714 MGD • WW: Additional 0.785 MGD	• $15.9 M	• In city's planned service area • Capital $6.7 M	• Add 0.785 MGD capacity • Expand city WWTP or transfer more to county	• In city's planned service area • Capital $10.0 M	• Need 11.0 plus 0.7 for a total of 11.7 MGD. • Provide 2.5 MGD additional with initial county 5.0 MGD.
FAZ 3A[3]	• Water: Additional 0.264 MGD • WW: Additional 0.29 MGD	• $6.5 M	• Some planning done in Water & Sewer Master Plan • In city's planned service area • Requires some interceptor extensions beyond FAZ 2 - Estimated $0.5 M	• Add 0.29 MGD capacity • Expand city WWTP or transfer more to county	• Some planning done in Water & Sewer Master Plan • City service area • Requires main extension • Requires main extensions beyond FAZ 2 – Estimated $0.3 M	• Need 11.7 plus 0.26 for a total of 11.96 MGD. • Provide 2.76 MGD additional with initial county 5.0 MGD
FAZ 3B[3]	• Water: Additional 0.054 MGD • WW: Additional 0.059 MGD	• $1.2 M	• Some planning done in Water & Sewer Master Plan • In county service area • Interceptor needs in FAZ 2	• Add 0.059 MGD capacity • Transfer more to county WWTP	• Some planning done in Water & Sewer Master Plan • In city's planned service area • Main extension in FAZ 2	• Need 11.96 plus 0.05 for a total of 12.0 MGD. • Provide 2.8 MGD additional with initial county 5.0 MGD
FAZ 3C[3]	• Water: Additional 0.662 MGD • WW: Additional 0.728 MGD	• $15.5 M	• Some planning done in Water & Sewer Master Plan • In county service area • Requires interceptor extensions beyond FAZ 2 – Estimated $1.0 M • Capacity issue possible in Monocacy Interceptor	• Add 0.728 MGD capacity • Transfer more to county WWTP or expand county WWTP	• Some planning done in Water & Sewer Master Plan • In city's planned service area • Requires main extension beyond FAZ 2 – Estimated $0.5 M	• Need 12.0 plus 0.66 for a total of 12.66 MGD. • Provide 3.46 MGD additional with initial county 5.0 MGD

Appendix G

Table 1.9 (Continued)
Flow and Cost Estimates by FAZ
Scenario 2

STUDY AREA	Water and Wastewater Requirements[1]	Local Development Costs Water and Sewer [2]	Sewer Service Costs (interceptors)	Wastewater Treatment	Water Service Costs (force mains)	Water Treatment
FAZ 3D[3]	• Water: Additional 0.150 MGD • WW: Additional 0.165 MGD	• $3.8 M	• No planning done in Water & Sewer Master Plan • In county service area • Interceptor needed beyond FAZ 2 – Estimated $1.0 M	• Add 0.165 MGD capacity • Transfer more to county WWTP or expand county WWTP	• No planning done in Water & Sewer Master Plan • In city's planned service area • Requires main extension beyond FAZ 2 – Estimated $0.5 M	• Need 12.66 plus 0.15 for a total of 12.8 MGD. • Provide 3.6 MGD additional with initial county 5.0 MGD
FAZ 3E[3]	• Water: Additional 0.412 MGD • WW: Additional 0.453 MGD	• $9.5 M	• No planning done in Water & Sewer Master Plan • In county service area • Interceptor needed beyond FAZ 2 – Estimated $2.0 M	• Add 0.453 MGD capacity • Transfer more to county WWTP or expand county WWTP	• No planning done in Water & Sewer Master Plan • In county service area • Requires main extension beyond FAZ 2 – Estimated $1.5 M	• Need 12.8 MGD plus 0.4 for a total of 13.3 MGD (rounding). • Provide 4.1 MGD additional with initial county 5.0 MGD
TOTALS[3]	• Total Water Demand: 7.0 + 6.3 = 13.3 MGD • Total Wastewater Produced: 8.0 + 6.9 = 14.9 MGD	• Total Cost: $141 M	• Total Cost: $13.2 M	• Wastewater Capacity Needed: 8.0 MGD + 6.9 MGD = 14.9 MGD • Transfer minimum 0.059 MGD to maximum 6.9 MGD to county • Capacity cost of $24 M for 7.0 MGD	• Total Cost: $17.8 M	• County Water at 5.0 MGD at cost of $27.0 M • Additional 2.0 MGD at cost of $2.5 M/ 1 MGD

[1] *FAZ wastewater (WW) values are based on 110% of water values.*

[2] *Assumed to be costs borne by the developer including costs for extensions to laterals; laterals; hydrants; and manholes. See Attachment B for detailed analysis* (see separate Excel file called "SewerWater Att A,B 102803.xls"*)*

[3] *The costs for FAZ 1 and 2 are based upon the project descriptions from the 2000 Master Water and Sewer Plan, but have been re-estimated based upon 2003 dollars. The 2000 estimated costs for interceptor sewer-related projects typically changed by 40% by this re-estimation. The water main costs typically changed by 10%. These costs should be considered with a +/- 35% contingency at this point. The costs for FAZ 3A -3E are rough estimates, given that no preliminary planning has been done for water or sewer service to these areas. These costs should be considered with a +/- 100% contingency at this point*

Appendix G

6.0 IMPLICATIONS OF GROWTH SCENARIOS

The purpose of this memo is to capture the estimated water and sewer service increases both to capacity and cost, due to future growth and the possible addition of annexation areas.

As the city determines future water and sewer needs, along with whether to annex additional lands, the implications of each scenario need to be considered. These implications are summarized as follows:

Scenario 1:

- The 2030 average day water requirements for this scenario (10.8 MGD) can be met with the current adequate capacity of 9.2 MGD plus the projected 8.6 MGD capacity from the new county system. For this scenario, the city needs at least 1.6 MGD from the county during low flows.
- The wastewater treatment requirements (12.2 MGD) exceed the current available average day capacity at the city WWTP (8.0 MGD). Additional capacity will have to be obtained by expanding the city WWTP, contracting for more county WWTP capacity, or some of both.
- The wastewater treatment needs of the city, along with certain needs of the county could be handled by both agencies expanding their current facilities. This is not desirable in that economies of scale would be lost. It would make good economic sense for only one facility to be expanded. However, in any city/county joint service agreement, the city must retain its right to annex and self-determine its future development and expansion. Any joint city/county agreement should include this right of self-determination as well as include the potential lands the city has plans to annex and provide services as part of the City of Frederick.
- This scenario will require the construction of all the planned water and sewer system upgrades noted in the 2000 Water and Sewer Master Plan. The update to the Water and Sewer Master Plan should re-evaluate these costs and compile them on an individual area basis to further refine the FAZ analysis.
- The water needs for this scenario would change considerably if the city's Water Allocation Ordinance factors were revised to reflect less conservative allowances for commercial and industrial development. The 20 gallons per employee per day factor, if used for future planning, would result in substantially lower water and sewer needs.
- The FAZs in this scenario are relatively easy to serve, and the service costs have already been studied in the 2000 Water and Sewer Master Plan.
- The FAZs in this scenario are all within the city's planned Service Area except for FAZ 3B, which is in the county's WWTP service area, and a portion of 3A, which is outside the city's Service Area, but which can be served.

Scenario 2:

- To meet the 2030 average day water requirements for this scenario (13.3 MGD) during low flows, the current city adequate capacity of 9.2 MGD must be supplemented with at least 4.1 MGD from the new county system. If the agreement to receive 8.6 MGD from the county is ratified, this scenario's water needs will be met.
- The wastewater treatment requirements (14.9 MGD) exceed the current available capacity at the city WWTP (8.0 MGD). Additional capacity will have to be obtained by expanding the city WWTP, contracting for more county WWTP capacity, or some of both.
- The wastewater treatment needs of the city, along with certain needs of the county could be handled by both agencies expanding their current facilities. This is not desirable in that economies of scale would be lost. It would make good economic sense for only one facility to be expanded. In addition, for this scenario, the expansion of the city WWTP may not be economically feasible, given the increased treatment requirements for such a large increase in flow (due to the "cap" on nitrogen discharge). Expansion of the county WWTP may be the only option. . However, in any city/county joint service agreement, the city must retain its right to annex and self-determine its future development and expansion. Any joint city/county agreement should include this right of self-determination as well as include the potential lands the city has plans to annex and provide services as part of the City of Frederick.
- This scenario will require the construction of all the planned water and sewer system upgrades noted in the 2000 Master Plan. The update to the Water and Sewer Master Plan should re-evaluate these costs and compile them on an individual area basis to further refine the FAZ analysis.
- The water needs for this scenario would change considerably if the Water Allocation Ordinance factors were revised to reflect less conservative allowances for commercial and industrial development. The 20 gallons per employee per day factor, if used for future planning, would result in substantially lower water and sewer needs.
- In this scenario, FAZ 2, 3A, and 3B are relatively easy to serve, and the service costs have already been studied in the 2000 Water and Sewer Master Plan. These FAZs are all within the city's planned Service Area except for FAZ 3B, which is in the county's WWTP service area, and a portion of 3A, which is outside the city's Service Area, but which can be served.
- FAZ 3C will be more costly to serve with sewer as it is a very long distance from the WWTP, and it must be served by the county WWTP. It may cause even higher development costs than what is shown in Table 1.9 (due to additional interceptor capacity requirements such as the reinforcement of the current Monocacy Interceptor). In addition, no planning has been done for this area as it was not included in the 2000 Water and Sewer Master Plan. Transmitting water service to FAZ 3C may also be difficult due to the distance to the Lester Dingle

WTP, the distance to the county water service connection, and circumventing Fort Detrick.

- FAZ 3D will be more costly to serve as no utility planning has yet been done for this area, it is a long distance from the WWTP, and it must be served by the county WWTP. Water service for this area should be relatively economical in that the area abuts the Linganore WTP.
- FAZ 3E is possibly the more costly area to serve as no utility planning has yet been done for this area, it is isolated due to being south and west of I-70, and it must be served by the county WTP and WWTP.

Attachments A and B to this technical memorandum are provided in a separate Excel file named "SewerWater Att B,C 102803.xls".

Appendix G

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

Alternative Scenarios Evaluation
Summary of Results

November 2003

Prepared by:

HNTB Corporation
Architects Engineers Planners

Introduction to the Summary of Scenario Evaluation Results

The attached table presents the summary results of the testing of the two alternative scenarios for the City of Frederick as part of the Comprehensive Plan Update. The first scenario -- (1) "**Upgrading in Place**" -- tells a story of focusing on the urban enhancement of Frederick. This scenario forecasts an additional 29,200 persons and 22,300 jobs between 2000 and 2030.

The second scenario -- (2) "**Expanding Horizons**" -- is a story of Frederick becoming an expanded regional employment center. This scenario forecasts an additional 51,200 persons and 43,600 jobs between 2000 and 2030.

The **Upgrading in Place** scenario focuses on enhancement of the existing city accompanied by limited growth and annexation while **Expanding Horizons** outlines a city with expansive growth that expands Frederick's role into a major employment center.

The attached summary table is supplemented by a number of background and technical memos that explain how the evaluation was undertaken. These papers are available through the City of Frederick's Department of Planning. They include:

- Scenario Allocation Method (Household and Employment Forecasts and Allocation Methodology) – (HNTB)
- Water and Sewer Evaluation – (HNTB)
- Fiscal Results of Scenarios 1 and 2 – (Tischler & Associates, Inc.)
- Transcad Results (Transportation Evaluation) – (Gallop Corporation, City of Frederick, HNTB)

Please note that this evaluation includes only selected indicators or evaluation criteria that could be measured based on the analysis and testing that was done. Considered together, the indicators evaluated provide a picture of the future quality of life of the City of Frederick.

Next Steps

- November 5: The Mayor, Board of Aldermen and Planning Commission will be briefed on the results of the scenario testing at a joint work session.
- November 5: The Plan Steering Committee reviews the results of the scenario testing.
- November 12: Public Forum on the alternative scenarios and evaluation results. Public will be asked for their views on a preferred scenario.
- November 19: Plan Steering Committee Meeting. Plan Steering Committee will be asked to make a recommendation to the Planning Commission on a preferred scenario.
- November 20: Planning Commission Special Meeting to consider and make a recommendation to the Mayor and Board on a preferred scenario.
- December 3: Mayor and Board work session on the scenario testing results and Planning Commission recommendation for a preferred scenario.
- December 18: Mayor and Board to adopt a preferred scenario. This preferred scenario will be evaluated for its impacts. The development of the Comprehensive Plan polices and recommendations will be the outcome of this process.

Goals and Evaluation Measures		Year 2000	Upgrading in Place	Expanding Horizons
Goal 1: To become a major mixed-use urban center				
EVALUATION MEASURES	A. New jobs added	41,774 (existing)	22,300 (53% increase)	43,600 (1.04% increase)
	B. Gross residential density in 2030 (households/acre)	1.6	2.1	2.0
	C. Gross employment density in 2030 (jobs/acre)	3.1	4.0	4.1
Goal 2: To preserve and enhance downtown Frederick				
EVALU ATION	A. Total number of jobs downtown	8,430	10,610	11,720
	B. Total number of households downtown	4,033	5,700	6,460
Goal 3: To encourage the development of a variety of housing types throughout Frederick				
EVALUATION MEASURES	A. Percentage of multi-family units per TAZ (Average)		36%	36%
	B. Percent of TAZs with less than 20% non-SF units		13%	14%

Goals and Evaluation Measures		Year 2000	Upgrading In Place	Expanding Horizons
Goal 4: To develop a safe and efficient transportation network				
EVALUATION MEASURES	A. Total Vehicle **Miles** of Travel	See details below		
	➢ On Existing Road Network	2.6 Million		
	➢ On Base Planned Network *		4.4 Million	
	➢ Enhanced Network *		4.4 Million	4.7 Million
	B. Percentage of congested Vehicle **Miles** of Travel (VMT)/day:	See details below		
	➢ On Existing Road Network	15%		
	➢ On Base Planned Network *		30%	
	➢ Enhanced Network *		20%	24%
	C. Percentage of congested Vehicle **Miles** of Travel (VMT)/day **(excluding freeways)**	See details below		
	➢ On Existing Road Network	13%		
	➢ On Base Planned Network		19%	
	➢ Enhanced Network		19%	20%
	D. Total **Hours** of Travel	See details below		
	➢ On Existing Road Network	60,504		
	➢ On Base Planned Network *		109,814	
	➢ Enhanced Network *		103,235	113,390
	E. Percentage of congested Vehicle **Hours** of Travel (VHT)/day	See details below		
	➢ On Existing Road Network	8%		
	➢ On Base Planned Network		20%	
	➢ Enhanced Network		13%	16%
	F. Percentage of congested Vehicle **Hours** of Travel (VHT)/day **(excluding freeways)**	See details below		
	➢ On Existing Road Network	11%		
	➢ On Base Planned Network		21%	
	➢ Enhanced Network		18%	21%
	G. Annual hours of delay per capita	See details below		
	➢ On Existing Road Network	12		
	➢ On Base Planned Network		27	
	➢ Enhanced Network		14	17
	H. Average trip time (minutes)	See details below		
	➢ On Existing Road Network	8.21		
	➢ On Base Planned Network		8.06	
	➢ Enhanced Network		7.57	7.54
	I. Average trip length (miles)	See details below		
	➢ On Existing Road Network	5.85		
	➢ On Base Planned Network		5.40	
	➢ Enhanced Network		5.43	5.28
	J. Change from year 2000 (roadways becoming congested)	See maps in transportation evaluation report		

* Note: The **Planned Network** is the existing roadway network with the planned improvements included in the 1995 Comprehensive Plan with the addition of East Street Extended and the new I-70 interchange. The **Enhanced Network** includes all of the improvements in the Planned Network plus a number of network enhancements.

Goals and Evaluation Measures		Year 2000	Upgrading in Place	Expanding Horizons
Goal 5: To promote the use of transit				
EVALUATIN MEASURES	A. Jobs/households ratio in TAZs around MARC station (average)	6.0	3.6	3.5
	B. Percent of households served by existing TransIT routes	77%	68%	63%
	C. Percent of jobs served by existing TransIT routes	70%	70%	61%
Goal 6: To enhance the fiscal health of the city				
EVALUATIO N MEASURES	A. Net Revenues? Yes/No (from new growth only)		Yes	Yes, ~2X more than Scenario 1
	B. Average annual results (net revenues)		$4,091,000	$7,814,000
	C. Cumulative results (net revenues)		$110,478,000	$210,722,000
Goal 7: To provide for adequate water supply and wastewater treatment to support the growth and development of the City of Frederick				
EVALUATION MEASURES	A. Amount of additional water supply needed (MGD)		3.8	6.3
	B. Portion of water supply from the Potomac system	0%	35%	47%
	C. Amount of additional wastewater treatment capacity required (MGD)		4.2	6.9
	D. New wastewater treatment plant needed (Yes/No)		Yes or upgrade	Yes
	E. Portion of treatment provided by county WWTP	0%	Uncertain	Uncertain but some must be done by the county
	F. Are additions needed to water storage and transmission mains?		Yes	Yes
	G. Are additions needed to wastewater interceptor system?		Yes	Yes
H. **Goal 8: To preserve scenic views of mountains and spires**				
	A. Extent to which the scenarios protect scenic views		√	√-
Goal 9: To enhance and maintain a system of parks, trails and other recreation and open space resources				
EVALUATION MEASURES	A. Percent of households within neighborhood park service areas	34%	32%	28%
	B. Percent of households within community park service areas	90%	87%	78%
	C. Acres of additional neighborhood parkland needed to meet national per capita parks standards	8	48	93
	D. Acres of additional community parkland needed to meet national per capita parks standards	103	334	512

Goals and Evaluation Measures		Year 2000	Upgrading in Place	Expanding Horizons
Goal 10: To protect and enhance historic resources				
	A. Extent to which the scenarios protect historic resources outside the downtown historic district		√	√ -
Goal 11: To promote city/county interjurisdictional coordination				
	A. Extent to which the scenarios preserve/protect the rural character of outlying areas to the city's north, west and east.			
Goal 12: To protect natural resources				
EVALUATION MEASURES	A. Percent of impervious surface cover by watershed	See results below		
	Tuscarora Creek	11%	17%	18%
	Muddy Run	8%	9%	9%
	Carroll Creek	22%	25%	31%

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

Transportation Analysis of the Alternative Scenarios

November, 2003

Prepared by:
The City of Frederick
&

HNTB Corporation
Architects Engineers Planners

Based on analysis undertaken by the Gallop Corporation

TRANSPORTATION ANALYSIS OF THE ALTERNATIVE SCENARIOS

Introduction

This memo presents the preliminary findings of the evaluations of the Frederick region's roadway system to accommodate growth as defined by two alternative growth scenarios for the City of Frederick as part of the Comprehensive Plan update. The two scenarios are:

- Scenario 1: "Upgrading in Place" that focuses on enhancements of the existing city accompanied by limited growth and annexation. This scenario forecasts an additional 29,200 persons and 22,300 jobs between 2000 and 2030; and
- Scenario 2: "Expanding Horizons," which outlines a city with expansive growth becoming a regional employment center. This scenario forecasts an additional 51,200 persons and 43,600 jobs between 2000 and 2030.

The transportation testing was undertaken using a travel demand model called TransCAD. A travel demand models employs a set of mathematical relationships. It first estimates the travel patterns in a region based on the number of trips between various origin and destination pairs and then assigns the trips to the highway network to estimate the traffic volumes. It simulates the traffic flow on transportation facilities given the physical and operation characteristics of the roadway facilities and forecasted population and employment.

Travel demand modeling is the most commonly used and the most effective approach for estimating traffic demand on a transportation network. Instead of just looking at the individual transportation facility under study, a travel demand model considers the interaction of traffic on various transportation facilities in the study area. It is particularly useful for evaluating the impacts of alternative land use development scenarios on the transportation facilities.

The TransCAD model area for Frederick is the Comprehensive Plan Study Area, which encompasses approximately 58 square miles including the City of Frederick. The area was further divided into analysis areas called Traffic Analysis Areas (TAZs). All results presented in this analysis are for the Study Area.

The Gallup Corporation, under contract to the RBA Group, performed preliminary runs of the transportation model. The two alternative growth scenarios have been evaluated. Two roadway networks were also evaluated. In addition, a run of the current roadway network with 2000 population and employment data was analyzed for comparison purposes. Table 1 below shows the land use scenarios and road network combinations that were evaluated.

Table 1: Scenarios and Roadway Networks Evaluated

Scenario/Year	Existing Roadway Network	Planned Network	Enhanced Network
Existing Conditions (2000)	X		
1: Upgrading in Place (2030)		X	X
2: Expanding Horizons (2030)			X

The findings by Gallup and the preliminary analysis by HNTB and City Staff are summarized in this memo.

Alternative Networks

The base "Planned Network" is the existing roadway network plus the improvements included in the 1995 Comprehensive Plan with the addition of East Street Extended and the new I-70 interchange. The network improvements assumed under this network are listed below.

- Rosemont Avenue five-lanes from US15 to Wilson, and upgrade between Christopher's Crossing and Wilson
- Opossumtown Pike /Willowbrook Road extension to US15
- Butterfly Lane to four lanes / closed section from Alt. US40 to MD180
- Widen East South Street between East Street and Monocacy Blvd.
- Bowman Farm Road upgrade to closed section from Frederick Airpark Associates to MD144
- Widen US40 between Mt. Phillip and US 15
- Western Arterial (new southern segment) between Mt. Phillip and New Design Road New Design, Adventist Drive, Walser Drive and Monocacy Blvd. upgrade (between Crestwood and MD144)
- Gas House Pike four lanes of closed section from County Lane to Monocacy River Bridge and four lanes from Monocacy Blvd to Frederick County Line.
- Shookstown Road to four lane closed section between Kemp Lane and Rosemont Avenue.
- Baughmans Lane upgrade between and Shookstown Road and Rosemont Avenue.
- Tuscanney Drive upgrade between Kemp Lane & Rosemont Avenue.
- Yellow Springs Road upgrade between Christopher's Crossing & Bethel Road.
- Extend Opossumtown Pike/Willowbrook Road between Walter Martz and US15
- Walter Martz Road upgrade between Opossumtown Pike & Christopher's Crossing
- Highland Street extension from East Street to Monocacy Blvd.
- US15/Christopher's Crossing (Western Loop) Interchange

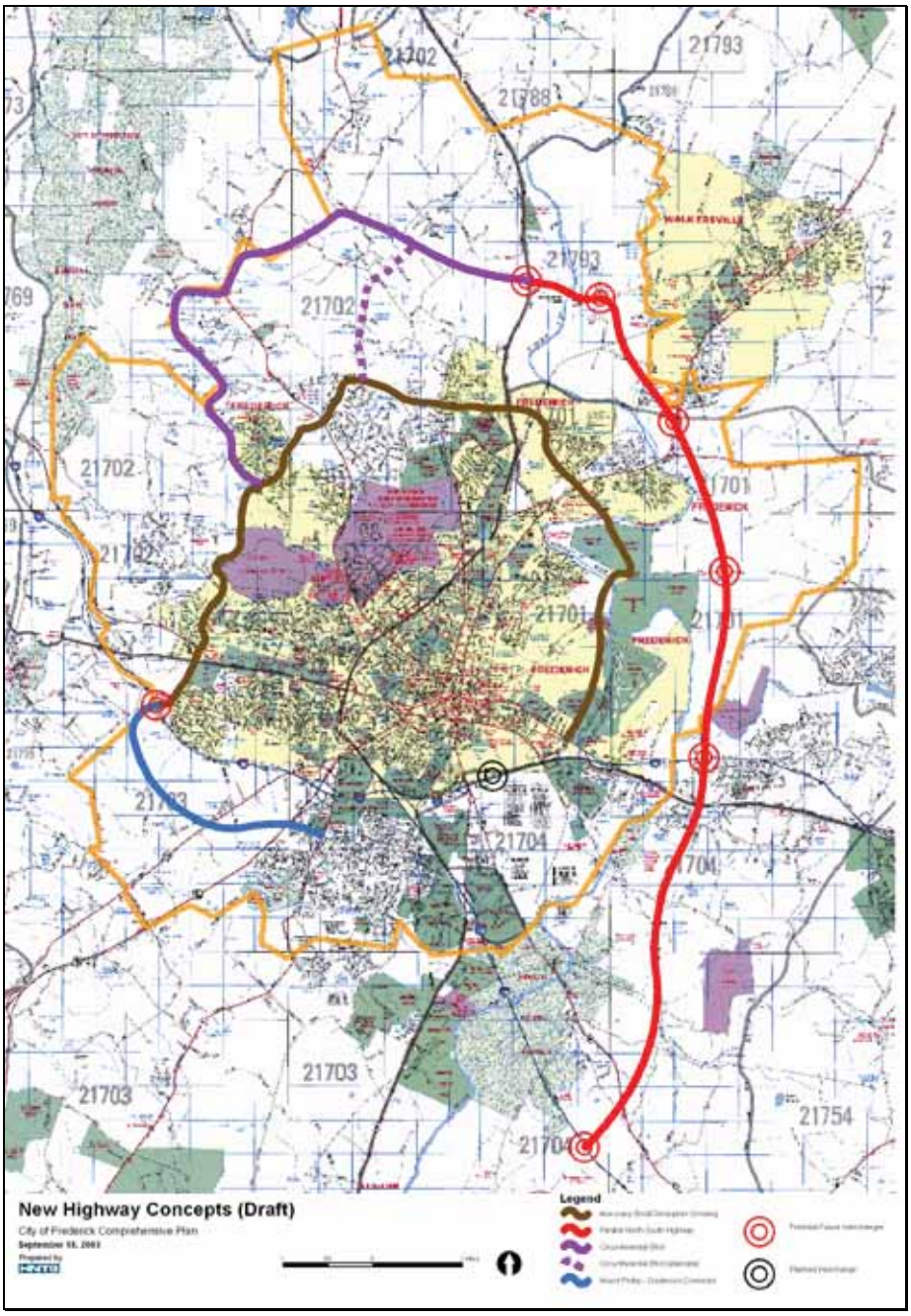
- US15 widening from four to six lanes from Jefferson to Monocacy Blvd

The “Enhanced Network” includes all of the improvements in the Planned Network plus a number of network enhancements including the following:

- A new North-South Parallel Highway east of the city
- Interchange at I-70 at Mt. Phillip
- A Western Arterial (new southern segment) between Mt. Phillip and New Design Road
- A new Northwest Ring Road (an outer ring arterial NW of Monocacy Blvd.)
- A North-South Connector from the New Ring Road to Monocacy Blvd.

