

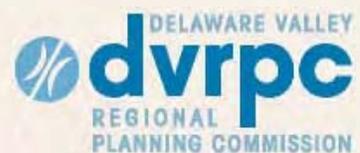


CONNECTIONS

THE REGIONAL PLAN
FOR A SUSTAINABLE FUTURE

**THE LONG-RANGE PLAN FOR
THE GREATER PHILADELPHIA REGION**

ADMINISTRATIVE VERSION / JULY 2009



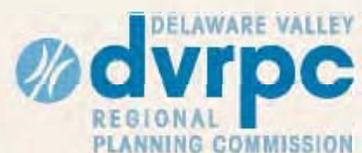


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The Delaware Valley Regional Planning Commission is dedicated to uniting the region's elected officials, planning professionals and the public with the common vision of making a great region even greater. Shaping the way we live, work and play, DVRPC builds consensus on improving transportation, promoting smart growth, protecting the environment, and enhancing the economy. We serve a diverse region of nine counties: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester and Mercer in New Jersey. DVRPC is the official Metropolitan Planning Organization for the Greater Philadelphia Region — leading the way to a better future.

The symbol in our logo is adapted from the official DVRPC seal, and is designed as a stylized image of the Delaware Valley. The circular shape symbolizes the region as a whole. The diagonal line represents the Delaware River and the two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

DVRPC is funded by a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for its findings and conclusions, which may not represent the official views or policies of the funding agencies.

DVRPC fully complies with Title VI of the Civil Rights Act of 1964 and related statutes and regulations in all programs and activities. DVRPC's website may be translated into Spanish, Russian, and Traditional Chinese online by visiting www.dvrpc.org. Publications and other public documents can be made available in alternative languages and formats, if requested. For more information, please call (215) 238-2871.

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Executive Summary

Connections: The Regional Plan for a Sustainable Future is a blueprint for the future growth and development of the Greater Philadelphia region with an emphasis on the transportation system. The *Connections* plan identifies four integrated principles to achieve a sustainable future by 2035.

Manage Growth and Protect Resources

There are just over 1 million acres of undeveloped, unprotected land remaining in the region and the *Connections* plan proposes protecting one-half of this – 500,000 acres – by 2035. This open space system will enhance environmental quality, improve and maintain surface water quality, provide abundant passive recreational opportunities, strengthen the region’s agricultural industry, better define communities by creating greenbelts, eliminate the need to extend costly infrastructure into rural areas, and revitalizes cities and towns. This target can be achieved by focusing new development as infill and redevelopment in existing developed areas, and by targeting new development to designated Future Growth Areas.

Create Livable Communities

Another key principle is to create and support livable communities in appropriate locations throughout the region. Livable communities can be found in the region’s core cities and their component neighborhoods; in the region’s older first suburbs; and in town and rural centers scattered throughout the region’s suburbs and ex-urban areas. These Centers provide a focal point in the regional landscape that can reinforce or establish a sense of community for local residents. Centers serve as a basis for organizing and focusing the development landscape while coordinating the more efficient provision of supportive infrastructure systems, including water, sewer, and transportation. By concentrating new growth around and within centers, the region can both preserve open space and reduce infrastructure costs. The densities and mixed-uses inherent within centers can enhance the feasibility of walking, bicycling, and public transit as alternatives to the automobile.

Build an Energy-Efficient Economy

Over the coming decades, the profound transformation of the global economy to use less energy and produce less greenhouse gas presents a tremendous opportunity for Greater Philadelphia. As we transform our land use to build on our historic advantages of mixed-use development and transit infrastructure, we will provide opportunities for transforming our business and workforce infrastructure to provide the products, services, and skills required for this future. This transformation will require regional cooperation and strong coordination between the states, counties, and municipalities. A key component of this strategy is reducing regional greenhouse gas emissions by 50 percent by 2035 compared to 2005 levels.

Create a Modern, Multi-Modal Transportation System

The future transportation system will need to serve different modes and *Connections* includes specific policies for each. The emphasis now and in the future is not on building new roads but making the roads and other facilities we have perform better. Therefore, the top priority for transportation investments is the maintenance and modernization

of the existing transportation system. The second-highest priority is to improve the operation of the existing network through technological improvements and demand management strategies. The third priority is increasing the capacity of the existing multi-modal transportation system through the elimination of critical bottlenecks and better linking existing facilities.

Transportation Investments

The *Connections* plan includes a fiscally-constrained set of transportation investments that seek to implement the various goals of the Plan. Federal and state funding allocation formulas, along with anticipated local match requirements, were used to develop the revenue estimates for the *Connections* plan. The *Connections* plan anticipates \$64.8 billion in year-of-expenditure dollars in total federal, state, local, and Small and New Starts funding over the life of the 26-year Plan with 58 percent of the total allocated to highway projects and 42 percent allocated to transit projects on a regional basis.

Needs Assessment

DVRPC worked with its partner operating agencies to develop a full need-based estimation, based on asset management system analysis, for all transportation infrastructure in the region. This assessment clearly highlights the significant gap between anticipated revenue and what it would cost to address the set of needs. The Pennsylvania subregion's funding gap is estimated at \$36.4 billion over the life of the *Connections* plan, and the total New Jersey subregion's funding gap is estimated at \$8.9 billion dollars over the life of the *Connections* plan.

Following the lead of both state Departments of Transportation, the *Connections* plan pursues a policy to "fix-it-first," which prioritizes funding to maintaining the existing roadway and transit networks. The goal is to achieve and maintain a state of good repair for existing transportation infrastructure before undertaking significant expansions to the system. Almost 75 percent of anticipated revenues have been allocated to rebuilding the highway and transit infrastructure in the region and funding for new highway capacity is capped at ten percent of total highway revenues. Unfortunately, this amount does not come close to fully addressing the identified need.

Closing the Funding Gap

Federal and state funding levels are not expected to increase and the region's local funding contribution is low compared to other large metropolitan areas. Recognizing these issues, DVRPC has formulated a list of local funding options that could be used to finance improvements to the region's transportation system. During the extensive public outreach conducted as part of the development of the *Connections* plan, DVRPC outlined the challenge to increase local funding for transportation investments. Participants at workshops and in focus groups spoke of the region's transportation system as a shining asset and also agreed that rebuilding the system should be the top transportation priority but also noted that it would take a lot of money to accomplish. The *Connections* plan does not advocate any particular local funding alternative but instead issues a challenge to the region's leaders, stakeholders, and citizenry to reach consensus on new local and regional means to maintain and modernize the region's critical transportation infrastructure, which impacts not just our standard of living but our economic competitiveness.

Introduction

As a region, Greater Philadelphia enjoys many advantages including a relatively low rate of transportation congestion; a superb transit system; a location in the middle of the northeast corridor; many traditional hometown communities; an affordable standard of living; a popular and growing park and trail system; numerous institutions of higher learning and advanced medical care; and abundant historical, cultural, natural, and scenic resources. At the same time, we face notable challenges such as increasing sprawl; a decreasing amount of open space; pockets of poverty, unemployment, and racial or ethnic segregation; a spatial mismatch between workers and jobs; disinvestment in many older centers; and an aging infrastructure that requires extensive reinvestment.

Connections: the Regional Plan for a Sustainable Future outlines a vision for the future of the Greater Philadelphia region. The vision takes into account a number of present-day factors that will have a significant impact on the future form of the region. These factors include increasing energy prices and declining oil supplies, a rapidly evolving global economy, and the impacts of climate change.

The concept of sustainability is a key policy principle that is woven throughout the long-range plan. Sustainability refers to the ability of a region to meet the needs of the present without compromising the ability of future generations to meet their own needs.¹ The Plan sets a number of goals to ensure a sustainable future and outlines what investments and policy steps the region will need to make over the span of the Plan to achieve the vision.

What is the DVRPC?

The Delaware Valley Regional Planning Commission (DVRPC) is the federally designated Metropolitan Planning Organization (MPO) for the nine-county Greater Philadelphia region, which includes: Bucks, Chester, Delaware, Montgomery, and Philadelphia counties in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer counties in New Jersey. DVRPC's mission is to build consensus on improving transportation, promoting smart growth, protecting the environment, and enhancing the economy. DVRPC is governed by an 18-member board composed of state, county, and city representatives from its member governments, as well as various participating, non-voting members and federal agency observers.

¹ World Commission on Environment and Development. Brundtland Commission. 1989.

As the MPO for the Greater Philadelphia Region, DVRPC is required by the U.S. Department of Transportation in accordance with the planning regulations of the Safe, Accountable, Flexible, Efficient Transportation Act – A Legacy for Users (SAFETEA-LU), the current federal surface transportation act, to develop a long-range transportation plan that covers a minimum twenty-year time span. This long-range plan helps guide the prioritization and funding of transportation investments for the region, which is another key responsibility for Metropolitan Planning Organizations. The *Connections* plan fully embodies the mission of DVRPC and serves as a mechanism for forwarding the mission. The *Connections* plan expands

The DVRPC Region



Source: DVRPC 2009

beyond the traditional long-range transportation plan to also encompass land use, economic competitiveness, and environmental issues. The Plan encompasses all these factors because transportation does not stand alone but is effected by and affects each of these other components. Land development creates transportation demand and the transportation system shapes subsequent land use and influences a host of environmental elements. The region's economic competitiveness in the global marketplace is also impacted by its transportation infrastructure. The *Connections* plan is built around a policy framework that addresses transportation, land use, the environment, and economic competitiveness. It encompasses the linkages, or connections, between each of these four elements.

What is the *Connections* plan?

The *Connections* plan serves many different purposes. It is the basis for the region's Transportation Improvement Program (TIP), which prioritizes transportation projects for federal funding. It is used to evaluate the consistency of public sewer and water investments with designated growth areas in the Plan. It identifies large landscapes important to preserve for natural resource protection and agricultural retention. Above all, it serves as a collective vision across municipal and county boundaries for how the region should look and function in the future. To accomplish this, the *Connections* plan addresses eight planning factors that MPOs are required to consider in long-range plans. They include:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the safety of the transportation system for all motorized and non-motorized users;
- Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users;
- Increase accessibility and mobility of people and freight;

- Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns;
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- Promote efficient system management and operation; and
- Emphasize the preservation of the existing transportation system.

As part of a federally-designated air quality non-attainment area, DVRPC is required to update the region's long-range plan every four years. The *Connections* plan serves as an update to the existing *Destination 2030* long-range plan, which was adopted in May 2005. The *Connections* plan extends the horizon year of Greater Philadelphia's long-range plan to 2035, while continuing the vast majority of the policies contained in *Destination 2030*. However, the *Connections* plan also introduces several new elements to the long-range planning process such as climate change and energy initiatives, local food production, and cultural and historic landscapes. The Plan emphasizes the linkages between land use, the environment, the region's economic competitiveness, and the transportation network. It also includes a more robust project evaluation procedure and a quantitative assessment of the region's transportation needs over the 26-year timespan of the long-range plan.

Predicting the future, particularly over a 26-year time span, is virtually impossible. Many different events can impact the future form of the region and many are not even on the horizon. The strategies contained in the long-range plan are based on commonly accepted and documented trends and forecasts but are augmented by specific policy decisions in order to attain the region's collective vision for the future. There is a fine line between planning for current trends and trying to attain long-term goals. The *Connections* plan attempts to strike a balance between planning for current needs, such as reducing congestion on the region's roadways, and formulating strategies that accomplish such goals in as sustainable a manner as possible. One of the primary reasons that the U.S. Department of Transportation requires MPOs to update long-range plans every four years is to monitor trends and make adjustments to policies as appropriate.

Stakeholder and Public Outreach

The *Connections* plan was developed in conjunction with many stakeholders and strives to be consistent with and complementary to the goals and policies of the plans and programs of DVRPC's member municipal and county governments, the policies of the New Jersey Statewide Development and Redevelopment Plan, and the statewide transportation plans of the Pennsylvania and New Jersey Departments of Transportation.

Long-range planning is a collaborative process and involves close working relationships with the aforementioned member governments, departments of transportation, and three public transit agencies. DVRPC convenes a number of committees, consisting of citizens, agency, and organization representatives in specific fields including: the Regional Citizens Committee; Regional Aviation Committee; Transportation Operations Task Force; Central Jersey Transportation Forum; Planning at the Edge Advisory Committee; Goods Movement Task Force; Land Use and Housing Committee; Land Use, Transportation, and Economic Development Forum; Regional Transit Advisory Committee; and the Information Resources Exchange Group. Much of this Plan was formalized with contributions

from each of these groups. Other collaborators include the Pennsylvania Department of Conservation and Natural Resources, Pennsylvania and New Jersey Departments of Environmental Protection, Pennsylvania Environmental Council, Natural Lands Trust, South Jersey Land and Water Trust, Greenspace Alliance, Montgomery County Lands Trust, Heritage Conservancy, New Jersey Conservation Foundation, Rancocas Conservancy, Partnership for the Delaware Estuary, Philadelphia Water Department, the Schuylkill Action Network Land Protection Collaborative, New Jersey Bicycle Advisory Council, the Southeastern Pennsylvania Bicycle Task Force, New Jersey Pedestrian Task Force, and Philly Walks.

DVRPC developed this Plan through an extensive public outreach campaign to stakeholders and the public. Public participation is an integral part of the long-range planning process, allowing stakeholders and residents to learn about issues facing the region and participate in the creation of the Plan. The Regional Citizens Committee (RCC) is the primary vehicle for ongoing public participation in DVRPC's activities. With representatives from the private sector, social service agencies, environmental organizations, and other interested parties, the RCC reviews and comments on all issues and plans that are acted upon by the DVRPC Board.

During the development of the *Connections* plan, DVRPC undertook a number of outreach activities to gather public input. The purpose of these outreach activities was to give the people who live and work throughout the Greater Philadelphia region an opportunity to share their vision of the region's future and to provide input as to how they would like to see the region grow and prosper. DVRPC used diverse outreach strategies to capture the many concerns and recommendations of the region's residents, government officials, and stakeholders. Special emphasis was put on attracting individuals and organizations who have not participated in previous DVRPC planning exercises, as well as those representing environmental justice concerns and underserved communities.

DVRPC began this campaign with an extensive online survey to identify what types of issues were priorities for the citizens of the region. Staff then analyzed and used the survey results to develop key planning principles to drive the development of the long-range plan. The key planning principles were presented to multiple focus groups comprised of members of the general public, municipal officials, and other stakeholders who have an impact on the growth and development of the region. Their input helped identify particular issues and constraints that would impact the implementation of the key planning principles. Finally, a series of workshops were conducted in each of the region's nine counties to collect the public's opinion on the Plan's principles and vision. The ideas, concepts, and feedback received during the public comment period helped to refine the vision and policies put forth in the Plan.

Environmental Justice

Title VI of the Civil Rights Act of 1964 states that "no person in the United States shall, on the grounds of race, color, or national origin, be excluded from the participation of, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance." Building on this framework, Executive Order 12898 mandates that federal agencies incorporate environmental justice considerations and analysis in their policies, programs, and activities. Environmental justice (EJ) is the fair treatment and meaningful involvement of all people regardless of religion, race, ethnicity, income, or education level in the planning and decision-making process. To meet the requirements of these laws, an MPO must:

- Enhance its analytical capabilities to ensure that the long-range plan and the TIP comply with Title VI;
- Identify residential, employment, and transportation patterns of low-income and minority populations so that their needs may be identified and addressed, and the impacts of transportation can be fairly distributed; and
- Evaluate and, where necessary, improve the public involvement process to eliminate barriers and engage minority, disabled, elderly, and low-income populations in regional decision-making.

DVRPC is mandated by these federal statutes to ensure non-discrimination in all of its programs and activities and ensure that transportation and regional planning is done in an open, accessible way for all residents and stakeholders. A commitment to Title VI and Environmental Justice has, and continues to be, reflected in DVRPC plans and programs, public involvement effort and general way of doing business. DVRPC has created an internal technical methodology, the Degrees of Disadvantage (DOD) to identify disadvantaged populations within Greater Philadelphia. DVRPC’s DOD methodology includes the following:

- Identifies groups that may be negatively impacted
- Locates them in the region
- Plots key destinations, such as employment or health care locations, that need to be accessed
- Acknowledges nearby land use patterns
- Overlays these destinations with the region’s existing and proposed transportation network
- Determines what transportation service gaps exist for these disadvantaged groups

Environmental Justice is traditionally concerned with the impacts of disparate funding and services on defined minority and low-income groups. DVRPC currently assesses the following populations, which may have unique planning-related challenges, using 2000 US Census data:

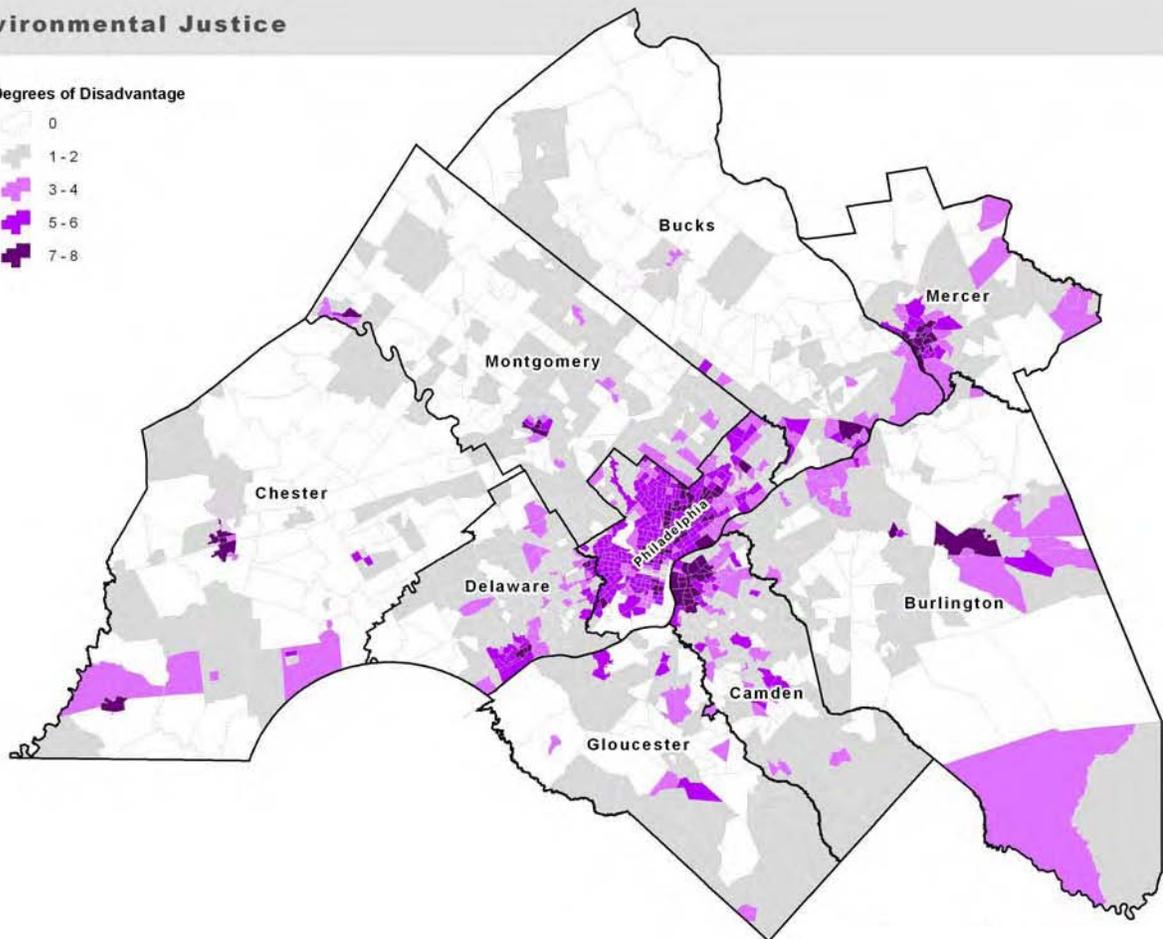
- | | |
|-------------------------|---------------------------------------|
| ■ Poverty | ■ Car-less Households |
| ■ Non-Hispanic Minority | ■ Physically Disabled |
| ■ Hispanic | ■ Limited English Proficiency |
| ■ Elderly | ■ Female Head of Household with Child |

The Environmental Justice map shows concentrations of disadvantaged populations in the nine-county region, with categories of zero DOD, one to two DOD, three to four DOD, five to six DOD, and seven to eight DOD. Of the region’s 1,378 census tracts, 76 percent have at least one DOD, which is not surprising given the multiple demographic categories present in the DOD methodology. Over a quarter of the census tracts contain five to eight DOD. These areas are recognized as potentially being highly disadvantaged; and extra care and analysis should be taken when projects or programs occur within these areas.

The DOD methodology is an integral tool that can be used to understand the region’s demographics. This information can then be used for a variety of DVRPC programs and plans to analyze impacts, recommend solutions that may mitigate adverse project or program consequences, or to direct public outreach efforts. Additionally, the DOD methodology was one of the criteria utilized for evaluating fixed guideway transit projects considered for inclusion in the Plan with the intent to highlight those projects that provide the greatest benefit for EJ communities.

Environmental Justice

Degrees of Disadvantage



Sources: DVRPC 2009, US Census Bureau

The work undertaken by DVRPC, including various plans and programs, inherently includes opportunities to include EJ considerations and to promote an open public participation process. Specifically, programs such as the Coordinated Human Services Transportation Plan, the Air Quality Partnership, and the Transportation and Community Development Initiative (TCDI) are designed to positively affect various groups and communities throughout the region.

The concept of creating a sustainable future is one that can especially benefit EJ populations, and many of the goals presented in the *Connections* plan highlight DVRPC's commitment to EJ and planning for all residents of the nine-county region. In the following pages, goals related to food systems, investing in the region's centers, promoting affordable and accessible housing, green infrastructure, economic and workforce development, and maintaining the region's transportation infrastructure for all users are interrelated and can have far-reaching benefits for the identified populations in the DOD methodology. Policies that promote urban agriculture, increasing the stock of affordable housing near employment centers, revitalizing brownfields and greyfields, creating jobs that match the workforce supply, increasing mobility and accessibility in the region's transportation system, and upgrading bicycle and pedestrian facilities are just a few recommendations to improve the quality of life for all residents.

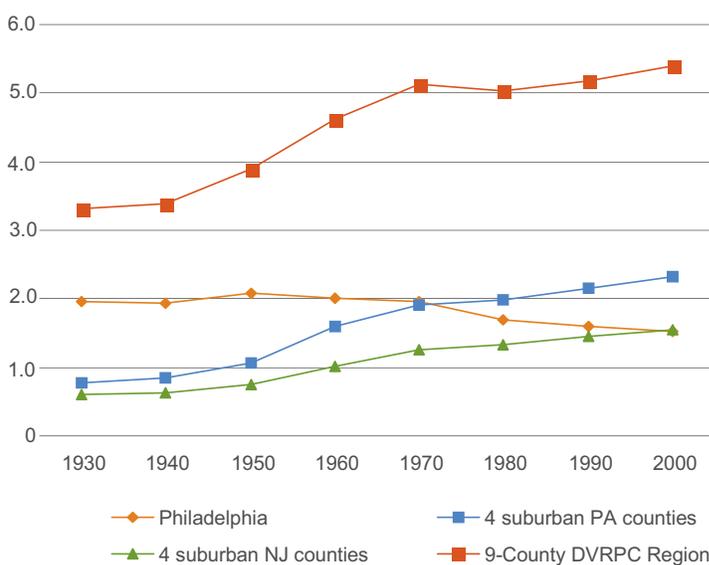
Trends and Forces

A long-range plan defines a future vision for the region and develops goals and strategies to attain that vision. The first step in developing a vision for the future is analyzing past trends, current conditions, and future forecasts. How many people live here, and how many new residents can we expect in the future? Where are they living, and in what types of communities? How many jobs are there in the region, and where are those jobs located? How do people travel to work and other desired locations, and how do needed goods move in and out of the region? Analysis of these and many other indicators highlight the region's relative strengths and weaknesses that can then be perpetuated or countered through Plan policies.

Population

The population of Greater Philadelphia grew rapidly during the 20th Century. In 1900, there were approximately 2 million people living in the nine-county region. At that time, over 65 percent of those 2 million people resided in the City of Philadelphia. By the year 1950, the region's population had doubled to around 4 million people and the City reached its population apex of over 2 million people. Fifty years later the region had approximately 5.4 million residents while the City contracted to a little less than 1.5 million people.

Regional Population: 1930-2000 (millions)



Source: US Census Bureau 1930-2000

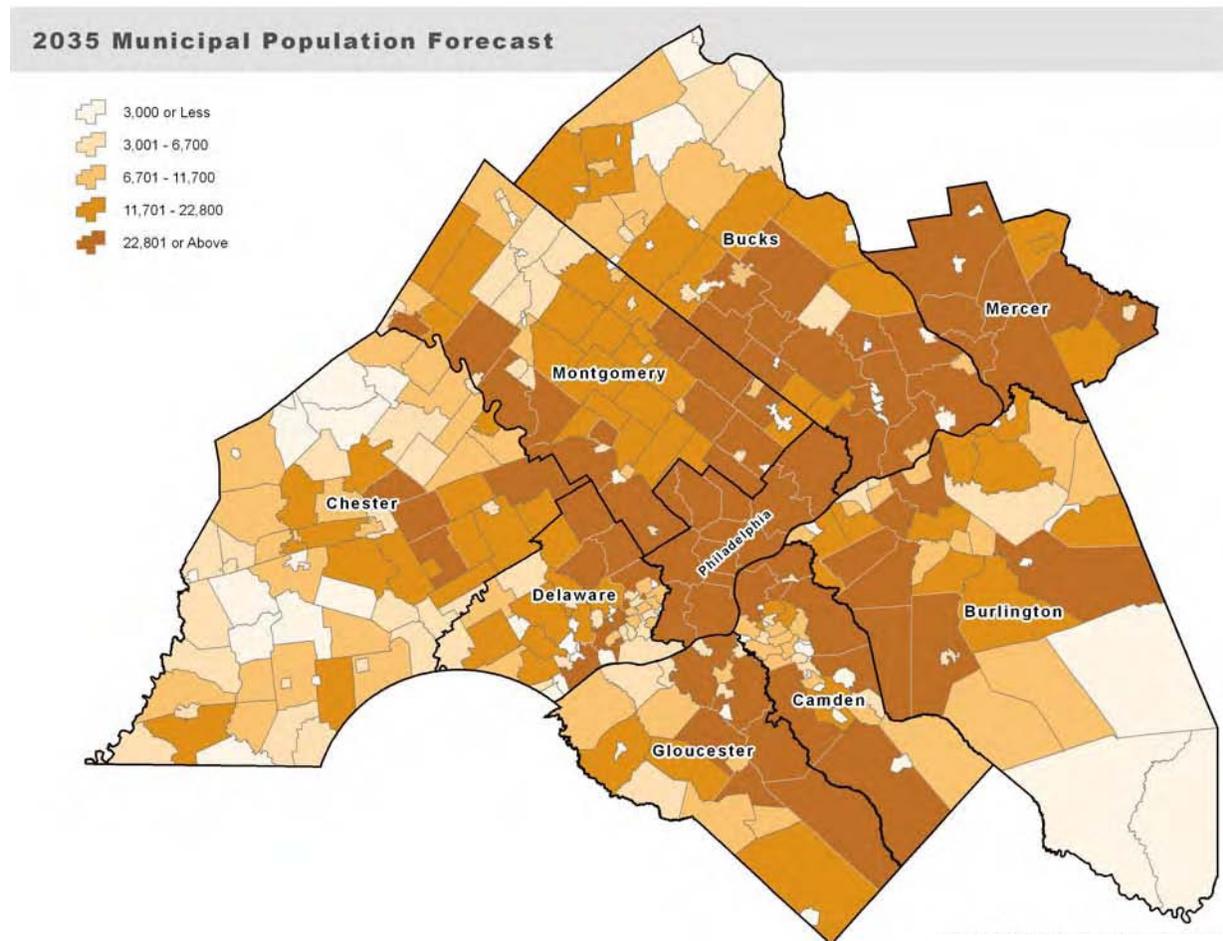
Between 1930 and 2000, the nine-county DVRPC region gained almost 2.1 million new residents. Most of this growth took place between 1940 and 1970, when the region's population increased by over 50 percent. This growth occurred primarily in the suburbs. By 1970, the four suburban Pennsylvania counties had approximately the same number of residents as the City of Philadelphia. The decades between 1970 and 2000 can be characterized more as a period of population shift rather than growth. During these three decades the region gained less than 260,000 people

overall (an increase of only 5 percent), despite significant increases in many suburban municipalities. Changes in regional demographics resemble a doughnut, with communities in the center of the region losing jobs and people (the “doughnut hole”), and suburban communities ringing the region’s core gaining jobs and people (the “doughnut”).

Population Forecasts

Population forecasts are a critical component of long-range planning. The forecasts for the *Destination 2030* plan, adopted in February 2005, were based on data from the 2000 decennial Census. The first step in developing forecasts for 2035 was to develop and reach agreement with DVRPC’s member counties on the estimated population and employment in 2005, to be used as a base for the 30-year forecast through 2035.

Population forecasting at the regional level involves the review and analysis of four major components: births, deaths, migration, and changes in group-quarter populations (e.g., dormitories, military barracks, prisons, and nursing homes). DVRPC uses the cohort survival concept (based on 2005 population estimates) to age individuals and project the flow of people. DVRPC also relies on its member counties to provide feedback on the population forecasts and information on any known, expected, and/or forecasted changes in group-quarter populations. County and municipal population forecasts in five-year increments through 2035 for the DVRPC region were adopted by the DVRPC Board in July 2007.

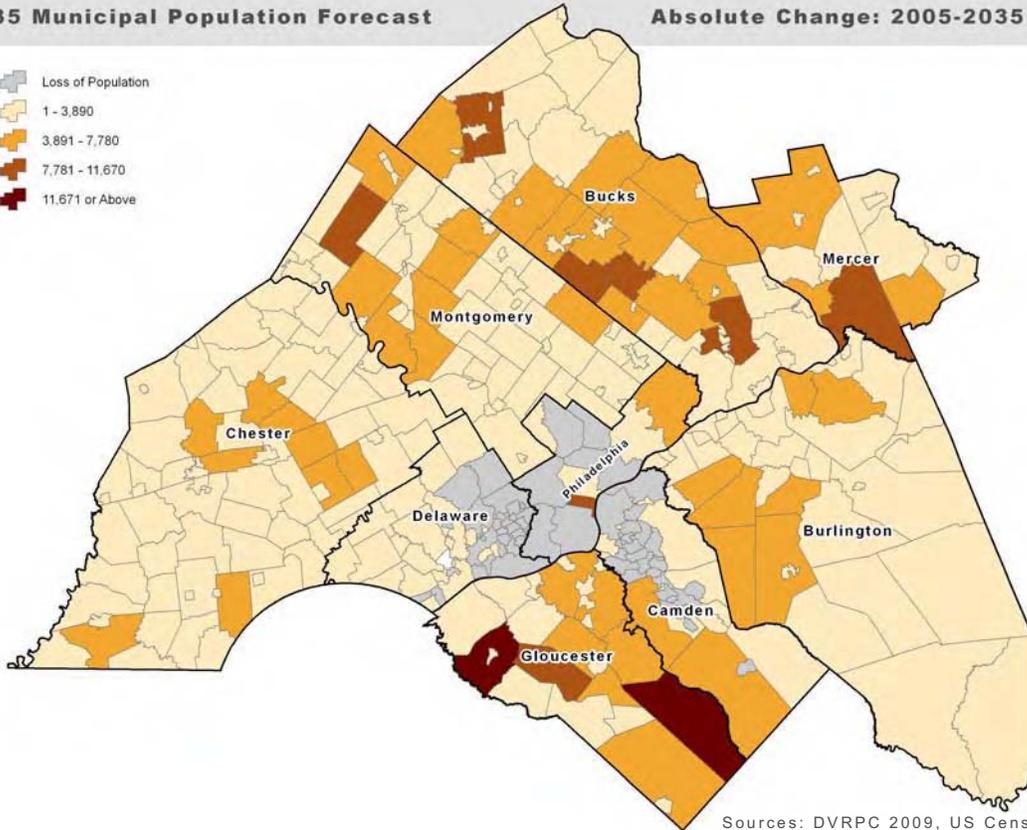


Sources: DVRPC 2009, US Census Bureau

2035 Municipal Population Forecast

Absolute Change: 2005-2035

-  Loss of Population
-  1 - 3,890
-  3,891 - 7,780
-  7,781 - 11,670
-  11,671 or Above

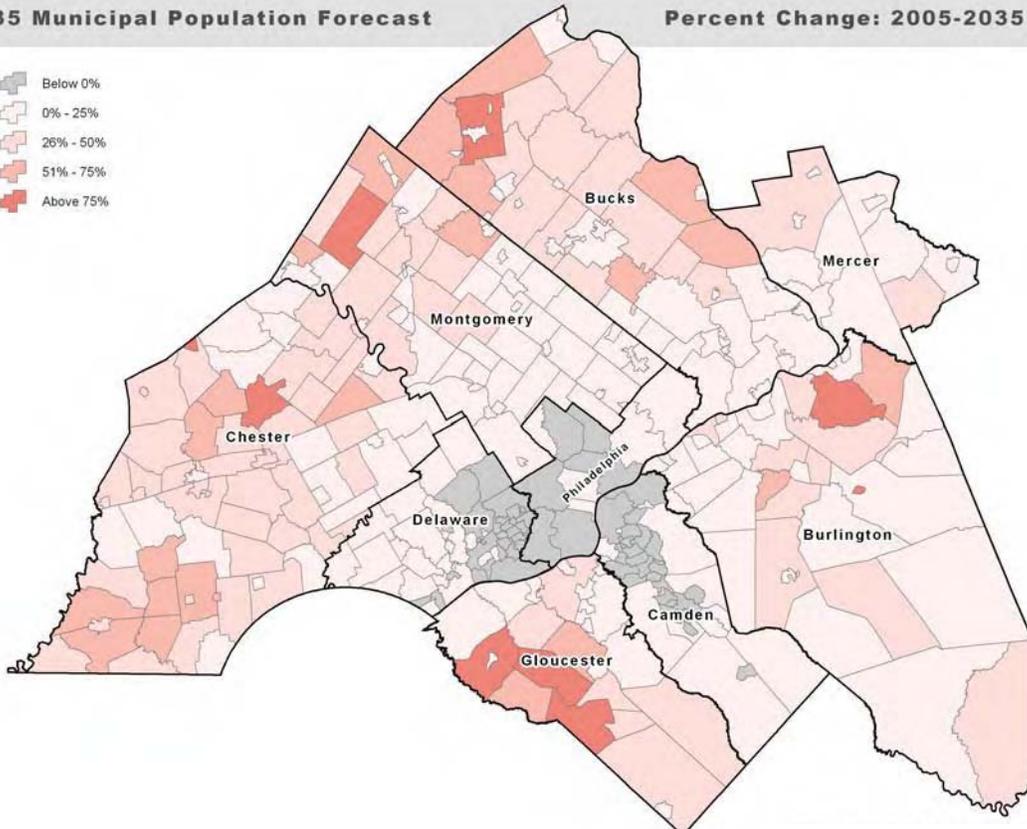


Sources: DVRPC 2009, US Census Bureau

2035 Municipal Population Forecast

Percent Change: 2005-2035

-  Below 0%
-  0% - 25%
-  26% - 50%
-  51% - 75%
-  Above 75%



Sources: DVRPC 2009, US Census Bureau

Population Forecasts: 2005-2035

Jurisdiction	2005 Estimate	2015	2025	2035	Absolute change	Percent change
Bucks County	624,351	672,674	715,819	753,784	129,433	21%
Chester County	473,880	531,971	582,047	622,498	148,618	31%
Delaware County	555,206	556,979	558,563	559,956	4,750	1%
Montgomery County	780,544	822,952	860,816	894,136	113,592	15%
Philadelphia County	1,483,851	1,472,422	1,476,150	1,480,023	-3,828	0%
5 - PA counties	3,917,832	4,056,998	4,193,395	4,310,397	392,565	10%
Burlington County	446,866	482,153	513,569	541,203	94,337	21%
Camden County	515,027	518,632	521,851	524,684	9,657	2%
Gloucester County	274,229	309,751	341,468	369,374	95,145	35%
Mercer County	365,097	382,692	395,652	403,976	38,879	11%
4 - NJ counties	1,601,219	1,693,228	1,772,540	1,839,237	238,018	15%
9 - DVRPC counties	5,519,051	5,750,226	5,965,935	6,149,634	630,583	11%

Source: DVRPC 2007

In 2005, there were over 5.5 million people living in the nine-county DVRPC region. By 2035, more than 6.1 million people are expected. This represents an 11 percent increase over the 26-year life of the *Connections* plan. The City of Philadelphia has experienced a continual decline in population since 1950, but the population loss has been less drastic in recent years and population is projected to remain steady at just over 1.475 million over the life of the *Connections* plan. The share of the region's population living in the City, however, is expected to decline from 27 percent in 2005 to 24 percent by 2035, due primarily to continuing population growth in the suburbs. Like Philadelphia, Delaware and Camden counties are projected to hold steady at their current population levels.

The largest percent increases in population between 2005 and 2035 are forecast in Gloucester County in New Jersey and Chester County in Pennsylvania, 35 percent and 31 percent respectively. The largest absolute increase in population is forecast for Chester County, expected to gain almost 149,000 residents and surpass Delaware and Camden counties by 2035 to become the region's 4th most populous county. Other counties forecast to see a significant number of additional residents include Bucks County (forecast to gain over 129,000 residents) and Montgomery County (with a forecasted increase of over 113,500 people). Municipalities forecast to experience a decline in population include the region's core cities, older boroughs, and first generation suburbs located in the center of the region. The fastest growing municipalities tend to be toward the edge of the region.

An important demographic trend that is expected to accelerate over the life of the Plan is the aging of the region's population. The number of elderly residents has increased dramatically throughout the nation and the region in recent years and is expected to continue to increase at a record pace. Most of this growth is expected to occur in the suburbs, as the region's "baby boomers" (born between 1946 and 1964) age in place. The region's elderly population increased by 46 percent between 1970 and 2000, compared to an overall population increase of only 5 percent during the same decades. This disparity is even more dramatic when considering only the region's eight suburban

counties (exclusive of Philadelphia), where the elderly population grew by 90 percent between 1970 and 2000 compared to an overall population increase of 22 percent.

Based on DVRPC forecasts, many of the region’s counties can expect to experience a doubling or more of their elderly population by 2025. At this time almost one in five of the region’s residents will be over the age of 65. Pennsylvania, Bucks and Chester counties will continue to see the most rapid maturation. Elderly residents are expected to account for over 21 percent of the population in each of these two counties by 2025, up from 12 percent in 2000. Philadelphia, home to 29 percent of the region’s elderly residents in 2000, will see their share decline significantly by 2025. In New Jersey, Burlington County will see the most dramatic demographic shift, with the elderly population more than doubling between 2000 and 2025.

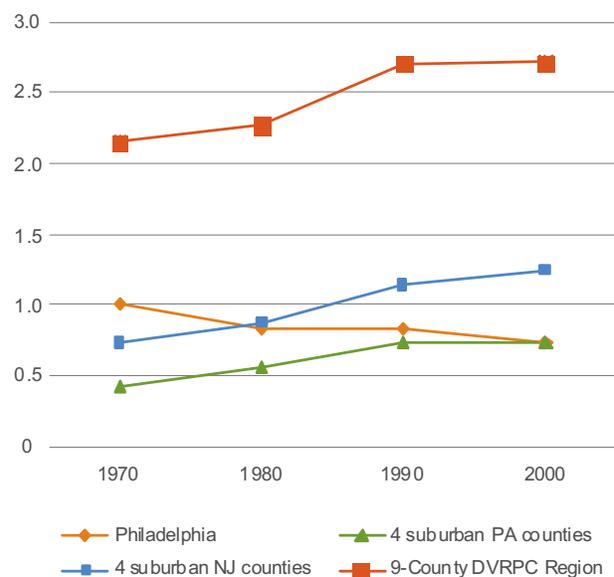
Many aging suburban baby boomers will want to stay in the suburban communities in which they have raised their families after they retire. Challenges facing seniors include a lack of affordable and accessible housing alternatives; limited accessibility within their existing homes; limited accessibility within their communities; and transportation and mobility, especially given the lack of public transit in many suburban locations. Elderly homeowners will also face economic challenges, as the cost of essentials such as transportation and health care skyrocket, leaving less money available for housing costs (including rising property taxes and the costs of home repair and maintenance). It is imperative that the region’s elected officials, planners, service providers, and the elderly and near-elderly themselves plan now to accommodate the coming “senior boom.”

Employment

The region’s employment grew significantly between 1980 and 1990, but the period since 1990 (like population change) has been a period of shift rather than growth, as employment declined in the core cities and older suburbs but grew rapidly in the region’s suburbs.

The most significant regional employment trend over the last few decades has been the shift from a manufacturing-based economy to a service-dominated economy, a trend seen throughout the nation as a whole and particularly in most urban areas in the Northeast and Midwest. In 1969, manufacturing accounted for over 30 percent of the region’s total employment; by 1985, that share had declined to under 20 percent; and by 2000, to under 12 percent. At the same time, the region’s service-oriented employment grew significantly, particularly in the health, education, and professional services sectors.

Employment: 1970-2000 (millions)

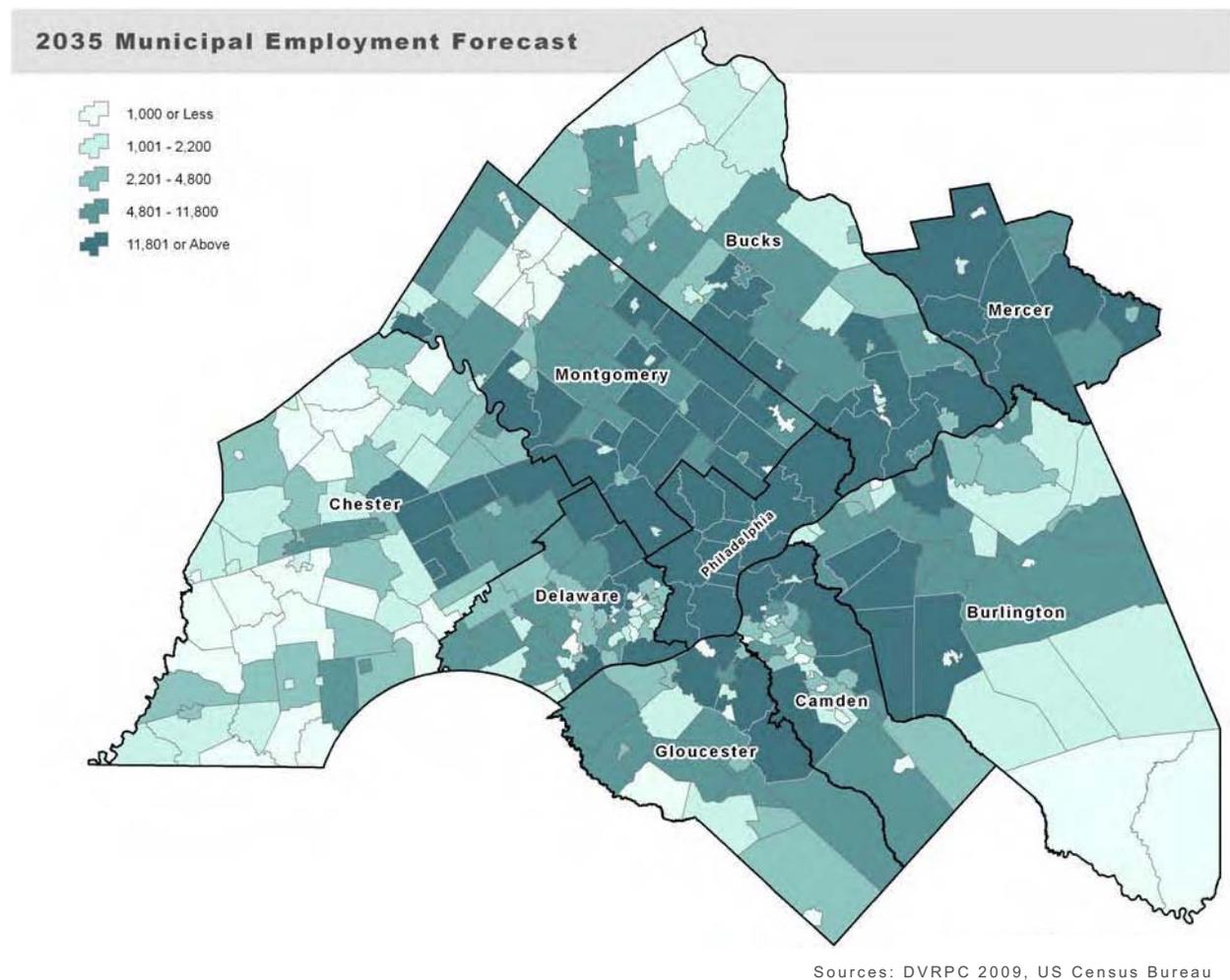


Source: US Census Bureau 1970-2000 as modified by DVRPC

Employment Forecasts

In general, employment is more difficult to forecast than population, since it is impacted by political and socioeconomic factors at local, regional, national, and global levels. Various studies and past experience, however, have shown that there is a direct relationship between the number of households in a region (which is a function of population) and the number of jobs. The relative change in employment closely tracks the relative change in households, since the number of workers per household is relatively constant and because new households require goods and services that create jobs.

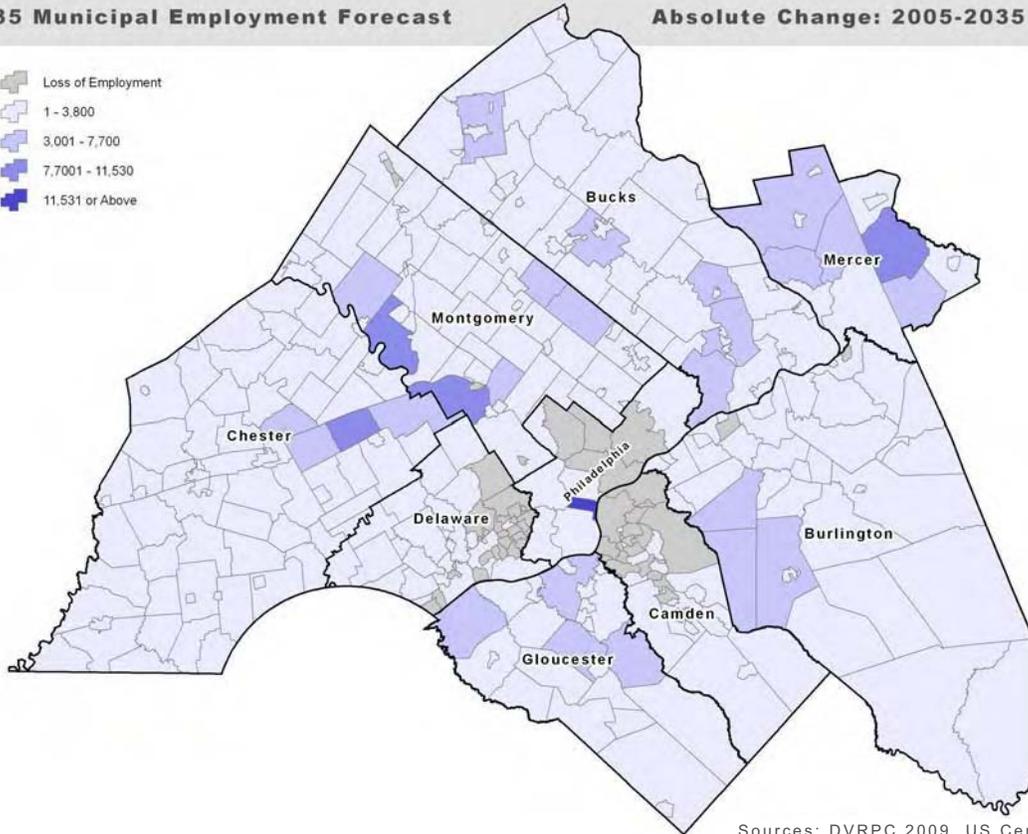
To forecast employment, DVRPC calculated the ratio of employment to population for each county and the region as a whole in 1990, 2000, and 2005, and, based on historic trends in these ratios, developed reasonable 2035 employment forecasts. Using planning knowledge of theoretical employment growth and decline, DVRPC developed a curve reflecting decreasing rates of growth or decline and applied these rates of change to forecast employment for the interim years. County and municipal forecasts in five-year increments through 2035 were then reviewed by each County planning department, who revised these forecasts as appropriate based on their knowledge of proposed development and local conditions. These forecasts were adopted by the DVRPC Board in July 2007.



2035 Municipal Employment Forecast

Absolute Change: 2005-2035

-  Loss of Employment
-  1 - 3,800
-  3,001 - 7,700
-  7,7001 - 11,530
-  11,531 or Above

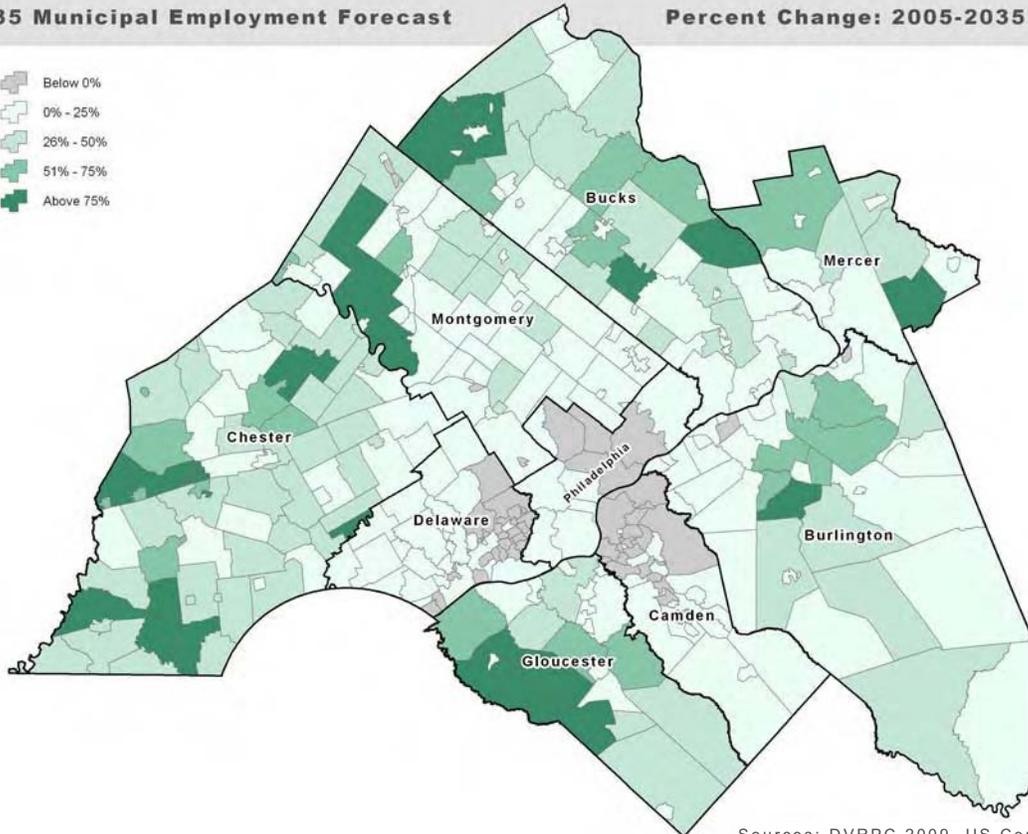


Sources: DVRPC 2009, US Census Bureau

2035 Municipal Employment Forecast

Percent Change: 2005-2035

-  Below 0%
-  0% - 25%
-  26% - 50%
-  51% - 75%
-  Above 75%



Sources: DVRPC 2009, US Census Bureau

Employment Forecasts: 2005-2035

Jurisdiction	2005 Estimate	2015	2025	2035	Absolute change	Percent change
Bucks County	277,886	301,910	323,361	342,236	64,350	23%
Chester County	253,628	285,352	313,815	337,093	83,465	33%
Delaware County	237,582	239,809	241,797	243,547	5,965	3%
Montgomery County	505,952	535,621	562,117	585,430	79,478	16%
Philadelphia County	728,054	724,962	731,831	736,268	8,214	1%
5 - PA counties	2,003,102	2,087,654	2,172,921	2,244,574	241,472	12%
Burlington County	214,621	231,760	247,063	260,529	45,908	21%
Camden County	222,721	224,200	225,520	226,682	3,961	2%
Gloucester County	108,229	122,291	134,847	145,895	37,666	35%
Mercer County	228,502	243,788	257,436	269,446	40,944	18%
4 - NJ counties	774,073	822,039	864,866	902,552	128,479	17%
9 - DVRPC counties	2,777,175	2,909,693	3,037,787	3,147,126	369,951	13%

Source: DVRPC 2007

Employment forecasts show a similar pattern of growth and distribution in the region as population, with the region's core cities, older boroughs, and first suburbs experiencing decline and growth expected in municipalities located toward the edges of the region.

Between 2005 and 2035, the region is forecast to add an additional 370,000 jobs, a 13 percent increase over 2005 levels. New Jersey is forecast to have a slightly higher percentage gain in employment compared to Pennsylvania, similar to the population forecasts. Employment in Gloucester County and Chester County is forecast to grow by the largest percentage over the life of the Plan while Philadelphia, Delaware, and Camden counties will experience the lowest percentage growth.

The City of Philadelphia will remain the region's largest job center, with over 736,000 jobs forecasted in 2035. Like population, however, the share of the region's employment located in the City is expected to decline from 26 percent in 2005 to 23 percent by 2035, due to continuing job growth in the region's suburbs. The largest absolute increase in population is forecast for Chester County, which is expected to gain over 83,000 new jobs. Other counties forecast to gain a significant number of additional jobs include Montgomery County (forecast to gain over 79,000 jobs) and Bucks County (forecast to gain over 64,000 jobs).

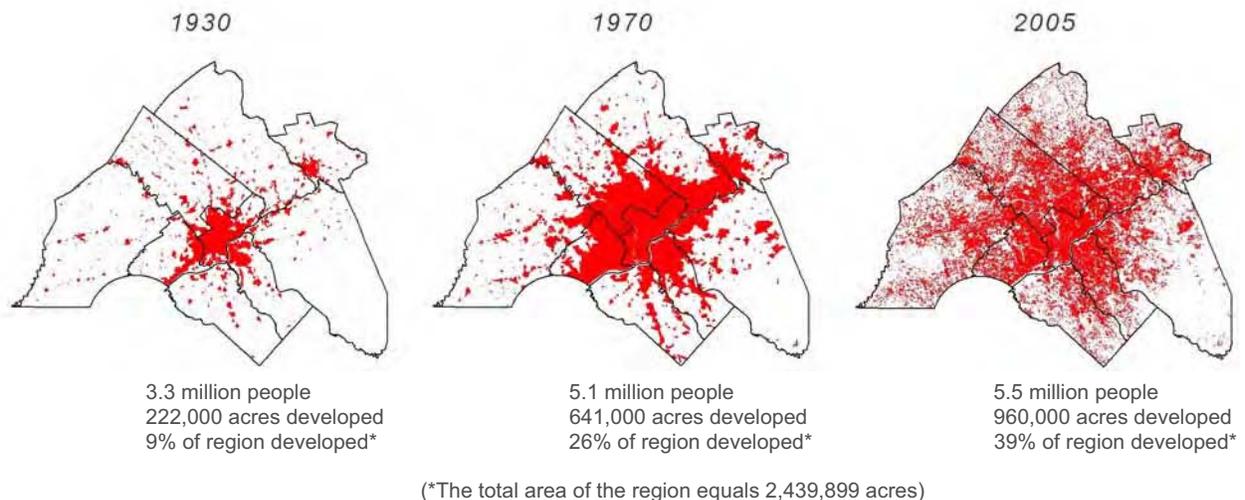
Land Use

Land use information and analysis is a fundamental tool in the planning process. Since 1970, DVRPC has produced land use files for the nine-county region, based on information derived from aerial photography. Originally updated every 10 years, DVRPC's land use data is now updated based on aerial surveillance gathered every 5 years.

Not only has the population of the region increased over the course of the 20th century, but where people live has also changed dramatically. In 1900, almost two-thirds of the region's population called the City of Philadelphia home; by mid-century, that figure was a little over 50 percent. By the turn of the 20th century, just 28 percent of the region's residents lived in the City of Philadelphia. As the region's population expanded, so did its settlement pattern, pushing out in ever-widening rings.

The maps below illustrate the extent of regional development since 1930. In 1930, 3.3 million people lived in the nine counties and 222,000 acres in the region were developed. By 1970, the region's population had increased to 5.1 million people while the land that was developed had nearly tripled to 641,000 acres. During these four decades, land developed at three and a half times the rate of population increase. This trend accelerated between 1970 and 2005 (when land consumption increased at seven times the rate of population increase), leading to continued suburban sprawl with a consequent loss of open space and farmland coupled with decline in existing developed communities.

Extent of Regional Development



Source: DVRPC 2009

By 2005, the region's population had increased to approximately 5.5 million people, while the developed area had increased to 960,000 acres. On a more positive note, the rate of development between 2000 and 2005 slowed, albeit slightly, compared to the rate between 1970 and 2000. From 1970 to 1990, development occurred at a rate of approximately one acre per hour; between 1990 and 2000, the rate accelerated to one acre every 45 minutes but has since declined, with approximately one acre of land developed every 65 minutes between 2000 and 2005.

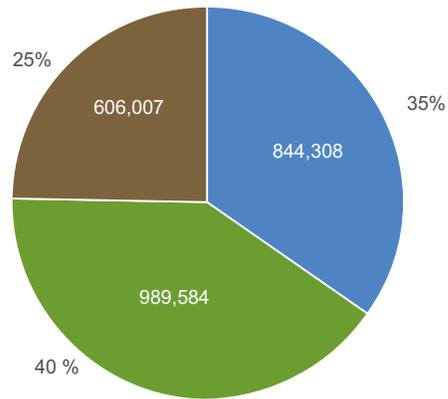
The charts on the following page illustrate land use in 1995 and 2005. Of the region's total land area in 2005, 20 percent was in residential use (predominantly single-family); 20 percent was in other developed uses; 21 percent was in agricultural use (down from 25 percent in 1995); and an additional 39 percent was either vacant or wooded, or water (also down slightly, from 40 percent in 1995). Although the region's population increased by only 4 percent between 1995 and 2005, residential land area increased by approximately 11 percent (a gain of over 48,000 acres). Other developed uses consumed an additional 67,000 acres, for a net increase of over 115,000 acres in developed land over the ten years.

Between 1995 and 2005, just over one-quarter acre was developed with residential uses for every additional resident in the region. That number has declined slightly in more recent years: between 2000 and 2005 just over two-tenths of an acre was developed for every resident that the region gained.

Chester and Bucks counties (in Pennsylvania), and Burlington and Gloucester counties (in New Jersey) realized the highest net increase in residential acres between 2000 and 2005. In terms of percentage increase, Chester and Gloucester counties each experienced a 9 percent increase in residential acreage (mirroring population increases), followed by Burlington County (at 7 percent).

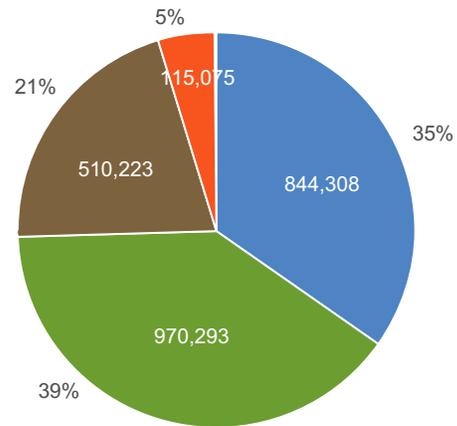
Between 2000 and 2005, the DVRPC region lost over 34,600 acres of agricultural land area and an additional 5,100 acres of other undeveloped areas, for a total loss of almost 40,000 undeveloped acres (an overall decline of over 3 percent in undeveloped land area since 2000). Chester, Montgomery, and Gloucester counties realized the greatest net losses of agricultural land during over the five-year time span, while Burlington County saw the greatest decline in vacant or wooded acres.

1995 Land Use



■ Developed acres ■ Wooded, vacant, and water acres ■ Agricultural acres

2005 Land Use



■ Developed acres ■ Wooded, vacant, and water acres
 ■ Agricultural acres ■ Additional developed acres

Source: DVRPC 2008

The Environment

Environmental trends throughout Greater Philadelphia have largely been driven by changes in land use. The region’s agricultural, wooded, and natural lands—areas collectively referred to as “open space”—have been steadily vanishing in recent decades, while the amount of developed land has steadily increased. Between 1970 and 2005, 320,000 acres of open space were lost to development. Furthermore, throughout this period, open space has been consumed primarily to accommodate lower density development, not population growth.

Between 1990 and 2005, the region lost approximately 70,000 acres of wooded lands, or almost 5,000 acres per year. The ability of land to capture and store stormwater, filter pollutants, and ameliorate flooding is compromised by

the loss of natural vegetation and woodlands. The impact of open space loss on the region's surface waters is borne out by surface water quality data. In 2006, 65 percent of the sub-watersheds in DVRPC's four South Jersey counties did not meet statewide water quality standards for aquatic life use. In the five southeastern Pennsylvania counties, 34 percent of all assessed stream miles were impaired for aquatic life use in 2006. In 2008, that number grew to 36 percent.

Farmland in the region is some of the most productive agricultural land in the nation, but it is land most likely to be converted to other developed uses. Greater Philadelphia lost 126,000 acres, or approximately 8,500 acres of farmland per year between 1990 and 2005. This loss of agricultural land threatens the agricultural industry, diminishes the region's ability to produce food locally, and deprives communities of their cultural heritage and unique sense of place.

Although the region has been losing open space at a steady rate, land preservation activities have kept pace with the rate of development over the past 15 years—an average of 10,000 acres have been both developed and protected each year. In the fifteen years prior to 2007, the region's publicly-owned open space grew by almost 77,000 acres, a 31 percent increase, while the number of preserved farmland acres grew from 15,000 to 85,000, a 400 percent increase. As of 2007, nearly 477,000 acres within the region were permanently protected, including parkland, land trust owned and eased lands, and preserved farmland.

- Protected public and private open space lands represent 14 percent and 6 percent of the region's area respectively.
- Public protected lands increased by about 18,000 acres since DVRPC's 2004 inventory, though all but 2,000 acres of this increase occurred in Burlington County.
- Although public lands represent over 14 percent of the region's area, the analysis shows that these lands are not evenly distributed among the counties. Burlington County alone contains almost 53 percent of the region's public lands.
- While Burlington County has by far the greatest amount of public land, both in terms of total area and acres per 1,000 population, most of this area is for conservation purposes in the Pinelands, and is therefore less accessible to the majority of both the county and regional population.
- The most dramatic and consistent gains in protected open space across the region since DVRPC's last inventory in 2004 occurred in farmland preservation. During this period, preserved farmland increased by almost 7,000 acres in Pennsylvania and nearly 11,000 acres in New Jersey.
- Non-profit protected open space increased by nearly 14,000 acres since 2004, although almost all of this gain occurred in Chester County, and may partially reflect the use of a new data source for Chester County non-profit lands.
- Community gardens in the City of Philadelphia and other urban areas are important to recognize and maintain. While not inventoried due to their small scale and uncertain ownership status, they provide visual relief, safe havens, community pride, and fresh, healthy produce for neighborhood residents.

2007 Protected Open Space by Ownership

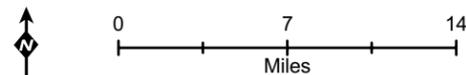
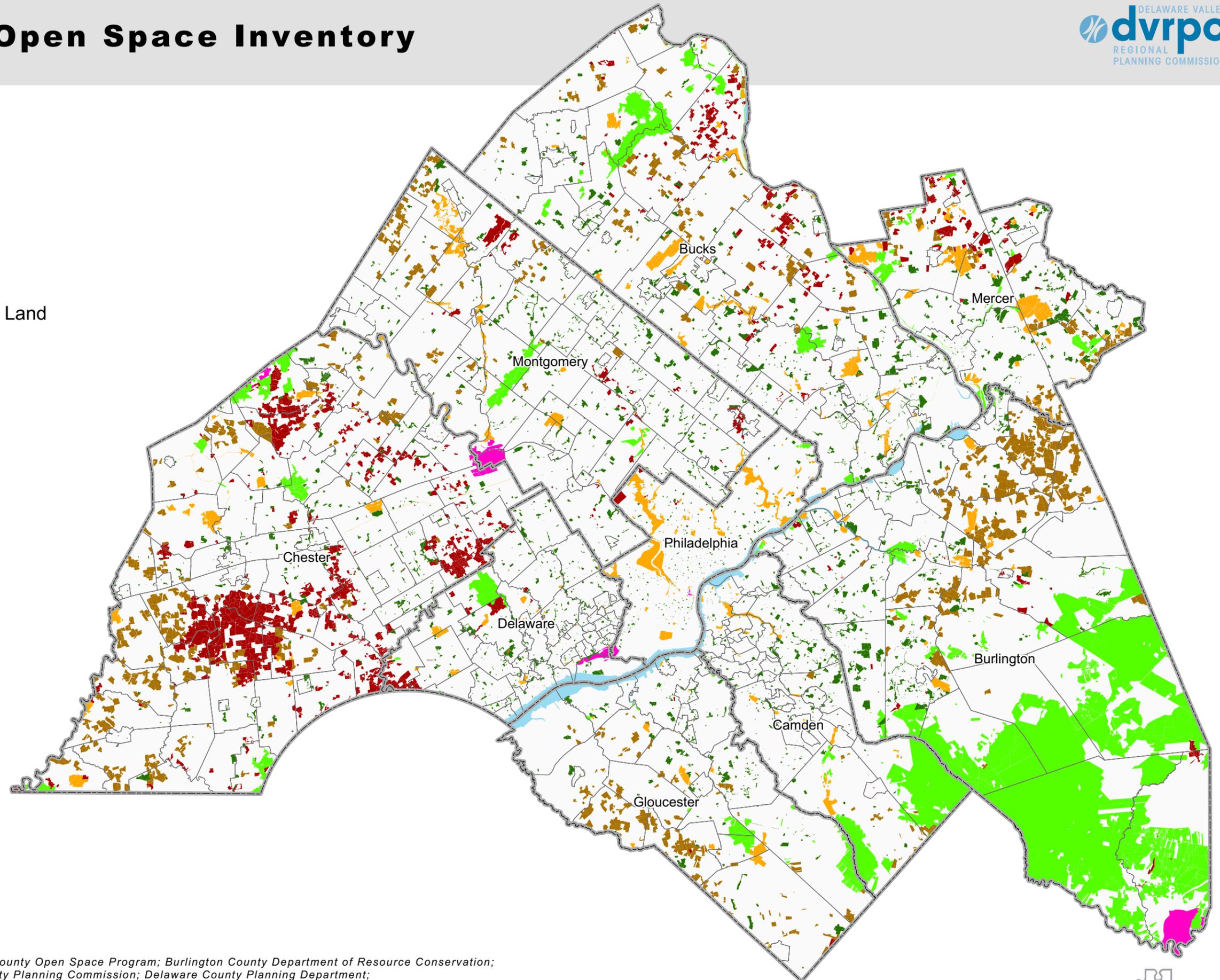
County	Publicly Owned Lands							Privately Owned Lands			
	Federal	State	County	Municipal	Total Protected Public Open Space	Protected Public Open Space as Percent of Total Area	Public Protected Acreage per 1000 population	Preserved Farmland	Land Trust or Privately Protected	Total Protected Private Open Space	Protected Private Open Space as Percent of Total Area
Bucks	0	12,880	7,919	11,979	32,778	8.43%	54.8	9,982	8,046	18,028	4.64%
Chester	1,288	7,218	5,956	8,787	23,249	4.81%	53.6	24,875	44,506	69,381	14.34%
Delaware	729	2,584	1,659	4,630	9,602	8.15%	17.4	236	2,903	3,139	2.66%
Montgomery	1,964	3,774	4,899	9,129	19,766	6.39%	26.4	6,940	3,661	10,601	3.43%
Philadelphia	373	259	8,267	1,450	10,349	11.97%	6.8	0	488	488	0.56%
PA TOTAL	4,354	26,715	28,700	35,975	95,744	6.91%	24.9	42,033	59,604	101,637	7.33%
Burlington	4,001	154,556	3,439	10,424	172,420	33.49%	407.2	25,841	1,739	27,580	5.36%
Camden	0	20,002	2,361	4,050	26,413	18.57%	51.9	1,313	0	1,313	0.92%
Gloucester	0	5,447	1,921	4,307	11,675	5.61%	45.8	10,232	302	10,534	5.06%
Mercer	0	4,208	8,614	8,875	21,697	15.01%	61.9	5,560	2,066	7,626	5.28%
NJ TOTAL	4,001	184,213	16,335	27,656	232,205	23.00%	151.0	42,946	4,107	47,053	4.66%
REGION TOTAL	8,355	210,928	45,035	63,631	327,949	13.69%	60.9	84,979	63,711	148,690	6.21%

Source: Bucks County Planning Commission; Bucks County Open Space Program; Burlington County Department of Resource Conservation; Camden County Improvement Authority; Camden County Division of Open Space and Farmland Preservation; Chester County Planning Commission; Delaware County Planning Department; Gloucester County Planning Division; Mercer County Planning Commission; Montgomery County Planning Commission; Montgomery County Lands Trust; Natural Lands Trust; Wallace, Roberts & Todd; NJ DEP; NJDEP Green Acres Program; PA DCNR; DVRPC 2008

The importance of open space to the region is underscored by the growth of locally-funded open space programs. Much of the region's success in preserving open space is the result of voter-approved county and municipal funding programs dedicated to open space preservation. The region is among the nation's leaders in the use of voter referendums to authorize conservation funding. Since 1987, county and municipal open space funding programs have generated over \$1.5 billion dollars in local funding for conservation. In fact, according to the Trust for Public Land, the Greater Philadelphia region generates more dedicated funding per capita for conservation than any of the other 11 largest metropolitan areas in the country.

2007 Protected Open Space Inventory

- Federal Lands
- State Lands
- County Lands
- Municipal Lands
- Preserved Farmland
- Non-Profit Eased and Owned Land



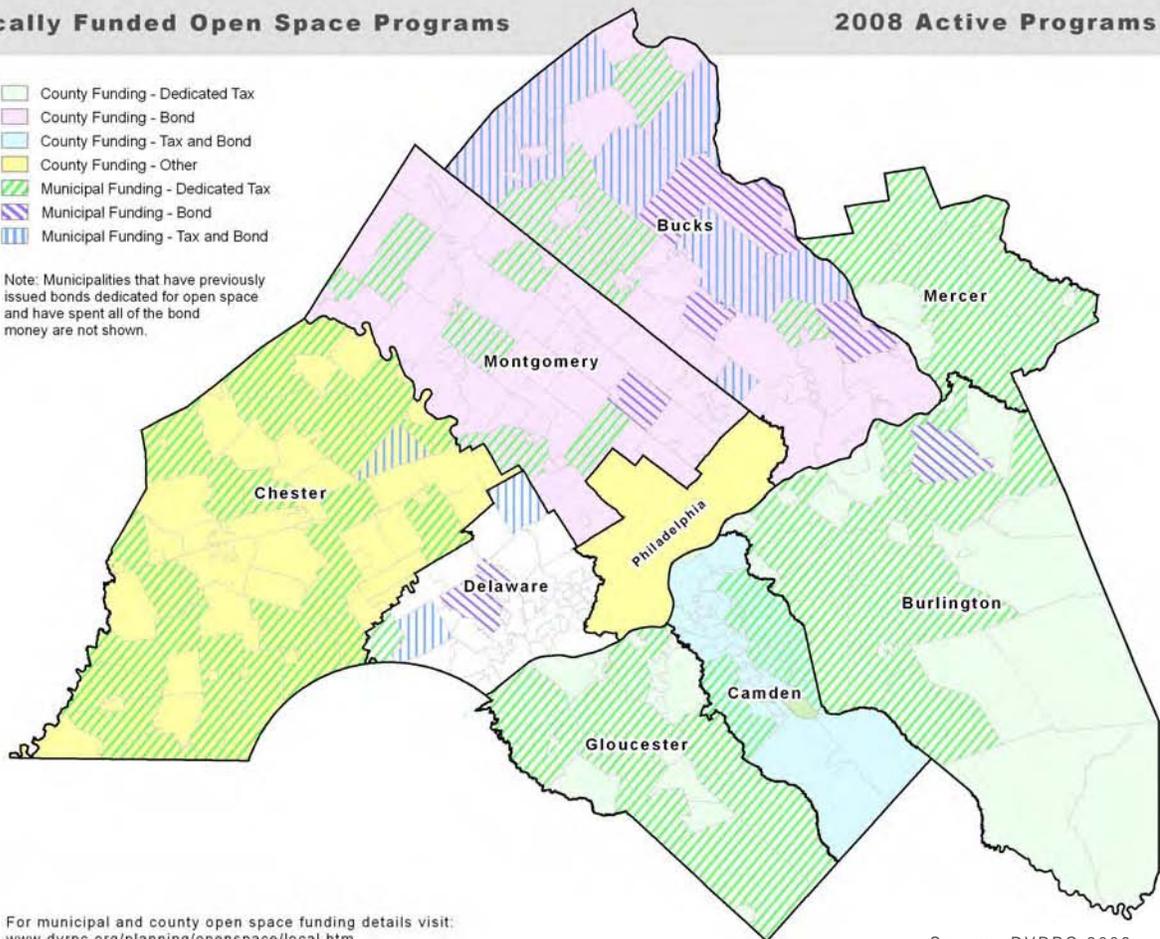
Sources: Bucks County Planning Commission; Bucks County Open Space Program; Burlington County Department of Resource Conservation; Camden County Improvement Authority; Chester County Planning Commission; Delaware County Planning Department; Gloucester County Planning Commission; Mercer County Planning Commission; Montgomery County Planning Commission; Heritage Conservancy; Montgomery County Lands Trust; Natural Lands Trust; Wallace, Roberts & Todd; NJ DEP; NJ Green Acres; PA DCNR; DVRPC 2009

Locally Funded Open Space Programs

2008 Active Programs

-  County Funding - Dedicated Tax
-  County Funding - Bond
-  County Funding - Tax and Bond
-  County Funding - Other
-  Municipal Funding - Dedicated Tax
-  Municipal Funding - Bond
-  Municipal Funding - Tax and Bond

Note: Municipalities that have previously issued bonds dedicated for open space and have spent all of the bond money are not shown.



In the DVRPC Region, voters voted on 240 local referendums between 1988 and 2008. Voters approved 212 referendums (88 percent) authorizing counties and municipalities to levy additional taxes or issue bonds dedicated to open space preservation.

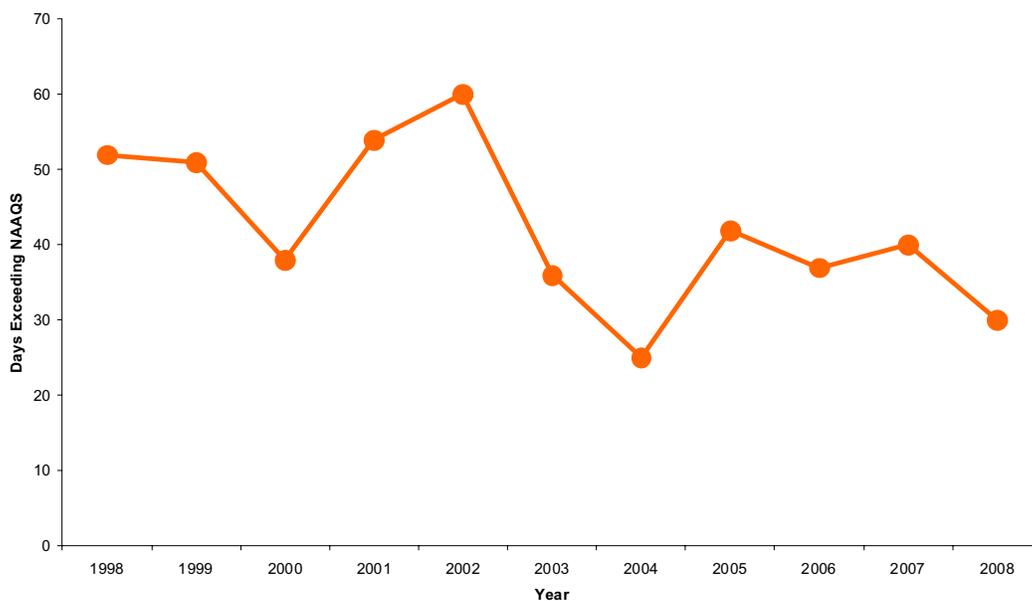
- The number of local referendums issued for open space preservation increased dramatically in the past decade. Of the 240 referendums issued since 1988, 172 were issued in the past 10 years.
- All 8 of the suburban counties (4 in New Jersey and 4 in Pennsylvania) and 123 of the region's 352 municipalities (35 percent) have submitted open space funding referendums to voters.
- Over the last 20 years, voters in the DVRPC Region have approved over \$738 million in bonds and \$128 million in annual tax revenue and appropriations dedicated to open space preservation.
- Over the time period of 1988 to 2008, 85 percent of all open space referendums issued in New Jersey were approved. In Pennsylvania, 91 percent of all referendums were approved.

Air quality is another environmental issue that is a significant concern in the region. The DVRPC region does not meet the federal health based standards for ground level ozone and fine particle pollution. The National Ambient Air Quality Standards (NAAQS) are measured at air quality monitors in each county across the region and can serve as a general indicator of the region's progress towards better air quality.

Ground level ozone is the primary air pollutant affecting the DVRPC region. Ozone is not directly emitted but forms when nitrogen oxides combine with volatile organic compounds in the presence of sunlight, making ozone a summertime problem. Fine particle pollution or PM_{2.5} can reach unhealthy levels at anytime of the year but high PM_{2.5} levels often correspond with elevated levels of ozone.

Since climate plays a large role in the local accumulation and formation of these pollutants, days exceeding the NAAQS can show considerable variation from year to year due to weather conditions. It is also important to note that there have been changes to the ozone standards in 2005 and again in 2008. This tightening of the standards results in a larger number of days that exceed the NAAQS than would be indicated if the standards had not changed. The overall number of days that exceed the federal health-based air quality standard has dropped over the past ten years. However, the air pollution levels in the region remain above the standard.

Number of Days Exceeding the NAAQS



Source: U.S. Environmental Protection Agency 1998-2008

Note: Data is for the Metropolitan Statistical Area (MSA), which does not include Mercer County, NJ. Salem County, NJ is included in the MSA data; Data is for PM and Ozone; Years are normalized to current standards so violations are higher in years prior to the implementation of the new, tighter standard than they were in previous reports. This is because standards have been lowered so violations in those prior years have increased.

Economic Competitiveness

In 2000, the Greater Philadelphia region was the 4th most populous metropolitan statistical area (MSA) in the country, behind only New York, Los Angeles, and Chicago. As we end the decade, the Philadelphia MSA is the nation's 5th largest metro area (having been passed in population by the Dallas-Forth Worth area) and may soon be eclipsed by fast-growing metropolitan areas such as Houston and Miami.

Greater Philadelphia boasts one of the nation's most diverse economies, low unemployment, a relatively low poverty rate, affordable housing, relatively low taxes, short average commute times, modern air and port facilities, a multitude of colleges and universities, and an extensive healthcare network. These strengths, however, threaten to be compromised by regional weaknesses that include an aging population, a low retention of young college graduates, lower educational attainment in urban areas, concentrations of poverty and unemployment, a fragmented system of local governments, and crumbling infrastructure. The challenge now facing the region is determining how to best capitalize and build on our strengths while recognizing and working to address our weaknesses.

The region's future economic competitiveness will depend on a number of factors, including its ability to continue to attract and retain a qualified work force. The percent of the region's adult population with associate degrees, bachelor degrees, and graduate or professional degrees has increased steadily since 1990. As of 2005, over 32 percent of the region's adults over the age of 25 had completed at least four years of college, ranking 6th among the nation's largest metropolitan areas. While the percentages of high school and college graduates have improved during the last decade and meet or exceed the national average, the greatest challenges remain in the core cities of Philadelphia, Trenton, Camden, and Chester, where SAT scores and high school and college graduation rates are significantly lower than state or regional averages. In the City of Philadelphia in 2000, for example, almost 29 percent of adults had not completed high school, compared to less than 13 percent in the suburbs. Only 18 percent of adults living in the City had obtained a college degree compared to 33 percent in the Philadelphia suburbs.

The region's educational resources are impressive. According to *Cities Ranked and Rated*, the Philadelphia and Trenton metropolitan areas combined have 46 four-year colleges and universities, third only to New York and Chicago. In 2006, Select Greater Philadelphia, a regional marketing organization, identified 89 educational institutions within the nine-county DVRPC region that offer at least a two-year Associate degree. When compared to the top 25 metropolitan statistical areas (MSAs), the Greater Philadelphia region ranks 2nd only to Boston in the number of bachelor and first professional degrees awarded per capita. According to US News and World Report, the region is home to two of the nation's best universities: Princeton University in Mercer County, New Jersey and the University of Pennsylvania in Philadelphia.

In 2007, 65 percent of the region's population over the age of 16 was in the civilian labor force, with 93.4 percent of those employed and 6.6 percent unemployed. Largely because of its economic diversity, unemployment in the Greater Philadelphia region has historically been lower than that of the nation and other large metros with less diverse economies. A diverse economy, while not "booming," is resilient, protected from potential extremes in job growth or decline related to a specific industry.

2007 Labor Force Characteristics

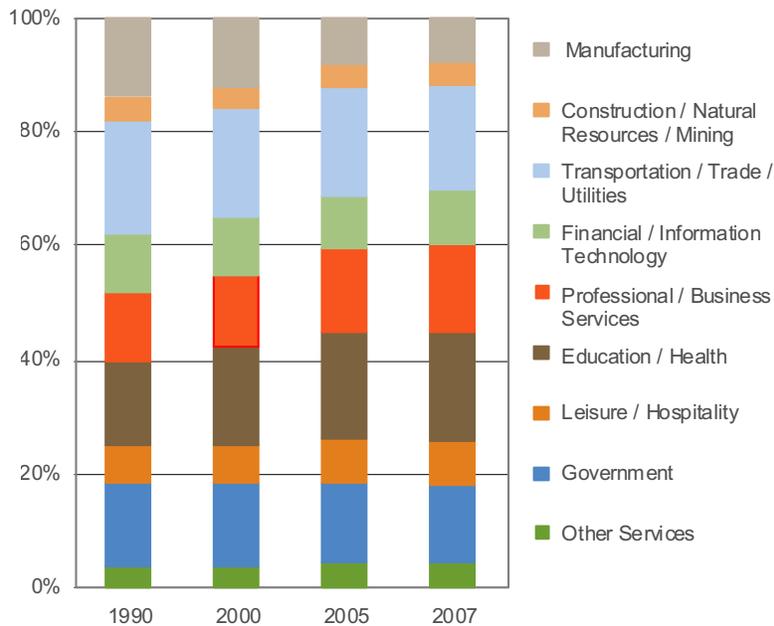
	Number	Percent
Employment Status		
Population 16 years and over	4,338,880	100%
In labor force	2,832,756	65%
Civilian labor force	2,825,432	99.7%
Employed	2,637,558	93%
Unemployed	187,874	7%
Armed Forces	7,324	0.3%
Not in labor force	1,506,124	35%
Occupations		
Civilian employed population 16 years and over	2,637,558	100%
Management and professional	1,044,991	40%
Service	410,943	16%
Sales and office occupations	719,708	27%
Farming, fishing, and forestry occupations	7,050	0.3%
Construction, extraction, maintenance and repair	194,447	7%
Production, transportation, and material moving	260,419	10%

Source: U.S. Census Bureau, American Community Survey, 2007

Of those people working in the civilian labor force, 40 percent were employed in management, professional, or related occupations (compared to 34 percent nationwide); 27 percent in sales and office occupations; 16 percent in other service occupations; and the remaining 17 percent in construction or production-related occupations.

Based on the 2007 American Community Survey, the region's estimated average annual household income (\$79,697) was almost 20 percent higher than the nation's, while the per capita income was almost \$31,000 (compared to a national average of just over \$26,000). The Greater Philadelphia region boasts the 5th highest per capita income and a lower overall cost of living than other large metropolitan areas. According to the National Association of Realtors, in 2008 those looking to locate in Greater Philadelphia found the 7th lowest median price for an existing single family amongst the nation's twelve largest metropolitan areas (\$251,700). The region's residents enjoy a high quality of life, with excellent museums, music, multicultural festivals, recreational venues, and important historical sites. The region's diverse neighborhood options range from urban living to growing suburbs to rural towns and villages.

Non-farm Employment Sectors



Source: U.S. Bureau of Labor Statistics 1990-2007

The figure to the left illustrates regional non-farm employment by major sector in 1990, 2000, 2005, and 2007. Since 1995, the number of manufacturing jobs has declined by 38 percent, while the number of non-manufacturing jobs (particularly service sector employment) has increased by 20 percent. Fast-growing service sectors include professional and business services; leisure and hospitality; and education and health-related services.

While the region's economy was once dominated by manufacturing, knowledge-based industries are now prominent, with life sciences, information technology, professional services, and chemicals ranking

among the region's top industries. Sectors such as education and health services, professional and business services, financial activities, and information technology require highly educated and skilled workers, and now make up over 44 percent of the region's employment. The region's economy has transitioned from industrial manufacturing to professional services, with almost 75 percent of the region's workforce currently employed in service-providing sectors following an increase of over 390,000 service-providing jobs between 1990 and 2007.

Greater Philadelphia's thriving life sciences cluster of pharmaceutical, biotech, research and development, and support companies is one of the largest in the nation. With deep roots in public health, the region has become one of the nation's top life science industry centers. Greater Philadelphia is also powered by a solid and diversified information technology (IT) industry that ranks as the 6th largest in the country, based on shares of employment in IT occupations and IT-providing industries in the nation's 12 largest metropolitan statistical areas. IT plays a major role in the local economy both as a provider of IT products and services and as a support function to other major industries.

Although the manufacturing sector has declined significantly in recent decades, it remains an important part of the region's economy. With its strong base of highly skilled workers, top universities, and support infrastructure for a wide variety of high tech industries, Greater Philadelphia has transformed from a traditional manufacturing center to a high-tech manufacturing hub. Next-generation electronics, defense systems, aerospace, and shipbuilding are just a few of the diverse, highly specialized manufacturing segments thriving throughout the region. The region has one of the largest concentrations of employment in the country in the chemical manufacturing industry, traditionally a major driver of the region's economy.

Already a national leader with more than 100 companies engaged in nanotechnology business activities, the region ranks second nationally in nanotechnology-related patents and research. The region has also become a hub for alternative energy, with the world's three largest wind energy companies—Gamesa, Iberdrola and GE Wind—as well as the world's largest solar energy systems integrator, SunTechnics (a subsidiary of Conergy)—all having a presence in the area.

Greater Philadelphia currently boasts a large and diverse set of eco-industries, comprised of businesses and professionals that possess the potential to transform challenges in energy efficiency and ecological sustainability into a competitive economic advantage, creating jobs and quality economic development. In 2005, the region ranked 7th nationally in terms of eco-industries professionals as a percent of total employment, comparing favorably on a per-capita employment basis to our competitor regions. Eco-industries can offer new economic life and purpose to the infrastructure and facilities of the region's once vast production economy, providing economic growth and new employment born out of the economic restructuring of previous decades. The ecologically sustainable manufacture and harvest of products and commodities such as food and energy address the increasingly expensive externalities of current production patterns within and outside of the region.

To some, eco-industries are the vanguard of a new global economy that will emerge to meet the requirements of an era in which resource extraction and energy consumption are increasingly expensive. The restructuring of economies in response to resource depletion presents huge opportunities as shifts in production create jobs and open new areas of economic growth.

Energy dependence and increasing commodity prices threaten our economic stability. As one of the nation's largest post-industrial regions, we must address the factors of our former manufacturing-based economy which are now economic and ecological liabilities. Growth of the nation's service industries and its feverish production of technological innovation have buoyed the continued growth of the regional economy. Eco-industries businesses and professionals lie on the next horizon of economic expansion and continued prosperity as we begin to grapple with the adverse impacts of an increasingly global economy.

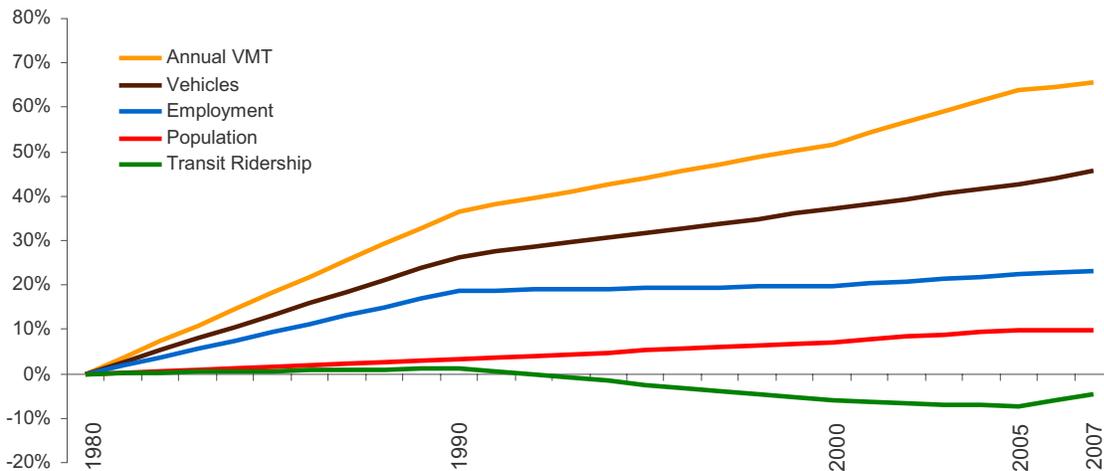
Transportation

The evolving decentralized land use pattern coupled with new technologies has had significant impact on the way people in the region have traveled over the past century. Travel at the beginning of the 20th century was limited by how far people could travel using mass transit or walking. The passenger rail infrastructure that developed during this time primarily served Center City and was designed as a radial or hub and spoke system that brought commuters from residential “bedroom” suburbs into work in Philadelphia. During the post World War II period, the private automobile dominated and the distance people could travel between home and work was greater. During the latter part of the 20th century - as population pushed farther outward and the number of different employment centers sprouted throughout the region - the number of different origins and destinations multiplied. This had a dramatic impact on transit ridership, which requires a large, centralized population and high employment densities in specific centers. Between 1980 and 2000 the number of automobiles in the region increased by 37 percent and the number of vehicle miles traveled (VMT) increased by 52 percent, despite a population increase of only 7 percent. As the

region spread out, transit and walking became less feasible as trip lengths became longer and required the use of an automobile to complete.

More recently, however, the region has seen a slight shift in travel patterns. Vehicle miles traveled remained relatively flat between 2005 and 2007, and due first to high oil prices and then the global recession, these numbers are not likely to grow in the near future. Meanwhile, transit ridership, which fell steadily from 1990 to 2005, has risen from 2005 to 2007. This mirrors national trends, where 2008 recorded the highest level of transit ridership since the early 1950s.

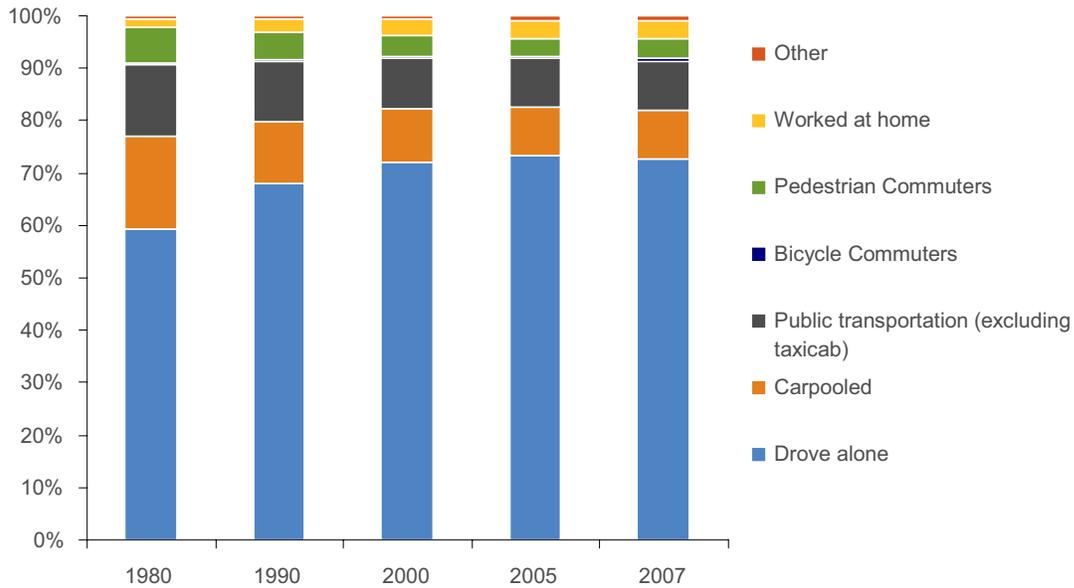
Change in Population, Employment, Vehicles, VMT and Transit Ridership: 1980-2007



Source: US Census Bureau 1980-2000; American Community Survey 2005-2007; PennDOT, NJDOT, SEPTA, DRPA/PATCO, NJ Transit 1980-2007

Commuting patterns have also seen longer term trends beginning to taper. After rapid increases in the number of commuters driving alone from 1980 to 2000, this form of commuting has remained steady. During the 1980s and 1990s the commuting pattern became increasingly suburb to suburb with a declining percent of the region’s jobs located in regional centers. Matching this change in pattern, the region saw significant declines in walking, transit ridership, and carpooling during these times. Since 2000, most forms of commuting have remained at relatively the same levels, with some growth in the number of people bicycling and working at home.

Commuting Modes: 1980-2007

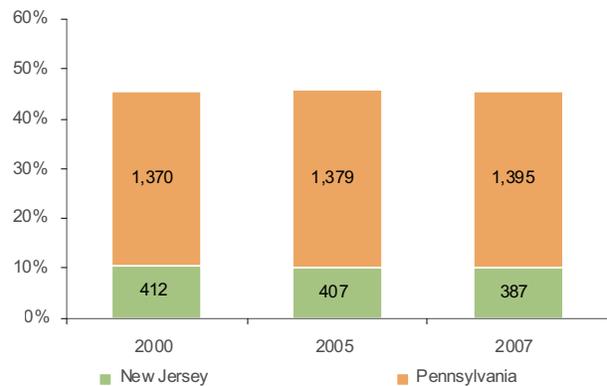


Source: US Census Bureau 1980-2000, American Community Survey 2005-2007

Regional vehicle hours of delay, as defined by the Texas Transportation Institute, increased by 163 percent from 1982 to 2000. This was during the period of rapid regional decentralization and heavy growth in VMT. Congestion began to occur over longer stretches of each day, and delayed more people, goods, and services, negatively impacting the region's economy. Since 2000, vehicle hours of delay actually decreased from 42 annually per peak hour traveler to 38 in 2005. While this is an improvement, congestion is still well-above 1982 levels and remains a major issue in the region. Several regional surveys, including DVRPC's 2005 *Destination 2030* household survey and 2008 *Connections* online survey found congestion to be one of the top issues negatively affecting the quality of life and business activity in the region.

The DVRPC region has increasingly been focusing on a "fix-it-first" approach with respect to transportation infrastructure. Despite these efforts, the region has been unable to gain ground on bridges that are functionally obsolete or structurally deficient. Between 2000 and 2007, the number of deficient bridges in the region remained steady at about 45 percent. Due to the aging bridge infrastructure in the region, bridges have been falling into disrepair as fast as they are being reconstructed.

Percent and Number of Deficient Bridges



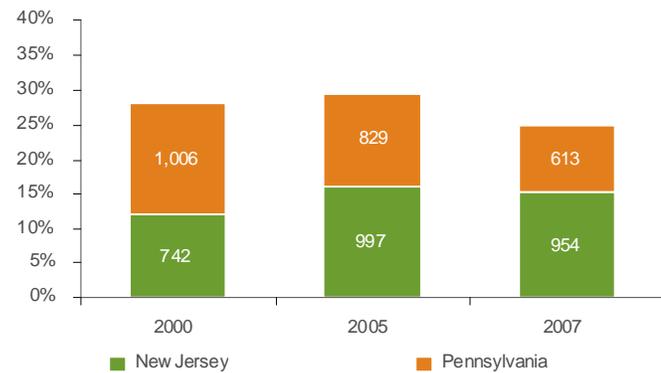
Source: NJDOT and PennDOT 2008

In contrast, the region has been able to make progress on pavement condition. From 2005 to 2007, the number of lane miles rated as deficient in the region has decreased by 259 miles, or 4.2 percent of the total.

The movement of freight is an important aspect of the transportation system and is of increasing concern to the region. Both the weight and value of shipments in the region are predicted to increase in the next 25 years. The forecasts include intra-regional, domestic outbound, and

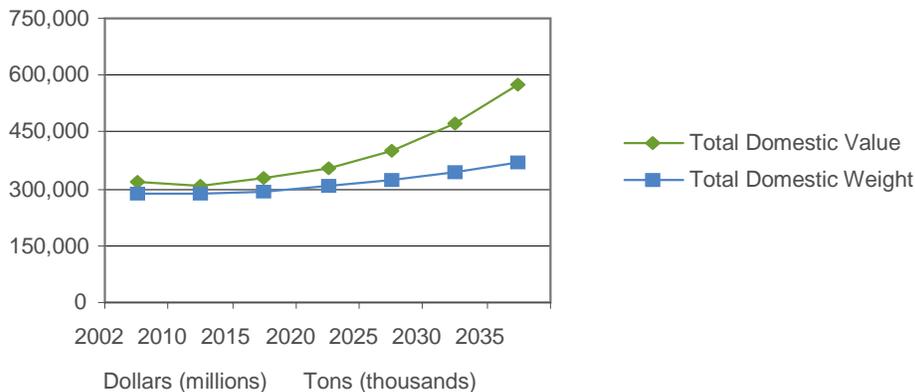
domestic inbound shipments but not international shipments. According to the forecasts, the weight of goods will grow 29 percent, from 286 million tons to 369 million tons, and the value of goods shipped will grow 82 percent, from \$317 billion in 2002 to \$577 billion in 2035 (both figures in 2002 dollars).

Percent and Number of Deficient Lane Miles



Source: NJDOT and PennDOT 2008

Total Domestic Shipments



Source: Freight Flows and Forecasts for the Philadelphia Consolidated Statistical Area, DVRPC 2009

Investment to an overburdened transportation system, particularly National Highway System (NHS) Connectors is imperative to handle the increase in freight traffic. NHS Connectors provide the critical link between the region's freeways and major airport, port, and other freight facilities.

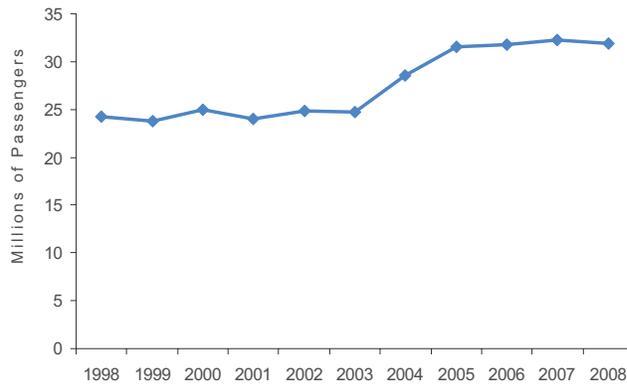
Philadelphia International Airport has seen a 1.2 percent decline of total passenger traffic directly due to the economic crisis and a decline in total plane movements of 1.5 percent between the end of 2007 and the end of 2008.² Despite these short-term losses, the PHL Master Plan Update forecasts passenger enplanements to increase from 13.55 million in 2005 to 26.1 million in 2025, a 93 percent increase.³ This document also anticipates aircraft

² Source: www.PHL.org, About PHL, Activity Reports. City of Philadelphia. 2009.

³ Philadelphia International Airport, Master Plan Update, Final Technical Report 2004.01, Forecast of Aviation Demand - Update, DMJM Aviation, 23 February 2004; amended November 2004.

operations will increase from 508,000 in 2005 to 760,000 in 2025, a 50 percent increase.⁴ General Aviation (GA) non-towered (airports without an operating tower or air traffic control unit) aircraft traffic is monitored by DVRPC in this region. A decline of 2.4 percent has been registered regionwide in GA operations at non-towered airports within the last completed counting cycle between 1999 and 2005 for all regional non-towered airports included in our Regional Airport System Plan.⁵ An increased decline in the short term is expected before a flat growth is forecasted mid-term. A slight increase in total GA operations, concurrent with the FAA forecast of 0.6 percent annually, mainly contributed by GA aircraft used for business trips, is forecasted regionally. GA recreational trips will continue to decline in the mid-term.

Total Passenger Traffic at Philadelphia International Airport



Source: Philadelphia International Airport 2009

With an emphasis on reduced energy use and greenhouse gas production, a global and regional shift to sustainable development will necessitate a reduction in long-distance travel of people and goods. The *Connections Plan* straddles the line between planning for existing trends and recognizing forces which are likely to shape the future. Where forces of change are likely to result in negative impacts, the Plan attempts to lessen them.

⁴ Ibid.

⁵ Source; DVRPC Aircraft Operations Counting Program, Reports 2001/2002, 2002/2003 and 2004/2005.

Creating a Vision for the Future

The long-range planning process requires a vision of the future to be defined in order to develop a set of goals and strategies to achieve the vision. The vision is based on looking at recent and historic trends, as well as future forecasts and collectively discussing which trends and forecasts we collectively would like to bolster and which we would like to alter. For the *Connections* plan, DVRPC conducted a scenario planning exercise to present a set of alternative futures to spur discussion on a collective vision for the region. An extensive public outreach process broadened the dialogue to include as many varying views and ideas as possible.

Regional What-if Scenarios

DVRPC's scenario planning exercise compared the magnitude of impacts for two extreme settlement patterns – a **Recentralization** of population and jobs back into the region's developed areas, and an acceleration of **Sprawl** into the region's undeveloped outlying areas. A third, **Trend** scenario, based on the DVRPC Board adopted population and employment forecasts for 2035, serves as a benchmark to the two extreme scenarios. The scenario analysis is intended to help better understand how different development patterns could affect land use, transportation, the environment, and economic competitiveness. It also highlights some of the trade-offs between the scenarios.

All three scenarios forecast a total regional population of 6.15 million and employment of 3.15 million in 2035. The difference is where individuals will live and work. The Recentralization scenario locates most population and employment growth in the region's core cities and developed communities with more reuse and densification of already developed areas. The Trend scenario foresees some of the region's residents and jobs moving away from existing developed communities and relocating - along with future population and employment growth - in growing suburbs and rural areas. Development will mostly occur in currently undeveloped areas with some infill site reuse. The Sprawl scenario greatly accelerates this trend, with population and job losses in the developed areas and more gains in outlying suburbs and rural areas that are currently designated as open space.

The what-if scenario exercise analyzed the impact of each of the scenarios on various factors organized around the four long-range plan themes of land use, the environment, economic competitiveness, and transportation.

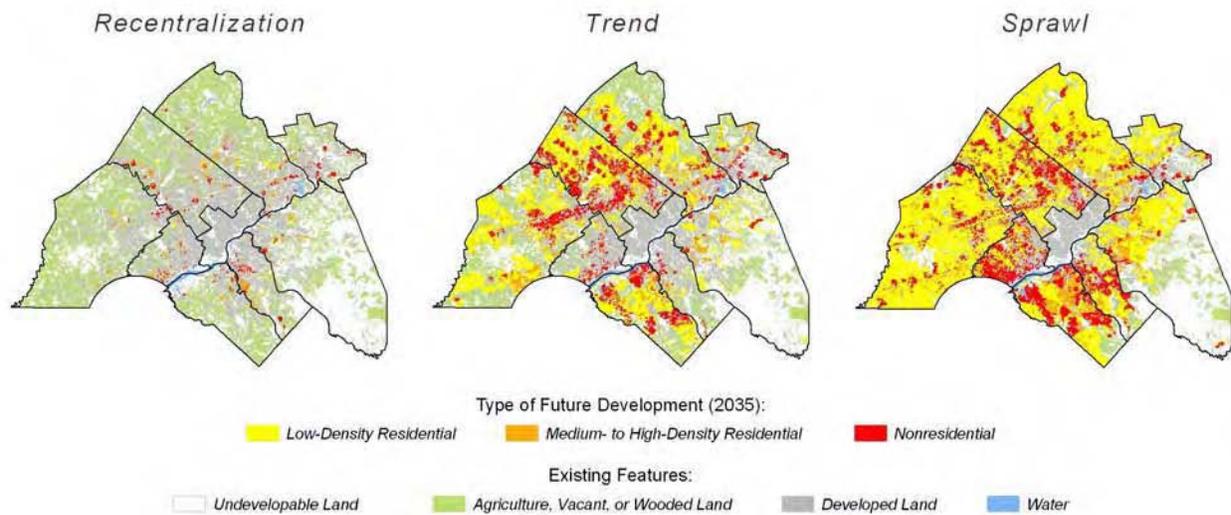
Land Use

By accommodating increases in population and employment through compact infill development, the Recentralization scenario saves existing open space. This scenario could preserve 163,000 acres compared to the current trend, an

area roughly the size of Camden County. Of these acres, 71,800 are currently used for agriculture, and 37,600 are forested. By reserving more land for agricultural use, the region is better able to respond to changes in global trading, specifically those related to shifts in food and energy prices. This allows for more locally grown food, providing economic and nutritional benefits for the region's residents.

Under the Sprawl scenario, an additional 309,000 acres would be developed in the region compared to the current trend, an area roughly the size of Montgomery County. This would result in the loss of 168,000 agricultural acres in the region and 137,000 wooded acres.

New Footprint Development by Scenario: 2005 to 2035



Source: DVRPC 2008

New Footprint Acres Developed by Scenario: 2005 to 2035

Acres	Recentralization	Trend	Sprawl
Agricultural	2,740	74,500	242,000
Wooded	1,970	39,600	167,000
Other Vacant	1,090	54,900	69,000
Total	5,800	169,000	478,000
Regional Average Residential Lot Size (in Acres)	0.28	0.34	0.45

Source: DVRPC 2008

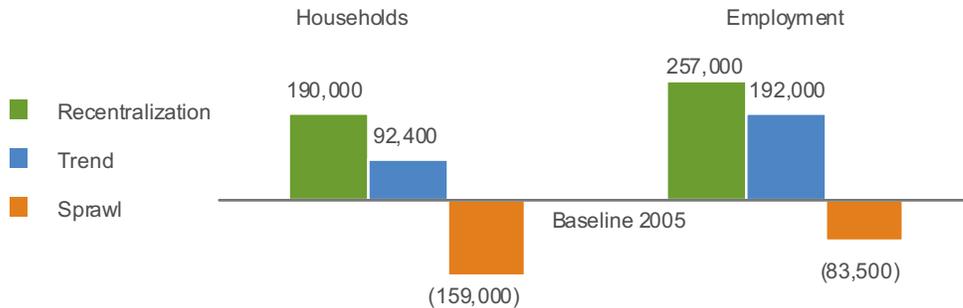
The wetlands and forests that remain intact in the Recentralization scenario will continue to filter out pollutants, mitigate flooding, and reduce erosion and stormwater runoff. The Sprawl scenario, on the other hand, would develop a considerable portion of the region's existing open space, creating more pollution, while at the same time reducing the ability of the ecosystem to mitigate the negative impacts of pollutants.

In addition to consuming what is currently open space, the Sprawl scenario locates many new jobs and housing units in areas of the region that lack transit access. This scenario anticipates that the current number of jobs and housing

units with transit access will decrease by 159,000 and 83,500 respectively in 2035. The diffuse nature of the sprawl scenario makes it difficult to create new transit service in an economically feasible way.

The Recentralization scenario could add more than 190,000 new households and 257,000 new jobs in areas with existing transit access. Increasing the number of jobs and households with transit access encourages transit ridership, reducing automobile driving and air pollution.

Change in Transit Access by Scenario: 2005 to 2035



Source: DVRPC 2008

The Environment

Increased use of alternative modes of transportation and fewer vehicle miles traveled can reduce vehicle-based emissions. By 2035, the Recentralization scenario could lead to an annual reduction of 20 tons of Fine Particulate Matter (PM_{2.5}), more than 400 tons of Volatile Organic Compounds (VOCs), and 260 tons of Oxides of Nitrogen (NO_x) compared to the current trend; and by 40 tons of PM_{2.5}, 700 tons of VOCs, and 400 tons of NO_x released into the atmosphere compared to the Sprawl scenario. VOCs and NO_x form ground-level ozone and more emissions worsen the region's air quality. This will negatively affect the health of individuals who suffer from asthma, bronchitis, heart, other respiratory illnesses, as well as damage crops and lower water quality.

2035 Difference in Daily Vehicle Emissions by Scenario

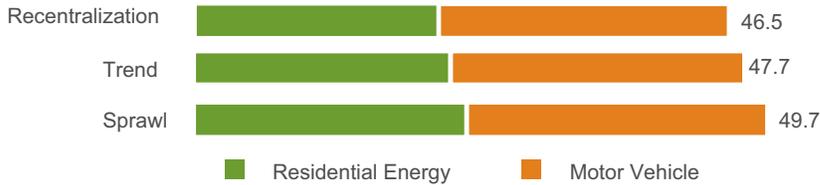
Indicator	Recentralization	Trend	Sprawl
NO _x (tons per year)	7,700	7,960	8,100
VOC (ton per year)	10,800	11,210	11,500
PM _{2.5} (tons per year)	640	660	680

Source: DVRPC 2008

The average household in the Recentralization scenario will require 0.4 percent less energy to power, heat, and cool than an average household under the current trend. Conversely, the average household in the Sprawl scenario will need 2.9 percent more energy per household than in the Trend. Motor vehicle fuel use is 3.4 percent lower in the Recentralization scenario than in the Trend. In the Sprawl scenario, vehicle fuel use is 2.6 percent higher than in the Trend. By using less energy to power, heat, and cool residences and for driving in the recentralization scenario, carbon dioxide (CO₂) emissions from residential and vehicle energy use could be decreased by nearly 1.2 million tons in 2035, or by about 15 million tons over the life of the *Connections* plan compared to the Trend. This is the

equivalent of planting more than 28 million trees in the region. The Sprawl scenario will likely emit 2.0 million additional tons of CO₂ from transportation and residential energy consumption in 2035, and by about 25 million tons of CO₂ emissions over the life of the *Connections* plan, compared to the Trend. This would require planting more than 47 million trees in the region to offset just these additional emissions.

2035 Residential Energy and Motor Vehicle Greenhouse Gas Emissions (MMTCO₂E) by Scenario



Source: DVRPC 2008

Global climate change threatens ecosystems around the planet, and our economy continues to be highly dependent on an uncertain future supply of petroleum. Solutions to both of these issues are related to reducing energy demand and finding less carbon-intense alternative fuels. While no single solution will be capable of meeting the challenges of these twin crises, a series of partial solutions implemented together can achieve sustainability. The Recentralization scenario, by reducing energy demand and CO₂ emissions, can be a key part of this solution.

Economic Competitiveness

Utilizing and maintaining existing infrastructure rather than duplicating it with new facilities could provide major economic benefits to the region. Energy consumption can be reduced by more efficient land use such as higher density and mixed-uses. This can make the region more energy independent and prepared for energy price volatility, while lowering greenhouse gas emissions. By returning population and jobs to older areas that have declined due to sprawl, municipal fiscal health can also be improved. All of these reduce costs for businesses and residents, which enhances the region's economic competitiveness in the global marketplace.

2035 Average Household Auto and Utility Expenditures by Scenario



Source: DVRPC 2008

DVRPC estimates that by using less energy to power households and automobiles, along with lower rates of auto ownership, the Recentralization scenario could save the average household \$310 in annual auto and utility expenses compared to the Trend, and more than \$1,300 compared to the Sprawl scenario.

The estimated total supporting infrastructure costs for schools, local roads, sewers, and water is \$25 billion more under the Sprawl scenario than the Trend. The Sprawl scenario projects more than twice as many new housing units and \$15,900 higher per unit costs. More greenfield development translates to additional lane miles of road, sewer and water line extensions, and new schools, all of which duplicate infrastructure already built in the region's developed communities and core cities. By more fully utilizing existing infrastructure, the Recentralization scenario could save a total of nearly \$3 billion dollars, \$8,800 per new housing unit, compared to Trend, and \$24,800 per new housing unit compared to Sprawl.

Supporting Infrastructure Costs (in billions) by Scenario: 2005 to 2035

Infrastructure	Recentralization	Trend	Sprawl
Sewer and Water	\$1.4 B	\$2.2 B	\$6.3 B
Roads	\$3.4 B	\$5.8 B	\$23.1 B
Schools	\$2.7 B	\$2.8 B	\$6.3 B
Total Cost	\$7.4 B	\$10.8 B	\$35.6 B
Per New Household	\$28,700	\$37,500	\$53,500

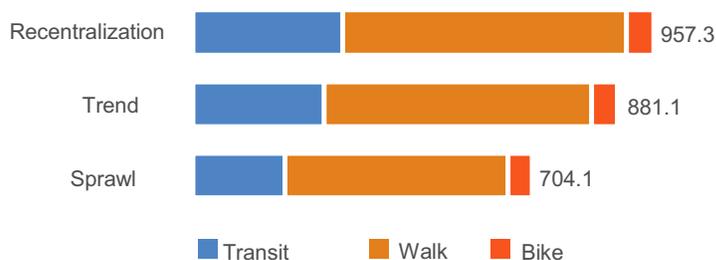
Source: DVRPC 2008

Transportation

The Recentralization scenario locates more households and jobs in areas that are already served by transit. As a result, this scenario could increase transit ridership by 14 percent in 2035, compared to the Trend. The Sprawl scenario shows fewer households and jobs located near transit, resulting in 30 percent fewer transit trips compared to the Trend scenario. Transit is a more sustainable form of transportation, as it uses considerably less energy and produces lower greenhouse gas emissions per passenger mile than automobiles.

The more compact nature and mixed-use development pattern of the Recentralization scenario can also encourage more walking and biking trips. This scenario is estimated to increase pedestrian trips by 6.5 percent and bicycle trips by 4.6 percent in 2035 compared to the Trend. The Sprawl scenario anticipates 16.1 percent fewer walking and 9.9 percent less bicycling trips than the Trend in 2035.

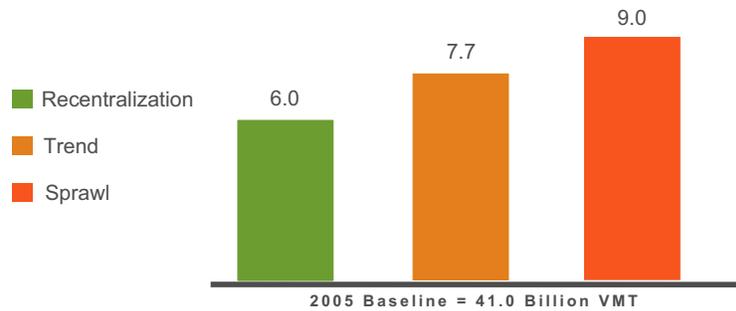
2035 Alternative Transportation Trips (millions of trips) by Scenario



Source: DVRPC 2008

Population and employment is highly decentralized in the Sprawl scenario, increasing the region's auto dependency. This scenario projects an additional 1.3 billion vehicle miles traveled (VMT) in 2035 and an extra 28.5 billion VMT cumulatively from 2010 to 2035 compared to the Trend. With greater use of alternative transportation modes, the Recentralization scenario forecasts lower VMT than the Trend. This scenario could reduce annual VMT in 2035 by 1.7 billion compared to the Trend and by 3.0 billion compared to the Sprawl scenario. Over the 26-year life of the *Connections* plan, the Recentralization scenario could reduce VMT by 39 billion miles compared to the Trend.

Net Change in Annual VMT (billions) by Scenario: 2005 to 2035



Source: DVRPC 2008

2035 Transportation Indicators by Scenario

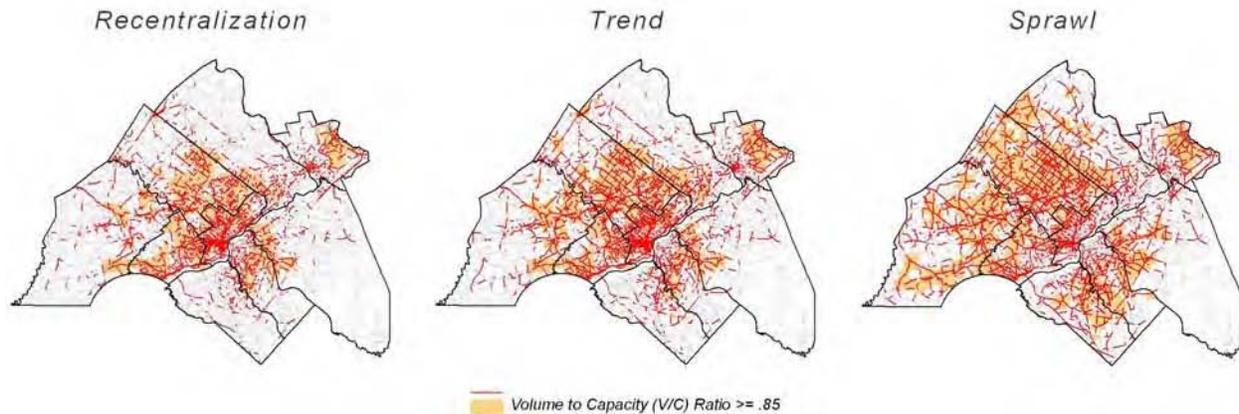
Indicator	Recentralization	Trend	Sprawl
Annual Vehicle Miles Traveled (billions of VMT)	47.0	48.7	50.0
Annual Vehicle Trips (billions)	7.60	7.80	8.29
Annual Crashes	62,400	64,600	66,600
Average Peak Period Roadway Speed (MPH)	30.2	29.7	28.6
Annual Transit Trips (millions of linked trips)	310.2	272.5	190.2
Annual Wasted Time (Millions of Person Hours of Delay)	146.3	170.3	202.3
Annual Hours of Delay per Capita	23.8	27.7	32.9
Annual Pedestrian Trips (millions)	590.4	554.3	465.0
Annual Bicycle Trips (millions)	56.8	54.3	48.9

Source: DVRPC 2008

Fewer VMT in the Recentralization scenario will likely reduce the number of vehicle crashes in 2035, an estimated reduction of 4,200 compared to the Sprawl scenario and 2,200 fewer crashes than the Trend.

Less driving means less time spent on congested roadways. In 2035, the Recentralization scenario could reduce person hours of delay due to congestion by 24 million hours regionwide, or four hours per capita, compared to the Trend; and by 56 million person hours of delay, or nine hours per capita, compared to the Sprawl scenario.

2035 Peak Hour Congestion by Scenario



Source: DVRPC 2008

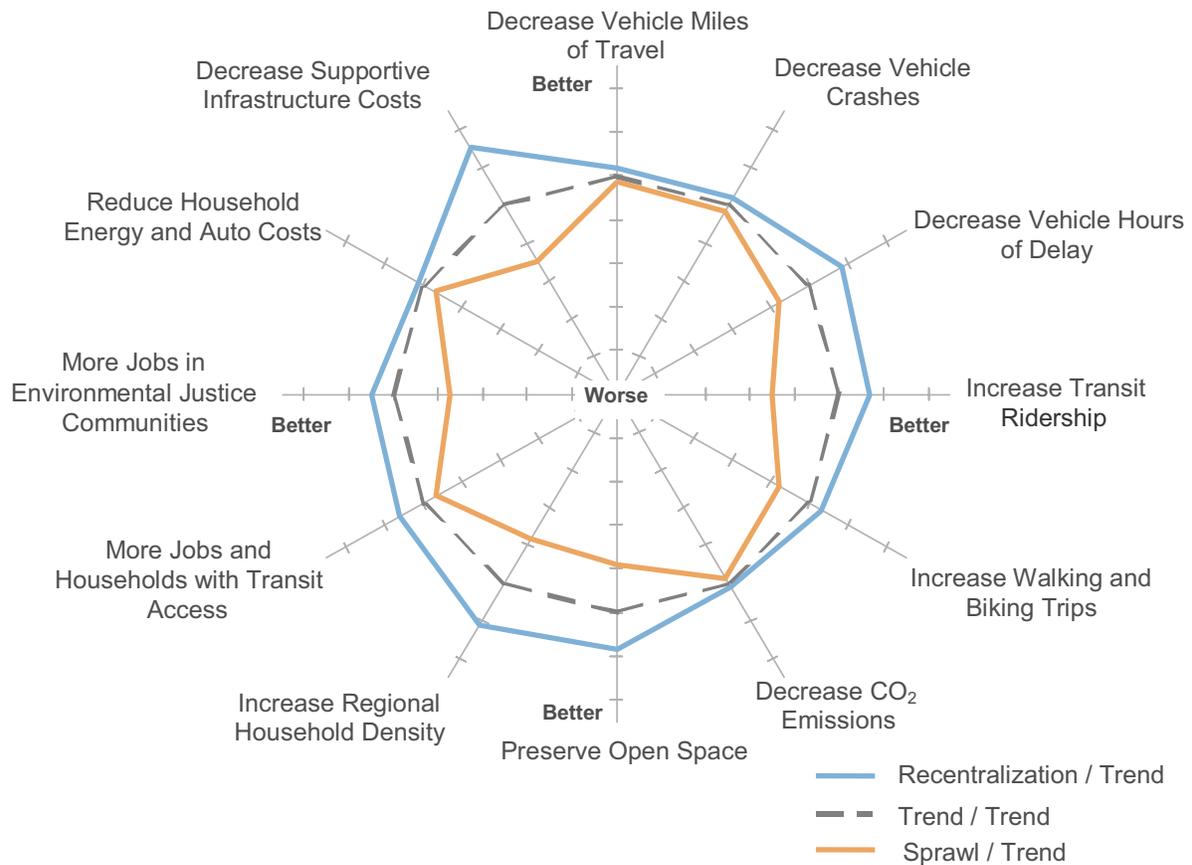
The region will need to make investments in new transportation capacity in order to meet the needs of population growth and to maintain economic competitiveness. The more compact nature of the Recentralization scenario means that transit and alternative transportation can play a major role in fulfilling future travel needs. The more decentralized Sprawl scenario will likely mean that new or widened roads will be the primary solution to meeting future demand.

The Choice for a Better Future

Based on this analysis of different scenario impacts to land use, transportation, the environment, and economic competitiveness, the Recentralization scenario offers the best solutions for a sustainable future. This scenario offers a superior quality of life by increasing mobility choices, preserving more open space, and reducing demand for energy, which lowers household and business expenses. Denser, more compact, mixed land uses can shorten distances between origins and destinations, which encourages alternative forms of transportation. Less energy use helps to reduce CO₂ emissions, making the region more sustainable. By spending less on replicating existing infrastructure, more money can be invested in green and energy efficient technologies or alternative fuels. This, in turn, will help ensure that the region remains economically competitive in a fast and ever-changing world.

The Scenario Comparison Index compares a key set of summary indicators by indexing the Trend scenario estimates at a value of one and taking a ratio of the other two scenarios compared to the Trend. This indicates the magnitude of impact of each of the scenarios on various regional goals. Each indicator is arranged so that a larger number is considered to be a better outcome for the region.

Scenario Comparison Index



Source: DVRPC 2008

A Vision for the Future

The What-if Scenario analysis is intended to spur discussion of the long-range planning process and the region's vision for the future by analyzing the impacts of two extreme land use scenarios. Neither of these scenarios is likely to occur but by quantifying their impacts, we can more fully see some of the costs involved in different land development patterns. To further engage the region's residents in identifying a preferred scenario and discussing a shared vision for the future, the scenarios were presented at each of the nine county workshops that DVRPC conducted as part of the *Connections* public outreach campaign.

Community responses from the county outreach meetings largely supported the Recentralization scenario. While support for the principles underlying the Recentralization scenario was widespread, many workshop attendees also expressed an opinion that the Recentralization scenario did not adequately address future growth in the region. Based on feedback from the county workshops, the future vision for the region that is outlined in the *Connections* plan incorporates many aspects of the Recentralization scenario and augments that scenario with additional development outside core cities and developed communities, but which is focused in areas that are appropriate for future development. Such future growth areas are contiguous to existing development and have either existing or planned water and sewer service, and proximity to the transportation network.

Key Plan Principles

The *Connections* plan is built around four key Plan principles that reflect regional priorities, as identified in the online survey that was conducted at the onset of the *Connections* plan development. The four key Plan principles are each related to one of the four factors considered in the Plan: the environment; land use; economic competitiveness; and transportation. During the county workshops and focus groups that were held to solicit public input, the key Plan principles were presented and participants were asked if they supported the principle and to identify any challenges in implementing them. The support for each of the principles was strong but the outreach process did identify several challenges to implementing the principles. Each key principle is outlined below and each section contains pertinent issues and challenges related to the principle, as well as set of goals and policies to implement the principle.

Principle: Manage Growth and Protect Resources

Most people recognize the environmental, scenic, and recreational value of open space, but many may not be familiar with the economic value or return on investment. A report commissioned by the Philadelphia Parks Alliance and conducted by the Trust for Public Land recently documented this value for the City of Philadelphia's parks. The June 2008 report "How Much Value Does the City of Philadelphia Receive from its Park and Recreation System" showed the annual payback to be huge: \$23 million in city revenue (tax receipts from increased property value and tourism); \$16 million in municipal cost savings (from stormwater management, air pollution mitigation, and community cohesion benefits); \$729 million generated in wealth for residents (from property value from park proximity and profits from tourism); and \$1.1 billion in cost savings for citizens (from direct use value and health benefits). Considerable return on investment can be enjoyed by all communities that invest in preserving their open space.

The region has a wealth of natural and manmade resources that contribute to a superior quality of life for the region's residents. However, many of these resources are endangered by sprawling development patterns and require increased stewardship. The *Connections* plan has for the first time documented historic and cultural resources to signify the importance of recognizing where these resources are located and incorporating them into the planning process.

Goal: Manage Growth and Preserve Open Space

During the last several decades Greater Philadelphia's agricultural lands, wooded lands, and natural areas, lands collectively referred to as "open space," have been steadily vanishing, while the amount of developed land has

steadily increased. This trend is largely the result of sprawling land use patterns, not absolute population growth. Between 1970 and 2005, 320,000 acres were converted to developed uses, an increase of 50 percent, while population grew by only 7 percent. This combination of low-density sprawl and open space consumption has long-term negative consequences for the environment, land use, personal mobility, the transportation system, and the competitiveness of the regional economy.

Reversing the current land consumptive trend will require the use of growth management and open space preservation techniques. Smart Growth policies, strategic land preservation, market-based conservation, and regulatory land use tools will be needed to build livable communities, improve environmental quality, create energy-efficient land use patterns, and strengthen economic competitiveness. In short, growth management and open space preservation are complementary building blocks of a sustainable future.

The loss of open space and sprawling development patterns are not sustainable and the need to accelerate and coordinate growth management and land protection activities is urgent. Effective growth management and open space preservation will:

- Limit the need for ever-expanding water, wastewater, and transportation infrastructure that is becoming increasingly difficult to finance, build, and maintain.
- Preserve natural features, including important habitat areas, woodlands, stream buffers, and wetlands. These features maintain surface water quality, reduce flooding, recharge groundwater, improve air quality, strengthen biodiversity, enhance personal health, and make the region more attractive.
- Decrease dependence on the automobile for personal mobility, leading to lower levels of air pollution, less dependence on fossil-fuel energy, and fewer greenhouse gas emissions.
- Provide more opportunities to live, work, and play in walkable, pedestrian-friendly communities served by high-quality, efficient transit.
- Preserve farmland and strengthen the local agricultural industry, thereby enhancing local food production at a time when rising energy prices and climate change are making long-distance food transport increasingly cost prohibitive.
- Prevent outward expansion of suburban development into rural communities, allowing them to maintain their character and preserve their unique identity as historic and culturally-significant places.

The negative effects of land consumption and the loss of open space on the natural environment are significant. The ability of lands to capture and store stormwater, filter pollutants, and ameliorate flooding is compromised by the loss of natural vegetation, wetlands, and woodlands. Likewise, the loss of healthy forested headwaters, vegetated riparian buffers, and naturally-functioning floodplains diminishes surface water quality, lowers biological productivity, and hinders groundwater recharge, depleting aquifers and lowering dry-weather flows. At the same time, open space loss diminishes and fragments natural habitats, thereby decreasing biodiversity, stressing threatened and endangered species, and making natural areas more susceptible to invasive plants and pests.

All of these environmental impacts have direct consequences for local communities. Surface waters are an important source of drinking water, and without adequate protection, the cost of providing clean water for drinking and other uses will steadily increase, impacting the region's economic competitiveness. Natural areas store and dissipate storm waters and act to minimize the damages and costs associated with flooding. Soil productivity, nutrient cycling,

carbon storage, and biodiversity are all negatively impacted by the loss of wetlands, woodlands, and other types of open space.

In addition, land consumption negatively impacts the region's farmland. Even though farmland in the region is some of the most productive in the nation, it is the land use type most likely to be converted to developed uses. Between 1990 and 2005, the region lost over 126,000 acres of farmland, or approximately 8,500 acres per year. This loss of agricultural land threatens the viability of the agricultural industry and reduces the availability of local food at a time when the demand for fresh, local food is beginning to experience double-digit growth.

Finally, and perhaps most noticeably, unmanaged growth and the loss of open space strain the region's transportation infrastructure, diminish community character, limit opportunities for interaction with nature, and decrease overall quality of life. As open space is consumed, our region's communities increasingly lose their unique identity and blend together in a continuous sprawling, often homogeneous pattern. Mobility options become more limited, residents find it more difficult to access natural areas, and the aesthetic pleasures and quality of life benefits provided by forests, fields, and farms become increasingly rare.

Land Use Plan Map

The *Connections* Land Use Plan defines a regional vision for growth management and open space preservation. The Land Use Plan comprises four layers: Existing Development, Future Growth Areas, Rural Conservation Lands, and the regional Greenspace Network. Together, these areas envision a clean and sustainable environment where key natural resource areas and agricultural lands are protected, open space is provided in an inter-connected network, fragmentation of rural areas is drastically reduced, and new greenfield development is constrained to designated future growth areas, where supporting infrastructure is in place or planned. At the same time, *Connections* proposes concentrating most new growth in the form of infill and redevelopment into the region's existing developed areas. Both new development and redevelopment should be focused into the region's Centers, ranging from the "Metropolitan Center" of Center City, Philadelphia, down to "Planned Town Centers." This vision for the region's centers-based development strategy over the next 25 years is conceptually depicted on the Planning Areas and Centers map. The following section on Creating Livable Communities shows the Planning Areas and Centers map and explains the Centers concept in more detail.

With just over 1 million acres of undeveloped, unprotected land remaining in the region, the *Connections* plan proposes protecting one-half of this – 500,000 acres – by 2035. These lands should be strategically located in the Greenspace Network and Rural Conservation lands to protect sensitive natural areas, create interconnected networks of greenspace, and preserve key agricultural areas. This open space system will enhance environmental quality, improve and maintain surface water quality, provide abundant passive recreational opportunities, strengthen the region's agricultural economy, create a natural framework for the creation of livable communities, and eliminate the need to extend costly infrastructure into rural areas.

Accomplishing this goal will require a combination of efforts, including acquisitions, conservation easements, purchase of development rights, market-based conservation mechanisms, and land use regulations. It will also

require the creation of compact, mixed-use, diverse communities that are able to attract and maintain residents by offering a high quality of life.

Greenspace Network

The *Connections* plan proposes linking and expanding the region's existing protected natural areas into a Greenspace Network, where parks, forests, meadows, stream corridors, and floodplains are joined together in an inter-connected system. The Greenspace Network, is based on the twin principles of protecting core natural resource areas and linking them with greenways to create a connected system of naturally-vegetated open space spanning urban, suburban, and rural areas to maintain and improve ecological health, enhance recreational opportunities, ameliorate the impacts of sprawl, and improve quality of life in the region's communities.

The vision of the Network is to permanently protect these unprotected acres through acquisitions, easements, land use regulations, and growth management. The Network is broken down into approximately 100 distinct "greenspace corridors." Each of these corridors is named to promote its identity and brand it as a unique preservation project. The Greenspace Network is shown on the Land Use Plan map and also on the Greenspace Network map, where each individual greenspace area is labeled.

The Greenspace Network reflects numerous regional high-priority environmental goals. First among these is the need to maintain and improve surface water quality. Key strategies for improving water quality include protecting and restoring naturally-vegetated riparian buffers, naturally-functioning floodplains, and wetlands. The Greenspace Network will contribute directly to realizing these strategies.

Protecting critical habitat areas and the region's remaining large, intact ecosystems, such as the Pinelands, Highlands, and Big Woods, is another key regional environmental goal. The Greenspace Network complements on-going efforts to conserve these high-value ecosystems.

Finally, the Greenspace Network is a blueprint for creating a system of landscape-scale green spaces interspersed throughout the region's urban and suburban core. Relatively large-scale green resources in developed communities maintain neighborhood identity, manage stormwater, improve local air quality and provide opportunities for passive recreation within easy reach of population centers. Furthermore, urban and suburban greenways greatly enhance the quality of life in more densely developed areas, making them more attractive and appealing places to live, work and play. Enhancing natural amenities in urban areas boosts property values, encourages revitalization, spurs infill development, and reduces development pressure in rural areas.