These potential enhancements to the road network were included to provide alternative north-south as well as east-west roadways to an existing roadway network that is heavily dependent on US15, I-70 and Monocacy Blvd. Some of these improvements to the system have been shown on city and county plans as far back as 1956.

Map 1: Enhancements to the Planned Network



Analysis

Our evaluation of the City road network output focused first on Volume to Capacity Ratio (V/C). This number is attained by knowing the size and capacity of a given road segment, and knowing the average volume on that segment at a given time. In our case, The V/C ratio reflects the traffic condition of average peak period, which is assumed to account for 10 percent of total daily traffic.

To gain an understanding of the performance of our road system today and in the future, the V/C ratio provides a very clear and understandable measure to compare the scenarios. Consider the numbers as a percent of congestion on the roadway. If the V/C = .60, 40 percent of the roadway is not congested. If the V/C = 1.0, 100 percent of the roadway is congested. For instance:

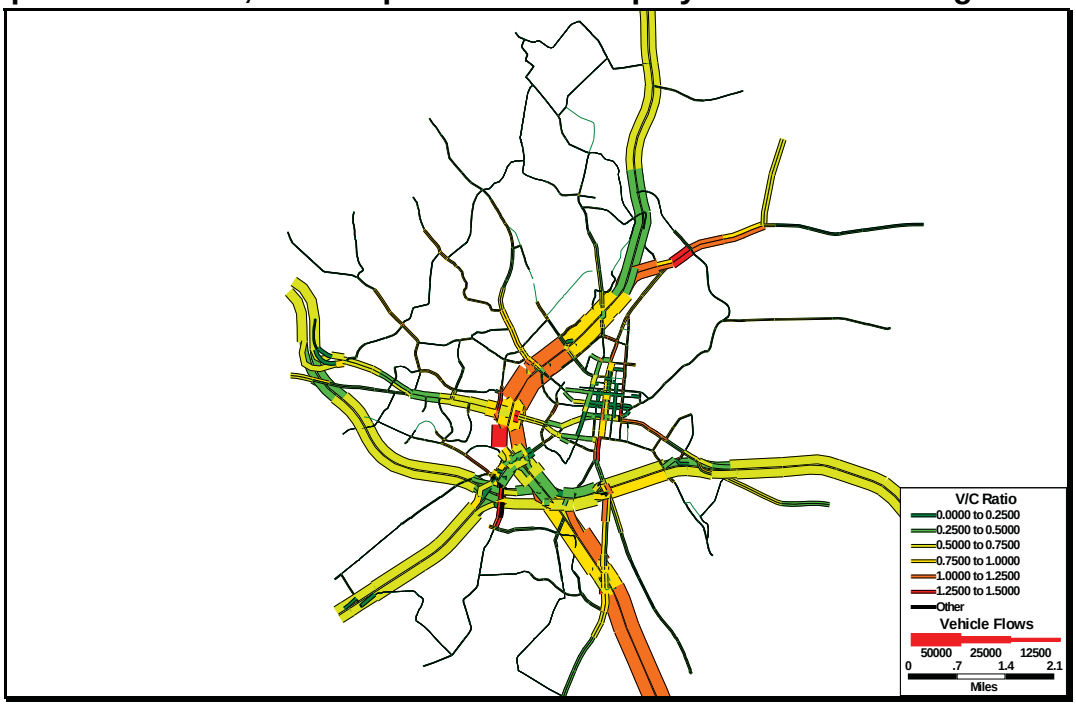
Table 2.		
Traffic Flow		**V/C Ratio**
Free Flow	=	.60
Stable Flow	=	.70
Less Stable Flow	=	.80
Approaching Unstable Flow	=	.90
Unstable Flow	=	1.00

In our TransCAD Model, the V/C is depicted graphically by color, simply put – red is bad (unstable – congested) and green is good (free flow – no congestion). These colors are used in Maps 2-5.

Existing Conditions

As with any study, an understanding of the current conditions is necessary. Using a variety of inputs already described, our 2000 (or current) traffic patterns as expressed by V/C ratios are shown on Map 2:

Map 2. V/C Ratios, 2000 Population and Employment and Existing Network



Note the areas of greatest congestion are found in five major segments in the City network. It is important to note that three of the five segments are freeways that carry significant amounts of through traffic that is the result of Frederick's central location and a fourth is at an interchange with a freeway (I-70). The segments are listed in Table 3.

Table 3. Current Congested Roadways

Lane Segment	Volume / Capacity Ratio	Congestion Level
SB US15 south of US40	1.25-1.50	Unstable Flow
MD26 (both directions) west of Monocacy Blvd	1.25-1.50	Unstable Flow
Route 355(both directions) @ I-70	1.25-1.50	Unstable Flow
US15 (both directions) between US40 & Rosemont	1.0-1.25	Unstable Flow
I-270 (both directions) south of MD85	1.0-1.25	Unstable Flow

Now that we briefly understand the current conditions of the City's road network, and where the areas of congestion are today, let us look at the results of the future scenario preliminary tests performed by Gallup Corporation using TransCAD.

Scenario Evaluation

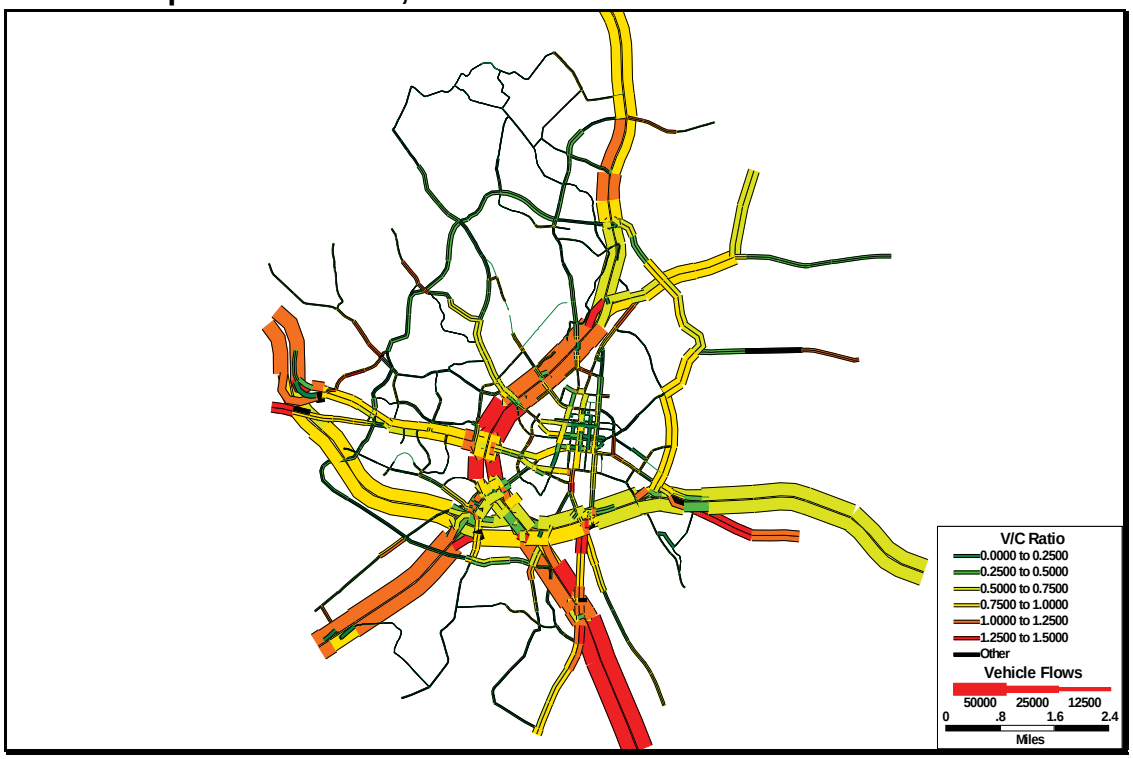
We evaluated Scenario 1 “Upgrading in Place” with the base Planned Network. The model results show a situation that goes from bad for freeways today to gridlock on those freeways as well as the interstate interchange gateways of the City. As seen in the graphic below, TransCAD found that US15 has a V/C of 1.25-1.50 for the entire stretch from MD26 to MD340 / Jefferson. Gateways into the City from nearly all directions are found to be (at a minimum) “approaching unstable flow.” These are:

- I-70 Eastbound
- US15 / MD340 Northbound
- East Patrick Street
- US15 Southbound

Another point to note is that the addition of the Monocacy Blvd. link (central section) does not assist US15 at all. In fact, it comes on-line performing at an “approaching unstable flow’ (V/C .75-1.0) level. There are other considerations for assisting both US15 and Monocacy Blvd. that are addressed in the Enhanced Network explained on the next page in the discussion of Scenario 2.

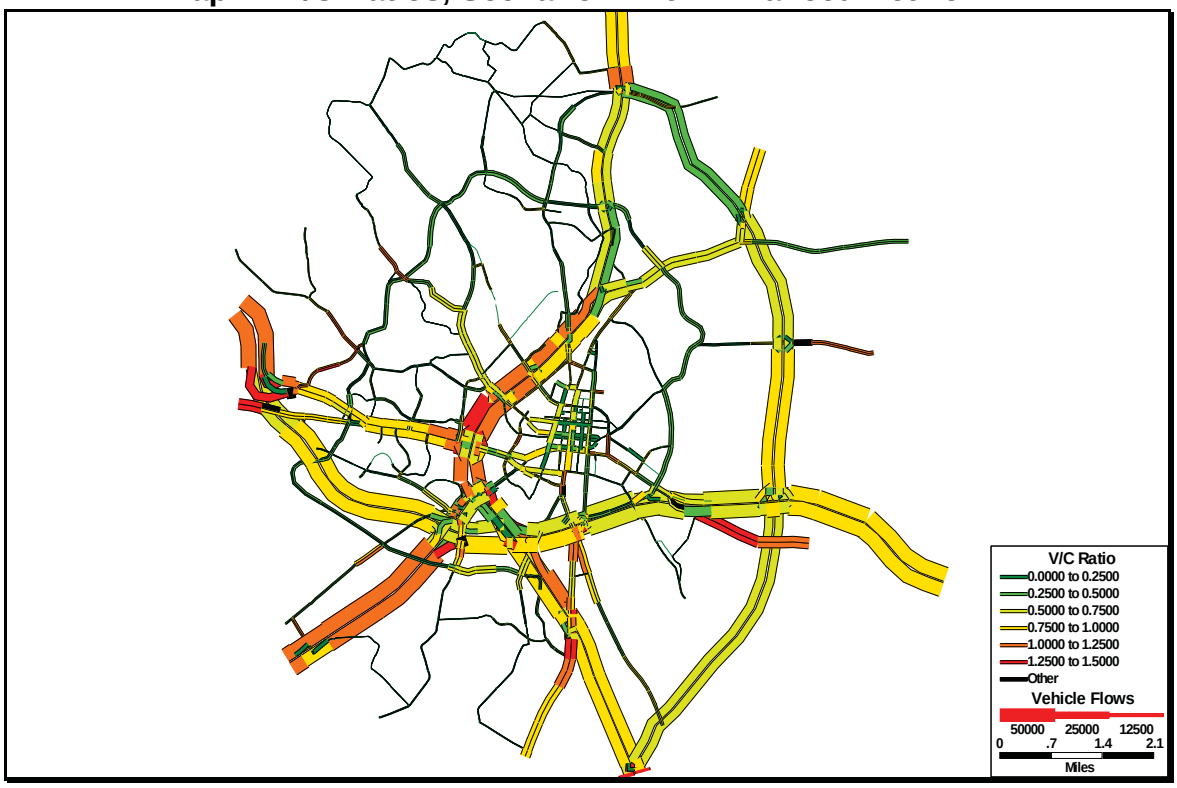
Below, Map 3 provides the graphical TransCAD output for Scenario 1, “Upgrading in Place” with the base Planned Network.

Map 3. V/C Ratios, Scenario 1 with Base Planned Network



Continuing with Scenario 1, we next evaluated Scenario 1 with the Enhanced Network intended to relieve congestion on US15, provide better circulation by the establishment of a parallel north-south road to US15 as well as the other improvements listed previously. The relief to US15 is noticeable, yet there remain unacceptable levels of congestion (V/C ratio at or above 1.0 in almost the entire City-segment of US15). Where the impact is most notable from a relief standpoint is on Monocacy Blvd., and on the gateways into the City on I-270, SB US15 north of Biggs Ford Road, and on MD26 at US15. Below, Map 4 is a graphical representation of the network.

Map 4. V/C Ratios, Scenario 1 with Enhanced Network



In addition to the graphical output, the following tables provide additional modeling results. Table 4 shows the daily trips for existing conditions and compares that to Scenario 1 and Scenario 2. Scenario 2 generates approximately 10 percent more daily trips than Scenario 1.

Table 4: Daily Vehicle Trips by Scenario

Alternative	Daily Vehicle Trips
Existing Conditions (yr 2000)	442,301
Scenario 1, Planned Network	817,231
Scenario 1, Enhanced Network	817,914
Scenario 2, Enhanced Network	902,167

Next we evaluated Scenario 2 “Expanding Horizons”, using the Enhanced Network. As a reminder the expected population and employment growth in Scenario 2 is substantially higher than Scenario 1 and nearly double the population and employment in the City than we have today. One might expect that traffic congestion would worsen considerably from Scenario 1. Yet the difference between the two is relatively small. The parallel road makes its biggest impact on US15, US40, MD355, and portions of Monocacy Blvd. It is important to note that most local roads through Frederick remain at acceptable levels. Map 5 shows the V/C ratios for Scenario 2, enhanced Network.

Map 5. V/C Ratios, Scenario 2 with Enhanced Network

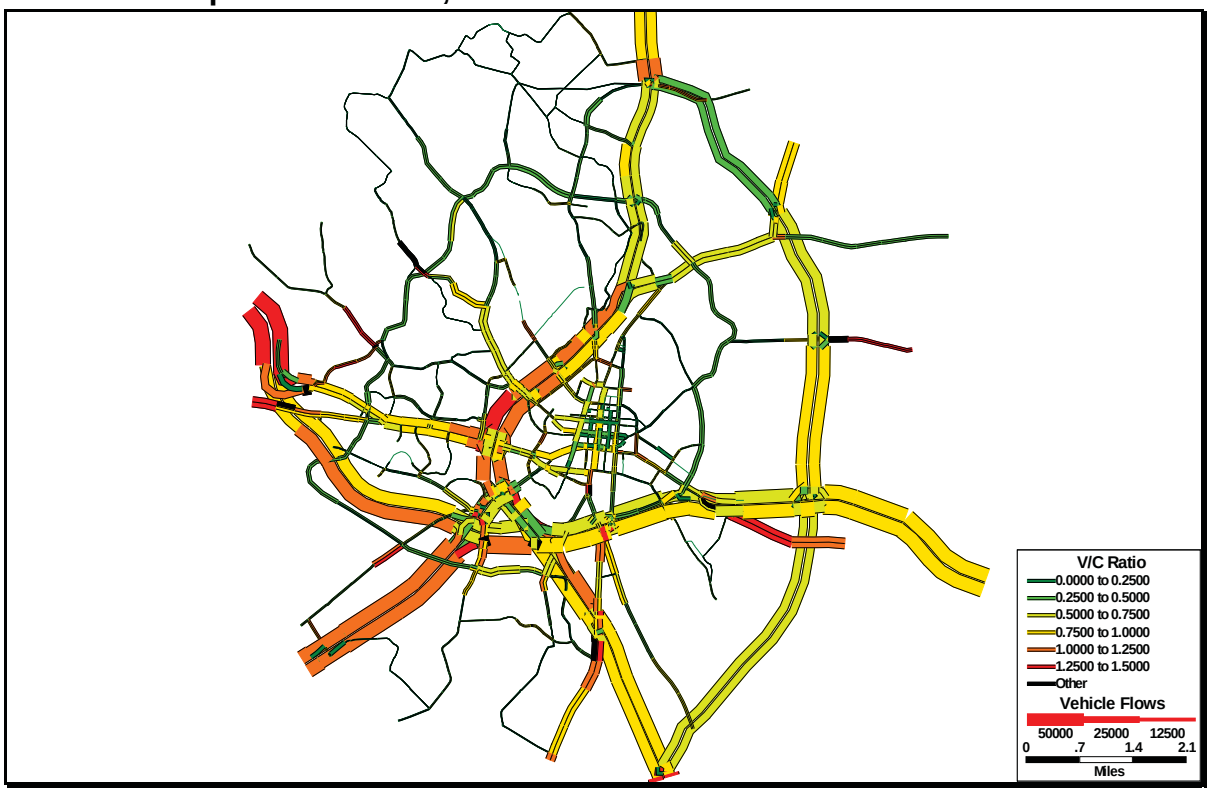


Table 5 shows the percent of congested non-freeway lane miles for Scenario 1 (with the Planned Network) and Scenario 2 (with the Enhanced Network) are very similar (7.8 percent vs. 7.5 percent), but the percentage of congested freeway lane miles are quite different -- 30.5 percent congested for Scenario 1 with the Planned Network as compared to 16.2 percent congested for Scenario 2.

Table 5. Lane Miles by Scenario

Scenario	Lane-miles		Non-Freeway Lane Miles Only		Freeway Lane Miles Only	
	Total	% Congested	Total	% Congested	Total	% Congested
Existing Conditions (yr 2000)	464.6	5.3	359.6	3.9	105.0	10.2
Scenario 1, Planned Network	603.6	12.2	488.1	7.8	115.5	30.6
Scenario 1, Enhanced Network	685.7	8.0	507.7	6.6	178.0	12.0
Scenario 2, Enhanced Network	685.7	9.7	507.7	7.5	178.0	16.2

Table 6 shows the total miles of travel and highlights the proportion of those miles that are congested. The proportion of congested non-freeway miles for both scenarios is similar at between 18 and 20 percent. However, a substantial improvement for congested freeway miles is seen with the Enhanced Network, and either Scenario.

Table 6. Vehicle Miles of Travel by Scenario

Scenario	Vehicle Miles		Non-Freeway Vehicle Miles		Freeway Vehicle Miles	
	Total	% Congested	Total	% Congested	Total	% Congested
Existing Conditions (yr 2000)	2,586,775	15.2	1,232,048	12.6	1,354,727	17.5
Scenario 1, Planned Network	4,412,823	30.0	2,442,633	19.3	1,970,190	43.2
Scenario 1, Enhanced Network	4,444,022	20.0	2,187,111	18.8	2,256,911	21.2
Scenario 2, Enhanced Network	4,762,747	23.7	2,387,862	19.9	2,374,885	27.5

Table 7 shows the total and congested hours of travel. Scenario 2 is projected to have a reduction of total congested hours of travel versus Scenario 1 with the Planned Network and slightly more than Scenario 1 with the Enhanced Network. However, the real story is the reduction in congested freeway hours evident with the Enhanced Network for both scenarios.

Table 7. Vehicle Hours of Travel by Scenario

Scenario	Vehicle Hours		Non-Freeway Vehicle Hours		Freeway Vehicle Hours	
	Total	% Congested	Total	% Congested	Total	% Congested
Existing Conditions (yr 2000)	60,504	8.4	35,496	10.8	25,008	5.1
Scenario 1, Planned Network	109,814	19.7	70,072	20.5	39,742	18.2
Scenario 1, Enhanced Network	103,235	13.0	61,696	18.1	41,539	5.5
Scenario 2, Enhanced Network	113,390	16.0	69,119	21.0	44,271	8.4

Table 8 presents the average speed, average trip time and annual delay per capita for the scenarios. It is clear from the results that the Enhanced Network results in lower hours of delay per capita than the other Planned Network. This is true for both scenarios.

Table 8. Average Speed, Trip Time and Hours of Delay

Scenario	Average Speed	Avg. Trip Time (Min.)	Annual Delay Per Capita (Hrs.)
Existing Conditions (yr 2000)	42.75	8.21	11.87
Scenario 1, Planned Network	40.18	8.06	26.69
Scenario 1, Enhanced Network	43.05	7.57	13.96
Scenario 2, Enhanced Network	42.00	7.54	16.91

A number of origin – destination pairs were examined to see how travel time between points changed from today's conditions to those forecast for each scenario. Table 9 shows that the changes in travel time among the scenarios are marginal. This is worth noting since there are more trips on the roadway network in Scenario 2 than 1. Scenario 2 is better than Scenario 1 on the Planned Network (due to the North – South parallel highway), and travel times for Scenario 2 are marginally worse than Scenario 1 with the Enhanced Network (due to the increase of population and employment assumed in this alternative).

Table 9. Travel Times, by Specific Location

Origin-Destination (Description)	(A) Scenario 1, Planned Network	(B) Scenario 1, Enhanced Network	% Chg A->B	(C) Scenario 2, Enhanced Network	% Chg A->C
McCain/Key --- Baughman/US40	2.35	2.35	0.0%	2.35	0.0%
Butterfly/McCain --- Waverly/Key	2.20	2.19	-0.5%	2.20	0.0%
Sabastian/MD26 --- 7th Street Gate	7.26	6.90	-5.2%	7.03	-3.3%
Mill Pond/Monocacy --- Market/Patrick	6.60	6.18	-6.8%	6.25	-5.6%
Himes/Butterfly --- Grove/MD85	7.47	7.36	-1.5%	7.60	1.7%
Crestwood/Ballinger --- Market/Patrick	6.29	6.12	-2.8%	6.39	1.6%
Gas House/Linganore --- Moncacy/MD26	5.99	5.61	-6.8%	6.13	2.3%
7th/Market --- Thomas Johnson/Oppossumtown	4.37	4.34	-0.7%	4.36	-0.2%
Whittier/Christophers Xing --- MD26/Market	7.37	7.37	0.0%	7.40	0.4%
Butterfly/Mt. Phillip --- 351/Solerex	4.15	4.13	-0.5%	4.29	3.3%

TransCAD was used to project the significant change in daily traffic flow from one scenario to another in the following pairs:

- Current Conditions to Scenario 1 (Planned)
- Scenario 1 (Planned) to Scenario 1 (Enhanced)
- Scenario 1 (Planned) to Scenario 2 (Enhanced)
- Scenario 1 (Enhanced) to Scenario 2 (Enhanced)

TransCAD maps (Maps 6-9) highlight these significant changes in traffic flow. In addition to the maps, Table 10 lists the roadway segments that correspond to the red and green on Map 8 – the change from Scenario 1 with the Planned Network to Scenario 2 with the Enhanced Network, the main point of comparison. It is

clear from Map 8 and Table 10 that there are major reductions in north-south and east-west trips on US 15, US40, MD355, Gashouse Pike and portions of Monocacy Blvd. even with the addition trips on the overall road network.

Table 10

Significant Change in Daily Traffic Flow
From Scenario 1, Base Network to Scenario 2, Enhanced Network

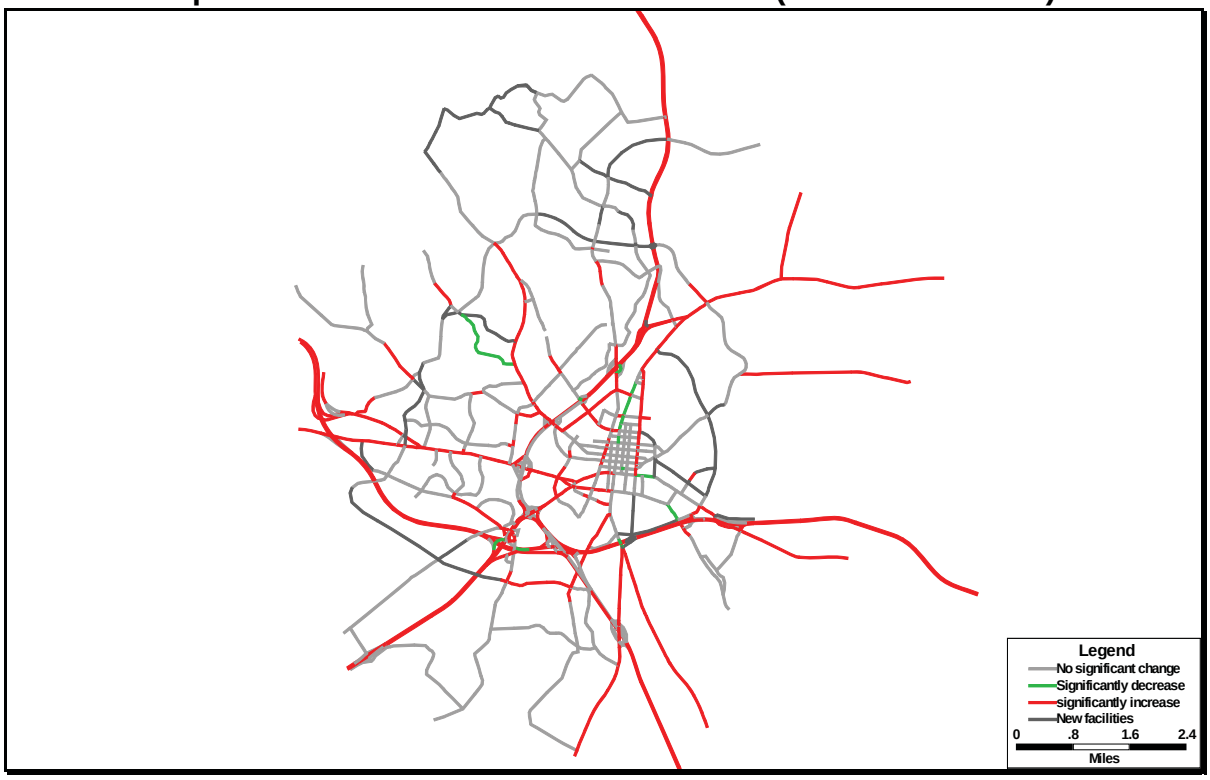
Segments with significant increase in traffic

New Design Road-.20 Mi. N. of Crestwood Blvd.
MD144 -.30 Mi E. of Franklin St.
I-70 0.10 Mi. W. STRUC#10184(Linganore Road)
I-270 0.20 Mi. S. of Baker Valley Rd.
Christopher's Crossing E. of Opossumtown Place
Christopher's Crossing W. of Yellow Spring Rd.
Mt. Phillip Rd N. of Butterfly Lane
Crestwood Blvd. E. of MD 351