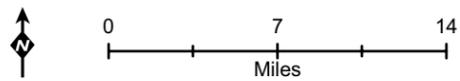
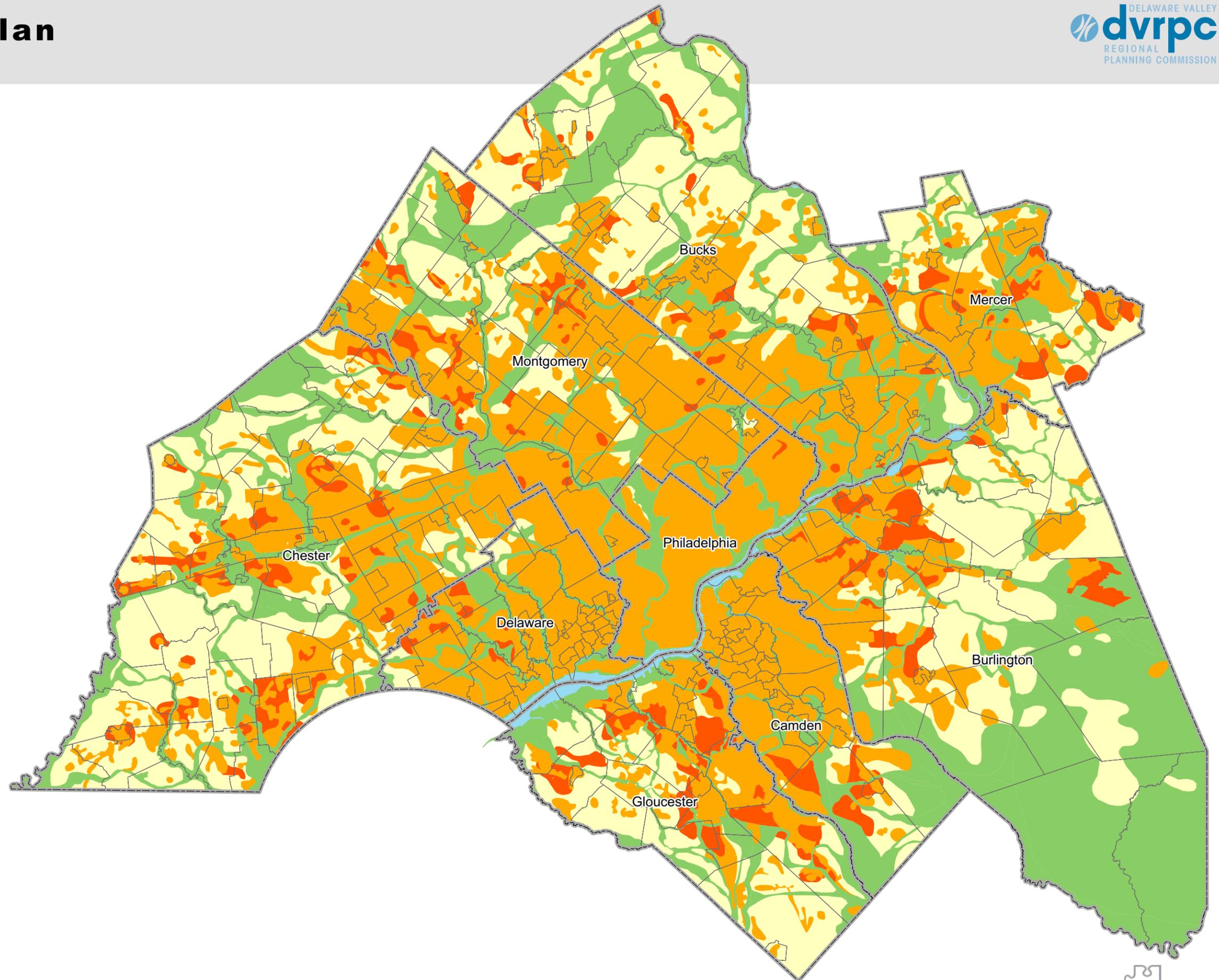
Rural Conservation Lands and Conservation Focus Areas

As defined on the Land Use Plan map, Rural Conservation Focus Areas depict large agricultural, natural, and rural areas worthy of heightened preservation efforts by governments and non-profit land trusts. The Rural Conservation Lands contain villages and scattered suburban development, but they remain mostly unfragmented and their integrity can be maintained through strategic acquisitions and easements, land management, and appropriate forms of

2035 Land Use Plan

Land Use Categories

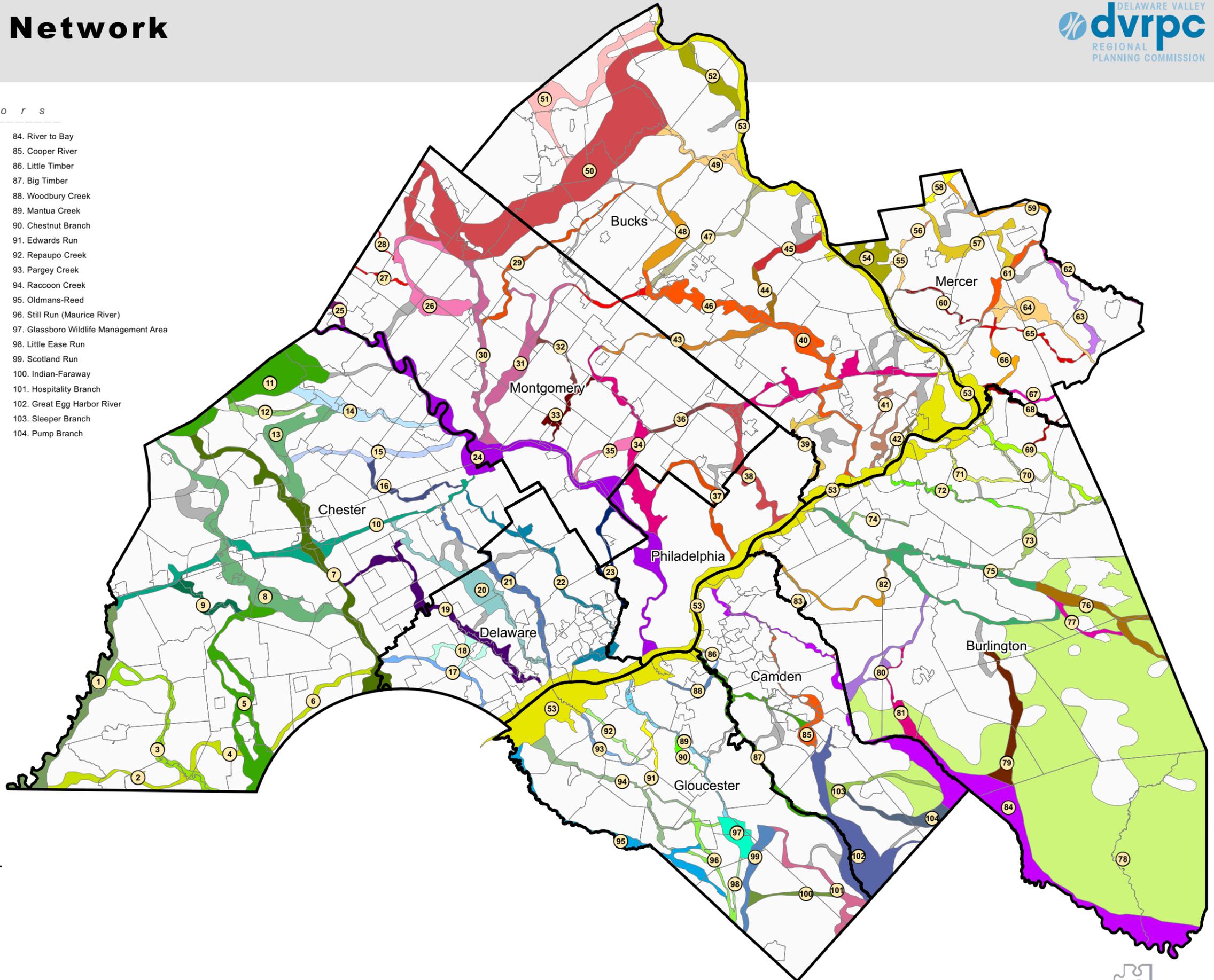
- Existing Development
- Future Growth
- Greenspace Network
- Rural Conservation Lands



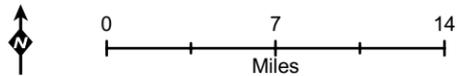
2035 Greenspace Network

Greenspace Corridors

- | | | |
|---------------------------------|-------------------------------------|--|
| 1. Octoraro Creek | 43. Little Neshaminy Creek | 84. River to Bay |
| 2. Serpentine Barrens | 44. Mill Creek | 85. Cooper River |
| 3. Big Elk Creek | 45. New Hope-Ivlyland | 86. Little Timber |
| 4. White Clay-Ways Run | 46. West Branch Neshaminy | 87. Big Timber |
| 5. White Clay Creek-Doe Run | 47. Paunnaucussing-Pine Run | 88. Woodbury Creek |
| 6. Delaware Arc | 48. Peace Valley-Deep Run Creek | 89. Mantua Creek |
| 7. Brandywine Creek | 49. Tohickon Creek | 90. Chestnut Branch |
| 8. West Branch Brandywine Creek | 50. North Woods | 91. Edwards Run |
| 9. Buck Run | 51. Quakertown-Cooks Creek | 92. Repaupo Creek |
| 10. Great Valley Ridgelines | 52. Tinicum-Nockamixon | 93. Pargey Creek |
| 11. Big Wood Corridor | 53. Delaware River | 94. Raccoon Creek |
| 12. Warwick-Elverson | 54. Washington Crossing | 95. Oldmans-Reed |
| 13. Marsh Creek-Beaver Run | 55. Jacobs Creek | 96. Still Run (Maurice River) |
| 14. French Creek | 56. Pennington Mountain | 97. Glassboro Wildlife Management Area |
| 15. Pickering Creek | 57. Stony Brook | 98. Little Ease Run |
| 16. Valley Creek-Pigeon Run | 58. North Hopewell | 99. Scotland Run |
| 17. Harvey Run-Naaman's Creek | 59. North Mercer | 100. Indian-Faraway |
| 18. West Branch Chester Creek | 60. Shabakunk-Ewing | 101. Hospitality Branch |
| 19. Chester Creek | 61. Delaware and Raritan Canal | 102. Great Egg Harbor River |
| 20. Ridley Creek | 62. Millstone River | 103. Sleeper Branch |
| 21. Crum Creek | 63. Big Bear Brook | 104. Pump Branch |
| 22. Darby Creek | 64. Assunpink Creek | |
| 23. Cobbs-Mill Creek | 65. Miry Run | |
| 24. Schuylkill River | 66. Pond Run-Back Creek | |
| 25. Manatawny Creek | 67. Doctors Creek | |
| 26. Swamp-Deep Creek | 68. Crosswicks Creek | |
| 27. Minister Creek | 69. Blacks Creek | |
| 28. Middle Creek | 70. Bacons Run | |
| 29. East Branch Perkiomen Creek | 71. Crafts Creek | |
| 30. Perkiomen Creek | 72. Assicunk Creek-Annaricken Brook | |
| 31. Schippack Creek | 73. Budd Run-North Run | |
| 32. Towamencin Creek | 74. Mill Creek | |
| 33. Stony Creek | 75. Rancocas Creek | |
| 34. Cross County Corridor | 76. Mount Misery | |
| 34. Wissahickon Creek | 77. Bishpams Mill Creek | |
| 35. Plymouth Meeting | 78. Pinelands Conservation Areas | |
| 36. Cross County Corridor | 79. Batsto-Friendship | |
| 37. Tacony-Cresheim Creek | 80. Southwest Branch Rancocas Creek | |
| 38. Pennypack Creek | 81. Haynes Creek | |
| 39. Poquessing Creek | 82. Pennsauken-Masons | |
| 40. Neshaminy Creek | 83. South Pennsauken Creek | |
| 41. Mill-Queen Anne Creek | | |
| 42. Delaware Canal | | |



Minor Connecting Greenspace Corridor

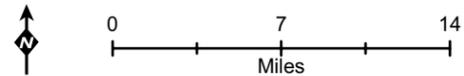
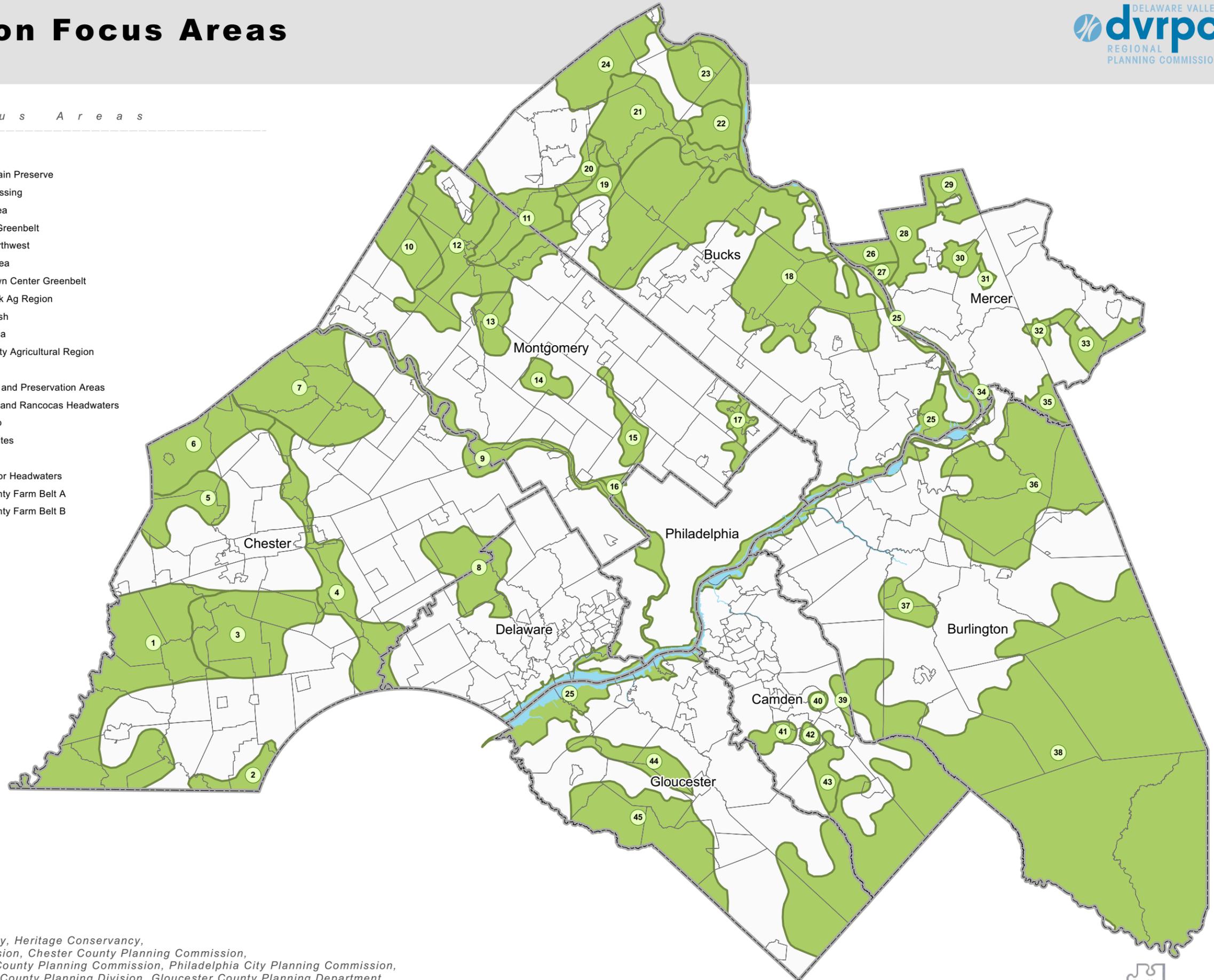


2035 Conservation Focus Areas

Conservation Focus Areas

- | | |
|--|---|
| 1. Southwest Chester Agricultural Region | 25. Delaware River |
| 2. White Clay | 26. Baldpate Mountain Preserve |
| 3. King Ranch Region | 27. Washington Crossing |
| 4. Brandywine Valley | 28. Hopewell Ag Area |
| 5. Sadsbury Woods | 29. Hopewell Boro Greenbelt |
| 6. Upper Brandywine Agricultural Region | 30. Mercer Park Northwest |
| 7. Big Woods | 31. Lawrence Ag Area |
| 8. Ockehocking | 32. Washington Town Center Greenbelt |
| 9. Schuylkill River | 33. Lower Assunpink Ag Region |
| 10. Montgomery Agricultural Region | 34. Crosswicks Marsh |
| 11. Unami Hills | 35. Hamilton Ag Area |
| 12. Upper Perkiomen Headwaters | 36. Burlington County Agricultural Region |
| 13. Spring Mountain | 37. Barkers Brook |
| 14. Worcester | 38. Pinelands Rural and Preservation Areas |
| 15. Upper Wissahickon | 39. Cooper, Mullica and Rancocas Headwaters |
| 16. Miquon | 40. Headwaters Hub |
| 17. Pennypack Preserve | 41. Camden NHP Sites |
| 18. Bucks Agricultural Heritage Area | 42. Pine Valley |
| 19. Rock Hills | 43. Great Egg Harbor Headwaters |
| 20. Quakertown Swamp | 44. Gloucester County Farm Belt A |
| 21. Tohickon Watershed-Nockamixon | 45. Gloucester County Farm Belt B |
| 22. Tinicum Watershed | |
| 23. Palisades | |
| 24. Cooks Creek Watershed | |

Conservation Focus Areas



Sources: Natural Lands Trust, Brandywine Conservancy, Heritage Conservancy, GreenSpace Alliance, Bucks County Planning Commission, Chester County Planning Commission, Delaware County Planning Department, Montgomery County Planning Commission, Philadelphia City Planning Department, NJDEP, New Jersey Conservation Foundation, Mercer County Planning Division, Gloucester County Planning Department, Burlington County Department of Resource Conservation, Camden County Division of Open Space and Farmland Preservation, DVRPC 2009

growth. The Rural Conservation Lands are not “no-growth zones,” but instead are areas whose natural, agricultural, and recreational values should be protected, while allowing for limited growth that is in character with each region.

For planning purposes, the region’s Rural Conservation Lands have been broken down into subareas and branded on the Conservation Focus Areas map. This map depicts lands similar to the Rural Conservation Lands layer, but individual areas are defined and named based on their unique physiographic, vegetative, and land use characteristics. Examples of such areas include Chester County’s Big Woods and the New Jersey Pinelands. In general, the Focus Areas are either agricultural or natural in character, although some Focus Areas are a mix of the two land use types. Focus Areas may overlap with the Greenspace Network, but they are larger and encompass scattered, very low-density development sites, whereas the Greenspace Network is conceived of as an unbroken system of naturally-vegetated open space. In total, the region contains approximately 45 Focus Areas. Protecting unprotected open space and/or promoting context-sensitive, centers-based growth are key policy recommendations for both the Conservation Focus Areas and the Rural Conservation Lands.

Policies to Manage Growth and Preserve Open Space

- ▶ Manage growth by focusing new development as infill and redevelopment in existing developed areas, and by targeting new development to designated Future Growth Areas on the Land Use Plan.
- ▶ Promote compact, centers-based development through Smart Growth tools and techniques such as Transit Oriented Development (TOD); Traditional Neighborhood Design (TND); Transfer of Development Rights (TDR) Programs; and Revitalization and Stabilization of existing development.
- ▶ Direct major preservation efforts to protect and restore the Greenspace Network, the Conservation Focus Areas, and the Rural Conservation Lands.
- ▶ Employ a range of regulatory, voluntary, and funding techniques, including fee-simple acquisitions, conservation easements, locally-funded open space programs, statewide preservation trust funds, municipal natural resource protections plans and ordinances, and market-based conservation such as TDR programs.

Goal: Manage Stormwater and Improve Water Quality

Open space loss and development have a detrimental effect on surface water quality due to the loss of natural vegetation and increased impervious surfaces. Water quality impairments are primarily the result of stormwater runoff and non-point source pollution from streets, parking lots, driveways, buildings, lawn areas, and agricultural fields that lack adequate vegetative buffers. Some examples of non-point source pollutants contained in stormwater runoff include the following: excess fertilizers, herbicides, and insecticides from residential lawn areas and agricultural lands; oil, grease, rubber, and toxic chemicals from parking lots and roadways; sediment from improperly managed construction sites; salt from streets treated during winter precipitation events; and bacteria and nutrients from livestock, geese, pet wastes and faulty septic systems.

Increased stormwater runoff also impacts stream channel condition. As an area becomes developed, stormwater is rapidly directed to streams from impervious surfaces. Scientists have found that levels of impervious cover of 10 percent or more within a subwatershed are directly linked to enlargement of stream channels, streambank erosion, lower dry weather flows, higher stream temperatures, lower water quality, and declines in aquatic life diversity.

Policies to Manage Stormwater and Improve Water Quality

- ▶ Protect and restore vegetated riparian buffers, maintain naturally-functioning floodplains, and preserve wetlands and wetlands buffers to manage stormwater and improve water quality. These policies are inherent in the Greenspace Network described above.
- ▶ Promote the use of community-scale green infrastructure through techniques such as green streets, green roofs, rain gardens, bioswales, and naturalized retention basins to imitate natural processes to infiltrate stormwater, reduce flows, improve water quality, and enhance community livability.

Goal: Improve Air Quality

The region continues to struggle to attain the federal air quality standard for ground-level ozone and fine particulate matter; two of the six criteria pollutants monitored by the Environmental Protection Agency. Non-attainment of these standards is not only a concern for the health of the region's citizens but also risks the loss of federal transportation funding.

Ozone in the upper atmosphere protects us from the sun's harmful rays where it plays an important role protecting life on earth. At ground level, where we breathe, ozone can be harmful to our lungs and the environment. In the summer, sunlight and heat can "bake" pollutants to form ground-level ozone, also known as smog. Inhaling high levels of ground-level ozone damages your lungs and may feel like a sunburn on your lungs.

Particulate matter, or particle pollution, is the term for tiny drops of liquid or small bits of dust. Some particles are large enough to see as soot or smoke. Other particles are so small that they can only be seen with an electron microscope. Particle pollution comes from a variety of natural and manmade sources such as cars, power plants, and forest fires. Particle pollution is a year-round problem.

Policies to Improve Air Quality

- ▶ Forecast poor air quality days and request temporary, voluntary changes in behavior to reduce pollutants, particularly on days when pollution is forecast to exceed the standard.
- ▶ Advance strategies that reduce motor vehicle emissions.

Goal: Increase Local Food Production and Distribution

The *Connections* plan outlines a strategy for recentralization based on the land use, transportation, environmental and economic competitiveness benefits such a development pattern would bestow. The global food system will most likely go through recentralization as well, and more of the world's urbanizing populations will need to be fed by agricultural resources closer by, rather than exporting agricultural products. Conversely, Greater Philadelphia, similar to the rest of the United States, is relying on agricultural resources further and further away while we are losing viable farmland and a successful agricultural industry.

There are a myriad of issues facing the global and regional food systems, including:

- Land constraints: food system activities take up a significant amount of land and farmland in metropolitan areas is facing extreme development pressures;
- Contradicting health effects: America is experience rising incidences of both hunger and obesity;
- Food access: availability of healthy and affordable foods in low-income urban and rural areas is an increasing problem;
- Energy: the food we eat takes a considerable amount of fossil fuel energy to produce, process, and transport, and dispose; and
- Economic development: the food system represents an important part of the regional economy; food manufacturing can provide much needed low-skill jobs; local food production, preparation, and distribution offers entrepreneurial opportunities; and agricultural products are among the nation's strongest and largest exports.

Today's food system is a product of significant technological advances that produces, for the most part, an abundant and safe supply of food to most people in this country. These advances in the food system have allowed more Americans to specialize in labor. For example, in the 1900s, 30 percent of the US workforce worked on farms; today, less than 2 percent work on a farm. However, today's global food system has also contributed to the increased incidence of obesity and diet-related diseases; loss of diverse culinary traditions; and environmental degradation, including water pollution and greenhouse gas emissions.

As the world continues to industrialize and globalize, and the global population becomes more urbanized, food production and distribution may become recentralized. In the near future, countries that are primarily agricultural exporters may retain more food products for their domestic markets. For example, due to poor growing seasons in the spring and summer of 2008, both China and India restricted the amount of rice exported to other international markets in order to meet domestic demand. As a result, the price of rice in U.S. grocery stores spiked.

Meanwhile, the United States and Greater Philadelphia are losing irreplaceable agricultural lands to urban development. Between 1990 and 2005, the DVRPC-region lost over 126,000 acres of agricultural land. Recently, media attention and consumer interest has espoused the virtues of "eating local" to support local farmers, enjoy better tasting seasonal food, lessen the environmental impact of large-scale agricultural operations, reduce food travel distance from farm to plate, and know where our food comes from. Regardless of why a person chooses to buy local food, a stronger regional food system will increase the region's food security and the regional economy, making Greater Philadelphia a more competitive metropolitan area.

Policies to Increase Local Food Production and Distribution

- ▶ Enhance coordination between all food system stakeholders, ranging from the private sector to the public sector, from local food advocates to hunger relief organizations, from farmland preservation coordinators to economic development agencies, in order to collaborate on solutions for the evolving food system.
- ▶ Incorporate farming and food into economic development policies and funding programs, in recognition that the food system accounts for 10 percent to 30 percent of all economic activities within the region.
- ▶ Forge partnerships between land trusts, public agencies, and future farmers to increase food production on protected lands within the region.
- ▶ Facilitate local food production and distribution in rural, suburban, and urban areas through supportive land use ordinances.

Goal: Preserve Historic Resources and Cultural Landscapes

Greater Philadelphia has a rich history reflecting thousands of years of Native American culture and nearly four hundred years of post-European settlement. The original inhabitants of the area, the Lenape people or “Delawares”, were present in the region for more than 10,000 years. The first European settlers, the Swedish, who were closely followed by the Dutch, began forming settlements in the region in the mid-sixteenth century. The arrival of William Penn in 1682 signaled the beginning of a long period of intense colonial settlement by the British. Many of the Revolutionary War’s most significant events took place in and around Philadelphia, such as the signing of the Declaration of Independence, George Washington’s encampment at Valley Forge, and major battles fought in Brandywine, Germantown, Trenton and Princeton.

Following the formation of the United States, Philadelphia and its environs emerged as one of the largest and most prosperous cities in the country. Due to an abundance of high-quality soils, the region became a key center for high-value agriculture, producing a wide variety of staple and specialty crops, a role that continues today. In the 19th century, Philadelphia blossomed into a leading workshop of the industrial era, and enjoyed a period of prosperity that is still reflected in its impressive collection of architecture and public infrastructure from that time. Greater Philadelphia has continued to build upon its assets, emerging in the 21st century as a nationally significant center of higher education, medicine, finance, the arts, and the pharmaceutical industry.

The region’s rich past is reflected in its tremendous variety and number of historic and cultural resources. From Native American archeological sites to early Swedish settlements, and from Independence Mall to the hallowed grounds of Valley Forge, the region’s history is incorporated into and enriches the fabric of Greater Philadelphia’s present-day life. The nine-county region’s wealth of historic resources is underscored by the number of national and historic landmarks, sites and districts on the national and state registers of historic places, state- and nationally-recognized historic landscapes and heritage areas, and sites protected through local historic designations. In addition, the region has a vast array of museums, libraries, and active historic and cultural organizations committed to preserving and interpreting the region’s historic resources. However, despite these circumstances, the region’s historic and cultural resources are threatened by demolition, neglect, encroaching sprawl, incompatible land uses, poor planning, and insensitive design.

Historic and Cultural Resources

There are many different types of historic and cultural resources, and various ways to protect, enhance or recognize them. A historic resource can be a building, structure, district, archeological site, or area that is significant in, or representative of, the history, architecture, or culture of a given a community, state, or country. A “cultural landscape” is another type of historic resource that includes not just buildings and structures, but also the lands, or “landscapes” around those buildings and structures that define their context. A cultural landscape can range from a historic battlefield encompassing thousands of acres to a small historic homestead on less than one acre of land. Cultural landscapes reveal aspects of our region’s origins and development through their form, features, and characteristics. They also point towards the region’s interdependence on its natural resources. A historic resource can be protected

or recognized by a multitude of designations, including National Historical Landmark designation, listing on the national or state registers of historic places, and listing on a local register of historic sites or districts.

A Historic District is a group of buildings, properties, or sites that have been designated as historically or architecturally significant. The National Park Service defines a historic district as possessing “a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.” Historic districts can vary in size with some having thousands of structures and others having just a few. There are two primary types of historic districts: “National Register listed and eligible historic districts” designated at the national level by the National Park Service, and “local historic districts” designated by local municipal governing bodies. Local district regulations can be enforced through a zoning code, or in the case of Pennsylvania, through the Historic District Act, and are typically more protective of historic resources than National Register districts. Districts can, and often do, have both national and local designations, although the boundaries of local and national districts are not always identical. The process of creating a local historic district is governed by state enabling laws.⁶ The following map depicts only those districts that are listed on the National Register of Historic Places, making them National Register Historic Districts. The region also contains many hundreds of local historic districts, although these have not all been mapped at the regional scale.

As defined in the Historic Sites Act of 1935, National Historic Landmarks are historic resources that are significant to the nation and its history. The Secretary of the Interior and the National Park Service (NPS) are responsible for designating and maintaining the list of National Historic Landmarks. The region has 116 **National Historic Landmarks**.⁷ All National Historic Landmarks are also listed on the National Register of Historic Places. In addition to landmarks, the region also boasts two National Historic Parks: Independence Mall and Valley Forge. Independence Hall, the centerpiece of Independence Mall National Historic Park, is also a UNESCO World Heritage Site.⁸ The region’s National Historical Landmarks, National Register Historical Districts and National Historic Parks are depicted on the accompanying map.

Archaeological sites, like historic buildings, are considered cultural resources and, if they meet eligibility requirements as set forth in the National Historic Preservation Act (NHPA), they may receive official historic status. Unlike historic buildings, however, archaeological sites are not always evident to the untrained eye. While some archaeological sites have obvious above ground indicators such as earth mounds, or chimney remnants, most consist of artifacts (objects made or modified by humans such as stone tools, pottery, bottle glass, etc.) and features (post holes, trash pits, stone building foundations, human burials, etc.) that are underground. Because this region was inhabited by humans for the last 16,000 years, the potential exists for finding archeological sites whenever excavations take place. This is significant for transportation projects, which sometime “unearth” previously unknown archeological sites during their construction. There are two types of archaeological sites: prehistoric sites and historic period sites, which require different techniques for discovery and treatment.

⁶ For more information on historic sites and districts, enabling legislation, and nomination processes, see the New Jersey State Historic Preservation Office (www.state.nj.us/dep/hpo/) and the Pennsylvania Historical and Museum Commission (www.phmc.state.pa.us)

⁷ See National Park Service (www.nps.gov/history/nhl/) for more information on the region’s National Historic Landmarks.

⁸ United Nations Educational, Scientific and Cultural Organization. <http://whc.unesco.org/en/list/78>

National Heritage Areas

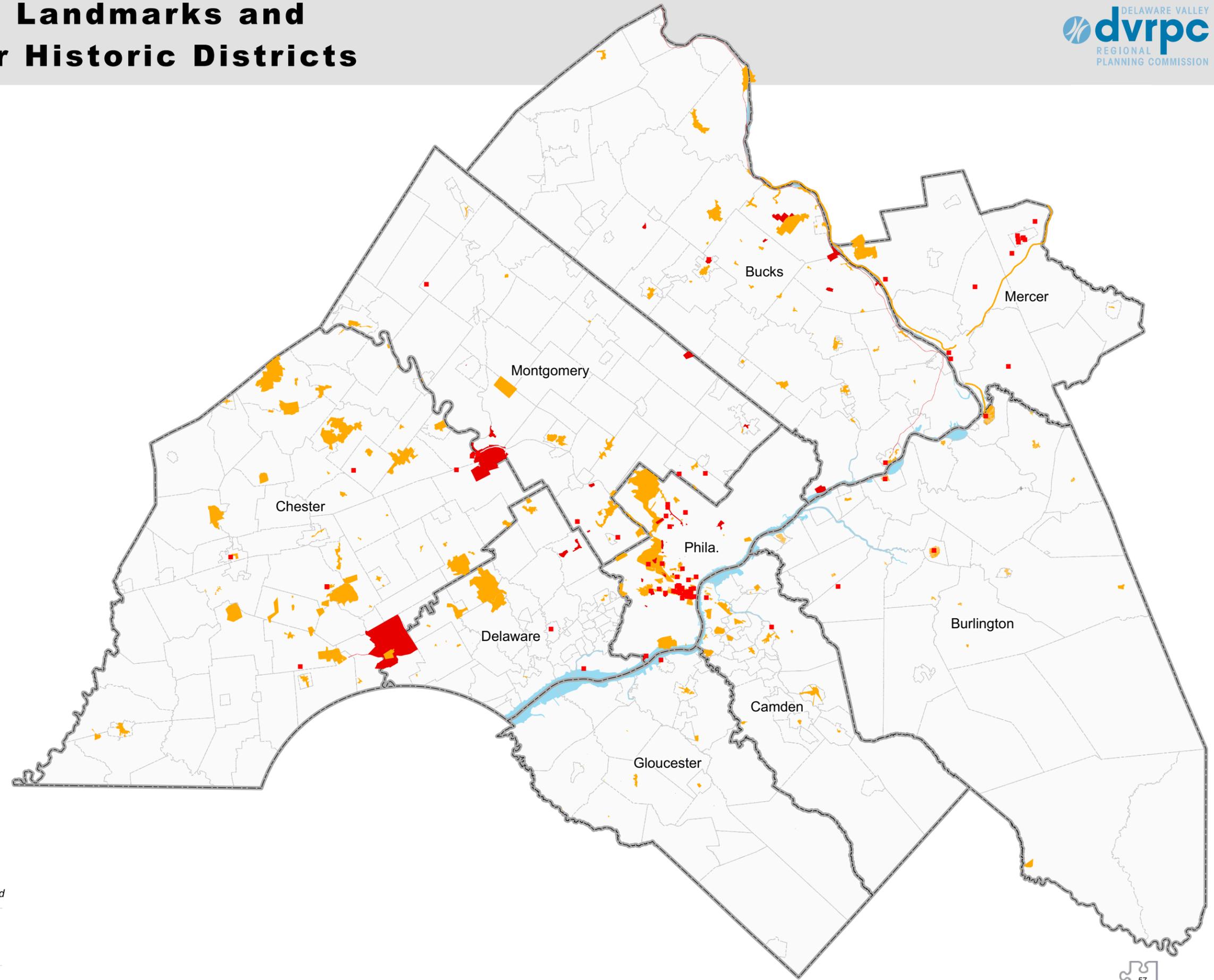
National Heritage Areas are designated by a Congressional Act. Each National Heritage Area is governed by separate authorizing legislation and operates under provisions unique to its resources and desired goals. For an area to be considered for designation, the landscape must have nationally distinctive natural, cultural, historic, and scenic resources that, when linked together, tell a unique story about the United States. Each National Heritage Area has a “management action plan” that helps to characterize the specific histories and related resource in each region. As of June 2009, there were 49 National Heritage Areas throughout the country. Parts of three National Heritage Areas are located in Greater Philadelphia: the **Delaware & Lehigh**, the **Schuylkill River Valley**, and the **Crossroads of the American Revolution**.

Scenic Byways

Scenic roads are also considered to be a type of cultural landscape. From the highlands in Chester, Montgomery and Bucks counties to the flat cranberry bogs of Burlington County, the region’s diverse topography and land uses create numerous scenic corridors. Scenic roads provide visually pleasant experiences for drivers, bicyclists and pedestrians. Generally, a road can have two types of scenic value: the immediate physical characteristics of the road and its right-of-way; and the views of natural and cultural resources from the roadway. The roadway, its right-of-way, and all land visible from the road make up the scenic road corridor.

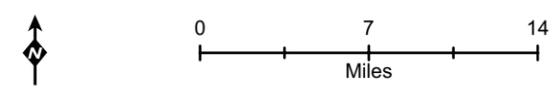
The National Scenic Byway Program officially started in October 1994, as part of the Intermodal Surface Transportation Efficiency Act. Designated roads become eligible for funding for improvements, enhancements, and protective measures. As of December 2008, there were no National Scenic Byways in the Philadelphia metropolitan area. However, both the New Jersey and Pennsylvania departments of transportation designate scenic roadways, making those roadways eligible for federal funds to pay for paved shoulders, interpretative signs, and scenic overlooks. This designation also limits outdoor advertising. Greater Philadelphia has five different roads designated as a scenic byway, including: Interstate 476 (the “Blue Route”) in Delaware County; the Route 30 Exton Bypass in Chester County; Routes 52 and 162 (the Brandywine Valley Scenic Byway) in Chester and Delaware counties; Route 29 (the Delaware River Scenic Byway) in Mercer County, and parts of County Route-542, US 9, and NJ-167 (the Southern Pinelands Heritage Trail) in Burlington County. The region possesses many other scenic roads, although no other formal scenic road designations exist other than the ones highlighted above.

National Historic Landmarks and National Register Historic Districts



-  National Historic Landmarks
-  National Register Historic Districts

**Not all National Historic Landmarks and Districts are mapped*



Transportation Impacts on Historic and Cultural Resources

Transportation projects often impact the integrity of historic and cultural resources. There are several federal and state laws that were enacted to avoid and minimize these impacts and disturbances, including Section 4(f) of SAFETEA-LU, the National Environmental Policy Act (NEPA), Section 106 of NHPA,⁹ the Pennsylvania History Code and the New Jersey Register of Historic Places Act. All federally-funded transportation agencies must follow federal laws and plan their projects accordingly. As part of this process, State Historic Preservation Offices work with federal agencies to identify historic resources and avoid or minimize any potential adverse effects on them during the planning, permitting design, and construction of federally-funded and licensed projects. While not subject to NEPA, non federally-funded projects must follow state environmental review processes, and comply with all applicable federal, state and local regulations put in place to protect historic and cultural resources.

Historic Preservation Efforts

Interest in the region's historic and cultural sites is strong. Many communities have protected their historic resources by creating historic zoning districts and establishing historic architectural review boards and historic commissions.¹⁰ Other communities, non-profit groups, and individuals are investing in historic sites as catalysts for redevelopment. Additionally, the region markets its history and heritage, attracting millions of tourists from throughout the country and world each year to visit our historic sites, charming towns, and scenic landscapes. Many more organizations and local governments recognize the need to identify, protect, preserve, rehabilitate, and restore the region's historic and cultural resources and landscapes as a way to increase the region's livability, enhance its "sense of place", and cultivate a unique identity. These organizations and governments are actively advocating for, planning for, and undertaking a multitude of preservation projects, which can be better supported through collaboration and coordinated investments.

Policies to Preserve Cultural Landscapes and Historic Resources

- ▶ Invest in the preservation, rehabilitation, and re-use of historic structures as a means to promote a community's unique identity and improve its quality of life.
- ▶ Manage growth and enhance community design through land development ordinances, design review, and local preservation planning processes in order to protect the context and integrity of historic sites and cultural landscapes.
- ▶ Preserve open space and farmland as a means to also preserve the scenic, historic, and cultural context of many historic sites in the region.
- ▶ Form closer partnerships between DVRPC, the state Departments of Transportation and the state Historic Preservation Offices (Pennsylvania Historical and Museum Commission and New Jersey State Historic Preservation Office) in order to enhance coordination and collaboration and reduce the adverse impact of transportation projects on historic resources and scenic corridors.

⁹ The review process as outlined in the National Historic Preservation Act is often referred to by the section it appears in, "Section 106."

¹⁰ For more information on each state's historic preservation enabling laws, visit the Pennsylvania Historical and Museum Commission's website (www.phmc.state.pa.us) and the New Jersey State Historic Preservation Office's website (www.state.nj.us/dep/hpo/)

Principle: Create Livable Communities

The *Connections* plan seeks to create and support livable communities in appropriate locations throughout the region – literally, places where people intuitively want to live. Livable communities provide their residents access to jobs and services; offer cultural and recreational opportunities, as well as open spaces; have a strong sense of place and community; are walkable, bicycle-friendly, and (where feasible) served by public transit; and offer affordable and accessible housing opportunities for residents of all ages and socio-economic backgrounds. With their relatively high densities and mix of integrated uses, livable communities foster the most efficient use of land and resources. Livable communities can be found in the region’s core cities and their component neighborhoods; in the region’s older first generation suburbs; and in town and rural centers scattered throughout the region’s suburbs and ex-urban areas.

Greater Philadelphia is a complex mosaic of 353 diverse cities, boroughs, and townships. The *Connections* plan characterizes the region’s municipalities as core cities, developed communities/mature suburbs, growing suburbs, or rural areas, as a means of categorizing and simplifying the types of communities and defining the corresponding long-range planning policies appropriate for each type. This categorization is shown on the Planning Areas map. Many municipalities have within their boundaries areas that fit the characteristics of more than one of these types. Gloucester Township (in Camden County, New Jersey), for example, has neighborhoods that are fully developed but also a significant number of undeveloped acres and significant forecasted population and employment growth, more characteristic of a growing suburb. The intent of the Plan is to assign to each municipality the planning area type associated with the long-range planning policies that will be most beneficial to the entire community. While the Planning Areas map is a guide to the policy direction at the regional scale, actual approaches should always relate directly to local situations.

The region’s four **Core Cities** include Philadelphia, Trenton, Camden, and Chester. Policies that will guide future growth and development and improve livability in the Core Cities include redevelopment and renewal. Targeted infrastructure investment, maintenance and rehabilitation, comprehensive neighborhood revitalization, and efforts focused on reinforcing a network of social and educational programs will help to rebuild and revitalize the region’s cities.

Developed Communities/Mature Suburbs are those communities that have already experienced most of their population and employment growth, and include inner ring communities adjacent to the Core Cities; railroad boroughs and trolley car communities; and mature suburban townships. Many of these communities are stable and thriving, with affordable housing opportunities for young families; access to transit; safe pedestrian and bicycling environments; and a strong community identity. Others, however, are experiencing population and employment losses; have deteriorating infrastructure systems; have aging resident populations living on limited incomes but requiring more services; and have stable or declining tax bases that cannot keep pace with rising service demands. The key policies for these communities include stabilization and revitalization. Rehabilitation and maintenance of infrastructure systems and the housing stock, economic development activities (such as Main Street programs), and streetscape and signage programs can help to reinforce location advantages while stemming decline.

Growing Suburbs are communities that have a significant number or percentage of developable upland acres remaining and are experiencing or are forecast to experience significant population and/or employment growth. Key

planning policies to enhance livability in these communities include growth management and community design, reflecting the need to improve the form of development, reduce congestion, and mitigate the negative impacts of unmanaged growth. Smart growth techniques that support a more concentrated development pattern with higher densities (including clustering, mixed-uses, transit-oriented development, and transfer of development rights) can provide the critical mass necessary to support new transit services and other alternatives to the automobile. A key planning approach is to focus on the quality of design and architectural character, considering the location and arrangement of buildings, landscaping, signage, and other design features. Preservation and the creation of a coordinated system of open spaces and recreational opportunities is also a priority in these communities.

Rural Areas include the region's agricultural communities and communities with large remaining natural areas. The key policy approaches for these communities are preservation and limited development, including limited expansion of infrastructure systems, preservation of a rural lifestyle and village character, support for continued farming, and enhanced natural resource protection. Livable communities in these rural areas include centers that have an identifiable main street, a mix of uses, slightly higher densities than their surrounding uses, and a true sense of place.

Livable communities can be created and supported throughout the region by reinvesting in and redeveloping centers, promoting affordable housing in appropriate locations, enhancing community design, and promoting green infrastructure.

Goal: Invest in Centers

A key principle to guide the *Connections* plan is the concept of centers. Centers provide a focal point in the regional landscape that can reinforce or establish a sense of community for local residents while recognizing their regional and local significance. Centers serve as a basis for organizing and focusing the development landscape while coordinating the more efficient provision of supportive infrastructure systems, including water, sewer, and transportation. They provide a focus for new development, including revitalization, infill, and adaptive reuse. By concentrating new growth around and within centers, the region can both preserve open space and reduce infrastructure costs. The densities and mixed-uses inherent within centers can enhance the feasibility of walking, bicycling, and public transit as alternatives to the automobile.

The *Connections* plan identifies a hierarchy of seven center types, shown on the Planning Areas map, based on their role and activities within the region. The Center City/University City area of Philadelphia – bounded roughly by the Delaware River and 40th Street from Girard to Washington avenues – is identified as the region's Metropolitan Center. This dense, compact, mixed-use area includes the central business district and office core and major academic and medical institutions, as well as major tourist and entertainment destinations.

The Plan also identifies six Metropolitan Sub-Centers, reflecting their magnitude of jobs and commercial activity. These include the downtown areas of Trenton and Camden, and the destinations of King of Prussia/Valley Forge (Montgomery County); International Airport/Navy Yard/Sports Complex (Philadelphia and Delaware counties), Cherry Hill/Mt. Laurel/Marlton (Burlington and Camden counties), and the Route 1 Corridor (Mercer County).

Embedded within the region's core cities of Philadelphia, Trenton, Camden, and Chester are Neighborhood Centers, recognizable places with a mix of commercial, retail, anchor institutional, or residential activities.

■ Neighborhood centers:

- Are located within one of the four core cities,
- Have an identifiable main street or focal point,
- Are walkable, with pedestrian connections, and
- Have a unique history or sense of a community within the larger city setting.

The *Connections* plan recognizes that each of the region's core cities is a collection of diverse neighborhoods with varying characteristics, assets, challenges, and needs, and that specific approaches and strategies for improving and revitalizing these neighborhoods will differ. The planning policies within the core cities and their neighborhoods focus on redevelopment and revitalization through targeted investment and reinvestment.

In addition to these metropolitan, metropolitan sub-centers, and neighborhood centers, the Plan identifies four types of 2035 centers: suburban centers, town centers, rural centers, and planned town centers. The characteristics of each type are as follows:

■ Suburban centers:

- Are significant region-wide,
- While not necessarily single municipalities, are perceived as single "places,"
- Generally have more jobs than residents,
- Are defined primarily by a concentration and variety of commercial, professional, and light industrial uses,
- Are suburban in character,
- Are less dense than town centers,
- Lack the integrated mix of uses found in town centers, and
- Are generally auto-dependent rather than transit-oriented or pedestrian scale.

■ Town centers:

- Have a mixture of high-density residential and commercial land use; defined as a minimum density of six people *and* three employees per developed acre,
- Have an integrated mix of land uses,
- Have a unique history, character, and sense of place,
- Are of relatively higher density than their surrounding land uses,
- Have a distinct downtown/main street area surrounded by relatively dense residential development,
- Are pedestrian friendly and often transit-oriented, and
- Are surrounded by suburban land uses.

■ Rural centers:

- Have a minimum density of six people *and* three employees per developed acre,
- Have an integrated mix of land uses,

- Have a unique history, character, and sense of place,
 - Are of relatively higher density than the surrounding area,
 - Have a distinct downtown/main street (though smaller than a Town Center), and
 - Are surrounded by rural and agricultural land uses.
- Planned town centers:
- Have planned town-center type development on greenfields in growing suburbs or rural areas or through redevelopment on greyfields and/or brownfields in existing developed communities.
 - Plans call for village-type development, incorporating mixed, integrated land uses; relatively high densities; pedestrian connections; and a distinct downtown or main street.

Policies to Invest in Centers

- ▶ Attract new residents and jobs to the region’s cities and centers.
- ▶ Restore and maintain the existing infrastructure in identified centers.
- ▶ Target infrastructure expansions, to manage growth, curtail sprawl and encourage a more sustainable, center-based regional development pattern.
- ▶ Redevelop abandoned and underutilized brownfield and greyfields sites into thriving mixed-use areas.
- ▶ Support and reinforce social and educational programs in the region’s centers.
- ▶ Revitalize neighborhoods, through economic development activities (such as Main Street programs), housing rehabilitation and maintenance programs, and activities to improve the pedestrian environment (including streetscape and lighting improvements).

New Jersey Land Use Centers

County	Metropolitan Sub-Centers	Suburban Centers	Neighborhood Centers	Town Centers	Rural Centers	Planned Town Centers
Burlington	Cherry Hill / Mt. Laurel / Marlton	Route 38 / Mt. Laurel		Bordentown, Burlington City, Mt. Holly, Palmyra, Pemberton Borough, Riverside Township, Village of Moorestown	Browns Mills	Columbus, Wrightstown
Camden	Camden, Cherry Hill / Mt. Laurel / Marlton	Cherry Hill	Fairview, Parkside	Collingswood, Gloucester City, Haddonfield, Haddon Heights, Westmont		Voorhees / Lindenwold
Gloucester		Deptford		Glassboro, Paulsboro, Pitman, Swedesboro, Woodbury		Woolwich
Mercer	Trenton, Route 1 Corridor		Chambersburg / Wilbur, North Trenton	Hightstown, Princeton Borough, Washington Town Center	Pennington Borough, Hopewell Borough	Mercer Crossings

Source: DVRPC 2009

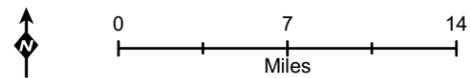
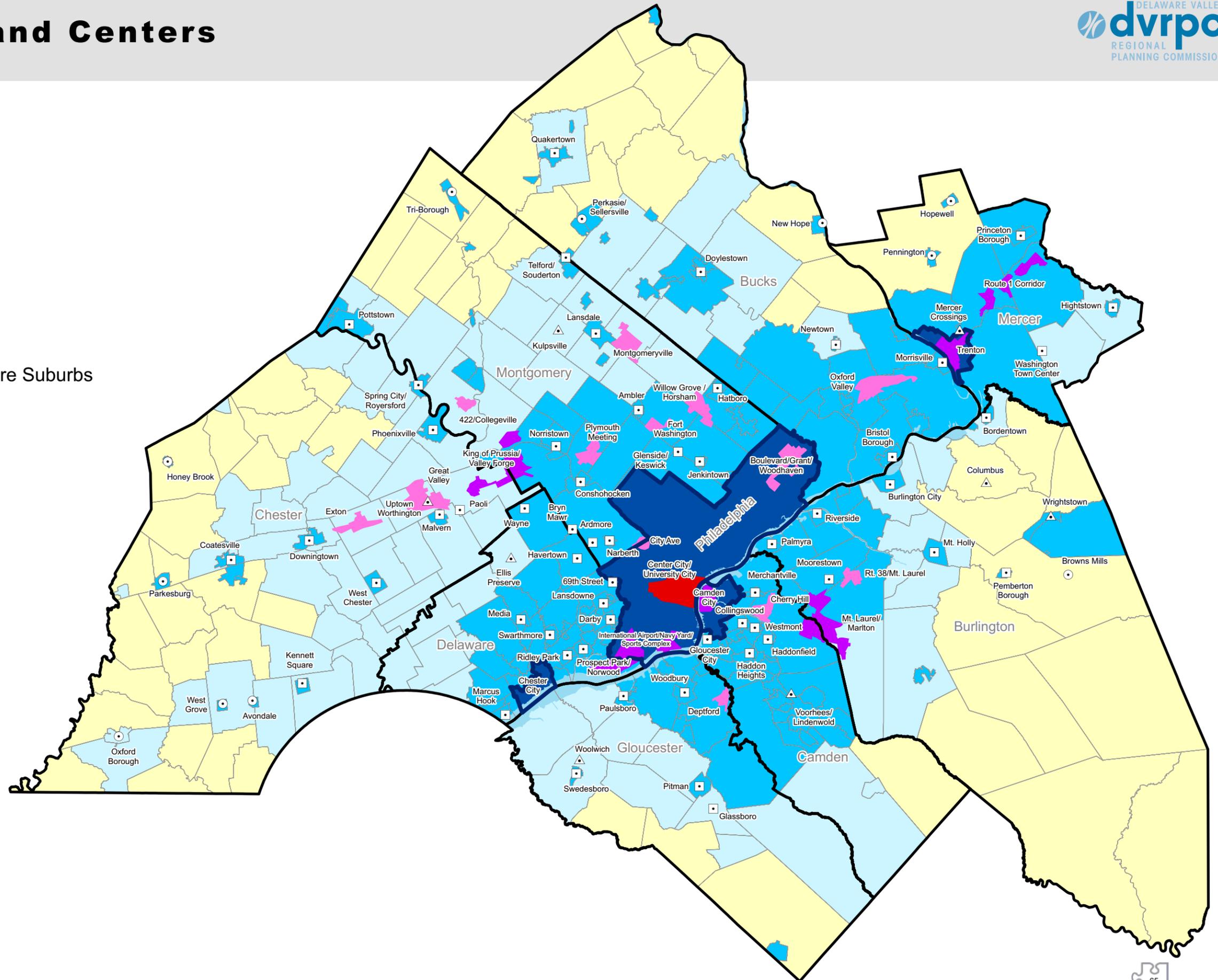
Pennsylvania Land Use Centers

County	Metropolitan Sub-Centers	Suburban Centers	Neighborhood Centers	Town Centers	Rural Centers	Planned Town Centers
Bucks		Oxford Valley		Bristol Borough, Doylestown Borough, Morrisville, Newtown Borough, Quakertown	New Hope Borough, Perkasie / Sellersville	
Chester		Exton, Great Valley		Coatesville, Downingtown Borough, Kennett Square, Malvern, Paoli, Phoenixville, Spring City / Royersford, West Chester	Avondale, Honey Brook Borough, Oxford Borough, Parkesburg, West Grove	Uptown Worthington
Delaware	International Airport / Navy Yard / Sports Complex		Chester Riverfront, University Crossing	Darby Borough, Havertown, Lansdowne Borough, Marcus Hook, Media, Norwood / Prospect Park, Ridley Park, Wayne, Swarthmore, 69 th Street		Ellis Preserve
Montgomery	King of Prussia / Valley Forge	City Avenue, Fort Washington, Montgomeryville, Plymouth Meeting, Willow Grove / Horsham, Route 422 / Collegeville		Ambler Borough, Ardmore, Bryn Mawr, Conshohocken, Glenside / Keswick, Hatboro Borough, Jenkintown, Lansdale, Narberth, Norristown, Pottstown, Spring City / Royersford, Telford / Souderton	Tri-Borough	Kulpsville
Philadelphia	International Airport / Navy Yard / Sports Complex	City Avenue, Boulevard / Grant / Woodhaven	Broad and Passyunk, Woodland Avenue, 52 nd and Market, Broad and Cecil B. Moore, Broad and Erie, Kensington / Richmond, Manayunk, Roxborough, Germantown, Chestnut Hill, Mount Airy, Broad and Olney, West Oak Lane, Frankford, Bustleton and Cottman, Lawncrest / Fox Chase, Mayfair / Holmesburg			

Source: DVRPC 2009

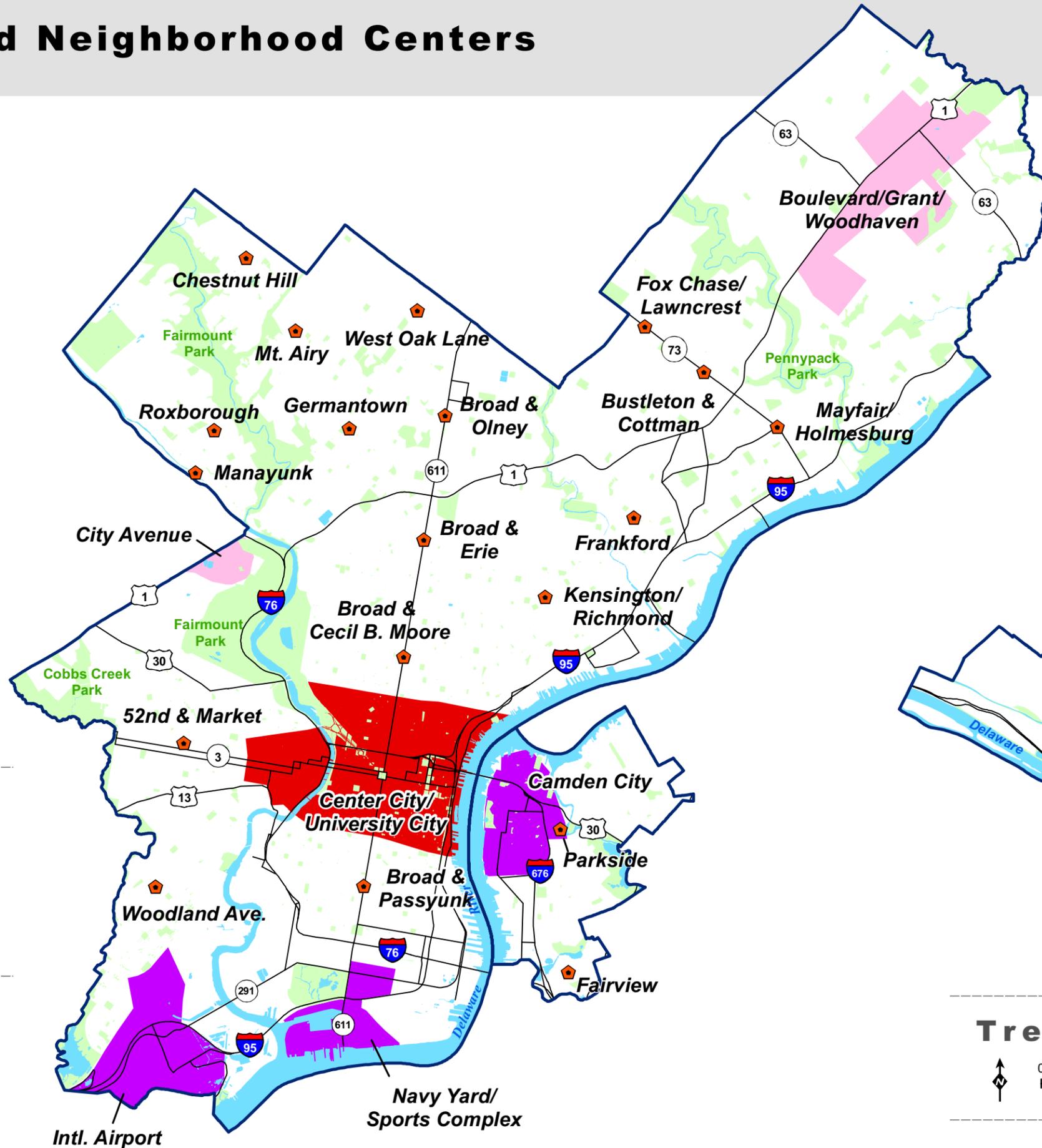
Planning Areas and Centers

-  Metropolitan Center
-  Metropolitan Sub-Center
-  Suburban Center
-  Town Center
-  Rural Center
-  Planned Town Center
-  Core Cities
-  Developed Communities/Mature Suburbs
-  Growing Suburbs
-  Rural Areas

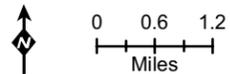


Core Cities and Neighborhood Centers

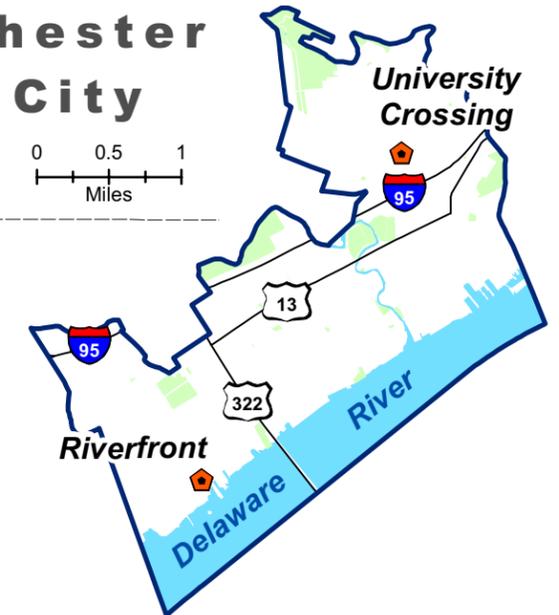
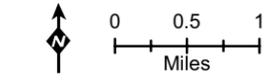
-  Metropolitan Center
-  Metropolitan Sub-Center
-  Suburban Center
-  Neighborhood Center



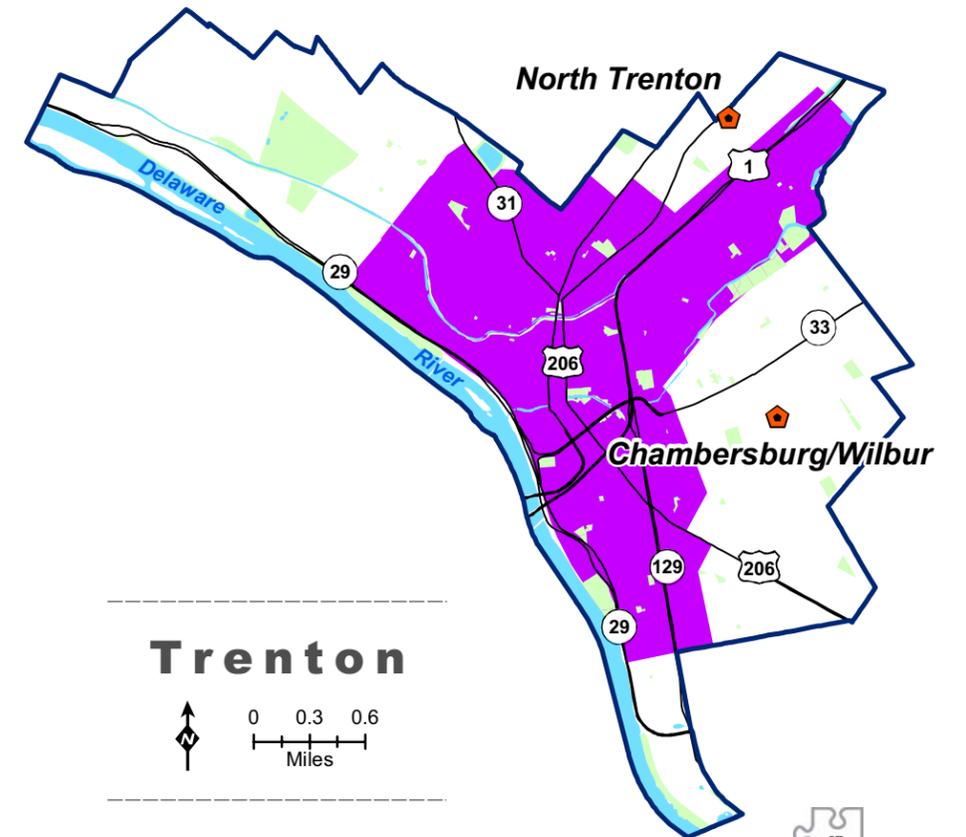
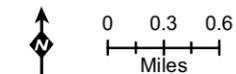
Philadelphia and Camden



Chester City



Trenton



Goal: Promote Affordable and Accessible Housing

Housing is an important facet in determining the livability of individual communities and the competitiveness of the region as a whole. A lack of affordable housing opportunities within a reasonable distance of the workplace affects the workers' quality of life and can have significant negative consequences on employers, including difficulty in attracting and maintaining a quality workforce; increased re-training costs; a need to pay disproportionately high wages; and increased tardiness and absenteeism, resulting in decreased employee productivity. Local economies may also suffer, as more and more of each family's disposable income is consumed by housing and/or transportation costs. Volunteerism becomes difficult, and time that otherwise might be spent participating in community activities is instead spent commuting to and from work.

First-time homebuyers in particular find it difficult to locate an affordable home for purchase, particularly in the neighborhoods where they grew up or close to their current place of employment. Limited opportunities for first-time homeownership can result in a tightening of the rental market, as families that would traditionally purchase their first home find it increasingly difficult to locate an affordable unit in an attractive location. Increased demand for a limited supply of rental units leads to increased rental costs, which in turn makes it even more difficult to accumulate the necessary capital for a downpayment and closing costs.

Additionally, with the projected aging of the region's population over the next 26 years, more accessible housing units will be needed. The individual units themselves need to be built to allow for senior or handicapped accessibility, allowing for individuals to maintain the greatest independence possible. They also need to be woven into the fabric of existing and planned centers for social interaction, easy access to the transportation system, shops and restaurants and other activities.

Federal and state past and current housing policies have generally encouraged suburban sprawl; disinvestment in cities and older communities; and a concentration of affordable housing in the region's core cities and first suburbs. In turn, a mismatch between the locations of jobs and labor has developed, with many lower income and entry-level workers limited to affordable housing options located far from suburban job centers. This mismatch has resulted in increased commute times, spiraling transportation costs, and increased traffic congestion, which in turn contribute to decreased productivity and increased employee turnover.

The concentration of affordable housing in older communities also reduces the local tax base, impacting the local community's ability to finance a quality education system, invest in needed infrastructure repairs, and meet social service demands. As a result, older municipalities find it even more difficult to attract market-rate housing and middle-income residents, further compounding the problem. The attractiveness of the region's older communities is reduced and development sprawls outward into the suburbs, continuing a downward cycle that reduces the region's overall competitiveness.

In response to the limited number of affordable housing opportunities in newer suburban communities, the New Jersey Supreme Court has established a constitutional obligation for every municipality to provide for a fair share of their region's affordable housing need, and the state's Municipal Land Use Law requires that all municipalities adopt a

housing plan that addresses how they will meet that need. Pennsylvania's Municipalities Planning Code requires that every municipality provide for every type of housing, but does not address affordability. What is needed is a more balanced and sustainable approach to housing that will benefit older and newer communities, workers and employers, and the region as a whole. Tools available to help preserve the region's existing stock of affordable units or support the creation of new affordable housing opportunities in close proximity to employment and/or transit include the following:

- Expanding programs that support the rehabilitation or modification of existing affordable units.
- Allowing increased densities and an integration of land uses, particularly around employment centers and transit.
- Allowing a full range of housing types in residential zones, including non-traditional housing alternatives such as elder cottages and accessory apartments.
- Supporting the adaptive re-use of obsolete non-residential buildings for residential uses.
- Offering density bonuses to developers willing to construct affordable housing.
- Undertaking public-private partnership efforts.
- Reducing the cost of development by streamlining plan review and permitting processes.

Policies to Promote Affordable and Accessible Housing

- ▶ Preserve the region's existing affordable housing stock.
- ▶ Increase the stock of affordable housing units in suburban centers close to jobs and services and served by public transit.
- ▶ Increase employment in places where affordable housing opportunities currently exist, including the region's core cities and developed communities, by increasing their attractiveness to moderate and middle-income families searching for affordable housing close to work and in places where they would want to live and raise their families.

Goal: Enhance Community Design

The issue of how our communities look and function is an important one. Several studies have now shown that many Americans want to live in traditional towns, places where they can walk to the store, and walk their kids to school. The National Association of Realtors found that over 60 percent of Americans want to live in such walkable, mixed-use communities. However, the issue of community design is not just about consumer choice. Communities that are designed for the pedestrian and connected to transit can affect a number of issues including safety, economic competitiveness, mobility, quality of life, and cost of living. Consider this:

- Municipalities across the region are focusing on community design for their shopping districts, creating a more attractive and walkable environment in order to bolster economic growth.
- Designing places that are oriented to the pedestrian reduces reliance on automobile travel for everyone, while increasing mobility for the elderly, the young, and the disabled.
- By enhancing the visual perception of an area from a commuter corridor to a destination with people and activity, municipalities have calmed traffic and created safer, more attractive streets.
- By concentrating growth around existing centers, while preserving farmland, we are saving costs on new roads and infrastructure, and preserving our valuable open space.

In November 2007, DVRPC produced *Promoting Civic Design Excellence for Philadelphia*, a report which argues that investing in good design makes a place competitive, livable, and noteworthy. Communities in the DVRPC region that have invested in smart, walkable design have attracted good development and new residents. Places such as Ambler, Haddonfield, Collingswood, Media, Center City Philadelphia, and Narberth have reputations as desirable places to live and do business. DVRPC's program, *Classic Towns of Greater Philadelphia*, recognizes and promotes a number of the region's unique, diverse, livable communities.

Some of the keys to community design include concentrating new growth in existing centers, preserving open space, valuing the pedestrian, mixing residential and commercial uses, connecting with transit, historic preservation, infill development built up to the street line, parking on-street or hidden behind commercial structures, investments in facades, landscaping, and streetscaping to create a high-quality public realm. Together these elements can transform a place, and develop a fresh identity.

The first challenge for many municipalities is making the shared decision that smart growth and enhanced community design are desirable goals. The second challenge is figuring out how to get there. DVRPC promotes a series of tools that when combined can help municipalities create better places for their residents, businesses, and for the competitiveness of the region. Tools include:

- Form-based zoning
- Design standards/guidelines
- Development incentives
- Multi-municipal planning/zoning
- Special zoning districts
- Transferable development rights
- Investment in placemaking
- Multi-modal planning
- "Green Streets" and sustainable site design techniques
- Environmental resource inventories and resource protection ordinances

Pennsylvania and New Jersey each have a number of assistance programs and funding sources to support the implementation of these tools. Through strategies like tax-increment financing, Transit Revitalization Investment Districts, business, or neighborhood improvement districts, impact fees, and state investment programs, municipalities have resources to start planning for smarter and more competitive environments. Enhancing community design takes a fresh mindset and a commitment to public education.

Policies to Enhance Community Design

- ▶ Enhance the design quality of new development and redevelopment, such that it is more sensitive to its surroundings, community character, and thematic landscapes, through the implementation of municipal smart growth tools.
- ▶ New development should incorporate a mix of uses, new urbanism principles, pedestrian and bicycle friendliness, and where appropriate transit oriented design.

- ▶ Promote and market the amenities and unique qualities that make the region’s developed municipalities and neighborhoods great places to live, work, and play.

Goal: Promote Community Green Infrastructure

The term “Green Infrastructure” is being used more and more in the conservation, planning, and development fields, but it is a term that means different things to different people. Some people refer to green infrastructure as vegetated greenways, due to the flood control and stormwater management functions they perform. Other people think of street trees along urban boulevards as green infrastructure, due to the air quality, stormwater retention, and cooling benefits they confer. Even engineered structures such as green roofs are thought of as green infrastructure by some. A good definition of green infrastructure is “an interconnected network of greenspace that conserves natural ecosystem values and functions and provides associated benefits to human populations.”¹¹ Whereas greenspace is often viewed as a nice amenity, attaching the term “infrastructure” to “green” implies something necessary to have. Protecting, restoring, and enhancing our region’s natural life support system is a necessity, not an amenity.¹²

The *Connections* plan proposes a Greenspace Network throughout the region that serves to protect and connect environmentally sensitive areas for ecosystem functions and people’s connections to places. Drilling down to a finer scale, the *Connections* plan also promotes installation and maintenance of green infrastructure throughout the region’s urban, suburban, and rural communities. This “Community Green Infrastructure” consists of small parks, trails, community gardens, street trees, green schoolyards, landscaping, and green roofs. Together, these various types of green infrastructure perform valuable ecosystem functions that the public would have to otherwise pay for, and they promote livability. For example, a recent study commissioned by the Philadelphia Parks Alliance and conducted by the Trust for Public Land documented the ecosystem value of parkland and trees in Philadelphia. The air pollution mitigation value was calculated at \$1.5 million annually, and the stormwater management value was calculated at \$5.9 million annually. These are tremendous cost savings to the City government.

Few elements of the grey infrastructure of our developed communities can be said to boost property values, support retail activity, improve municipal health, protect water quality, reduce stormwater runoff, counter climate change, provide wildlife habitat, and ensure roadway safety – all at once. Communities need look no farther than their trees to enjoy this host of benefits. Many of these benefits of **community trees** have been quantified: Recent studies from the University of Pennsylvania demonstrate that planting a tree within 50 feet of a house can increase its value by 9 percent, and that cleaning and greening vacant lots can increase adjacent property values by as much as 30 percent.¹³ Each year, a single large shade tree can absorb 90 pounds of carbon dioxide and 10 pounds of air pollution, including four pounds of ozone and three pounds of particulates.¹⁴ Philadelphia’s 2.1 million trees currently store approximately 530,000 tons of carbon at an estimated value of \$9.8 million.¹⁵ One hundred mature tree crowns intercept approximately 100,000 gallons of rainfall per year.¹⁶ A single street tree produces \$90,000 of direct benefits,

¹¹ Green Infrastructure: Smart Conservation for the 21st Century, Mark A. Benedict and Edward T. McMahon. The Conservation Fund, Sprawl Watch Clearinghouse Monograph Series. Washington, D.C.

¹² Ibid.

¹³ Wachter, 2004.

¹⁴ Elmendorf, 2008.

¹⁵ USDA Forest Service, 2007.

¹⁶ Ibid.

such as traffic calming safety, stormwater, and air quality improvements, over its lifetime, and this does not include aesthetic, social, and other natural benefits.¹⁷

Despite all these benefits, loss of tree coverage is occurring almost everywhere across the region. To counter this trend, each county and municipality can do its part by setting tree canopy coverage goals and methods to achieve them. American Forests recommends the following generalized targets for different land uses, recognizing that every community is different and needs to set its own targets.

- 40 percent tree canopy overall
- 50 percent canopy in suburban residential
- 25 percent tree canopy in urban residential
- 15 percent tree canopy in central business districts

Methods to achieve these goals include developing strategies to plant trees in suitable spaces such as vacant lots, parks, and riparian areas; planting trees to absorb stormwater runoff, requiring trees in redevelopment and new development projects, and maintaining trees to prolong their life and environmental benefits. Communities can make use of a number of regulatory, planning, and non-regulatory tools, such as tree protection ordinances, tree inventories, and street tree commissions.

Converting existing streets into **Green Streets** is another way to install green infrastructure in a community. Green Streets include features such as swales, pervious pavement, vegetated strips, medians with infiltration beds, street trees, and planted curb bump outs. Benefits of green streets include reduction and management of stormwater through interception, evapotranspiration, throughfall, and attenuation. They improve water quality by filtering stormwater, removing contaminants, cooling runoff before it reaches a water body, and reducing the volume of water entering drainage systems, which is especially important with combined sewer systems. Added vegetation also makes streets more attractive for pedestrians, encouraging more use which further increases safety

Many schools, particularly in urban areas of the region, are surrounded by concrete and asphalt and provide no lawns or trees for recreation, shade, or relief from the surrounding urban environment. Yet, schoolyards have great potential to become neighborhood parks. As parks with trees and natural landscaping, **green schoolyards** can filter air and water pollution, reduce stormwater runoff, increase property values, provide improved recreational opportunities and living laboratories for school curricula, promote human health, and increase community cohesion.

Community gardens and urban agriculture can range from a rooftop garden to a for-profit business that grows crops for sale. Whatever the scale of the operation, growing food in developed communities is an important element of green infrastructure that provides multiple benefits. Benefits of farming or gardening lands in developed communities include watershed and water quality protection through the capture and absorption of rainwater, filtering of air pollutants, provision of habitat for native species and improved biodiversity, greater access to fresher, healthier foods, decreased cost and amount of energy consumed in transporting food, increased food security for food insecure

¹⁷ Burden, 2006.

populations, job creation, participation in neighborhood revitalization, promotion of community cohesion, outdoor exercise, and use as an educational tool.

Policies to Promote Community Green Infrastructure

- ▶ Promote the planting and stewardship of shade trees in suburban and urban areas to enhance property values, provide energy savings, store and sequester carbon, clean the air, and absorb stormwater.
- ▶ Incorporate elements of green streets when new streets are constructed and when existing streets are upgraded with improvements.
- ▶ Encourage school districts to undertake schoolyard greening initiatives by working with nonprofits, civic associations, parent-teacher associations, and their municipal governments.
- ▶ Support community gardens and urban agriculture by ensuring it is a permissible use in zoning codes, promoting the conversion of vacant land to agriculture, providing financial incentives, and assisting in the formation of farmers markets and “buy local” campaigns.
- ▶ Integrate green infrastructure such as trees, rain gardens, landscaping, parkland, trails, and green roofs into development and redevelopment projects to reap the multiple ecosystem, economic, and livability benefits they provide.

Principle: Build an Energy-Efficient Economy

The region's economy is large, diverse, and multifaceted, with dozens of public and private economic development organizations, each seeking to promote or attract a wide variety of sectors or specific interests. Thus, there is no single process or simple strategy that will fully address all of the opportunities and challenges the region faces. Continued coordination across state lines, across city and county lines, across sectoral interests, and across the public and private sectors is essential to maintain that broad view of the region and find a common vision, goals, and objectives.

The *Connections* plan reiterates the policies and strategies embodied in the Commonwealth of Pennsylvania's Keystone Principles for Growth, Investment, and Resource Conservation. The Keystone Principles state general goals and objectives for economic development and resource conservation, and were agreed upon among 23 state agencies as a coordinated interagency approach to fostering sustainable development. The Plan is also consistent with the economic growth strategies touted by New Jersey's Office of Economic Growth.

A key component of future economic growth for any region is to identify key growth sectors, particularly sectors that match a region's strengths and workforce. Greater Philadelphia is already home to a high concentration of such cutting edge sectors as life sciences, chemicals, and higher education. There is also a burgeoning alternative and clean energy industry in the region. Furthermore, this sector is poised for high growth during the coming years. Developing a "green" economy means not just focusing on high-paying technical positions but also more blue-collar "green jobs." The term "green jobs" is used by some observers to describe those jobs and occupations associated with environmental improvement, energy conservation, and renewable energy. These workers bring expertise and knowledge of environmentally-conscious techniques in design, policy, conservation, and sustainability into the economy. With more stringent environmental regulations and energy concerns, many companies now seek professionals with knowledge of environmental and energy issues. These workers encompass professions such as environmental consultants, environmental or biological engineers, green architects, environmental lawyers, educators, and technology workers. This category of jobs also includes low-skill jobs such as insulation installers and recycling workers, which provide employment opportunities for low-skilled workers.

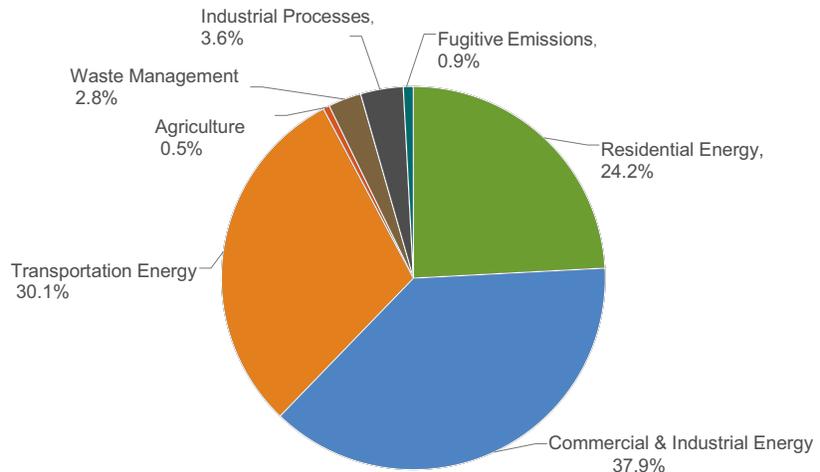
The Greater Philadelphia region has made an excellent start in establishing itself as a center for businesses and professionals who possess the skills to transform challenges in energy efficiency and ecological sustainability into a competitive economic advantage, creating jobs, and quality economic development for our region. DVRPC is actively engaged in regional efforts to foster this growth and the jobs that attract and retain skilled professionals, and to link the economy's need for blue-collar workers trained to perform jobs related to energy conservation and environmental improvement with the need for a ladder out of poverty for jobless urban residents.

As discussed in DVRPC's 2006 publication *A Post-Global Economic Development Strategy*, global challenges present local opportunities to redirect regional economic development efforts to prepare the region to compete in a future where energy-efficient and environmentally-benign products and services will be key drivers of growth.

Rising levels of greenhouse gases (GHG) pose an impending threat to the world's economy. As nations begin to more closely monitor and regulate greenhouse gas emissions, their ability to compete in the world marketplace will also be impacted. DVRPC's Regional Greenhouse Gas Emissions Inventory estimates that in 2005 the region produced just over 90 million metric tons CO₂ equivalent of greenhouse gases, roughly 1.5 percent of the U.S. total, and about the same as Portugal and greater than Austria, both of which have populations about two times that of the DVRPC region.

Over 90 percent of these emissions are from stationary or mobile energy consumption. The latest science indicates a reduction in GHG emissions of 80 percent is required by 2050 to keep global climate change within an acceptable range. A 50 percent reduction by 2035 would put our region on track to achieve this.

Emissions by Source



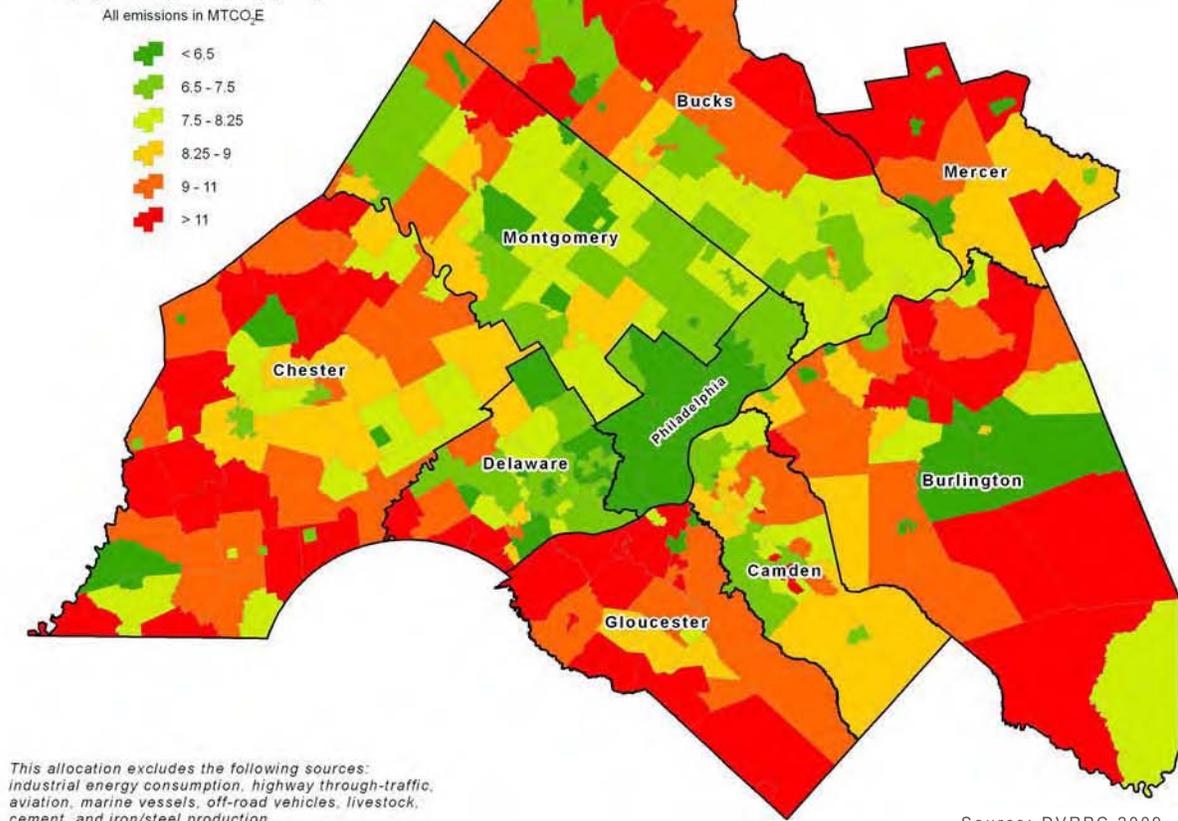
Source: DVRPC 2008

Even if there were no GHG concerns, the impact of energy prices on our economy is tremendous. Total expenditure in the region for energy (electricity, natural gas, gasoline, diesel, heating oil, coal, and jet fuel) in 2005 is estimated at \$15 billion, or about 5 percent of the region's \$300 billion economy. If the same amount of energy was consumed at the energy prices of mid-2008, it would cost \$25 billion. While we cannot predict future energy prices, most observers agree they will increase over the long term. At twice the prices of mid-2008, the region's 2005 energy consumption would cost \$50 billion, or about one out of every six dollars in the region's economy. As energy prices increase, more of our regional economy is eaten up by energy, leaving fewer resources available to address other regional needs.

Regional land and housing development patterns over the coming decades will have a profound impact on future energy requirements as well. Shown below are GHG emissions per capita (including both population plus employment) by municipality. Population plus employment serves as a good indicator of overall economic activity. As the map illustrates, municipalities with higher levels of activity per acre produce lower emissions per person.

Greenhouse Gas Emissions

Greenhouse Gas Emissions per Population + Employment by Municipality (2005)



In general, emissions per capita are lower in those municipalities that encourage walkable, mixed-use neighborhoods, are near transit infrastructure, have smaller houses, and require less driving. DVRPC's transportation and land use planning policies and projects work to advance these goals.

In fact, New Jersey's Global Warming Response Act (GWRA) (P.L.2207, c. 112) calls for reducing GHG emissions to 1990 levels by 2020, approximately a 25 percent reduction below estimated 2020 business-as-usual emissions. The GWRA requires a doubling of ridership on NJ TRANSIT's services by 2020 to meet these and the equally aggressive 2050 goals.

Similarly, building codes and regional programs that result in new high-performance buildings and the retrofitting of existing buildings will further reduce our region's energy requirements. DVRPC continues to bring to the region's planners the latest tools and knowledge for green codes and zoning, and to incorporate sustainability elements into comprehensive plans. The Greenhouse Gas illustration is a reasonable proxy for how much energy is used per capita in different municipalities in the region. As energy becomes more expensive, it is likely that municipalities with lower energy consumption per capita will be more desirable places to live and locate businesses.

Over the coming decades, the profound transformation of the global economy to use less energy and produce less greenhouse gas presents a tremendous opportunity for Greater Philadelphia. As we transform our land use to build on our historic advantages of mixed-use development and transit infrastructure, we will also transform our business and workforce infrastructure to provide the products, services, and skills required for this future. This transformation will require regional cooperation and strong coordination between the states, counties, and municipalities. DVRPC continues to play a critical role in building and leading that coordination.

Goal: Support and Promote the Growth of Key Economic Sectors

The region must continue to attract new companies in key economic sectors, including those related to the emerging “green economy,” that have the greatest potential for growth and encourage the expansion of existing companies that compete in these sectors, which include:

- Life sciences (biotechnology and pharmaceuticals)
- Alternative/clean energy and energy conservation
- Tourism
- Health care
- Higher education
- Finance and investments
- Professional and business services
- Creative industries
- Information technology
- Chemicals
- Defense and homeland security
- Internet, cable, and telecommunications
- Transportation and logistics
- Specialty manufacturing
- Food production, processing, and distribution

Policies to Support and Promote Key Economic Sectors

- ▶ Expand the Greater Philadelphia Region’s Connections to the Global Economy.

The Greater Philadelphia region’s connections to the global economy are essential to maintaining the region’s economic competitiveness in an interconnected world. The region needs to promote international trade and continue to attract foreign direct investment. Success requires expanded capacity and improved performance at Philadelphia International Airport, as well as enhanced utilization of the region’s ports and overall leverage of the region’s multi-modal infrastructure. With limited available funding for improvements to the transportation network, facilities that serve clusters of key economic sectors should receive priority attention.

- ▶ Foster a High-Quality, Productive Labor Force.

Improving the region’s pre-K-12 public education, especially in the urban districts, is a critical task. There is also a tremendous opportunity to leverage the region’s impressive higher education resources to raise the level of educational attainment. In addition, there are opportunities to help develop skills through industry and school partnerships and specialized training that offer pathways into specific careers, such as bio-technicians or energy auditors. This is especially pertinent to lifelong learning programs to (re)train adults, seniors, and immigrants as they (re)enter the work force. There is also a

need to better connect small employers with the resources available through the public workforce system and others involved in workforce training.

Employment that matches the skills of the workforce that the region currently has and has committed to developing should be supported and promoted. Jobs appropriate for employing and building on the skills of the region's most vulnerable and distressed populations, including those who have been chronically unemployed, must also be created. These jobs should foster pathways out of poverty through career ladders.

▶ Enhance the Climate for Business Growth.

Specific recommendations include:

- ◆ Seek and welcome business locations and expansions;
- ◆ Expand availability of venture and other investment capital;
- ◆ Continue to secure a more attractive business tax environment;
- ◆ Increase the speed, predictability, and transparency of government decision-making;
- ◆ Foster regional collaboration;
- ◆ Improve the region's image both internally and externally;
- ◆ Conduct a regional economic development marketing program;
- ◆ Engage business leaders in growing the regional economy;
- ◆ Promote entrepreneurship to increase the rate of new business formation, both within the region by residents and by attracting entrepreneurs from other regions; and
- ◆ Retain and improve the region's quality of life to ensure Greater Philadelphia remains an attractive place to live and work.

Goal: Reduce Greenhouse Gas Emissions

As energy prices increase and governmental policies to curb greenhouse gas emissions are put in place across the nation and world, businesses and individuals will increasingly select places where they can meet their needs with less energy from fossil fuel sources. In order to keep the DVRPC region competitive, a multi-pronged strategy is needed to effectively address both GHG emissions and energy use.

Policies to Reduce Greenhouse Gas Emissions

- ▶ Reduce greenhouse gas emissions by 50 percent by 2035 compared to 2005 levels.
 - ◆ Provide services with less energy by encouraging the use of more efficient cars, furnaces, and lighting, and expand transit services.
 - ◆ Produce energy with less CO₂ by promoting bio-fuels, solar hot water and electricity, wind power, geothermal energy, and nuclear power as alternatives to carbon-based fuels.
 - ◆ Reduce the demand for services and energy provision by locating jobs, housing, and services closer together, and encouraging denser development.

Principle: Create a Modern Multi-Modal Transportation System

Transportation planning supports the region's land use, environmental, and economic development policies. In this context, DVRPC is committed to the region-wide promotion and implementation of a safe, convenient, and seamless passenger and freight multi-modal transportation system that includes road, rail, bus, bicyclist, and pedestrian networks of mobility. This is accomplished in a collaborative manner with a wide-range of stakeholders and based upon strong technical analysis. The transportation planning philosophy outlined below provides the framework for the planning process at DVRPC.

DVRPC's Transportation Planning Philosophy

- Transportation investments will support the goals and policies of the DVRPC Long-Range Plan.
- The priorities for transportation projects and programs are as follow:
 - 1) Maintain, optimize, and modernize the existing transportation system and rights-of-way. This includes optimizing the services delivered by the system, such as options for and convenience of transfers among modes.
 - 2) Manage demand for transportation by fostering land use patterns and other strategies that reduce the need for and length of trips.
 - 3) Increase capacity of the existing multi-modal transportation system, limiting the addition of through-travel lanes.
- The transportation planning process will be comprehensive, cooperative, continuing, compatible, and coordinated. The first three are the basis of the federally required "3C" process. This process will be:
 - Comprehensive – All modes and their implications will be considered and evaluated. All transportation solutions will consider more than one mode.
 - Cooperative – Work together productively, seeking consensus and enhancing participation across the whole population.
 - Continuing – New endeavors need to incorporate maintenance, consider prior efforts, and fit with adopted ongoing system planning efforts.
 - Coordinated – This complex region requires a focus on fitting pieces and projects together across agencies, organizations, and boundaries.
 - Compatible – Try to make land uses and infrastructure (transportation, water/sewer, and technologies) work efficiently together.
- Investment benefits and costs should be strategically distributed across the region, with careful consideration of environmental and social impacts. Investments will be affordable and consider appropriate economic development. Projects will incorporate context-sensitive design and other Smart Transportation techniques.
- The region will be innovative at incorporating policy approaches, ITS applications, and emerging technologies. DVRPC will be bold in doing projects that continue to transform the region into a better place to live, visit, and work.

Transportation networks have been a key component of prosperous regions throughout history and the efficient movement of people and goods locally, regionally, and internationally will be a hallmark of thriving regions in the

future. Greater Philadelphia enjoys a superb advantage by virtue of its location in the middle of the Northeast Corridor but needs to address several challenges to continue to take advantage of this locational benefit in the future. Maintaining and improving key interstate and inter-regional highway and transit routes is imperative as are upgrading the region's airport and port facilities, which serve as our link to the rest of the world.

The region's transportation system is at a crossroads. The region enjoys a robust transit system that most areas of the country cannot rival. However, due to the sprawling development patterns of the past 50 years, the suburban areas do not have enough density to support transit and many portions of the urban system are underutilized.

The road and transit systems are both mature and both require extensive investment to bring them up to a state of good repair and even more to maintain them into the future. Many parts of the transit system are a century old and most of the region's freeway network is over fifty years old. Funding for bridges is a particularly significant dilemma. Currently, the region can only fund about half of the identified needs for bridges over the life of the Plan. The collapse of the I-35W Bridge in Minneapolis and recent emergency shut-downs to I-95 in this region, because of cracks in the bridge supports, highlights the danger and economic consequences of not investing in the infrastructure. The sheer amount of maintenance needs in the region means that funding for improving and expanding our system must be diverted to rebuilding the existing system.

Within this constrained fiscal environment, we must continue to find ways to ensure safety and security of the system, reduce congestion, and improve the ability of all people to reach destinations throughout the region. The transportation planning process also must consider the strong environmental impacts that the transportation system, particularly the highway system, has on our natural environment. Automobiles and trucks contribute significantly to the region's greenhouse gas emissions, air pollution, stormwater run-off, and other environmental impacts are an important consideration for highway construction. The *Connections* plan calls for a more sustainable approach that addresses land development and environmental impacts of the transportation system.

Looking toward the future, the *Connections* plan envisions a seamless multi-modal passenger and freight system that is safe; convenient; sufficient in its capacity; attractive and affordable to its users; accessible and equitable for all citizens and visitors to locations throughout the region; and incorporates sound growth management, urban revitalization, and environmental and economic competitiveness planning principles.

The *Connections* plan contains a number of goals to achieve this vision. Because of the Plan's emphasis on intermodal transportation, separate sections are included for highways, transit, bicycle and pedestrian, freight, and aviation, as well as transportation operations.

Goal: Rebuild and Maintain the Region's Transportation Infrastructure

The age and sheer size of the region's transportation network coupled with decades of deferred maintenance as system expansion took precedence has led to a vast backlog of maintenance and repair needs. A high percentage of our roads, bridges, and rail infrastructure are rated as either deficient or obsolete. The rebuilding of the existing network of roads, transit lines, and other transportation facilities is the focus for transportation investments moving

forward. We must continue to prioritize projects based on quantitative data to ensure that funds are spent efficiently and effectively. We must also plan for the future and preserve vital right-of-ways so that the system can expand. Utilizing abandoned rail lines as bike paths in the interim is one example in which key corridors can be preserved for future use.

Policies to Rebuild and Maintain the Region's Transportation Infrastructure

- ▶ Develop and employ asset-management systems to select capital that are cost-effective.
- ▶ Devote sufficient resources to address reconstruction and maintenance needs.
- ▶ Preserve existing rail and road right-of-way for future transportation uses.

Goal: Ensure Adequate Funding

The region faces many challenges in fully funding the current and future needs of the transportation system. The first step is to make sure that identified projects utilize Smart Transportation principles. Projects should be tailored to the size of the problem, respect the character of the community, take into account alternative modes, and be planned in collaboration with the community. This process ensures that we are getting the most out of our current funding levels.

Additional sources of revenue also need to be identified and many of these sources will require federal approval or state enabling legislation to pursue. Funding mechanisms which spread out the cost over the entire region should be considered for projects that significantly impact regional travel and provide a regional benefit.

Policies to Ensure Adequate Funding

- ▶ Scale the solution of the size of the problem and tailor the approach to the specific project.
- ▶ Maximize the amount of state and federal transportation resources that flow to this region, consistent with statewide mobility needs and cognizant of the added costs associated with construction in dense, older urban areas.
- ▶ Establish a funding mechanism for financing projects of regional significance, including enactment of state-enabling legislation to permit dedicated regional revenue generation.

Goal: Ensure Transportation Investments Support Long-Range Plan Goals

Transportation projects should support the four key Plan principles of Managing Growth and Protecting Resources; Creating Livable Communities; Building an Energy-Efficient Economy; and of course, Creating a Multi-Modal Transportation System. In particular, investments should serve areas that are either already developed or designated as appropriate for future growth, encourage (re)investment in the region's centers, have limited environmental impact, and support key economic sectors. Potential projects should be evaluated to make sure that they help achieve the key principles outlined in the Plan.

Policies to Ensure Transportation Investments Support Long-Range Plan Goals

- ▶ Apply context-sensitive design standards to transportation facilities.
- ▶ Promote transit-oriented development and mixed-use development.
- ▶ Encourage investment in older, developed areas and brownfields.
- ▶ Increase the level of investment in transportation facilities that promote freight movement and economic development.
- ▶ Limit new capacity to appropriate areas as identified in the Congestion Management Process.
- ▶ Consider the land use impacts of transportation investments in the development of plans and programs.
- ▶ Select projects for capital programming in the Transportation Improvement Program based on sound long-range strategic planning considerations, life-cycle investment analyses, and system performance and condition data (actual and projected).

Goal: Create a Safer Transportation System

The region's Regional Safety Action Plan focuses on reducing crashes and fatalities on the regional roadway system by providing a roadmap for effective collaboration and coordination among safety professionals and stakeholders. Strategies for advancing this goal are detailed in agreed-upon priority emphasis areas which focus on various safety issues including: teen driver safety, impaired driving, roadway departure crashes, and seatbelt use. The Regional Safety Action Plan is a data-driven living document that is coordinated with New Jersey and Pennsylvania's safety plans.

Policies to Create a Safer Transportation System

- ▶ Improve the safety of all users of all modes.
 - ◆ Plan for and seek funding for improvements to transportation infrastructure to increase safety.
 - ◆ Focus on key emphasis areas derived from analysis and coordination with other agencies as an efficient way to improve safety.
 - ◆ Support appropriate enforcement to improve safety, including by building knowledge for necessary legislative initiatives, supporting relevant professional development for law enforcement staff, and educating members of the judicial branch of the consequences of frequently reducing charges.
 - ◆ Maintain a crash database and provide safety analysis to planning partners.
 - ◆ Facilitate coordinated emergency responses through incident management planning and other means of saving lives.
 - ◆ Promote and coordinate programs that educate about and market safety.
 - ◆ Address safety needs of environmental justice population segments, including elderly or disabled people.

Goal: Create a More Secure Transportation System

With an increasing national focus on security, a role for metropolitan planning organizations (MPO) has also been established in the federal transportation legislation, SAFETEA-LU. One goal of this effort is to explore ways MPOs can play a part in security planning by researching and documenting all ongoing security efforts among our traditional

partners. DVRPC seeks to fulfill its classic role of facilitating the exchange of ideas and resource sharing to build upon existing programs to further security efforts in the region.

Policies to Create a More Secure Transportation System

- ▶ Elevate security in the planning process and DVRPC will consider and advance transportation security planning without compromising security-improving efforts by:
 - ◆ Consider regional transportation security in programs, projects, and in preparing capital programs.
 - ◆ Provide studies, analysis, and mapping as helpful to improve transportation security planning.
 - ◆ Support the development of efficient, coordinated responses, for example through incident management task forces.
 - ◆ Support the development and communication of regional preparedness and evacuation planning.
 - ◆ Facilitate discussion among entities doing transportation security planning throughout the region and with related professions.
 - ◆ Coordinate and cooperate with other bodies involved in transportation security planning with full respect for the extensive work already underway.
 - ◆ Participate in regional recovery efforts such as through capital programming changes in the event of a major incident.
 - ◆ Aid the region in learning from major events, for example by facilitating or participating in follow-up meetings.

Goal: Increase Mobility and Accessibility

Mobility refers to the movement of people and goods and accessibility refers to the ability to reach desired destinations within the region. Mobility is heightened when the transportation system is multi-modal and provides connections between various modes. The ability to reach destinations throughout the region is a challenge for many members of society that do not have access to an automobile. There is a critical spatial mismatch between employment centers offering entry-level service sector jobs – which are predominantly located in growing suburbs – and workers, who primarily reside in the region’s inner cities and older suburbs. Providing alternative modes is crucial so that everyone in the region can enjoy mobility.

Policies to Increase Mobility and Accessibility

- ▶ Promote coordination and integration of all transportation systems.
 - ◆ Establish opportunities for connections among all modes.
 - ◆ Improve scheduling and operations to accommodate intermodal movements.
 - ◆ Provide system accessibility for all segments of the population and increase affordable transportation alternatives.
 - ◆ Comply with regulations and guidance for the Americans with Disabilities Act and Environmental Justice (Title VI).

Goal: Reduce Congestion

Congestion has a significant impact on a region’s economic competitiveness since people and goods sitting in traffic equates to money lost in time. The Greater Philadelphia region experiences 112 million hours of travel delay

annually, which ranks 10th nationally. This equates to over 60 million gallons of excess fuel consumed and an annual cost of almost \$1.9 billion due to sitting in congestion.¹⁸ Reducing congestion has traditionally been accomplished by expanding capacity. However, that capacity quickly fills up and entices expanded development ever further out. Other components, such as making the transportation system more efficient, instituting transportation demand management strategies, and providing alternatives to the single-occupant vehicle can also accomplish the same goal.

Policies to Reduce Congestion

- ▶ Optimize the efficiency of the existing transportation system.
 - ◆ Reduce traffic congestion along travel corridors and at critical intersections through incident management, access control, signal system improvements, and needed highway improvements.
- ▶ Reduce the amount of vehicle miles traveled, particularly single-occupant vehicle (SOV) trips.
 - ◆ Establish programs to reduce the number of vehicle trips.
 - ◆ Encourage practices that spread travel throughout the day, and throughout the week, making the transportation system more efficient.
 - ◆ Provide more options for commuters.
 - ◆ Improve area coverage and operation of transit service.
 - ◆ Increase the number of multi-modal transportation centers and park-and-ride facilities.
 - ◆ Improve bicycle and pedestrian facilities.
 - ◆ Focus construction of new capacity on missing links.

Goal: Limit Transportation Impacts on the Natural Environment

Transportation facilities have a significant impact on the natural environment. Automobiles, in particular, contribute significantly to air and noise pollution, and stormwater run-off from roads impacts water quality. DVRPC is committed to limiting the negative impacts of all transportation projects. DVRPC is devoting time and effort to a new approach that will better link environmental planning, transportation project development, and the National Environmental Policy Act (NEPA) process. NEPA establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment and it provides a process for implementing these goals within the federal agencies. Its most significant impact was to require all federal government agencies to prepare Environmental Assessments and Environmental Impact Statements that contain statements of the environmental effects of proposed federal agency actions. Consideration of potential conflicts between transportation proposals and green infrastructure goals can simplify the NEPA process by identifying transportation solutions that avoid or minimize environmental impacts early in the planning process. DVRPC is considering the impacts of transportation projects on the region's ecosystems as a whole, including regulated and unregulated environmental features, and ecosystem services. Conducting this screening and analysis aids in the identification of potential primary and secondary ecosystem impacts, encourages the development of projects that are compatible with regional environmental goals, and is a critical first step in the NEPA and permitting process.

¹⁸ 2007 Urban Mobility Report. Texas Transportation Institute. College Station, TX. 2007.

Policies to Limit Transportation Impacts on the Natural Environment

- ▶ Encourage the reduction in use of travel modes that contribute significantly to air pollution by promoting the use of public transit, bicycle and pedestrian facilities, telecommuting, ridesharing, and car sharing.
- ▶ Improve the regional green infrastructure by refining and expanding the range of environmental mitigation activities.
 - ◆ Work with stakeholders to increase regulatory flexibility.
 - ◆ Promote ecosystem-based approaches to mitigation by increasing understanding of the importance and scope of green infrastructure.
 - ◆ Encourage activities that mitigate for impacts to non-regulated environmental resources.
 - ◆ Assist stakeholders with the identification of mitigation sites.
- ▶ Encourage the use of more fuel efficient, or alternative fuel vehicles.

These goals transcend across all transportation modes. However, each mode is unique and the *Connections* plan highlights different policy perspectives that are unique to each mode. The next section details a regional approach to transportation operations and is followed by specific perspectives and policies for highway, transit, freight, and aviation modes. Each of the sections was developed in collaboration with the respective DVRPC committee that is comprised of operators and specialists in each of the fields.

Transportation Operations

Approximately 60 percent of the traffic congestion in major urban areas, like Greater Philadelphia, is due to temporary or non-recurring conditions, such as disabled vehicles, traffic crashes, maintenance and construction activity, or adverse weather conditions. Traditional transportation improvement strategies, such as increasing highway capacity or providing alternative transportation options, are not applicable in these situations. Transportation operation strategies are targeted to mitigating non-recurring congestion. Transportation operations are the application of a combination of technology, robust planning, improved preparedness, and extensive interagency and intra-agency coordination.

Benefits of transportation operations programs have been widely documented. For example, deploying emergency service patrols on expressways has reduced average duration of incidents by 33 to 60 percent, resulting in fewer secondary accidents and saving millions of gallons of fuel. Improving traffic signal timings by synchronization reduces travel times and delays by 5 to 20 percent, translating into a 10 to 25 percent reduction in fuel consumption. Using Automatic Vehicle Location (AVL) systems on buses has improved on-time bus performance by 12 to 23 percent, thereby reducing passenger waits at bus stops.

The Transportation Operations Master Plan was developed in cooperation with DVRPC's Transportation Operations Task Force (TOTF), which is composed of traffic, transit, and emergency management operators in the region. The Operations Master Plan contains four major operational policies associated with transportation operations management: incident management, traffic management, transit operations, and traveler information. Several basic tenets cut across them: the need to obtain real-time accurate information; the ability to share information among agencies and with the public; and having the appropriate resources available to respond to situations.

2035 ITS Infrastructure Vision

Primary Coverage

- Full CCTV Coverage
- VMS on Mainline, Select Crossroads
- Incident Detection
- Travel Time Detectors

Secondary Coverage

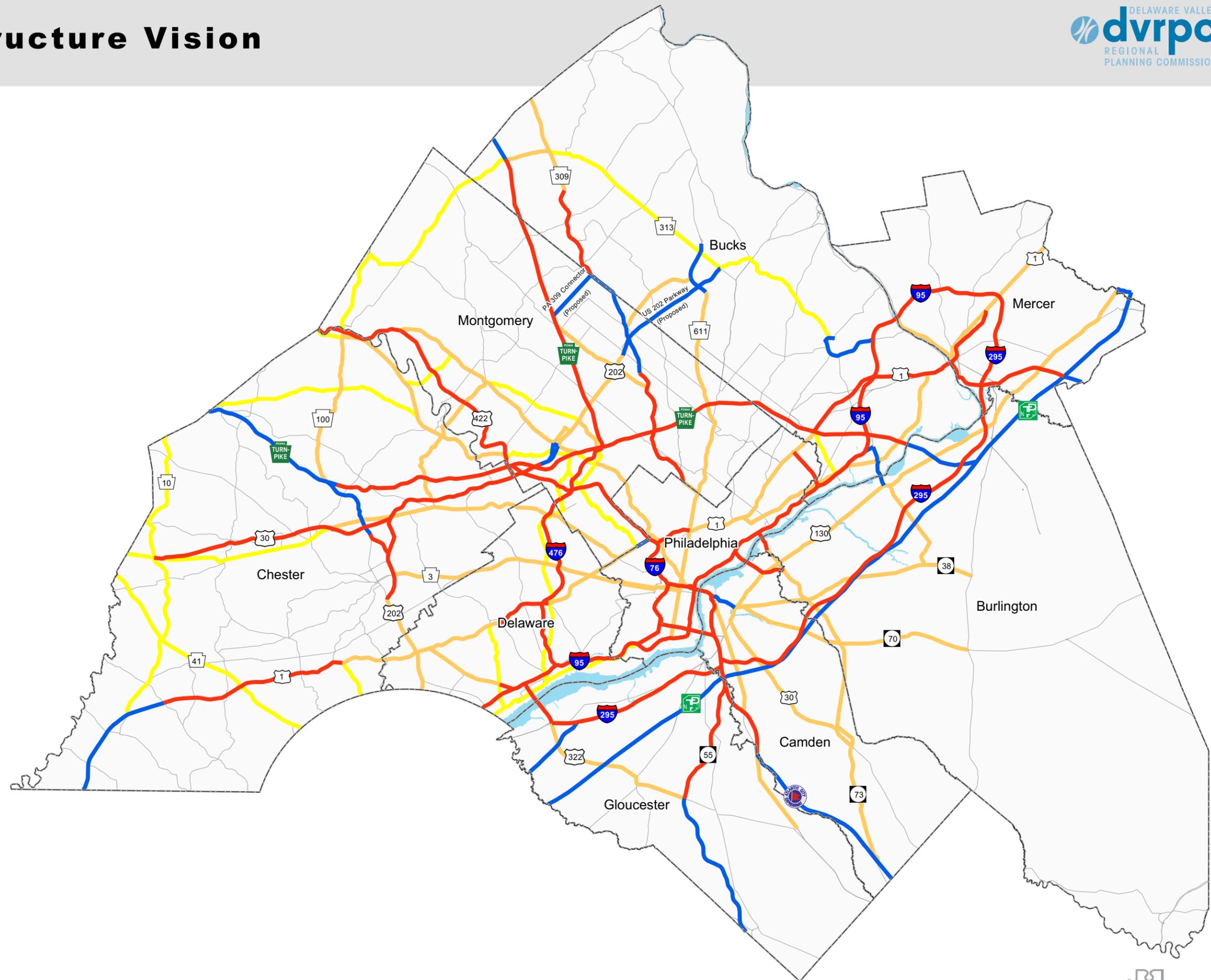
- Limited CCTV Coverage on Expressways, Mainly at Interchanges
- Full CCTV Coverage on Arterials
- VMS
- Travel Time Detectors
- All signals Part of Signal Systems
- Signals Operated by PennDOT (In PA)

Tertiary Coverage

- CCTV at Major Intersections
- VMS at Decision Points
- Travel Time Detectors
- All Signals Part of Signal Systems
- Signals Operated by PennDOT (In PA)

Emergency Routes

- Limited CCTV Coverage
- Limited VMS
- Signals Operated by PennDOT (In PA) in Emergency Situations



▶ Reduce Traffic Congestion through Improved Incident Management

Twenty-five percent of traffic congestion in large urban areas is due to traffic incidents ranging from flat tires to overturned tractor-trailers. These unforeseen events cause havoc, making commuters late, affecting truck deliveries, and ultimately making the region less competitive economically. Incidents cause secondary accidents, where drivers slam into the rear of an unanticipated queue; the secondary crash can occasionally be worse than the original incident. Incident management strategies include:

- ◆ Improve incident detection and verification,
- ◆ Improve response times,
- ◆ Improve interagency coordination and cooperation, and
- ◆ Improve incident clearance.

▶ Reduce Traffic Congestion through Improved Traffic Management

Improved traffic management targets both recurring and non-recurring congestion. The objective is to move away from a static transportation system to a more dynamic transportation system. Examples include periodically retiming isolated traffic signals, installing more signal systems that can be centrally controlled to reflect current conditions, utilizing ramp metering and variable speed limit signs to manage traffic flow on expressways, and implementing more advanced work zone traffic control measures. Another strategy is to focus on travel corridors, not exclusively on expressways, using traveler information to help balance traffic over multiple roadways. Traffic management strategies include:

- ◆ Implement integrated corridor management,
- ◆ Optimize traffic signal systems,
- ◆ Improve work zone management, and
- ◆ Implement traffic control programs improve winter weather management.

▶ Provide more Options for Travelers by Providing Real -Time Information

Providing travelers real-time travel times, incident information, and transit delay information will give them a unique opportunity to optimize their trips. With information about travel conditions, they can make intelligent decisions about routes or modes, and take in-trip corrective actions to avoid delays. With cell phones and wireless technology, the public demands and expects information on demand. Traveler information strategies include:

- ◆ Collect travel condition information,
- ◆ Promote public-private partnerships to disseminate traveler information,
- ◆ Enhance agency traveler information programs, and
- ◆ Enhance en-route traveler information.

▶ Improve Delivery of Transit Services

Unlike highway agencies, transit agencies routinely perform transportation operations on an on-going basis. They manage transit fleets, take corrective actions when vehicles breakdown or are delayed. Instead of primarily focusing on the operations side of transit, the main emphasis for transit will be the technology component. For years, transit agencies used technology to manage their rail systems,

controlling signals and power systems. Modern Supervisory Control and Data Acquisition (SCADA) systems gives operations center staff a more comprehensive picture of all elements of rail systems, automatically monitoring various system elements and issuing alerts when problems are detected. Installing on-board sensors in rail vehicles and buses complements SCADA systems and will lead to improved vehicle diagnostics; reducing the incidence breakdowns and equipment failures. Computer aided dispatch (CAD) systems are used to monitor bus movements, identifying when buses are behind schedule and alerting operations center personnel that corrective action needs to be taken. Surveillance and traveler information systems similar to those used for highways can make transit stations safer and impart real-time traveler information to passengers. Transit management strategies include:

- ◆ Implement technologies to control and operate transit systems,
- ◆ Upgrade transit information systems,
- ◆ Improve fare collection, and
- ◆ Improve security and passenger safety.

The Transportation ITS Infrastructure Vision Map establishes different levels of ITS infrastructure deployment for various ITS elements including CCTV cameras, VMS signs, incident detection, travel time detectors, and traffic signals. Level of coverage is associated with the location and function of the road. For example, different deployment levels are established for urban versus more rural expressways, and for major arterials that carry substantial traffic versus secondary arterials that support emergency operations. This map is a vision developed in the Transportation Operations Master Plan, and was used for the needs assessment estimate for ITS and signal improvements. The vision is not able to be fully funded, and DVRPC will work with the TOTF to prioritize funding for the ITS coverage and other elements of the TOMP.

Transportation Modes

Highway

Beginning with the creation of the interstate highway system in the 1950s, the national vision for transportation has been to build more and more roads. With the interstate highway system essentially complete, the emphasis now and in the future has shifted to making the roads we have perform better. Greater Philadelphia is a mature region with established settlement patterns and stable population and employment. There is not a need to expand the system as in other areas of the country with exploding population and employment. Secondly, there is a widely acknowledged realization that it is impossible to build your way “out of congestion.” New roads simply push development further out and new roads quickly fill up with traffic. The development patterns leads to sprawl and inefficient use of the region’s natural and manmade resources. Finally, the mounting maintenance need of the highway network requires more investment than can be readily met. It makes little sense to invest in new roads while we cannot maintain the roads we already have. A hierarchy of priorities for the roadway infrastructure is listed below.

- 1) Rebuild the Region’s Infrastructure

Many of the region's freeways were built decades ago and require a massive amount of investment. In addition, many miles of county and locally-owned roads have even greater funding deficits. Many recent examples, such as the Minnesota bridges collapse and the closing of I-95 in Philadelphia due to infrastructure failure, highlight the importance of reinvesting in the transportation system. Prioritization of maintenance projects should be based on a quantitative analysis using the federally-mandated Pavement Management System and Bridge Management System.

2) Improve the Operation of the Region's Highway Network

We must improve the efficiency of our transportation network through better timing and linking traffic signals within a corridor, responding to and removing incidents and providing better information to the traveling public. Road improvements should also be designed to accommodate various modes utilizing a 'Complete Streets' approach.

3) Expand the System through Select, Appropriate Capacity Enhancements

New highway projects should focus on eliminating regional bottlenecks and improving the operation of the existing road network. Any expansion of the regional road network should be guided by the region's Congestion Management Process.

As the terminus of any vehicle trip, parking is a key component of the transportation system. Parking can be designed and managed in conjunction with other land uses to support transit systems, enhance the vitality of core urban areas, and prevent sprawl from overtaking valuable open space. Parking strategies can also help communities minimize congestion, foster economic development, preserve neighborhood quality of life, and protect natural resources.

Each of the region's municipalities sets its own parking requirements in its municipal zoning ordinance, typically based on national standards. These standards usually dictate a set number of parking spots be provided for a certain number of dwellings or square footage of office, retail, or industrial space. However, these standards often assume that all trips will be made by car and that destinations will be isolated and single-use in character. They often do not take into account the different types of parking provisions that may be desirable or cost appropriate for different contexts such as downtowns, suburban shopping districts, or rural areas. There is also little guidance about shared parking, public parking garages, and other strategies that recognize that parking should be sensitive to the broader context rather than being viewed as just a single use. DVRPC recognizes has identified the following priority parking policies for the region:

- ◆ Focus parking standards on parking supply and demand and on innovative ways to calculate parking requirements.
- ◆ Use parking management to reduce demand and improve supply, where appropriate or necessary, through such strategies as pricing, car-sharing, and shared-parking facilities.
- ◆ Use context and design treatments to best match off-street, structured, or bicycle parking to different land uses.
- ◆ Consider the environmental impacts of parking, especially the critical issue of stormwater.
- ◆ Reduce parking requirements particularly in areas with good transit service, incentivize shared parking, and better design and manage existing parking resources.

The Congestion Management Process

The Congestion Management Process (CMP) advances the goals of the DVRPC long-range plan and strengthens the connection between the Plan and the Transportation Improvement Program (TIP). It identifies congested corridors and multimodal strategies to mitigate the congestion. Where additions to capacity are appropriate, the CMP includes supplemental strategies to get the most long-term value from the project. The CMP segments congested corridors into subcorridors within which similar transportation strategies seem to be appropriate at a regional planning level of detail. This is accomplished through analysis of transportation and land-use data, and stakeholder reviews.

The CMP also identifies corridors of regional significance that are not currently congested, but seem likely to become so in the future. Proactive strategies such as access management are recommended for these emerging corridors. The CMP defines procedures for all federally funded major capacity-adding road projects, whether in congested corridors or not. While projects not in congested corridors may be appropriate, they begin with a higher burden of proof, given the limits on funding. Additionally, the CMP provides information about the performance of the regional transportation system and identifies inexpensive strategies appropriate almost everywhere to minimize congestion and enhance the mobility of people and goods.

Regulations require projects that add Single Occupancy Vehicle (SOV) capacity to be consistent with the CMP in order to be eligible for federal funding. The easiest way for project managers to meet this requirement is to work with the CMP from an early point in the project development process. Further analysis may be required for projects that add SOV but are not consistent with the CMP, the results of which will form the basis of DVRPC Board discussion to either amend the CMP or suggest other funding for the project. Projects outside of congested corridors must demonstrate consistency with the Plan, follow CMP Procedures, and compare well with projects located in CMP corridors.

The CMP is guided by the long-range plan and provides technical analysis to inform the next Plan update. A guiding principle of the CMP is that transportation investments will support the land use goals and policies of the long-range plan. This principle leads to the following set of priorities adopted in the 2006 and 2008 CMP Reports:

- 1) Maintain, optimize, and modernize the existing transportation system and rights-of-way. This includes optimizing the services delivered by the system, such as options for and convenience of transfers among modes.
- 2) Manage demand for transportation by fostering land use patterns and other strategies that reduce the need for and length of trips.
- 3) Increase capacity of the existing multimodal transportation system, limiting the addition of through-travel lanes.
- 4) Add new capacity where necessary, limiting the addition of new roads.

The CMP implements these priorities in several ways. One way is through the range of strategies employed and the order in which they are listed. The strategies are grouped into the following categories, which also reflect the order in which they are used in the CMP:

- Operational Improvements, Transportation System Management (TSM), and Intelligent Transportation Systems (ITS)

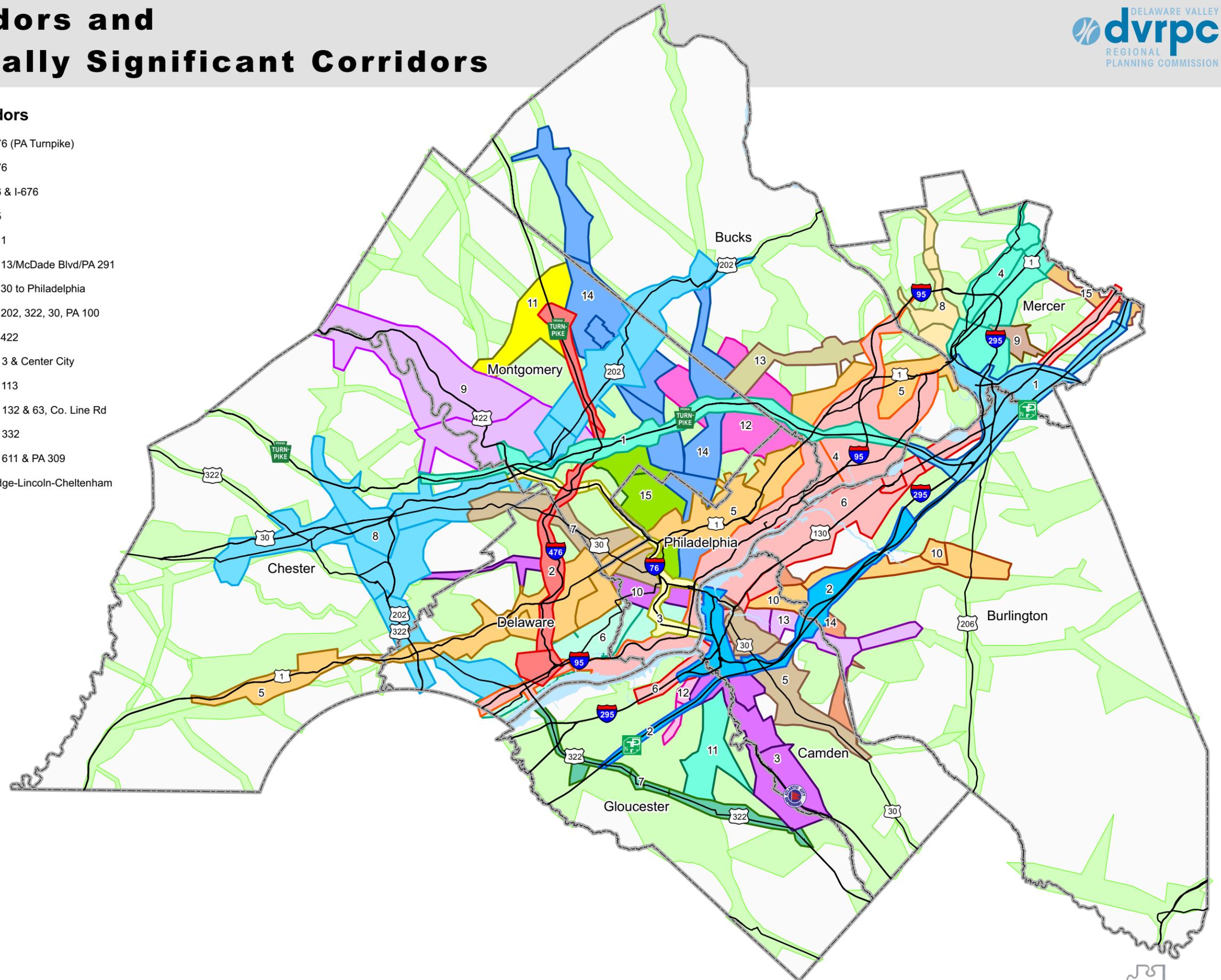
Congested Corridors and Emerging/Regionally Significant Corridors

NJ Corridors

- 1 -- I-295, NJ Turnpike (N)
- 2 -- I-295, NJ Turnpike (S)
- 3 -- AC Expressway/NJ 42
- 4 -- US 1, US 206
- 5 -- US 30
- 6 -- US 130
- 7 -- US 322, Cross Keys Area
- 8 -- NJ 31
- 9 -- NJ 33
- 10 -- NJ 38
- 11 -- NJ 41, NJ 47, NJ 55
- 12 -- NJ 45
- 13 -- NJ 70
- 14 -- NJ 73
- 15 -- CR 571
- Emerging/Regional Corridors

PA Corridors

- 1 -- I-276 (PA Turnpike)
- 2 -- I-476
- 3 -- I-76 & I-676
- 4 -- I-95
- 5 -- US 1
- 6 -- US 13/McDade Blvd/PA 291
- 7 -- US 30 to Philadelphia
- 8 -- US 202, 322, 30, PA 100
- 9 -- US 422
- 10 -- PA 3 & Center City
- 11 -- PA 113
- 12 -- PA 132 & 63, Co. Line Rd
- 13 -- PA 332
- 14 -- PA 611 & PA 309
- 15 -- Ridge-Lincoln-Cheltenham



- Transportation Demand Management (TDM)
- Policy Approaches (such as Complete Streets and Transit-Oriented Development)
- Smart Transportation (to provide better conditions for walking, bicycling, and using modes other than driving alone)
- Public Transit Improvements (programs and projects to increase the capacity of existing services and facilities such as more frequent service on a bus route)
- Road Improvement Projects that Increase the Capacity of Existing Roads

Strategies for each CMP subcorridor are selected in a multi-step process that includes reviews by stakeholders. In one of several steps, the analysis of CMP criteria is used to suggest strategies that may be reasonable for specific congested subcorridors.

Transit

The region’s public transit network is a tremendous asset and provides a significant competitive advantage for the region amid rising energy costs and concerns about climate change. The region’s fixed guideway (rail) network provides a frame around which to anchor growth as we develop into a more sustainable region in the twenty-first century.

Through the early twentieth century, our region’s expansion was defined by transit, and now-“Classic Towns” thrived along transit corridors and around transit hubs. These historic centers of place are integral to the development of a more sustainable Greater Philadelphia region in the coming decades, but this same history means that the transit infrastructure that defined these places requires maintenance and modernization to continue to effectively meet the needs of residents and fit into a modern multi-modal transportation network. Accordingly, the hierarchy of policies for investments in transit infrastructure is listed below. Project types that fall under each priority group are identified for each policy.

1) Ensure the Existing Network is in a State of Good Repair

Modernizing infrastructure enhances efficiency and performance (by removing speed restrictions through antiquated facilities, for example), adds capacity, improves safety, and mitigates the need for costly wholesale reconstruction in the future.

- ◆ Rail guideway facility modernization (track, switches, signals, etc.)
- ◆ Rail station rehabilitation/expansion
- ◆ Transit vehicle replacement/modernization
- ◆ Bus facility enhancement (shelters, intermodal facilities, etc.)

2) Operational Investments and Systemwide Strategies to Realize Additional Benefits from the Existing System

Because the region’s multi-modal transit network is already expansive and interconnected, targeted investments in improving its performance and better integrating facilities with development can have

enormous benefits for residents, businesses, and visitors, and often at comparatively small public expense (relative to major network expansion projects).

- ◆ Fare modernization with interoperability across carriers (SEPTA, NJ TRANSIT, PATCO)
- ◆ Higher levels of transit service
 - Higher frequencies and extended hours - If a passenger knows that along every transit route at every time of day, a transit vehicle or train will arrive within a reasonable amount of time, transit becomes much more convenient to use.
 - Faster and more effective transit service - Strategies should be pursued to move passengers faster and more reliably by transit, including signal priority for buses and trolleys at select traffic signals.
- ◆ Improved and seamless passenger information systems, including real-time service information.
 - Better signage and route information are a requisite for riders. Schedule and route information for all of our regional transit carriers should be presented together. When combined with fare interoperability, this coordination of passenger information will allow a truly seamless regional transit network, where the divisions between SEPTA, NJ TRANSIT, and PATCO services are invisible to the passenger.
- ◆ Invest in stations with coordinated transit-oriented development (TOD).
 - Major transportation centers and intermodal facilities represent major opportunities for coordinated development. An excellent example is Philadelphia's 30th Street Station, the neighboring Cira Center, and additional pending office, retail, and residential development in the station vicinity.
 - Mixed-use TOD in local station or facility areas can generate two-way transit trip flows, reconnect stations with surrounding neighborhoods, and provide an anchor for local commerce.
- ◆ Continue to explore innovative "last mile" solutions such as car sharing, bike sharing, and well-connected taxi or shuttle services to better connect rail stations with more dispersed origins and destinations.

3) Network Expansions that Reinforce Existing or Planned Development Centers

System expansion projects should be pursued only where the new service would reinforce development centers and land use planning objectives. To better integrate with development centers, new stations should accommodate walk-up/bike-up access, and the largest parking facilities should generally be located only at the terminal of a line.

- ◆ Passenger rail extensions (commuter/regional rail, heavy urban rail (subway/elevated), light rail, streetcar, or trolley).
- ◆ Bus Rapid Transit in exclusive guideways.
- ◆ Dedicated guideways for Bus Rapid Transit along existing facilities.

Realizing the vision of a modernized, integrated, and enhanced transit network that maximizes regional and inter-regional mobility will require stakeholders and policymakers to join in making a series of policy and financial commitments at all levels. At the municipal level, officials will need to affirmatively commit to transit supportive zoning and bicycle/pedestrian connectivity in station and transit facility areas. At the transit agency level, the sorts of fare interoperability and seamlessness of passenger information systems envisioned here will require SEPTA, NJ TRANSIT, and PATCO to cooperate through data sharing and financial agreements.

Additionally, operating services at higher frequencies and with extended service hours is expensive and depends on the ability of transit agencies and local governments to absorb higher operating costs. As federal and state transit policy continues to evolve, there may or may not be additional funding available to support these investments. Without significant new federal or state funding, a source of local or regional capital and operating funding – including private sector investment – may be required for our regional transit network to achieve its long-range potential.

Coordinated Human Services Transportation Planning

Current federal transit law, as amended by SAFETEA-LU, requires that projects funded from the Elderly Individuals and Individuals with Disabilities (Section 5310), Job Access Reverse Commute (JARC), and New Freedom programs be derived from a locally developed, coordinated public transit human services transportation plan (CHSTP). The Coordinated Human Services Transportation Process includes linking employment and jobs with transportation services for low income and disabled individuals, as well as facilitating full participation in society for disabled individuals through transportation and infrastructure projects. DVRPC's continuing responsibilities in the CHSTP are:

- ◆ Coordinate, update, and work with regional partners to adopt a Coordinated Human Services Transportation Plan;
- ◆ Administer the project selection process for JARC and New Freedom which determines allocation of federal and state money to eligible projects; and
- ◆ Establish and maintain program outreach/coordination with member governments, transit agencies (who act as designated recipients for the federal money distributed to successful applicants), Transportation Management Associations (TMAs), employers, other transportation providers, and human service agencies.

Bicycle and Pedestrian

Bicycling and walking are low-impact, environmentally friendly, and sustainable modes of transportation that are accessible to a wide-range of users, for a variety of trip purposes. DVRPC is committed to a region where bicycling and walking are safe, attractive, and accessible travel options for everyone.

To achieve this vision, improvements in infrastructure must be accompanied by changes in policy which facilitate greater local mobility and regional access. These policies include an emphasis on bicycle and pedestrian-friendly engineering solutions, more focused enforcement on bicycle and pedestrian safety, as well as the provision of educational programs for cyclists, pedestrians, and drivers.

Federal transportation policy seeks to increase nonmotorized transportation to at least 15 percent of all trips as well as to reduce the number of nonmotorized users killed or injured in traffic crashes by at least 10 percent. DVRPC concurs with this policy. The outlined priorities below, as well as the pursuit of a region-wide Complete Streets policy will help meet these goals. The priorities for DVRPC's bicycle and pedestrian program are as follows:

1) Ensure that Current Facilities are Maintained, and Up-To-Date

Maintain existing bicycle and pedestrian facilities such as bicycle lanes, multi-use paths, and sidewalks in a state of good repair. This will add capacity, promote a safer environment for walking and bicycling, and set strong standards for future facilities. The primary strategies for maintaining the current facilities are:

- ◆ Integrate maintenance costs into the capital program
- ◆ Develop plans for routine maintenance of identified bike and pedestrian facilities
- ◆ Forge partnerships between municipalities, counties, and departments of transportation to share maintenance responsibilities
- ◆ Ensure sidewalks are in a state of good repair and prioritize closing gaps in sidewalk networks

2) Enhance Local Mobility

The majority of trips made by foot or bicycle are local in nature. People in a given community walk or bike to school, to shops, to train stations, or for recreational purposes. These trips are not necessarily associated with bicycle trails or a larger network of facilities. Enhancing bicycle and pedestrian mobility locally will increase the number of trips made by bicycle or foot and promote an environment where these non-motorized modes are safe and attractive forms of transportation. Projects that can enhance local mobility include:

- ◆ Safe Routes to School
- ◆ Inter-Modal Access to Transit
- ◆ Walkable Communities Workshops
- ◆ Bicycle and Pedestrian Level of Service Studies
- ◆ Pedestrian Safety Audits
- ◆ Development of Municipal Plans

3) Establish an Integrated Network of Relevant Bicycle Facilities that Connect Communities and Access Important Regional Destinations

The implementation of interconnected on- and off-road facilities will increase mobility and assist the region in prioritizing projects. This network should access major regional shopping and employment centers and serve bicyclists of all ages and skill levels. It should also facilitate inter-municipal and county cooperation. Local communities should be able to access the network easily for longer trips. A comprehensive bicycle network should include the following strategies:

- ◆ Review and prioritize existing and planned facilities
- ◆ Determine community priorities
- ◆ Establish appropriate engineering solutions to make recommended facilities more bicycle friendly
- ◆ Establish facility standards for both on- and off-road segments
- ◆ Prioritize regionally significant facilities
- ◆ Maintain consistent wayfinding signage throughout various jurisdiction

Regional Trails Network

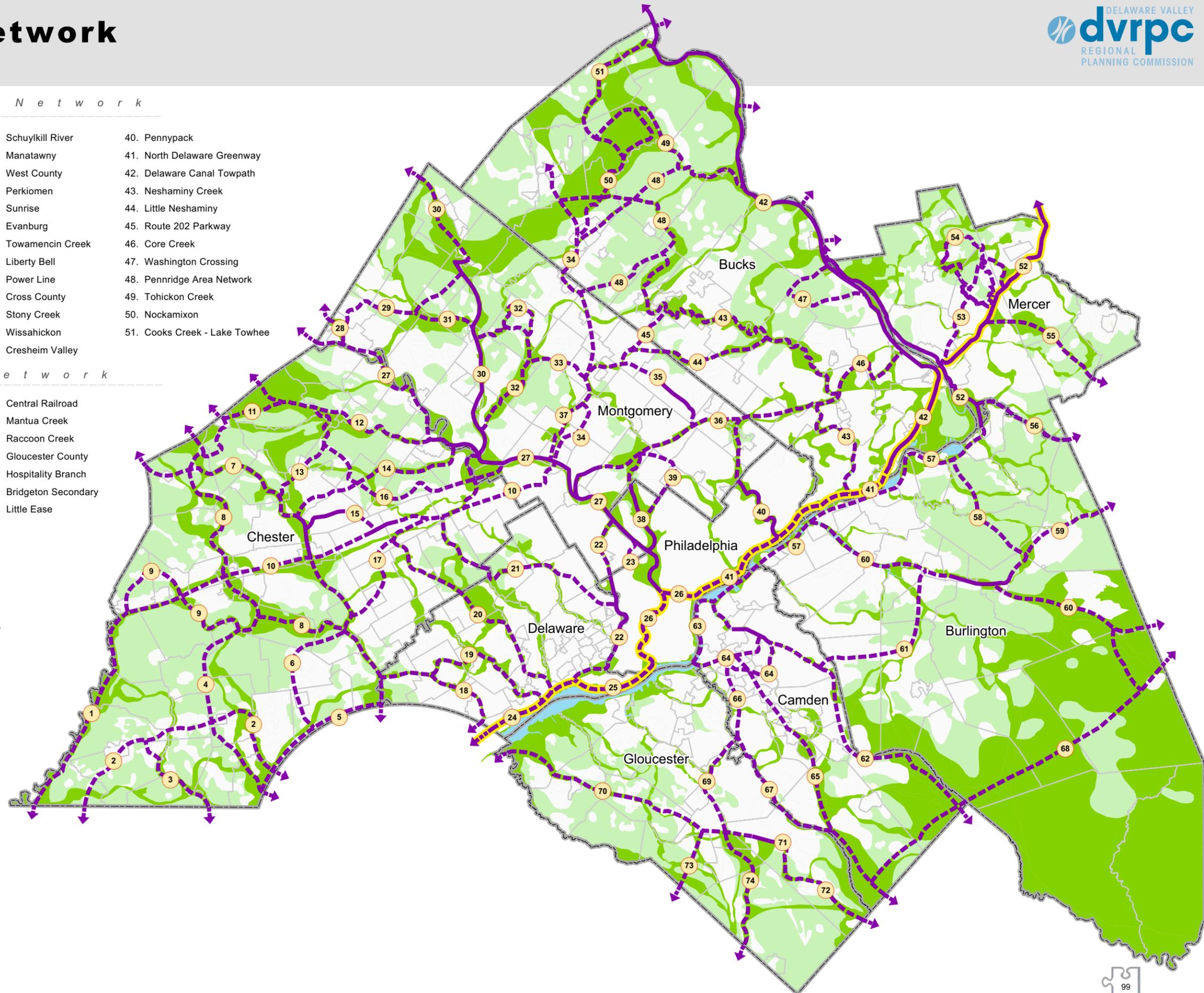
P e n n s y l v a n i a T r a i l N e t w o r k

- | | | | |
|---------------------------------|----------------------------------|----------------------|-------------------------------|
| 1. Octoraro | 14. Pickering Creek | 27. Schuylkill River | 40. Pennypack |
| 2. Oxford - Avondale | 15. Uwchlan | 28. Manatawny | 41. North Delaware Greenway |
| 3. Big Elk Creek | 16. Horse Shoe | 29. West County | 42. Delaware Canal Towpath |
| 4. White Clay Creek | 17. County Seat | 30. Perkiomen | 43. Neshaminy Creek |
| 5. Delaware Arc | 18. Havey Run - Naaman Creek | 31. Sunrise | 44. Little Neshaminy |
| 6. Red Clay Creek | 19. Chester Creek | 32. Evanburg | 45. Route 202 Parkway |
| 7. Brandywine - Struble | 20. Ridley Creek | 33. Towamencin Creek | 46. Core Creek |
| 8. Brandywine - West Branch | 21. Newtown | 34. Liberty Bell | 47. Washington Crossing |
| 9. Buck - Atglen | 22. Darby - Cobbs | 35. Power Line | 48. Penridge Area Network |
| 10. Chester Valley | 23. Cynwyd Heritage Trail | 36. Cross County | 49. Tohickon Creek |
| 11. Welsh Mountain - St. Peters | 24. Route 291/13 | 37. Stony Creek | 50. Nockamixon |
| 12. Sow Belly - French Creek | 25. Tinicum - Ft. Mifflin | 38. Wissahickon | 51. Cooks Creek - Lake Towhee |
| 13. Brandywine - Marsh Creek | 26. Tidal Schuylkill River Trail | 39. Cresheim Valley | |

N e w J e r s e y T r a i l N e t w o r k

- | | | |
|--------------------------------|------------------------------|-------------------------|
| 52. Delaware and Raritan Canal | 60. Rancocas Creek | 68. Central Railroad |
| 53. Trenton - Princeton | 61. Mt Holly - Cherry Hill | 69. Mantua Creek |
| 54. Lawrence Hopewell | 62. River-to-Bay | 70. Raccoon Creek |
| 55. Assunpink Creek | 63. Camden Waterfront | 71. Gloucester County |
| 56. Crosswicks Creek | 64. West Jersey - Seashore | 72. Hospitality Branch |
| 57. Delaware River | 65. East Atlantic | 73. Bridgeton Secondary |
| 58. Kinkora | 66. Gloucester - Mt. Ephraim | 74. Little Ease |
| 59. Pemberton | 67. Big Timber | |

- Existing Trails
- Planned and Proposed Trails and Trail Corridors
- Planned East Coast Greenway Route
- Greenspace Network
- Rural Conservation Lands
- Urban/Suburban Lands



This map depicts existing, planned, and proposed trails and trail corridors. The lines on this map depict generalized trail alignments.