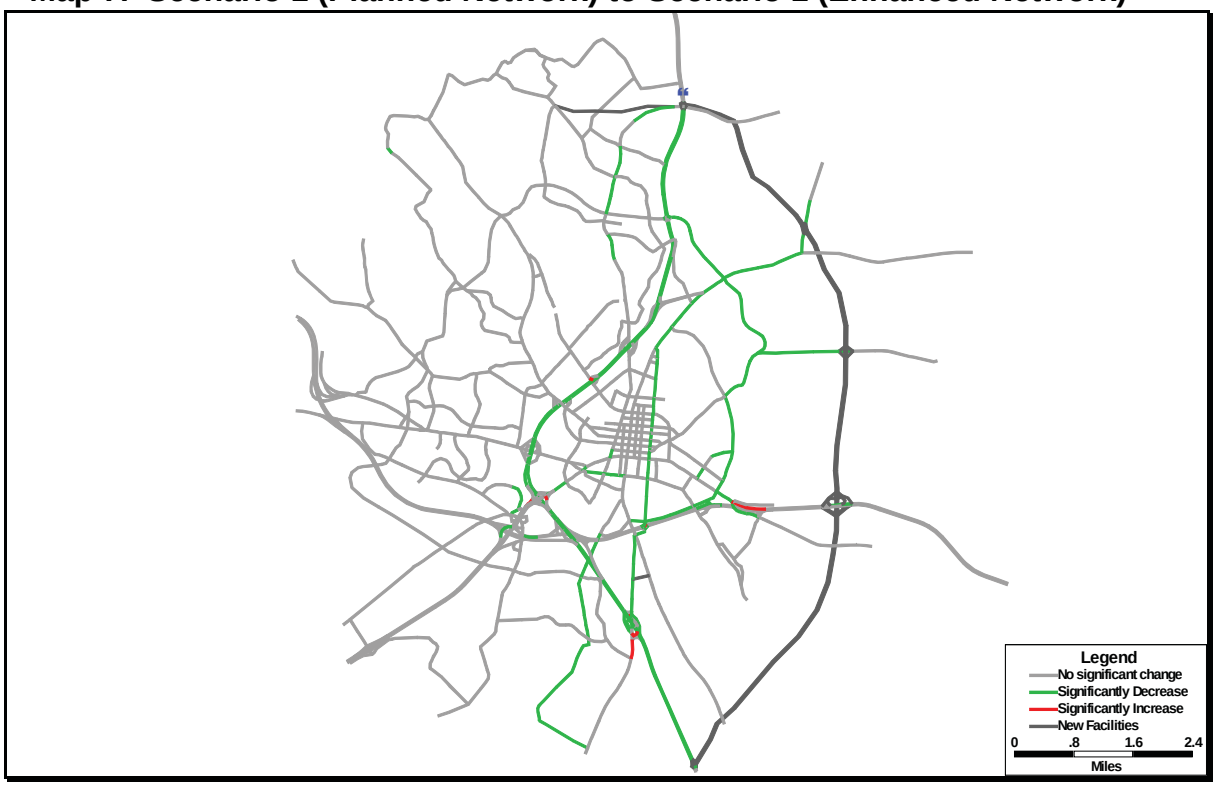
Segments with significant decrease in traffic

Gas House Pike 0.1 Mi S. of Monocacy River
US15-.40 Mi. N. of US40/MD144 (Patrick St)
US15-.20 Mi. N. of Rosemont Ave.
US15-.40 Mi. N. of W. 7th Street
US40-.20 Mi. S. of US15/MD144
US40-.40 Mi. N. of I70/270
MD355 0.10 Mi. N. of East Street
Monocacy Blvd. S. of Gas House Pike
Monacacy Blvd. S. of MD 26
Trading Lane E. of US15
Adventist Dr. E. of MD 355

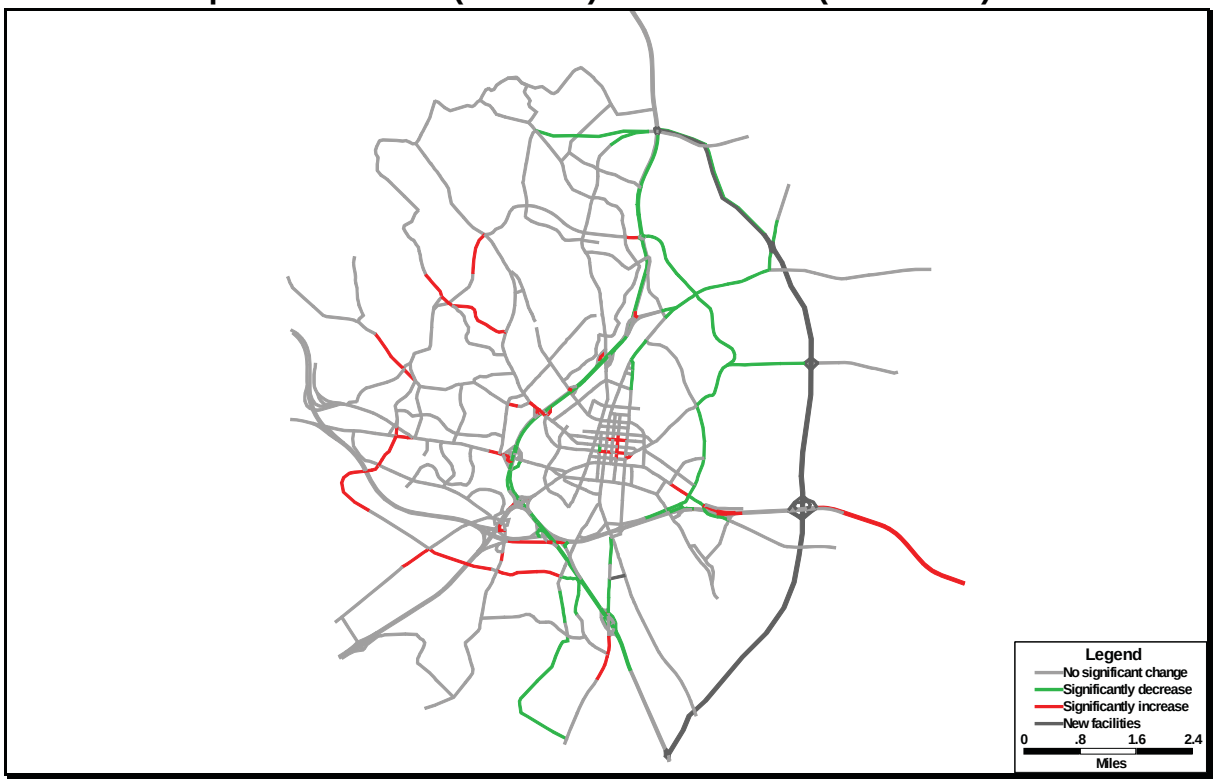
Map 6. Current Conditions to Scenario 1 (Planned Network)



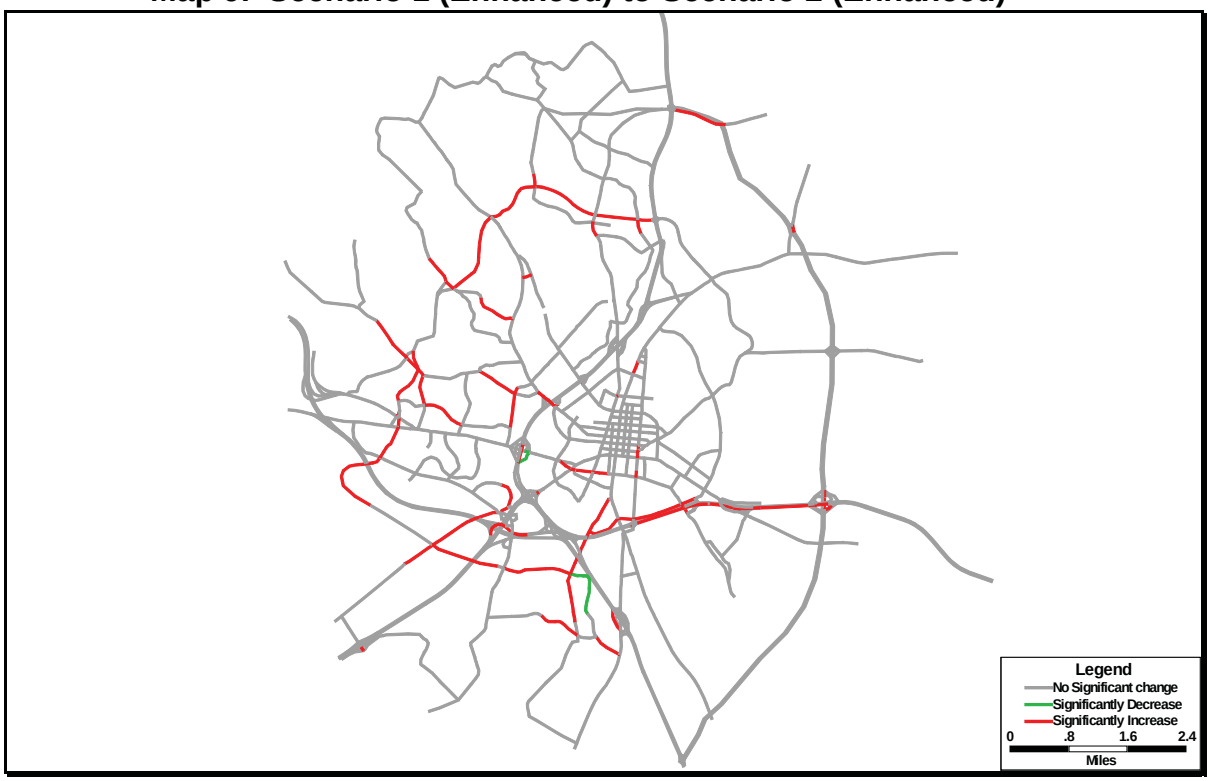
Map 7. Scenario 1 (Planned Network) to Scenario 1 (Enhanced Network)



Map 8. Scenario 1 (Planned) to Scenario 2 (Enhanced)



Map 9. Scenario 1 (Enhanced) to Scenario 2 (Enhanced)



CITY OF FREDERICK, MARYLAND
FISCAL IMPACT ANALYSIS

Fiscal Results of Scenarios 1 & 2

November 7, 2003

Prepared by:

Tischler & Associates, Inc.
Fiscal, Economic, and Planning Consultants

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I. EXECUTIVE SUMMARY

A. Background & Methodology

Tischler & Associates, Inc. (TA), in conjunction with HNTB of Columbia, Maryland, is under contract with The City of Frederick to conduct a fiscal impact analysis of two alternative development scenarios and a preferred scenario as a part of updating the City's Comprehensive Plan. *All costs and revenues that are directly attributable to the new development only are included in the analysis. Both operating and capital costs are taken into consideration. Water and Sewer costs are not included in this analysis because they are considered self-supporting enterprise funds.* Water and Sewer costs are discussed at the end of this report. Costs and revenue factors and level of service assumptions for Frederick are based on the Fiscal Year 2004 (FY04) budget and on-site discussions and interviews with representatives from City departments. The revenue and cost projections are based on the assumption that current levels of tax rates, fees, and spending, as provided in the FY04 approved budget, will continue in the future. For capital costs, TA considered the City's current Capital Improvement Program, current capital levels of service, and capital financing policies.

Where detailed information was available, a marginal approach was used. The two most common methodologies utilized in fiscal impact analyses are the average cost method and case study marginal cost method. The average cost approach is simple and more popular. Costs and revenues are calculated on the average cost per unit of service (often per capita or per employee). This method assumes a linear relationship and does not consider current available public service and capital capacities or the unique characteristics of a community. The case study marginal cost method is the most realistic method for evaluating fiscal impacts by taking the unique demographic characteristics and available public service and capital facility capacities into consideration.

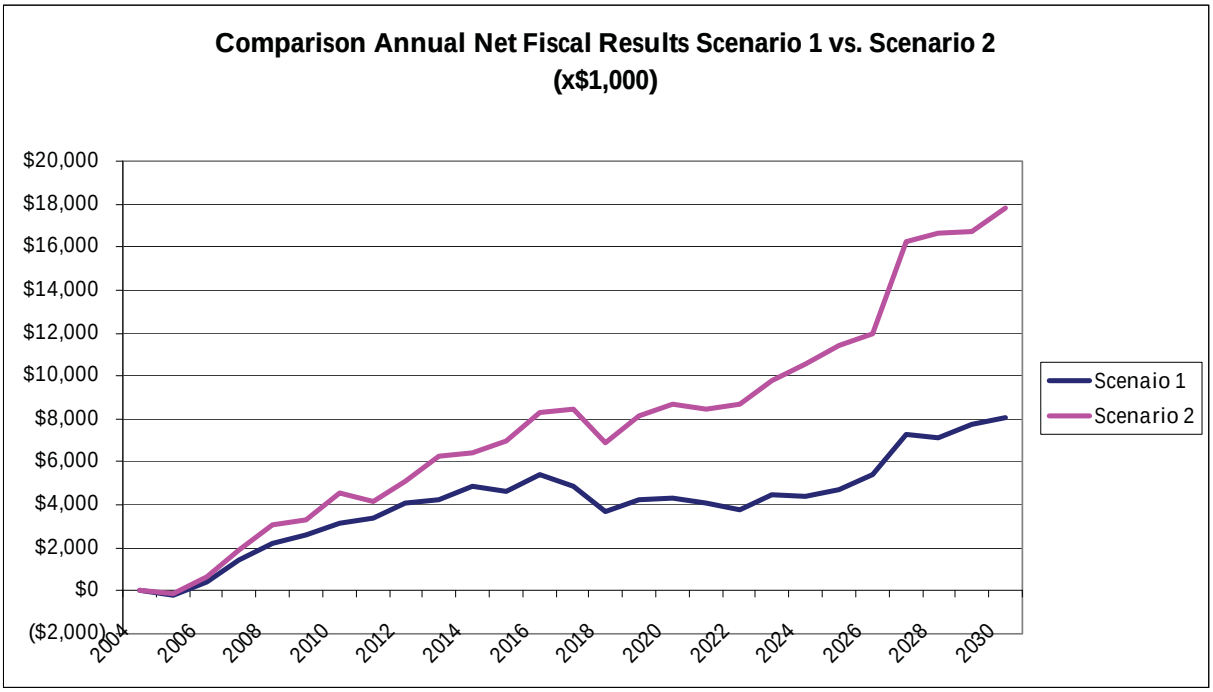
Some costs and revenues are not expected to be impacted by demographic changes, and may be fixed in the analysis. Some examples of fixed factors include the number of elected officials, the number of department heads, revenues affected by factors beyond the City's control (interest rates, the fiscal health of the State).

B. Fiscal Impact Results

The chart below shows the total annual net results to the City for each of the two scenarios over the 26-year planning period. By showing the results annually, the magnitude, rate of change, and timeline of fiscal results can be observed over time. The

"bumpy" nature of the annual results during particular years represent the addition of capital facilities or major operating expenses.

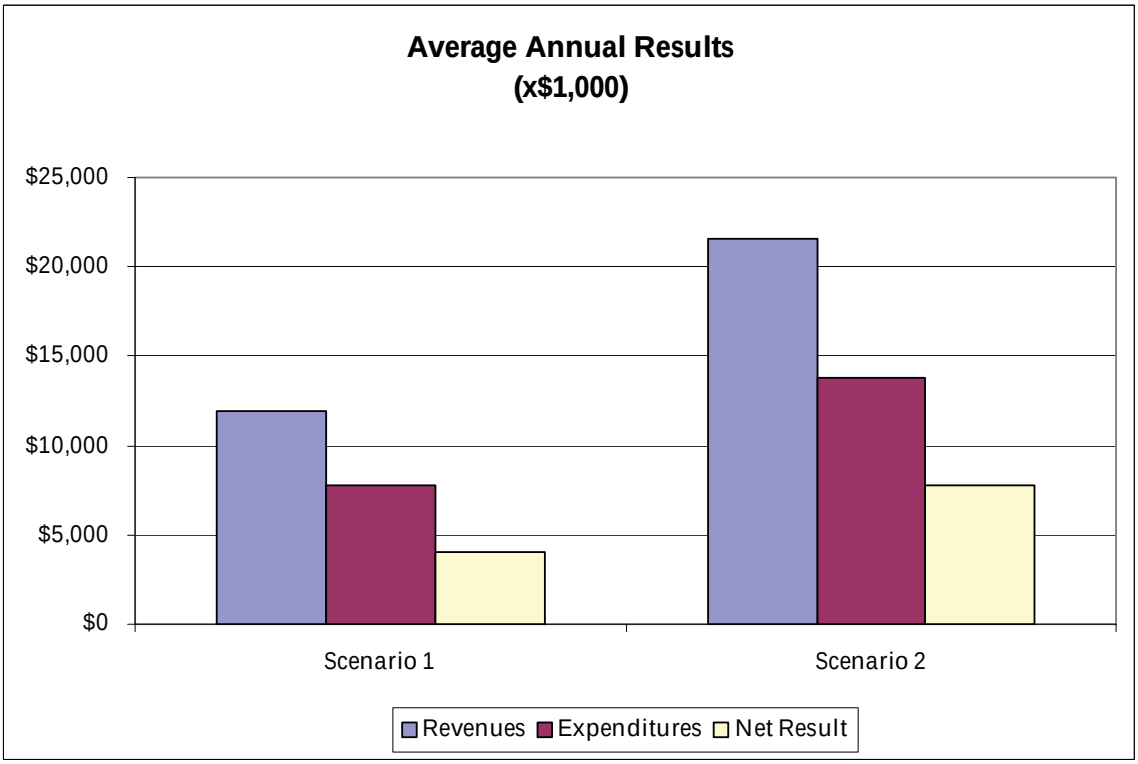
Figure 1: Annual Net Results



Both scenarios produce small deficits in the first year of the analysis (-$174,000 for Scenario 1, and -$147,000 for Scenario 2), but then produce positive net results to the City over the next 25 years. By 2030, Scenario 2 produces almost double the annual net results of Scenario 1.

The chart below shows the average annual results of each scenario over the 26 years planning period.

Figure 2: Average Annual Results by Scenario



C. Conclusions

Aside from the first year, positive annual results occur 25 out of the 26 years of the planning period. The best annual results for each scenario occur in the period 2020-2030. Surpluses are brought about by several factors:

- High assessed values for residential and nonresidential development and subsequent property tax revenue.
- High assessed values for residential development also produce significant personal income tax revenues.
- This is especially true for Scenario 2 where FAZ 3C, 3D, and 3E have higher assessed values for residential units than the other FAZ in Scenario 1. The additional higher value units result in higher property tax and income tax revenues to the City under Scenario 2 per units and in total.
- Industrial development in FAZ 3E has higher assessed values than the other FAZ in the two scenarios due to projected growth in research & development and high technology businesses. These higher assessed values generate additional property tax revenues to the City under Scenario 2.
- Scenario 2 has a greater amount of residential and nonresidential development than Scenario 1 which also accounts for the higher results of Scenario 2.

- The City does not have operating and capital expenses associated with schools and fire/EMS services.
- The City will debt finance 95% of the capital costs for new growth.
- The City will pay an average of only 11% of future road projects with the State, County, and developers paying the majority of costs. Given the magnitude of these projects, changes to these funding assumptions could have an impact on the overall fiscal results of the scenarios.
- Because the City currently provides a full range of municipal services, there are some "savings" on operating and capital expenditures as a result of economies of scale.

II. MAJOR ASSUMPTIONS

- The revenue and cost projections are based on the assumption that the current level of spending, as provided in the City's FY04 Adopted Budget (with roads being the notable exception) will continue through the twenty-six year planning period.

- Enterprise operations such as the City's water and sewer utilities are not included in this analysis since it is assumed that these services continue to be self-funded; that is, revenues generated from fees are sufficient to cover related expenses. A separate analysis is being conducted to determine new growth's utility costs.

- The rate of inflation is assumed to be zero throughout the projection period, and cost and revenue projections are in constant 2004 dollars. This assumption is in accord with current budget data and avoids the difficulty of forecasting as well as interpreting results expressed in inflated dollars. In general, including inflation is very complicated and unpredictable. This is particularly the case given that some costs, such as salaries, increase at different rates than other operating and capital costs such as contractual and building construction costs. And these costs, in turn, almost always increase in variation to the appreciation of real estate. Using constant 2004 dollars avoids these problems.

- The impact of new growth on the City's finances is measured using a variety of demographic statistics and City characteristics. These are listed below:

  Population: 53,047
  Jobs: 43,158
  Population and Jobs: 96,205
  Total City Facility Square Footage: 119,000
  Recreation Square Footage: 39,000
  Park Acreage: 211
  City Vehicles: 313
  Road Miles: 240
  Full Time-Equivalent City Employees: 789
  Calls for Police Services (excluding road-related calls): 40,518

- For this analysis, costs and revenues that are directly attributable to new growth are included. Both *operating and capital* costs are taken into consideration. Where detailed information was available, a marginal approach was used. The two most common methodologies utilized in fiscal impact analyses are the average cost method and case study marginal cost method. The average cost approach is

simple and more popular. Costs and revenues are calculated on the average cost per unit of service (often per capita or per employee). This method assumes a linear relationship and does not consider current available public service and capital capacities or the unique characteristics of a community. The case study marginal cost method is the most realistic method for evaluating fiscal impacts by taking the unique demographic characteristics and available public service and capital facility capacities into consideration.

- Real estate tax revenues for residential and nonresidential development are based on the following assessed value information provided by the City. Personal Income Tax revenues are also based on the residential values.

Figure 3: Estimated Assessed Values for Residential and Nonresidential Development by FAZ

FAZ =>	*1*	*2*	*3A*	*3B*	*3C*	*3D*	*3E*
Residential (per unit)							
Single Family	$220,000	$220,000	$196,000	$222,000	$235,000	$235,000	$220,000
Townhouse	$174,000	$174,000	$143,000	$188,000	$210,000	$210,000	$174,000
Multi-Family (condominium)	$110,000	$110,000	$135,000	$160,000	$160,000	$160,000	$110,000

FAZ =>	*1*	*2*	*3A*	*3B*	*3C*	*3D*	*3E*
Nonresidential (per square foot)							
Commercial	$96	$96	$96	$96	$96	$96	$96
Office	$73	$73	$73	$73	$73	$73	$73
Industrial / Flex	$52	$52	$52	$52	$52	$52	$78
Service	$155	$155	$155	$155	$155	$155	$155

- It should be noted that while a fiscal impact analysis is an important consideration in planning decisions, it is only one of several issues that should be considered. Environmental and social issues, for example, should also be considered when making planning and policy decisions. The above not withstanding, this analysis will enable interested parties to understand the fiscal implications of future development.

III.FISCAL IMPACT RESULTS

Annual results are discussed first and show the impacts from one year to the next. Average annual results are discussed next and provide an easy way to compare scenarios and summarize the general impacts over time.

A. Annual Results

The charts below shows the total annual net results to the City for each of the two scenarios over the planning period. Both General Fund and Capital Improvement revenues and costs are included in these calculations. By showing the results annually, the magnitude, rate of change, and timeline of fiscal results can be observed over time. The "bumpy" nature of the annual results during particular years represents the opening of capital facilities and/or major operating costs being incurred.

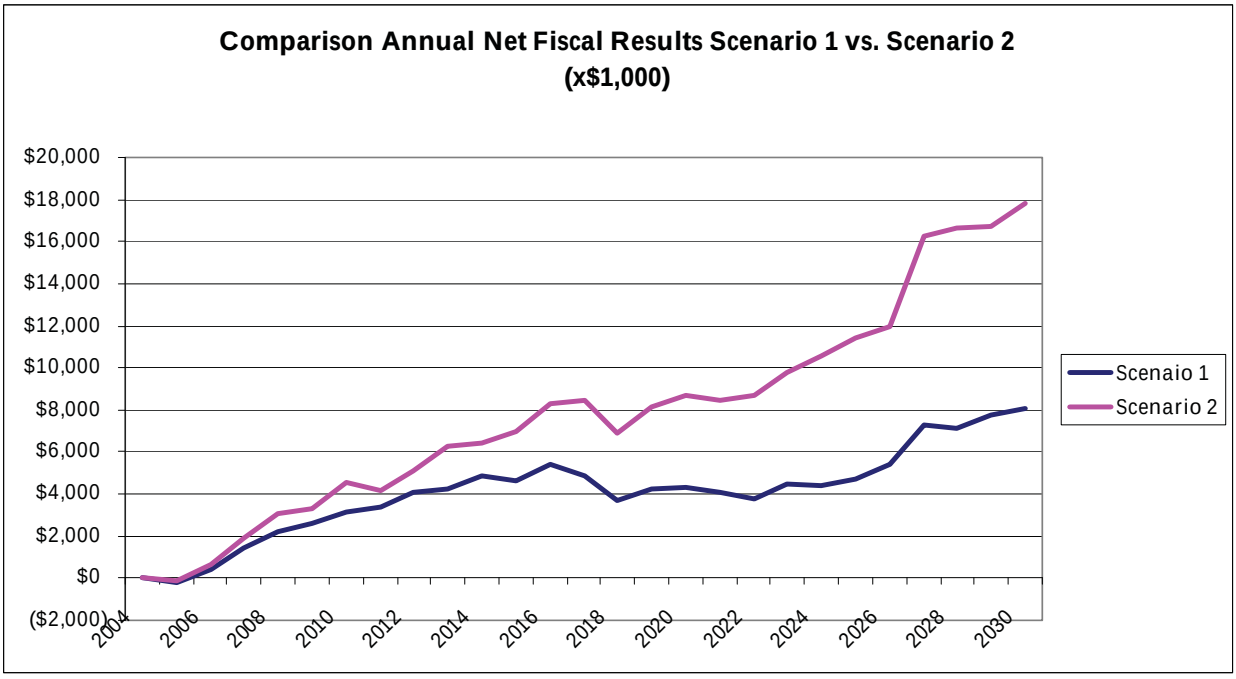
It is important to note that TA assumed all capital improvements to be 95% debt financed over 20 years at 5% interest (per City debt management policies) with the remaining 5% directly funded (Pay-Go). It is also assumed that the vast majority of road capital costs (89%) will be funded by other entities (State, County, developers) with the City paying an the remaining 11%.

Each year's fiscal result is *not* carried forward into the next year. This enables a comparison from year-to-year of the net results without distorting the revenue or cost side of the equation. In reality, surpluses would be carried forward and deficits would be funded through other means such as debt financing for capital improvements where there is a shortfall.

Capital improvement revenues and expenditures are shown starting in the first projection year. It is assumed that capital revenues and expenditures are in balance for the base year. Existing debt is not included in this analysis since the City is obligated to repay it regardless of new growth.

Data points above the $0 line represent annual surpluses; points below the $0 line represent annual deficits.