4) Expand the Regional Off-Road Trail Network

Expanding the network of multi-use trails in both Pennsylvania and New Jersey will offer more cyclists access to off-road facilities, as well as increase exposure to open space and recreational opportunities throughout the region. Trails can also be integrated into the bicycle network when appropriate and serve as important corridors for bicycle travel. The Regional Trail Network Map shows existing, planned, and proposed trails and trail corridors. Priorities relating to the trail network are:

- ◆ Prioritization of proposed trail projects
- ◆ Completion of the Schuylkill River Trail, from the City of Philadelphia to Reading, Pennsylvania
- ◆ Establishment of the East Coast Greenway through the region
- ◆ Linking Chester and Montgomery counties through the creation of the Chester Valley Trail
- ◆ Identification of regionally significant trail corridors in New Jersey
- ◆ Maintain a database of existing and planned trail locations, conditions, and status for the region

Freight

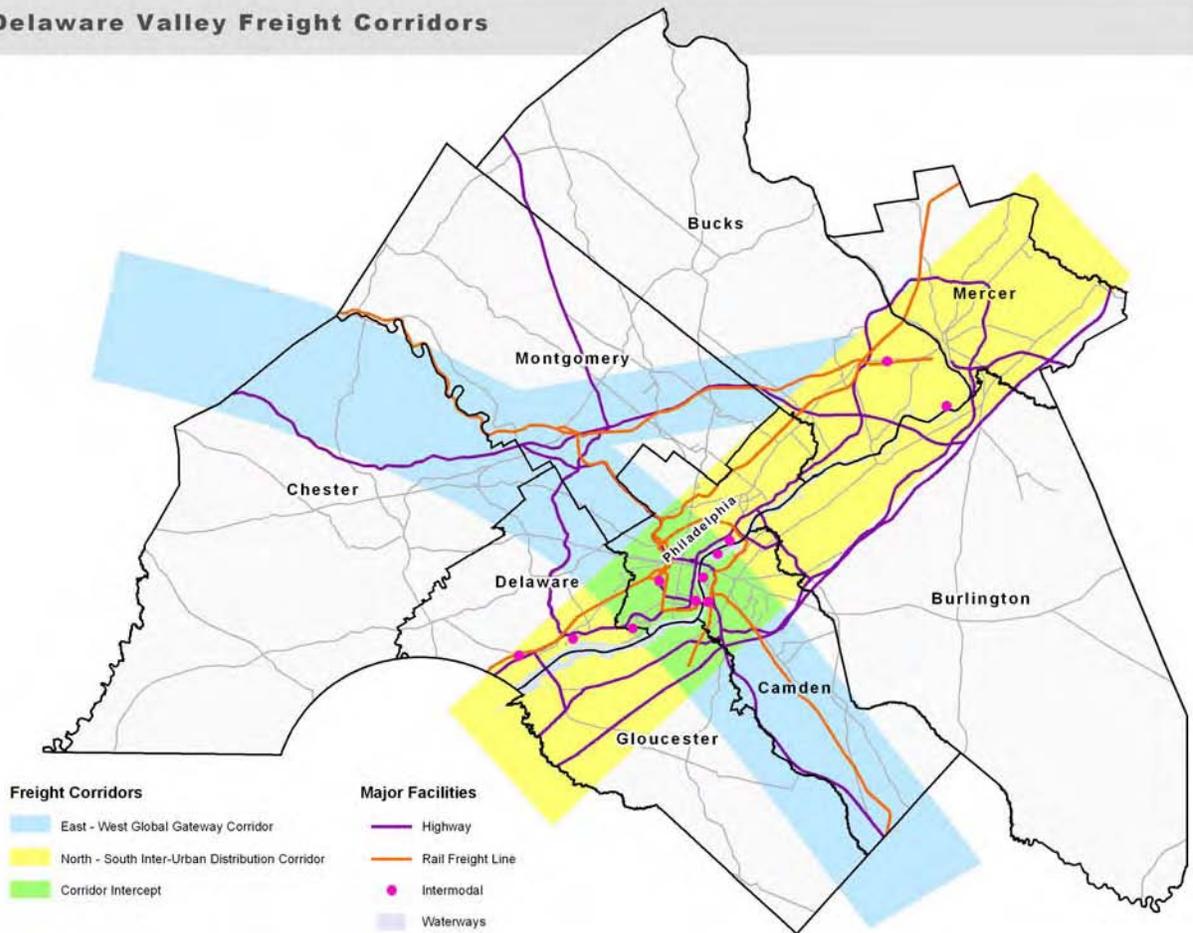
A major justification for supporting freight planning is the economic benefits freight activity brings to the Greater Philadelphia region. In a report from the Federal Highway Administration entitled, “Freight Transportation: Improvements and the Economy,” freight transportation is described as essential to local and national economies. Everything purchased in a store is only there because of the ability to move goods. In a consumer based economy, we are especially dependent on this ability and making it easier for goods to move has enormous benefits to our economy. Goods movement has evolved over time, and businesses and individuals now demand that freight be able to move with increased flexibility and reliability.

The most successful freight programs have adopted a corridor approach to address freight needs. The foundation of the corridor philosophy is to create facilities that move freight in an efficient, safe, and secure manner while keeping freight out of local communities as much as possible. Two **freight corridors** have been identified in the region – a north-south corridor and an east-west corridor. DVRPC has been promoting these corridors and the individual transportation facilities within them to balance freight mobility and community goals within the region.

The North-South Freight Corridor includes three major interstate highways (I-95, I-295, and the New Jersey Turnpike), one Class I railroad line (CSX), the Delaware River and 33 active port facilities, and the Philadelphia International Airport. The corridor includes the South Philadelphia Freight Complex which contains the region’s largest port facility and largest intermodal rail facility and a wide array of warehouses. The corridor is the region’s main connection with the northeast megalopolis linking Philadelphia with New York and Boston markets to the north and Baltimore and Washington, D.C. markets to the south.

The East-West Freight Corridor includes two Interstate Highways (I-76 and I-276/PA Turnpike) and one Class I railroad line (Norfolk Southern). It intersects the North-South Corridor to also include the South Philadelphia Freight Complex. The corridor connects Philadelphia with South Jersey and Atlantic City, as well as central and western Pennsylvania and the markets of Chicago and the agricultural mid-west.

Delaware Valley Freight Corridors



Source: DVRPC 2009

The policies outlined below are contained in the Long-Range Vision for Freight plan and were developed in collaboration with the Delaware Valley Goods Movement Task Force. With limited funding available, adopting these policies will improve the freight system and provide a complement over the next twenty-six years to capital programs and projects. The policies have been organized into five sections which serve as overarching themes to the long-range vision of freight developed by DVRPC and the Delaware Valley Goods Movement Task Force.

1) Recognize the Value of Freight

Freight is a major economic generator. While freight brings positive benefits to the public, freight projects and interests have often taken a back seat to those of the passenger in terms of transportation needs. Public benefits provided by freight movement, such as economic and – in some instances – air quality, should be taken into account and public funding should be considered to pay for a portion of these projects. In the past, large freight projects have been funded primarily through federal earmarks. However, with the recent emphasis on trying to reduce earmarks, it is important to identify dedicated public funding for freight projects. Key target strategies include:

- ◆ Educate decision-makers on the economic benefits and necessity of goods movement.
- ◆ Ensure that transportation revenues support projects that help freight.
- ◆ Revise benefit-cost analyses to include all freight impacts.

- ◆ Continue and augment both railroad and seaport capital funding.

2) Practice Good Neighbor Strategies

Additional noise and sound, reduced air quality, and increased traffic, whether real or perceived, are some of the concerns that communities have in regards to freight movement. These “not in my backyard” (NIMBY) attitudes can restrict projects meant to help the movement of goods and increase freight’s economic benefits. It is essential for freight facilities and operators to work with communities to help educate the public on the benefits of freight, and to decrease both the real and perceived concerns. Below are examples of strategies that could improve the neighborhood relations of the freight industry:

- ◆ Improve signage and infrastructure for local truck traffic generators.
- ◆ Implement quiet zone corridors.

3) Be Environmentally-Friendly and Sustainable

With the recent attention and emphasis placed on the areas of climate change and sustainability and to bridge the gap into the future, the freight community needs to recognize the value of “going green.” Green technologies represent a great way for shippers and carriers to become more efficient in terms of fossil fuels consumed. This will help lead the freight industry to profits that are less dependent on the price of crude oil. Also, creating more environmentally friendly freight movement technologies will make freight have a more positive public image which may help resolve some of the NIMBY attitudes that slow projects. Environmentally-friendly and sustainable actions include the following:

- ◆ Increase truck idle reduction programs and idle free technology.
- ◆ Implement other fuel reduction strategies.
- ◆ Advance Green Ports Initiatives.
- ◆ Increase use of environmentally friendly low emissions yard locomotives.

4) Enhance the Linkages between Freight-Related Transportation and Land Use

The DVRPC long-range plan has always been focused on linking transportation and land-use. It is important to develop tools that allow for the placement of new distribution centers, warehouses, and other freight generating businesses in locations that are well situated for transportation. Many different agencies help companies find industrial space to locate these types of businesses, but there is no available database indicating proximity to associated transportation infrastructure. Major facilities need to be located near the highway, preferably near a rail line which a siding could be built to, and in a community accepting of the business. Below are a series of policies that can improve these links:

- ◆ Maintain existing industrial areas.
- ◆ Continue to promote and support Freight Villages.¹⁹

¹⁹ Freight villages promote efficient land use and transportation practices much in the same way transit oriented development initiatives (TOD) do. A freight village is described as a defined area where “...all activities relating to transport, logistics, and the distribution of goods are carried out by various operators in a coordinated fashion.” Freight villages pose many advantages such as encouraging “freight as a good neighbor” operational and design practices, combating “freight sprawl,” and transforming former manufacturing and brownfield sites (e.g., former steel mills) into full service, value added distribution centers.

- ◆ Promote advance reservation systems for pick-ups and deliveries at large freight generators.

5) Make Operational Improvements

Studies have proven that additional operational improvements such as Intelligent Transportation Systems (ITS) can make roadways and other modes increase the capacity of the transportation system without expanding facilities. By providing more information it becomes possible to have better detours and better emergency response, thus decreasing the amount of time goods sit in congestion. Below are a series of policies that were developed to improve the operations of the transportation infrastructure from a freight point of view.

- ◆ Continue to develop connections between Department of Transportation Operations Centers and Commercial Motor Vehicles.
- ◆ Expand and Maintain Incident Management Task Forces.
- ◆ Add ITS components across all modes.
- ◆ Expand the coverage area and reliability of Weigh-In-Motion monitoring.
- ◆ Implement additional Regional Security Systems.

Appendix E includes a set of Highways and NHS Connectors, Freight Rail, and Ports/Facilities projects that were identified and prioritized by the Delaware Valley Goods Movement Task Force as important for the movement of freight through the region. Most of the Highways and NHS Connectors projects are being funded through the long-range plan but the Freight Rail and Ports/Facilities projects do not have long-range plan funding at this time.

Aviation

Air travel is a critical link in connecting the region to the global economy. The Greater Philadelphia region is served by three commercial airports, with Philadelphia International Airport being the most prominent. The region is also home to several reliever and general aviation (GA) airports which serve their own markets but also complement and support the commercial airports. For the purpose of aviation planning, DVRPC covers a larger area than its traditional nine-county jurisdiction; adding Salem County in New Jersey, New Castle County in Delaware, and Cecil County in Maryland. The Aviation Map shows the aviation facilities within this extended area.

Aviation planning currently has many challenges with the start of a new recessionary business cycle, political change at the Federal government executive and legislative branches, and anti-terrorism security requirements becoming more permanent. With the worsening US and global economic condition, and both general aviation and commercial operational traffic in decline, Federal and state airport funding levels are uncertain. The passage of the economic stimulus bill – The American Recovery and Reinvestment Act of 2009 – provides an increase of Airport Improvement Program (AIP) funds of \$1.1 billion, short-term.

The continuation of antiterrorism security measures since 2001 have had a paradigm shift on both GA and commercial traffic operations and demand, especially in the dense northeast corridor, with high levels of aviation congestion and delay. New security measures in the planning realm call for airline type security requirements to be imposed on non-airline aircraft weighting over 12,500 lbs. These measures would require that even a small charter

operator or corporate owner of such aircraft, accomplish the same level of scrutiny and record keeping as scheduled airlines.

The financial burdens on corporate and GA airports from security, airspace, fuel price, and recession are threatening facility preservation. Commercial scheduled airline operators have had massive financial difficulties since 2001. These difficulties varied from tremendous fuel price increases, mandated expensive security measures, and a downturn in passenger demand, manifesting in 2008 with bankruptcies, reorganization and mergers, and reduced passenger flights and revenue.

Since 2001, GA operations have suffered from annual compounded flight operation declines of up to 9% within the DVRPC region. Flight operation declines are attributed to raising fuel prices, airspace restrictions and controls resulting from congestion around large airports, and new airspace security requirements since 2001. Compliance has resulted in flight training, aircraft charter and recreational operations frequencies being adversely affected. GA operations have also been negatively affected by an aging pilot population resulting in fewer pilots qualifying annually for their flight physicals. With flight training in decline and existing pilots aging, an aggressive recruitment and training program will be needed to meet the future demands of commercial carriers and charter operators and to support recreational operations.

With flight operations trending downward and development pressures increasing, the survival of many existing airports is in question. Preservation of these facilities is paramount to future aviation success in stimulating regional economic activity and to relieving congestion at commercial airports. The replacement cost and feasibility of building new airports is prohibitive, and available land is non-existent for future replacement airports. Current long-range planning must emphasize the lowering of airport expenses, raising revenue, and preservation of existing facilities.

Aviation infrastructure in the northeastern United States has been eroding due to inadequate increases in commercial capacity, loss of GA and reliever capacity, and accelerating restrictions on airspace. Critical airports have been operating at their capacity limits, therefore critical regional aviation infrastructure must be identified, preserved, and enhanced where necessary. Traditional municipal control over zoning, land use, and developmental decisions also contribute to the erosion of aviation infrastructure. The states and federal governments must develop stronger regulations, funding program incentives, and operations standards to better protect the regional aviation infrastructure as a component of the national and international aviation system.

Where aviation will be twenty-six years from now was much easier to predict when the industry was in an expansionary phase which had continued from World War II until the events of September 11, 2001. With the needed imposition of heightened security requirements and other technologies, such as the internet, offering alternatives to some business travel, we must plan in a business environment which is in a maturing phase. We must strengthen our infrastructure of airports and their facilities, maintain and train new pilots, flight attendants, aviation mechanics, and airport operation management personnel. In order to reach these goals and meet the aviation needs of Greater Philadelphia, the region must target the following specific policies. These policies are incorporated in the Regional Aviation System Plan (RASP) and were developed in collaboration with the Regional Aviation Committee.

1) Increase Capacity

- ◆ Provide increased regional commercial aviation operations capacity with increased safety and minimum delay to serve population and employment concentrations in the region within one hour travel time of commercial airports, including ground, airspace and access trip improvements.
- ◆ Provide adequate business and general aviation aircraft operating and storage capacity within one half hour of population and employment centers.
- ◆ Improve select facilities regarding runway length, width, guidance systems and apron/hangar capacity to satisfy suburban market area demand and provide sufficient non-commercial reliever capacity to ensure maximum commercial utilization of Philadelphia International Airport. Runway extension criteria must reflect the shift in the non-commercial fleet to include very light and corporate jets based at suburban airports.
- ◆ Provide and expand helicopter services for commuters, medical services, and police functions in the region's major urban centers.

2) Airport Preservation

- ◆ Preserve essential aviation facilities and where necessary, transfer ownership of public use airports from private to public owners. In cases where private owners remain in control, provide public capital subsidies in support or match of provided investment to ensure extended existence of an aviation facility.
- ◆ Support existing or create new facilities which offer education of new aviation personnel to include: pilots, aviation mechanics, air traffic controllers, and flight safety personnel.
- ◆ Strengthen enforcement of local zoning laws where urban encroachment threatens existing airports and become more pro-active in preventing incompatible land uses by finding better suited alternatives.

3) Environmental Issues

- ◆ Enhance airports as needed to support development which integrates environmental preservation and neighborhood concerns regarding noise impacts and pollution, with improvements to operating capacity and flexibility.

4) Capital Investments

- ◆ Ensure adequate regional capital investment from federal, state, local, and private sources which represent the regions "fair share" of statewide and national annual allocations based on population, employment, based aircraft, operations, or other appropriate criteria.
- ◆ Develop existing, versus new, facilities as a means of reducing capital requirements.
- ◆ Develop federal and states legislation and regulatory reforms to enhance the business viability of the general aviation airports, and expedite funding of capital improvements safety of operations and other RASP goals.

5) Safety and Security

- ◆ Improve safety incursions according to FAA regulations where feasible and justifiable.
- ◆ Adopt reasonable, reliable, and economic anti-terrorism regulations that offer improved general aviation security without additional financial burden. New technology coupled with practical means of implementation need to be found based on aviation flight capabilities and aviation risk assessments. In addition, enforcement action capabilities need to be enhanced.

6) Airport Access

- ◆ Provide and improve commercial facilities to efficiently facilitate intermodal access and transfers.
- ◆ Explore options of direct high speed, inter-city rail access to commercial airports.
- ◆ Improve existing regional rail and bus access especially in view of regional connectivity to decrease non-High Occupancy Vehicle traffic to airports via highways.

2035 Greater Philadelphia Aviation Facilities



Commercial Airport

Providing scheduled air carrier and general aviation services. International, domestic, and commuter destinations.



Reliever Airport

Providing corporate, some charter and personal general aviation services. Northeast, regional, and local operations.



General Aviation Airport

Providing limited corporate and charter services, with emphasis on local general aviation services and destinations.



Military Airport

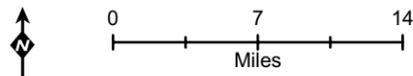
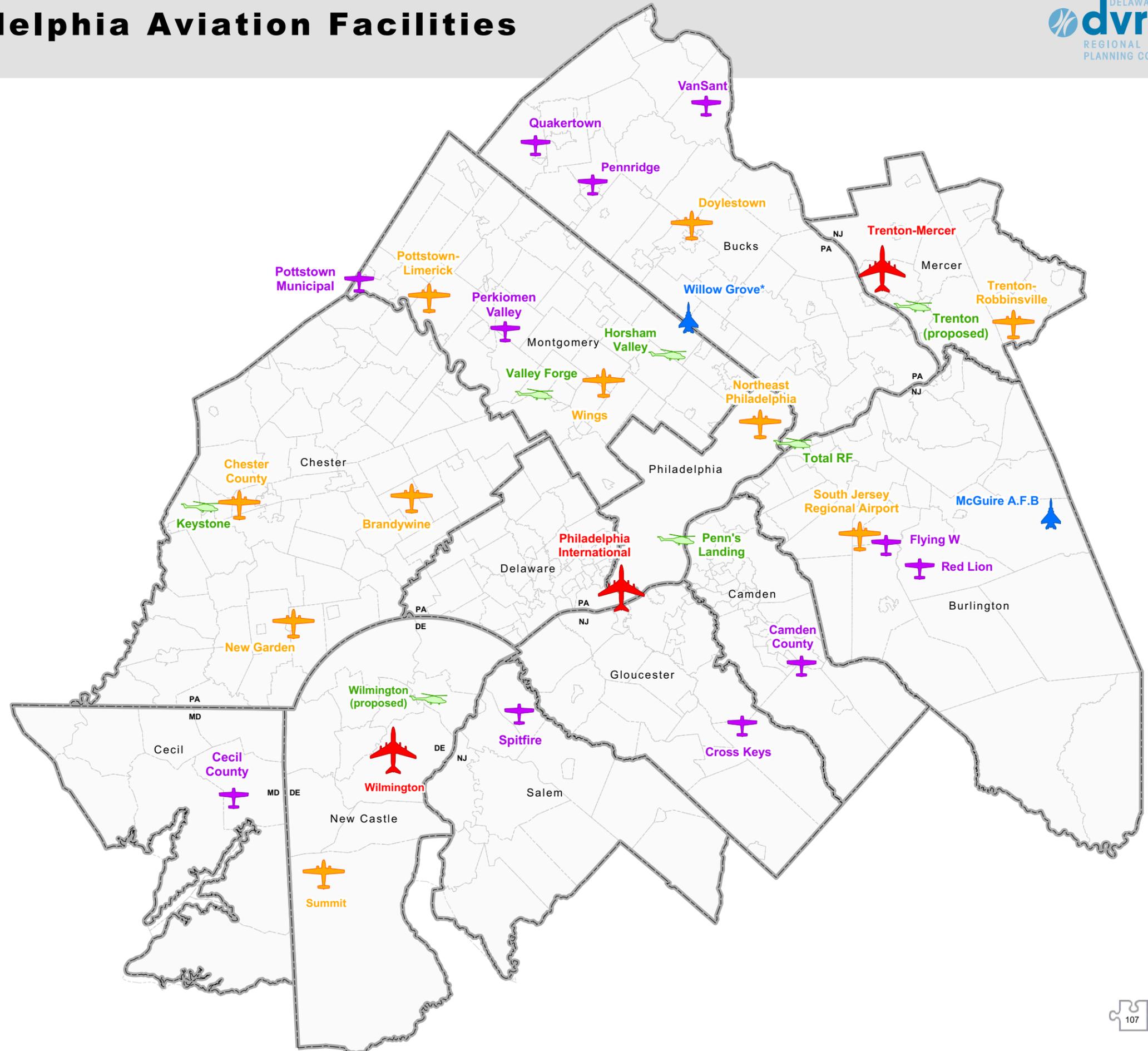
No civilian use

* Joint interagency installation by 2011



Heliport

Local and east coast helicopter operations. Visual flight rules only.



Financial Plan and Transportation Investments

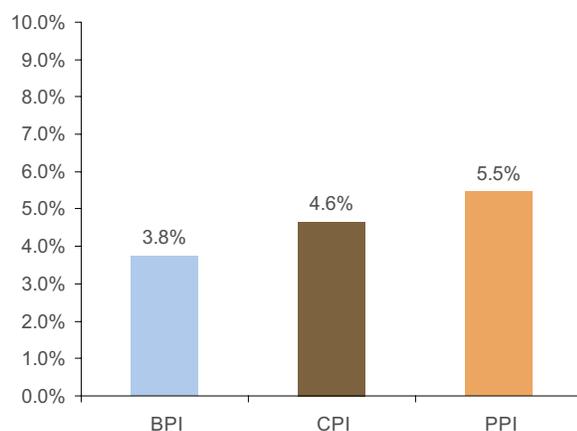
Federal regulations require that a regional long-range transportation plan be fiscally constrained. This means total transportation expenditures identified in a long-range plan must not exceed the total revenues reasonably expected to be available for the region over the life of the Plan. DVRPC worked in consultation with its federal, state, local, transit, and operating authority partners to develop the *Connections* financial plan.

DVRPC and its partner operating agencies identified the level of expenditure for all transportation infrastructure that is needed to achieve and maintain a state of good repair without considering fiscal constraint. Following the lead of both state Departments of Transportation, DVRPC has pursued a policy to “fix-it-first,” which allocates more funding to maintaining the existing roadway and transit networks. The goal is to achieve and maintain a state of good repair for existing transportation infrastructure, before undertaking significant expansions to the system.

To estimate revenue for the *Connections* plan, DVRPC identified all federal, state, and local sources that the region can reasonably expect to receive through the year 2035. Reasonably expected revenues are then allocated to the different expenditure categories based on policy and identified need. Need is much greater than available revenue – the difference between these is shown as the region’s minimum funding gap. This funding gap will be much greater if the full need for system expansion is also considered.

Federal requirements dictate that fiscal constraint be determined using **year-of-expenditure (y-o-e) dollars**. A projected inflationary factor is necessary to convert current year dollars to year-of-expenditure dollars using a compound annual inflation rate. FHWA guidance recommends using a four percent inflation rate as a minimum when developing a long-range financial plan. Rapid increases in construction costs in recent years have surpassed four percent but have recently begun returning to historical levels. Using this guidance, DVRPC applied four percent compound annual inflation to the mid-year of each plan period to the total forecast need, which was developed using current year (2009) dollars.

Average Annual Increase in Bid-Price Index (BPI), Consumer Price Index (CPI), and Producer Price Index (PPI) Over the Last 25 Years



Source: Federal Highway Administration 1981-2006, Bureau of Labor Statistics 1983-2008

The financial plan needs to be fiscally constrained over its life, and for each individual **funding period**. Three funding periods will comprise the total 26-year timespan of the *Connections* plan. The short-term funding period begins in the first year of the Plan, fiscal year 2010, and ends six years later in FY 2015. The mid-term period begins in FY 2016 and ends ten years later in FY 2025. The long-term period begins in FY 2026 and runs for 10 years to the horizon year of the Plan in FY 2035. Individual transportation projects that require years to design and build may span multiple funding periods.

Key decisions for the financial plan were made by two **Long-Range Plan Subcommittees**, one for each state subregion. The subcommittees were composed of representatives from DVRPC's Regional Transportation Committee (which is made up by representatives of each state DOT, transit agencies, transportation authorities, member city and county governments, and the Regional Citizens Committee). The long-range plan Subcommittees reviewed the revenue and expenditure assumptions, decided how to allocate revenue to meet expenditure needs, and selected the major regional projects included in the Plan.

Revenue Assumptions and Estimates

Preparation of this financial plan revenue estimate included a review of historical data and trends including the statewide FY 2008 financial guidance documents from both Pennsylvania and New Jersey, previous statewide transportation improvement programs (STIPs) information from state DOTs and transit agencies, FHWA SAFETEA-LU planning guidance, and other relevant materials. All planning principles and financial assumptions in identifying federal and state financial resources are developed with and reviewed by federal, state, and transit partners. More detailed information on revenue assumptions can be found in Appendix A.

Revenue Assumptions

Revenue estimates are for capital project expenditures only, and do not include any operating funds. All revenue amounts are in y-o-e dollars, as required by federal regulations. No new or undefined funding sources are recognized for the fiscally constrained Plan.

Federal Funding

FHWA guidance is to assume federal transportation funding will increase 3 percent compounded annually. DVRPC assumes federal funding will increase 19.4 percent (3 percent compounded annually) each six year funding period, mimicking federal transportation legislation authorization periods. This method assumes an 80/20 split of federal funds between highways and transit, following a 3 percent takedown. The current federal transportation bill, SAFETEA-LU is set to expire in September 2009. This bill allocated \$294 billion in federal transportation dollars over a six-year period from FY 2004 to FY 2009. The next transportation act is scheduled by October 2009; however, there are currently few concrete details about this legislation which can be used to make planning assumptions.

Due to economic conditions in the United States, and throughout much of the world, Congress recently enacted a major infrastructure building stimulus package, the American Recovery and Reinvestment Act (ARRA) of 2009. This stimulus drastically increases federal spending in the short-term on road, transit, school, water, sewer, and electricity infrastructure. The *Connections* financial plan does not account for additional revenue resulting from the stimulus, since this is a one-time influx of funds, rather than a change to the trend. Its primary impact will be on the expenditure side of the Plan, reducing the backlog of existing infrastructure repair needs. The needs assessment reflects the impact of ARRA funding.

New Starts and Small Starts Funding

Upon consultation with the Federal Transit Administration (FTA), DVRPC assumes that the region as a whole may be able to receive two New Start matches over the life of the LRP. These two New Start matches are estimated to be \$700,000,000 (in 2009 dollars) and are evenly divided into each sub-region and allocated to projects expected to occur in the middle funding period.

Small Starts funding is available to projects with a total capital development cost of under \$250 million dollars. Maximum funding levels for any Small Starts project is \$75 million dollars. DVRPC assumes the Pennsylvania and New Jersey subregions will both receive the equivalent of \$75 million in Small Starts funding over the life of the Plan. These funds are also allocated to projects in the middle period of the financial plan.

State Funding

In July 2007, the Commonwealth of Pennsylvania passed Act 44 which dramatically increased transportation funding in the state. The Act increased funding by 30 percent over previous levels, based primarily on placing new tolls on Interstate 80 and a new lease agreement between the Pennsylvania Turnpike Authority and the Commonwealth. Adding tolls to I-80 requires FHWA approval, which has not been granted and appears increasingly unlikely to happen under the current federal transportation authorization. Without I-80 tolling, increased funding levels are capped at \$250 million additional per year for transit and \$200 million additional per year for roads and bridges in FY 2011. By contrast, with I-80 tolling, Act 44 revenues will increase to \$512.5 million for roads and \$410 million for transit in FY 2011, and will then increase by 2.5 percent each year thereafter. If I-80 tolling is not implemented, Pennsylvania forecasts \$20.3 billion less in state transportation funds over the life of the *Connections* plan.

Due to the high level of uncertainty surrounding the implementation of tolls on I-80, DVRPC is basing its revenue assumptions on the guaranteed funding levels in Act 44 that occur without tolling. New Act 44 funds, based on the Turnpike lease agreement with the Pennsylvania Turnpike Commission (PTC), are capped at \$450 million. There are no annual increases on the lease payment amounts in the current legislation. Existing, non-Act 44, Commonwealth of Pennsylvania funding levels are estimated to grow at a rate of 3 percent compounded annually.

Act 44 also created a new Public Transit Trust Fund (PTTF), which receives funding from the state sales tax, lottery revenues, payments from the PTC and other tax monies. The turnpike lease provides funds for Section 1514 Transit Capital Asset Management program of Act 44. These are state 'Discretionary' funds with guaranteed levels of \$50

million in FY 2008, \$100 million in FY 2009, and \$150 million in FY 2010. In FY 2011, this fund will begin to grow by 2.5 percent annually with I-80 tolling, and will have zero funding without it. The state also grants \$125 million in annual transit 'Bond' funds under Section 1514. Section 1517 Transit Capital Improvements Program funds come from the 4.4 percent of the state sales tax dedicated to transit.

In the State of New Jersey, the legislation for the Transportation Trust Fund is set to expire in FY 2011. DVRPC assumes that the state legislature will enact new Trust Fund legislation, as it has historically done, with increases projected at 3 percent per year compounded annually.

Local Funding

Pennsylvania Act 44 of 2007 maintained the 3.33 percent local funding match for transit capital programs. In *Destination 2030*, local transportation match funds were included with state revenues. For the *Connections* plan, these funds are shown separately in a local funding category. As a result, state funding levels will appear to be somewhat lower in the *Connections* plan than they were in *Destination 2030*. The amount of local funds forecast for the life of the Plan is based on match fund levels in the current Pennsylvania and New Jersey STIPs. Local funds are forecast to grow with state and federal funds to maintain their appropriate match levels.

DVRPC has encouraged the region to look into raising additional funding through a dedicated local revenue source as a way to help close the gap between the region's revenues and its needs. Montgomery County is the first governmental entity in the region to consider raising additional local funds. The County is currently debating a proposed \$150 million dollar bond program (Montgomery County Transportation Program). Though creation of this new local funding stream is a realistic possibility, it is not included in the local funding revenues of the *Connections* financial plan because it must first pass a voter referendum.

Authority and Other Funding

DVRPC works with several partner transportation authorities which generate their own revenues, generally via tolling. Revenue generated by partner authorities is not included as a revenue source in DVRPC's long-range plan. For the most part, all capital and operating expenditures of these authorities are covered by authority toll revenues. In some instances, federal dollars are used in conjunction with authority revenue to fund specific capital projects. In these cases, DVRPC tracks both federal and non-federal capital expenditures for such projects and accounts for the federal funding as a part of its regional transportation expenditures.

Estimated Revenue for the *Connections* Plan

Federal and state funding allocation formulas, along with anticipated local match requirements, were used to develop the revenue estimates for the *Connections* plan. The *Connections* plan anticipates \$64.8 billion year-of-expenditure dollars in total federal, state, local, and Small and New Starts funding over the life of the 26-year Plan.

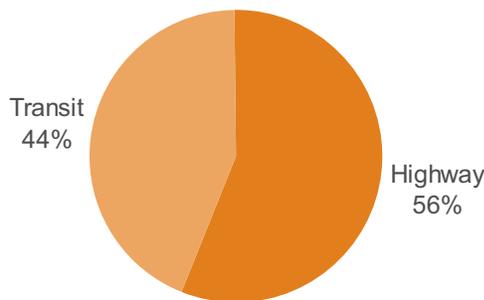
The Pennsylvania subregion allocates 56 percent, \$22.7 billion, to highway and bridge funding; and the remaining 44 percent, \$17.9 billion, for transit funding. Total funding for the Pennsylvania subregion is \$40.6 billion over the life of the *Connections* plan. The New Jersey subregion allocates 62 percent or \$14.9 billion to highway and bridge funding. The remaining 38 percent, or \$9.3 billion, is for transit funding. This subregion anticipates a total funding level of \$24.2 billion over the life of the Plan.

DVRPC Region Funding Levels by Period and Mode (in billions of Y-O-E \$s)

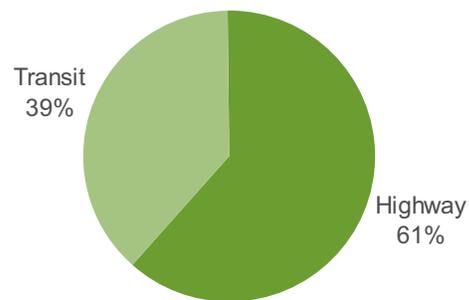
Sub-region	Mode	Long-Range Plan Time Period			Long-Range Plan Total
		2010-2015	2016-2025	2026-2035	
Pennsylvania	Highway	\$ 3.4 B	\$ 8.3 B	\$ 10.9 B	\$ 22.7 B
	Transit	\$ 3.2 B	\$ 5.8 B	\$ 7.7 B	\$ 16.7 B
	New-Start/Small-Start	\$ 0.0 B	\$ 1.2 B	\$ 0.0 B	\$ 1.2 B
	Subregion Total	\$ 6.6 B	\$ 15.3 B	\$ 18.6 B	\$ 40.6 B
New Jersey	Highway	\$ 2.0 B	\$ 5.5 B	\$ 7.4 B	\$ 14.9 B
	Transit	\$ 1.0 B	\$ 3.0 B	\$ 4.1 B	\$ 8.1 B
	New-Start/Small-Start	\$ 0.0 B	\$ 1.2 B	\$ 0.0 B	\$ 1.2 B
	Subregion Total	\$ 3.0 B	\$ 9.8 B	\$ 11.4 B	\$ 24.2 B
DVRPC Total		\$ 9.6 B	\$ 25.1 B	\$ 30.1 B	\$ 64.8 B

Source: DVRPC 2008

Pennsylvania Revenue Allocation by Mode Share



New Jersey Revenue Allocation by Mode Share



Source: DVRPC 2009

Transportation Needs Assessment

DVRPC worked with its partner operating agencies to develop a full need-based assessment for all transportation infrastructure for the *Connections* financial plan. Needs estimates, based on asset management systems analysis, seek to achieve and maintain a state of good repair for all transportation system components as defined by each operating agency.

The financial plan tracks revenue and expenditure streams by mode (highway and transit), for both of DVRPC’s state subregions. DVRPC further disaggregates each mode’s expenditures into seven highway and six transit categories.

The tables on the following pages identify each funding category for highway and transit and the types of projects they consist of. A more detailed version of the needs assessment can be found in Appendix B.

On the highway side, categories H1 and H2 are capital maintenance funds for renovating and rehabilitating existing pavement and bridge infrastructure. Needs estimates for these categories were developed using the federally required Pavement Management System (PMS) and Bridge Management System (BMS) databases, which track the current condition of each roadway lane mile and bridge.

H3 represents projects that are specific to operational improvements, such as intersection/interchange reconstruction, roadway realignment, etc. to improve the functionality and safety of the roadway network. This is a difficult category to estimate funding need, as it is potentially unlimited. DVRPC based this need estimate by maintaining current funding levels in the 2009-12 DVRPC TIP and increasing at four percent compounded annually to account for inflation.

H4 is shown as a separate category for the first time in the *Connections* financial plan, to reflect the region's goal and policy of better managing existing roadway capacity to improve traffic flow using technology before expanding the roadway system. The region's Transportation Operations Master Plan developed in collaboration with operations staff at FHWA, state departments of transportation, transit operators, and area Transportation Management Associations (TMAs), is the basis of the need assessment for this category.

H5 is the funding category for all projects that add capacity to the roadway network, from widening existing facilities to new roads or interchanges. Need was estimated for both Major Regional Projects, as well as a Minor New Capacity line item. Major Regional Projects are projects that have a significant impact on regional travel. By definition, almost all Major Regional Projects are either new highway capacity or new fixed guideway transit facilities. Major Regional Projects are specifically listed in the long-range plan. Minor New Capacity projects are widenings of generally less than a few miles in length on minor arterials and collectors. Minor New Capacity projects are not listed in the Plan, but funding is included for such projects as they are identified and come up for funding through the TIP cycle. The need for Major Regional Projects was based on those projects included in the current *Destination 2030* long-range plan. Member governments and departments of transportation were asked to review the set of projects contained in *Destination 2030* and revise the project scope, timing, and cost as appropriate. They were also asked to submit any additional priorities for consideration for inclusion in the *Connections* plan. The need for Minor New Capacity was based on the amount programmed in the current 2009-2012 TIP and forecast out over the life of the Plan.

Bike and pedestrian (H6) is a separate category for the first time in this financial plan, and reflects the region's desire to continue to become more bike and pedestrian friendly. Need was estimated by maintaining current funding levels in the 2009-12 DVRPC TIP and constructing multi-use pedestrian trails in DVRPC's Regional Trail Network.

H7 is a miscellaneous expenditures category, including lighting, signage, parking facilities, planning, engineering, drainage, environmental mitigation, TransitCheck marketing, Mobility Alternatives Program, Ozone Action programs, Transportation Management Associations (TMAs), Congestion Mitigation and Air Quality (CMAQ), and debt service.

Long-Range Plan Highway Funding Categories

Category ID	Category	Subcategories
H1	Pavement Reconstruction, Rehabilitation, Resurfacing, and Restoration	Preventative Maintenance; Resurfacing; Restoration; Reconstruction; Rehabilitation; Local and County Federal Aid Road Maintenance
H2	Bridge Replacement and Restoration	Preventative Maintenance; Painting; Substructure, Superstructure, Bridge Deck, Parapet, Dam, or Viaduct Replacement or Rehabilitation; Bridge Removal
H3	Operational Improvements	Access Management; Interchange Reconstruction or Realignment; Channelization; Roadway Realignment; New Turn Lanes; Roundabout; NHS Connectors; Pavement Markings; Regional Safety Initiatives (HSIP); Rail Crossing
H4	ITS and Signal	ITS Deployment; Traffic Operations Center(s); Incident Management; Signal Modernization, Interconnection, or Closed Loop Signal Systems; Traffic Management Systems
H5	Highway New Capacity	New Roads, Lanes, Bypasses, Bridges, or Interchanges; Roadway Relocations
H6	Bike and Pedestrian	Streetscaping; Sidewalks; Multi-use Paths; Bike Lanes; Pedestrian and Bike Safety Improvements; Pedestrian Bridge or Tunnel; ADA Curb Cuts
H7	Other	Signage; Lighting; Drainage; Debt Service; Environmental Mitigation; TransitChek; Mobility Alternatives Program; Ozone Action Programs; CMAQ; Transportation Management Associations; Parking Facilities; Park and Ride

Source: DVRPC 2009

Transit funding categories T1, T2, and T3 represent capital maintenance funds for existing rail, vehicle, and station infrastructure. These funds will be shared between all the transit operators in each subregion. T3 is shown as a separate category for the first time in the *Connections* financial plan. It was previously included as part of the T1 category. Regular vehicle track, signal, catenary, vehicle overhaul and replacement, station renovations, and ADA accessibility needs were used to develop needs for each of these three categories. T4 reflects system needs for investment in improving the functionality of the existing transit system, needs estimates were developed by DVRPC as part of the region's Transportation Operations Master Plan.

Long-Range Plan Transit Funding Categories

Category ID	Category	Subcategories
T1	Rail Infrastructure Rehabilitation, and Restoration	Track Rehabilitation, Resurfacing, or Replacement; Catenary Rehabilitation or Replacement; Signal Rehabilitation or Replacement; Rail Bridge Improvements; Regional Substation Improvements; Positive Train Control Amtrak Lease Agreements
T2	Vehicle Rehabilitation and Replacement	New or Rehabilitated Buses or Paratransit Vehicles, Commuter Rail, Light Rail, or Heavy Rail Vehicles; Maintenance and Storage Facilities; Vehicle Maintenance Equipment
T3	Station Enhancements	Station Rehabilitation and Station Improvements; Access Improvements; Expanded Parking; Transit Oriented Development; Park and Ride; Parking Lot Rehabilitation or Expansion; Transportation Center; ADA Compliance
T4	System and Operational Improvements	ITS; Fare Modernization; Real Time Information; Signal Preemption; Doubling Tracking; Sidings;; Light Rail Restoration; Smart Stations
T5	New Transit Capacity (Including New Starts/Small Starts)	New Station on Existing Line (Including New Parking Facilities); Extension of Existing Line; New Bus or Rail Route; Bus Rapid Transit
T6	Other	Safety; Security; Coordinated Human Services; Debt Service

Source: DVRPC 2009

T5 is the new capacity project funding category for new transit facilities, routes, and lines. Need for this category is based on a short list of projects developed by the Long-Range Plan Subcommittee and based on projects included in the *Destination 2030* plan, the DVRPC Long-Range Vision for Transit Report and the Dots and Dashes exercise. T6 is a miscellaneous category including safety, security, coordinated human services, and debt service. Need for this category is estimated by maintaining current funding levels over the life of the Plan, adjusted for inflation.

Pennsylvania Subregion Total Assessed Transportation Need

DVRPC worked with PennDOT to estimate transportation needs for all highway categories, and with SEPTA, DRPA/PATCO, and PUT to estimate need for all transit categories. This estimate also includes what DVRPC forecasts as the need for county and local roadways eligible for federal aid. In order to arrive at year-of-expenditure dollars for the needs assessment, DVRPC applied a four percent rate of inflation out to the mid-year in each funding period. The mid-years are 2013 for the first funding period, 2021 for the second funding period, and 2031 for the third funding period.

Pennsylvania Subregion Total Expenditure Need (in billions of Y-O-E \$s)

Mode	Subcategory	2010-2015	2016-2025	2026-2035	Total
Highway	H1. Pavement Recon./Rehab./Resurfac./Restor.	\$ 1.46 B	\$ 3.33 B	\$ 4.56 B	\$ 9.34 B
	H2. Bridge Replacement and Restoration	\$ 3.80 B	\$ 7.36 B	\$ 8.62 B	\$ 19.78 B
	H3. Operational Improvements	\$ 0.33 B	\$ 0.77 B	\$ 1.13 B	\$ 2.23 B
	H4. ITS and Signal	\$ 0.18 B	\$ 0.62 B	\$ 0.97 B	\$ 1.77 B
	H5. Highway New Capacity	\$ 0.71 B	\$ 1.23 B	\$ 0.59 B	\$ 2.53 B
	H6. Bicycle and Pedestrian	\$ 0.11 B	\$ 0.25 B	\$ 0.45 B	\$ 0.81 B
	H7. Other	\$ 0.07 B	\$ 0.15 B	\$ 0.22 B	\$ 0.44 B
	Highway Subtotal	\$ 6.66 B	\$ 13.70 B	\$ 16.54 B	\$ 36.90 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	\$ 1.06 B	\$ 2.31 B	\$ 3.14 B	\$ 6.50 B
	T2. Vehicle Rehabilitation and Replacement	\$ 1.26 B	\$ 3.47 B	\$ 6.75 B	\$ 11.48 B
	T3. Station Enhancements	\$ 0.75 B	\$ 1.69 B	\$ 2.49 B	\$ 4.94 B
	T4. System and Operational Improvements	\$ 0.28 B	\$ 0.57 B	\$ 0.28 B	\$ 1.12 B
	T5. Transit New Capacity	\$ 0.14 B	\$ 1.41 B	\$ 12.99 B	\$ 14.54 B
	T6. Other	\$ 0.38 B	\$ 0.57 B	\$ 0.52 B	\$ 1.47 B
	Transit Subtotal	\$ 3.85 B	\$ 10.03 B	\$ 26.17 B	\$ 40.05 B
PA Subregion Total		\$ 10.51 B	\$ 23.73 B	\$ 42.71 B	\$ 76.95 B

Source: DVRPC 2009

The Pennsylvania subregion's funding surplus or gap for each period by mode is shown below. On the highway side there is a total estimated funding gap of \$14.2 billion dollars over the life of the Plan. Only about 61 percent of the total need is able to be funded. On the transit side, there is a total funding gap of about \$22.1 billion over the life of the Plan. Only about 45 percent of the total identified need is able to be funded. The Pennsylvania subregion's funding gap, based on limited new capacity, is estimated at \$36.4 billion over the life of the *Connections* plan. The funding gap estimate is based on primarily maintaining and repairing the region's transportation infrastructure with limited, focused new capacity investment. This funding gap does not account for any additional new capacity needs the region may want to fund in order to increase economic competitiveness, enhance the environment, or provide more mobility options.

Pennsylvania Subregion Funding Deficit (in billions of Y-O-E \$s)

Mode	2010-2015	2016-2025	2026-2035	Total
Highway Revenue	\$ 3.41 B	\$ 8.32 B	\$ 10.92 B	\$ 22.65 B
Highway Needs Assessment	\$ 6.66 B	\$ 13.70 B	\$ 16.54 B	\$ 36.90 B
Highway Funding Deficit	\$ 3.25 B	\$ 5.38 B	\$ 5.62 B	\$ 14.25 B
Transit Revenue	\$ 3.19 B	\$ 6.99 B	\$ 7.72 B	\$ 17.90 B
Transit Needs Assessment	\$ 3.85 B	\$ 10.03 B	\$ 26.17 B	\$ 40.05 B
Transit Funding Deficit	\$ 0.67 B	\$ 3.03 B	\$ 18.46 B	\$ 22.15 B
PA Subregion Total Deficit	\$ 3.91 B	\$ 8.41 B	\$ 24.07 B	\$ 36.40 B

Source: DVRPC 2009

New Jersey Subregion Total Assessed Transportation Need

DVRPC worked with NJDOT to estimate transportation need for all highway categories and with NJ Transit to estimate need for all transit categories. This estimate also includes what DVRPC forecasts as the need for county and local roadways eligible for federal aid. These needs are shown in y-o-e dollars. In order to arrive at y-o-e dollars for the needs assessment, DVRPC applied a four percent rate of inflation out to the mid-year in each funding period. The mid-years are 2013 for the first funding period, 2021 for the second funding period, and 2031 for the third funding period.

New Jersey Subregion Total Expenditure Need (in billions of Y-O-E \$s)

Mode	Subcategory	2010-2015	2016-2025	2026-2035	Total
Highway	H1. Pavement Recon./Rehab./Resurfac./Restor.	\$ 0.98 B	\$ 2.33 B	\$ 3.23 B	\$ 6.54 B
	H2. Bridge Replacement and Restoration	\$ 1.26 B	\$ 2.86 B	\$ 4.20 B	\$ 8.32 B
	H3. Operational Improvements	\$ 0.32 B	\$ 0.74 B	\$ 1.10 B	\$ 2.16 B
	H4. ITS and Signal	\$ 0.08 B	\$ 0.25 B	\$ 0.43 B	\$ 0.75 B
	H5. Highway New Capacity	\$ 0.43 B	\$ 0.81 B	\$ 1.19 B	\$ 2.44 B
	H6. Bicycle and Pedestrian	\$ 0.05 B	\$ 0.27 B	\$ 0.56 B	\$ 0.89 B
	H7. Other	\$ 0.06 B	\$ 0.15 B	\$ 0.22 B	\$ 0.43 B
	Highway Subtotal	\$ 3.19 B	\$ 7.40 B	\$ 10.93 B	\$ 21.52 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	\$ 0.11 B	\$ 0.25 B	\$ 0.37 B	\$ 0.72 B
	T2. Vehicle Rehabilitation and Replacement	\$ 0.76 B	\$ 1.73 B	\$ 2.55 B	\$ 5.04 B
	T3. Station Enhancements	\$ 0.14 B	\$ 0.33 B	\$ 0.48 B	\$ 0.95 B
	T4. System and Operational Improvements	\$ 0.02 B	\$ 0.05 B	\$ 0.07 B	\$ 0.14 B
	T5. Transit New Capacity	-	\$ 1.58 B	\$ 2.07 B	\$ 3.65 B
	T6. Other	\$ 0.39 B	\$ 0.49 B	\$ 0.31 B	\$ 1.19 B
	Transit Subtotal	\$ 1.42 B	\$ 4.41 B	\$ 5.86 B	\$ 11.69 B
NJ Subregion Total		\$ 4.61 B	\$ 11.82 B	\$ 16.78 B	\$ 33.21 B

Source: DVRPC 2009

Total highway need for the New Jersey subregion in year-of-expenditure dollars is estimated to be about \$21.5 billion. Total transit need for the New Jersey subregion over the life of the *Connections* plan is estimated to be \$11.7 billion. The chart below illustrates the region's funding surplus or gap for each period by mode. On the highway side there is a total estimated funding gap of \$6.6 billion dollars over the life of the Plan. Only about 69 percent of the total need can be funded. On the transit side, there is a total funding gap of about \$2.3 billion over the life of the Plan. Only about 80 percent of the total identified need can be funded.

New Jersey Subregion Funding Deficit (in billions of Y-O-E \$s)

Mode	2010-2015	2016-2025	2026-2035	Total
Highway Revenue	\$ 1.99 B	\$ 5.52 B	\$ 7.37 B	\$ 14.88 B
Highway Needs Assessment	\$ 3.19 B	\$ 7.40 B	\$ 10.93 B	\$ 21.52 B
Highway Funding Deficit	\$ 1.20 B	\$ 1.88 B	\$ 3.56 B	\$ 6.64 B
Transit Revenue	\$ 1.02 B	\$ 4.26 B	\$ 4.07 B	\$ 9.35 B
Transit Needs Assessment	\$ 1.42 B	\$ 4.41 B	\$ 5.86 B	\$ 11.69 B
Transit Funding Deficit	\$ 0.40 B	\$ 0.15 B	\$ 1.79 B	\$ 2.34 B
NJ Subregion Total Deficit	\$ 1.60 B	\$ 2.03 B	\$ 5.35 B	\$ 8.98 B

Source: DVRPC 2009

The total New Jersey subregion’s funding gap, with limited new capacity, is estimated at \$9.0 billion dollars over the life of the *Connections* plan. This funding gap estimate is based on primarily maintaining and repairing the subregion’s transportation infrastructure with limited, focused new capacity investment. It does not include any additional new capacity needs the region may want to fund in order to increase economic competitiveness, enhance the environment, or provide more mobility options.

DVRPC conducted a freight rail needs assessment for the Greater Philadelphia region. These needs are project based and more information can be found in the *DVRPC Long-Range Vision for Freight* report. Project examples include new main tracks, additional vertical clearance for double stacking containers, sidings, yards, wyes, highway grade separated crossings, and track reconstruction. Since there are no federal formula funds specifically under the existing SAFETEA-LU authorization for freight rail projects, these needs do not have revenue allocated to them. Individual projects are eligible for CMAQ and other grant funding opportunities. DVRPC supports improvements to the region’s freight rail network.

Freight Rail Needs Assessment (in millions of Y-O-E \$s)

Subregion	2010-15	2016-25	2026-2035	Total
Pennsylvania	\$ 68.2	\$ 175.7	\$ 2,399.4	\$ 2,643.3
New Jersey	\$ 5.8	\$ 64.0	\$ 489.4	\$ 559.2
Total	\$ 74.0	\$ 239.7	\$ 2,888.8	\$ 3,202.5

Source: DVRPC 2009

Allocating Plan Revenues to Plan Funding Categories

DVRPC worked with the long-range plan subcommittees to identify a target revenue allocation for each of the funding categories based on the needs assessment and regional policies. Both the Pennsylvania and New Jersey long-range plan subcommittees agreed to continue the funding cap of ten percent of highway revenues for new highway capacity projects. This is based on a policy to limit new highway capacity in the region and also the need to direct as much funding as possible toward the rebuilding and maintenance of the existing system. Even if all anticipated Plan revenues were directed toward maintaining the roads (category H1), replacing bridges (category (H2), rebuilding the rail infrastructure (category T1), and replacing and renovating transit vehicles (category T2), there would not be enough money to address the identified need. Furthermore, the region would not have funding for any other types of improvements to address congestion, safety, or mobility.

Together, the pavement reconstruction (H1) and bridge replacement (H2) categories comprise over 72.5 percent of total highway expenditures in Pennsylvania and 71.5 percent in New Jersey. In Pennsylvania, the rail infrastructure replacement (T1) and vehicle replacement (T2) categories account for 60 percent of transit revenues; and in New Jersey they account for 54 percent of transit expenditures. A higher percentage was allocated in Pennsylvania because of the larger, and older, system on that side of the river. These amounts signify what regional stakeholders agreed represented a prioritization of rebuilding and maintaining the system but also addressing other needs to improve the system through projects such as traffic signal modernization, ITS and other operational improvements, and multi-modal enhancements to the transportation network. These investments reflect the prioritization for both the

highway and transit network of rebuilding the system, followed by improving the operation, and then expanding the system. FTA's New Start and Small Start funding is not allocated by this formula.

The figures below (for Pennsylvania) and on the following page (for New Jersey) identify the agreed upon target allocations for each funding category, the resulting revenue over the life of the Plan, how much revenue has been programmed in each funding category for the Plan's Major Regional Projects and existing TIP projects. The final column in this table, 'Balance to be Spent as Identified', includes funding for projects as they are identified and prioritized to be funded in future TIP development cycles. For the same information by plan funding period, please see Appendix D.

Pennsylvania Subregion Target Funding Allocation (in billions of Y-O-E \$s)

Mode	Long-Range Plan Funding Category	Target Funding Allocation	Allocated Revenue (by Category)	TIP and MRP Programmed Expenditures ¹	Balance ² (To Be Spent as Identified)
Highway	H1. Pavement Recon./Rehab./Resurfac./Restor.	30.0%	\$ 6.82 B	\$ 3.20 B	\$ 3.62 B
	H2. Bridge Replacement and Restoration	42.5%	\$ 9.64 B	\$ 4.84 B	\$ 4.80 B
	H3. Operational Improvements	8.0%	\$ 1.85 B	\$ 1.50 B	\$ 0.35 B
	H4. ITS and Signal	6.0%	\$ 1.35 B	\$ 0.32 B	\$ 1.02 B
	H5. Highway New Capacity ³	10.0%	\$ 2.23 B	\$ 1.87 B	\$ 0.36 B
	H6. Bicycle and Pedestrian	1.75%	\$ 0.40 B	\$ 0.10 B	\$ 0.30 B
	H7. Other	1.75%	\$ 0.36 B	\$ 0.03 B	\$ 0.34 B
	Subtotal	100.0%	\$ 22.65 B	\$ 11.87 B	\$ 10.79 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	22.0%	\$ 3.94 B	\$ 1.25 B	\$ 2.70 B
	T2. Vehicle Rehabilitation and Replacement	38.0%	\$ 6.82 B	\$ 1.06 B	\$ 5.77 B
	T3. Station Enhancements	17.0%	\$ 2.99 B	\$ 0.51 B	\$ 2.48 B
	T4. System and Operational Improvements	5.0%	\$ 0.90 B	\$ 0.00 B	\$ 0.90 B
	T5. Transit New Capacity ⁴	9.3%	\$ 0.46 B	\$ 1.65 B	\$ 0.02 B
	New Starts/Small Starts Funding ⁵	-	\$ 1.21 B		
	T6. Other	8.7%	\$ 1.57 B	\$ 0.54 B	\$ 1.03 B
	Subtotal	100%	\$ 17.90 B	\$ 5.01 B	\$ 12.89 B
PA Subregion Total		100%	\$ 40.55 B	\$ 16.87 B	\$ 23.68 B

1. Programmed expenditure is the sum of all funding identified in the 2009-12 DVRPC TIP and the Financial Plan's Major Regional Projects.

2. Balance is remaining funding that has not been programmed in the TIP or for Major Regional Projects and will be identified in future TIP cycles by prioritizing the region's needs within each funding category.

3. Includes new capacity component of Major Regional Projects and Minor New Capacity projects. Remaining Balance to be Identified reserved for future Minor New Capacity projects only.

4. Represents non-federal only and does not include discretionary grants for transit new starts or small starts projects.

5. Represents discretionary federal grant amount for new starts and small starts projects.

Source: DVRPC 2009

New Jersey Subregion Target Funding Allocation (in billions of Y-O-E \$\$)

Mode	Long-Range Plan Funding Category	Target Funding Allocation	Allocated Revenue (by Category)	TIP and MRP Programmed Expenditures ¹	Balance ² (To Be Spent as Identified)
Highway	H1. Pavement Recon./Rehab./Resurfac./Restor.	31.5%	\$ 4.69 B	\$ 0.97 B	\$ 3.72 B
	H2. Bridge Replacement and Restoration	40.0%	\$ 5.95 B	\$ 0.28 B	\$ 5.67 B
	H3. Operational Improvements	11.0%	\$ 1.65 B	\$ 1.14 B	\$ 0.51 B
	H4. ITS and Signal	3.0%	\$ 0.45 B	\$ 0.35 B	\$ 0.09 B
	H5. Highway New Capacity ³	10.0%	\$ 1.49 B	\$ 1.33 B	\$ 0.16 B
	H6. Bicycle and Pedestrian	1.5%	\$ 0.22 B	\$ 0.02 B	\$ 0.20 B
	H7. Other	3.0%	\$ 0.45 B	\$ 0.10 B	\$ 0.34 B
	Subtotal	100.0%	\$ 14.88 B	\$ 4.19 B	\$ 10.69 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	7.5%	\$ 0.78 B	\$ 0.06 B	\$ 0.72 B
	T2. Vehicle Rehabilitation and Replacement	46.5%	\$ 4.33 B	\$ 0.88 B	\$ 3.45 B
	T3. Station Enhancements	10.0%	\$ 0.95 B	\$ 0.06 B	\$ 0.89 B
	T4. System and Operational Improvements	1.5%	\$ 0.14 B	\$ 0.01 B	\$ 0.13 B
	T5. Transit New Capacity ⁴	25.0%	\$ 1.13 B	\$ 2.33 B	\$ 0.02 B
	New Starts/Small Starts Funding ⁵	-	\$ 1.21 B		
	T6. Other	9.5%	\$ 0.80 B	\$ 0.20 B	\$ 0.61 B
	Subtotal	100.0%	\$ 9.35 B	\$ 3.54 B	\$ 5.81 B
NJ Subregion Total		100.0%	\$ 24.23 B	\$ 7.73 B	\$ 16.50 B

1. Programmed expenditure is the sum of all funding identified in the 2009-12 DVRPC TIP and the Financial Plan's Major Regional Projects.

2. Balance is remaining funding that has not been programmed in the TIP or for Major Regional Projects and will be identified in future TIP cycles by prioritizing the region's needs within each funding category.

3. Includes new capacity component of Major Regional Projects and Minor New Capacity projects. Remaining Balance to be Identified reserved for future Minor New Capacity projects only.

4. Represents non-federal only and does not include discretionary grants for transit new starts or small starts projects.

5. Represents discretionary federal grant amount for new starts and small starts projects.

Source: DVRPC 2009

Major Regional Project Evaluation and Selection

A primary objective of the DVRPC long-range planning process is that transportation investments should help further the goals of the long-range plan. The *Connections* plan has four key principles: Invest in Livable Communities; Manage Growth and Preserve Open Space; Build an Energy-Efficient Economy; and Invest in a Multi-modal Transportation Network. These four principles form a framework for the goals of the Plan. Under this context, the individual goals of rebuilding the existing system, reducing congestion, improving safety, increasing mobility options for people and goods, and identifying additional funding all further the principle of investing in a multi-modal transportation network.

Major Regional Projects are large-scale projects that will have a significant impact on regional travel in the region and usually consist of new highway capacity projects or new fixed guideway transit routes. The first step in the analysis is a screening process to determine if a proposed project meets the key criteria of investing in areas that are currently

developed or have been identified as areas appropriate for development over the life of the Plan. Highway projects have an additional screening criterion of being consistent with the region's Congestion Management Process. Consistency is determined by whether the subcorridor that a potential new highway capacity project is located has been identified in the CMP as appropriate for additional capacity. If a project fails the screening process, it is not considered for inclusion in the Plan. Projects that pass the screening are then evaluated further by a series of factors that are described in the figure on the following page. More information on the Major Regional Project evaluation criteria can be found in Appendix C.

The Pennsylvania and New Jersey long-range plan subcommittees were provided with the project evaluation summaries for each of the Major Regional Projects for use during their deliberations of which projects would be included in the fiscally constrained Plan. Deciding which Major Regional Projects to fund using the 10 percent of highway revenues allocated to new capacity and the respective transit new capacity funding, from Pennsylvania and New Jersey, is the final step in developing the financial plan. It is important to note that Major Regional Project costs are broken out over several funding categories since their scope may involve reconstructing the road, replacing or rehabilitating bridges, or operational type improvements; in addition to whatever road widening component is included. Costs for each component are broken out and assigned to the proper funding category for each of the Major Regional Projects.

The following tables and map present the Major Regional Projects that are funded in the *Connections* plan. The first set of tables show the highway, transit, and externally-federally funded projects in Pennsylvania. The following set shows the highway, transit, and externally-funded projects in New Jersey. The highway and transit tables represent the fiscally-constrained set of Major Regional Projects in the DVRPC region. The map locates each project in these six tables geographically in the region. The LRP ID number serves as the link between each project listed in the tables and shown in the map.

The highway tables show each facility's name, scope, and location by county. The 'timing' columns indicate which funding periods the project will be constructed. The 'other funding' columns indicate additional funding from non-federal sources such as additional local or county revenue, stimulus expenditure from the ARRA of 2009, or funds from other external sources which are generally tolling revenues from regional authorities. The other funds are shown in 2009 dollars as provided by the sponsoring agency or authority. Each project may have funding in several different categories. These include pavement reconstruction or rehabilitation (H1), bridge replacement or rehabilitation (H2), operational improvements (H3), or new capacity (H5). The columns related to each of these categories indicate the estimated expenditure in y-o-e dollars by period. Since new capacity is capped at 10 percent of available revenue, new capacity costs are totaled in the second to last column. The total federally funded project cost for all categories in y-o-e dollars is summed in the final column of the table.

The transit project tables are similar to the highway in that they show the facility name, scope, location and funding period timing. However, each of these projects is considered to be entirely new capacity (T5). As a result, only this category is shown in the table with the final column summing the anticipated total project cost in y-o-e dollars.

Highway Project Criteria

- Does the Project Serve the Region's Identified Population and Employment Centers? – Highway capacity expansions should enforce existing or planned developed places as defined by the *Connections* land use plan map designated centers. Exit ramps and access points should serve the centers.
- Is There Significant Environmental Issues That Will Be Impacted by a Project as measured by DVRPC's Environmental Screening Tool (EST)? – The EST evaluates the impacts of transportation projects on environmental features and assigns a quantitative value to those impacts.
- Is the Project Located in a CMP Priority Subcorridor? – With limited available funding, it is important to identify those corridors that have the greatest significance for carrying regional travel. This criterion elevates those congested corridors with the greatest impact on regional travel.
- Is the Facility an Intermodal NHS or NHS Connector? – The National Highway System is a key component for the movement of freight. Improvements to these facilities, particularly the NHS Connectors, have a significant impact on improving goods movement in the region.
- Cost per Vehicle Mile Traveled on Facility? – Determined by dividing the project cost estimate by current year traffic volumes and then multiplied by facility length. Project cost should reflect the proportion of the total construction cost attributable to new capacity.
- What Level of Support is there for the Project? – Does the project have a broad-base of support and is there a long-standing regional consensus for it.

Transit Project Criteria

- Does the Project Serve Areas That Will Support a High Level of Transit Service as measured by DVRPC's Transit Score Index? – Network expansions should enforce existing or planned developed places. The Transit Score Index indicates whether a project has the requisite density to be successful. Because the region's centers have a high degree of density, this measure will also serve as a proxy for serving centers of place. Analysis will be based on the percentage of the route, with a half-mile buffer, that serves 2035 census-tracts ranked as either Medium-High or High using the Transit Score Index.
- Does the Project Serve Environmental Justice Communities with Additional Transit Needs as Identified by DVRPC's Degrees of Disadvantage Analysis? – A census tract with twice the regional average in elderly, disabled, poverty, and female head of household is the basis for each DOD.
- Are there Significant Environmental Issues That Will Be Impacted By a Project as measured by DVRPC's Environmental Screening Tool (EST)? – See explanation under Highway criteria. A proposed project will not be analyzed if it utilizes an existing rail line that has been de-activated or is an active freight line, since the environmental impact will be minimal compared to a brand new alignment.
- Project Capital Cost per Passenger? – Project capital cost divided by projected year of maturity annual ridership.
- What is the Project Status? – Has the project been studied, as defined by FTA? A more detailed level of study results in more robust ridership and cost estimates, as well as examining various alternative routings.
- What Level of Support is there for the Project? – Does the project have a broad-base of support and is there a long-standing regional consensus for it. Operating agency support is important because they ultimately will have to provide operational funding for the project once it is completed.

A third table shows externally funded highway and transit projects, by facility name, scope, timing, location, and estimated project cost in 2009 dollars as provided by the sponsoring agency or authority. The projects listed in the externally-funded tables do not count against the Plan's anticipated revenues. A map locating all Major Regional Projects in the region follows the tables.

The major regional projects listed in the following table represent only a small number of the total projects that will be funded over the life of the Plan. As already noted, only 10 percent of available highway funding is allocated for new highway capacity. The bulk of the highway funding will go towards pavement and bridge maintenance and repair. Other funding will go towards operational improvements, bicycle and pedestrian projects, or to other categories. Similarly, only new fixed guideway projects are included in the set of major regional transit projects that are shown in the Plan. The majority of transit funding will go toward replacing and rehabilitating transit vehicles, rebuilding the transit infrastructure, such as tracks and stations, and operational improvements, such as fare modernization.

The full listing of projects that will be funded through the Plan is not shown here for practicality. A listing of thousands of repair and maintenance projects over the life of the Plan would fill volumes. Secondly, the exact timing and need for projects on the region's numerous road segments, bridges, transit vehicles, and stations is difficult to identify over a 26 year period. Money has been set aside for each of these different types of projects in the financial plan in order to meet these needs to the best of our abilities to do so. In the short-term, the Transportation Improvement Program (TIP) lists the projects being funded through the Plan. Future iterations of the TIP will identify the priority projects to fund at that time.