Figure 4: Annual Results



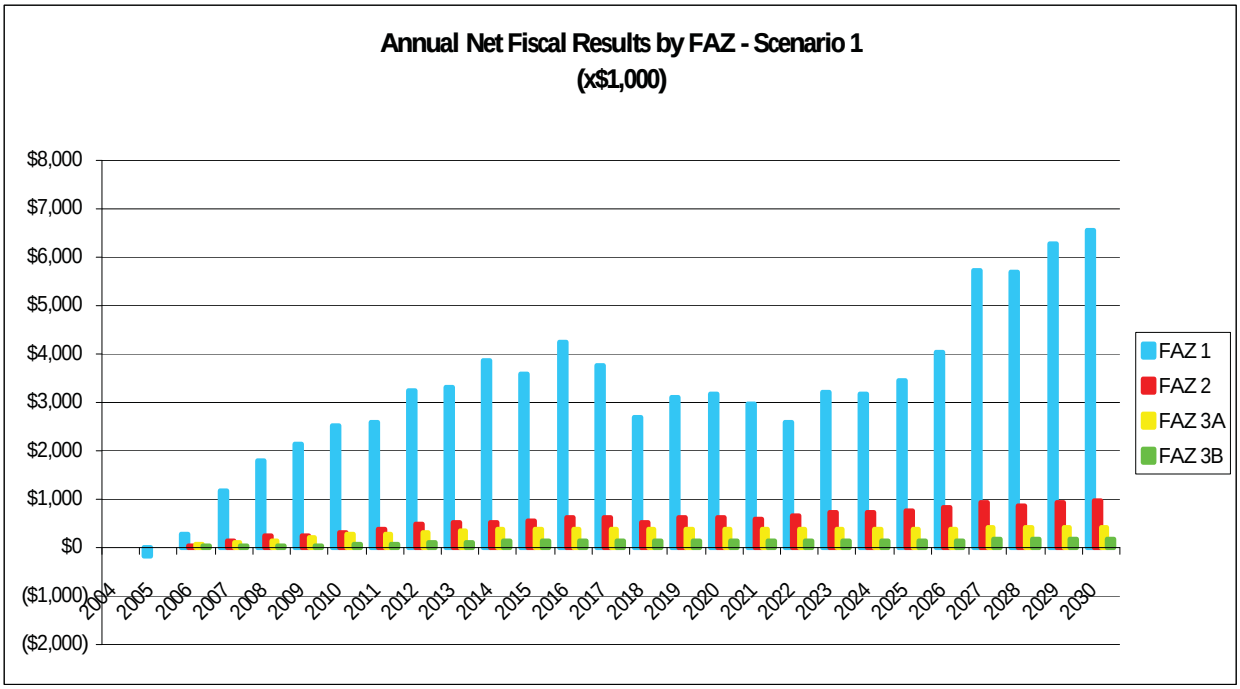
Both scenarios produce small deficits in the first year of the analysis (-$174,000 for Scenario 1, and -$147,000 for Scenario 2), but then produce positive net results to the City over the next 25 years. By 2030, Scenario 2 produces almost double the annual net results of Scenario 1.

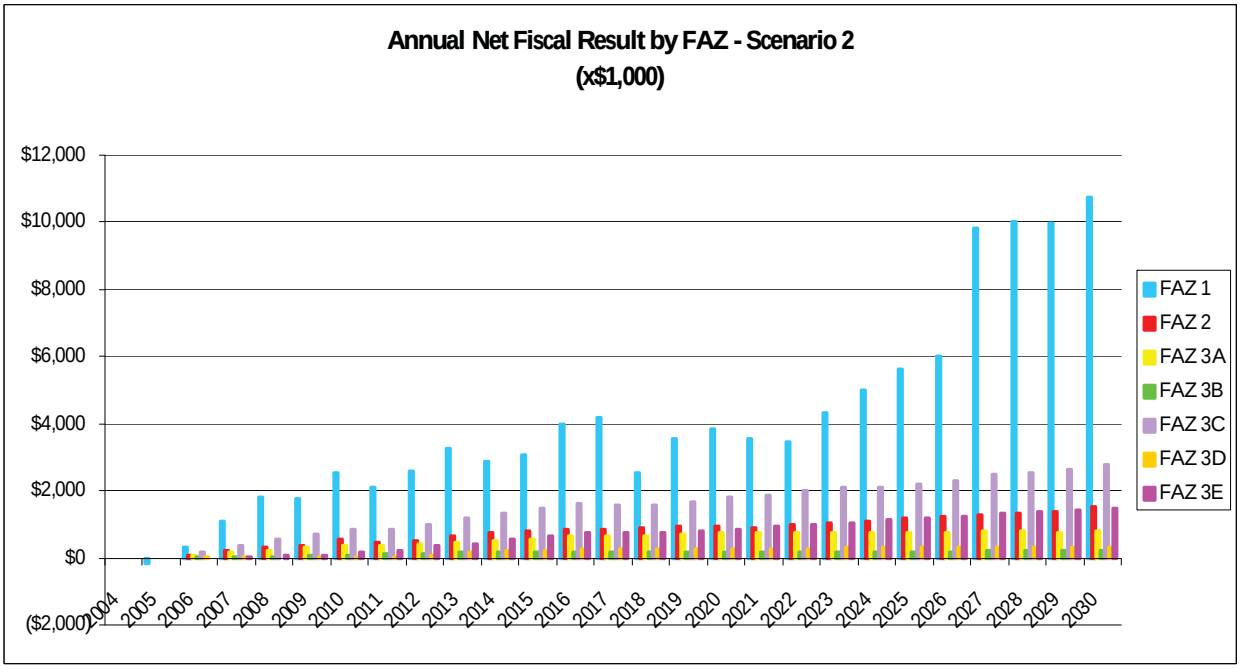
The annual results by FAZ are discussed in the next section.

B. Annual Results by FAZ

The charts below illustrate the annual results for each scenario by FAZ.

Figure 5: Annual Results by FAZ



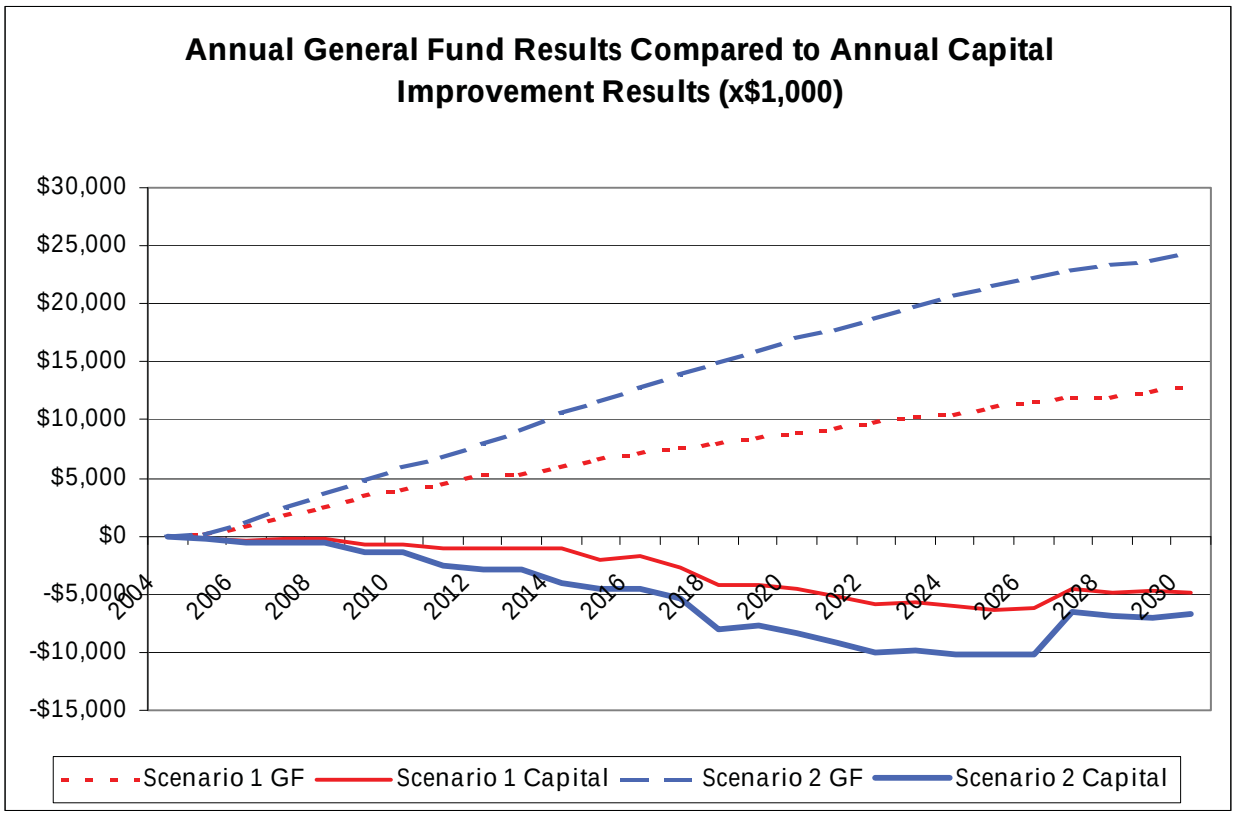


FAZ 1 generates a small deficit in FY05 under both scenarios, but then all FAZ in both scenarios produce positive fiscal results through 2030. FAZ 1 produces the greatest annual results in both scenarios because it contains the greatest amount of development. In Scenario 1, FAZ 2 produces the next highest results, followed by FAZ 3A and 3B. For Scenario 2, FAZ 3C produces the second highest results followed in order by FAZ 2, 3E, 3A 3D, and 3B.

C. General Fund and Capital Improvement Annual Results

To further illustrate the results of the fiscal impact analysis, the below chart shows net results separately for General Fund and Capital Improvements for both scenarios. General Fund net results represent General Fund revenues minus General Fund expenditures. Capital net results represent revenue from dedicated capital revenues (Park impact fees are the only dedicated revenue source for capital improvements) minus debt service and Pay-Go expenditures for capital costs.

Figure 6: General Fund and Capital Improvement Annual Results by Scenario



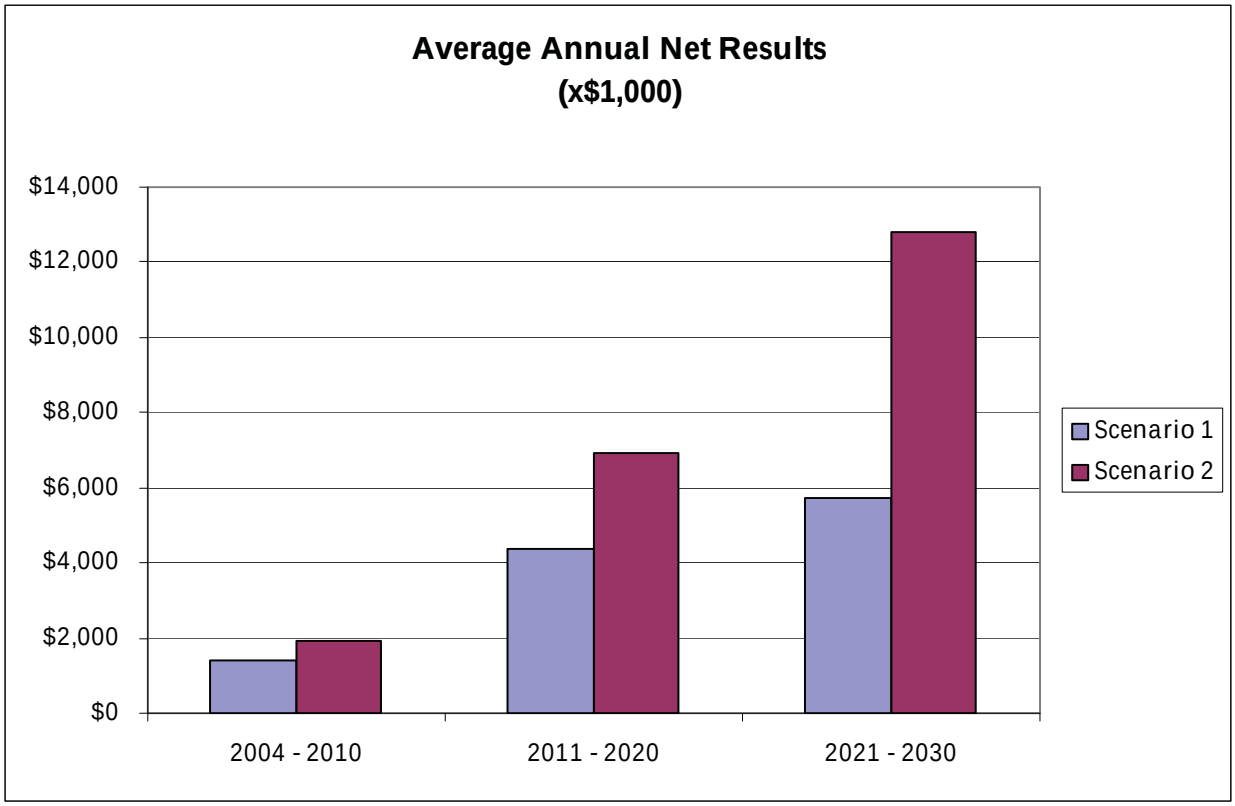
The Capital Improvement annual results are negative for both scenarios because there is only one source of revenue dedicated for capital improvements (the Parks Impact Fee). Fortunately the General Fund results produce sufficient net revenues to both cover the

Capital Improvement deficits and also produce overall positive fiscal results for both scenarios.

D. Average Annual Results

The chart and table below summarizes the average annual net fiscal results (General Fund and Capital Improvement) for three time periods—(1) 2004 – 2010; (2) 2011- 2020; and (3) 2021 - 2030.

Figure 7: Average Annual Results



Average Annual Results (x$1,000)
City of Frederick, Maryland

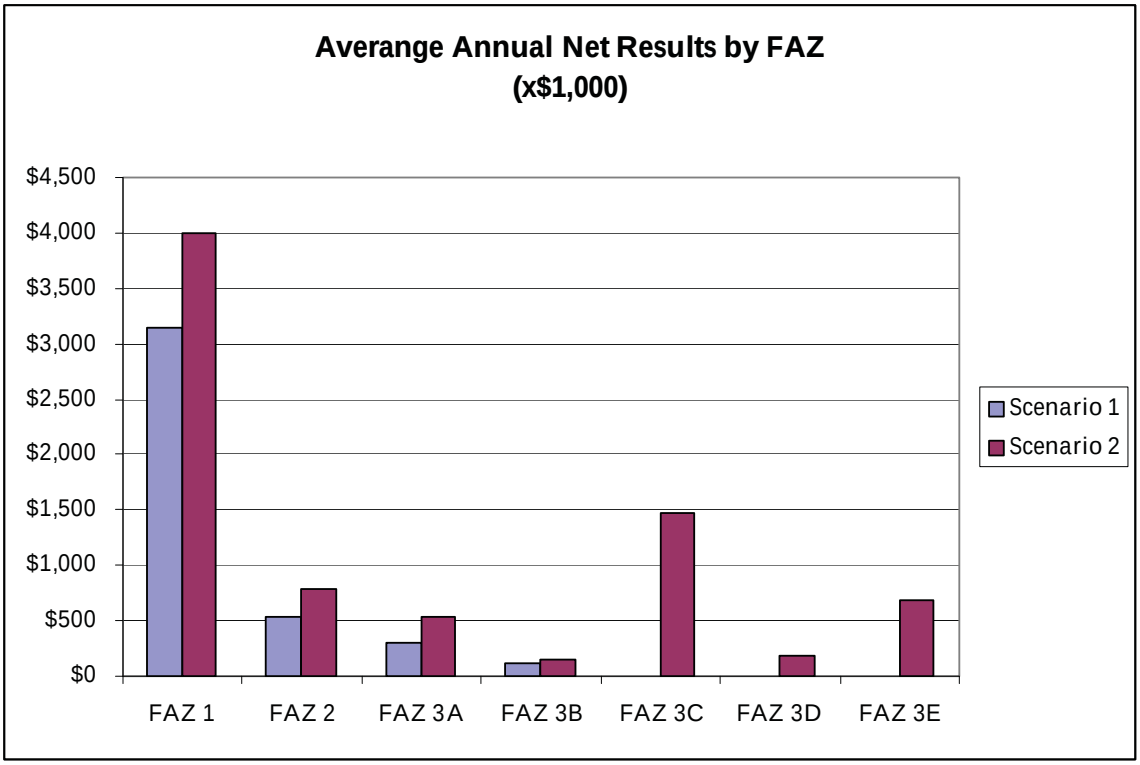
	2004 -2010			2011 - 2020			2021 -2030		
	Revenues	Expenditures	Net Result	Revenues	Expenditures	Net Result	Revenues	Expenditures	Net Result
Scenario 1	$3,145	$1,766	$1,379	$11,345	$6,967	$4,378	$18,576	$12,871	$5,704
Scenario 2	$4,844	$2,928	$1,916	$20,172	$13,240	$6,932	$34,813	$21,988	$12,825

The highest average annual results for both scenarios occur in the years 2021-2030 as development reaches completion and maximum revenues are produced. This is

especially the case with Scenario 2 as it average annual results for the years 2021-2030 are almost double its average annual results for the previous 10 year period.

The chart below shows the average annual results by FAZ.

Figure 8: Average Annual Results by FAZ



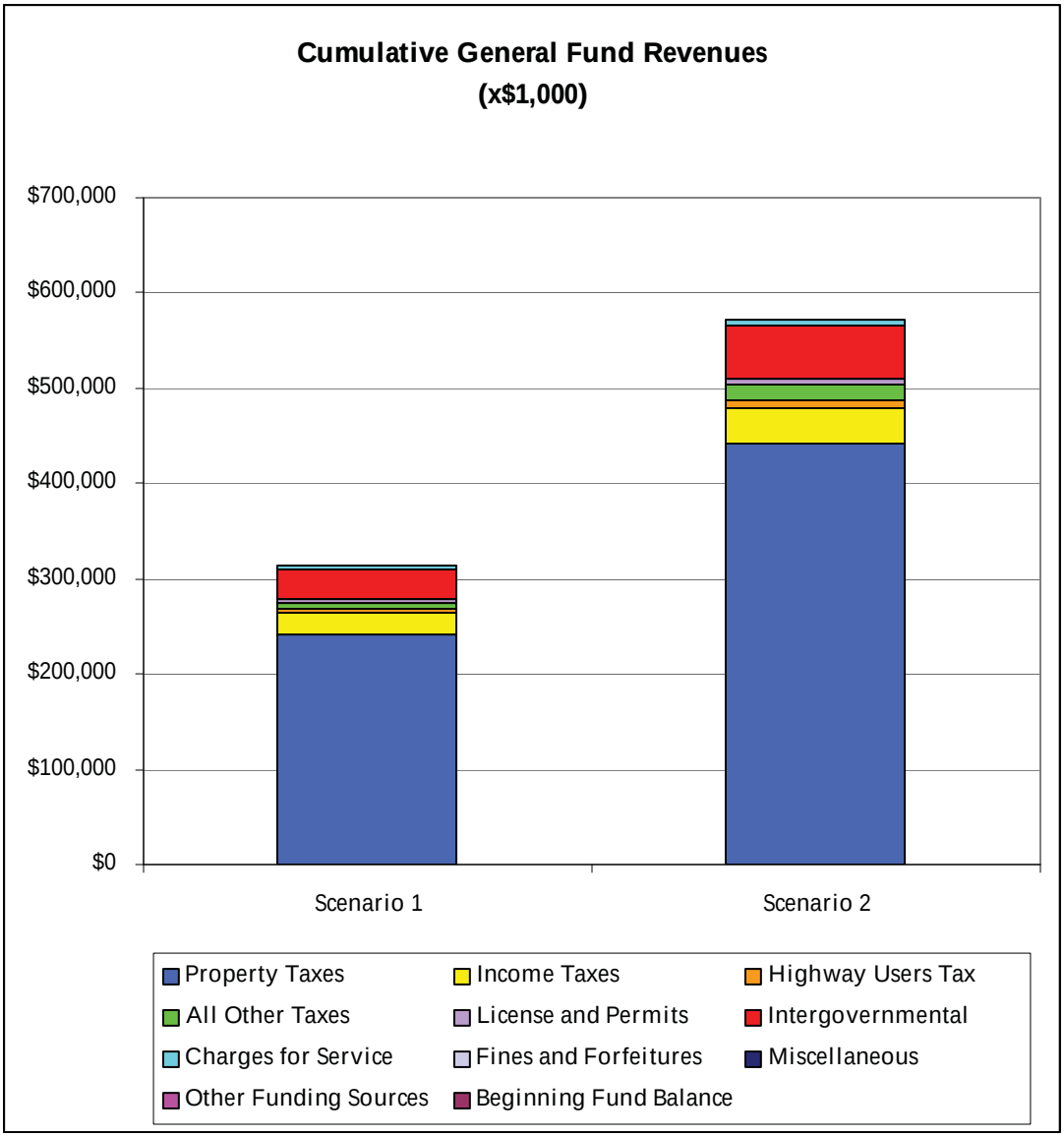
All FAZ in both scenarios produce positive average annual results, with FAZ 1 producing the highest average results for both scenarios.

E. Cumulative Results

1. Revenues

The table below shows the cumulative General Fund revenues generated by each scenario over the 26 year planning period.

Figure 9: Cumulative General Fund Revenue by Source



Property tax revenues account for the largest source of revenue under both scenarios. In the current FY04 budget, property taxes are also the largest revenue source and account for 44% of General Fund revenues. This analysis highlights the importance of property taxes as a growth-related revenue and the importance of the assessed values of future development.

Personal Income Tax revenues account for 7.2% of General Fund revenues in Scenario 1 and 6.7% in Scenario 2. The lower percentage in Scenario 2 is the result of a few of the FAZ having a greater focus on nonresidential development than residential

development. These FAZ also account for the reason that Scenario 2 "All Other Taxes" is a higher percentage of General Fund revenues than Scenario 1 as the majority of the "All Other Taxes" are business personal property taxes.

The Intergovernmental category account for the second largest source of revenues in this analysis. The largest revenue source in this category is the Tax Differential paid by the County to the City. Other significant revenues include Community Action Agency Grants and Grant for Public Safety.

Fines and Forfeitures, Miscellaneous, Other Funding Sources, and Beginning Fund Balance are considered fixed relative to new growth. These revenues are considered fixed because they are dependent on factors external to the City (such as interest rates and investment income), or one-time in nature (Beginning Fund Balance, Sale of General Fund Assets), or are minor revenues.

Revenues from Park Impact Fees are the only revenue source for Capital Improvements. These fees are imposed on residential development only. This analysis assumes that 75% of new residential development will have a HOA pool (and pay the $586 per unit fee) with the remaining 25% paying the $868 per unit fee for units without a HOA pool.

Figure 10: Cumulative Capital Improvement Revenue by Source

Cumulative Capital Revenue (x$1,000)
City of Frederick, Maryland

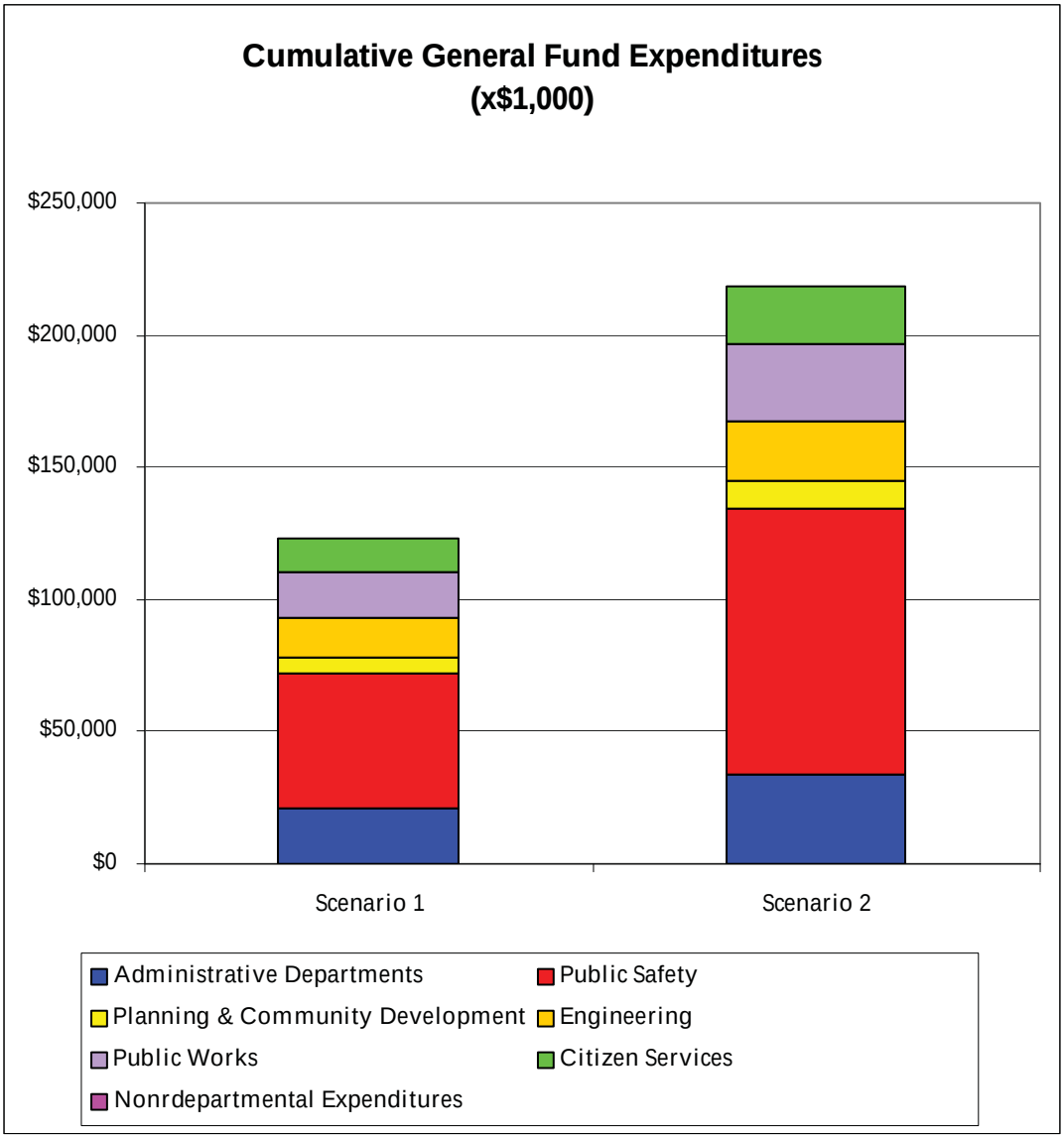
Category	Scenario 1 Revenue	%	Scenario 2 Revenue	%
Park Impact Fee Revenue	$6,928	100.0%	$11,922	100.0%
TOTAL	**$6,928**	**100.0%**	**$11,922**	**100.0%**

The park impact fees are the only dedicated revenues for new growth's share of Capital Improvements. The rest of the funding for Capital Improvements come from the General Fund either in the form of debt service payments or Pay-Go cash payments.