A number of the major regional highway projects complete gaps in the existing system. The new I-95 and Pennsylvania Turnpike Interchange (LRP ID #35) addresses the missing movement between these two critical elements of the region's highway system. The Adams Avenue Connector (LRP ID #68) provides connection between I-95 and the Betsy Ross Bridge, and invests in one of the region's core cities. Similarly, in New Jersey, the I-295 and I-76/NJ 42 direct connection (LRP ID #77) and missing movements (LRP ID #72) projects complete this critical interchange and improves the functionality and safety of the highway network. Each of these will help to facilitate goods movement within and through the region.

Other new highway capacity projects improve the region's economic competitiveness, while supporting Plan goals. The Penrose Avenue / 26th Street (LRP ID #67) access road improves access to the Navy Yard, which is one of the region's largest brownfield redevelopment areas. Likewise the North Delaware Avenue extension (LRP ID #66) provides access to planned residential and recreational facilities. Similarly, the Lafayette Street extension (LRP ID #55) will provide direct access from the Pennsylvania Turnpike to Norristown, one of the region's town centers.

There are several projects on US 202, which has evolved into an outer beltway around the region. Several widening projects (LRP ID #s 43 and 56) on this route will help to alleviate some of the region's worst congestion, while addressing multi-modalism through an array of CMP commitments for pedestrian, bicycle and transit improvements. Other projects, such as the grade-separated interchange on Country Road 533 in Mercer County (LRP ID #99), will support transit improvements, in this case the Route 1 BRT project (LRP ID 'S').

Major Regional Projects

Pennsylvania Transit

LRP ID	Facility	Project Scope	Location					Timing			Other Funding (in MM 2009 \$)			T5. Transit New Capacity Cost (in MM YOY \$)			
			Bucks	Chester	Delaware	Montgomery	Philadelphia	2010-2015	2016-2025	2026-2035	County	ARRA	External	2010-2015	2016-2025	2026-2035	Total T5 Cost
H	R1 Regional Rail / Route 36	New R1 Station at Eastwick and Extension of Route 36 to new Eastwick Station					X	X	X		\$ -	\$ -	\$ -	\$ -	\$ 17.3	\$ -	\$ 17.3
N	Quakertown Line	New Passenger Rail Line from Lansdale to Shelly	X			X		X	X		\$ -	\$ -	\$ -	\$ -	\$ 199.1	\$ -	\$ 199.1
P	R3 Regional Rail Extension	Rail Line Extension from Elwyn to Wawa			X			X			\$ -	\$ -	\$ -	\$ 81.5	\$ -	\$ 81.5	
Q	Route 100 Spur	Rail Line Extension from Hughes Park to King of Prussia Mall				X		X	X		\$ -	\$ -	\$ -	\$ -	\$ 536.3	\$ -	\$ 536.3
V	Delaware Ave. Rail Line	New LRT Line Within Philadelphia					X		X		\$ -	\$ -	\$ -	\$ -	\$ 756.5	\$ -	\$ 756.5
W	R5 Regional Rail Extension	Rail Line Extension from Thorndale to Atglen		X				X			\$ -	\$ -	\$ -	\$ 56.9	\$ -	\$ 56.9	

Source: DVRPC 2009

Pennsylvania Externally Funded

LRP ID	Facility	Project Scope	Location					Timing			External Costs (in MM 2009 \$)
			Bucks	Chester	Delaware	Montgomery	Philadelphia	2010-2015	2016-2025	2026-2035	
32	I-476 (PA Turnpike Northeast Extension)	Widen to 6 Lanes from Lansdale to Quakertown	X			X			X		\$ 665.0
36	I-95 at Scudders Falls Bridge	Widen I-95 from PA 332 to the River Bridge; Replace and Widen the River Bridge; Reconfigure the NJ 29 and I-95 Interchange and repave I-95 from PA 332 (Bear Tavern Road) to CR 579	X					X			\$ 154.5*
40	I-76 (PA Turnpike)	Widen from Downingtown to Valley Forge		X		X			X		\$ 300.0
47	I-76 (PA Turnpike)	Electronic Interchange at PA 29		X				X			\$ 65.0
52	I-476 (PA Turnpike Northeast Extension)	Widen to 6 Lanes from Mid-County to Lansdale Interchanges				X		X			\$ 295.0
M	Delaware River Tram	New Aerial Tram from Philadelphia to Camden					X		X		\$ 27.5*
O	R6 Regional Rail Extension	Rail Line Extension from Norristown to Wyomissing, Berks County		X		X		X	X		\$ 500.0

* Cost shown is for Pennsylvania portion only, total project cost is Pennsylvania portion plus New Jersey portion.

Source: DVRPC 2009

Major Regional Projects

New Jersey Externally Funded

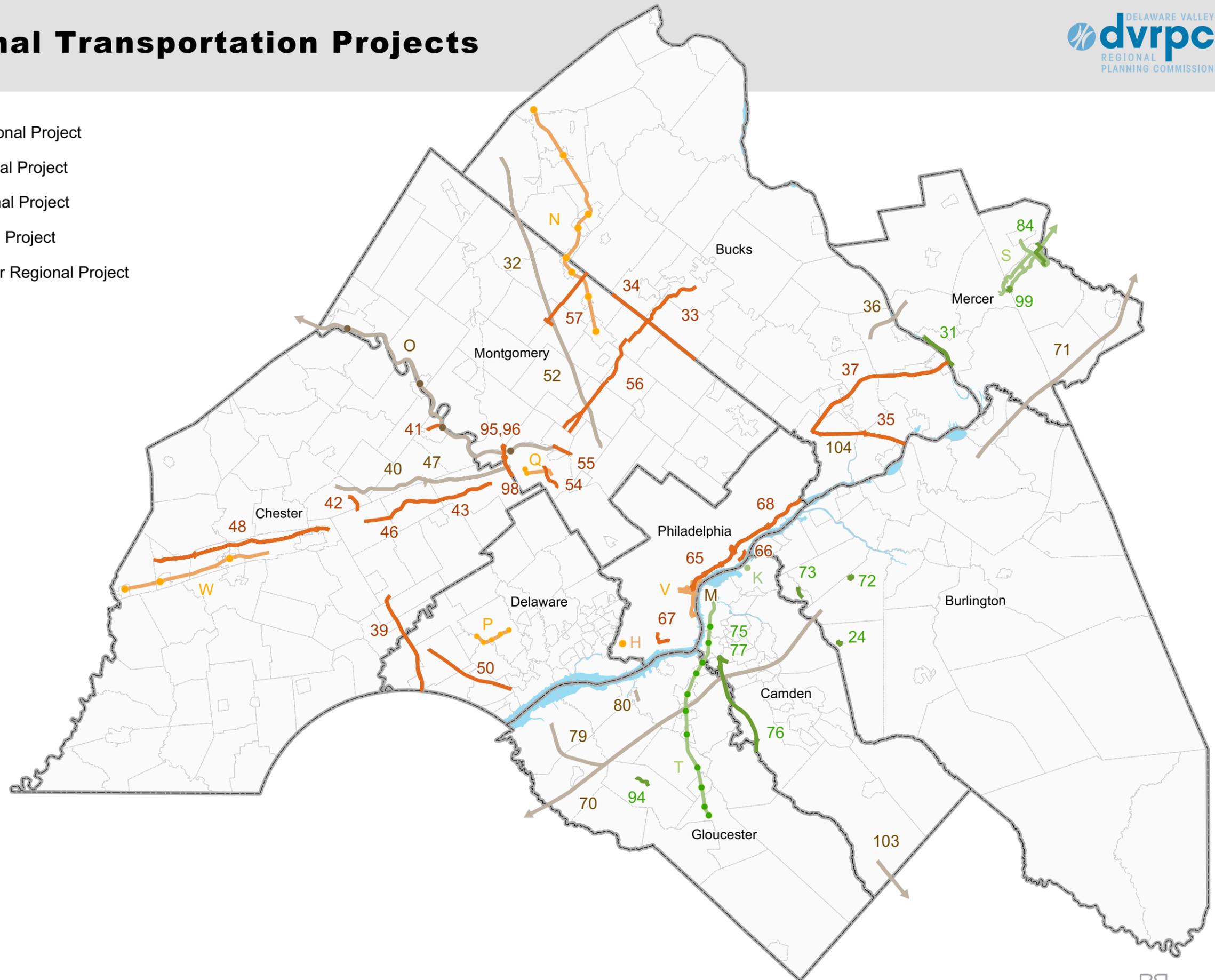
LRP ID	Facility	Project Scope	Location				Timing			External Costs (in MM 2009 \$)
			Burlington	Camden	Gloucester	Mercer	2010-2015	2016-2025	2026-2035	
36	I-95 at Scudders Falls Bridge	Widen I-95 from PA 332 to the River Bridge; Replace and Widen the River Bridge; Reconfigure the NJ 29 and I-95 Interchange and repave I-95 from PA 332 (Bear Tavern Road) to CR 579				X	X		\$ 154.5*	
70	New Jersey Turnpike	Widen from Exit 4 to Delaware Memorial Bridge	X	X	X			X	\$ 310.0	
71	New Jersey Turnpike	Widen from Exit 6 to Exit 9	X			X	X		\$ 2,700.0	
79	US 322	Widen from US 130 to NJ Turnpike			X			X	\$ 40.0	
80	Paulsboro Bridge	New Bridge and Roadway Improvements from I-295 to Paulsboro BP site			X		X	X	\$ 40.0	
103	Atlantic City Expressway	Widen from 5 Lanes to 6 Lanes from Route 73 to Atlantic County		X			X		\$ 131.8	
M	Delaware River Tram	New Aerial Tram from Philadelphia to Camden		X				X	\$ 27.5*	

* Cost shown is for New Jersey portion only, total project cost is New Jersey portion plus Pennsylvania portion.

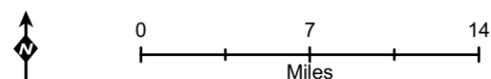
Source: DVRPC 2009

2035 Major Regional Transportation Projects

- Pennsylvania Highway Major Regional Project
- Pennsylvania Transit Major Regional Project
- New Jersey Highway Major Regional Project
- New Jersey Transit Major Regional Project
- PA and NJ Externally Funded Major Regional Project



Numbers and letters shown for each project correspond to 'LRP ID' in Major Regional Project tables, please refer to these for facility name and additional information regarding each project



Several new fixed guideway transit projects are included in the Plan. Projects, such as the R3 extension to Wawa (LRP ID 'P') and the R5 extension to Atglen (LRP ID 'W') will extend existing lines. Other projects, like the Route 100 spur (LRP ID 'Q') and US 1 BRT (LRP ID 'S'), will provide service to the high-growth suburban centers of King of Prussia and the Princeton/US 1 corridor, respectively. The Delaware Avenue rail line (LRP ID 'V') improves service in the metropolitan center while in New Jersey the transit line to Gloucester County (LRP ID 'T') links a number of town centers to one of the region's core cities (Camden). Two other projects, the Quakertown Line (LRP ID 'N') and the R6 Extension (LRP ID 'O'), will provide new rail service along two burgeoning, congested suburban corridors.

While it does not provide new capacity, the conversion of the NJ 29 freeway to an urban boulevard is a project that will provide many benefits to the residents of another of the region's core cities (Trenton). This project will improve access to the Delaware River, increase safety, and promote redevelopment.

Rebuilding I-95 from Center City to the Delaware state line is a major project that will need to be initiated during the life of the *Connections* plan. Much of this segment of I-95 is a viaduct bridge structure and many sections will be more than 65 years old by 2035, well beyond their 50-year useful design life. Strictly rebuilding the portion of this facility in-kind between Queen Street and Broad Street in Philadelphia is estimated to cost \$4 billion in 2009 dollars, which if scheduled to be built in the final period of the financial plan will cost an estimated \$11.4 billion in y-o-e dollars. This single project would require more than the region's total allocation for bridge reconstruction (H2) over the life of the plan and would amount to 50 percent of the Pennsylvania subregion's reasonably expected highway revenue. This particular reconstruction need becomes even more difficult to fund in the face of the need to rebuild the rest of I-95, from Broad Street south to the Girard Point Bridge, then through Delaware County to the state line. As a result of the high cost, a fiscally constrained Plan is able to accommodate only the first segment of this section of I-95 from Queen Street to Washington Avenue in Philadelphia (LRP ID #100). This initial phase gets the project moving and alerts DVRPC's state and Federal partners of the urgent need this project entails. Clearly, the key issue in successfully delivering this project is determining how to fund it as part of a multi-party, collaborative effort.

The Federal Interstate Maintenance System and the Pennsylvania State Interstate Management Program (IMP) were set up to provide funding for maintaining the Interstate system. In Pennsylvania, the sum of Federal and state IMP funds average \$435 million per year from 2009 to 2012. The DVRPC Pennsylvania subregion can reasonably expect to receive approximately 32 percent of these funds, or an average of \$132 million per year. Over the life of the plan, the Pennsylvania region expects \$5.3 billion (in y-o-e dollars) of IMP funds (this is one source of the \$22.7 billion in Pennsylvania highway funds identified in the financial plan). If 50 percent of the region's IMP funds (\$2.65 billion) are allocated to rebuilding I-95's northern Philadelphia section (LRP ID #65), and if the region contributes 2 billion for the Queen to Broad Street section of I-95, there would be less than one billion of IMP funds left for rebuilding the rest of the Interstate system in the region, including the remaining southern portion of I-95 in Philadelphia and Delaware County and a more northern section in Bucks County (which is included in the Plan). The overwhelming funding requirements of reconstructing I-95 is a serious issue, which needs to be addressed by FHWA and the Commonwealth of Pennsylvania in partnership with DVRPC, the City of Philadelphia, Delaware and Bucks counties, neighborhood groups and the general public in order to facilitate a plan of action that is acceptable to all stakeholders. DVRPC recommends that PennDOT sponsor a study which identifies a plan of action for developing a design and financial strategy for rebuilding this critical piece of the national and regional transportation infrastructure. This study will need to identify innovative and low cost design strategies, as well as explore funding options such as

instituting tolls on this facility in recognition of the fiscal constraint surrounding this project. In addition, the shortage of funds from the Federal and state partners needs to be addressed.

Transportation Improvement Program

Inclusion in the *Connections* plan means that a Major Regional Project has been identified as a regional priority for funding and is part of the long-range financial plan for the region. The Transportation Improvement Program (TIP) is the short-term implementation of the long-range financial plan. The TIP is the regionally agreed upon list of priority projects to be advanced during a three to four year timeframe. The TIP is authorization to seek funding. A project's presence in the TIP represents a critical step in the authorization of funding to a project. It does not, however, represent a commitment of funds, an obligation to fund, or a grant of funds.

As required by federal law, the TIP document must list all projects that intend to use federal funds, along with non-federally funded projects that are regionally significant. The TIP also includes all other state-funded capital projects. The projects are multi-modal; that is they include bicycle, pedestrian, freight-related projects, and innovative air quality projects, as well as the more traditional highway and transit projects.

Regionally-significant projects must be drawn from the region's long-range plan and all projects in the TIP must help implement the goals of the Plan. The long-range plan is the document that helps direct transportation and land use decisions over a long horizon. The TIP represents the implementation of recommendations from the long-range plan into a short-term program of improvements. As each subsequent iteration of the TIP is developed, it will draw down on the balance of the respective long-range plan funding category. TIP projects that are not listed as Major Regional Projects in the long-range plan, will still be considered to be consistent with the long-range plan because they further Plan goals of rebuilding, maintaining, and improving the operation of the existing system or further alternative modes of transportation, such as transit or bicycle and pedestrian facilities.

Air Quality Conformity

The Environmental Protection Agency (EPA) has established health based standards for six criteria air pollutants referred to as the National Ambient Air Quality Standards (NAAQS). Air Quality in the DVRPC Region does not meet the standards for two of these pollutants; ground level ozone and fine particulate matter (PM_{2.5}).

Ozone is a strong oxidant that can irritate lung tissue and impede proper lung development in children. While ozone in the stratosphere protects the earth from the sun's ultra-violet rays, at ground level, ozone is a dangerous pollutant. Ozone is not directly emitted but forms when nitrogen oxides combine with volatile organic compounds in the presence of sunlight. Ozone pollution is largely a summertime problem in the DVRPC region when sunny days with little breeze are most conducive to ozone formation.

Fine Particle Pollution or PM_{2.5} is made up of extremely small particles of materials or droplets of liquids. These particles can travel deep into the lungs, get into the bloodstream and aggravate heart and lung conditions. Unlike ozone, PM_{2.5} is a year round problem in the DVRPC region.

Since the DVRPC Region does not meet the standards for ozone and PM_{2.5}, the Clean Air Act requires DVRPC to demonstrate that the transportation projects contained in the TIPs and Plan do not make the region's air quality worse or impede the region's progress towards meeting the NAAQS. The process of this demonstration is referred to as transportation conformity.

DVRPC demonstrates transportation conformity by using a transportation demand model to estimate the motor vehicle emissions from all of the major regional projects in the TIPs and Plan and comparing those emissions against budgets or limits established by the states. This process is conducted in close coordination with an interagency consultation group which is comprised of state and federal regulatory environmental, transportation and transit agencies. The consultation group reviews the list of transportation projects, agrees on the planning assumptions, such as population and employment forecasts and agrees on the emission model inputs before the conformity analysis is conducted.

DVRPC has successfully demonstrated transportation conformity of the *Connections* plan and Pennsylvania and New Jersey Transportation Improvement Programs in accordance with the corresponding State Implementation Plans and Clean Air Act requirements.

Meeting the Goals of the Plan

The transportation investments outlined in the *Connections* plan help further the regional transportation, land use, environmental, and economic competitiveness goals contained in the long-range plan. A top priority in the region is the rebuilding and maintenance of the transportation infrastructure and almost 75 percent of projected available funding will be allocated to rebuild the highway and transit system. Furthermore, transit, bicycle, and pedestrian projects account for nearly half of the overall funding in the Plan. This reflects the goal to construct a multi-modal transportation network. The next largest amount of funding is allocated toward improving the operation of the system. Finally, new highway capacity funding is capped at 10 percent of anticipated highway revenue and no new projects are identified beyond what is included in the current TIP. This funding follows the prioritization of needs for both the highway and transit systems that were outlined as key Plan principles.

The Major Regional Projects contained in the long-range plan were screened to ensure that they were located in areas that were appropriate for development and that they were consistent with the region's Congestion Management Process, which identifies appropriate corridors for additional highway capacity. In order to meet fiscal constraint, several projects that were included in the set of Major Regional Projects in the *Destination 2030* plan were right-sized to reduce project scope and cost.

Closing the Funding Gap

The region receives transportation capital funding from various levels of federal, state, and local government. Current funding levels are not nearly enough to meet the region's transportation needs. DVRPC's transportation infrastructure needs assessment found a minimum regional funding gap of \$45.4 billion over the 26-year life of the *Connections* plan, just in order to achieve and maintain a state of good repair for existing infrastructure with limited new capacity expansion. Failure to maintain and expand the transportation system reduces the region's economic competitiveness, as it becomes a less attractive location for business investment; harms the environment due to increased congestion; causes more vehicular damage due to poor road conditions; and increases vehicular crashes due to less safe driving conditions.

Roads in poor condition damage tires and suspension systems, cause extra fuel use, increase travel time, and make for less safe driving conditions. The American Association of State Highway and Transportation Officials (AASHTO) *Rough Roads Ahead* report estimates that poor road conditions in the Greater Philadelphia region costs the average driver \$525 per year in additional vehicle costs. This leads to what is essentially a double payment in road repair costs, as drivers must pay for the damage to their vehicles caused by the road conditions, and then again to repair the road. Meanwhile, ongoing budget shortfalls mean only the highest priority projects can be completed, causing DOTs to be more reactive than proactive in roadway maintenance. Keeping roads in a good state of repair extends useful life, and lowers the expenditure needed over time. This is the more cost effective course of action, as the basic maintenance involved in keeping a road in good condition costs only anywhere from 1/3rd to 1/14th that of fixing a road that has fallen into disrepair.²⁰ Thus in the long run, the more maintenance is deferred now the more disproportionately expensive it becomes to eventually fix the problem.

The poor condition of the transportation system and the increasing backlog of unmet needs make it imperative that the region find a way to reduce the funding gap. The majority of the funding the region currently uses to build, maintain, and repair its road and transit infrastructure currently comes from the Federal and state governments. In reviewing the expectations for funding from these two levels of government it is clear the region cannot expect a major increase in funding from either of these sources. Thus other possibilities for increasing revenues, such as Public-Private Partnerships (PPPs) and/or local funding options, must be seriously considered. On the expenditure side, the region can work to right size projects and reduce costs through better control and project management.

²⁰ Rough Roads Ahead. AASHTO. Washington, DC. 2009.

The Vision

Each successive iteration of the long-range plan has had to remove projects that were included in the previous version of the long-range plan in order to maintain fiscal constraint. More and more funding is being shifted toward maintaining and reconstructing the system and yet, the funding gap continues to grow. Several regional priorities were not able to be funded in the *Connections* plan. This was especially true for the transit system where two projects included in the *Destination 2030* plan, the Broad Street Subway extension to the Navy Yard and the RiverLine extension to the state capitol in Trenton, were unable to be included in the *Connections* plan because there is not enough revenue to cover their cost. There are several other rail lines which are being studied across the region, including the Devault Line between Phoenixville and Paoli and the Octoraro Line between Wawa and Nottingham, which are also unable to be funded in the Plan due to fiscal constraint. These routes, and others, are the true vision for the future. The set of projects that are able to be funded in the Plan represent only a portion of what is needed for the region to attain the potential of the vision.

The more pragmatic issue is not about attaining a vision, but about simply maintaining what we have. As noted, throughout the Plan, the region has a massive funding gap, particularly in regards to highway pavement, bridges, and rail and transit vehicle infrastructure. The true vision for the future in our highway system is to be able to rebuild and maintain the existing infrastructure. This includes being able to fund freight rail projects in order to facilitate goods movement, relieve congestion and improve air quality. The reality, as funded in the *Connections* plan, is that we can only accomplish rebuilding and maintaining about half of the identified roadway and bridge needs. There are several major multi-billion dollar reconstruction projects, relating to the reconstruction of I-95 between Center City and the Delaware state line that are not able to be fully funded in the long-range plan. This highway segment is critical to the regions ability to move people and goods, yet on its alone would utilize virtually the entire amount the region has available to rebuild bridges over the entire 26-year lifespan of the Plan. Then consider all the other critical pieces of the transportation network which also need rehabilitation or replacement and the magnitude of the task becomes daunting.

Federal Funding Outlook

In Infrastructure 2008, The Urban Land Institute estimated that there is a \$170 billion funding gap for infrastructure nationwide. Recognizing this as a critical issue, the National Surface Transportation Policy and Revenue Study Commission recommended the Federal fuel tax be increased from 5 to 8 cents per gallon per year for 5 years, after which it should be indexed to inflation. The Commission also suggested truck taxes increase proportionally with fuel taxes.

Despite the fact the federal gas tax of 18.4 cents per gallon has not been increased since 1993, there currently appears to be little political will to raise it. Meanwhile, the Highway Trust Fund needed an eight billion dollar infusion from the general fund to avoid insolvency in 2008, and will likely need more

“Much of the country’s metropolitan infrastructure was built in the last half of the 20th century and will reach its capacity limits early in the 21st century. Unless new capacity is created in roads, rails, airports, seaports, and other systems, the nation’s economic potential will be artificially limited.”

America 2050: A Prospectus
Regional Plan Association

infusions in the next few years if revenues do not increase or expenditures are not cut back. Poor economic conditions, rising fuel prices, and more fuel efficient vehicles have meant less gas tax revenue. In addition, the gas tax revenue that is coming in has lost significant purchasing power due to recent increases in FHWA's Bid-Price Index of highway project costs.

In September 2009, new federal transportation legislation is due to replace SAFETEA-LU, which was enacted more than a year late in 2005. Details surrounding the new transportation legislation remain unclear, and may be further clouded by the 2009 American Recovery and Reinvestment Act (ARRA) which provided an additional \$48.1 billion in transportation funding nationwide. Regardless, without an increase in the fuel tax, or another transportation specific tax, the insolvency issues related to the Highway Trust Fund make it very unlikely that the region can expect significantly higher Federal transportation funding levels anytime soon.

State Funding Outlook

In July 2007, Pennsylvania Act 44 was passed increasing transportation funding by 30 percent over previous levels. This bill expected an average of \$946 million in additional average funding for highways and \$432 million devoted to transit. To pay for this additional funding, Act 44 created a lease of the Pennsylvania Turnpike between the Commonwealth and the Pennsylvania Turnpike Commission (PTC) which provides \$450 million per year in guaranteed funding (\$250 million to transit and \$200 million for highways); and allowed the PTC to enact tolls on I-80 in the northern portion of the Commonwealth. Five billion dollars in bonds were issued to generate new highway and bridge funds. These are backed by increasing tolls on the Pennsylvania Turnpike, and by implementing proposed new tolls on I-80. This new highway and bridge funding is restricted to the preservation and restoration of the existing system, operations, and maintenance.

Three years of guaranteed additional transportation funding (\$750 million for FY 2008; \$850 million for FY 2009; and \$900 for FY 2010) were paid for through the initial bond revenue. Beginning in FY 2011, these amounts are slated to grow by 2.5 percent annually with the implementation of the I-80 tolls. Without the tolls these amounts will go to zero for both additional highway and transit funds. The lower revenue scenario of no tolls placed on I-80 is assumed in the *Connections* financial plan because FHWA has not yet approved the tolling of I-80. Moving forward with the tolls, or finding an alternate source of revenue would provide urgently needed additional revenue for the Pennsylvania subregion's financial plan.

Passage of Act 44 came in response to the findings of the Transportation Funding and Reform Commission (TFRC), which published the final report of its findings in November 2006. This report identified three levels of funding need in Pennsylvania. A baseline preservation level established what additional funds are needed to adequately maintain the current transportation network. For the entire Commonwealth, this was estimated to be \$497 million for transit and \$546 million for highways and bridges per year above then current funding levels. To expand the system, either through incremental improvements or mobility expansion, would require a significant amount of new revenue above the baseline. Statewide incremental improvements were estimated to need an additional \$659 million for transit and \$1.013 billion for highways and bridges. Mobility expansion throughout the state would call for an extra \$820 million for transit and \$1.464 billion for highways and bridges per year above funding levels at that time. Fully funded (i.e.

including I-80 tolls) Act 44 provided only enough funding to meet the statewide preservation funding baseline need. It did not include enough funding for either incremental improvements or mobility expansion.

In New Jersey, the Transportation Trust Fund (TTF) is set to expire in 2011. Statewide needs have been estimated for transit in the 2004 Blue Ribbon Report of \$490 million per year in additional funding for transit maintenance and an additional \$700 million per year to increase transit service. An analysis of the NJDOT 10-year Program shows annual available state funding is \$1.8 billion, but the desired annual funding needed is \$3.6 billion. The greatest shortfall is in bridge maintenance and congestion reduction.

The region does not have the power to control the level of federal or state funding it receives; and it is unlikely that either the Federal government, Pennsylvania, or New Jersey will significantly increase funding for transportation anytime soon. Nor can the region control rising labor and materials costs. Given the large set of needs that will remain unmet at currently available funding levels, the region needs to seek ways to close its funding gap. This can be through raising additional revenues via local funding options or public-private partnerships, or on the expenditure side through project right-sizing and better program management.

Project Right-Sizing

Right-sizing and seeking efficiencies throughout the transportation system are a precursor to any discussion of raising additional revenues. Project right-sizing is a key component of the Smart Transportation program being instituted at both PennDOT and NJDOT. Smart Transportation works to resolve transportation problems with solutions that are context-sensitive, affordable, supported by the communities involved, and can be implemented in a reasonable timeframe. Right-sizing means the DOT will consider reduced scale alternatives like network additions or transportation system management before developing alternatives such as new or widened roadways. If safety, and not congestion, is the problem, the DOT will consider focused solutions that can improve safety without increasing capacity. However, safety must be considered in all projects.

Since financial resources are very limited in both New Jersey and Pennsylvania, as seen in the needs assessment, wise investment in transportation infrastructure requires sensitivity to the constraints of available funding. Virtually all projects offer a range of design options with different costs, corresponding to different levels of value. However, the importance of understanding alternatives based on the value to price ratio is often overlooked. Performance measures such as cost per existing trip, cost per new trip, and cost per time savings for a representative trip may be used to better understand the return on a proposed investment. These measures attempt to direct projects toward the most effective value to price yield.

Both NJDOT and PennDOT have capital investment committees that review cost estimates for all major projects and determine if the project should move forward. Acting as “gatekeepers,” these committees are tasked at key decision points with evaluating the proposed investment in relation to potential benefits and federal, state, and regional priorities.

Local Funding Options

A key finding of the TFRC report is that regional and local areas in the state provide little in terms of matching funds for transit. The regional/local funding match for transit in the five-county Pennsylvania subregion of DVRPC has been just under 6 percent for capital and operating expenses, in comparison to peer region averages of 33 percent. In fact, of the top 10 U.S. metropolitan regions by population, only Boston approaches the local contribution of Greater Philadelphia, and their 11.5 percent local funding contribution is nearly double our rate. If the region was to match Boston's percentage for local contribution, there would be an additional \$97 million dollars annually for transit service improvements. Matching the peer region average of 33 percent local funding would provide an additional \$477 million annually. Such funding amounts could have considerable impact on the quality of transit service in Greater Philadelphia.

“The problem is not simply insufficient investment, our system is underpriced. Basic economic theory tells us when something valuable – in this case roadway space – is provided for less than its true cost, demand increases and shortages result ... All too often the prices paid by transportation system users are markedly less than the costs of providing the transportation services they use (including pavement repair) – and much less than the total social costs (including traffic congestion and pollution). This underpayment contributes to less efficient use of the system, increased pavement damage, capacity shortages and congestion.”

Paying Our Way
National Surface Transportation Infrastructure
Financing Committee

The low local funding match in Pennsylvania is partly due to the lack of authority to raise revenues at the regional or local level. As a response to this, the TFRC proposed a 25 percent local match requirement, in exchange for more local decision-making, and made several suggestions for dedicated tax revenues to generate funds.

Act 44 of 2007 increased the local funding match for Class 1 transit systems, like SEPTA, to 15 percent for operating programs, while keeping the 3.33 percent requirement for capital expenditures. Two local tax options were authorized to raise this funding match, a \$2 per day vehicle rental fee or up to a 10 percent increase in the retail liquor tax. For local road and bridge improvements the bill allocated an additional \$35 million per year in state funding above previous levels.

Local funding match requirements in Act 44 for transit remain well-below peer region averages. Limited local tax options handicap the region's ability to fulfill its transportation goals. This puts the region at a competitive disadvantage when compared to its peers across the nation.

Additional funding is needed if the region wants to realize the transportation goals set forth in this long-range plan. These new funds will most likely need to be generated at the regional level. To do this, the region needs to find ways to translate the growth in its economic vitality into improvements in the transportation system. Ideally, any new local transportation funding sources should be easy to implement, stable and sustainable over time, equitable both for system users and over geographic areas, and should not yield unintended negative economic impacts. An added bonus for any tax or fee is if it can support the goals of the long-range plan.

2007 Local Transit Funding Comparison to Other Major Metropolitan Regions

	Atlanta	Boston	Chicago	Dallas	Denver	Houston	Los Angeles	Miami	New York*	San Diego	San Francisco	Washington D.C.	Peer Average	Philadelphia*
Capital Funds														
Fare Revenue	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.2	\$ -	\$ -	\$ -	\$ 0.4	\$ -
Local Funds	\$ 115.8	\$ 18.0	\$ 166.0	\$ 71.4	\$ 140.8	\$ 212.1	\$ 488.4	\$ 54.4	\$1,657.8	\$ -	\$ 445.3	\$ 96.2	\$ 288.9	\$ 28.0
State Funds	\$ 8.7	\$ 116.8	\$ 28.5	\$ 339.1	\$ -	\$ -	\$ 117.5	\$ 35.2	\$ 336.1	\$ 55.4	\$ 43.7	\$ 40.5	\$ 93.5	\$ 176.0
Federal Assistance	\$ 40.2	\$ -	\$ 352.5	\$ 97.0	\$ 107.7	\$ 43.2	\$ 246.9	\$ 85.0	\$1,580.8	\$ 6.7	\$ 123.2	\$ 37.1	\$ 226.7	\$ 251.2
% Local	70.3%	13.3%	30.4%	14.1%	56.7%	83.1%	57.3%	31.1%	46.4%	0.0%	72.7%	55.3%	47.4%	6.2%
Operating Funds														
Fare Revenue	\$ 104.9	\$ 395.9	\$ 682.8	\$ 42.4	\$ 78.6	\$ 56.9	\$ 370.2	\$ 90.4	\$4,101.4	\$ 76.0	\$ 469.6	\$ 514.9	\$ 574.5	\$ 457.7
Local Funds	\$ 228.7	\$ 159.0	\$ 530.1	\$ 318.6	\$ 259.9	\$ 212.3	\$ 746.4	\$ 351.3	\$1,779.8	\$ 18.7	\$ 466.2	\$ 369.3	\$ 453.4	\$ 74.5
State Funds	\$ -	\$ 837.0	\$ 199.8	\$ 2.2	\$ -	\$ -	\$ 207.9	\$ 15.1	\$2,748.9	\$ 69.9	\$ 115.1	\$ 221.7	\$ 368.1	\$ 515.9
Federal Assistance	\$ 93.2	\$ -	\$ 325.6	\$ 81.7	\$ 92.6	\$ 108.2	\$ 972.5	\$ -	\$ 395.7	\$ 65.4	\$ 65.5	\$ 37.1	\$ 186.5	\$ 248.6
Other	\$ 116.4	\$ 12.6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3.6	\$ 58.0	\$ -	\$ 27.0	\$ 23.9	\$ 28.5	\$ 0.2
% Local	42.1%	11.3%	30.5%	71.6%	60.3%	56.2%	32.5%	76.3%	19.6%	8.1%	40.8%	31.6%	28.1%	5.7%
% Local Capital + Operating	48.7%	11.5%	30.5%	40.9%	59.0%	67.1%	39.2%	63.9%	27.1%	6.4%	51.9%	34.7%	33.4%	5.9%

* Assumes 86 percent of NJ Transit ridership occurs in New York City region and 10.5 percent occurs in Greater Philadelphia region. All figures in millions of dollars

Source: National Transit Database 2007

DVRPC's *Options for Filling the Region's Transportation Funding Gap* was prepared to help decision-makers consider how much funding different revenue options could generate for the Pennsylvania subregion. This report also considered the ease with which each option could be implemented, how well each option is tied to transportation, how stable and equitable funding would be, and its potential economic impacts. A similar exercise has been conducted for the New Jersey subregion, with a number of different local revenue options. Options could include bonds, dedicating taxes or fees to transportation programs, or new or increased tolls.

Many economists and transportation experts are beginning to recognize that congestion based fees are directly tied to transportation system use and can be used for travel demand management which can increase the system's efficiency. In many ways they are similar to or dependent upon tolling.

Many of these options would require state enabling legislation before the region could pursue them any further. It is unlikely that any single option could fill the funding gap on its own. DVRPC has not identified any of the options as a preferred alternative. Rather, the hope is to generate discussion and develop consensus on the optimal funding mechanisms to help the region achieve its transportation goals. Various options for raising additional revenue are discussed below and have been grouped into four major categories: bonds; taxes and fees; tolling; and public private partnerships.

Bonds

Pennsylvania suffered heavily due to overexposure from bond borrowing in the 1970s. As a result, the Commonwealth has long relied exclusively on pay-as-you-go funding for transportation improvements. Pay-as-you-go funding works best with smooth expenditure levels. Large transportation projects cause spikes in expenditures, and bonds can help to fill the resulting short-term funding gaps created by implementing major system improvements. When inflation is rising faster than construction costs, issuing bonds to speed up project development can lower its overall expense. Additionally, transportation investments can generate positive economic returns as a result of a more efficient system, helping to pay off the bonds through increased revenues. However, bonds are not a source of funding, but rather a tool to use for financing projects. There still needs to be a mechanism in place to eventually be able to retire any outstanding bonds.

Montgomery County has been considering different ways to generate additional funding at the county level for transportation projects, possibly through bonds. If Montgomery County is successful in this venture, other counties may follow suit.

Taxes and Fees

The list of possible ways the region could raise additional transportation funding includes direct user fees based on system use, indirect user fees, or taxes which are related to some extent to the use of the transportation system, and various excise or ad valorem taxes which are not related to the use of the system but may otherwise be impacted by it through higher property values, etc.

Direct user fees include items such as vehicle miles traveled fees, tolling, and transit fares. Tolling will be discussed in the next section. These fees are or would be directly related to the use of the transportation system, and can be easily varied for efficient system use, for example by time period or during peak hour congestion. As a result these user fees are generally considered to be the fairest way to pay for system improvements. A number of recent studies and reports produced by agencies and commissions, including the National Surface Transportation Infrastructure Financing Commission created by SAFETEA-

“The fuel tax is directly related to gasoline and diesel fuel consumption, only indirectly related to system use, and negatively related to increased use of alternative fuels. Other funding mechanisms (such as vehicle registration fees or sales or property taxes) are even less related to usage. More direct charges for use of specific infrastructure (such as tolls or congestion pricing) can influence behavior, shifting travel to less congested times or modes such as transit or telecommuting. Such direct charges can promote better utilization of existing capacity and may reduce the need for additional improvements.”

The Path Forward: Financing Our Surface Transportation System
(Interim Report)
National Surface Transportation Infrastructure Financing
Committee

LU to study and make recommendations for the future of transportation financing the United States, have recommended switching transportation funding from the current per gallon purchased gas tax to a vehicle miles traveled fee. The variable nature of this type of fee, however, makes it less attractive to politicians and system users. Users may find them difficult to budget for, and those whose lifestyle or business is more dependent on heavy use of the system will be more impacted by increases in this use-based fee.

Indirect user fees and taxes such as fuel sales taxes, tire taxes or parking taxes are only loosely related to the efficient use of the transportation system. In the case of the gas tax, the amount paid varies by user depending on vehicular fuel efficiency. This tax can't be used to reduce peak period demand for the network through higher costs. Over the long-term, increased fuel efficiency and growth in alternative fuel vehicles are likely to greatly diminish its revenue generating ability. Likewise, the tire tax is related to vehicle miles traveled, but is not geared towards efficient system use. Parking taxes can be priced for efficient system use, but are not based on distance traveled.

Other indirect fees and taxes relating to automobile purchase and ownership, such as vehicle sales tax, title registration fees, and vehicle lease tax are tied to the transportation system, but not its use. For example, an individual who drives 20,000 miles per year pays the same title and registration fees as a person who drives 10,000 miles per year. Sales and lease taxes are applied to the value of a vehicle, not its use. Property taxes, surface coverage taxes, tax increment financing, real estate transfer fees, and the access fee, generally contain some additional value to the property owner from the transportation system. Improvements to the transportation network correlate to increased nearby property values. Tourism based taxes such as the hotel room rental tax and rental vehicle tax capture transportation use from non-residents who otherwise may not pay their fair share of the system.

Earned income taxes and sales taxes are loosely tied to the transportation system, which moves the goods and services that drive the economy. While transportation system improvements do not directly increase economic activity, failure to properly maintain and improve the system can create chokepoints and dampen economic activity. Excise taxes such as the cigarette tax and liquor tax have no direct ties to the transportation system or its use. They remain, however, popular with politicians and easy to implement. None of these taxes, however, are directly related to the use of the transportation system.

Pennsylvania Subregion Local Funding Option Summary Table

Funding Option ¹	Proposed Rate	% Increase	Revenue (MM 2007 \$s)	Significance	
				Rate Increase ²	Revenue Increase
Access Fee	(a) \$0.10 per sq ft – commercial building area near transit (b) \$100 per acre – commercial property near highway exits	(a) N/A (b) N/A	(a) \$5.3 ³ (b) \$2.4	(a) ● (b) ●	(a) ○ (b) ○
Cigarette Tax ⁴	Increase \$0.43 per pack	31.9%	\$89.2	●	●
Earned Income Tax ⁴	Increase 0.08%	2.6%	\$87.5	○	●
Fuel Sales Tax	6.0% of consumer price	N/A	\$245.5	●	●
Hotel Room Rental Tax	Increase room rate by 1 percent	14% - 50%	\$9.5	●	○
Liquor Tax ⁴	Increase 10 percent	56%	\$43.8	●	●
Parking Tax	\$20 per year per space	N/A	\$44.0	○	●
Occupational Privilege Tax	\$10 annually per employee	N/A	\$17.7	○	●
Property Tax	Increase \$0.001 per assessed value	0.8% - 3.8%	\$144.0	○	●
Real Estate Transfer Tax ⁵	Increase existing rates 0.5%	10.8% - 21.5%	\$84.0	●	●
Regional Toll Surcharge	(a) \$1.00 surcharge on 12 regional PA Turnpike exits (b) \$1.00 surcharge on 4 bridges	(a) N/A (b) 33%	(a) \$83.0 (b) \$27.0	(a) ● (b) ●	(a) ● (b) ●
Rental Vehicle Tax ⁴	Increase \$2 per day	100%	\$10.2	●	○
Sales Tax ⁴	Increase existing rate by 0.26 percent	3.7%	\$144.0	○	●
Surface Coverage Fee	\$5 per year per 1,000 sq ft of impervious surface cover	N/A	\$19.7	○	●
Tax Increment Financing (TIF) ⁵	Dedicate 10 percent of annual growth in region's property tax to a TIF	N/A	\$10.7	○	○
Tire Tax ⁴	Increase \$1 per tire sold	100%	\$2.1	●	○
Toll Existing Highways	\$0.08 (avg.) per VMT on major regional highways	N/A	\$307.8	●	●
Transit Fare Increases ⁶	Increase all fares by 1 percent	1%	\$3.2	○	○
Vehicle Lease Tax	Increase 1 percent	33%	\$7.4	●	○
Vehicle Miles Traveled Fee	\$0.01 per mile	N/A	\$266	●	●
Vehicle Property Tax	0.25% of vehicle value	N/A	\$94.1	●	●
Vehicle Sales Tax ⁴	Increase existing rate by 1 percent	16.7%	\$70.7	●	●
Vehicle Registration Fee	Increase \$10 per vehicle	27.8%	\$21.4	●	●

1. Please see DVRPC's *Options for Filling the Region's Transportation Funding Gap* for detailed information on assumptions used to develop revenue estimates. Where existing tax data is not available, DVRPC has estimated potential tax revenues using vehicle registration, traffic volume, or GIS data for existing development and surface coverage for the 5-county PA subregion.

2. Where tax is not in existence (identified as N/A in '% Increase' column) DVRPC has estimated the impact in comparison to similar tax payments.

3. Estimate for Center City and University City, Philadelphia, and Montgomery County only.

4. Five county PA subregion is estimated to represent 1/3rd of Commonwealth of Pennsylvania revenues in 2004.

5. Estimate is derived using five-county PA subregion tax revenues for 2004.

6. Estimate provided by SEPTA.

Legend:

- = Substantial Increase (> 10% or \$30 Million)
- = Moderate Increase (> 5% or \$15 Million)
- = Slight Increase (< 5% or \$15 Million)

Source: DVRPC 2007

New Jersey Subregion Local Funding Option Summary Table

Funding Option ¹	Proposed Rate	% Increase	Revenue (MM 2007 \$)	Significance	
				Rate Increase ²	Revenue Increase
Alcoholic Beverage Tax ³	Increase 10 percent	10%	\$ 1.9	●	○
Access Fee	\$100 per acre - commercial property near highway exits	N/A	\$ 1.5	●	○
Cigarette Tax ³	Increase \$0.25 per pack	10%	\$ 13.7	●	○
Earned Income Tax	Increase existing rates by 1 percent	1%	\$ 21.4	○	●
Fuel Sales and Use Tax	7.0 percent of consumer price	N/A	\$ 157.2	●	●
Hotel/Motel Occupancy Fee ⁵	Increase room rate by 1 percent	20%	\$ 1.8	●	○
Motor Vehicle Tire Fee	Increase \$1 per tire sold	67%	\$ 1.1	●	○
Occupational Privilege Tax	\$10 annually per employee	N/A	\$ 7.7	○	○
Parking Tax	\$20 per year per commercial parking space	N/A	\$ 22.5	●	●
Property Tax ⁴	Increase \$0.001 per assessed value	1.3% - 8.7%	\$ 108.3	●	●
Realty Transfer Fee ³	Increase existing rates by 1 percent	1.0%	\$ 1.1	○	○
Regional Toll Surcharge - Turnpike	\$1.00 surcharge on regional NJ Turnpike, Garden State Parkway and Atlantic City Expressway exits	46.3%	\$ 52.5	●	●
Regional Toll Surcharge - Bridges	\$1.00 Per 2 way crossing, split with Pennsylvania (Ben Franklin, Betsy Ross, Walt Whitman, Commodore Barry)	25%	\$ 27.4	●	●
Sales and Use Tax ³	Increase existing rate by 0.25 percent	3.6%	\$ 56.4	○	●
Surface Coverage Fee	\$5 per year per 1,000 square ft. of impervious surface cover	N/A	\$ 8.9	○	○
Tax Increment Financing (TIF) ⁴	Dedicate 10 percent of annual growth in region's property tax to a TIF	N/A	\$ 19.3	○	●
Toll Existing Highways	\$0.08 (avg.) per VMT on major regional highways	N/A	\$ 355.6	●	●
Transit Fare Increases ⁶	Increase all fares by 1 percent	1%	\$ 0.8	○	○
Vehicle Miles Traveled Fee	\$0.01 per vehicle mile traveled	N/A	\$ 152.6	●	●
Vehicle Registration Fee	Increase 10% per vehicle	10%	\$ 6.1	●	○

1. Where existing tax data is not available, DVRPC has estimated potential tax revenues using employment, traffic volume, vehicle ownership, or GIS data for existing development and surface coverage for the four-county NJ subregion.
2. Where tax is not in existence (identified as N/A in '% Increase' column) DVRPC has estimated the impact in comparison to similar tax payments.
3. Estimate is based on proportion of population in four-county NJ subregion to total statewide.
4. Estimate is derived using four-county NJ subregion tax revenues for 2007.
5. Assumes 2.2 million annual room rentals at average rate of \$81 per night.
6. Estimate provided by NJ Transit.

Source: DVRPC 2008

Legend:
 ● = Substantial Increase (> 10% or \$30 Million)
 ● = Moderate Increase (> 5% or \$15 Million)
 ○ = Slight Increase (< 5% or \$15 Million)

Tolling

DVRPC's *Options for Filling the Funding Gap* report considered the possibility of tolling existing 'free' highways, and adding regional toll surcharges to facilities that are already tolled. These fees relate to the use of specific transportation facilities. To be equitable, the pain of paying for transportation improvements should be spread amongst various facilities to make a minor impact on users throughout the region, as opposed to on fewer facilities which unfairly burdens only a portion of the region's transportation system users.

SAFETEA-LU further broadened Federal policy concerning tolling Interstates and other Federal-Aid highways. Continuing authority from Section 1216(b) of TEA-21 allows the tolling of up to three existing Interstate facilities to help pay for reconstruction. There is one authority remaining, which Pennsylvania applied for in 2008 for I-80 as a part of Act 44. The Commonwealth's request was denied by the previous administration. A resolution to this issue has yet to be identified.

The Value Pricing Pilot Program (VPP) in Section 1604(a) in SAFETEA-LU allows variable (congestion or time-of-day) tolls on existing or new highways with electronic toll collection. This program is limited to 15 slots, of which one remains. Residual tolls from this program may be used for other Title 23 highway projects.

The Express Lanes Demonstration Program (SAFETEA-LU Section 1604(b)) allows tolling on either new or High Occupancy Vehicle (HOV) lanes on Interstates, with electronic toll collection. This program is limited to 15 demonstration projects through 2009 to manage high levels of congestion by such means as variable toll rates by time of day or level of traffic; reduce emissions in a non-attainment area or maintenance area; finance the expansion of a highway, for the purpose of reducing traffic congestion, by constructing one or more additional lanes (including bridges, tunnels, supports, or other necessary structures) on the Interstate System.

The Toll Facility Agreements program (Title 23 Section 129(a)) allows states to toll projects that also receive Federal-aid grants for:

- Construction of new non-Interstates,
- Reconstruction of existing tolled facilities,
- Reconstruction and conversion of free bridges and tunnels to tolled, or
- Reconstruction and conversion of free non-Interstate highways.

Tolls must first be used for capital and operating outlays of that facility. Excess tolls may be used for other Title 23 highway projects.

Montgomery County has proposed creating tolls on US 422 and using the proceeds to pay for reconstruction and widening of this facility, as well to finance the construction and ongoing operating expenses associated with the R6 extension to Wyomissing, PA.

Public-Private Partnerships

Private sector involvement is a way to stimulate development of large scale projects given the region's current level of fiscal constraint. Transportation agencies around the country are experimenting with various forms of public-private partnerships (PPP's) as a way to finance, deliver, operate, and even maintain, highway and transit infrastructure. Some advantages of PPPs may include:

- Accelerating project development and construction, through design-build contracting,
- Transferring construction completion and performance risk away from government,
- Providing enhanced operation and customer service, as a result of performance-based compensation,
- Introducing new technologies, and
- Attracting net new investment capital that other might not be available.

There is a range of different possible PPP's arrangements. PPP's can be used as a means for project procurement such as a design-build contract, where the government assumes ongoing private operating and capital maintenance responsibility upon project completion. At the far extreme, a PPP could shift responsibility for designing, building, operating, maintaining, and financing a project to the private sector.

The proposed lease of the Pennsylvania Turnpike to generate additional transportation revenue is a recent example of an asset leasing PPP agreement. In these PPP's, a private entity (concessionaire) enters into an agreement to maintain and operate a public facility in exchange for the right to collect user fees. The agreement is for a finite period and the title of the facility remains with the governmental owner. Such an agreement essentially consists of a monetization (up-front sum) of future years' residual cash flows. Nationwide examples of these types of concessions include the leasing of the Pocahontas Parkway in Virginia, the Chicago Skyway in Illinois, and the Indiana Toll Road in Indiana.

A second type of PPP project involves the building of a new tolled facility by the private sector. In exchange for taking responsibility for building, operating, maintaining, and possibly even financing a net revenue generating project, the private enterprise controls the resulting financial rewards. A regional example of such a project was the design, build, operate, and maintain concession used to develop and operate the RiverLine between Trenton and Camden. This project was financed and continues to receive a subsidy from the New Jersey Transportation Trust Fund. Both PennDOT and the Pennsylvania Turnpike Commission have made limited use of design-build concessions. No long-term private concessions for transportation facilities have been made in Pennsylvania due to a lack of enabling legislation.

A third type of public-private partnership is the tolling of existing 'free' highways. With increasing fuel efficiency, inflation, and escalating construction costs, the traditional gas excise tax-based funding is inadequate to meet ongoing needs. Many of the highways built in the 1960s and 1970s are approaching the end of their 40-year life-cycle, and will require massive expenditure levels for reconstruction, which cannot be readily met from existing sources. I-95 in Philadelphia is an example of a roadway the region needs to reconstruct, but currently lacks the funding needed to fully carry out.

A fourth type of private public partnership utilizes private funds to build public projects. Both Pennsylvania and New Jersey have 'partnership acts' which encourage private developer contributions to advance transportation projects. These funds often come as a result of a major development impacting the local transportation network. The rationale for such an approach is that the developers contribution (or implementation in absence of public funds) serves to speed up project delivery, resulting in enhanced overall accessibility to the development. Partnership funds have helped finance many major transportation improvements in the past, such as the PA 29 and US 202 interchange in Chester County, and continue to be planned and implemented today. For example the Country Road 533 in Mercer County (LRP ID # 99) to add a lane of grade separated flyover in each direction over the intersection with Country 638 has received \$2 million in private developer funding. Where municipalities and developers can reach contribution agreements this can be a source of revenue for transportation improvements and can reduce the amount of funding the public needs to invest.

Call for Action

During the extensive public outreach conducted for the *Connections* plan, DVRPC outlined the challenge to increase local funding for transportation investments. Participants in focus groups spoke of the region's transportation system as a shining asset. They also agreed that rebuilding the system should be the top transportation priority and that it will take a substantial financial investment to accomplish it. Workshop participants were asked, among other questions, what their vision of the future transportation system is and how they would pay for it. Beyond the numerous calls for bicycling, walking, and transit improvements many participants were well aware of the transportation systems' value to the region and how it is tied to land-use, the environment, and the economy. The participants recognized that issues such as reducing automobile reliance, preparing for peak oil, and providing transportation alternatives are related to increasing density, preserving farmland and open space, and reducing greenhouse gas emissions. At the same time, they also recognized that it will be a difficult task to achieve these goals. Changing settlement patterns is not easy once they are in place and raising taxes to pay for transportation improvements is politically difficult to do. Nevertheless, virtually all workshop participants agreed on the need for action. The participants called for leadership to be shown on all these issues, including generating more revenue locally. While no consensus was reached on specific tax or fee mechanisms, there was general agreement that additional costs should be borne by users of the system. Other workshop participants called for incentives to promote development that can support the transportation and other goals of the Plan. Many pointed out that the key to promoting these ideas to the general public is to show what benefits the region will receive in return.

The *Connections* plan, through considerable public input, has attempted to create a vision of a more sustainable region in the future. Improving transportation infrastructure is a major key to achieving sustainability, and more funding is needed to make the vision reality. Transportation infrastructure does not exist in a vacuum - it shapes land-use, impacts the environment, and affects our global competitiveness. The Plan is about creating more choices for an aging population, where many retirees and young people are already showing a preference for smaller housing units located in dense, vibrant communities with easy access to alternative transportation. For those who prefer the suburban lifestyle, there will remain an ample supply of single-family suburban housing. Drivers will benefit from the provision of better information, improved safety and reduced congestion. However, the automobile and suburban house will not be the only option - car ownership can be more of a luxury, instead of a necessity. In a world of

increasing scarcity, growing concern about climate change, intense global competition, and an aging population, provision of mixed-use, transit-oriented communities are critical for reducing CO₂ emissions, attracting talent, and providing for quality of life.

To achieve this vision the region's residents and businesses will need to make the choices that support it. They will need to vote with their feet, as to where to locate, and with their wallet, to pay for the transportation improvements needed to make the Plan a reality. The Plan does not advocate any particular funding alternative. It is likely that a combination of several funding mechanisms is needed in order to fully fund the region's identified needs. However, since federal and state funding levels are not expected to increase and the region's local funding contribution is low compared to other large metropolitan areas, additional funding will most likely need to be raised here in Greater Philadelphia. This Plan is issuing a challenge to the region's leaders, stakeholders, and citizenry to reach consensus on new local and regional means to maintain and modernize the region's critical transportation infrastructure, which impacts not just our standard of living but our economic competitiveness and environmental sustainability.

Implementation

The *Connections* plan presents a blueprint for a sustainable future. However, it will remain only a plan unless it is implemented. As a regional entity, DVRPC is uniquely positioned to bring together area government, business, and non-profit leaders to begin discussing and taking action on many of the critical issues that will arise in coming years. DVRPC is already taking initiative on a number of the policies that are outlined in the Plan.

DVRPC Efforts

DVRPC strives to implement the vision and policies of the *Connections* plan through its work program and projects. To begin with, DVRPC serves as a regional information resource. The most up-to-date census and other data; state-of-the-art Geographic Information Systems (GIS); aerial photography; and various other economic, employment, housing, environmental, and transportation reports and information are maintained by DVRPC.

As part of its work program, DVRPC conducts corridor studies and local area plans. These studies involve working together with groups of communities along a corridor or area to consider what transportation improvements are needed, what impacts new transportation infrastructure will have on the local environment, what the area would like to look like and how it would like to function, and what steps are needed to get there. DVRPC also conducts detailed technical analysis on specific subjects such as climate change, Transit-Oriented Development (TOD), regional economic development strategies, civic design excellence, and local food production and distribution.

To implement the *Connections* Greenspace Network and Conservation Focus Areas at the local level, DVRPC offers New Jersey municipalities a program of services – the “Open Space and Natural Resource Planning Program” – through which a municipality can conduct in-depth planning to protect its important environmental resources, its land, and its quality of life. This successful program assists communities in assessing the current state of their resources, works with the public and community leaders to articulate a future vision, and develops specific municipal tools that a community can use to achieve its vision. Municipalities can choose from the following “market basket” of planning services to meet their diverse needs: Community Visioning, Environmental Resource Inventories, Open Space and Recreation Plans, Farmland Preservation Plans including Planning Incentive Grant applications, Conservation Elements of the Master Plan, Greenway Plans, build-out analysis, and environmental protection ordinances such as Conservation Subdivision Design. Natural resource protection tool usage in the region is monitored to gauge which municipalities are using which tools, so that underutilized tools can be targeted to communities that would benefit. Sample ordinances are also collected and posted on the DVRPC web site for municipalities to utilize.

DVRPC produces materials specifically designed to help municipalities throughout the region implement regional goals through its Municipal Implementation (MIT) brochures series. The MIT series are “how to” guides on a variety of planning topics related to the regional long-range plan. To date, 18 MITs have been produced and widely distributed to all the municipalities in the region, as well as to participants at various conferences covering the topics. A sampling of the subjects covered in the MITs: include Parking Management Strategies, Historic Preservation, Inclusionary Housing, Aging in Place, Form-Based Codes for Big Box Retail, Municipal Tree Management, Safe Routes to School, and Road Diets.

DVRPC also acts as a facilitator to bring together stakeholders throughout the region to discuss regional issues. A number of committees bring together elected officials, planners, professional practitioners, and the private sector.

- **The Regional Citizens Committee (RCC)** provides citizen access to, and participation in, the regional planning and decision-making process. The RCC Chairman sits as a non-voting member of the DVRPC Board and reports the RCC recommendations to the Board for its appropriate action.
- **The Land Use and Housing Committee** provides a regional forum for land use and housing issues facing Greater Philadelphia and directs land use and housing research and planning activities by DVRPC staff. The committee makes recommendations to the DVRPC Board and staff on issues to be addressed in the annual work program; keeps DVRPC Board and staff apprised of current and emerging citizen concerns relating to housing and land use; and serves in a technical review capacity on all related studies being conducted by DVRPC staff.
- **The Planning at the Edge Advisory Committee** attends to inter-regional issues and projects and provides outreach to adjacent metropolitan planning organizations and counties with the goal of achieving cooperative solutions. The committee was formed to help initiate discussion on proposed coordination, communication and cooperation techniques, issue and project priorities, and other potential collaborative activities.
- **The Regional Safety Task Force** brings together a multi-disciplinary group of professionals to reduce the number of crashes and the resultant casualties in the region. It meets quarterly to build effective partnerships, exchange information, and guide planning efforts.
- **The Transportation Operations Task Force**, composed of technical staff representatives from over 35 regional stakeholders, is the focal point of regional ITS coordination. The Task Force is a forum for agencies to share information on ITS deployments and incident management programs, develop a consensus on regional ITS issues and respond to federal initiatives. It has the ability to establish subcommittees to tackle specific issues as they arise.
- **The Delaware Valley Goods Movement Task Force** was established to maximize the region's goods movement capability by sharing information and technology between public and private freight interests, promoting the region's intermodal capabilities and capacity, and developing and implementing a regional goods movement strategy. It advises the DVRPC Board on all goods movement issues, studies and projects.
- **The Regional Aviation Committee** provides technical and policy guidance concerning regional airport systems planning to the Federal Aviation Administration, the states, and the Delaware Valley Regional Planning Commission. Membership is open to all aviation related professionals, local governments, consultants, and interested citizens.
- **The Central Jersey Transportation Forum** has been meeting since 1999 to address concerns of municipalities in Mercer, Middlesex, Somerset, and Hunterdon counties focused on the US 1 corridor. It gathers high-level representatives from twenty-one municipalities with relevant county, state, and other organizations to coordinate and to initiate solutions. The Forum itself is not an implementing agency. The key issues it addresses are east-west access; improving coordination of transportation and land use in this high growth, congested area; and transit.

- **The Tri-County Water Quality Management Board** was created by the resolution adopting the 208 Final Water Quality Management Plan on March 23, 1978. This resolution states that "the mission of the Tri-County Water Quality Management Policy Board would be to adopt policy for the continuing planning process, establish priorities for the implementation of the adopted 208 program, and direct the lead agency's 208 planning role in the Tri-County area within the regional framework established by DVRPC." It primarily serves to coordinate water supply and wastewater treatment plans for Burlington, Camden, and Gloucester counties and to maintain the Tri-County Water Quality Management Plan.
- **The Urban Waterfront Action Group (UWAG)** was created in 1980 through the Pennsylvania Coastal Zone Management (CZM) Program to provide "one-stop" shopping for information about waterfront development permits in the Delaware Estuary. The UWAG meets monthly, as needed, to provide a pre-permit application service whereby potential waterfront developers and regulatory agencies can meet to identify and hopefully resolve potential permitting issues. The UWAG meeting occurs in advance of detailed project engineering.
- **The Information Resources Exchange Group (IREG)** was formed in 1991 to provide a forum to discuss the creation, use, and exchange of planning-related information in the Greater Philadelphia region. IREG also promotes knowledge-sharing in the methods and technology for data analysis, synthesis, and presentation. To support its mission, IREG's activities and topics include data, metadata, modeling, forecasting, aerial imagery, geographic information systems, database systems, and the Internet as a data access and dissemination tool.
- **The Land Use, Transportation and Economic Development (LUTED) Forum** fosters enhanced communication, coordination and consistency between the goals and policies of regional land use and transportation plans and economic development strategies and among economic development and planning agency staff in southeastern Pennsylvania and southern New Jersey.

Finally, DVRPC's programs carry out and promote the goals of the long-range plan. Many of the examples below provide grant funding to municipalities and other entities in the region to conduct planning or marketing work that forward the mission of DVRPC.

Transportation and Community Development Initiative (TCDI)

TCDI provides grants to support local development and redevelopment efforts in the region's core cities, developed communities and mature suburbs. The grant program funds projects that will serve to improve the overall character and quality of life within these communities to retain and attract business and residents, thereby also reducing pressure for further sprawl and expansion into growing suburbs and rural areas of the region.

Efficient Growth for Growing Suburbs (EGGS)

The EGGS Program recognizes the challenges that the growing suburbs of the region face and provides grants to these municipalities to improve growth management and community design and to optimize the efficiency of their existing and planned transportation network, through better linking land use and transportation planning. EGGS grants support planning, design, preliminary engineering, ordinance writing, and feasibility studies such as roadway connectivity plans, transfer of development rights programs, and zoning and design guidelines for converting aging and automobile oriented industrial parks into thriving, mixed-use and pedestrian-oriented centers.

Strategies for Older Suburbs

The Strategies for Older Suburbs program focuses on revitalizing the older developed communities of the region. Work includes technical advice on redeveloping abandoned areas of land such as brownfields and greyfields, as well as providing an up-to-date directory of funding programs for older communities called the Resource Guide. The Strategies for Older Suburbs Program also partners with other organizations such as the Urban Land Institute on periodic forums to match up prospective developers with sites available for development in these older suburbs.

Classic Towns

The Classic Towns initiative grew out of the Strategies for Older Suburbs Program. Classic Towns is a marketing program that aims to promote the region's developed municipalities and neighborhoods as great places to live, work, and play. Classic communities are often at a competitive disadvantage when it comes to attracting new businesses and residents. While Greater Philadelphia as a whole is promoted as a tourist destination and center of commerce, many suburban municipalities and urban neighborhoods lack the resources necessary to launch sophisticated and effective marketing programs that target specific segments of the public. Classic Towns includes a promotional video, website, and targeted forums on public relations, marketing and other skill-development to help attract investment in these towns.

TransitChek

TransitChek is a commuter benefit program that employers can offer to their employees to help pay for commuting on transit. It saves employers and commuters money because the program takes advantage of federal legislation that allows tax-free dollars to pay for transit fares.

The Mobility Alternatives Program (MAP)

The Mobility Alternatives Program (MAP) can help companies improve their benefits package and even help employees save time and money on their commute. Using the MAP also helps reduce traffic and air pollution. MAP can help everyone find a better way to get to work in Southeastern Pennsylvania. Whether it is on transit, in a car pool or van pool, or even working from home, MAP has information on what the alternatives are and how companies and individuals can take advantage of them. In addition, there's information on incentives, emergency rides home, flex time, and parking management. DVRPC also offers Share-A-Ride, a free, comprehensive, computerized commute match service that can put employees in touch with the most convenient transit options or other commuters going their way.

Air Quality Partnership

The Air Quality Partnership is a public-private coalition of businesses and organizations that promote better air quality through voluntary actions to reduce air pollution. The partnership is administered by DVRPC and provides a daily air quality forecast for the region and tips to protect your health through a broad-based outreach effort.

Sustainable Skylines

The Sustainable Skylines Initiative is a partnership with EPA to coordinate efforts that have environmental and sustainability benefits for the region. DVRPC is convening local partners to develop projects that have quantifiable benefits for air quality, energy conservation, and quality of life issues. The Sustainable Skyline Partners cooperate to publicize sustainability efforts and attract new stakeholders to pool resources and maximize the benefits of these efforts for our region.

TreeVitalize Municipalities

TreeVitalize is a program launched in 2004 by the Pennsylvania Department of Conservation and Natural Resources (DCNR) to increase public awareness of the importance of community trees and to reverse the loss of tree cover in the state's metropolitan areas. DVRPC is an active partner in the TreeVitalize Municipalities Initiative, with the specific directive of helping local governments better incorporate tree management into their overall responsibilities, through widespread outreach and education, and connecting communities with technical and financial assistance for planting and maintaining trees.

Coastal Zone Management Program

The Coastal Zone Management Program (CZM) – is administered by DVRPC in the Commonwealth of Pennsylvania for the total region along the Delaware River. DVRPC assists with CZM grant applications, providing municipal assistance along the Delaware Estuary, and hosting the Urban Waterfront Action Group, which provides “one-stop shopping” for information about waterfront development permits.

Getting There

The *Connections* plan was developed with input from a broad array of regional stakeholders and the general public and is intended to be the region's plan for a sustainable future. Likewise, its implementation will also rely on a large cast of governmental entities; federal, state and local agencies; non-profit groups; and citizens. Attaining the vision and goals outlined in the Plan will require a collective effort and we will all need to consider the impact our individual actions have on the region. DVRPC will continue to work with regional stakeholders and the public to make the vision of the Plan a reality. By “thinking regionally but acting locally,” DVRPC is able to achieve coordinated and cooperative action across municipal, county, and state lines; across local, county, state, and federal agencies; and across the public and private sectors.

DVRPC supports multi-municipal planning as a foundation for implementing the Plan. Multi-municipal planning allows neighboring municipalities to develop a shared vision and to coordinate on various planning issues, including growth management, infrastructure provisions, preservation of natural and historic resources, and economic development. It can also help municipalities receive funding from state agencies, address issues that cross municipal boundaries, and reinforce the importance of local planning.

As the region implements the *Connections* plan, it will be important to determine whether the goals contained in the Plan are being met. The Tracking Progress project is designed to collect and compile a meaningful time series data set that can help DVRPC and its partners make more effective decisions. Tracking Progress is an on-going, outcome based effort to align DVRPC's planning and implementation activities, and it will guide the region's investment strategy to help achieve the vision and goals set forth in the *Connections* plan. In turn, these indicators will inform the development of the next long-range plan by identifying areas of strength and weakness and helping to prioritize initiatives within the Plan.

APPENDIX A



Revenue Assumptions

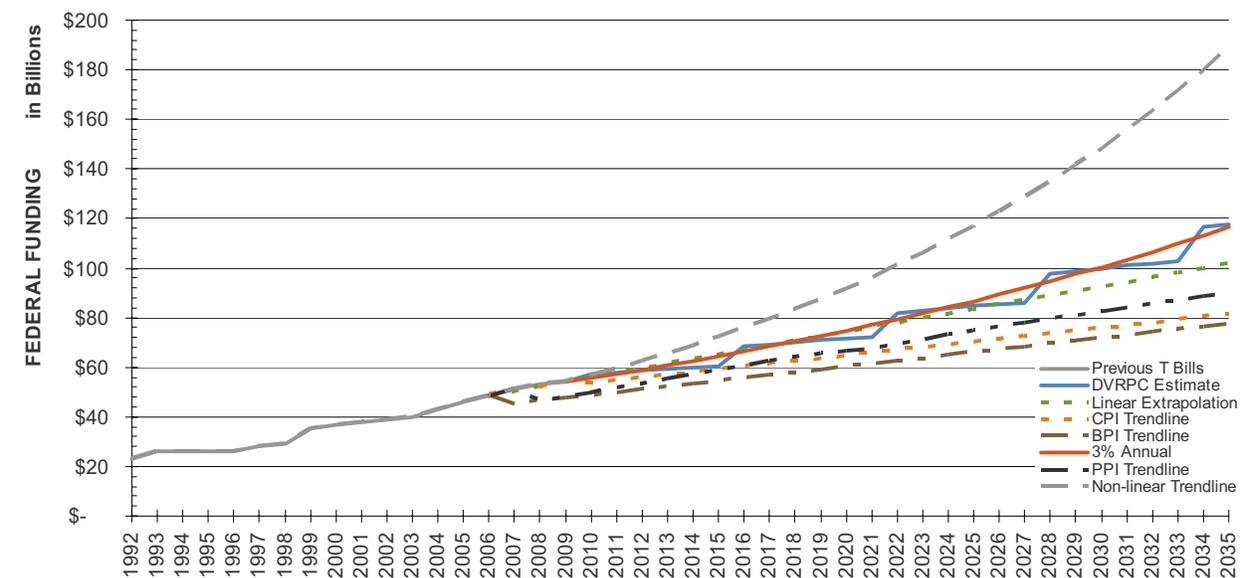
To estimate revenue for the *Connections* plan, DVRPC identified all federal, state, and local sources that the region can reasonably expect to receive through the year 2035. Revenue estimates from these sources were developed in consultation with federal, state, and transit partners, including:

- Federal Highway Administration (FHWA),
- Federal Transit Administration (FTA),
- Pennsylvania Department of Transportation (PennDOT),
- New Jersey Department of Transportation (NJ DOT),
- Southeastern Pennsylvania Transportation Authority (SEPTA),
- New Jersey Transit (NJ Transit),
- Port Authority Transit Corporation (PATCO) of the Delaware River Port Authority (DRPA), and
- Pottstown Urban Transit (PUT).

Previous State Transportation Improvement Programs (STIPs) and federal authorization levels serve as general guidelines as to how much funding the region can expect to receive in the future. Trends in historic funding levels are the basis for the expected levels of all future federal authorization acts. Highway distribution formulas used in this plan apply each state's share of the total authorized amount, and the DVRPC region's share of the state's share to calculate regional anticipated funding.

The figure below shows historic federal transportation funding levels from 1992 to 2009, and projected funding levels to 2035 using a variety of methods. The stepped line is DVRPC's forecast of future federal transportation authorizations.

Historic and Forecasted Authorized Federal Transportation Funding Level (Nationwide)



Source: DVRPC 2009

Revenue estimates are for capital project expenditures only, and do not include any operating funds. All anticipated revenue amounts are in year-of-expenditure dollars, as required by federal regulations. No new or undefined funding sources are recognized for the fiscally constrained plan. Relevant planning principles and financial assumptions are detailed in the following sections.

Funding Distribution Formulas

Federal formulas determine the funding distribution levels to each state. The figure below reflects the current highway apportionment to each state, as defined by Title 23 Section 104(2) of the United States Code. Future year state shares of federal funding are uncertain because of ongoing controversy between donor and donee funding states. The *Connections* plan assumes that future year changes to state shares are likely to occur. Pennsylvania is a donee state, i.e. it receives more federal funding than it pays in taxes and fees. It is likely to receive a lower percent of allocated funds in the future. New Jersey is a donor state, i.e. it pays more taxes and fees than it receives back in revenue. It is likely to receive a higher percent of federal funding in the future.

Distribution of Federal Funds to States

Time Period	PA Statewide		NJ Statewide	
	Highway	Transit	Highway	Transit
Short-term (2010-15)	4.4%	4.5%	2.9%	7.2%
Long-term (2016-35)	4.3%	3.7%	3.3%	6.2%

Source: DVRPC 2009

A percent of these federal funds are allocated to each of the MPOs and RPOs in the state. The figure below presents the anticipated DVRPC share of each state's federal funds based on guidance from both PennDOT and NJDOT.

DVRPC currently is slated to receive about 23.5 percent of the federal funds distributed among the MPO/RPO regions in Pennsylvania. Further, the region could expect to receive about 32 percent of the Interstate Management Program funds. In the future, DVRPC assumes the region's share of federal highway funds in Pennsylvania will trend upward to more closely approximate its 31 percent share of the state's population. State highway funds are expected to follow the same trend. Therefore, the short- and long-term shares of 22.4 percent and 26.0 percent are conservative. The short-term share is lower than the agreed to share since it is based on the actual TIP funding. This funding is partly dependent on the region's ability to deliver elements of the Interstate Management Program (IMP). Once PennDOT's District 6 sections begin to be reconstructed, DVRPC's share of the IMP will become much higher, making the region's overall state share higher.

Distribution of Federal Funds to the Region

Time Period	DVRPC PA Subregion		DVRPC NJ Subregion	
	Highway	Transit	Highway	Transit
Short-term (2010-15)	22.4%	70.6%	17.9%	8.8%
Long-term (2016-35)	26.0%	67.0%	20.0%	12.0%

Source: DVRPC 2009

Likewise, the New Jersey subregion anticipates maintaining the current percent of funding allocated to the DVRPC region as in the 2009 TIP in the short-term. Burlington, Camden, Gloucester, and Mercer Counties represent about

19 percent of New Jersey's total population. DVRPC expects this region to grow faster than the rest of the state over the next 25 years, resulting in higher allocation percentages in the future.

While federal funds to the region are dependent on national authorization bills, state funding is set by state law. Pennsylvania dramatically changed funding levels and formulas with Act 44 of 2007, and may change again in 2010. New Jersey will likely see a major change in 2011.

The figure below presents the state funding allocations for the DVRPC region based on the State Transportation Improvement Programs (STIPs) for both Pennsylvania and New Jersey. New Jersey percent allocations in the short-term are based on recent state funding allocations in the STIP, while long-term recognizes higher growth is likely to occur in the southern part of the state. In Pennsylvania, Section 1517 Capital Improvements funds are allocated by formula: the percent of transit passengers in the region compared to the total passenger ridership on all transit systems in the Commonwealth. Section 1514 funds are allocated by grant. It is assumed the region will receive a similar percent of the grant allocated funds as formula allocated.

Distribution of State Funds to Region

Time Period	DVRPC PA Subregion		DVRPC NJ Subregion	
	Highway	Transit	Highway	Transit
Short-term (2010-15)	20.7%	69.9%	8.8%	16.2%
Long-term (2016-2035)	26.0%	67.0%	12.0%	25.0%

Source: DVRPC 2009

Estimated Revenue for the *Connections* Plan

Using a three percent compounded annual increase in existing state and federal funding levels, DVRPC computed future funding expectations based on the above funding formulas. The Pennsylvania subregion allocates 56 percent, \$22.7 billion, to highway and bridge funding; and the remaining 44 percent, \$17.9 billion, for transit funding. Total funding for the Pennsylvania subregion is \$40.6 billion over the life of the *Connections* plan. The New Jersey subregion allocates 61 percent, \$14.9 billion, to highway and bridge funding; and the remaining 39 percent, \$9.3 billion, to transit funding. Total funding for the New Jersey subregion is \$24.2 billion over the life of the Plan. The figure below shows the projected revenue by mode.

DVRPC Region Funding Levels by Source and Mode (in billions of Y-O-E \$s)

Mode	Source	PA Sub-region	NJ Sub-region	LRP Total
Highway	Federal	\$ 18.0 B	\$ 10.4 B	\$ 28.3 B
	State	\$ 4.2 B	\$ 4.5 B	\$ 8.7 B
	Local	\$ 0.5 B	\$ 0.1 B	\$ 0.6 B
	Highway Total	\$ 22.7 B	\$ 14.9 B	\$ 37.5 B
Transit	Federal	\$ 10.6 B	\$ 3.0 B	\$ 13.6 B
	New-Start/Small-Start	\$ 1.2 B	\$ 1.2 B	\$ 2.4 B
	State	\$ 5.3 B	\$ 5.1 B	\$ 10.4 B
	Local	\$ 0.8 B	\$ 0.1 B	\$ 0.9 B
	Transit Total	\$ 17.9 B	\$ 9.4 B	\$ 27.3 B
DVRPC Total		\$ 40.6 B	\$ 24.2 B	\$ 64.8 B

Source: DVRPC 2009

Connections anticipates \$64.8 billion year of expenditure dollars in total federal, state, local, Small and New Starts funding over the life of the 26-year Plan. Compared to the 25-year *Destination 2030* revised funding projections, this is an increase of \$4.9 billion. Approximately \$2.5 billion of the total revenue increase is due to the additional year of funding.

Compared to revenue estimates in the revised *Destination 2030* Plan, federal and state highway funding is estimated to increase by \$4.8 billion to help keep up with inflation. Federal transit revenues are expected to increase by \$2.3 billion for the Pennsylvania subregion and \$0.5 billion for the New Jersey subregion. Both Pennsylvania and New Jersey currently have lower state transit capital funding than was anticipated in *Destination 2030*. Over the life of the *Connections* plan, the Pennsylvania subregion projects a decrease of \$2.1 billion in state and local transit funding, while the New Jersey subregion also forecasts a \$1.0 billion dollar decrease, compared to the previous plan. Act 44 of 2007 increased operating subsidies to transit agencies in Pennsylvania. In New Jersey, the Trans Hudson tunnel project is directing more short-term capital expenditures to the northern section of the state.

APPENDIX B



Transportation Needs Assessment

Federal regulations require DVRPC to consider the effects of inflation in its financial plan. In this appendix, each subcategory's identified need is discussed and presented in 2009 dollars. When introduced in the main body of this report, the need has been translated to year-of-expenditure dollars using a four percent compounded annually rate of inflation. Before converting to y-o-e dollars, the impacts of the American Recovery and Reinvestment Act (ARRA) were considered by reducing investment need in the first plan funding period (2010-2015).

The following sections identify needs assessment for highway, transit, and freight rail infrastructure in both the Pennsylvania and New Jersey subregions. The final section of this appendix lists the ARRA funding for each subcategory in the financial plan.

Pennsylvania Subregion Highway Needs Assessment

The financial needs assessment for highways in the five-county Pennsylvania subregion is reviewed in the following sections. The needs assessment draws heavily on PennDOT's asset management systems.

H1. Highway Pavement Reconstruction, Rehabilitation, Resurfacing, and Restoration

This is a capital maintenance category for roadway pavement. DVRPC and PennDOT worked together to identify total funding needs for state and federal highway reconstruction, rehabilitation, resurfacing, and restoration expenditure. The funding needs are based on defining a state of good repair (SOGR) for the network. Estimates are then based on what level of investment is needed to achieve a SOGR and then how much funding is required on an ongoing basis to maintain it.

State DOTs are required to maintain a Pavement Management System (PMS) which tracks the condition of all federal and state maintained roadways. The PMS tracks conditions for each road segment in the region. One condition that PennDOT closely monitors is the International Roughness Index (IRI) for each road segment. The IRI tracks pavement roughness condition on a scale of about 70 to 220. Depending on the functional class of road, different IRI ratings are acceptable, see figure below. Roadway that is in 'poor' condition by its IRI rating is considered deficient. PennDOT maintains approximately 10,818 lane miles (2 directions) of roadway in the DVPRC region. Of these, approximately 19.4 percent are currently in a deficient condition.

PennDOT International Roughness Index Reporting Guidelines

IRI Ranges (inches per mile)	National Highway System		Non-National Highway System	
	Interstate	Non-Interstate	ADT ≥ 2000	ADT < 2000
≤ 70	Excellent	Excellent	Excellent	Excellent
71-75	Good	Excellent	Excellent	Excellent
76-100	Good	Good	Excellent	Excellent
101-120	Fair	Good	Good	Good
121-150	Fair	Fair	Good	Good
151-170	Poor	Fair	Fair	Good
171-195	Poor	Poor	Fair	Fair
196-220	Poor	Poor	Poor	Fair
>220	Poor	Poor	Poor	Poor

Source: PennDOT 2004

PennDOT defines a state of good repair as reducing the percent of deficient lane miles less than 10 percent of the total system. PennDOT's pavement expenditure needs are based on achieving a state of good repair by 2020.

'Preventative Maintenance' (H1.01) is estimated by PennDOT to require \$25 million annually to achieve and maintain a state of good repair.

'Resurfacing' (H1.02) is estimated by PennDOT to require \$60 million annually to achieve and maintain a state of good repair.

'Rehabilitation and Reconstruction' (H1.03) is estimated by PennDOT to require \$54 million annually to achieve and maintain a state of good repair.

'Local and County Federal Aid Roadways' (H1.04) comprise approximately 1,827 linear miles of roadway in the five-county Pennsylvania subregion. These roads are assumed to be a similar level of deficiency as those maintained by PennDOT. As a result, additional money is set aside in the short and mid-periods in order to bring these roads to a state of good repair. Once a SOGR is achieved in 2020, an ongoing investment of \$25,000 per linear mile per year is set aside to maintain them. This includes preventative maintenance, resurfacing, and rehabilitation needs for these roadways.

The figure below presents all estimated Highway Reconstruction, Rehabilitation, Resurfacing, and Restoration needs in the Pennsylvania subregion over the life of the *Connections* plan. Total H1 need over the life of the *Connections* plan is estimated to be \$5.29 billion.

Pennsylvania Subregion Highway Pavement Reconstruction, Rehabilitation, Resurfacing, and Restoration (H1) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA H1	Subcategory	2010-15	2016-25	2026-35
H1.01	Preventative Maintenance	\$ 150.0	\$ 250.0	\$ 250.0
H1.02	Resurfacing	\$ 360.0	\$ 600.0	\$ 600.0
H1.03	Rehabilitation & Reconstruction	\$ 324.0	\$ 540.0	\$ 540.0
H1.04	Local and County Federal Aid Roadways	\$ 457.0	\$ 689.7	\$ 530.3
H1	PA Pavement Reconstruction, Rehabilitation, Resurfacing, Restoration Total	\$ 1,291.0	\$ 2,079.7	\$ 1,920.3

Source: DVRPC 2009

H2. Highway Bridge Replacement and Restoration

DVRPC and PennDOT identified total funding needs for state and federal bridges based on identifying a SOGR for the network, what needs to be done to get the system into a SOGR, and how many years it will take to accomplish. Once SOGR is achieved, the DOT determined how much annual funding is needed to maintain it.

State DOTs are required to maintain a Bridge Management System (BMS) which tracks the structural condition of key bridge elements for all bridges greater than 20 feet in length, regardless of ownership. The BMS scores the condition of the deck, substructure and superstructure on a scale of 0 to 9, any of these items scoring a four or below indicates work is needed on the bridge. Using these three ratings, the bridge database calculates an overall sufficiency rating with a score between 0 and 100. A score under 80 indicates the bridge is in a deficient condition and needs to be rehabilitated. A score under 80 also makes a bridge eligible to receive federal funding. A sufficiency score less than 50 signifies the bridge may need to be replaced.

Approximately 23 percent of the Pennsylvania subregion's nearly 27.8 million square feet of bridge deck area is currently in deficient condition. PennDOT considers a state of good repair to be reducing this amount to less than 10

percent deficient status by deck area. PennDOT's bridge expenditure needs are based on achieving a state of good repair by 2020.

'Maintenance' (H2.01) needs are estimated by PennDOT to be \$20 million per year.

'Painting' (H2.02) needs are estimated by PennDOT to be \$10 million per year.

'Bridge Rehabilitation and Replacement' (H2.03) needs are estimated to be \$525 million per year to achieve a SOGR, and \$333 million per year to maintain it. This subcategory also includes bridge deck, superstructure, substructure, viaduct, and parapet rehabilitation or replacement.

'Bridge Removal' (H2.04) needs are based on maintaining current spending levels in the 2009-12 DVPRC TIP.

'Dam Replacement or Rehabilitation' (H2.05) needs estimate is based on maintaining current annual spending levels in the 2009-12 DVRPC TIP.

The figure below presents all estimated Bridge Restoration or Replacement needs in the Pennsylvania subregion. Total estimated need over the life of the *Connections* plan is \$11.6 billion (in 2009 dollars).

Pennsylvania Subregion Highway Bridge Replacement and Restoration (H2) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA H2	Subcategory	2010-15	2016-25	2026-35
H2.01	Maintenance	\$ 120.0	\$ 200.0	\$ 200.0
H2.02	Painting	\$ 60.0	\$ 100.0	\$ 100.0
H2.03	Bridge Rehabilitation or Replacement	\$ 3,147.6	\$ 4,288.4	\$ 3,330.8
H2.04	Bridge Removal	\$ 3.1	\$ 5.1	\$ 5.1
H2.05	Dam Replacement or Rehabilitation	\$ 0.8	\$ 1.3	\$ 1.3
H2	PA Bridge Replacement, Restoration Total	\$ 3,331.5	\$ 4,594.8	\$ 3,637.2

Source: DVRPC 2009

H3. Highway Operational Improvements

The operational improvements category includes projects such as interchange reconstruction, roadway realignments, new turn lanes, etc. The majority of these projects improve the safety of the highway system. Since the need for operational improvements is potentially infinite, this is a difficult category to assess. As a result, DVRPC used current 2009-12 expenditure levels to estimate operational improvement needs.

'Interchange Reconstruction or Realignment' (H3.01) have an estimated annual need of \$28.8 million based on the current funding levels in the 2009-12 DVRPC TIP.

'Operational Improvements' (H3.02) are estimated to need \$7.1 million per year based on the current funding levels in the 2009-12 DVRPC TIP.

'Roadway Realignment' (H3.03) are estimated to need \$215,000 annually based on the current funding levels in the 2009-12 DVRPC TIP.

'New Turn Lanes' (H3.04) are estimated to need \$6.7 million per year based on the current funding levels in the 2009-12 DVRPC TIP.

'National Highway System Connections' (H3.05) grants an average of \$500,000 per year for improving port facility access along the Delaware River.

'Other' (H3.06) operations needs are estimated to be \$4.4 million annually for Regional Safety Initiatives (HSIP), rail crossings, etc. based on the current funding levels in the 2009-12 DVRPC TIP.

The figure below presents the estimated total need for operational improvements in the Pennsylvania subregion over the life of the *Connections* plan. Total need is estimated to be \$1.24 billion in 2009 dollars.

Pennsylvania Subregion Highway Operational Improvements (H3) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA H3	Subcategory	2010-15	2016-25	2026-35
H3.01	Interchange Reconstruction, Realignment	\$ 173.0	\$ 288.3	\$ 288.3
H3.02	Operational Improvements (Channelization, Roundabouts, Access Management)	\$ 42.7	\$ 71.1	\$ 71.1
H3.03	Roadway Realignment	\$ 1.3	\$ 2.2	\$ 2.2
H3.04	New Turn Lanes	\$ 40.1	\$ 66.8	\$ 66.8
H3.05	National Highway System Connectors	\$ 3.0	\$ 5.0	\$ 5.0
H3.06	Other (Rail Crossings, Regional Safety Initiatives, Pavement Markings, etc)	\$ 26.6	\$ 44.3	\$ 44.3
H3	PA Safety and Operational Improvement Total	\$ 286.6	\$ 477.6	\$ 477.6

Source: DVRPC 2009

H4. Highway ITS and Signal

DVRPC's transportation operations staff developed the Transportation Operations Master Plan for the nine-county region. The purpose of the Plan is to present a comprehensive long-term vision of transportation operations, bridging individual programs to create a cohesive regional vision. It was developed in cooperation with DVRPC's Transportation Operations Task Force (TOTF), which is composed of traffic, transit, and emergency management operators in the region. The ITS Master Plan highlights four major operational themes: incident management, traffic management, transit operations, and traveler information. Several operational needs emerged, including obtaining real-time accurate information, sharing information among agencies and with the public, and having the appropriate resources available to respond to incidents. The Transportation Operations Master Plan identifies operational strategies such as the addition of transportation operations centers, variable speed limit signs, closed circuit TV cameras, weigh-in-motion detectors, modernization of traffic signals, closed loop traffic signal systems, cyclical resynchronization of traffic lights, and locations for parking management systems.

Transportation operations has unique funding and implementation requirements. While Intelligent Transportation Systems (ITS) projects are like other major transportation capital investments, in that they are funded through the TIP, there is substantial maintenance and operations costs associated with them. Hardware, software, and communications have to be continually maintained and updated to remain consistent with latest IT standards.

'ITS Deployment' (H4.01) cost estimate includes laying communications fiber along highway corridors where needed; infilling CCTV and VMS on I-95, I-476, and I-676 and adding VMS signs to their approach roads. ITS will also be deployed on sections of US 1, US 30, US 202, US 422, PA 63, PA 100, and PA 309. This subcategory also includes estimates for Road Weather Information Systems (RWIS) and Road Treatment Systems spread throughout the PA subregion. Cost estimates for Delaware River Port Authority (DRPA) Infrastructure include a total of \$8.9 million over the life of the Plan for VMS, closed circuit TV, and detectors on its four bridges spanning the Delaware River. This DRPA cost estimate is the Pennsylvania subregion only, and includes only the federally funded portion.

'Traffic Operations Center(s)' (H4.02) new and ongoing needs include funding ongoing capital maintenance for the PennDOT District 6 Regional Traffic Management Center at about \$800,000 a year. Costs also include new and ongoing capital maintenance needs for DRPA's Traffic Operation Center (TOC) and Philadelphia Streets Department's TOC. Cost for each new TOC is estimated to be \$500,000 and \$750,000 respectively. Ongoing capital maintenance needs are programmed in each period at \$200,000 for each TOC.

'Incident Management' (H4.03) expands emergency service patrols (ESP) on Interstates from 8 or 16 hour weekday coverage to full 24/7 coverage. It is assumed that coverage on I-95, I-76, and I-476 will be expanded to 16 hours per day in the first funding period, extended again to 5 days at 24 hours per day in the middle period, and extended to full 24/7 coverage in the final period. Other limited access highways such as US 1, US 30, US 202, US 422, and PA 309 that currently have limited or no ESP coverage will expand to peak period or 16 hour per day coverage. Regional ITS coordination funding utilizing Regional Integrated Multi-Modal Information Sharing (RIMIS) is included in this subcategory. Major upgrades to the RIMIS system are estimated to occur every eight years, at a cost of \$800,000 per upgrade. Data Interface (DI) investments are planned to connect with DRPA, Pennsylvania Turnpike, county and state Computer Aided Dispatch (CAD) services, and other emergency service software systems. Funding in this subcategory also includes \$600,000 in the first period and \$1,000,000 in each of the last two funding periods for incident management task forces; \$240,000 in the first funding period and \$400,000 in the second period and \$500,000 in the final funding period for an incident management grant initiative; \$33,500 in the first funding period and \$67,000 in each of the final two funding periods to advertise 'Quick Clearance' incident management policies as part of a region wide campaign; and \$84,000 in the near-term and \$105,000 in the mid- and long-term periods for accident investigation equipment.

'Traffic Management Systems' (H4.04) includes estimates for ramp metering for ramps on I-95, I-476, US 30 Bypass, US 422, and PA 309. This subcategory also contains cost estimates for variable speed limit signs installed on I-76, I-95, I-476, I-676, US 1, US 30, US 422, PA 63 and PA 309. The total cost to install these efforts over all three funding periods, including capital maintenance, is \$31.4 million.

'Signal systems' (H4.05) includes a signal retiming program, an ongoing retiming of signals on a five year cycle, estimated to cost \$24.9 million over the life of the Plan at an average cost of \$3,500 per signal. This section also includes a Signal Upgrade Program to place new closed loop signal systems in Bucks, Chester, Delaware and

Montgomery counties at a total cost of \$195 million over the life of the Plan. This subcategory also includes a signal timing and upgrade program in Philadelphia estimated to cost \$70.8 million over the life of the Plan.

The figure below shows costs for all Pennsylvania subregion ITS and signal needs over the life of the Plan. Total needs assessment for this category is estimated to be \$1.02 billion (in 2009 dollars).

Pennsylvania Subregion Highway ITS and Signal (H4) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA H4	Subcategory	2010-15	2016-25	2026-35
H4.01	ITS Deployment	\$ 104.2	\$ 171.1	\$ 184.1
H4.02	Traffic Operations Center(s)	\$ 6.4	\$ 9.3	\$ 9.3
H4.03	Incident Management	\$ 33.2	\$ 68.5	\$ 95.4
H4.04	Traffic Management Systems	\$ 3.9	\$ 13.8	\$ 13.7
H4.05	Traffic Signals	\$ 79.0	\$ 122.9	\$ 106.8
H4	PA ITS and Signal Total	\$ 226.7	\$ 385.6	\$ 409.3

Source: DVRPC 2009

H5. Highway New Capacity

Highway new capacity funding was limited by DVRPC and partner agency policy to 10 percent of total highway revenue for each state subregion in the *Destination 2030* plan. Need estimate was developed by updating the costs from the Major Regional Project list in the *Destination 2030* long-range plan. Rising project costs increased this need to more than 10 percent of available revenue, meaning some projects from the previous plan had to be removed. The final list of highway new capacity projects were selected by the Long-Range Plan Subcommittee for each state subregion.

New capacity projects that have significant impact on regional travel patterns are deemed to be Major Regional Projects. These projects are listed individually in the Plan. DVRPC developed a set of selection criteria to compare and judge the merits of each major regional new capacity project proposed for the long-range plan. Project selection occurs in two phases. The first phase is a project screening phase to verify the proposed project is consistent with DVRPC’s Congestion Management Process (CMP) and is primarily located in the existing development or future growth areas identified in the Plan’s land use map. This is further detailed in Appendix C on Major Regional Project Evaluation.

‘Major Regional Project’ (H5.01) need estimate was developed based on the project list on the updated *Destination 2030* Major Regional new capacity projects that have not been completed in the meantime.

In addition to major new capacity projects, there are some minor, non-regionally significant new capacity projects (H5.02) that will fall into this category as noted by DVRPC’s Congestion Management Process (CMP). These projects are typically road widenings or extensions of less than 3 miles in length and are located on minor arterial or collector roads.

'Minor New Capacity' (H5.02) need is estimated based on continuing current funding levels in the 2009-12 DVRPC TIP. Current examples of such projects from the 2009 Pennsylvania TIP include: Bristol Road Extension from US 202 to Park Avenue (MPMS #12923); PA 252 (Providence Road) widening from Palmers Mill Road to Kirk Lane (MPMS #15345); County Line Road extension from Bustletown Pike to Philmont Avenue (MPMS #57629); Belmont Avenue from PA 23 to I-76 (MPMS #64795); PA 463 Horsham Road from N. Wales Road to General Hancock Road (MPMS #64811); Sumneytown Pike from Allentown Road to Beaver Street (MPMS #64017); Boot Road extension bridge over Brandywine Creek (MPMS #83710); US 1 widening to 6 lanes from Kennett Square Bypass to Greenwood Road (MPMS #14541), and Ridge Pike from Butler Pike to Philadelphia intersection improvements, widening from 4 to 6 lanes (bottleneck removal) and reconstruction (MPMS #16577). This need is estimated to be higher in the short-term, due to the large number of projects underway and then decreasing to about \$7.7 million per year in the mid- and long-term Plan periods.

Total expenditure need for new capacity over the life of the Plan is estimated to be \$1.63 billion (in 2009 dollars), see figure below.

Pennsylvania Subregion Highway New Capacity (H5) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA H5	Subcategory	2010-15	2016-25	2026-35
H5.01	Major Regional Project	\$ 519.4	\$ 694.0	\$ 170.6
H5.02	Minor New Capacity	\$ 89.3	\$ 77.0	\$ 77.0
H5	PA New Capacity Total	\$ 608.6	\$ 771.0	\$ 247.6

Source: DVRPC 2009

H6. Bicycle and Pedestrian

This category contains a number of areas such as landscaping, beautification, signage, street furniture, etc. Estimated need for these categories was based on current funding levels in the 2009-12 DVRPC TIP, as well as some target funding levels to increase the region's bike and pedestrian friendliness in order to help achieve some of the Plan's goals.

'Sidewalk' (H6.01) need is based on the installation of roughly 75 miles of sidewalks throughout the Pennsylvania subregion. Sidewalk costs are estimated at \$150,000 to \$250,000 per mile depending on issues such as drainage, number and location of crosswalks, and any type of obstacle removal.

'Streetscaping' (H6.02) is based on continuing current funding levels in the 2009-12 DVRPC TIP.

'Multi-use Bike/Ped Paths' (H6.03) need is based on building the roughly 600 miles of uncompleted trails proposed in the Plan. The cost for these trails is estimated at \$250,000 per mile. The average trail can cost anywhere between \$10,000 and \$500,000 based on a multitude of different factors, from acquisition to location to surface treatment.

'Bike/Ped Safety Improvements' (H6.04) need estimate is based on continuing current funding levels in the 2009-12 DVRPC TIP.

'Pedestrian Bridge/Tunnel' (H6.05) needs are based on continuing current funding levels in the 2009-12 DVRPC TIP.

'Other Bike/Ped Improvements' (H6.06) includes items such as bike lanes, installation of bike racks, ADA accessible curb cuts, etc. More need for this category is shown in the first and second funding periods to reflect a court order mandate for PennDOT to provide ADA accessible curb cuts throughout the Commonwealth. The second and third Plan periods shift more funding to the provision of bike lanes and other facilities.

Total bicycle and pedestrian need is estimated to be \$481 million (in 2009 dollars) over the life of the financial plan, see figure below.

Pennsylvania Subregion Bicycle and Pedestrian (H6) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA H6	Subcategory	2010-15	2016-25	2026-35
H6.01	Sidewalks	\$ 4.0	\$ 5.9	\$ 9.9
H6.02	Streetscaping	\$ 3.5	\$ 5.2	\$ 8.6
H6.03	Multi-use Paths	\$ 38.9	\$ 58.3	\$ 109.2
H6.04	Ped/Bike Safety Improvements	\$ 4.3	\$ 6.5	\$ 10.8
H6.05	Pedestrian Bridge / Tunnel	\$ 0.9	\$ 1.3	\$ 2.2
H6.06	Other Bike / Ped Facilities	\$ 82.8	\$ 78.2	\$ 50.4
H6	PA Bicycle and Pedestrian Total	\$ 134.3	\$ 155.4	\$ 191.1

Source: DVRPC 2009

H7. Highway Other

To develop the 'Highway Other' need assessment, DVRPC maintained current spending levels for most of the subcategories over the life of the Plan, updating in instances where PennDOT was able to give a better cost estimate.

'Signage' (H7.01) needs are based on an estimated 1,000 sign structures in PennDOT's District 6-0 coverage area, each holding 1 or more signs. Assuming 1.5 signs per structure, and approximately \$5,000 per to resheet, repair, or replace each between now and 2035 total need is approximately \$78 million, or \$3 million per year. Other signage maintenance responsibilities are estimated at \$2 million per year.

'Park and Ride' (H7.02) need estimate is based on maintaining current funding levels in the 2009-12 DVRPC TIP.

'Drainage Management' (H7.03) and 'Other' (H7.06), which includes parking facilities, new rail tracks and security, etc. are both based on maintaining current funding levels in the 2009-12 DVRPC TIP.

'Environmental Mitigation' (H7.04) costs are generally included with project costs, but in some instances a specific environmental mitigation project is not attached to a specific highway project. This line item is for the non-project specific needs, including wetland mitigation, cultural resource preservation, etc.

'Debt Service' (H7.05) has no associated costs in the Pennsylvania subregion.

'Other' (H7.06) includes items such as parking facilities, rail investments, security, CMAQ program, TransitChek marketing, air quality partnership funding, and Transit Management Association (TMA) funding.

Total highway other need is estimated to be \$243 million (in 2009 dollars) over the life of the financial plan, see figure below.

Pennsylvania Subregion Highway Other (H7) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA H7	Subcategory	2010-15	2016-25	2026-35
H7.01	Signage (Capital and Maintenance)	\$ 30.0	\$ 50.0	\$ 50.0
H7.02	Park and Ride	\$ 0.5	\$ 0.9	\$ 0.9
H7.03	Drainage Management	\$ 0.9	\$ 1.4	\$ 1.4
H7.04	Environmental Mitigation	\$ 9.4	\$ 15.6	\$ 15.6
H7.05	Debt Service	\$ -	\$ -	\$ -
H7.06	Other	\$ 15.4	\$ 25.7	\$ 25.7
H7	PA Other Total	\$ 56.2	\$ 93.6	\$ 93.6

Source: DVRPC 2009

Pennsylvania Subregion Transit Needs Assessment

Needs assessment for transit in the five-county Pennsylvania subregion is defined in the following sections. The needs assessments were developed by DVRPC working with SEPTA, DRPA/PATCO, and Pottstown Urban Transit (PUT).

T1. Rail Infrastructure Rehabilitation and Restoration

SEPTA and DRPA/PATCO identified all major rail infrastructure improvements each agency expects to make over the next 26 years. This includes bridges, rails, rail ties, beds, signals, catenaries, and power stations. The agency reviewed its infrastructure and developed regular maintenance cycles, as to how often they need to be rehabilitated, restored, or replaced.

'Track Rehabilitation, Replacement' (T1.01) assumes a regular maintenance schedule for all 407 SEPTA owned revenue track miles.

'Catenary Rehabilitation/Replacement' (T1.02) assumes a regular maintenance schedule for all SEPTA owned revenue track miles with catenaries (349 miles).

'Signal Rehabilitation/Replacement' (T1.03) assumes a regular maintenance schedule for signaled SEPTA owned revenue track miles (316 miles, plus another 24 revenue track miles which have very basic signal systems for the Routes 101 and 102). The need per track mile to rehab/replace signals is estimated to average \$1.0 million/mile. This line item includes the cost to implement 'Positive Train Control. A mandate from Congress requires that all Class 1 railroad operators implement this system as a safety improvement by 2015. The Rail Safety Improvement Act of 2008 authorized \$250 million of discretionary 'Railroad Safety Technology Grants' (\$50 million per year for five years) to

assist operators with the implementation of PTC technology. Total cost for this line item is estimated to be \$224.2 million in the first funding period.

'Rail Bridge Improvements' (T1.04) assume a regular maintenance schedule for all SEPTA owned rail bridges.

'Regional Substation Improvements' (T1.05) expenditure needs estimate provided by SEPTA.

'Tunnel/Tunnel Support Systems' (T1.06) needs estimate provided by SEPTA.

'Amtrak Owned Lease Agreements' (T1.07) needs are based on SEPTA's existing lease agreement with Amtrak. For use of Amtrak owned track miles in the Pennsylvania subregion (240 miles)

'Amtrak Owned Track Rehabilitation/Resurfacing/Replacement' (T1.08) assumes a regular maintenance schedule for all Amtrak owned track miles in the Pennsylvania subregion (240 miles). SEPTA contributes a portion of the total rehabilitation/replacement costs.

'Amtrak Owned Catenary Rehabilitation/Replacement' (T1.09) assumes a regular maintenance schedule for all catenaries on Amtrak owned track miles in the Pennsylvania subregion (240 miles). SEPTA contributes a portion of the total rehabilitation/replacement costs.

'Amtrak Owned Signal Rehabilitation/Replacement' (T1.10) assumes a regular maintenance schedule for all signals along Amtrak owned track miles in the Pennsylvania subregion (240 miles). SEPTA contributes a portion of the total rehabilitation/replacement costs.

'Amtrak Owned Rail Bridge Improvements' (T1.11) assume a regular maintenance schedule for all rail bridges in Amtrak owned track miles in the Pennsylvania subregion (240 miles). SEPTA contributes a portion of the total rehabilitation/replacement costs.

'Amtrak Owned Regional Substation Improvements' (T1.12) do not expect any SEPTA contributions during the life of the financial plan.

Total transit rail infrastructure rehabilitation need is estimated to be \$3.73 billion over the life of the financial plan (in 2009 dollars), see figure on following page.

Pennsylvania Subregion Rail Infrastructure Rehabilitation and Restoration (T1) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA T1	Subcategory	2010-15	2016-25	2026-35
T1.01	Track Rehabilitation, Resurfacing, Replacement	\$ 95.9	\$ 205.8	\$ 234.8
T1.02	Catenary Rehabilitation, Replacement	\$ 57.5	\$ 80.4	\$ 80.4
T1.03	Signal Rehabilitation, Replacement	\$ 224.2	\$ 158.2	\$ 186.7
T1.04	Rail Bridge Improvements	\$ 185.3	\$ 408.6	\$ 361.8
T1.05	Regional Substation Improvements	\$ 165.9	\$ 296.0	\$ 189.7
T1.06	Tunnel / Tunnel Support Systems Improvements	\$ 8.9	\$ 18.2	\$ 23.5
T1.07	Amtrak Lease Agreements	\$ 148.2	\$ 246.4	\$ 246.4
T1.08	Amtrak Owned Track Rehabilitation, Resurfacing, Replacement	\$ 18.9	\$ 7.6	\$ -
T1.09	Amtrak Owned Catenary Rehabilitation, Replacement	\$ 11.4	\$ 4.6	\$ -
T1.10	Amtrak Owned Signal Rehabilitation, Replacement	\$ 37.8	\$ 15.3	\$ -
T1.11	Amtrak Owned Rail Bridge Improvements	\$ 7.6	\$ 3.1	\$ -
T1.12	Amtrak Owned Regional Substation Improvements	\$ -	\$ -	\$ -
T1	PA Rail Infrastructure Rehabilitation, Restoration Total	\$ 961.5	\$ 1,444.1	\$ 1,323.3

Source: DVRPC 2009

T2. Transit Vehicle Rehabilitation and Replacement

SEPTA has developed regular overhaul and replacement cycles for their light, heavy, and regional rail vehicles, as well as buses. This was used as the basis for the vehicle rehabilitation, replacement needs assessment.

'New Bus' (T2.01) assumes SEPTA will maintain its 1,400 bus fleet at an average age of 6 years. To achieve this, the entire fleet will need to turn over on a 12-year schedule. It is estimated that the average cost for a new 40-foot hybrid bus is \$510,000. This estimate assumes all buses bought by SEPTA over the life of the *Connections* plan will be hybrids. SEPTA will have a slightly lower bus need after returning two routes that are currently operating as buses to light rail (routes 23 and 56) in the middle financial plan period.

Pottstown Urban Transit (PUT) maintains a fleet of 11 buses. These buses are estimated to have a 13 year service life. Four new buses are needed in the short-term funding period, seven in the middle, and five in the last. Average cost for these buses is estimated to be \$335,000 per bus.

'Rehabilitated Bus' (T2.02) anticipates each bus will undergo one or two major overhauls during its lifespan, approximately during year six or in years four and eight. The bus overhaul program applies to both SEPTA and PUT.

'New Light Rail Vehicle' (T2.03) is based replacing SEPTA's fleet of 185 light rail vehicles at the end of their expected lifespan, approximately 40 years. SEPTA's current capital budget contains a line item for 141 LRVs at a cost of \$300 million. This is reflected in the financial plan in the first and second periods. The remaining vehicles in need of replacement are purchased in both the second and third financial plan periods. The purchase of additional light rail vehicles in order to return Route's 23 and 56 to light-rail service is included in line item T3.10.

'Rehabilitated Light Rail Vehicle' (T2.04) is based on regular maintenance schedule for SEPTA's fleet of 185 light rail vehicles.

'New Heavy Rail Vehicle' (T2.05) need estimate is based on a regular replacement schedule for SEPTA's fleet of 294 single-end heavy rail vehicles and 75 double-end heavy rail vehicles. These vehicles are anticipated to have a useful service life of 40 years. SEPTA is expected to replace 76 single end HRVs and 49 double end HRVs used on the Broad Street Subway line in the third period of the financial plan.

'Rehabilitated Heavy Rail Vehicle' (T2.06) needs assessment is based on a regular maintenance schedule for SEPTA's fleet of 294 single-end heavy rail vehicles and 75 double-end heavy rail vehicles. DRPA/PATCO owns 121 heavy rail vehicles. Rehabilitation of these vehicles is scheduled to take place during the first funding period at a total cost of \$113 million, only a portion of which is federally funded and some of which has already been obligated. A total of \$9 million in federal funding is put towards the rehabilitation of these vehicles in the first funding period, this amount is matched in New Jersey for a total of \$18 million in federal funds.

'New Regional Rail Vehicle' (T2.07) SEPTA is estimated to own and operate a fleet of 304 Regional Rail Vehicles (RRVs), 53 push pull cars, and 8 locomotives. It is anticipated that these vehicles will have a 40-year lifespan. SEPTA's 2009 Capital Budget contains a line item for 120 new RRVs at a cost of \$330 million. These RRVs will replace the Silverliner IIs and IIIs, which were originally purchased in the 1960s. Delivery on these vehicles will begin in 2010 and continue through 2011. The Capital Budget also includes a second order for 234 RRVs to replace SEPTA's existing Silverliner IV fleet dating from the mid-1970s. This is reflected in the financial plan in the second and third periods.

'Rehabilitated Regional Rail Vehicle' (T2.08) needs for this subcategory are estimated for a regular maintenance schedule for SEPTA's fleet of 304 regional rail vehicles, 53 push/pull cars and 8 locomotives.

'New Paratransit Vehicle' (T2.09) need is based on SEPTA replacing its fleet of 421 paratransit vehicles every 5 years. SEPTA leases these vehicles to private paratransit service operators. In FY 2009 SEPTA's capital budget contained \$4.6 million to purchase 68 paratransit vehicles. These vehicles do not undergo a major overhaul like other transit vehicles do.

'Vehicle Storage and Maintenance Facilities' (T2.10) is based on SEPTA's need to maintain nine bus depots, various train sheds and garages. Major projects in the 2009 SEPTA Capital Budget include replacement of the Callowhill Garage (\$116 million) and \$25 million to renovate bus facilities.

'Vehicle Maintenance Equipment' (T2.11) is included by SEPTA in the 'Vehicle Storage and Maintenance Facilities' (T2.10) subcategory.

Total transit vehicle rehabilitation and replacement need is estimated to be \$6.13 billion over the life of the financial plan (in 2009 dollars), see figure on following page.

Pennsylvania Subregion Transit Vehicle Rehabilitation and Replacement (T2) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA T2	Subcategory	2010-15	2016-25	2026-35
T2.01	New Bus	\$ 459.4	\$ 597.2	\$ 596.9
T2.02	Rehabilitated Bus	\$ 142.2	\$ 193.4	\$ 193.4
T2.03	New Light Rail Vehicle*	\$ 5.3	\$ 336.7	\$ 35.5
T2.04	Rehabilitated Light Rail Vehicle*	\$ 17.2	\$ 40.0	\$ 104.8
T2.05	New Heavy Rail Vehicle	\$ -	\$ 11.2	\$ 1,219.1
T2.06	Rehabilitated Heavy Rail Vehicle	\$ 112.9	\$ 126.0	\$ 52.1
T2.07	New Regional Rail Vehicle	\$ 139.9	\$ 415.6	\$ 172.2
T2.08	Rehabilitated Regional Rail Vehicle	\$ 9.2	\$ 101.3	\$ 147.2
T2.09	New Paratransit Vehicle	\$ 25.2	\$ 40.1	\$ 40.1
T2.10	Vehicle Storage and Maintenance Facilities	\$ 207.3	\$ 304.4	\$ 286.9
T2.11	Vehicle Maintenance Equipment	\$ -	\$ -	\$ -
T2	PA Vehicle Rehabilitation, Replacement Total	\$ 1,118.6	\$ 2,166.1	\$ 2,848.3

Source: DVRPC 2009

T3. Transit Station Enhancements

SEPTA and DRPA/PATCO compiled a list of all transit stations in the region that would need to be upgraded, from minor repairs to major renovations, including ADA accessibility needs. The basis of the short-term need is drawn primarily from the existing 12-year SEPTA Capital Budget. Medium and long-term needs are then projects that are identified as a result of a known, unmet need due to fiscal constraint or as a part of a regular capital maintenance regimen.

'Station Renovation' (T3.01) is based on regular maintenance for SEPTA's 280 stations. Of these there are 52 subway stations, 153 regional rail stations, and 75 Light Rail/Trolley stations. Four regional rail stations are located in Delaware (Claymont, Wilmington, Churchmans Crossing, and Newark), and two are located in New Jersey (Trenton and West Trenton). The four Delaware stations are excluded from the needs assessment since they are outside the nine-county region. Four of DRPA/PATCO's 13 stations are located in Philadelphia. Approximately \$1.1 million in annual federal funding is used to renovate these stations.

'Station Improvements' (T3.02) includes costs for minor repairs and smaller projects for the 278 stations in the DVRPC region. SEPTA's 2009 Capital Budget contains a number of such improvements, at an average cost of \$1 million per improvement.

'ADA Compliance' (T3.03) need estimate is based on continuing to make more of SEPTA's stations ADA compliant. Currently SEPTA has approximately 87 fully or partially non-ADA compliant stations. The DRPA/PATCO system is ADA compliant.

'Transit Oriented Development/Access Improvements' (T3.04) have plenty of need. No federal funding is envisioned for these programs in the *Connections* plan, however, it is possible that highway, local, or private funding could go towards such improvements.

'Expanded Station Parking' (T3.05) reflects SEPTA's need to expand parking at a number of its stations. DVRPC estimates that SEPTA needs to add 3,700 new parking spaces to the system over the life of the financial plan. This includes costs for land acquisition, possible demolition, and development of new facilities (including garages).

'Parking Lot Rehabilitation' (T3.06) need estimate is based on regular rehabilitation of each parking lot in the SEPTA system.

'Park and Ride Facilities' (T3.07) have no identified funding need in the *Connections* financial plan. It is possible that PennDOT may provide for some new park-and-ride facilities.

'Transportation Center' (T3.08) is based on continuing to improve transit service through investing in more multi-modal transportation centers. SEPTA's 2009 Capital Budget includes transportation centers at Paoli, Ardmore, and Eastwick.

Total estimated transit station enhancement need in the Pennsylvania subregion is \$2.84 billion (in 2009 dollars), see figure below.

Pennsylvania Subregion Transit Station Enhancement (T3) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA T3	Subcategory	2010-15	2016-25	2026-35
T3.01	Station Renovation	\$ 333.2	\$ 542.4	\$ 537.9
T3.02	Station Improvements	\$ 41.4	\$ 176.9	\$ 176.9
T3.03	ADA Compliance	\$ 165.1	\$ 88.9	\$ 88.5
T3.04	Transit Oriented Development / Access Improvements	\$ -	\$ -	\$ -
T3.05	Expanded Station Parking	\$ 97.6	\$ 96.5	\$ 96.5
T3.06	Parking Lot Rehabilitation	\$ 2.2	\$ 64.3	\$ 64.3
T3.07	Park and Ride Facilities	\$ -	\$ -	\$ -
T3.08	Transportation Center	\$ 87.7	\$ 88.4	\$ 88.5
T3	PA Station Enhancement Total	\$ 727.2	\$ 1,057.5	\$ 1,052.5

Source: DVRPC 2009

T4. Transit System and Operational Improvements

SEPTA, DRPA/PATCO and DVRPC worked together to identify system and operational improvements for the *Connections* plan.

'Information Technology Systems' (T4.01) includes improvements to the SEPTA Operations Center, which covers all operating assets (rail, subway surface, buses, SEPTA police dispatch, and paratransit).

'Real Time Information' (T4.02) need estimate is based on creating smart bus stops, website, Interactive Voice Response (IVR) system, etc.

'Signal Preemption' (T4.03) need estimate is based on creating bus and trolley priority treatment at intersections.

'Smart Stations' (T4.04) is a need estimate based on a passenger safety, security and station communication upgrade project in the 2009 SEPTA Capital Budget. The short-term funding provides smart stations on the Market-Frankford El and Broad Street Subway, total project cost of \$78 million for all 53 stations. Of this total, \$31 million remains to be obligated; this is done in the first funding period. Funding is included in the middle and long term periods to continue improving other SEPTA stations.

'Fare Modernization' (T4.05) is based on the remaining obligations for SEPTA fare modernization estimate in the 2009 Capital Budget, which included a \$84 million cost estimate.

'Doubling Tracks' (T4.06) need estimate provided by SEPTA.

'Sidings' (T4.07) need estimate provided by SEPTA.

'Light Rail Service Restoration' (T4.08) reflects the expenditure needed to return SEPTA Route's 23 and 56 to light-rail service. The total cost includes improvements to tracks and light-rail vehicle purchases.

Total estimated transit system and operational improvement need in the Pennsylvania subregion is \$715 million (in 2009 dollars), see figure below.

Pennsylvania Subregion Transit System and Operational Improvements (T4) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA T4	Subcategory	2010-15	2016-25	2026-35
T4.01	Information Technology Systems (ITS)	\$ 62.7	\$ 36.9	\$ 36.9
T4.02	Real Time Information	\$ 52.9	\$ 14.0	\$ -
T4.03	Signal Preemption	\$ 8.9	\$ 8.1	\$ 9.6
T4.04	Smart Stations	\$ 30.8	\$ 21.0	\$ 26.1
T4.05	Fare Modernization	\$ 83.6	\$ -	\$ -
T4.06	Doubling Tracks	\$ -	\$ 45.6	\$ 36.5
T4.07	Sidings	\$ 4.4	\$ 6.0	\$ 6.9
T4.08	Light Rail Restoration	\$ -	\$ 223.7	\$ -
T4	PA Transit System, Operational Improvement Total	\$ 243.3	\$ 355.4	\$ 116.0

Source: DVRPC 2009

T5. Transit New Capacity (Including Small Starts and New Starts)

This category is project cost based including projects such as new stations on existing lines (including new station parking needs), extension of existing lines, new bus or rail routes, and development of bus rapid transit (BRT). Transit new capacity need is based on updated cost estimates for system expansion projects identified in the *Destination 2030* plan, along with projects in DVRPC's Transit Vision. Major new capacity transit projects were screened and analyzed by a set of evaluation criteria (see Appendix C for more information). Using these criteria and the fiscal constraint for this category, plan projects were chosen by the Long-Range Plan Subcommittee.

'Transit New Capacity' (T5.01) includes completing projects in *Destination 2030* such as a new passenger rail line (Quakertown line) from Lansdale to Hellertown; phase 1 of the R6 extension from Norristown to Wyomissing; the R3 extension from Elwyn to Wawa; the Route 100 spur from Hughes Park to First Avenue; and the Broad Street Subway from Pattison Avenue to the Navy Yard. In addition, the needs assessment considers projects in DVRPC's Transit Vision such as the Roosevelt Boulevard Subway, the Delaware Avenue Rail Line and the R5 extension from Thorndale to Atglen.

Total estimated transit new capacity need in the Pennsylvania subregion is \$6.48 billion (in 2009 dollars), see figure below.

Pennsylvania Subregion Transit New Capacity (T5) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA T5	Subcategory	2010-15	2016-25	2026-35
T5.01	Transit New Capacity	\$ 118.4	\$ 882.9	\$ 5,481.4
T5	PA Transit New Capacity Total	\$ 118.4	\$ 882.9	\$ 5,481.4

Source: DVRPC 2009

T6. Transit Other

Transit other funding needs are based on current spending levels in DVRPC's 2009-12 TIP and by need as indicated by SEPTA and DRPA/PATCO.

'Safety' (T6.01) estimate provided by SEPTA.

'Security' (T6.02) estimate provided by SEPTA.

'Coordinated Human Services' (T6.03) estimate provides capital funds for New Freedoms projects of approximately \$1.75 million annually.

'Debt Service' (T6.04) estimate provided by SEPTA.

'Utility Vehicles' (T6.05) estimate provided by SEPTA.

'Other' (T6.06) estimate provided by SEPTA.

Total transit other need is estimated to be \$901 million over the life of the financial plan (in 2009 dollars), see figure on following page.

Pennsylvania Subregion Transit Other (T6) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

PA T6	Subcategory	2010-15	2016-25	2026-35
T6.01	Safety	\$ 17.8	\$ 19.6	\$ 18.8
T6.02	Security	\$ 26.7	\$ 29.5	\$ 28.2
T6.03	Coordinated Human Services	\$ 10.5	\$ 17.5	\$ 17.5
T6.04	Debt Service	\$ 231.2	\$ 251.7	\$ 119.5
T6.05	Utility Vehicles	\$ 20.5	\$ 34.1	\$ 34.1
T6.06	Other	\$ 15.3	\$ 4.1	\$ 4.1
T6	PA Other Total	\$ 321.9	\$ 356.5	\$ 222.2

Source: DVRPC 2009

Pennsylvania Subregion Freight Rail Needs Assessment

Needs assessment for freight rail in the five-county Pennsylvania subregion is defined in the following section. The needs assessments were developed by DVRPC working with CSX, Norfolk Southern and other carriers, as well as shippers and other stakeholders. A detailed list of freight rail projects is included in Appendix E.

'New Main Track along Existing Lines' (FR1) includes adding second tracks to various existing freight lines and constructing a new freight track along AMTRAK's Northeast Corridor line from Wilmington to Philadelphia.

'Vertical Clearance' (FR2) includes creating additional vertical clearance along existing lines, often to accommodate double-stacked cars.

'Additional Capacity through Sidings, Yards, and Wyes' (FR3) includes increasing yard capacities, creating missing connections between lines, and adding sidings.

'Grade Crossings' (FR4) describes eliminating an at-grade crossing between the CSX Philadelphia Subdivision freight line and SEPTA's Route 11 light-rail passenger line along Main Street in Darby Borough.

'Freight Rail Reconstruction' (FR5) includes rehabilitating track, switches, signaling, and bridges along various lines.

Total freight rail need is estimated to be \$1.18 billion over the life of the financial plan (in 2009 dollars), see figure below.

PA FR	Subcategory	2010-15	2016-25	2026-35
FR1	New Main Track along Existing Lines	\$ 0.0	\$ 39.1	\$ 966.8
FR2	Vertical Clearance	\$ 42.1	\$ 0.0	\$ 35.0
FR3	Additional Capacity through Sidings, Yards, and Wyes	\$ 15.2	\$ 10.7	\$ 10.7
FR4	Grade Crossings	\$ 0.0	\$ 50.0	\$ 0.0
FR5	Freight Rail Reconstruction	\$ 1.0	\$ 10.0	\$ 0.0
FR	PA Freight Rail Total	\$ 58.3	\$ 109.8	\$ 1,012.5

Source: DVRPC 2009

New Jersey Subregion Highway Needs Assessment

The needs assessment for highways within the four-county New Jersey subregion is defined in the following sections. This needs assessment draws heavily on the asset management systems of NJDOT and NJ TRANSIT.

H1. Highway Pavement Reconstruction, Rehabilitation, Resurfacing and Restoration

This is a capital maintenance category for roadway pavement. DVRPC and NJDOT worked together to identify total funding needs for state and federal highway reconstruction, rehabilitation, resurfacing, and restoration expenditure. The funding needs are based on defining a state of good repair (SOGR) for the network, and what needs to be done to get the system into a SOGR. Once a SOGR is achieved, NJDOT determined how much annual funding is needed to maintain it.

NJDOT has defined a state of good repair as achieving and maintaining 80 percent of its lane miles in either 'good' or 'fair to mediocre' condition (less than 20 percent deficient by International Roughness Index (IRI) or Surface Distress Index (SDI)). The IRI measures smoothness conditions, while the SDI evaluates the type, severity and extent of surface distress exhibited by cracking and other visible deterioration. SDI is reported on a scale of 0 to 5 (5 is a perfect pavement free of any distress). The criteria used to evaluate the pavement condition status are shown in the Pavement Condition Criteria figure on this page.

State DOTs are required to maintain a Pavement Management System (PMS) which tracks the condition of all federal and state maintained roadways. Statewide, New Jersey DOT maintains approximately 4,675 two-way directional miles in the state highway system which is about 8,364 lane miles of mainline pavement. Of this amount, approximately 1,055 two-way directional miles and 1,970 lane miles are within the DVRPC region, about 23.6 percent of the total statewide network.

Utilizing roadway data collected and stored in the PMS, NJDOT is able to forecast future pavement conditions under various budget scenarios. A query is run using the PMS database to calculate lane miles of mainline pavement falling into each condition status category, followed by further analysis on the deficient portion using the following three conditions:

- **Rough Only:** Road segments with deficient roughness but without deficient surface distress.
- **Distressed Only:** Road segments with deficient surface distress but without deficient roughness.
- **Rough and Distressed:** Road segments with deficient roughness and deficient surface distress.

Pavement Condition Criteria

Condition Status	International Roughness Index (IRI, in/mi)	Surface Distress Index (SDI)
Deficient (Poor)	> 170	0 - 2.4 *
Fair	95 - 170	> 2.4 * and < 3.5
Good	> 0 and < 95	3.5 - 5.0

***Note:** For data collection cycles prior to 2007, an SDI of 2.5 was used as the cutoff for a deficient condition. Beginning with 2007 data, the algorithm to calculate SDI was enhanced and became more stringent. To assure backwards compatibility with prior data, the deficiency cutoff for SDI was changed to 2.4.

Source: The Road Information Program, Washington, D.C. 2004

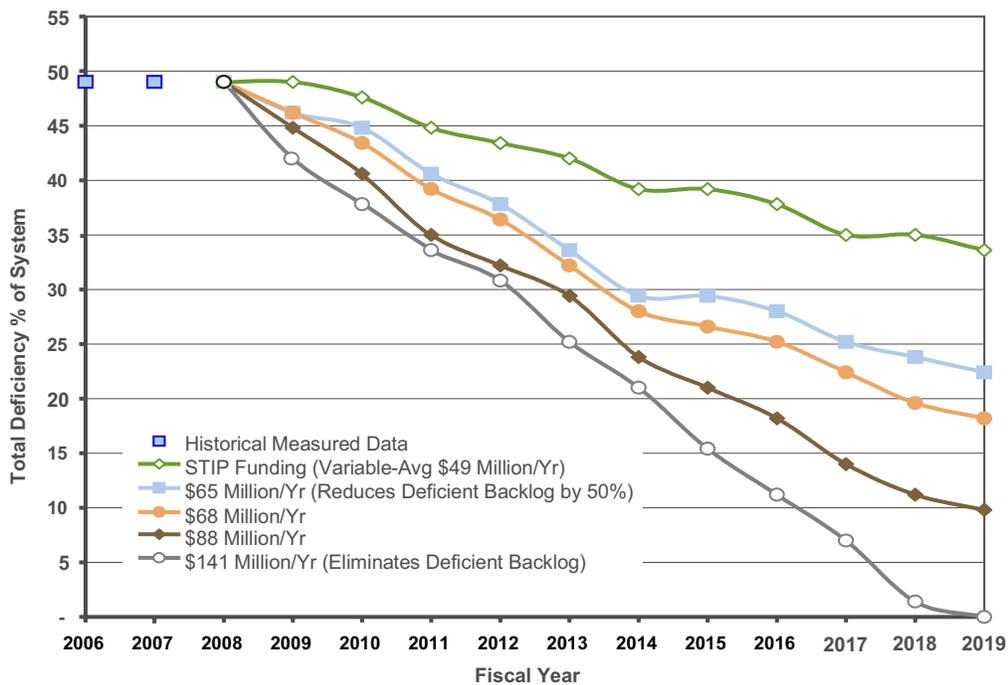
Current Status of DVRPC Region Pavements in NJ State Highway System (Based on 2008 Roughness and Distress Data)

Condition	Road Miles (2 Directions)	Lane Miles (2 Directions)	% of Total System Lane Miles
Deficient by Roughness Alone	127.3	228.5	11%
Deficient by Roughness & Distress	142.4	274.2	14%
Deficient by Distress Alone	235.9	451.3	23%
Total Deficient	505.6	954.0	48%
Total Fair/Mediocre	358.7	610.5	31%
Total Good	190.2	405.2	21%
Total DVRPC	1,054.5	1,969.7	100%

Source: NJDOT 2009

Analysis results for DVRPC pavements in the state highway system are presented in the figure below.

Multi-Year Performance Analysis of DVPRC Region Pavements in NJ State Highway System (Total Deficiency Based on IRI and SDI)



Source: NJDOT 2009

On an annual basis, the NJDOT Pavement Management and Technology Unit forecasts future pavement system conditions under various alternative funding scenarios for mainline pavements in the state maintained highway network. A comparison of system conditions for the entire state highway system (SHS) with pavements in the DVRPC region shows the status is fairly consistent. Therefore, to estimate future system conditions for the DVRPC portion of the state, results for the entire SHS will be used and funding needs will be estimated by the region's percent of total state lane miles.

To reduce system deficiency to no more than 20 percent (i.e., achieve a system sufficiency of 80 percent), it is estimated that \$68 million per year for 10 years is required for the DVRPC portion of the state highway system (see the Multi-Year Performance Analysis of DVRPC Pavements in State Highway figure). Of this total, approximately 10 percent is needed for 'Preventative Maintenance' (H1.01), 60 percent for 'Resurfacing' (H1.02) and 30 percent for 'Rehabilitation and Reconstruction' (H1.03), see figure below.

To maintain a state of good repair after achieving it in 2020, NJDOT experience indicates that approximately 10 percent of the system (197 lane miles) needs to be resurfaced each year. This equates to an expenditure of approximately \$49 million per year dedicated to DVRPC pavements in the SHS from 2021 to 2035. The same percent of spending for each subcategory is maintained as in the requirements for achieving a SOGR.

A similar methodology as above was also used to determine the need to bring the federal aid portion of the county and local road networks (H1.04) to a state of good repair and then maintain it. The New Jersey subregion contains approximately 2,630 lane miles of federal aid local and county maintained roadways. DVRPC estimates approximately \$25,000 per lane mile is needed annually to keep the local and county maintained federal aid road network in a state of good repair.

Total highway reconstruction, rehabilitation, resurfacing, and restoration need is estimated to be \$3.77 billion over the life of the financial plan (in 2009 dollars).

New Jersey Subregion Highway Pavement Reconstruction, Rehabilitation, Resurfacing, and Restoration (H1) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ H1	Subcategory	2010-15	2016-25	2026-35
H1.01	Preventative Maintenance	\$ 40.8	\$ 56.6	\$ 49.0
H1.02	Resurfacing	\$ 293.8	\$ 407.5	\$ 352.8
H1.03	Rehabilitation & Reconstruction	\$ 146.9	\$ 203.8	\$ 176.4
H1.04	Local and County Federal Aid	\$ 471.0	\$ 785.0	\$ 785.0
H1	NJ Pavement Reconstruction, Rehabilitation, Resurfacing, Restoration Total	\$ 952.4	\$ 1,452.9	\$ 1,363.2

Source: DVRPC 2009

H2. Highway Bridge Replacement and Restoration

DVRPC and NJDOT worked together to identify total funding needs for state and federal bridges in order to achieve a state of good repair, and then determined the ongoing annual funding need to maintain a SOGR.

State DOTs are required to maintain a Bridge Management System (BMS) which tracks the structural condition of key bridge elements for all bridges greater than 20 feet in length regardless of ownership. The BMS scores the condition of the deck, substructure and superstructure on a scale of 0 to 9, any of these items scoring a four or below indicates work is needed on the bridge. In addition to these scores, the bridge database calculates an overall sufficiency rating with a score between 0 and 100. A score under 80 indicates the bridge is in a deficient condition and needs to be rehabilitated. A score under 80 also makes a bridge eligible to receive federal funding. A sufficiency score less than 50 signifies the bridge may need to be replaced.

NJDOT defines a bridge as being in a state of good repair if it does not need any significant maintenance work in the next 10 years. NJDOT has set varying state of good repair targets for each subclass of bridges in its system. For major viaducts the goal is 89 percent, for moveable bridges it is 67 percent, for standard bridges it is 93 percent and for minor bridges it is 95 percent. The actual statewide conditions for these subclasses are 81 percent of major viaducts are in a state of good repair, as are 37 percent of moveable bridges, 90 percent of standard bridges and 94 percent of minor bridges. NJDOT prioritizes their bridge maintenance work to address high volume roads and bridges.

The four-county DVRPC New Jersey subregion currently has about 14 million square feet of bridge deck area maintained by state, county or local transportation agencies. Approximately 12 percent of the state's bridges are rated as deficient. Approximately 5 percent of the NJ subregion's bridges are deficient by deck area.

'Maintenance' (H2.01), 'Bridge Removal' (H2.05), and 'Dam Replacement or Rehabilitation' (H2.07) needs are based on maintaining current spending levels in the 2009-12 DVRPC TIP database.

Annual 'Painting' (H2.02) need is estimated from NJDOT's Tactical Asset Management Plan, which indicates statewide the bridge system needs \$6.25 million per year to achieve a state of good repair by 2020, and \$3.75 million per year from 2021 to 2035 to maintain it. The region's estimated need is derived as being 12 percent of the state needs based on deck area.

'Bridge Rehabilitation or Replacement' (H2.03) is estimated the region needs to invest approximately \$140 million per year to achieve and maintain a state of good repair.

Total bridge replacement and restoration need is estimated to be \$4.64 billion over the life of the financial plan (in 2009 dollars), see figure below.

New Jersey Subregion Highway Bridge Replacement and Restoration (H2) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ H2	Subcategory	2010-15	2016-25	2026-35
H2.01	Maintenance	\$ 21.0	\$ 35.0	\$ 35.0
H2.02	Painting	\$ 37.5	\$ 50.0	\$ 37.5
H2.03	Bridge Rehabilitation or Replacement	\$ 837.5	\$ 1,395.8	\$ 1,395.8
H2.04	Bridge Removal	\$ 7.2	\$ 12.0	\$ 12.0
H2.05	Dam Replacement or Rehabilitation	\$ 8.0	\$ 13.3	\$ 13.3
H2	NJ Bridge Replacement, Restoration Total	\$ 1,078.6	\$ 1,785.2	\$ 1,772.7

Source: DVRPC 2009

H3. Highway Operational Improvements

The operational improvements category includes projects such as interchange reconstruction, roadway realignments, new turn lanes, etc. The majority of these projects improve the safety of the highway system. Since the need for operational improvements is potentially infinite, this is a difficult category to assess. As a result, DVRPC used current 2009-12 expenditure levels to estimate operational improvement needs.

'Interchange Reconstruction or Realignment' (H3.01) have an annual need of \$5.2 million based on the current funding levels in the 2009-12 DVRPC TIP.

'Operational Improvements' (H3.02) are estimated to need \$36.2 million per year based on the current funding levels in the 2009-12 DVRPC TIP.

'Roadway Realignment' (H3.03) are estimated to need \$1.4 million annually based on the current funding levels in the 2009-12 DVRPC TIP.

'New Turn Lanes' (H3.04) are estimated to need \$820,000 per year based on the current funding levels in the 2009-12 DVRPC TIP.

'NHS Connectors' (H3.05) grants an average of \$500,000 per year for improving port facility access along the Delaware River.

'Operational Other' (H3.06). needs are estimated to be \$2.1 million annually for pavement markings, rail crossings, etc. based on the current funding levels in the 2009-12 DVRPC TIP.

The total estimated need for highway operational improvements in the New Jersey subregion over the life of the *Connections* plan is \$1.20 billion (in 2009 dollars), see figure below.

New Jersey Subregion Highway Operational Improvements (H3) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ H3	Subcategory	2010-15	2016-25	2026-35
H3.01	Interchange Reconstruction, Realignment	\$ 31.2	\$ 52.1	\$ 52.1
H3.02	Operational Improvements (Channelization, Roundabouts, Access Management)	\$ 217.1	\$ 361.8	\$ 361.8
H3.03	Roadway Realignment	\$ 8.3	\$ 13.8	\$ 13.8
H3.04	New Turn Lanes	\$ 4.9	\$ 8.1	\$ 8.1
H3.05	NHS Connectors	\$ 3.0	\$ 5.0	\$ 5.0
H3.06	Operational Other	\$ 12.6	\$ 21.0	\$ 21.0
H3	NJ Operational Improvements Total	\$ 277.1	\$ 461.8	\$ 461.8

Source: DVRPC 2009

H4. Highway ITS and Signal

DVRPC's transportation operations staff developed the Transportation Operations Master Plan (TOMP) for the nine-county region. The purpose of the TOMP is to present a comprehensive long-term vision of transportation operations, bridging individual programs to create a cohesive regional vision. It was developed in cooperation with DVRPC's Transportation Operations Task Force (TOTF), which is composed of traffic, transit, and emergency management operators in the region. The ITS Master Plan highlights four major operational themes: incident management, traffic

management, transit operations, and traveler information. Several operational needs emerged, including obtaining real-time accurate information, sharing information among agencies and with the public, and having the appropriate resources available to respond to incidents. The ITS Master Plan identifies operational strategies such as the addition of transportation operations centers, variable speed limit signs, closed circuit TV cameras, weigh-in-motion detectors, modernization of traffic signals, closed loop traffic signal systems, cyclical resynchronization of traffic lights, and locations for parking management systems.