2. Expenditures

The table below shows the cumulative General Fund revenues generated by each scenario over the 26 year planning period.

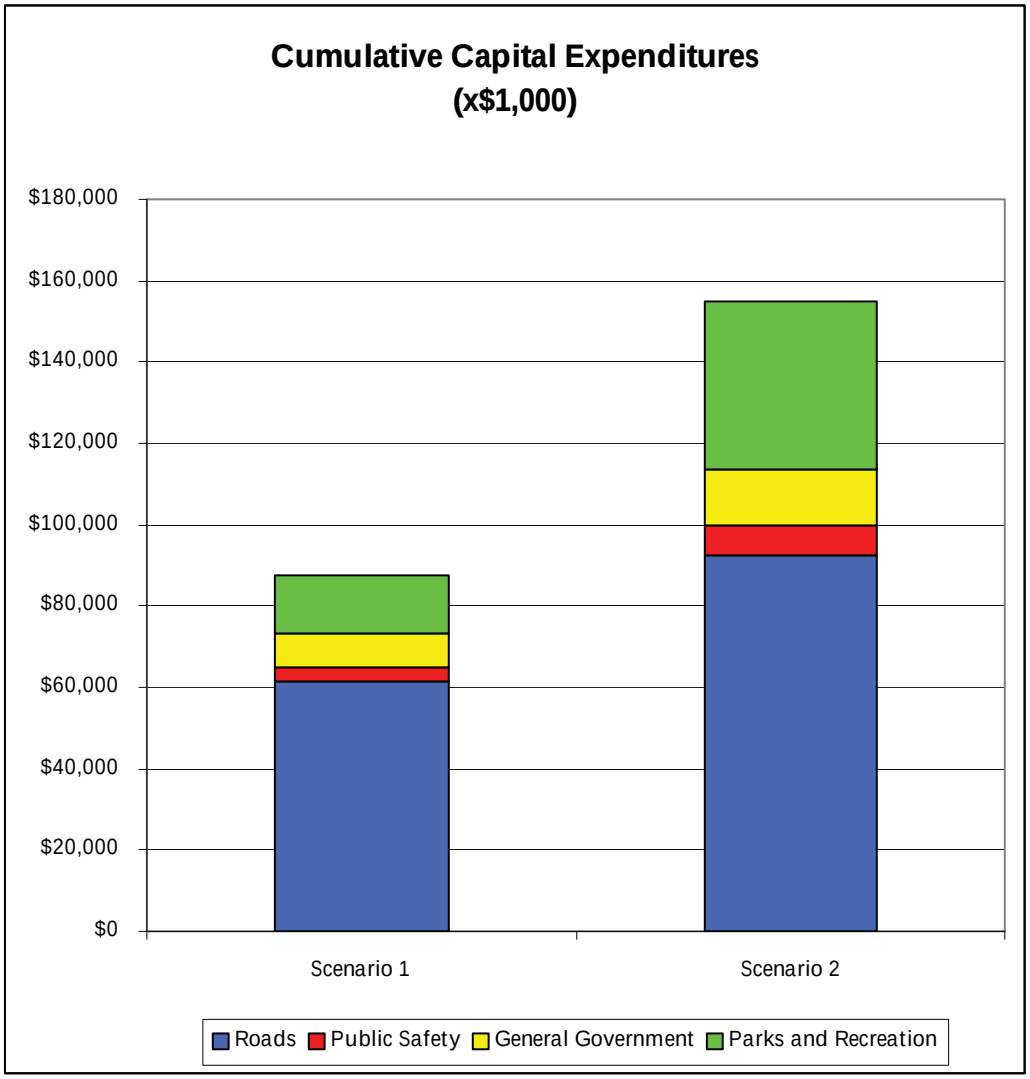
Figure 11: Cumulative General Fund Expenditures by Source



Public Safety accounts for the largest source of General Fund expenditures in both scenarios. Administrative Departments are the second largest category of expenses as a result of growth in other City departments as well as growth in the City. The next largest category of General Fund expenditures is Public Works, followed in order by Engineering, Citizen Services, and Planning and Community Development.

Nondepartmental expenditures are considered fixed relative to new growth. These expenditures are considered fixed because they are not dependent on new growth (such as existing debt service which the City is obligated to pay regardless of growth), or not expected to recur (Contingency Funds), or are minor expenses.

Figure 12: Cumulative Capital Expenditures by Source



These expenditures reflect debt/Pay-Go financing of 95%/5% under both scenarios. Roads account for the largest category of Capital Improvements followed by Parks and Recreation, General Government, and Public Safety respectively.

The road costs reflect the City's share of the capital costs. It is assumed that the City will fund an average of 11% of road projects with the remaining 89% being funded by the State, County, and developers. Given the magnitude of these projects, changes to

these funding assumptions could have an impact on the overall fiscal results of the scenarios.

The debt financing does not take the City's current debt service or planned debt issues. Nor does it consider the City's debt management thresholds as this sort of analysis would have to consider both new growth as well as the City's existing development.

F. Utility Costs

The table below lists the cumulative utility costs of new growth by FAZ provided by HNTB. These costs do not reflect any revenues.

Figure 13: Cumulative Utility Costs

Cumulative Utility Costs by FAZ (x$1,000)
City of Frederick, Maryland

	Scenario 1			Scenario 2		
FAZ	**Water**	**Sewer**	**TOTAL**	**Water**	**Sewer**	**TOTAL**
FAZ 1	$30,245	$32,906	$63,151	$42,679	$45,872	$88,551
FAZ 2	$3,676	$3,955	$7,631	$4,823	$5,225	$10,048
FAZ 3A	$945	$975	$1,920	$2,101	$2,145	$4,246
FAZ 3B	$317	$337	$654	$413	$453	$866
FAZ 3C	$0	$0	$0	$6,444	$6,771	$13,215
FAZ 3D	$0	$0	$0	$1,301	$1,437	$2,737
FAZ 3E	$0	$0	$0	$3,633	$3,988	$7,620
TOTAL	$35,183	$38,174	$73,356	$61,393	$65,891	$127,284

These costs are not included in the fiscal impact results because the City operates its water and sewer utilities as self-supporting enterprise funds financed with revenues from utility rates.

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

Water and Sewer Services Analysis

October, 2003

Prepared by:

HNTB Corporation
Architects Engineers Planners

1.0 INTRODUCTION

1.1 Purpose

The purpose of this technical memorandum is to summarize impacts of two alternative scenarios for the City of Frederick, Maryland on the city's water and wastewater facilities. The results of this evaluation will be compiled with the transportation and fiscal evaluations, to enable the city to consider the overall impacts of the scenarios.

Increased water and sewer demands due to future growth, development, and potential annexations are evaluated in this memo to determine if the existing facilities can accommodate growth to the year 2030. Where the existing facilities cannot accommodate growth expectations, this memo identifies the new facilities required, the issues associated with potential new service areas, and the associated order-of-magnitude costs for expanded service options.

2.0 EXISTING CONDITIONS

Based on the 2000 census, the City of Frederick's population in 2000 was 52,767. The City of Frederick's planned sewer and water service boundary (Service Area) is approximately 20 square miles and serves residential, commercial, and industrial users. Public water and sewer is provided to the entire City of Frederick.

2.1 Water Service – Current and Planned Capacity

Firm Capacity

According to "10 States Standards"[1] and best engineering practices in general, the firm capacity of a utility is determined with the largest treatment plant process units out of service. In addition, the firm capacity should be assessed with the water supply resources being at low flow. Based on the 2000 Water and Sewer Master Plan and this definition, the City of Frederick has a firm capacity of 10.7 million gallons per day (MGD) from the three water treatment plants, of which, under a Maryland Department of the Environment consent order, 10.12 MGD is available during drought conditions.

The city's one groundwater well has a capacity of 0.365 MGD,.

"Adequate Supply Model"

Based upon the consent decree, the city has developed the concept that "adequate supply" is the safe yield flow plus additional flow due to operational management during drought

[1] Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (1997). *Recommended Standards for Wastewater Facilities*. Albany, New York: Health Education Services.

conditions. Using available data and modeling techniques, Malcolm Pirnie[2] developed a mass flow model of the Monocacy River and WTP, using the worst draught on record (1966). This model, combined with other operational practices and a long term simulation model, resulted in an "adequate supply" figure of about 9.6 MGD for record drought conditions occurring in 1964 through 1967.

It is noted that the Malcolm Pirnie simulation model included the new well capacity of 0.365 MGD in the modeled result of 9.6 MGD and that this "adequate supply" analysis is the basis for the city's current water supply and allocation.

However, given the concept of "safe yield" and operational management, the inclusion of the well in the "adequate supply" is questionable for future planning purposes. It is advised that the model be rerun to determine what impact the well has on the "adequate supply" value. For purposes of this report, it is assumed that the well is not included, and the "adequate supply" value is estimated to be 9.2 MGD. This is only an estimate, as the model would have to be rerun to determine exactly what impact the well has on the "adequate supply" figure.

It is also noted that the Malcolm Pirnie model also used operational management techniques to obtain a greater amount of flow from the Fishing Creek system. In conjunction with the consent order and operational strategies for the Monocacy River, the total affects of these techniques on increased flow capacity is not clear. This element of the modeled "adequate supply" should also be evaluated for future water planning purposes, but the effect that this technique has on the 9.6 MGD figure cannot be estimated. Thus, for this report the 9.2 MGD estimate will be used.

Water Supplied by County

The City of Frederick obtains approximately 2.0 MGD from Frederick County on an as need basis. The amount that may be transferred cannot exceed 3.0 MGD, and is outlined in the consent order. These limits govern until either December 31, 2006 or when a new agreement is established.

Currently, the city is negotiating a contract to obtain 12.0 MGD max daily flow from Frederick County, (which would provide approximately 8.6 MGD average daily flow based on the city's Water Allocation Ordinance that stipulates a peaking factor of 1.4), to increase the amount of water available for city allocation. When this agreement is complete and the actual facilities are constructed, the city's "adequate supply" would be the 9.2 MGD existing, plus the additional 8.6 MGD from the county for a total of approximately 17.8 MGD.

The first phase of this agreement will include expansion of the county WTP and construction of a transmission line. This phase is anticipated to be completed within three years and will convey approximately 5.0 MGD to the city. The remaining additional capacity will come at a later time.

[2] Malcolm Pirnie, Task 2 Report, 2003

The completion of this agreement is critical for determining the amount of planned population and employment growth that the city can accommodate; the amount of land that should be annexed into the city; and the city's ability to serve a growing population to the year 2030. It is also noted that with this agreement, the city will be obtaining nearly half of its water from the county. For further details regarding the existing water supply capacity, see Figure 1.

2.2 Wastewater Service

The City of Frederick Wastewater Treatment Plant (WWTP) has a design average daily flow capacity of 8.0 MGD, a maximum (24-hour) flow of 12.0 MGD, and a peak instantaneous flow of 16.0 MGD. The city also sends a portion of its wastewater to the Frederick County WWTP, but then treats the same amount of county wastewater so this transfer has no net impact on treatment capacity. The treatment capacity is 8.0 MGD, and requires a permit modification to exceed 8.0 MGD. The 1998-99 Engineering Study by O'Brien & Gere, *Frederick WWTP BNR Upgrade*, shows a current design of 8.0 MGD for the recently installed BNR System upgrades. The City has recently retained an engineering firm to evaluate the capacity of the current WWTP, given the new Maryland/Chesapeake Bay guidelines for total nitrogen removal. For purposes of this evaluation, a capacity of 8.0 MGD will be used.

The City of Frederick's sewer system serves the area generally corresponding to the city boundaries, according to the 2000 Water and Sewer Master Plan. But, there are areas of the city that the sewer service is provided by other providers as mentioned below.

- The Fort Detrick area has its own collection system.
- A small portion of the city lies in the Ballenger Creek Basin (south of I-70) and is served by a sewer system that discharges into the county's Ballenger Creek collection system and the Ballenger Creek WWTP.

The Monocacy collection system serves portions of Frederick County flows to the City of Frederick's WWTP where it can be treated on-site or diverted to Frederick County's Ballenger Creek WWTP for ultimate treatment through the Monocacy bypass interceptor. Normal practice is to divert this flow to the Monocacy bypass interceptor and on to the county's Ballenger Creek WWTP.

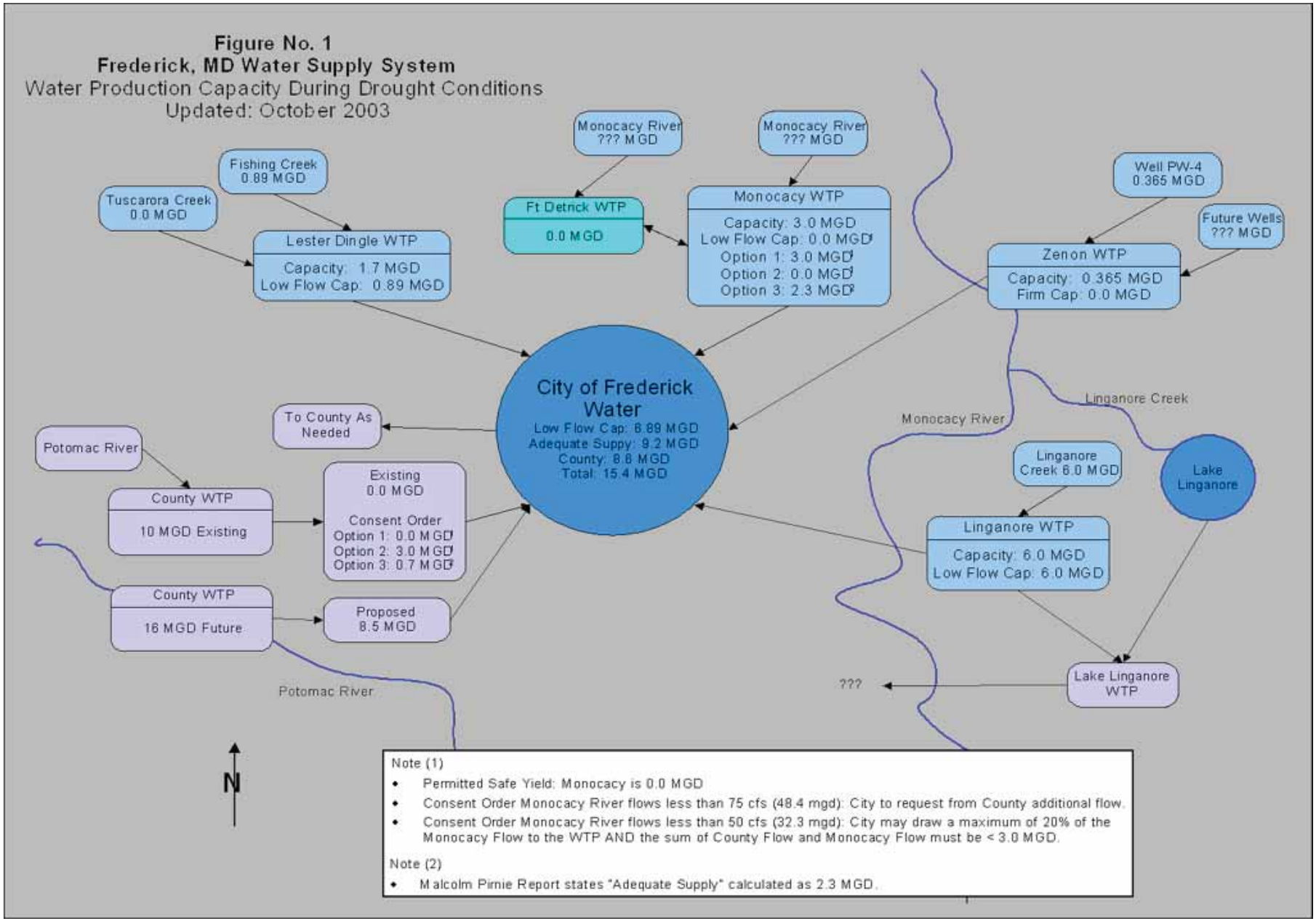


Figure No. 1
Frederick, MD Water Supply System
Water Production Capacity During Drought Conditions
Updated: October 2003
Monocacy River ??? MGD
Monocacy River ??? MGD
Fishing Creek 0.89 MGD
Tuscarora Creek 0.0 MGD
Ft Detrick WTP
0.0 MGD
Monocacy WTP
Capacity: 3.0 MGD
Low Flow Cap: 0.0 MGD
Option 1: 3.0 MGD
Option 2: 0.0 MGD
Option 3: 2.3 MGD
Well PW-4 0.365 MGD
Future Wells ??? MGD
Lester Dingle WTP
Capacity: 1.7 MGD
Low Flow Cap: 0.89 MGD
Zenon WTP
Capacity: 0.365 MGD
Firm Cap: 0.0 MGD
City of Frederick Water
Low Flow Cap: 8.89 MGD
Adequate Suppy: 9.2 MGD
County: 8.8 MGD
Total: 15.4 MGD
To County As Needed
Potomac River
Monocacy River
Linganore Creek
Linganore Creek 6.0 MGD
Lake Linganore
County WTP
10 MGD Existing
Existing 0.0 MGD
Consent Order
Option 1: 0.0 MGD
Option 2: 3.0 MGD
Option 3: 0.7 MGD
Linganore WTP
Capacity: 6.0 MGD
Low Flow Cap: 6.0 MGD
County WTP
16 MGD Future
Proposed 8.5 MGD
Lake Linganore WTP
???
Potomac River
N
Note (1)
• Permitted Safe Yield: Monocacy is 0.0 MGD
• Consent Order Monocacy River flows less than 75 cfs (48.4 mgd): City to request from County additional flow.
• Consent Order Monocacy River flows less than 50 cfs (32.3 mgd): City may draw a maximum of 20% of the Monocacy Flow to the WTP AND the sum of County Flow and Monocacy Flow must be < 3.0 MGD.
Note (2)
• Malcolm Pirnie Report states "Adequate Supply" calculated as 2.3 MGD.

3.0 SCENARIOS EVALUATED

The City of Frederick today and the land surrounding the city, which may be annexed in the future, has been divided into large areas as depicted on Map 1. Each area is called a Fiscal Analysis Zones (FAZ) and is further described below.

FAZ 1 This area is the land within the existing city boundary and lies completely within the city's planned Service Area. It is anticipated that during the next thirty years, portions of this area will become further developed. Although this will not entail annexation, vacant land will be developed and some developed lands may be converted to more intensive uses, thus expanding the water and sewer services needed.

FAZ 2 This includes areas that may be annexed that lie completely within the Service Area. These are fill-in areas adjacent to the city's current boundaries. This group of relatively small areas together comprises an approximately 12 percent increase in the city's land area.

FAZ 3 This includes areas both in and outside of the Service Area. These areas have been further subdivided into FAZ 3A through 3E. The feasibility of annexing and providing water and sewer services to each of these areas will play a part in developing the recommended scenario and identifying the combination of areas to be included within the city's boundaries by the year 2030.

Two alternative scenarios for the city's growth and development have been developed as part of the Comprehensive Plan update process. Scenario 1 – Upgrading in Place – includes future growth within the existing city limits (FAZ 1), along with the additional annexation areas FAZ 2, 3A, and 3B. Scenario 2 – Expanding Horizons – includes the Scenario 1 areas plus FAZs 3C, 3D, and 3E. In addition, the second scenario assumes a higher level of development for all FAZs.

Table 1.1 indicates the size of the annexation areas for each scenario.

Map 1: Fiscal Analysis Zones and Planned City Service Area Boundary Map

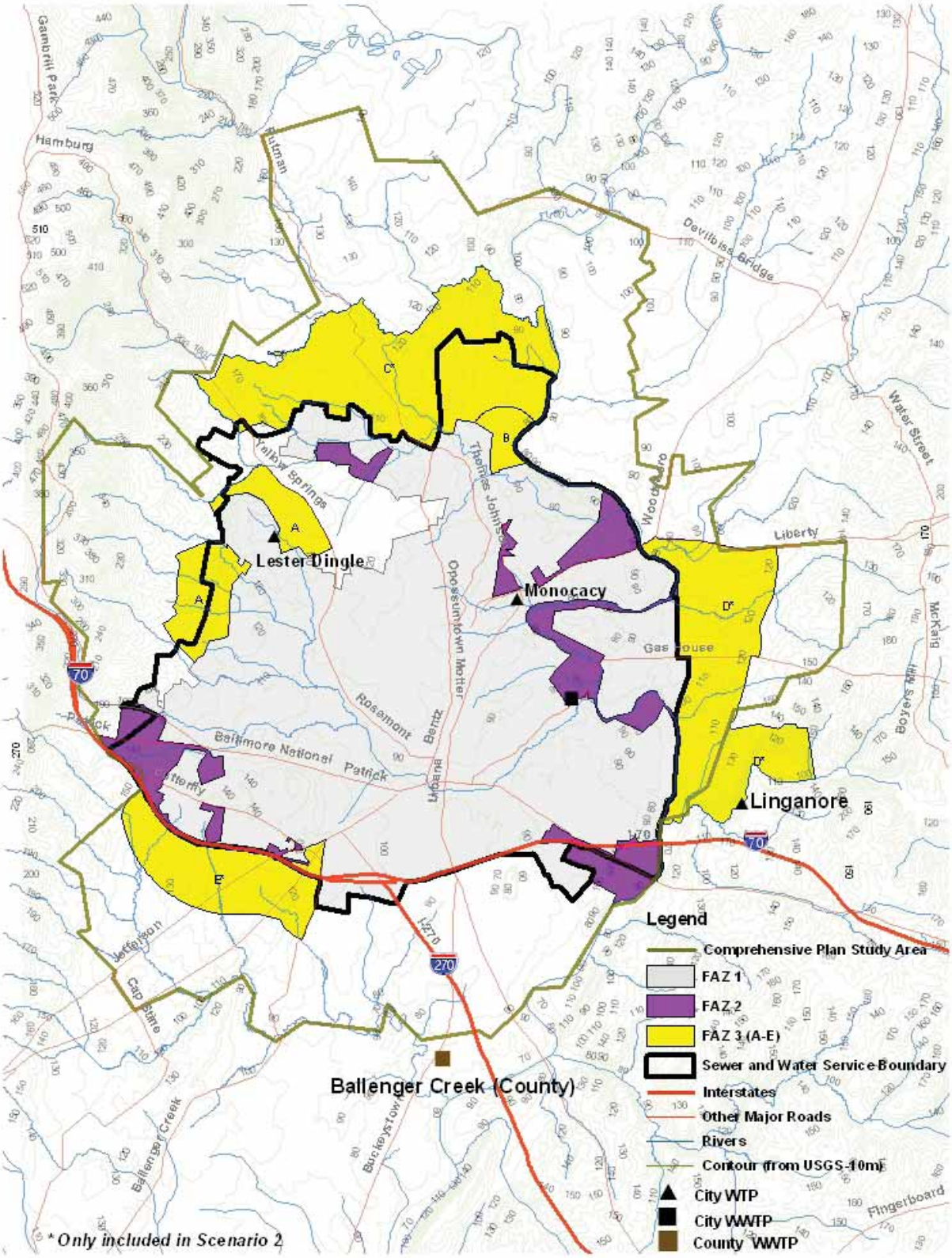


Table 1.1
Annexation Area Size

Area Name	Inside Service Area (acres)	Outside Service Area (acres)	Total (acres)
Scenario 1			
FAZ 1	13,339	0	13,339
FAZ 2	1,393	250	1,643
FAZ 3A	558	240	798
FAZ 3B	174	0	174
Total	**15,464**	**490**	**15,954**
Scenario 2			
FAZ 1	13,339	0	13,339
FAZ 2	1,393	250	1,643
FAZ 3A	558	240	798
FAZ 3B	174	0	174
FAZ 3C	400	1,870	2,270
FAZ 3D	0	1,387	1,387
FAZ 3E	0	1,060	1,060
Total	**15,864**	**4,807**	**20,671**

Population, household, and non-residential growth has been estimated for each FAZ for the period 2000 to 2030, and is summarized in Table 1.2.

Table 1.2
Number of Households and Acres of Non-Residential Development Growth Summary for 2030

Area Name	Households (units)	Non-Residential Development (acres)
Existing Development Served		
FAZ1	20,891	4,046
Scenario 1 – Total for 2030		
FAZ 1	30,480	5,022
FAZ 2	2,120	161
FAZ 3A	638	25
FAZ 3B	144	11
Total	**33,382**	**5,219**
Scenario 2 – Total for 2030		
FAZ 1	34,442	5,199
FAZ 2	2,416	207
FAZ 3A	1,065	29
FAZ 3B	172	18
FAZ 3C	2,456	127
FAZ 3D	447	45
FAZ 3E	1,280	132
Total	**42,278**	**5,757**

4.0 WATER AND SEWER SERVICES

For purposes of this memo, the year 2000 was established as the base existing condition. The incremental amount of growth and development occurring in and around the City of Frederick from 2000 to 2030 was then forecast. The same forecasts are being used in the fiscal and transportation testing of the two growth scenarios for the city.

4.1 Water Demand Estimates for Non-Residential Growth

The increased amount of water and sewer service demand due to non-residential growth and annexation can be estimated in a number of ways. Two methods were evaluated for this analysis and the one that used the city's Water Allocation Ordinance standards (and which projected the higher water demands) was selected to determine future water demand. An explanation of the two methods, along with the results, is outlined below.

The first analysis method was based on employment projections and assumes 20 gallons of water use per day (GPD) per employee, and no additional "process wastewater" component. This analysis assumes that non-residential development is composed solely of employment operations with minimal water use – typically referred to as "dry" versus "wet" industries. The results using this method are shown in Table 1.3.

The second analysis method used the City of Frederick's Water Allocation Ordinance values for non-residential acreage. As outlined in this ordinance, new non-residential development of various lot sizes is to be assessed using water demand values as follows:

Lot size 4.99 acre or less:	1,800 GPD/acre
Lot size 5.0 – 19.99 acre:	1,350 GPD/acre
Lot size 20.0 acre or more:	900 GPD/acre

For this analysis, we have assumed the lower value of 900 GPD/acre.

As shown in Table 1.4, this second analysis results in higher planned water/ sewer needs, and was used for this planning effort, since it is based on the city's Water Allocation Ordinance standards.

4.2 Water Demand Estimates for Residential Growth

The increased amount of water and sewer service demand due to potential residential growth in the city and within potential annexation areas was determined based on the growth in the number of housing units between 2000 and 2030. According to the city's Water Allocation Ordinance, the following water values should be used:

Single Family Unit:	250 GPD / unit
Townhouse Unit:	225 GPD / unit
Multi-family Unit:	180 GPD / unit

4.3 Results – Water Demand

Employing the two analysis methods, the estimated water demand was tabulated as shown below in Tables 1.3 and 1.4. While checking the existing water demand estimated versus 7.0 MGD existing water demand from data, the second method produces a more accurate, yet conservative estimate for future water demand.

Table 1.3
Estimated Future Average Day Water Demand
Analysis No. 1 – Using Employment at 20 GPD /Employee

	Scenario 1 (GPD)	Scenario 2 (GPD)
Demand for Employment		
Existing[1]	835,000	835,000
New Service + Increment	446,000	872,000
Total 2030	*1,281,000*	*1,707,000*
Demand for Residential Units		
Existing[1]	4,554,000	4,554,000
New Service + Increment	2,723,000	4,724,500
Total 2030	*7,277,000*	*7,724,500*
Employment + Residential	*8,558,000*	*9,431,500*

[1] Using this method – existing water use would be estimated at 835,000 plus 4,554,000 or 5,389,000 which is less than existing water usage of 7.0 MGD.

Table 1.4
Estimated Future Average Day Water Demand
Analysis No. 2 – Using Non-Residential Acreage
And Water Allocation Ordinance Values

	Scenario 1 (GPD)	Scenario 2 (GPD)
Demand for Non-Residential Acreage		
Existing[1]	3,641,000	3,641,000
New Service + Increment	1,056,000	1,540,100
Total 2030	*4,697,000*	*5,181,000*
Demand for Residential Units		
Existing[1]	4,554,000	4,554,000
New Service + Increment	2,723,000	4,724,000
Total 2030	*7,277,000*	*9,278,000*
Acreage + Residential	*11,974,000*	*14,459,000*

[1] Using this method – existing water use would be estimated at 3,641,000 plus 4,554,000 or 8,195,000 which is more than existing water usage of 7.0 MGD..

Using the Water Allocation Ordinance (Analysis No. 2) as the basis for estimating employment acreage and the residential housing units, and factoring the existing water

demand of 7.0 MGD, the estimated total average water supply demand for the City of Frederick in 2030 is indicated in Table 1.5. The estimated water demand is 10.8 MGD for Scenario No. 1 and 13.3 MGD for Scenario No. 2. A detailed breakdown of the existing and new water service demand by FAZ area is also shown.

Table 1.5
Estimated Water Demand – Detailed
Based on Analysis No. 2

Area Name	Existing Served[1] (MGD)	Existing New Service[2] (MGD)	Increment New Service[3] (MGD)	Total New Service (MGD)	Total 2030 Service (MGD)
Scenario 1					
FAZ 1	7.0		2.963	2.963	9.963
FAZ 2		0.250	0.355	0.606	0.606
FAZ 3A		0.085	0.082	0.167	0.167
FAZ 3B		0.014	0.028	0.042	0.042
Total	**7.0**	**0.35**	**3.4**	**3.8**	**10.8**
Scenario 2					
FAZ 1	7.0		4.009	4.009	11.009
FAZ 2		0.251	0.463	0.714	0.714
FAZ 3A		0.085	0.179	0.264	0.264
FAZ 3B		0.014	0.040	0.054	0.054
FAZ 3C		0.087	0.576	0.662	0.662
FAZ 3D		0.036	0.114	0.150	0.150
FAZ 3E		0.070	0.342	0.412	0.412
Total	**7.0**	**0.54**	**5.72**	**6.3**	**13.3**

[1] *Existing values are assumed based on existing water usage of 7.0 MGD.*
[2] *Existing development requiring new service*
[3] *Increment – new growth from 2000 – 2030*

Further details, regarding water demand implications for each individual annexation area, are located in the Attachment A tables[3].

4.4 Results - Sewer Service Demand

The sewer service values for average day service are assumed to be 110 percent of the above water values. This is based on the comparison of annual average water use (7.0 MGD) and average annual wastewater flow (8.0 MGD). The calculated 110% factor is very reasonable, given that a utility's wastewater volume will typically be higher due to infiltration/ inflow (I/I) entering the sewer service system. This additional I/I flow can range to 30 % or higher. The Frederick sewer system is only 110%, which indicates that the city is doing a good job at combating I/I. Using this method, the results for Analysis No. 2 are indicated in Table 1.6. The new sewer service demand, revised to consider the existing sewer flow of 8.0 MGD, is shown in Table 1.7

[3] Attachment A is provided in a separate Excel file called "SewerWater Att A,B 102803.xls"

Table 1.6
Estimated Sewer Service Demand
Analysis No. 2 – Using Forecast Non-Residential Acreage
And Water Allocation Ordinance Values

	Scenario No. 1 (GPD)	Scenario No. 2 (GPD)
Demand for Non-Residential Acreage		
Existing	4,005,000	4,005,000
New Service + Increment	1,161,900	1,694,100
Total 2030	*5,166,900*	*5,699,100*
Demand for Residential Units		
Existing	5,009,400	5,009,400
New Service + Increment	2,994,900	5,197,000
Total 2030	*8,004,300*	*10,206,400*
Total Demand	**13,171,000**	**15,906,000**

Table 1.7
Estimated Wastewater Demand – Detailed
Based on Analysis No. 2

Area Name	Existing Served[1] (MGD)	Existing New Service[2] (MGD)	Increment New Service[3] (MGD)	Total New Service (MGD)	Total 2030 Service (MGD)
Scenario 1					
FAZ 1	8.0		3.259	3.259	11.259
FAZ 2		0.280	0.390	0.670	0.670
FAZ 3A		0.093	0.090	0.183	0.183
FAZ 3B		0.015	0.031	0.046	0.046
Total	**8.0**	**0.39**	**3.8**	**4.2**	**12.2**
Scenario 2					
FAZ 1	8.0		4.410	4.410	12.410
FAZ 2		0.276	0.509	0.785	0.785
FAZ 3A		0.093	0.197	0.290	0.290
FAZ 3B		0.015	0.044	0.059	0.059
FAZ 3C		0.096	0.634	0.730	0.730
FAZ 3D		0.040	0.125	0.165	0.165
FAZ 3E		0.077	0.376	0.453	0.453
Total	**8.0**	**0.60**	**6.3**	**6.9**	**14.9**

[1] *Existing values are assumed based on existing water usage of 7.0 MGD.*
[2] *Existing development requiring new service*
[3] *Increment – new growth from 2000 – 2030*

5.0 COSTS

Table 1.8 and 1.9 show the major costs and service values for the various FAZs for Scenario 1 and Scenario 2.

The sewer and water system improvement costs for FAZ 1 and 2 are based upon the project descriptions from the 2000 Water and Sewer Master Plan, but have been re-estimated based upon 2003 dollars. The 2000 estimated costs for interceptor sewer-related projects typically changed by 40% by this re-estimation. This re-estimation caused the water main costs to change by about 10%. These costs should be considered with a +/- 50% contingency at this point.

The costs for FAZ 3A, 3B, 3C, 3D and 3E are very rough estimates, given that no preliminary planning has been done for water or sewer service to these areas. These costs should be considered with a +/- 100% contingency at this point.

Table 1.8
Flow and Cost Estimates by FAZ
Scenario 1

STUDY AREA	Water and Wastewater Requirements[1]	Local Development Costs Water and Sewer [2]	Sewer Service Costs (interceptors)	Wastewater Treatment	Water Service Costs (mains)	Water Treatment
Baseline	• Water: Existing 7.0 MGD • Wastewater (WW): Existing 8.0 MGD	• None (Existing Service)	• 2000 Water & Sewer Master Plan developed upgrade and expansion plan/cost	• 8.0 MGD (Existing Plant Capacity)	• 2000 Water & Sewer Master Plan developed upgrade and expansion plan/cost	• 9.2 MGD ("adequate supply" model)
FAZ 1[3]	• Water: Additional 3.0 MGD • WW: Additional 3.3 MGD	• $63.2 M	• In city service area • Upgrades planned • Capital $2.1 M	• Add 3.2 MGD capacity • Expand city WWTP or transfer more to county	• In existing city service area • Upgrades planned • Capital $5.5 M	• Need 7.0 plus 3.0 for a total of 10.0 MGD. • Provide 0.8 MGD additional with initial county 5.0 MGD
FAZ 2[3]	• Water: Additional 0.61 MGD • WW: Additional 0.67 MGD	• $13.4 M	• Planned service areas • Capital $9.3 M	• Add 0.67 MGD capacity • Expand city WWTP or transfer more to county	• In city's planned service area • Capital $11.0 M	• Need 10.0 plus 0.61 for a total of 10.6 MGD • Provide 1.4 additional water with initial county 5.0 MGD
FAZ 3A[3]	• Water: Additional 0.17 MGD • WW: Additional 0.18 MGD	• $4.1 M	• Some planning done • In city service area • Requires some interceptor extensions beyond FAZ 2 - Estimated $0.75 M	• Add 0.18 MGD capacity • Expand city WWTP or transfer more to county	• Some planning done • In city's planned service area • Requires main extension • Requires main extensions beyond FAZ 2 – Estimated $0.5 M	• Need 10.6 plus 0.17 for a total of 10.77 MGD • Provide 1.57 additional water with initial county 5.0 MGD
FAZ 3B[3]	• Water: Additional 0.04 MGD • WW: Additional 0.046	• $1.0 M	• Some planning done • In county service area • Interceptor needs in FAZ 2	• Add 0.04 MGD capacity • Expand city contract with County WWTP for more flow	• Some planning done • In city's planned Service Area • Main extension in FAZ 2	• Need 10.77 plus 0.04 for a total of 10.8 MGD • Provide 1.6 additional water with initial county 5.0 MGD
TOTAL	• Total Water Demand: 7.0 + 3.8 = 10.8 MGD • Total Wastewater Produced: 8.0 + 4.2 = 12.2 MGD	• Total Cost: $81.7 M	• Total Cost: $12 M	• Wastewater Capacity Needed: 8.0 + 4.2 MGD = 12.2 MGD • Transfer minimum 0.04 MGD to maximum 4.2 MGD to county • Capacity cost of $16 M for 4.2 MGD	• Total Cost: $17 M	• County Water at 5.0 MGD at cost of $27.0 M, covers the 3.8 MGD additional demand

[1] *FAZ wastewater (WW) values are based on 110% of water values.*
[2] *Assumed to be costs borne by the developer including costs of extensions from the main to lateral; laterals; hydrants; and manholes. See Attachment B for detailed analysis* (see separate Excel file called "SewerWater Att A,B 102803.xls"*)*
[3] *The costs for FAZ 1 and 2 are based upon the project descriptions from the 2000 Master Water and Sewer Plan, but have been re-estimated based upon 2003 dollars. The 2000 estimated costs for interceptor sewer-related projects typically changed by 40% by this re-estimation. The water main costs typically changed by 10%. These costs should be considered with a +/-50% contingency at this point.*
The costs for FAZ 3A and 3B are rough estimates, given that no preliminary planning has been done for water or sewer service to these areas. These costs should be considered with a +/- 100% contingency at this point

Table 1.9
Flow and Cost Estimates by FAZ
Scenario 2

STUDY AREA	Water and Wastewater Requirements[1]	Local Development Costs Water and Sewer[2]	Sewer Service Costs (interceptors)	Wastewater Treatment	Water Service Costs (force mains)	Water Treatment
Baseline	• Water: Existing 7.0 MGD • Wastewater (WW): Existing 8.0 MGD	• None (Existing Service)	• 2000 Master Water & Sewer Plan developed upgrade and expansion plan/cost	• 8.0 MGD (existing plant capacity)	• 2000 Master Plan developed upgrade and expansion plan/cost	• 9.2 MGD ("adequate supply" model)
FAZ 1[3]	• Water: Additional 4.0 MGD • WW: Additional 4.4 MGD	• $88.6 M	• In existing city service area • Upgrades planned • Capital $2.0 M	• Add 4.4 MGD capacity • Expand city WWTP or transfer more to county	• In city's existing service area • Upgrades planned • Capital $5.0 M	• Need 7.0 plus 4.0 for a total of 11.0 MGD. • Provide 1.8 MGD additional with initial county 5.0 MGD
FAZ 2[3]	• Water: Additional 0.714 MGD • WW: Additional 0.785 MGD	• $15.9 M	• In city's planned service area • Capital $6.7 M	• Add 0.785 MGD capacity • Expand city WWTP or transfer more to county	• In city's planned service area • Capital $10.0 M	• Need 11.0 plus 0.7 for a total of 11.7 MGD. • Provide 2.5 MGD additional with initial county 5.0 MGD.
FAZ 3A[3]	• Water: Additional 0.264 MGD • WW: Additional 0.29 MGD	• $6.5 M	• Some planning done in Water & Sewer Master Plan • In city's planned service area • Requires some interceptor extensions beyond FAZ 2 - Estimated $0.5 M	• Add 0.29 MGD capacity • Expand city WWTP or transfer more to county	• Some planning done in Water & Sewer Master Plan • City service area • Requires main extension • Requires main extensions beyond FAZ 2 – Estimated $0.3 M	• Need 11.7 plus 0.26 for a total of 11.96 MGD. • Provide 2.76 MGD additional with initial county 5.0 MGD
FAZ 3B[3]	• Water: Additional 0.054 MGD • WW: Additional 0.059 MGD	• $1.2 M	• Some planning done in Water & Sewer Master Plan • In county service area • Interceptor needs in FAZ 2	• Add 0.059 MGD capacity • Transfer more to county WWTP	• Some planning done in Water & Sewer Master Plan • In city's planned service area • Main extension in FAZ 2	• Need 11.96 plus 0.05 for a total of 12.0 MGD. • Provide 2.8 MGD additional with initial county 5.0 MGD
FAZ 3C[3]	• Water: Additional 0.662 MGD • WW: Additional 0.728 MGD	• $15.5 M	• Some planning done in Water & Sewer Master Plan • In county service area • Requires interceptor extensions beyond FAZ 2 – Estimated $1.0 M • Capacity issue possible in Monocacy Interceptor	• Add 0.728 MGD capacity • Transfer more to county WWTP or expand county WWTP	• Some planning done in Water & Sewer Master Plan • In city's planned service area • Requires main extension beyond FAZ 2 – Estimated $0.5 M	• Need 12.0 plus 0.66 for a total of 12.66 MGD. • Provide 3.46 MGD additional with initial county 5.0 MGD

Table 1.9 (Continued)
Flow and Cost Estimates by FAZ
Scenario 2

STUDY AREA	Water and Wastewater Requirements[1]	Local Development Costs Water and Sewer [2]	Sewer Service Costs (interceptors)	Wastewater Treatment	Water Service Costs (force mains)	Water Treatment
FAZ 3D[3]	• Water: Additional 0.150 MGD • WW: Additional 0.165 MGD	• $3.8 M	• No planning done in Water & Sewer Master Plan • In county service area • Interceptor needed beyond FAZ 2 – Estimated $1.0 M	• Add 0.165 MGD capacity • Transfer more to county WWTP or expand county WWTP	• No planning done in Water & Sewer Master Plan • In city's planned service area • Requires main extension beyond FAZ 2 – Estimated $0.5 M	• Need 12.66 plus 0.15 for a total of 12.8 MGD. • Provide 3.6 MGD additional with initial county 5.0 MGD
FAZ 3E[3]	• Water: Additional 0.412 MGD • WW: Additional 0.453 MGD	• $9.5 M	• No planning done in Water & Sewer Master Plan • In county service area • Interceptor needed beyond FAZ 2 – Estimated $2.0 M	• Add 0.453 MGD capacity • Transfer more to county WWTP or expand county WWTP	• No planning done in Water & Sewer Master Plan • In county service area • Requires main extension beyond FAZ 2 – Estimated $1.5 M	• Need 12.8 MGD plus 0.4 for a total of 13.3 MGD (rounding). • Provide 4.1 MGD additional with initial county 5.0 MGD
TOTALS[3]	• Total Water Demand: 7.0 + 6.3 = 13.3 MGD • Total Wastewater Produced: 8.0 + 6.9 = 14.9 MGD	• Total Cost: $141 M	• Total Cost: $13.2 M	• Wastewater Capacity Needed: 8.0 MGD + 6.9 MGD = 14.9 MGD • Transfer minimum 0.059 MGD to maximum 6.9 MGD to county • Capacity cost of $24 M for 7.0 MGD	• Total Cost: $17.8 M	• County Water at 5.0 MGD at cost of $27.0 M • Additional 2.0 MGD at cost of $2.5 M/ 1 MGD

[1] *FAZ wastewater (WW) values are based on 110% of water values.*

[2] *Assumed to be costs borne by the developer including costs for extensions to laterals; laterals; hydrants; and manholes. See Attachment B for detailed analysis* (see separate Excel file called "SewerWater Att A,B 102803.xls"*)*

[3] *The costs for FAZ 1 and 2 are based upon the project descriptions from the 2000 Master Water and Sewer Plan, but have been re-estimated based upon 2003 dollars. The 2000 estimated costs for interceptor sewer-related projects typically changed by 40% by this re-estimation. The water main costs typically changed by 10%. These costs should be considered with a +/- 35% contingency at this point. The costs for FAZ 3A -3E are rough estimates, given that no preliminary planning has been done for water or sewer service to these areas. These costs should be considered with a +/- 100% contingency at this point*

6.0 IMPLICATIONS OF GROWTH SCENARIOS

The purpose of this memo is to capture the estimated water and sewer service increases both to capacity and cost, due to future growth and the possible addition of annexation areas.

As the city determines future water and sewer needs, along with whether to annex additional lands, the implications of each scenario need to be considered. These implications are summarized as follows:

Scenario 1:

- The 2030 average day water requirements for this scenario (10.8 MGD) can be met with the current adequate capacity of 9.2 MGD plus the projected 8.6 MGD capacity from the new county system. For this scenario, the city needs at least 1.6 MGD from the county during low flows.
- The wastewater treatment requirements (12.2 MGD) exceed the current available average day capacity at the city WWTP (8.0 MGD). Additional capacity will have to be obtained by expanding the city WWTP, contracting for more county WWTP capacity, or some of both.
- The wastewater treatment needs of the city, along with certain needs of the county could be handled by both agencies expanding their current facilities. This is not desirable in that economies of scale would be lost. It would make good economic sense for only one facility to be expanded. However, in any city/county joint service agreement, the city must retain its right to annex and self-determine its future development and expansion. Any joint city/county agreement should include this right of self-determination as well as include the potential lands the city has plans to annex and provide services as part of the City of Frederick.
- This scenario will require the construction of all the planned water and sewer system upgrades noted in the 2000 Water and Sewer Master Plan. The update to the Water and Sewer Master Plan should re-evaluate these costs and compile them on an individual area basis to further refine the FAZ analysis.
- The water needs for this scenario would change considerably if the city's Water Allocation Ordinance factors were revised to reflect less conservative allowances for commercial and industrial development. The 20 gallons per employee per day factor, if used for future planning, would result in substantially lower water and sewer needs.
- The FAZs in this scenario are relatively easy to serve, and the service costs have already been studied in the 2000 Water and Sewer Master Plan.
- The FAZs in this scenario are all within the city's planned Service Area except for FAZ 3B, which is in the county's WWTP service area, and a portion of 3A, which is outside the city's Service Area, but which can be served.

Scenario 2:

- To meet the 2030 average day water requirements for this scenario (13.3 MGD) during low flows, the current city adequate capacity of 9.2 MGD must be supplemented with at least 4.1 MGD from the new county system. If the agreement to receive 8.6 MGD from the county is ratified, this scenario's water needs will be met.
- The wastewater treatment requirements (14.9 MGD) exceed the current available capacity at the city WWTP (8.0 MGD). Additional capacity will have to be obtained by expanding the city WWTP, contracting for more county WWTP capacity, or some of both.
- The wastewater treatment needs of the city, along with certain needs of the county could be handled by both agencies expanding their current facilities. This is not desirable in that economies of scale would be lost. It would make good economic sense for only one facility to be expanded. In addition, for this scenario, the expansion of the city WWTP may not be economically feasible, given the increased treatment requirements for such a large increase in flow (due to the "cap" on nitrogen discharge). Expansion of the county WWTP may be the only option. . However, in any city/county joint service agreement, the city must retain its right to annex and self-determine its future development and expansion. Any joint city/county agreement should include this right of self-determination as well as include the potential lands the city has plans to annex and provide services as part of the City of Frederick.
- This scenario will require the construction of all the planned water and sewer system upgrades noted in the 2000 Master Plan. The update to the Water and Sewer Master Plan should re-evaluate these costs and compile them on an individual area basis to further refine the FAZ analysis.
- The water needs for this scenario would change considerably if the Water Allocation Ordinance factors were revised to reflect less conservative allowances for commercial and industrial development. The 20 gallons per employee per day factor, if used for future planning, would result in substantially lower water and sewer needs.
- In this scenario, FAZ 2, 3A, and 3B are relatively easy to serve, and the service costs have already been studied in the 2000 Water and Sewer Master Plan. These FAZs are all within the city's planned Service Area except for FAZ 3B, which is in the county's WWTP service area, and a portion of 3A, which is outside the city's Service Area, but which can be served.
- FAZ 3C will be more costly to serve with sewer as it is a very long distance from the WWTP, and it must be served by the county WWTP. It may cause even higher development costs than what is shown in Table 1.9 (due to additional interceptor capacity requirements such as the reinforcement of the current Monocacy Interceptor). In addition, no planning has been done for this area as it was not included in the 2000 Water and Sewer Master Plan. Transmitting water service to FAZ 3C may also be difficult due to the distance to the Lester Dingle

WTP, the distance to the county water service connection, and circumventing Fort Detrick.

- FAZ 3D will be more costly to serve as no utility planning has yet been done for this area, it is a long distance from the WWTP, and it must be served by the county WWTP. Water service for this area should be relatively economical in that the area abuts the Linganore WTP.
- FAZ 3E is possibly the more costly area to serve as no utility planning has yet been done for this area, it is isolated due to being south and west of I-70, and it must be served by the county WTP and WWTP.

Attachments A and B to this technical memorandum are provided in a separate Excel file named "SewerWater Att B,C 102803.xls".

CITY OF FREDERICK, MARYLAND
COMPREHENSIVE PLAN UPDATE

APPENDIX H

Draft Traffic Impact Study Guidelines

September 2004

Prepared by:

THE City OF Frederick

Appendix H

Draft Traffic Impact Study Guidelines

Introduction

The purpose of these guidelines is to establish criteria by which the traffic impacts of new development proposals will be evaluated by Planning Department staff. They define submission requirements, the need to prepare a study, study scope and methodology, and the format of the study**.** THE PROPOSED GUIDELINES AND STANDARDS CONTAINED HEREIN ARE SUBJECT TO THE APPROVAL OF THE MAYOR AND CITY COUNCIL.

General Requirements

The total trips that would be generated by a proposed development is the basis for determining whether a traffic impact study is required to be performed by the Applicant. *An applicant will be required to submit a traffic impact study when a proposed development will generate more than 50 peak hour trips on a weekday and 100 peak hour trips on a weekend day.* The basis for trip generation estimates will be the latest edition of *ITE Trip Generation. Development of a project in stages, or on a piecemeal basis, will not avoid this requirement. The trips expected to be produced by the ultimate build-out of the development will be the basis for such study*. However, even if a development generates less than 50 peak hour trips, it is not totally excluded from the adequacy requirements of these guidelines unless site traffic generation is anticipated to be de minimus (less than 5 peak hour trips). Staff may perform its own evaluation of traffic impacts and determine the need for minor improvements or contributions to other needed improvements.

A traffic impact study will be required at the following stages of development:

- Rezoning
- Planned Neighborhood Development, Planned Unit Development
- Preliminary Plan of Subdivision
- Final Subdivision (if not completed with Preliminary Subdivision)
- Site Plan (if not completed with Preliminary Subdivision)

Except for rezoning applications, all approvals based on transportation adequacy shall expire after four (4) years if subdivision has not been recorded and/or development is not substantially underway.

Exemptions may be permitted by the Planning Department, if it is determined that site traffic generation is anticipated to be minimal except for irregular or seasonal events. This may include the following types of land uses and/or events:

- Stadium
- Church
- Fair
- Festival
- Concert

Conformance with Comprehensive Plan

If the proposed zoning or land use of a development application is not in conformance with the City's latest Comprehensive Plan, additional studies will be required. A trip generation study will be performed to determine whether the development proposal will add traffic volumes above levels anticipated in the development of the Comprehensive Plan. For those proposals, which would generate an increase in anticipated traffic, the impact of this increase on the Comprehensive Plan transportation network will be evaluated. Staff will determine the scope of study necessary and, if necessary, provide the Applicant with an electronic Synchro file of the Comprehensive Plan Network and traffic volumes. If additions to the Comprehensive Plan Network are required, the Applicant may be responsible for funding a pro-rata share of these improvements.

Any study required to address Comprehensive Plan issues will be supplemental to, and not replace, the standard traffic impact study.

Traffic Impact Study Requirements

The Planning staff will notify an applicant if a traffic impact study is required and will schedule a scoping meeting with the applicant, City planning staff, County staff, and Maryland State Highway Administration (MSHA) staff as required based on the location of the project and the planned site access points.

Based on the scoping meeting, the Applicant shall submit a standard "Scoping Agreement Form" to the planner in charge of the development review. The information required to be submitted shall include:

- Size/type of development and proposed access points
- Conformance with Comprehensive Plan
- Study Area
- Background developments to be included in study
- Trip generation/rates based on ITE guidelines
- Directional distribution of traffic
- Annual through traffic growth rates
- Design year (development completion)
- Assumed planned and programmed roadway improvements (Must be 100% funded in current CIP)
- Assumed intercept trip percentages
- Analysis methodology, e.g. Synchro, CLV, HCS

The scoping agreement shall be signed by the Applicant or his designee. The agreement will be reviewed and, if acceptable, accepted, signed by the City, and returned to the Applicant.

Traffic Impact Study Criteria

The following criteria will be applicable to all traffic impact studies:

- The study area for analysis will include the intersection of each site access point with a public street and extended as follows from the site access point intersection:
- Along public roadway in each direction to intersection with the first major collector/arterial
- Extend study area in all directions to major intersections (arterial/collector or arterial/arterial) with site impacts of > 50 peak hour trips subject to 1 mile limitation from site access point to closest signalized or unsignalized major intersection.

The City will notify the Applicant whether a signalized intersection is isolated or in a coordinated signal system.

Traffic Data

Recent traffic data, which is no more than one (1) year old at **the submission date of the Application** must be included for all study area intersections and roadway links in excess of one (1) mile between signalized intersections. New counts may be requested by the City if it is determined that there have been significant changes in the study area that would have modified traffic patterns since the data was collected. Typical traffic data should only be collected in 15-minute increments on Tuesdays, Wednesdays, and Thursdays during peak periods (generally from 7-9 AM and 4-6 PM or as directed by the City) unless higher traffic impacts are anticipated on other days. For example, Saturday data may be required for shopping centers and Sunday data may be required for Churches. Current traffic volume data at intersections and roadway links on the State Highway System may be found at http://www.marylandroads.com/tmsreports/.

No counts should be performed from the end of the school year through the week of Labor Day – exceptions may be allowed based on study area, development use, and/or approval of seasonal factors. In addition, traffic data should not be collected during the following time frames:

- December 15 to the week which includes New Year's Day
- The day before, day of, or day after a holiday unless dictated by development use
- School holidays or late opening/early closing
- When traffic patterns are influenced by an accident, road closure, inclement weather, or other event

Other Traffic Study Data

The Applicant's traffic study should also include the following data:

- Existing traffic control devices, geometrics, and lane use designations
- Existing speed limits
- Lengths of existing turn lanes
- Sight distance measurements at driveways and unsignalized intersections
- Determination of 85th percentile speeds
- Turning radius into and out of the proposed development
- Trip generation and distribution of site generated traffic and background traffic
- Pass-by trips to be computed in accordance with ITE criteria
- Annual growth in thru traffic – compounded from traffic count date to design year
- Estimated build-out year of the proposed development.
- City to provide background (pipeline)development data to applicant
- City to provide Synchro file for study area
- Identify any access control restrictions
- Existing signal timing from City or SHA – any deviations must be justified.
- Programmed roadway improvements that are 100% funded for construction in the current City or State CIP.

Analysis Techniques

The applicant's traffic study shall evaluate existing, background, and total future traffic conditions. Background traffic shall include existing traffic plus growth in through traffic (compounded percentage based on historical data) plus traffic generated from background developments. The total traffic conditions should reflect the addition of the background traffic volumes and trips generated by the site. The design year of the study shall be the build out year of the development or three (3) years from the collection date of the traffic volume data, whichever occurs later.

Methodologies

The ability of the roadway network to accommodate projected traffic volumes generated by the proposed development must be assessed utilizing the appropriate techniques to measure capacity and level of service (LOS). A description of levels of service is included in the *2000 Highway Capacity Manual*. The techniques selected to measure capacity and determine corresponding levels of service will depend on the nature of the study area and the facilities under study.

The methodologies that are identified for analyzing the transportation network are considered to be best suited to the needs of the Planning Board and its staff in applying County policy. Any proposed departure from these methods must be discussed with staff during the scoping process and prior to inclusion in a traffic study.

Isolated Signalized Intersections

An isolated signalized intersection is defined as an intersection that is not part of a coordinated signal system nor is its timing referenced to any other signal. For isolated signalized intersections, the Critical Lane Procedure (similar to the planning analysis method from the Highway Capacity Manual, Chapter 16 Appendix) should be used to measure the level of service. Critical lane volume analysis is a broad evaluation of the capacity and LOS of a signalized intersection for a given set of demand volumes and geometrics. The advantage of the technique is that it is simple and easy to use. Attachment A provides a description of the Critical Lane Procedure, and includes a sample worksheet for reference.

When the sum of critical lane volumes exceeds 1400, additional analysis will be required. The intersection(s) shall be re-analyzed using the Highway Capacity Manual operational methodology (Chapter 16) using existing signal timing and phasing. This analysis may be performed using Synchro to obtain the **Highway Capacity Manual Level of Service (NOT SYNCHRO LOS).**

Coordinated Signalized Intersections (Corridors)

Coordinated signals along a corridor may be included in a computerized signal system or their timings may be manually coordinated. In either instance, the timing and phasing of a coordinated signal is interrelated to the settings of nearby signals.

To evaluate coordinated signals, the City will provide an electronic file including the portion of the City's Synchro network applicable to the subject study. This file will constitute the base network for the traffic study. No changes to signal timings/phasing from those included in the City's Synchro model shall be made without the approval of the City and the responsible operating agency.

For each intersection in the corridor network, the following results from the Synchro evaluation shall be documented:

- Highway Capacity Manual LOS
- Overall Intersection Delay
- Approach Delays
- Queue lengths (95th percentile) for each intersection movement

The Synchro and Highway Capacity Manual procedures do not take into account that the operation of a study intersection may be affected by spillover congestion from nearby intersection or intersections. Nor do the methodologies detect and adjust for the impacts of turn-pocket overflows on through traffic and intersection operation. SimTraffic, however, analyzes the cumulative effects of corridor traffic movements. To account for these situations, SimTraffic simulations shall be performed whenever <u>any of the following results</u> occur at an intersection from the Synchro evaluation:

- Overall Intersection LOS = F
- Overall Intersection Delay > 50 seconds
- Queue length for a movement exceeds the available storage length

Measures of Effectiveness (MOE's) that contribute to operational characteristics of the corridor should include the following parameters obtained from SimTraffic:

- Queue lengths
- Intersection delays
- Corridor delays

Unsignalized Intersections

In areas where a significant portion of the traffic generated by the proposed development must utilize a two or four-way stop controlled unsignalized intersection, the procedures identified in Chapter 17 of the *Highway Capacity Manual* should be employed.

When average vehicle delay for a turning movement exceeds 50 seconds, additional studies should be conducted to determine potential means to correct the deficiency. The type of study deemed appropriate should be determined in consultation with staff. If a traffic signal warrant study is deemed appropriate, the warrant study must be conducted in accordance with the requirements of the MUTCD , MSHA, and/or the City and submitted with the traffic impact study. When an intersection is proposed to be signalized in the traffic study, the intersection should be analyzed under the CLV procedure to ensure that further physical improvements to the intersection beyond the signalization are not needed to achieve adequacy. If, however, a proposed new signal would be coordinated with existing signals, then the analysis shall include the procedure described for coordinated signals utilizing Synchro and/or SimTraffic.

Roadway Links

When the distance between signals is less than two miles the intersections in the study area will generally control the flow of traffic. However, when a proposed development impacts a roadway segment (link) when the distance between traffic signals is two miles or greater, link volumes should be analyzed when requested by staff. In such cases the procedures outlined in Chapters 20 and 21 of the *Highway Capacity Manual* should be utilized.

Standards for Adequacy

The proposed standards for determining adequacy of transportation facilities are listed below. THESE STANDARDS ARE SUBJECT TO APPROVAL OF THE MAYOR AND CITY COUNCIL.

Transportation facilities are deemed to be adequate if the following standards are met:

Isolated Signalized Intersections:

- Level of Service D/E
- CLV [1472
- HCM intersection v/c [0.92

Coordinated Signalized Intersections (Corridors):

(All standards must be met)

- All Intersections Level of Service E or better
- All Overall Intersection Delays [60 seconds
- SimTraffic queue lengths (95th percentile) [storage lengths

Unsignalized Intersections

- All movements Level of Service E or better (delays [50 sec)
- Sight distance (stopping and intersection) meets AASHTO criteria for 85th percentile speeds

Roadway Links

- V/C ratio [0.92

Mitigation

Mitigation of traffic impacts is required when transportation adequacy standards are not met for full buildout or intermediate stages of a proposed development. It is recognized that a specific development proposal may not, in itself, create an inadequacy, but that an inadequacy would exist regardless of whether the property

were to be developed. The mitigation criteria takes prevailing conditions into account when assessing the required level of mitigation.

Mitigation Criteria

- If background conditions are inadequate, then mitigation must either provide adequacy or mitigate 120% of the development's impact on levels of service (critical lane volume or v/c ratio) and/or overall intersection delays
- All sight distance inadequacies at unsignalized intersections must be addressed regardless of whether these conditions exist prior to consideration of the subject development

Types of Mitigation

When a traffic study identifies an inadequate condition(s) within the study area, the applicant may choose to recommend any action, which would result in adequate operations per the prescribed. Such actions can consist of physical improvements, which add capacity to the transportation system or programs to reduce trip generation.

Physical improvements could include roadway widening, intersection geometric improvements, or signalization improvements. The design and construction of any recommended improvement must receive the concurrence of the appropriate State or City operating agency. The design policies and standards of the agency, including provision of sidewalks, trails, and bike lanes adjacent to the roadway or intersection improvements and maintained within the agency's right-of-way or easements, shall apply to applicants or their heirs, successor or assigns who propose to construct the improvements under permit to the agency.

There are cases when the analysis indicates that an improved LOS could be achieved by changing the timing or phasing of an existing signal or restriping the approach to an intersection. **The approval of the appropriate operating agency must be obtained by the applicant before such a change will be considered in any staff recommendation.**

Larger developments may be developed in stages so that any necessary transportation improvements may also be staged. Each stage of development must, however, demonstrate adequacy.

An applicant may propose trip reduction measures such as car or vanpooling. However, such a program must be supported by an agreement that this program would be independently monitored at the applicant's expense. In addition, the Applicant should post a bond to cover full roadway improvements should the trip reduction program not be successful. If after a predefined level of development, say 50%, the anticipated reduction in trips has not been accomplished, then the Applicant's bond will be redeemed to provide road improvements.

The projected potential of physical improvements or trip reduction actions to reduce anticipated traffic impacts will be evaluated as part of the review of submitted traffic studies. Applicants are encouraged to discuss potential actions with staff prior to submittal. The traffic study should recommend improvements only after potential traffic impacts of the proposed development (without considering physical improvements or trip reduction actions) have been determined. The Applicant should provide analysis results including the proposed mitigation measures, based on the methodology that applies to the intersection or roadway segment

Submission Requirements

All traffic studies must be submitted a minimum of 60 calendar days in advance of an anticipated hearing date. The study shall be signed, on the inside title page, by a Maryland Registered Professional Engineer. Traffic studies must include all relevant information, as indicated in the Study Requirements and methodologies sections of the Guidelines, for staff to review the study in accordance with the Guidelines. The study shall include Appendices showing the approved scoping agreement, raw traffic counts and all level of service computation worksheets. All input assumptions must clearly be seen on computerized worksheets. Any study deemed to provide incomplete information will be returned to the Applicant within 5 business days of its receipt. The "review clock" will be frozen until an acceptable study is re-submitted.GLOSSARY OF TERMS USED IN THE *GUIDELINES*	
Access Controls	Regulations by which access to a road facility from individual driveways, minor streets or major streets may be limited for the purpose of increasing roadway capacity and improving safety
Arterial	A roadway for through traffic with partial control of access linking major traffic generators and communities to regional highway facilities
Intersection	The location at which two roadways cross and join at the same vertical elevation; access through the intersection may be controlled by traffic signals or stop/yield signs
Average Daily Traffic (ADT)	The total traffic volume passing a point or segment of a roadway in both directions during an average 24-hour period
Background Traffic	In a traffic analysis, current traffic in accordance with recent traffic counts plus traffic generated by pipeline development plus growth in through traffic, on the current road network plus all roadway improvements which are fully funded by the State, the City or another party
Capacity	On a roadway link, the maximum number of vehicles which can pass a given point during one hour under prevailing roadway and traffic conditions
Collector	A roadway with no control of access linking residential communities with the arterial system
Critical Lane Volume (CLV)	At an intersection, the sum of the critical movements in the north-south direction and the east-west direction
Critical Movement	At an intersection, the highest total of the through movement plus its opposing left-turn movement in one direction on an hourly per-lane basis (for example, the critical movement in the north-south direction is the higher of the northbound through movement plus the southbound left-turn movement, computed on an hourly per-lane basis, and the southbound through movement plus the northbound left-turn movement, computed on an hourly per-lane basis)
De Minimus Development	A development which generates 5 or fewer peak hour trips
Existing Traffic	In a traffic analysis, current traffic in accordance with recent traffic counts on the current road network
Highway Capacity Manual	Transportation Research Board Publication, which defines criteria and methodologies for capacity and level of service.
ITE	Institute of Transportation Engineers
ITE Trip Generation	ITE publication defining the number of trips that would be generated by various land use and development types
Level-of-Service (LOS)	A qualitative measure using a sequence of letters from A through F to describe the quality of operational conditions within an intersection or a roadway link
MUTCD	The *Manual on Uniform Traffic Control Devices*, or MUTCD defines the standards used by road managers nationwide to install and maintain traffic control devices on all streets and highways. The MUTCD is published by the Federal Highway Administration (FHWA) under 23 Code of Federal Regulations (CFR), Part 655, Subpart F.
Pass-By Trip	A trip generated by a land use which is already using the road adjacent to the land use; most frequently associated with land uses such as retail centers, service stations and fast food restaurants
Peak Hour	The one-hour period of greatest utilization of a transportation facility; weekdays normally have two peaks, one in the morning and one in the afternoon
Peak Period	A three-hour period during which a transportation facility has significantly increased levels of use; includes the peak hour
Phase	A portion of a traffic signal cycle allocated to any traffic movement or combination of traffic movements
Pipeline Development	Development having an approved and valid Preliminary Plan of Subdivision, Final Plat or Record Plat

All traffic studies must be submitted a minimum of 60 calendar days in advance of an anticipated hearing date. The study shall be signed, on the inside title page, by a Maryland Registered Professional Engineer. Traffic studies must include all relevant information, as indicated in the Study Requirements and methodologies sections of the Guidelines, for staff to review the study in accordance with the Guidelines. The study shall include Appendices showing the approved scoping agreement, raw traffic counts and all level of service computation worksheets. All input assumptions must clearly be seen on computerized worksheets. Any study deemed to provide incomplete information will be returned to the Applicant within 5 business days of its receipt. The "review clock" will be frozen until an acceptable study is re-submitted.GLOSSARY OF TERMS USED IN THE *GUIDELINES*	
Roadway Link	A segment of roadway between two points
Synchro	A traffic model which evaluates intersection and corridor traffic operations and signal timing.
SimTraffic	A traffic model (associated with Synchro) simulating the movement of traffic through a roadway network.
Through Traffic	Trips which begin and end outside of a given study area which pass through the study area
Total Traffic	In a traffic analysis, background traffic plus traffic generated by the development under consideration
Traffic Control Device	Any sign, signal, pavement marking or device placed or erected for the purpose of regulating, warning or directing traffic and/or pedestrians
Staff	City of Frederick Planning and Engineering staff or other staff persons who may be designated to advise the Planning Commission on transportation issues
Trip	A one-way movement by a person or a vehicle having an origin and a destination
Trip Assignment	The process of allocating vehicle travel generated within a land parcel to each link of the roadway network
Trip Distribution	The process of estimating the direction of travel and the length of vehicle trips originating from or destined for the uses on a land parcel
Trip Generation	The process of estimating the number of vehicle trips originating from or destined for the uses on a land parcel
Volume-to-Capacity Ratio (V/C)	A performance measure computed using the ratio of an actual roadway volume to the capacity of a roadway link

Procedure for Critical Lane Volume Analysis (Signalized Intersections)

1. Input Information

   Geometrics: number of lanes on each approach and turning movements assigned to each lane.

   Volumes: total vehicles per hour (vph), as determined over the applicable Peak Period, for each movement of each approach.

   The procedure does not consider the details of lane width, parking conditions or other features, nor does it consider the number of trucks and buses in the traffic stream.

2. Critical lane volume analysis identified critical movements by individual lanes; thus, volume must be assigned by lane.
   a. Where exclusive turning lanes are present, all turns are assigned to the appropriate turning lane.
   b. When two or more lanes are present on an approach, volume is distributed among the available lanes as follows:

`	**Lane Use Factor**
1	1.0
2	0.55
3	0.40
4	0.30

   c. When permitted left turns are included in shared lanes, vehicles are assigned to available lanes such that the number of vehicles using each lanes is equal. All right-turning and through vehicles have a passenger car equivalent (PCE) of 1.00, while permitted left turns have the following PCE values:

Opposing Through and Right-Turn Volume (vph)	**Passenger Car Equivalent (PCE)**
0 to 199	1.1
200 to 599	2.0
600 to 799	3.0
800 to 999	4.0
1,000 and over	5.0

It should be noted that all left turns must be assigned to the leftmost lane.

When trucks, through buses and local buses are included in the traffic volumes, the volumes must be adjusted to reflect their impact on intersection capacity. The adjustment factors to be used are as follows:

Vehicle Type	**Passenger Car Equivalent (PCE)**
Passenger car or motorcycle	1.0
Truck or through bus	2.0
Local bus	5.0

3. Because signal design is not known in the planning analysis, combinations of critical lane volumes are identified by considering conflicting movements. For a north-south street, critical conflicts are the northbound left-turn movement with the southbound through movement and the southbound left-turn movement with the northbound through movement. The critical volume for the north-south street is the largest sum among:

a. a. Northbound single-lane left-turn volume plus the maximum single-lane volume for the southbound through plus right-turn movement, or

b. b. Southbound single-lane left-turn volume plus the maximum single-lane volume for the northbound through plus right-turn movement.

c. Similarly, the critical volume for the east-west street is the greatest sum among:

d. c. Eastbound single-lane left-turn volume plus the maximum single-lane volume for the westbound through plus right-turn movement, or

e. d. Westbound single-lane left-turn volume plus the maximum single-lane volume for the eastbound through plus right-turn movement.

f. The total critical lane volume for the intersection is the sum of the critical volumes for the north-south and east-west streets. The critical volume for the intersection is then compared to the following criteria.

Critical Lane Volume	Level of Service
[1000	A
1001 – 1150	B
1151 - 1300	C
1300 - 1450	D
1451 -1472	D/E (proposed standard)
1473 - 1600	E
>1600	F

In those cases when it is known that an existing intersection is controlled by a three- or four-phased signal, it should be assumed that such phasing will continue to be used in the future. The critical lane analytical procedure should be modified to reflect the presence of the additional phases.

CITY OF FREDERICK, MARYLAND
FISCAL IMPACT ANALYSIS

Level of Service/Cost & Revenue Factors

November 4, 2003

Prepared by:

Tischler & Associates, Inc.
Fiscal, Economic, and Planning Consultants

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A. Introduction

Tischler & Associates, Inc. (TA), in conjunction with HNTB of Columbia, Maryland, is under contract with The City of Frederick to conduct a fiscal impact analysis of two alternative development scenarios and a preferred scenario as a part of updating the City's Comprehensive Plan. The following Level of Service, Cost and Revenue Assumptions document describes the revenues, service and facility costs that will be impacted by the two development scenarios. *All costs and revenues that are directly attributable to the new development only are included in the analysis. Both operating and capital costs are taken into consideration. Water and Sewer costs are not included in this analysis because they are considered self-supporting enterprise funds.* A separate analysis is being conducted to look at the cost of providing water and sewer service to new growth. Costs and revenue factors and level of service assumptions for Frederick are based on the Fiscal Year 2004 (FY04) budget and on-site discussions and interviews with representatives from City departments. The revenue and cost projections are based on the assumption that current levels of tax rates, fees, and spending, as provided in the FY04 approved budget, will continue in the future. For capital costs, TA considered the City's current Capital Improvement Program, current capital levels of service, and capital financing policies.

B. Methodology

The impact of new growth on the City's finances is measured using a variety of demographic statistics and City characteristics. These are listed below:

Figure 1: Current Demographic Statistics and City Characteristics

Population: 53,047
Jobs: 43,158
Population and Jobs: 96,205
Total City Facility Square Footage: 119,000
Recreation Square Footage: 39,000
Park Acreage: 211
City Vehicles: 313
Road Miles: 240
Full Time-Equivalent City Employees: 789
Calls for Police Services (excluding road-related calls): 40,518

For example, if a cost or revenue is expected to vary with an increase in population, the budget amount is divided by the population to determine a cost per capita. This figure then represents the estimated annual cost or revenues generated per additional person. Likewise, some City revenues and costs will vary based on additions to the City's staffing levels and infrastructure (park acreage, roads, etc). The fiscal impact analysis calculates both the capital cost of these additions, but also calculates the operating cost of these facilities.

Where detailed information was available, a marginal approach was used. The two most common methodologies utilized in fiscal impact analyses are the average cost method and case study marginal cost method. The average cost approach is simple and more popular. Costs and revenues are calculated on the average cost per unit of service (often per capita or per employee). This method assumes a linear relationship and does not consider current available public service and capital capacities or the unique characteristics of a community. The case study marginal cost method is the most realistic method for evaluating fiscal impacts by taking the unique demographic characteristics and available public service and capital facility capacities into consideration.

Examples where the marginal approach is used in this analysis include revenues from real estate taxes, personal income taxes, and staffing levels and expenditures (these will all be discussed further below).

In some cases, the data used are average costs or revenues, based on the best information available at this time. Costs and revenues are calculated on the average cost per unit of service such as per capita, per job, etc.

Some costs and revenues are not expected to be impacted by demographic changes, and may be fixed in the analysis. Some examples of fixed factors include the number of elected officials, the number of department heads, revenues affected by factors beyond the City's control (interest rates, the fiscal health of the State).

C. Operating Revenues

General Fund revenues for FY04 are summarized in the table below. Each of the revenue sources and their associated projection methodologies in relation to the two development scenarios are discussed in the following sections and tables.

Figure 2: General Fund Revenues Fiscal Year 2004

Revenue Source	*FY04 Amount*	*%*
General Property Taxes		
Real Estate	$23,000,000	44.1%
Railroad and Public Utilities	$1,038,500	2.0%
Ordinary Business - Domestic	$516,273	1.0%
Ordinary Business - Foreign	$941,006	1.8%
Ordinary Business - Unincorporated	$61,380	0.1%
Other General Property Tax Revenues	$155,000	0.3%
Personal Income Taxes		
Personal Income Taxes	$3,850,000	7.4%
Business Taxes		
Admissions and Amusements	$600,000	1.1%
Highway Users	$1,696,798	3.3%
Business Licenses and Permits		
Alcoholic Beverages	$60,000	0.1%
Traders Licenses	$140,000	0.3%
Professional and Occupational	$400	0.0%
Non-Business Licenses and Permits	$1,115,446	2.1%
Fees	$830,322	1.6%
Grants		
Grant for Public Safety	$613,916	1.2%
Tax Differential	$3,017,207	5.8%
Grants	$1,594,206	3.1%
Community Action Agency Grant	$1,276,731	2.4%
Miscellaneous Revenues	$6,257,789	12.0%
Beginning Fund Balance	$5,418,893	10.4%
TOTAL GENERAL FUND REVENUES	**$52,183,867**	**100.0%**

1. Real Estate Taxes

These revenues are the largest revenue source for the City, accounting for $23,000,000 or 44% of the FY04 budget. The FY04 rate of $.64 per $100 assessed value is used to estimate property tax revenue generated by the two development scenarios per FAZ. Property is assessed at 100 percent of estimated market value. The estimated market values by land use type as provided by the City are summarized in the table below.

Figure 3: Estimated Market Value for Residential and Nonresidential Development by FAZ

FAZ =>	*1*	*2*	*3A*	*3B*	*3C*	*3D*	*3E*
Residential (per unit)							
Single Family	$220,000	$220,000	$196,000	$222,000	$235,000	$235,000	$220,000
Townhouse	$174,000	$174,000	$143,000	$188,000	$210,000	$210,000	$174,000
Multi-Family (condominium)	$110,000	$110,000	$135,000	$160,000	$160,000	$160,000	$110,000

FAZ =>	*1*	*2*	*3A*	*3B*	*3C*	*3D*	*3E*
Nonresidential (per square foot)							
Commercial	$96	$96	$96	$96	$96	$96	$96
Office	$73	$73	$73	$73	$73	$73	$73
Industrial / Flex	$52	$52	$52	$52	$52	$52	$78
Service	$155	$155	$155	$155	$155	$155	$155

2. Personal Income Taxes

Revenue from personal income taxes totals $3,850,000 or 7.4% of the FY04 budget. Personal Income tax revenues are calculated as a function of the market value of housing. It is assumed that approximately 32 percent of the market value of a housing unit represents the adjustable gross household income. This is a typical mortgage industry standard which measures the affordability of the principal, interest, taxes, and insurance on a mortgage representing 80 percent of market value. It is estimated that about 70 percent of an adjustable gross income represents the net taxable income, accounting for typical homeowner income tax deductions of 30 percent. As an example, a house having a market value of $200,000 will necessitate a household income of $64,000 (32% of $200,000), which translates into a net taxable income of $44,800 (70% of $64,000). Multiplying this by .37 percent for the local income tax surcharge results in $237 in annual income tax revenue for the City.

The tables below summarize the demand bases and methodologies used to project the future operating revenues.

3. General Property Taxes

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
General Property Taxes											
Real Estate	X										
Railroad and Public Utilities			X								
Ordinary Business - Domestic			X								
Ordinary Business - Foreign					X						
Ordinary Business - Unincorporated					X						
Tax Credits					X						
Prior Year's Additions					X						
Prior Year's Abatements					X						
1999 TIF Bond					X						
Payment in Lieu of Taxes					X						

Real estate taxes account for the majority of revenues in this category. Personal property taxes generated by the Railroads and Public Utilities category are expected to increase with number of industrial jobs in the City. Personal property taxes in the Ordinary Business – Domestic category are expected to increase by the total number of jobs in the City. The remaining revenues are considered fixed to relative to new growth .

4. Business Taxes

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Business Taxes											
Admissions and Amusements			X								
Highway Users											X

Admissions and Amusement taxes are projected to increase with the number of commercial jobs in the City. The Highway Users tax is expected to increase as additional road miles are added to the City's road network.

5. Business Licenses and Permits

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Buisiness Licenses and Permits											
Alcoholic Beverages		X									
Traders Licenses			X								
Professional and Occupational					X						

Alcoholic Beverages license and permit revenues are expected to increase with the population of the City. Total employment in the City is a good measure for Traders Licenses. Revenues from Professional and Occupational licenses and permits is a minor revenue source and is considered fixed relative to new growth.

6. Non-business Licenses and Permits

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Non-business Licenses and Permits											
Building						X					
Reinspection						X					
Grading						X					
Electrical						X					
Fire Code						X					
Fire Protection						X					
Vending					X						
Parade					X						
Peddlar					X						
Banner					X						
Cable Television							X				

Revenues from building, reinspection, grading, electrical, fire code, and fire protection permits are assumed to partially offset the costs incurred by the City to provide reciprocal services. These revenues are applied against the operating costs of the Departments which issue the permits. Revenues from cable television licenses and permits is projected to increase with the total number of housing units. Other revenues in this category are minor and considered fixed.

7. Grants

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile	Per FTE Employee
REVENUES												
Grants												
Federal Grants (Public Safety)					X							
Community Action Agency Grant						X						
Youth Services					X							
Grant for Public Safety		X										
Police Supplemental					X							
Police Municipal					X							
Police Equipment					X							
State Grants Project (Public Safety)					X							
Community Action Agency Grant						X						
Other State Grants (Public Safety)					X							
Payment in Lieu of Taxes					X							
Financial Corporation					X							
Tax Differential				X								
County Assumed Costs					X							
Community Center					X							
Other County Grants (Health)					X							

Many of the grants in the category are non-recurring revenues in that they are one-time or are to be used for a specific, limited purpose. Thus, they are considered fixed relative to new growth. Revenues from the Community Action Agency Grant (Federal and State) are considered on-going and are applied against the costs of the Frederick Community Action Agency. Based on discussions with City staff and past financial data, revenues from the Grant for Public Safety are expected to grow with the City's population. Tax Differential revenues from the County are expected to increase as growth occurs in the City. Thus total population and jobs are used to project these revenues.

8. Fees

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Fees											
Planning and Zoning						X					
HDC Filing Fees						X					
Forest Conservation						X					
Development Review Fees						X					
Recording Fees						X					
Legal Review Fees						X					
Police Services (Water / Sewer / Airport Security)						X					
Development Inspection						X					
Maintenance of Memorial Grounds						X					
Equipment Rental						X					
Labor						X					
Overhead						X					
Waste Collection						X					
Trash Containers						X					
Swimming Pool Fees - Diggs Pool						X					
Swimming Pool Fees - Baker Pool						X					
Swim Instruction / team Fees						X					
Equipment Rental - Swimming Pools						X					
Swimming Pool Concessions						X					
Recreation Vending						X					
City Hall Concessions						X					
Special Activites						X					
Carriage Rides						X					
Skate Park Fees						X					
Participation ID Cards						X					
Whittier Open Gym						X					
TJ Open Gym						X					
Playground Program						X					
Whittier Recreation Center						X					
Angels in the Park Program						X					

Similar to the Non-Business Licenses and Permits, revenues from fees are assumed to partially offset the costs incurred by the City to provide reciprocal services. These revenues are applied against the operating costs of the Departments which provide the services.

9. Miscellaneous Revenues

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Miscellaneous Revenues											
Discount Allowance					X						
Penalties / Interest on Delinquient Taxes					X						
Municipal Infractions					X						
Investment Interest					X						
Other Interest					X						
Rents					X						
Community Action Agency					X						
Youth Services					X						
1854 Print Sales					X						
Other Miscellaneous Revenue					X						
Capital Leases					X						
Transfer from Parking					X						
Transfer from Airport					X						
Transfer from HCD					X						
Transfer from Water / Sewer					X						
Sale of General Fixed Assets					X						

These revenues are considered fixed relative to new growth because they are dependent on factors external to the City (such as interest rates), or one-time in nature (Sale of General Fund Assets), or are minor revenues.

10. Beginning Fund Balance

	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
REVENUES											
Beginning Fund Balance											
Beginning Fund Balance					X						

Revenues from the Beginning Fund Balance are considered fixed because they are from prior fiscal years and should not be considered a recurring revenue source.

D. Operating Expenditures

General Fund expenditures for FY04 are summarized in the table below.

Figure 4: General Fund Expenditures Fiscal Year 2004

Expenditure Source	*FY04 Amount*	*%*
Administrative Departments	$5,516,680	10.6%
Public Safety	$16,281,444	31.2%
Planning and Community Development	$1,492,983	2.9%
Engineering	$2,415,979	4.6%
Public Works	$11,677,025	22.4%
Citizen Services	$4,493,667	8.6%
Nondepartment Expenditures	$10,306,089	19.7%
TOTAL GENERAL FUND EXPENDITURES	**$52,183,867**	**100.0%**

As with the operating revenues, TA evaluated the impact of new growth on the City's operating expenditures based on interviews with City staff and calculated cost factors using the current demographic and City characteristics listed in Figure 1.

The graphic below illustrates how the fiscal impact model projects operating costs using the Finance Department as an example. Starting at the top of the graphic, operating expenditures for each department were broken down into categories for personnel (salaries and benefits), operating expenditures, and capital outlay. This allows TA to use several projection methodologies to forecast each category of expenditures. Capital outlay costs are considered fixed relative to new growth as capital needs are considered separately and discussed below.

The next section of the graphic shows the staffing input section. The marginal cost approach is used to project staffing costs. Using data from the Human Resource department on the number and type of positions in each department and interviews with City staff, TA estimates the demand for additional staff for each position. This enables the fiscal impact analysis to vary the staffing demands of new growth on a position-by-position basis to account for:

- Positions that are fixed relative to new growth (such as department heads).
- Remaining staffing capacity before a new position needs to be added.
- Differential in demand between front-line employees and a subsequent need for supervisors.

Then using salary information from the City's grade and step schedule and a benefits multiplier of 35%, TA can calculate the personnel costs for additional employees needed to serve new growth. TA assumed that each position would be hired at the first step of each grade.

There is also a section at the bottom of each department's input area to account for any off-setting revenues.

BASE YEAR BUDGET AND FACTOR PROJECTION METHODOLOGY INPUTS

FINANCE DEPARTMENT

Expenditure Name	Base Year Budget Amount	Project Expenditure Factor Using:	Demand Unit Multiplier	Projection Methodology	Annual Change (pos. or neg.)	LOS Std $ per Demand Unit
Personnel	$669,040	SEE BELOW	1.00	CONSTANT	0%	$0
Operating Expenditures	$114,934	POP AND JOBS	1.00	CONSTANT	0%	$1.19
Capital Outlay	$0	FIXED	1.00	CONSTANT	0%	$0
Direct Entry Cost Type 1	$0	DIRECT ENTRY	1.00	CONSTANT	0%	$0.00
Direct Entry Cost Type 2	$0	DIRECT ENTRY	1.00	CONSTANT	0%	$0.00
Direct Entry Cost Type 3	$0	DIRECT ENTRY	1.00	CONSTANT	0%	$0.00
Direct Entry Cost Type 4	$0	DIRECT ENTRY	1.00	CONSTANT	0%	$0.00
TOTAL	$783,974					

FINANCE DEPARTMENT STAFFING INPUT

Category	Base Year FTE Positions	Project Using Which Demand Base?	Current Demand Units Served Per Position	% Estimate of Available Capacity	Remaining Capacity/ Initial Hire Threshold	Estimated Service Capacity Per Position
Director of Budget and Purchasing	1	FIXED	0	100%	0	0
Payroll/System Administrator	1	FTE's	789	10%	79	434
Accounting Clerk I	2	POP AND JOBS	48,103	10%	4,810	33,672
Accounting Clerk II	2	POP AND JOBS	48,103	20%	9,621	35,275
Accounting Clerk Senior	1	POP AND JOBS	96,205	30%	28,862	62,533
Comptroller	1	FIXED	0	100%	0	0
CFO	1	FIXED	0	100%	0	0
Network Systems Administrator	1	FTE's	789	100%	789	789
Accounting Manager	1	POP AND JOBS	96,205	100%	96,205	96,205
Information Systems Coordinator	1	FTE's	789	100%	789	789
Information Technology Mananger	1	FTE's	789	100%	789	789
Webmaster Developer	1	POP AND JOBS	96,205	100%	96,205	96,205
Staff Type 2	0	FIXED	0	0%	0	0
Staff Type 3	0	FIXED	0	0%	0	0
	14					

SALARIES

	Avg Salary / Staff Member	Benefits Multiplier	Inflation Adj (+/- Base)	LOS Std Total Cost
Director of Budget and Purchasing	$62,940	35%	0%	$84,969
Accounting Clerk I	$24,070	35%	0%	$32,495
Accounting Clerk II	$27,473	35%	0%	$37,089
Accounting Clerk Senior	$30,536	35%	0%	$41,224
Comptroller	$62,940	35%	0%	$84,969
CFO	$74,269	35%	0%	$100,263
Accounting Manager	$44,148	35%	0%	$59,600
Staff Type 2	$0	35%	0%	$0
Staff Type 3	$0	35%	0%	$0

FINANCE DEPARTMENT PROGRAM REVENUES INPUT

Revenue Name	Base Year Budget Amount	Revenue Calculation Based On:	Demand Unit Multiplier	Revenue Projection Methodology	Annual Change (pos. or neg.)	LOS Std $ per Demand Unit
Program Rev 1	$0	FIXED	1.00	CONSTANT	0%	$0.00
Program Rev 2	$0	FIXED	1.00	CONSTANT	0%	$0.00
Program Rev 3	$0	FIXED	1.00	CONSTANT	0%	$0.00
Program Rev 4	$0	FIXED	1.00	CONSTANT	0%	$0.00
Program Rev 5	$0	FIXED	1.00	CONSTANT	0%	$0.00
TOTAL	$0					

The tables below list the various demand bases used to project the future operating costs for City departments/divisions. As illustrated above, more than one projection methodology is often used for each departments' future staffing estimates. Except where noted below, the "Fixed" methodology often applies to capital expenditures or a few staffing positions such as department heads and/or senior management positions.

1. Administrative Departments

	Per Capita	Per Job	Per Capita and Job	Fixed	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile	Per FTE Employee
EXPENDITURES									
Administrative Departments									
Mayor Office			X	X					
Office Of Legal Services			X	X					
Election Board	X			X					
Finance Department			X	X					X
Purchasing			X	X					
Information Technology				X					X
Human Resources				X					X
Occupational Safety And Health Department				X					X
Facilities Administration Department				X	X				
Community Promotions				X					

Given the nature of these departments, expenditures for several of these departments will increase as the City adds employees and square footage to its facilities. Some department expenditures will increase as the City grows, thus total population and jobs are used to estimate future costs. Most of the fixed costs relate to staffing positions that will not increase as a result of new growth (elected officials and department heads).

2. Public Safety

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Public Safety										
Police Department				X				X		

Calls for service are used to project future operating expenditures for the Police Department. Based on call data from calendar year 2002, the Police Department responded to 59,586 calls for service. To determine the impact of new growth on calls for service, road-related calls for service are omitted since the origin and destination of the trips is unknown and thus should not be assigned to new growth. Based on sample data from two months, approximately 32% of calls are road-related. Of the 59,586 calls for service, approximately 19,068 calls for service were road-related (32%) with the remaining 40,518 calls used as the calls for service demand base.

3. Planning and Community Development

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Planning and Community Development										
Planning Department			X	X						
Code Enforcement Department			X	X						
Community Development				X						

The demand for Planning and Code Enforcement services is expected to increase as the City grows. Thus, total population and jobs are used to project future costs for these departments. New growth is not expected to place additional demands on the Community Development Department. These costs are considered to be fixed.

4. Engineering

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Engineering										
Engineering Department			X	X						
Permits And Inspections - Building			X	X						
Permits And Inspections - Electrical Inspection			X	X						
Permits And Inspections - Construction Inspection			X	X						
Permits And Inspections - Plumbing Inspection			X	X						

Both new residential and nonresidential growth will place demands for additional Engineering services. Total population and jobs are used to project future costs.

5. Public Works

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Public Works										
General Administration			X	X						
Facility Maintenance				X			X			
Maintenance Shop				X					X	
Waste Collection And Disposal Department			X	X						
Street Sweeping				X						X
Street Maintenance				X						X
Snow Removal				X						X
Light And Signal Department				X						X
Paint And Sign Department				X						X
Storm Drains				X						X
Grounds Maintenance			X	X						
Grove Stadium Maintenance				X						

Additional road mileage in the City will increase costs for several Public Works divisions including Street Sweeping, Street Maintenance, Snow Removal, Lights and Signals, Paint and Signs, and Storm Drains. Additional City facilities and vehicles are used to project future costs for Facility Maintenance and the Maintenance Shop respectively. Total population and jobs are used to forecast expenditures for General Administration, Waste Collection and Disposal, and Grounds Maintenance. New growth is not expected to impact Grove Stadium Maintenance costs which are considered fixed.

6. Citizen Services

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Citizen Services										
Office Of Special Events				X						
Recreation	X			X						
Summer Playground	X									
Swimming Pools	X									
Department Of Economic Development		X		X						
Frederick Community Action Agency	X			X						
Youth Centers	X									

Citizen Services will primarily be affected by population growth, with Economic Development being the lone exception.

7. Nondepartmental Expenditures

	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES										
Nondepartmental Expenditures										
Bonded Debt				X						
Bus Service				X						
Contingency				X						
Contribution to Volunteer Fire Rescue				X						
Fund Balance				X						
Operating Transfers				X						
TIF Bonds				X						
State Loans				X						

These expenditures are considered fixed relative to new growth. New growth has no impact on existing debt service as it will be repaid regardless of whether the City grows (Note: new debt from new capital facilities required by new growth is discussed under "Capital Expenditures" below). Contingency funds should be considered one-time in nature and not projected to recur in the future. New growth does not have a direct impact on operating transfers to other funds.

E. Capital Revenues

The City has a parks impact fee of $868 per residential unit without a pool provided by its homeowners association (HOA) and $586 per residential unit with a HOA pool. For the purposes of the fiscal impact model, it is assumed that 75% of the new residential units will have a HOA pool and 25% will not have a HOA pool.

F. Capital Expenditures

Capital expenditures to accommodate new growth were allocated into the categories of roads, parks and recreation, general government, and public safety. TA evaluated new growth's demand for additional capital facilities based on interviews with City staff as well as using data from the City's current five year Capital Improvement Program (CIP), current inventory of facilities and capital assets, and data on future road projects provided by City.

The graphic below illustrates how the fiscal impact model projects capital costs using Parks and Recreation as an example. Capital expenditures are divided into several categories which allows TA to use several projection methodologies to forecast each category of expenditures.

In reviewing the current CIP, only a handful of park improvement projects were identified as being the result of new growth (the majority of CIP projects were routine replacement or maintenance projects). These capacity projects are shown at the bottom of the graphic. These projects were directly entered in the fiscal impact model over the next five years based on the costs in the CIP. Additional parks projects beyond the next five years are projected using the growth in population (shown at the top of the graphic). Additional facilities include regional parks and recreation facilities.

The below graphic also illustrates the model's ability to project future capital facilities using various construction thresholds. For example, future community parks are assumed to be 10 acres in size, while regional parks are 15 acres. Future recreation facilities are assumed to be 15,000 square feet in size.

All capital expenditures included in this fiscal impact analysis follow the City's debt management policies and are assumed to be cash financed at 5% with the remaining 95% debt financed for 20 years at 5% interest. These bond terms can be seen in the graphic below.

Parks and Recreation Capital Facilities Factor-Based Inputs

Capital Facilities Standards and Costs

Facility Type	Base Year Inventory		Need For Facility Based On:	Citywide LOS by Capital Facility	Current Cost/Unit ($000's)	Inflation Adjustment (+/-)
Community Parks	Acres	117	POPULATION	0.0022	$835	0%
USEFUL			PROTOTYPE			
FACILITY			FACILITY SIZE (acres):		10	
LIFE:	New Facility (years):	30	CONSTRUCTION THRESHOLD:		66%	
LAG/LEAD	Funding to Delivery (years):	0	FUNDING METHOD:		Bond Rate:	5.00%
TIME:	Bond to 1st Year DS:	0	Percent Bonded:	95%	Bond Term:	20
Regional Parks	Acres	94	POPULATION	0.0018	$6,175	0%
USEFUL			PROTOTYPE			
FACILITY			FACILITY SIZE (acres):		15	
LIFE:	New Facility (years):	30	CONSTRUCTION THRESHOLD:		66%	
LAG/LEAD	Funding to Delivery (yrs):	0	FUNDING METHOD:		Bond Rate:	5.00%
TIME:	Bond to 1st Year DS:	0	Percent Bonded:	95%	Bond Term:	20
Recreation Facilities	Square Feet	39,000	POPULATION	0.735197	$1,500.000	0%
USEFUL			PROTOTYPE			
FACILITY			FACILITY SIZE (miles):		15,000	$100 per sf
LIFE:	New Facility (years):	30	CONSTRUCTION THRESHOLD:		33%	
LAG/LEAD	Funding to Delivery (years):	0	FUNDING METHOD:		Bond Rate:	5.00%
TIME:	Bond to 1st Year DS:	0	Percent Bonded:	95%	Bond Term:	20
Parks - Capacity Projects		0	DIRECT	#N/A	$0	0%
USEFUL			PROTOTYPE			
FACILITY			FACILITY SIZE (acres):		0	
LIFE:	New Facility (years)	30	CONSTRUCTION THRESHOLD:		100%	
LAG/LEAD	Funding to Delivery (years):	0	FUNDING METHOD:		Bond Rate:	5.00%
TIME:	Bond to 1st Year DS	0	Percent Bonded:	95%	Bond Term:	20

The table below lists the project methodologies used to forecast new growth's demand for capital facilities.

1. Capital Expenditures

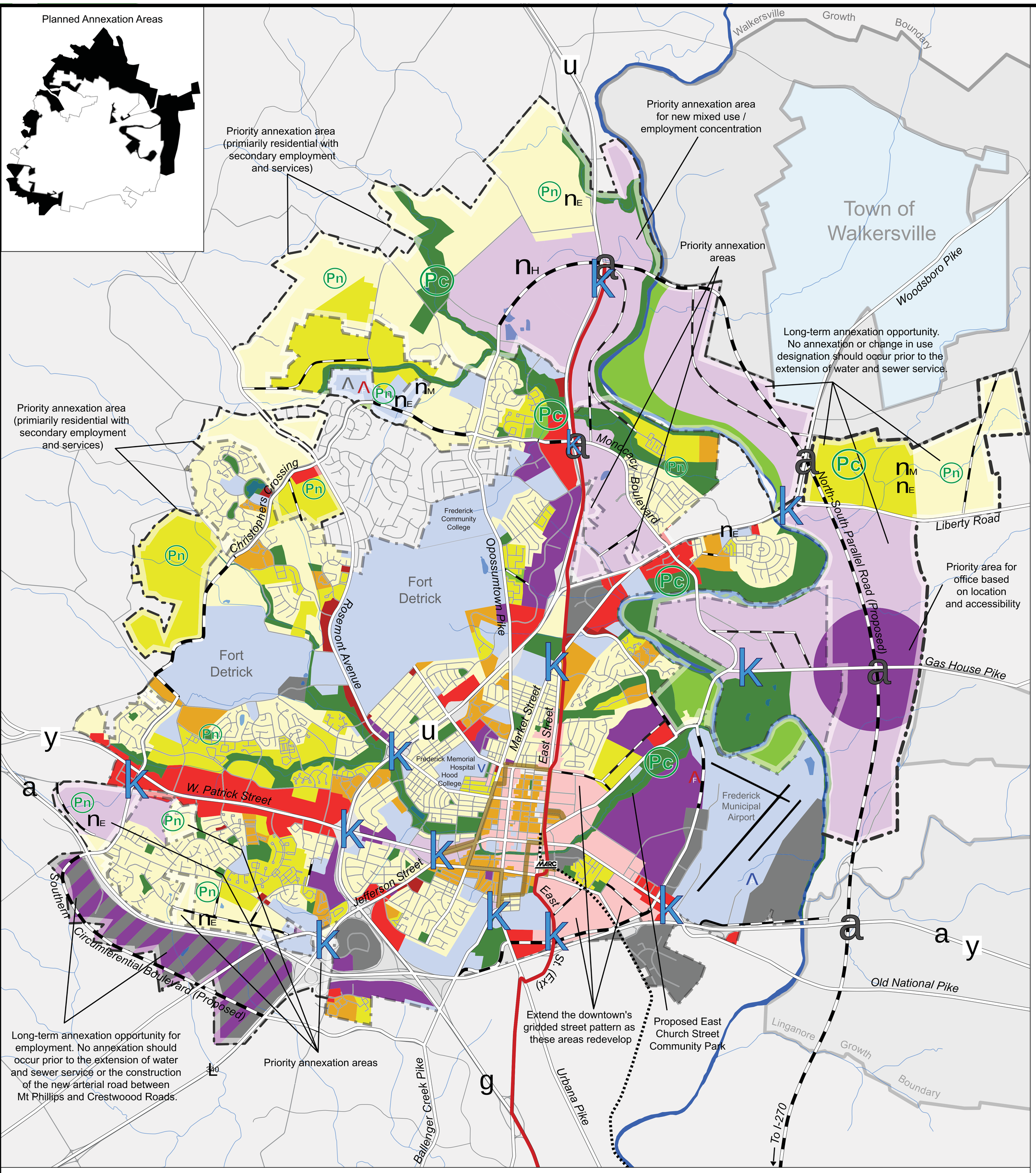
	Direct Entry/ Marginal	Per Capita	Per Job	Per Capita and Job	Fixed	Factored As Program Rev.	Per Housing Unit	Per City Facility Sq. Ft.	Per Calls for Service	Per City Vehicle	Per Road Mile
EXPENDITURES											
Capital Expenditures											
Roads	X										
Road-related Vehicles											X
Public Safety Facilities									X		
Public Safety Vehicles - Marked									X		
Public Safety Vehicles - Unmarked									X		
General Government Facilities				X							
General Government Vehicles - Population		X									
General Government Vehicles - Population and Jobs				X							
General Government Vehicles - City Vehicles										X	
General Government Vehicles - City Facilities								X			
Community Parks	X	X									
Regional Parks		X									
Recreation Facilities		X									

Future road projects were provided by the City and broken down by scenario. These projects were directly entered in the model. It is important to note that the vast majority of the costs (90%) for these road projects are expected to be paid by the state, county, and developers with the City paying the remaining 10%. Changes to these cost sharing arrangements could have an impact on the City's fiscal viability. Other road-related capital costs include vehicles and equipment used to maintain City streets. TA used the current fleet of vehicles and equipment to establish the current LOS. These costs vary with additional road mileage.

Capital expenditures for public safety include additional square footage, marked vehicles, and unmarked vehicles. Future public safety facilities are assumed to be 5,000 square feet in size (either substations or expansion of existing facilities). TA used the current fleet of marked and unmarked vehicles to establish the current LOS. Calls for service are used to determine the need for future public safety capital needs.

Additional general government facilities are projected to increase as the City grows so total population and jobs are used to forecast these facilities. Future general government facilities are assumed to be 20,000 square feet in size (either new facilities or expansion of existing facilities). The need for additional general government vehicles varies based on the department. For example, additional vehicles for Facilities Administration and Grounds Maintenance will vary with additional square footage added to City facilities.

City of Frederick, Maryland Comprehensive Plan Map, 2004



Legend

- City Boundary, 2004
- Planned City Boundary, 2030
- Planned Annexation Areas *(See inset map)*
- City Gateway
- Proposed Interchange
- Proposed Community Park (general location)
- Proposed Neighborhood Park (general location)
- Proposed Elementary School (general location)
- Proposed Middle School (general location)
- Proposed High School (general location)
- Proposed Fire Station (general location)
- Proposed Police Facility (general location)
- Proposed Library (general location)
- MARC Rail and Station
- Proposed Road
- Planned Transit Service
- Frederick Town Historic District

Land Use Designations

- General Commercial
- Neighborhood Commercial
- Office
- Office/Industrial
- Industrial
- Institutional/Government
- Downtown Mixed Use
- Planned Mixed Use
- Residential-Moderate Density
- Residential-Medium Density
- Residential-High Density
- Parks/Public Open Space
- Conservation

Note:
This map represents only the key recommendations of the Comprehensive Plan. It is to be used in conjunction with the Comprehensive Plan text and other Plan maps.

See Table LU.2 for Future Land Use Classification descriptions. In addition, see the Land Use Element for annexation policies and recommended phasing.

160 Acres
90 Acres
40 Acres

North

1 Mile

Approved by the Mayor and Board of Aldermen by Resolution 04-26 on September 16, 2004

JENNIFER DOUGHERTY, MAYOR

Vision Statement

The City of Frederick, Maryland is one of the most historic and charming communities in the country. It is a city with a strong sense of place, a rich heritage, and a robust and diverse economy. Its vibrant and cultured downtown is surrounded by walkable neighborhoods, employment centers and mixed use areas where residents are afforded both scenic views of the downtown spires and the Catoctin Mountains.

The City of Frederick has grown in a manner that is fiscally and environmentally sound and that has phased growth with adequate infrastructure. Rather than trying to stop growth altogether and remain a small town or become a large city due to unregulated growth, the City of Frederick has chosen to manage its growth so that it has become an urban employment and residential center while maintaining its small-town charm, unique historic heritage, and exceptional quality of life.

The characteristics that define the City of Frederick's exceptional quality of life include:

- a thriving downtown,
- local and plentiful job opportunities,
- convenient and multi-modal transport options,
- adequate sanitary sewer treatment and water supply systems,
- a range of housing opportunities,
- quality education for all ages,
- quality health care,
- an intact and thriving Frederick Town Historic District,
- vibrant arts and entertainment,
- abundant parks and recreation,
- healthy and protected natural resources, and
- an open community partnership between citizens, businesses, and government.

Organizing Themes

This Plan's recommendations are guided by five themes that serve as the Plan's overall goals. These themes are used to organize each of the Plan's elements. They express and reinforce the major concerns the Plan seeks to address and the issues raised by stakeholders

Balancing Growth
This theme relates to the need to manage growth and a wide variety of activities that affect the overall quality of life in the City. The theme encompasses such issues and recommendations as environmental protection, growth management, annexation, future land use, and the adequacy and delivery/timing of infrastructure in a fiscally responsible manner.

Enhancing Mobility, Accessibility and Connectivity
This theme addresses the need to facilitate motor vehicle movement (mobility) and the need to balance that with the ability and desire of people and business to reach desired places and activities (accessibility). The recommendations under this theme address such issues as reducing roadway congestion, the need for increased connectivity of the City road network and among different land uses, multi-modal transportation choices, the enhancement of the pedestrian and bicycle systems, and the Frederick Municipal Airport. Recommendations also address ways to reinforce community connectedness via improved communication and information exchange.

Enhancing the Community
This theme focuses on improvements to the quality of life beyond the provision of housing, employment, basic environmental protection and public services. The recommendations under this theme address such issues as the preservation of the City's historic architectural and landscape legacy, enhancement of community character and application of urban design guidelines, and creation and enhancement of civic spaces/gateways and cultural amenities.

Supporting a Vibrant Downtown
The recommendations under this theme address the special role and needs of Frederick downtown. The recommendations address such issues as downtown business development, housing and mixed use development, arts and entertainment, traffic and circulation, pedestrian mobility, parking and redevelopment issues.

Interacting with the Region
The recommendations under this theme address the need to foster interjurisdictional and institutional cooperation. The recommendations address such issues as County-City-State coordination on infrastructure provision, environmental protection, regional planning, and transportation.