Transportation operations has unique funding and implementation requirements. While Intelligent Transportation Systems (ITS) projects are like other major transportation capital investments, in that they are funded through the Transportation Improvement Program (TIP), there is substantial maintenance and operations costs associated with them. Hardware, software, and communications have to be continually maintained and updated to remain consistent with latest IT standards.

'ITS Deployment' (H4.01) cost estimate includes laying communications fiber along highway corridors where needed; infilling CCTV and VMS on I-76, I-95, and I-295, and adding VMS signs to their approach roads. ITS will also be deployed on I-676, US 130, NJ 42, and NJ 55. This subcategory also includes estimates for Road Weather Information Systems (RWIS) and Road Treatment Systems spread throughout the NJ subregion. Cost estimates for DRPA Infrastructure include a total of \$8.9 million over the life of the Plan for VMS, closed circuit TV, and detectors on its four bridges spanning the Delaware River. The DRPA cost estimate is the New Jersey portion only, and includes only the federally funded portions.

'Traffic Operations Center(s)' (H4.02) new and ongoing capital maintenance needs include funding a portion of the statewide NJDOT traffic operation center (TOC) as well as their TOC-South, DRPA's TOC and a new county TOC in each time period. Cost for each new TOC is estimated to be \$500,000. Ongoing capital maintenance needs are programmed in each period at \$200,000 for each existing TOC.

'Incident Management' (H4.03) extends emergency service patrols (ESP) from current roadway coverage of 5 days per week at 16 hours per day to full 24/7 coverage. To accomplish this additional coverage requires an estimated 50 percent increase in funding, which is currently approximately \$4.3 million per year. It is assumed coverage will be maintained at current levels in the first funding period, extended to 5 days at 24 hours per day in the middle period, and extended to full 24/7 coverage in the final period. Regional ITS coordination funding utilizing RIMIS is included in this subcategory. Major upgrades to the RIMIS system are estimated to occur every eight years, at a cost of \$800,000 per upgrade. Data Interface (DI) investments are planned to connect with DRPA, county Computer Aided Dispatch (CAD) services and other emergency service software systems. Funding in this subcategory also includes \$210,000 in the first period and \$350,000 in each of the last two funding periods for incident management task forces; \$180,000 in the first funding period and \$300,000 in each of the final two funding periods for an incident management grant initiative; \$16,500 in the first funding period and \$33,000 in each of the final two funding periods to advertise 'Quick Clearance' incident management policies as part of a regionwide campaign; and \$67,200 in the near-term and \$84,000 in the mid- and long-term periods for accident investigation equipment.

'Traffic Management Systems' (H4.04) includes ramp metering for ramps on I-95, I-295, and NJ 42. This subcategory also contains cost estimates for variable speed limit signs installed on I-76, I-95, I-195, I-295, I-676, US 1, US 130, NJ

42, NJ 55, NJ 90, NJ 29, and NJ 129. The total cost to install these over all three funding periods, including capital maintenance, is \$21.2 million.

'Signal systems' (H4.05) includes the cost to place new closed loop signal systems in all four counties at a total cost of \$36 million over the life of the Plan. Ongoing retiming of signal systems is estimated to cost \$64 million over the life of the Plan at an average cost of \$10,000 per signal retimed.

The estimated need for ITS and signal improvements in the New Jersey subregion over the life of the *Connections* plan is \$408 million (in 2009 dollars), see figure below.

New Jersey Subregion Highway ITS and Signal (H4) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ H4	Subcategory	2010-15	2016-25	2026-35
H4.01	ITS Deployment	\$ 21.1	\$ 41.7	\$ 53.8
H4.02	Traffic Operations Center(s)	\$ 6.1	\$ 9.2	\$ 9.4
H4.03	Incident Management	\$ 33.1	\$ 66.7	\$ 81.2
H4.04	Traffic Management Systems	\$ 3.2	\$ 8.2	\$ 9.8
H4.05	Traffic Signals	\$ 10.2	\$ 27.3	\$ 26.8
H4	NJ ITS and Signal Total	\$ 73.6	\$ 153.0	\$ 180.9

Source: DVRPC 2009

H5. Highway New Capacity

Highway new capacity funding was limited by DVRPC and partner agency policy to 10 percent of total highway revenue for each state subregion in the *Destination 2030* plan. Need estimate was developed by updating the costs from the Major Regional Project list in the *Destination 2030* long-range plan. Rising project costs increased this need to more than 10 percent of available revenue, meaning some projects from the previous plan had to be removed. The final set of highway new capacity projects were selected by the Long-Range Plan Subcommittee for each state subregion.

New capacity projects that have significant impact on regional travel patterns are deemed to be Major Regional Projects. These projects are listed individually in the Plan. DVRPC developed a set of selection criteria to compare and judge the merits of each major regional new capacity project proposed for the long-range plan. Project selection occurs in two phases. The first phase is a project screening phase to verify the proposed project is consistent with DVRPC's Congestion Management Process (CMP) and is primarily located in the existing development or future growth areas identified in the *Destination 2030* land use map. This is further detailed in Appendix C on Major Regional Project Evaluation.

Major Regional Project (H5.01) need is based on the updated *Destination 2030* project list with current cost estimates.

In addition to major new capacity projects, there are minor, non-regionally significant projects that will fall into this category as noted by DVRPC Congestion Management Process (CMP). These projects are typically road widenings or extensions of less than 3 miles in length and are located on minor arterial or collector roads.

'Minor New Capacity' (H5.02) estimated annual need is based on continuing current funding levels in the 2009-12 TIP for these projects. There is currently one minor new capacity project in New Jersey, Egg Harbor Road from Hurffville-Cross Keys Road to Hurffville-Grenloch Road, CR 630 (DB # D0503).

The total estimated need for new capacity improvements in the New Jersey subregion over the life of the *Connections* plan is \$1.29 billion (in 2009 dollars).

New Jersey Subregion Highway New Capacity (H5) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ H5	Subcategory	2010-15	2016-25	2026-35
H5.01	Major Regional Project	\$ 335.5	\$ 453.9	\$ 472.0
H5.02	Minor New Capacity	\$ 36.0	\$ 54.0	\$ 30.0
H5	NJ New Capacity Total	\$ 287.5	\$ 503.1	\$ 497.2

Source: DVRPC 2009

H6. Bicycle and Pedestrian

This category reflects needs for bicycling and pedestrians and contains a number of related items such as landscaping, beautification, signage, street furniture, etc. Estimated need for these categories is based on current funding levels in the 2009-12 DVRPC TIP, as well as some target funding levels to increase the region's bike and pedestrian friendliness in order to help achieve some of the Plan's goals.

'Sidewalk' (H6.01) need is based on the installation of roughly 50 miles of sidewalks throughout the New Jersey subregion. Sidewalk costs are estimated at \$150,000 to \$250,000 per mile depending on issues such as drainage, number and location of crosswalks, and any type of obstacle removal. ADA ramp needs are included in this category as well.

'Streetscaping' (H6.02), 'Other Bike/Ped Improvements' (H6.04), which include bike lanes, installation of bike racks, etc., and 'Bike/Ped Safety Improvements' (H6.05) are based on continuing current funding levels in the 2009-12 DVRPC TIP.

'Multi-use Bike/Ped Paths' (H6.03) need is based on building roughly 800 miles of trails from the 2030 long-range plan and other county and municipal plans. The average trail can cost anywhere between \$10,000 and \$500,000 based on a multitude of different factors, from acquisition to location to surface treatment.

'Bike/Ped Safety Improvements' (H6.04) estimates are based on maintaining funding levels in the 2009-12 DVRPC TIP.

'Pedestrian Bridge/Tunnel' (H6.05) estimates are high in the short-term due to one specific project, a pedestrian bridge over Route 130 in Washington Township.

'Other Bike/Ped Improvements' (H6.06) includes pedestrian and bike safety projects, installation of bicycle racks, etc. Ned was estimated based on current funding levels in the 2000-12 DVRPC TIP.

The total estimated need for bike and pedestrian improvements in the New Jersey subregion over the life of the *Connections* plan is \$454 million (in 2009 dollars), see figure below.

New Jersey Subregion Bicycle and Pedestrian (H6) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ H6	Subcategory	2010-15	2016-25	2026-35
H6.01	Sidewalks	\$ 4.5	\$ 16.5	\$ 27.5
H6.02	Streetscaping	\$ 8.4	\$ 21.0	\$ 42.0
H6.03	Multi-use Bike/Ped Paths	\$ 12.0	\$ 108.0	\$ 132.0
H6.04	Bike/Ped Safety Improvements	\$ 3.7	\$ 6.6	\$ 12.0
H6.05	Pedestrian Bridge/Tunnel	\$ 16.8	\$ 12.0	\$ 12.0
H6.06	Other Bike/Ped Improvements	\$ 0.5	\$ 6.0	\$ 12.0
H6	NJ Bicycle and Pedestrian Total	\$ 45.9	\$ 170.1	\$ 237.5

Source: DVRPC 2009

H7. Highway Other

To develop Highway Other need assessment, DVRPC extended historic spending levels on most of the subcategories in these areas, and updated in the instances where NJDOT was able to give a better cost estimate.

'Signage' (H7.01) needs are based on an estimated 500 sign structures, each holding 1 or more signs. Assuming 1.5 signs per structure, and approximately \$5,000 per to resheet, repair, or replace each between now and 2035, the total need is approximately \$37.5 million, or \$1.5 million per year. Other signage maintenance responsibilities are estimated at \$1 million per year.

'Park and Ride' (H7.02) lots have no estimated need in New Jersey subregion financial plan.

'Drainage Management' (H7.03) This need is based on maintaining current funding levels in the 2009-12 DVRPC TIP.

'Environmental Mitigation' (H7.04) costs are generally included with project costs, but in some instances a specific environmental mitigation project is not attached to a specific highway project. This line item is for the non-project specific needs, including wetland mitigation, cultural resource preservation, etc.

'Debt Service' (H7.05) This need is based on maintaining current funding levels in the 2009-12 DVRPC TIP.

'Other' (H7.06) includes items such as parking facilities, rail investments, security, CMAQ program, TransitChek marketing, air quality partnership funding, and Transit Management Association (TMA) funding. Need is estimated based on maintaining current funding levels in the 2009-12 DVRPC TIP.

The total estimated need for highway other improvements in the New Jersey subregion over the life of the *Connections* plan is \$237 million (in 2009 dollars), see figure below.

New Jersey Subregion Highway Other (H7) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ H7	Subcategory	2010-15	2016-25	2026-35
H7.01	Signage (Capital and Maintenance)	\$ 15.0	\$ 25.0	\$ 25.0
H7.02	Park and Ride	\$ -	\$ -	\$ -
H7.03	Drainage Management	\$ 19.2	\$ 32.0	\$ 32.0
H7.04	Environmental Mitigation	\$ -	\$ -	\$ -
H7.05	Debt Service	\$ 1.9	\$ 3.2	\$ 3.2
H7.06	Other	\$ 18.6	\$ 31.0	\$ 31.0
H7	NJ Highway Other Total	\$ 54.7	\$ 91.2	\$ 91.2

Source: DVRPC 2009

New Jersey Subregion Transit Needs Assessment

Needs assessment for transit in the four-county New Jersey subregion is defined in the following sections. DVRPC worked with NJ TRANSIT and DRPA/PATCO to quantify their overall funding needs over the next 26 years. Where possible, the agencies used their existing asset management systems.

NJ TRANSIT's capital program is generally focused on addressing the needs of the state's transit infrastructure - ensuring the basic reliability and state-of-good-repair of the rail, light rail, and bus system. Replacing bus, AccessLink and paratransit vehicles, constructing more bus shelters with improved customer information, and other system-wide improvements will enhance multi-modal connectivity to make transit the preferred choice for travel in the state. It is critical that transit strategically plans to extend its reach even as the demand for services increase.

The key categories of the NJ TRANSIT capital program include rail infrastructure rehabilitation and restoration, vehicle rehabilitation and replacement, station enhancements, system and operations improvements, new capacity, and a miscellaneous, or 'other' category which includes system-wide safety and security funding.

T1. Rail Infrastructure Rehabilitation and Restoration

NJ TRANSIT and DRPA/PATCO identified all major rail infrastructure needs each agency expects to make over the next 25 years. This includes bridges, rails, rail ties, beds, signals, catenaries, and power stations. Both agencies have developed regular maintenance cycles, as to how often these infrastructures need to be rehabilitated, restored, or replaced.

'Track Rehabilitation, Resurfacing, Replacement' (T1.01)) are all based on allocating six percent of on NJ TRANSIT's statewide total annual needs, as identified in the NJ TRANSIT Arc Financial Plan (2009 – 2028), to the region. This is the percent of NJ TRANSIT's total rail track which is located in the DVPRC subregion.

'Catenary Rehabilitation, Replacement' (T1.02), re all based on allocating six percent of on NJ TRANSIT's statewide total annual needs, as identified in the NJ TRANSIT Arc Financial Plan (2009 – 2028).

'Signal Rehabilitation, Replacement' (T1.03) are all based on allocating six percent of on NJ TRANSIT's statewide total annual needs, as derived from NJ TRANSIT's Bridge Rehabilitation Inventory and Maintenance Management system (BRIMMS). One major project that would fall under this category, congressionally mandated Positive Train Control (PTC), will be fully implemented prior to 2010.

'Rail Bridge Improvements' (T1.04) was estimated using NJ TRANSIT's BRIMMS system. Statewide, NJ TRANSIT maintains more than 600 bridges and various retaining walls.

'Regional Substation Improvements' (T1.05) and 'Tunnel/Tunnel Support Systems' (T1.06) do not apply to the New Jersey subregion.

'Amtrak Owned Lease Agreement(s)' (T1.07) is six percent of NJ TRANSIT's lease agreement with Amtrak expenses, allocated by the region's percent of total rail track length.

DRPA/PATCO's federally funded rail infrastructure needs are estimated to be \$6.1 million per year and are shown in track rehabilitation, resurfacing, replacement (T1.01). All other rail infrastructure needs identified in the figure below are for NJ TRANSIT. Total need for all subcategories under T1 Rail Infrastructure is estimated to be \$439 million (in 2009 \$s) over the life of the *Connections* plan.

New Jersey Subregion Rail Infrastructure Rehabilitation and Restoration (T1) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ T1	Subcategory	2010-15	2016-25	2026-35
T1.01	Track Rehabilitation, Resurfacing, Replacement	\$ 52.6	\$ 87.7	\$ 87.7
T1.02	Catenary Rehabilitation, Replacement	\$ 12.6	\$ 1.1	\$ 1.1
T1.03	Signal Rehabilitation, Replacement	\$ 29.5	\$ 9.2	\$ 9.2
T1.04	Rail Bridge Improvements	\$ 23.2	\$ 38.7	\$ 38.7
T1.05	Regional Substation Improvements	\$ -	\$ -	\$ -
T1.06	Tunnel / Tunnel Support Systems	\$ -	\$ -	\$ -
T1.07	Amtrak Owned Lease Agreement(s)	\$ 10.9	\$ 18.2	\$ 18.2
T1	NJ Rail Infrastructure Rehabilitation, Restoration Total	\$ 128.9	\$ 154.9	\$ 154.9

Source: DVPRC 2009

T2. Transit Vehicle Rehabilitation, Replacement

DVRPC worked with NJ TRANSIT and DRPA/PATCO to develop regular overhaul and replacement cycles for its light, heavy, and regional rail vehicles, as well as buses. This was used as the basis for the vehicle rehabilitation, replacement needs assessment.

Statewide, New Jersey Transit has over 4,700 pieces of rolling stock, including 3,440 buses, 160 regional rail locomotives, 1,038 rail coaches, and 93 light rail vehicles. Of this rolling stock, 8.6 percent of the buses (295) are located in and serve the DVRPC region. These buses are located at the Hamilton garage (69), the Newton Avenue garage (112), and the Washington Township garage (114).

'New Bus' (T2.01) needs are based on replacing the entire regional bus fleet (295 buses) on a 12-year schedule.

'Rehabilitated Bus' (T2.02) costs are based on rehabbing each bus located in the region once at the midpoint of its 12-year lifespan.

'New Light Rail Vehicle' (T2.03) purchases new light rail vehicles for the RiverLine.

'Rehabilitated Light Rail Vehicle' (T2.04) rehabs some of the RiverLine vehicles.

'New Heavy Rail Vehicle(s)' (T2.05) have no identified funding needs in the New Jersey subregion financial plan.

'Rehabilitated Heavy Rail Vehicle' (T2.06) includes the cost estimate for DRPA/PATCO to rebuild all 121 of its heavy rail vehicles. Rehabilitation of these vehicles is scheduled to take place during the first funding period at a total cost of \$120 million. Only approximately \$18 million of this cost is federally funded, which is further split evenly between Pennsylvania and New Jersey. Subcategory T2.06 indicates the federally funded portion to the New Jersey subregion, \$9 million in the 2010-15 funding period.

'New Regional Rail Vehicle' (T2.07) and 'Rehabilitated Regional Rail Vehicle' (T2.08) are both based on allocating six percent of on NJ TRANSIT statewide total annual needs, as identified in the NJ TRANSIT Arc Financial Plan (2009 – 2028), to the region. Six percent of New Jersey Transit's total rail track is located in the DVPRC subregion.

'New Paratransit Vehicles' (T2.09) are based on replacing NJ TRANSIT's 122 vehicles used for county paratransit services and AccessLink in the New Jersey subregion.

'Vehicle Storage and Maintenance Facilities' (T2.10) and 'Vehicle Maintenance Equipment' (T2.11) cost estimates both allocate 23 percent of on NJ TRANSIT statewide total annual needs, as identified in the NJ TRANSIT Arc Financial Plan (2009 – 2028), to the region. This is approximately the percent of NJ TRANSIT storage and maintenance facilities located in the region.

The figure on the following page presents the total Vehicle Rehabilitation and Replacement needs assessment for the New Jersey subregion. Over the life of the Plan this category is estimated to need \$2.81 billion (in 2009 dollars).

New Jersey Subregion Transit Vehicle Rehabilitation and Replacement (T2) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ T2	Subcategory	2010-15	2016-25	2026-35
T2.01	New Bus	\$ 176.8	\$ 294.7	\$ 294.7
T2.02	Rehabilitated Bus	\$ 326.4	\$ 544.0	\$ 544.0
T2.03	New Light Rail Vehicle	\$ 6.2	\$ 10.3	\$ 10.3
T2.04	Rehabilitated Light Rail Vehicle	\$ 2.4	\$ 4.1	\$ 4.1
T2.05	New Heavy Rail Vehicle	\$ -	\$ -	\$ -
T2.06	Rehabilitated Heavy Rail Vehicle (DRPA/PATCO)	\$ 9.0	\$ -	\$ -
T2.07	New Regional Rail Vehicle	\$ 83.8	\$ 139.6	\$ 139.6
T2.08	Rehabilitated Regional Rail Vehicle	\$ 22.3	\$ 37.2	\$ 37.2
T2.09	New Paratransit Vehicle	\$ 3.1	\$ 5.1	\$ 5.1
T2.10	Vehicle Storage and Maintenance Facilities	\$ 25.0	\$ 41.7	\$ 41.7
T2.11	Vehicle Maintenance Equipment	\$ 0.6	\$ 0.9	\$ 0.9
T2	NJ Vehicle Rehabilitation, Replacement Total	\$ 655.5	\$ 1,077.5	\$ 1,077.5

Source: DVRPC 2009

T3. Transit Station Enhancements

DVRPC, NJ TRANSIT, and DRPA/PATCO compiled a list of all transit stations in the region that need to be upgraded, from minor repairs to major renovations, including any ADA accessibility needs over the life of the *Connections* plan.

NJ TRANSIT regularly invests to maintain and upgrade its rail, bus, and light rail passenger facilities. Statewide, NJ TRANSIT maintains 164 commuter rail stations, 60 light rail stations and 27 bus terminals. Three of the eight Atlantic City Line commuter rail stations serve the DVRPC region, all of which are handicap accessible. Three commuter rail stations on the Northeast Corridor Line also serve the region - Princeton Junction, Hamilton, and the key Trenton Transportation Center, all are ADA accessible. Starting at Trenton, the light rail RiverLine makes 17 station stops, all accessible, as it travels south to the Walter Rand Transportation Center in Camden City. This is where the RiverLine intersects DRPA/PATCO's heavy rail line, and multiple NJ TRANSIT bus routes.

The basis of NJ TRANSIT's short and mid-term need is the existing NJ TRANSIT capital budget program that covers a 20-year period. Long-term needs are projects that are identified as a result of a known, unmet need due to fiscal constraint or as a part of a regular capital maintenance regimen.

'Station Renovation' (T3.01) need is based on NJ TRANSIT's capital budget program. PATCO owns 13 stations, nine of which are located in New Jersey. Ongoing station renovation needs for DRPA/PATCO are estimated at \$4.1 million per year.

'Station Improvements' (T3.02) and 'ADA Compliance' (T3.03) have both been included in a single line item with 'Station Renovation' by NJ TRANSIT. All DRPA/PATCO stations are ADA compliant.

'Transit Oriented Development' (T3.04), and 'Transportation Center' (T3.08) have funding needs, however fiscal constraint means these needs will not receive federal funding in the *Connections* plan.

'Expanded Station Parking' (T3.05) and 'Park and Ride Facilities' (T3.07) are based on allocating 23 percent NJ TRANSIT statewide total annual needs, as identified in the NJ TRANSIT Arc Financial Plan (2009 – 2028), to the region.

'Parking Lot Rehabilitation' (T3.06) is included with the expanded station parking line item.

The total estimated need for station enhancements in the New Jersey subregion over the life of the *Connections* plan is \$529 million (in 2009 dollars), see figure below.

New Jersey Subregion Transit Station Enhancement (T3) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ T3	Subcategory	2010-15	2016-25	2026-35
T3.01	Station Renovation	\$ 113.7	\$ 189.5	\$ 189.5
T3.02	Station Improvements	\$ 0.5	\$ -	\$ -
T3.03	ADA Compliance	\$ -	\$ -	\$ -
T3.04	Transit Oriented Development / Access Improvements	\$ -	\$ -	\$ -
T3.05	Expanded Station Parking	\$ 4.8	\$ 8.0	\$ 8.0
T3.06	Parking Lot Rehabilitation	\$ -	\$ -	\$ -
T3.07	Park and Ride Facilities	\$ 3.5	\$ 5.8	\$ 5.8
T3.08	Transportation Center	\$ -	\$ -	\$ -
T3	NJ Station Enhancement Total	\$ 122.5	\$ 203.4	\$ 203.4

Source: DVRPC 2009

T4. Transit System and Operational Improvements

NJ TRANSIT, DRPA/PATCO and DVRPC worked together to identify system and operational improvements for the *Connections* plan. NJ TRANSIT's primary focus is improving real time passenger information.

The total estimated need for transit system and operational improvements in the New Jersey subregion over the life of the *Connections* plan is \$79.3 million (in 2009 dollars), see figure on following page.

New Jersey Subregion Transit System and Operational Improvements (T4) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ T4	Subcategory	2010-15	2016-25	2026-35
T4.01	Information Technology Systems (ITS)	\$ 18.0	\$ 30.0	\$ 30.0
T4.02	Real Time Information	\$ -	\$ -	\$ -
T4.03	Signal Preemption	\$ -	\$ -	\$ -
T4.04	Smart Stations	\$ -	\$ -	\$ -
T4.05	Fare Modernization	\$ 0.3	\$ 0.5	\$ 0.5
T4.06	Doubling Tracks	\$ -	\$ -	\$ -
T4.07	Sidings	\$ -	\$ -	\$ -
T4	NJ Transit System, Operational Improvement Total	\$ 18.3	\$ 30.5	\$ 30.5

Source: DVRPC 2009

T5. Transit New Capacity

This category is project cost based including projects such as new stations on existing lines (including station parking needs), extension of existing lines, new bus or rail routes, and development of bus rapid transit (BRT). Transit new capacity need is based on updated cost estimates for system expansion projects in the *Destination 2030* plan, along with projects in DVRPC's *Transit Vision*. Major new capacity transit projects were screened and analyzed by a set of evaluation criteria (see appendix C for more information). Using these criteria and the fiscal constraint for this category, Plan projects were chosen by the Long-Range Plan subcommittee.

NJ TRANSIT is committed to expanding public transit infrastructure through a continued commitment of Transportation Trust Fund and federal resources. The biggest example and need for system expansion in New Jersey is the constructing of the ARC Mass Transit Tunnel. The Tunnel will not only double capacity under the Hudson River but will alleviate strain on the entire New Jersey system. More importantly it will allow for necessary system expansion in the years to come. More than 10 percent of the new trips forecast to use the Northeast Corridor when the ARC Transit Tunnel is complete in 2017 will originate in the DVRPC region.

Candidate expansion projects in the New Jersey subregion include extending rail service in Southern New Jersey into Gloucester County, as well as creating Bus Rapid Transit (BRT) service from Trenton to New Brunswick along the Route 1 Corridor. Such BRT service could be accompanied by intercept parking garages to increase multi-modal connectivity. Other opportunities include promoting transit-oriented development around stations, encouraging and implementing new commuter option programs, and working with the state Transportation Management Associations (TMAs) to further extend reach into local communities. Shuttles, vanpools, taxis, and local paratransit services will feed the regional rail, bus and light rail services, facilitating easy, timed transfers between services at key stations in the region.

The new transfer station in Pennsauken will extend the reach of the Atlantic City Rail Line (ACRL), directly connecting passenger service to the RiverLine light rail line. RiverLine improvements include extending the line to the State Capitol in Trenton, and extending sidings and adding cab signals to the light rail system to improve efficiency and safety.

DRPA/PATCO has undertaken an alternatives analysis on the rail line from Camden to Gloucester County. This project is estimated to cost \$2 billion. The state of New Jersey has promised \$500 million from the Transportation Trust Fund (TTF) towards this project, above regular state formula funding. Other possible funding could come from toll authorities.

The total estimated need for transit new capacity in the New Jersey subregion over the life of the *Connections* plan is \$1.86 billion (in 2009 dollars), see figure below.

New Jersey Subregion Transit New Capacity (T5) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ T5	Subcategory	2010-15	2016-25	2026-35
T5.01	Transit New Capacity	\$ -	\$ 987.0	\$ 875.0
T5	NJ Transit New Capacity Total	\$ -	\$ 987.0	\$ 875.0

Source: DVRPC 2009

T6. Transit Other

Transit other funding needs are based on current spending levels in DVRPCs 2009-12 TIP and by need as indicated by NJ TRANSIT.

The ‘Safety’ (T6.01) needs assessment also includes ‘Security’ (T6.02) upgrades and emergency annual needs as identified in the NJ TRANSIT Arc Financial Plan (2009 – 2028). The regional need is estimated to be 23 percent of statewide needs. The majority of safety and security needs are typically funded in the total project cost.

‘Coordinated Human Services’ (T6.03) is included by NJ TRANSIT in the ‘Other’ (T6.05) line item.

‘Debt service’ (T6.04) portion of this category is to retire the remaining debt on the RiverLine.

‘Other’ (T6.05) includes the cost estimates for expenditure estimates for project planning, capital claims, environmental compliance, capital program management, New Freedoms, and Coordinated Human Services (T6.03).

The total estimated need for transit other improvements in the New Jersey subregion over the life of the *Connections* plan is \$772 million (in 2009 dollars), see figure below.

New Jersey Subregion Transit Other (T6) Needs Assessment: 2010 to 2035 (in millions of 2009 \$s)

NJ T6	Subcategory	2010-15	2016-25	2026-35
T6.01	Safety	\$ 39.3	\$ 65.5	\$ 65.5
T6.02	Security	\$ -	\$ -	\$ -
T6.03	Coordinated Human Services	\$ -	\$ -	\$ -
T6.04	Debt Service	\$ 258.8	\$ 172.5	\$ -
T6.05	Other	\$ 39.2	\$ 65.4	\$ 65.4
T6	NJ Other Total	\$ 337.3	\$ 303.4	\$ 130.8

Source: DVRPC 2009

New Jersey Subregion Freight Rail Needs Assessment

Needs assessment for freight rail in the four-county New Jersey subregion is defined in the following section. The needs assessments were developed by DVRPC working with CSX, Norfolk Southern and other carriers, as well as shippers and other stakeholders. Appendix C includes a full listing of identified rail freight projects.

'New Main Track along Existing Lines' (FR1) is the cost of adding a second main track to the CSX Trenton Line from CP Ewing to Manville Yard.

'Vertical Clearance' (FR2) has no associated costs in the New Jersey subregion.

'Additional Capacity through Sidings, Yards, and Wyes' (FR3) is the cost of expanding capacity at the Bridgeport and Paulsboro Yards.

'Grade Crossings' (FR4) has no associated costs in the New Jersey subregion.

'Freight Rail Reconstruction' (FR5) includes rehabilitating track, switches, signaling, and bridges along various lines, as well as restoring freight service on the Blue Comet Line in Burlington and Camden Counties.

Total freight rail need is estimated to be \$251.5 million over the life of the financial plan (in 2009 dollars), see figure below.

NJ FR	Subcategory	2010-15	2016-25	2026-35
FR1	New Main Track along Existing Lines	\$ 0.0	\$ 0.0	\$ 76.5
FR2	Vertical Clearance	\$ 0.0	\$ 0.0	\$ 0.0
FR3	Additional Capacity through Sidings, Yards, and Wyes	\$ 2.5	\$ 0.0	\$ 0.0
FR4	Grade Crossings	\$ 0.0	\$ 0.0	\$ 0.0
FR5	Freight Rail Reconstruction	\$ 2.5	\$ 40.0	\$ 130.0
FR	NJ Freight Rail Total	\$ 5.0	\$ 40.0	\$ 206.5

Source: DVRPC 2009

American Recovery and Reinvestment Act (ARRA)

The economic stimulus program signed into law in February 2009 provided an additional \$48 billion in additional federal funding for transportation projects around the country. This extra funding is not expected to be an ongoing source of revenue so it has not been forecast in the revenue projection. This act will fund a number of necessary transportation improvements in the Delaware Valley, helping to reduce many short term needs. DVRPC and its county and operating agency partners were able to quickly select a set of projects to fund with the ARRA. DVRPC has identified the funding for each project in its appropriate line item and reduced the short-term need for each line item by the level of stimulus funding. See figure below (for highways) and on following page (for transit). Total first funding period needs determined in the previous sections will be reduced by funding provided through the ARRA.

American Recovery and Reinvestment Highway Project Funding (in millions of 2009 \$s)

Category	Sub Cat ID	Subcategory	PA Subregion ARRA Funds	NJ Subregion ARRA Funds
Pavement Reconstruction, Rehabilitation, Resurfacing, Restoration	H1.01	Preventative Maintenance	\$ -	\$ -
	H1.02	Resurfacing	\$ 39.7	\$ 29.7
	H1.03	Rehabilitation & Reconstruction	\$ -	\$ 4.0
	H1.04	Local and Federal Aid Roadways	\$ -	\$ -
Bridge Replacement, Restoration	H2.01	Maintenance	\$ -	\$ -
	H2.02	Painting	\$ -	\$ -
	H2.03	Bridge Rehabilitation or Replacement	\$ 83.8	\$ -
	H2.04	Sub or Superstructure Rehabilitation	\$ -	\$ -
	H2.05	Bridge Removal	\$ 1.5	\$ -
	H2.06	Dam Replacement or Rehabilitation	\$ -	\$ -
Operational Improvements	H3.01	Major Regional Projects	\$ -	\$ -
	H3.02	Interchange Reconstruction, Realignment	\$ 1.7	\$ -
	H3.03	Operational Improvements	\$ -	\$ -
	H3.04	Roadway Realignment	\$ -	\$ -
	H3.05	New Turn Lanes	\$ -	\$ -
	H3.06	National Highway System Connectors	\$ -	\$ -
	H3.07	Other	\$ 0.1	\$ 4.0
ITS / Signal	H4.01	ITS Deployment	\$ 73.8	\$ -
	H4.02	Traffic Operations Center(s)	\$ -	\$ -
	H4.03	Incident Management	\$ -	\$ -
	H4.04	Traffic Management	\$ -	\$ -
	H4.05	Traffic Signals	\$ 0.1	\$ 5.8
New Capacity	H5.01	Major Regional Projects	\$ 14.5	\$ -
	H5.02	Minor New Capacity Projects	\$ -	\$ -
Bicycle and Pedestrian	H6.01	Sidewalks	\$ -	\$ -
	H6.02	Streetscaping	\$ 0.1	\$ -
	H6.03	Multi-use Paths	\$ 5.0	\$ -
	H6.04	Ped/Bike Safety Improvements	\$ -	\$ 2.4
	H6.05	Pedestrian Bridge / Tunnel	\$ -	\$ -
	H6.06	Other Bike/Ped Facilities	\$ 37.4	\$ -
Other	H7.01	Signage (Capital and Maintenance)	\$ -	\$ -
	H7.02	High Mast Lighting	\$ -	\$ -
	H7.03	Park and Ride	\$ -	\$ -
	H7.04	Drainage Management	\$ -	\$ -
	H7.05	Environmental Mitigation	\$ -	\$ -
	H7.06	Debt Service	\$ -	\$ -
	H7.07	Other	\$ -	\$ -
Total ARRA Highway Funding (in 2009 \$s)			\$ 257.8	\$ 125.8

Source: DVRPC 2009

American Recovery and Reinvestment Transit Project Funding (in millions of 2009 \$s)

Category	Sub Cat ID	LRP Category / Subcategory	PA Subregion ARRA Funds	NJ Subregion ARRA Funds
Rail Infrastructure Rehabilitation, Restoration	T1.01	Track Rehabilitation, Resurfacing, Replacement	\$ 28.6	\$ 3.0
	T1.02	Catenary Rehabilitation/Replacement	\$ 10.5	\$ 12.0
	T1.03	Signal / Communications Rehabilitation/Replacement	\$ 15.0	\$ 24.0
	T1.04	Rail Bridge / Elevated Structure Improvements	\$ 5.3	\$ -
	T1.05	Regional Substation Improvements	\$ -	\$ -
	T1.06	Tunnel / Tunnel Support Systems Improvements	\$ -	\$ -
	T1.07	Amtrak Lease Agreements	\$ -	\$ -
	T1.08	Amtrak Owned Track Rehabilitation, Resurfacing, Replacement	\$ -	\$ -
	T1.09	Amtrak Owned Catenary Rehabilitation / Replacement	\$ -	\$ -
	T1.10	Amtrak Owned Signal Rehabilitation / Replacement	\$ -	\$ -
	T1.11	Amtrak Owned Rail Bridge Improvements	\$ -	\$ -
	T1.12	Amtrak Owned Regional Substation Improvements	\$ -	\$ -
Vehicle Rehabilitation / Replacement	T2.01	New Bus	\$ 19.4	\$ 0.8
	T2.02	Rehabilitated Bus	\$ -	\$ 2.3
	T2.03	New Light Rail Vehicle*	\$ -	\$ -
	T2.04	Rehabilitated Light Rail Vehicle*	\$ -	\$ -
	T2.05	New Heavy Rail Vehicle	\$ -	\$ -
	T2.06	Rehabilitated Heavy Rail Vehicle	\$ -	\$ -
	T2.07	New Regional Rail Vehicle	\$ -	\$ -
	T2.08	Rehabilitated Regional Rail Vehicle	\$ -	\$ 2.7
	T2.09	New Paratransit Vehicle	\$ -	\$ 2.0
	T2.10	Rehabilitated Paratransit Vehicle	\$ -	\$ -
	T2.11	Vehicle Storage and Maintenance Facilities	\$ 23.0	\$ -
	T2.12	Vehicle Maintenance Equipment	\$ -	\$ -
Station Enhancements	T3.01	Station Renovation	\$ 70.9	\$ -
	T3.02	Station Improvements	\$ 4.8	\$ 0.5
	T3.03	ADA Compliance	\$ -	\$ -
	T3.04	Transit Oriented Development / Access Improvements	\$ -	\$ -
	T3.05	Expanded Station Parking	\$ 1.3	\$ -
	T3.06	Parking Lot Rehabilitation	\$ -	\$ -
	T3.07	Park and Ride Facilities	\$ -	\$ -
	T3.08	Transportation Center	\$ -	\$ -
System / Operational Improvements	T4.01	Information Technology Systems (ITS)	\$ 6.1	\$ -
	T4.02	Real Time Information	\$ -	\$ -
	T4.03	Signal Preemption	\$ -	\$ -
	T4.04	Smart Stations	\$ 1.0	\$ -
	T4.05	Fare Modernization	\$ -	\$ -
	T4.06	Doubling Tracks	\$ -	\$ -
	T4.07	Sidings	\$ -	\$ -
	T4.08	Positive Train Control	\$ 5.2	\$ -
	T4.09	Light Rail Restoration	\$ -	\$ -
New Capacity	T5	New Capacity (Including New Starts/Small Starts)	\$ -	\$ 28.0
Transit Other	T6.01	Safety	\$ -	\$ -
	T6.02	Security	\$ -	\$ -
	T6.03	Coordinated Human Services	\$ -	\$ -
	T6.04	Debt Service	\$ -	\$ -
	T6.05	Utility Vehicles	\$ -	\$ -
	T6.06	Other	\$ -	\$ -
Total ARRA Transit Funding (in 2009 \$s)			\$ 201.6	\$ 75.3

Source: DVRPC 2009

APPENDIX C



Major Regional Project Evaluation

A primary objective of the DVRPC long-range planning process is to ensure transportation investments help further the goals of the long-range plan. The *Connections* plan has four key principles: Create Livable Communities; Manage Growth and Protect Resources; Build an Energy-Efficient Economy; and Create a Modern Multi-Modal Transportation System. These four principles form a framework for the goals of the Plan. Under this context, the individual goals of rebuilding the existing system, reducing congestion, improving safety and security, increasing mobility and accessibility, limiting impacts on the natural environment, and identifying additional funding all further the principle of investing in a modern, multi-modal transportation system.

A set of evaluation criteria was first developed during the project selection process for the *Destination 2030* long-range plan to help provide guidance to the project selection process. These initial criteria were both quantitative and qualitative and were established around key transportation goals. All highway and transit Major Regional Projects were evaluated using 14 criteria. One shortfall of this process was that while some criteria were suitable for all types of projects, others only pertained to specific categories of projects.

To select projects for the *Connections* long-range plan, the evaluation criteria were revisited in order to improve upon the previous analysis. A smaller number of criteria were used and highway and transit projects were analyzed using slightly different criteria. Six criteria were used to analyze highway projects and they are generally aligned with the four key Plan principles. Transit projects were also analyzed using six criteria that are designed to evaluate how well a proposed project serves population centers, environmental justice communities, as well as gauging support for the project.

A major point of difference for the *Connections* plan is that Major Regional Projects have been redefined. Major Regional Projects are large-scale projects that will have a significant impact on regional travel. In the *Connections* plan these projects consist primarily of new highway capacity or new fixed guideway transit. The revised analysis also includes a two-tier evaluation. The first tier is a screening to determine if a proposed project meets the key criteria of investing in areas that are currently developed or have been identified as areas appropriate for development over the life of the Plan. Highway projects have an additional screening criterion of being consistent with the region's Congestion Management Process. Projects that pass the screening are then further evaluated by a series of measures which assess the extent to which proposed Major Regional Projects meet key goals of the *Connections* long-range plan. The Long-Range Plan Subcommittee used this information as guidance for selecting the Major Regional Projects included in the *Connections* plan.

Highways

With needs far greater than anticipated revenues, it is imperative that transportation investments are made wisely. New highway projects that increase capacity should serve the region's population centers and be consistent with the region's adopted Congestion Management Process (CMP) for consideration for inclusion in the long-range plan. Minor new capacity projects, at a minimum, should pass the screening for inclusion in the financial plan.

Screening

The project should be located in either Existing Developed or Future Growth Areas – as defined by the *Connections* land use plan map. For all classes of roads, except limited access freeways, more than 75 percent of total facility length or area at a minimum should be included in such areas. For limited access freeways all interchanges must be located in these areas.

Any project adding single-occupancy vehicle (SOV) capacity must be consistent with the Congestion Management Process (CMP) to be eligible for Federal funding. The CMP identifies congested subcorridors and multimodal strategies to mitigate the congestion. Where more SOV road capacity is appropriate, the CMP includes potential supplemental strategies to get the most long-term value from the investment. The CMP also identifies emerging/regionally significant corridors where proactive steps are especially important to prevent congestion, and inexpensive strategies that are appropriate everywhere.

To be consistent with the CMP, a proposed project must be located in a (sub)corridor where adding SOV capacity is listed as an appropriate strategy. If adding SOV capacity is not included as a strategy, the project must undergo quantitative analysis including the listed strategies and comparison of the results for the region as well as for the project area. Projects outside of corridors must demonstrate consistency with the Plan, follow CMP Procedures, and compare well with projects located in corridors.

Project Selection Criteria

Projects that passed the initial screening were assessed based on the following criteria.

▶ Does the Project Serve the Region's Identified Population and Employment Centers?

Highway capacity expansions should enforce existing or planned developed places by being designated as a Plan Center in the *Connections* plan OR alternatively, serve areas with a population density greater than 6 people per acre AND an employment density greater than 3 people per acre. Exit ramps and access points should serve Centers.

- ◆ Evaluation: For Limited Access Roads – If all interchanges are within a one-mile buffer of a Center the project fulfills the criteria and receives a full circle (●); if most of the interchanges are within the one-mile buffer then the project is considered to partially fulfill the criteria and scores a half-filled circle (◐); and if no interchanges are located within the buffer the project does not meet the criteria and is coded as an empty circle (○). For Arterial Roads – If most of the road length is within a one-mile buffer of a Center it scores a full circle (●); if approximately half of the road length is within a one-mile buffer of a Center it scores a half-filled circle (◐); and if most of the road length is NOT within the buffer it scores an empty circle (○).

▶ Are There Significant Environmental Issues that will be Impacted by a Project?

SAFETEA-LU includes language that directs MPOs to more fully incorporate environmental considerations into the short- and long-range transportation planning process. The new environmental screening tool aims to evaluate the impacts of transportation projects on environmental features and assign a quantitative value to those impacts. To begin this process, each proposed Major Regional Project is assigned a buffer. For highway projects, the size of the

buffer is based upon the type of facility and whether the capacity increase is a widening of an existing facility or is a new right-of-way (ROW). Buffer sizes reflect the fact that transportation impacts extend well beyond the project right-of-way, due to habitat fragmentation, the systemic nature of ecosystem function and secondary impacts, such as potential land use change and water quality impacts. Buffer distances are sized based on similar studies and in a “regionally-appropriate” manner. The buffer categories are as follows:

- Highway capacity enhancement within existing arterial ROW: ½ mile
- Highway capacity enhancement within existing freeway ROW: 1 mile
- New highway right-of-way facility: 2 miles
- New rail right-of-way: 1/8 mile. A proposed project will not be analyzed if it utilizes an existing rail line that has been de-activated or is an active freight line, since the environmental impact will be minimal compared to a brand new alignment.

Proposed projects are overlaid with ten key environmental data layers outlined below. The data layers are “rasterized” into a grid of 30-meter cells. The presence of an environmental feature within a cell will give that cell a value of one point. The presence of two features will give the cell a value of two, and so on, with a maximum cell value of ten. The value of each and every cell within a project’s buffer area will be summed to produce a cumulative score.

This analysis calculates the natural and ecological context of transportation projects and provides an early indication of potential relative environmental impacts. A high score indicates a higher likelihood of potential impacts and conflicts with conservation objectives.

The following data layers are included in the Environmental Screening Tool:

- 2035 Greenspace Network
- 2035 Conservation Focus Areas
- 2035 Rural Conservation Areas
- Wetlands
 - Pennsylvania – National Wetlands Inventory
 - New Jersey – NJDEP Land Use/Land Cover Data
- Woodlands – DVRPC 2005 Land Use
- Floodplains – FEMA 100-year floodplains
- Steep Slopes – Over 10 percent
- Riparian Buffers – All streams within the DVRPC region will be assigned a 300-foot buffer
- High-Value Habitat Areas
 - Pennsylvania – Smart Conservation Model values of 8, 9 and 10
 - New Jersey – Landscape Project Critical Habitat Areas
- Significant Natural Areas
 - Pennsylvania – Natural Areas Inventory sites
 - New Jersey – Natural Heritage Priority sites

Each of these environmental data layers are weighted equally since the point of the analysis is to evaluate and compare the impacts of transportation projects on the environment, not compare the relative weight of one environmental feature to another. However, the screening tool achieves appropriate weight or “depth” due to feature

overlap. For example, a wooded floodplain area within the Greenspace Network has three times the value of land that is wooded but not within a floodplain or the Greenspace Network. It should be noted that key agricultural lands are incorporated into this analysis inasmuch as they are included within DVPRC's Conservation Focus Areas.

- ◆ Evaluation: A score per mile is utilized to look at the impacts over the entire length of a proposed project. The total score for each proposed projects is equal to the total value of all the cells within the buffer. The total score is then divided by the length of the project to determine the score per mile. The results of all proposed projects are then compared and broken down by quintiles, resulting in a range of scores encompassing Low, Medium-Low, Medium, Medium-High and High.

▶ Is the Project Located in a CMP Priority Subcorridor?

With limited available funding, it is important to identify those corridors that have the greatest significance for carrying regional travel. This criterion elevates those congested corridors with the greatest impact on regional travel.

- ◆ Evaluation: Is the majority of the project located in a priority subcorridor? Yes or No.

▶ Is the Facility an Intermodal NHS or NHS Connector?

The National Highway System (NHS) is a key component for the movement of freight. Improvements to these facilities, particularly the NHS Connectors, have a significant impact on improving goods movement in the region.

- ◆ Evaluation: Is the project part of the NHS, or a NHS connector? Yes, or No.

▶ What is the Cost per Vehicle Mile Traveled on Facility?

Determined by dividing project cost estimate by current year Average Annual Daily Traffic (AADT) multiplied by facility length. Project cost reflects the proportion of the total construction cost attributable to new capacity. This allows for a rudimentary comparison between projects of different scales.

- ◆ Evaluation: Cost range of Low (Top Quartile), Medium-Low (2nd Quartile), Medium-High (3rd Quartile), or High (Lowest Quartile) based on comparison of all projects considered.

▶ Does the Project Have a Strong Level of Support?

Does the project have a broad base of support and is there a long-standing regional consensus for it? Projects that have a strong level of opposition are more difficult to implement and may indicate cautionary concerns on other issues.

- ◆ Evaluation: Level of support starts with (a) the county signifying support for the project; and then rising to (b) the project being included in an official municipal, county or regional plan; and reaching a higher level when (c) the project is currently programmed in the Transportation Improvement Program.

▶ What other Relevant Factors are Related to the Project?

This section notes qualitative impacts of the proposed projects. Projects should be sensitive to the communities they serve and should not destroy unique factors that contribute to a sense of community, such as Main Street corridors. Projects should consider and abide by Smart Transportation techniques.

Transit

Transit projects also go through an initial screening process. Projects which satisfied the screening requirement were further evaluated based on additional criteria.

Screening

All stations should be located in an Existing Developed or Future Growth Areas – as defined by the *Connections* land use plan map – and the majority of the route must be located in these areas.

Project Selection Criteria

Projects that passed the initial screening process were ranked based on the following criteria.

▶ Does the Project Serve Areas with Requisite Density?

Transit network expansions should enforce existing or planned developed places. The Transit Score Index indicates whether a project has the requisite density to be successful. Because the region's centers have a high degree of density, this measure also serves as a proxy for serving centers of place. Analysis is based on the percentage of the route, with a half-mile buffer, that serves 2035 census-tracts ranked as either Medium-High or High using the Transit Score Index.

- ◆ Evaluation: The percentage (as a decimal from 0 to 1) of the route in Medium-High and High categories.

▶ To What Degree Does the Project Address Social Equity?

Does the project serve Environmental Justice communities with additional transit needs as defined by DVRPC's Degrees of Disadvantage analysis? A census tract with twice the regional average in elderly, disabled, poverty, and female head of household is the basis for each DOD.

- ◆ Evaluation: The percentage of the proposed route that is located in 0; 1 to 2; and 3 to 4 Degrees of Disadvantage census tracts.

▶ Are There Significant Environmental Issues that will be Impacted by a Project?

This is based on the Environmental Screening Tool (see explanation under Highway criteria). A proposed project was not analyzed if it utilizes an existing rail line that has been de-activated or is an active freight line, since the environmental impact will be minimal compared to a brand new alignment.

- ◆ Evaluation: A score per mile was utilized to look at the impacts over the entire length of a proposed project. The Environmental Screening Tool breaks the region down into over six million grid cells. Each grid cell has a value between one and ten based on the number of environmental factors contained within the cell. The total score for each proposed projects is equal to the total value of all the cells within the buffer. The total score was then divided by the length of the project to determine the score per mile. The results of all proposed projects were then compared and broken down by quintiles, resulting in a range of scores encompassing Low, Medium-Low, Medium, Medium-High, and High.

▶ What is the Project Capital Cost per Passenger?

Project capital cost divided by projected year of maturity annual ridership. This allowed comparison between projects of different scales.

- ◆ Evaluation: Cost range of Low (Top Quartile), Medium-Low (2nd Quartile), Medium-High (3rd Quartile), or High (Lowest Quartile) based on cost of all projects considered.

▶ What is the Project Status?

To what level has the project been studied, as defined by the Federal Transit Administration? A more detailed level of study produces more robust ridership and cost estimates as well as various alternative routings.

- ◆ Evaluation: A sketch level plan study is desirable (Sketch Plan); a feasibility analysis or non-FTA alternatives analysis is better (Conceptual AA); a completed FTA Alternatives Analysis is the preferred report (Full Alternatives Analysis).

▶ What is the Level of County and Operating Agency Support?

Does the project have a broad-base of support and is there a long-standing regional consensus for it? Operating agency support is important because they ultimately will have to provide operational funding for the project once it is completed.

- ◆ Evaluation: Level of support starts with (a) the county signifying support for the project; and then rising to (b) the project being included in an official municipal, county or regional plan; and reaching a higher level when (c) the project is currently programmed in the Transportation Improvement Program.

APPENDIX D



Available Revenue, Programmed Expenditure and Balance to be Identified by Plan Period

While the needs assessment identifies the funding that each category should receive in order to achieve and maintain a state of good repair, not all identified need is able to be funded, as seen by the region's sizable funding gap. DVPRC's TIP identifies funding and projects in the short-term period, as one of many implementation arms of the long-range plan. Given funding constraints, TIP development will carefully consider and weigh each project against the region's identified needs and prioritize investments based on which are most critical to the success of the region. Currently between the TIP and identified Major Regional Projects, approximately \$24 billion of available revenue has already been programmed. The remaining balance of unidentified funds will be programmed in the TIP in the future.

The next three figures show available revenue and programmed expenditures for the Pennsylvania subregion for each funding period in the financial plan.

Pennsylvania Subregion Anticipated Revenue, Programmed Expenditure, and Balance to be Programmed from 2010 to 2015 (in Y-O-E \$s)

Mode	LRP Funding Category	Anticipated Revenue	Programmed Expenditure	Balance to be Programmed
Highway	H1. Pavement Recon./Rehab./Resurface/Restor.	\$ 1.14 B	\$ 1.10 B	\$ 0.04 B
	H2. Bridge Replacement and Restoration	\$ 1.06 B	\$ 0.96 B	\$ 0.09 B
	H3. Operational Improvements	\$ 0.26 B	\$ 0.25 B	\$ 0.00 B
	H4. ITS and Signal	\$ 0.12 B	\$ 0.11 B	\$ 0.01 B
	H5. Highway New Capacity	\$ 0.70 B	\$ 0.69 B	\$ 0.01 B
	H6. Bicycle and Pedestrian	\$ 0.10 B	\$ 0.10 B	\$ 0.00 B
	H7. Other	\$ 0.04 B	\$ 0.03 B	\$ 0.01 B
	Highway Subtotal	\$ 3.41 B	\$ 3.24 B	\$ 0.17 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	\$ 0.63 B	\$ 0.43 B	\$ 0.20 B
	T2. Vehicle Rehabilitation and Replacement	\$ 1.16 B	\$ 0.89 B	\$ 0.28 B
	T3. Station Enhancements	\$ 0.54 B	\$ 0.43 B	\$ 0.11 B
	T4. System and Operational Improvements	\$ 0.16 B	\$ 0.00 B	\$ 0.16 B
	T5. Transit New Capacity	\$ 0.14 B	\$ 0.14 B	\$ 0.00 B
	New-Start/Small-Start	\$ -		
	T6. Other	\$ 0.55 B	\$ 0.54 B	\$ 0.01 B
	Transit Subtotal	\$ 3.19 B	\$ 2.43 B	\$ 0.76 B
PA Sub-region Total		\$ 6.60 B	\$ 5.67 B	\$ 0.93B

1. Programmed expenditure is the sum of all funding identified in the 2009-12 DVRPC TIP and the Financial Plan's Major Regional Projects.

2. Balance is remaining funding that has not been programmed in the TIP or for Major Regional Projects and will be identified in future TIP cycles by prioritizing the region's needs within each funding category.

3. Includes new capacity component of Major Regional Projects and Minor New Capacity projects. Remaining Balance reserved for future Minor New Capacity projects only.

4. Represents non-federal only and does not include discretionary grants for transit new starts or small starts projects.

5. Represents discretionary federal grant amount for new starts and small starts projects.

Source: DVRPC 2009

Pennsylvania Subregion Anticipated Revenue, Programmed Expenditure, and Balance to be Programmed from 2016 to 2025 (in Y-O-E \$s)

Mode	LRP Funding Category	Anticipated Revenue	Programmed Expenditure	Balance to be Programmed
Highway	H1. Pavement Recon./Rehab./Resurface/Restor.	\$ 2.51 B	\$ 1.65 B	\$ 0.86 B
	H2. Bridge Replacement and Restoration	\$ 3.29 B	\$ 1.36 B	\$ 1.96 B
	H3. Operational Improvements	\$ 1.04 B	\$ 0.73 B	\$ 0.31 B
	H4. ITS and Signal	\$ 0.25 B	\$ 0.09 B	\$ 0.16 B
	H5. Highway New Capacity	\$ 1.04 B	\$ 0.91 B	\$ 0.14 B
	H6. Bicycle and Pedestrian	\$ 0.08 B	\$ 0.00 B	\$ 0.06 B
	H7. Other	\$ 0.11 B	\$ 0.00 B	\$ 0.10 B
	Highway Subtotal	\$ 8.32 B	\$ 4.73 B	\$ 3.59 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	\$ 1.33 B	\$ 0.81 B	\$ 0.52 B
	T2. Vehicle Rehabilitation and Replacement	\$ 2.34 B	\$ 0.17 B	\$ 2.17 B
	T3. Station Enhancements	\$ 0.98 B	\$ 0.08 B	\$ 0.90 B
	T4. System and Operational Improvements	\$ 0.29 B	\$ 0.00 B	\$ 0.29 B
	T5. Transit New Capacity	\$ 0.32 B	\$ 1.51 B	\$ 0.02 B
	New-Start/Small-Start	\$ 1.21 B		
	T6. Other	\$ 0.52 B	\$ 0.00 B	\$ 0.52 B
	Transit Subtotal	\$ 6.99 B	\$ 2.57 B	\$ 4.42 B
PA Sub-region Total		\$ 15.32 B	\$ 7.31 B	\$ 8.00 B

1. Programmed expenditure is the sum of all funding identified in the 2009-12 DVRPC TIP and the Financial Plan's Major Regional Projects.

2. Balance is remaining funding that has not been programmed in the TIP or for Major Regional Projects and will be identified in future TIP cycles by prioritizing the region's needs within each funding category.

3. Includes new capacity component of Major Regional Projects and Minor New Capacity projects. Remaining Balance reserved for future Minor New Capacity projects only.

4. Represents non-federal only and does not include discretionary grants for transit new starts or small starts projects.

5. Represents discretionary federal grant amount for new starts and small starts projects.

Source: DVRPC 2009

Pennsylvania Subregion Anticipated Revenue, Programmed Expenditure, and Balance to be Programmed from 2016 to 2025 (in Y-O-E \$s)

Mode	LRP Funding Category	Anticipated Revenue	Programmed Expenditure	Balance to be Programmed
Highway	H1. Pavement Recon./Rehab./Resurface/Restor.	\$ 3.17 B	\$ 0.45 B	\$ 2.72 B
	H2. Bridge Replacement and Restoration	\$ 5.30 B	\$ 2.52 B	\$ 2.77 B
	H3. Operational Improvements	\$ 0.55 B	\$ 0.51 B	\$ 0.03 B
	H4. ITS and Signal	\$ 0.98 B	\$ 0.13 B	\$ 0.85 B
	H5. Highway New Capacity	\$ 0.49 B	\$ 0.27 B	\$ 0.22 B
	H6. Bicycle and Pedestrian	\$ 0.22 B	\$ 0.00 B	\$ 0.22 B
	H7. Other	\$ 0.22 B	\$ 0.00 B	\$ 0.22 B
	Highway Subtotal	\$ 10.92 B	\$ 3.98 B	\$ 7.03 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	\$ 1.98 B	\$ 0.00 B	\$ 1.98 B
	T2. Vehicle Rehabilitation and Replacement	\$ 3.32 B	\$ 0.00 B	\$ 3.32 B
	T3. Station Enhancements	\$ 1.47 B	\$ 0.00 B	\$ 1.47 B
	T4. System and Operational Improvements	\$ 0.45 B	\$ 0.00 B	\$ 0.45 B
	T5. Transit New Capacity	\$ 0.00 B	\$ 0.00 B	\$ -
	New-Start/Small-Start	\$ -		
	T6. Other	\$ 0.50 B	\$ 0.00 B	\$ 0.50 B
	Transit Subtotal	\$ 7.72 B	\$ 0.00 B	\$ 7.72 B
PA Sub-region Total		\$ 18.64 B	\$ 3.89 B	\$ 14.75 B

1. Programmed expenditure is the sum of all funding identified in the 2009-12 DVRPC TIP and the Financial Plan's Major Regional Projects.

2. Balance is remaining funding that has not been programmed in the TIP or for Major Regional Projects and will be identified in future TIP cycles by prioritizing the region's needs within each funding category.

3. Includes new capacity component of Major Regional Projects and Minor New Capacity projects. Remaining Balance reserved for future Minor New Capacity projects only.

4. Represents non-federal only and does not include discretionary grants for transit new starts or small starts projects.

5. Represents discretionary federal grant amount for new starts and small starts projects.

Source: DVRPC 2009

The following three figures identify the New Jersey subregion's available revenue, programmed expenditure and balance to be identified in future TIP development for each of the long-range plan periods.

New Jersey Subregion Anticipated Revenue, Programmed Expenditure, and Balance to be Programmed from 2010 to 2015 (in Y-O-E \$s)

Mode	LRP Funding Category	Anticipated Revenue	Programmed Expenditure	Balance to be Programmed
Highway	H1. Pavement Recon./Rehab./Resurface/Restor.	\$ 0.60 B	\$ 0.29 B	\$ 0.31 B
	H2. Bridge Replacement and Restoration	\$ 0.59 B	\$ 0.23 B	\$ 0.36 B
	H3. Operational Improvements	\$ 0.32 B	\$ 0.31 B	\$ 0.01 B
	H4. ITS and Signal	\$ 0.06 B	\$ 0.03 B	\$ 0.03 B
	H5. Highway New Capacity	\$ 0.34 B	\$ 0.31 B	\$ 0.03 B
	H6. Bicycle and Pedestrian	\$ 0.02 B	\$ 0.02 B	\$ 0.01 B
	H7. Other	\$ 0.06 B	\$ 0.06 B	\$ 0.00 B
	Highway Subtotal	\$ 1.99 B	\$ 1.25 B	\$ 0.74 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	\$ 0.05 B	\$ 0.05 B	\$ 0.00 B
	T2. Vehicle Rehabilitation and Replacement	\$ 0.60 B	\$ 0.59 B	\$ 0.01 B
	T3. Station Enhancements	\$ 0.03 B	\$ 0.03 B	\$ 0.00 B
	T4. System and Operational Improvements	\$ 0.01 B	\$ 0.01 B	\$ 0.00 B
	T5. Transit New Capacity	\$ 0.20 B	\$ 0.20 B	\$ 0.00 B
	New-Start/Small-Start	\$0		
	T6. Other	\$ 0.13 B	\$ 0.13 B	\$ 0.00 B
	Transit Subtotal	\$ 1.02 B	\$ 1.00 B	\$ 0.02 B
NJ Sub-region Total		\$ 3.01 B	\$ 2.25 B	\$ 0.76 B

1. Programmed expenditure is the sum of all funding identified in the 2009-12 DVRPC TIP and the Financial Plan's Major Regional Projects.

2. Balance is remaining funding that has not been programmed in the TIP or for Major Regional Projects and will be identified in future TIP cycles by prioritizing the region's needs within each funding category.

3. Includes new capacity component of Major Regional Projects and Minor New Capacity projects. Remaining Balance reserved for future Minor New Capacity projects only.

4. Represents non-federal only and does not include discretionary grants for transit new starts or small starts projects.

5. Represents discretionary federal grant amount for new starts and small starts projects.

Source: DVRPC 2009

New Jersey Subregion Anticipated Revenue, Programmed Expenditure, and Balance to be Programmed from 2016 to 2025 (in Y-O-E \$s)

Mode	LRP Funding Category	Anticipated Revenue	Programmed Expenditure	Balance to be Programmed
Highway	H1. Pavement Recon./Rehab./Resurface/Restor.	\$ 1.60 B	\$ 0.51 B	\$ 1.09 B
	H2. Bridge Replacement and Restoration	\$ 1.66 B	\$ 0.05 B	\$ 1.60 B
	H3. Operational Improvements	\$ 0.81 B	\$ 0.79 B	\$ 0.02 B
	H4. ITS and Signal	\$ 0.17 B	\$ 0.14 B	\$ 0.03 B
	H5. Highway New Capacity	\$ 1.04 B	\$ 0.95 B	\$ 0.09 B
	H6. Bicycle and Pedestrian	\$ 0.08 B	\$ 0.00 B	\$ 0.08 B
	H7. Other	\$ 0.17 B	\$ 0.05 B	\$ 0.12 B
	Highway Subtotal	\$ 5.52 B	\$ 2.49 B	\$ 3.03 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	\$ 0.43 B	\$ 0.01 B	\$ 0.41 B
	T2. Vehicle Rehabilitation and Replacement	\$ 1.05 B	\$ 0.29 B	\$ 0.76 B
	T3. Station Enhancements	\$ 0.30 B	\$ 0.03 B	\$ 0.28 B
	T4. System and Operational Improvements	\$ 0.05 B	\$ 0.00 B	\$ 0.04 B
	T5. Transit New Capacity	\$ 0.93 B	\$ 2.13 B	\$ 0.01 B
	New-Start/Small-Start	\$ 1.21 B		
	T6. Other	\$ 0.29 B	\$ 0.07 B	\$ 0.22 B
	Transit Subtotal	\$ 4.26 B	\$ 2.54 B	\$ 1.72 B
NJ Sub-region Total		\$ 9.78 B	\$ 5.02 B	\$ 4.76 B

1. Programmed expenditure is the sum of all funding identified in the 2009-12 DVRPC TIP and the Financial Plan's Major Regional Projects.
 2. Balance is remaining funding that has not been programmed in the TIP or for Major Regional Projects and will be identified in future TIP cycles by prioritizing the region's needs within each funding category.
 3. Includes new capacity component of Major Regional Projects and Minor New Capacity projects. Remaining Balance reserved for future Minor New Capacity projects only.
 4. Represents non-federal only and does not include discretionary grants for transit new starts or small starts projects.
 5. Represents discretionary federal grant amount for new starts and small starts projects.
- Source: DVRPC 2009

New Jersey Subregion Anticipated Revenue, Programmed Expenditure, and Balance to be Programmed from 2026 to 2035 (in Y-O-E \$s)

Mode	LRP Funding Category	Anticipated Revenue	Programmed Expenditure	Balance to be Programmed
Highway	H1. Pavement Recon./Rehab./Resurface/Restor.	\$ 2.49 B	\$ 0.17 B	\$ 2.32 B
	H2. Bridge Replacement and Restoration	\$ 3.70 B	\$ 0.00 B	\$ 3.70 B
	H3. Operational Improvements	\$ 0.52 B	\$ 0.03 B	\$ 0.48 B
	H4. ITS and Signal	\$ 0.22 B	\$ 0.18 B	\$ 0.04 B
	H5. Highway New Capacity	\$ 0.11 B	\$ 0.07 B	\$ 0.04 B
	H6. Bicycle and Pedestrian	\$ 0.11 B	\$ 0.00 B	\$ 0.11 B
	H7. Other	\$ 0.22 B	\$ 0.00 B	\$ 0.22 B
	Highway Subtotal	\$ 7.37 B	\$ 0.45 B	\$ 6.92 B
Transit	T1. Rail Infrastructure Rehabilitation/Restoration	\$ 0.31 B	\$ 0.00 B	\$ 0.31 B
	T2. Vehicle Rehabilitation and Replacement	\$ 2.69 B	\$ 0.00 B	\$ 2.69 B
	T3. Station Enhancements	\$ 0.61 B	\$ 0.00 B	\$ 0.61 B
	T4. System and Operational Improvements	\$ 0.08 B	\$ 0.00 B	\$ 0.08 B
	T5. Transit New Capacity	\$ 0.00 B	\$ 0.00 B	\$ -
	New-Start/Small-Start	\$ -		
	T6. Other	\$ 0.39 B	\$ 0.00 B	\$ 0.39 B
	Transit Subtotal	\$ 4.07 B	\$ 0.00 B	\$ 4.07 B
NJ Sub-region Total		\$ 11.44 B	\$ 0.45 B	\$ 10.99 B

1. Programmed expenditure is the sum of all funding identified in the 2009-12 DVRPC TIP and the Financial Plan's Major Regional Projects.
 2. Balance is remaining funding that has not been programmed in the TIP or for Major Regional Projects and will be identified in future TIP cycles by prioritizing the region's needs within each funding category.
 3. Includes new capacity component of Major Regional Projects and Minor New Capacity projects. Remaining Balance reserved for future Minor New Capacity projects only.
 4. Represents non-federal only and does not include discretionary grants for transit new starts or small starts projects.
 5. Represents discretionary federal grant amount for new starts and small starts projects.
- Source: DVRPC 2009

A P P E N D I X E



Regional Freight Projects

The Delaware Valley Goods Movement Task Force has compiled the following set of transportation improvements that are critical for freight movement in the region. These projects represent the prioritized set of needs and are grouped by mode: Highway and NHS Connector, Rail, and Ports/Facilities. The majority of the projects in the Highway category are being funded through the long-range plan. Funding for Rail Freight and Ports/Facilities projects have not been identified since there are no federal formula funds available under the existing SAFETEA-LU authorization for such projects. Individual projects are eligible for CMAQ and other grant funding opportunities. DVRPC supports improvements to the region's freight rail network, ports, and other freight facilities.

Freight Highway and NHS Connector Program

The freight highway program consists of projects from the DVRPC Long-Range Plan (LRP) and Transportation Improvement Program (TIP) that are of special importance to freight. Trucks share the roadways with all vehicles and any project that is creating additional roadway capacity, improving existing roadways, or taking passengers off the roadways and onto public transportation can be termed as beneficial to the trucking industry. So as not to replicate the TIP, the projects listed in this section include only projects on major interstates and National Highway System (NHS) Intermodal freight connectors. This has two results: one, it allows for a program consisting of projects that can be deemed especially important to the freight community, and two, it allows for the freight community to actively lobby for some of these large projects that have gone unfunded for years.

Trucking plays a major role in the movement of goods in our country and the Greater Philadelphia region. The DVRPC aggregation of the Freight Analysis Framework 2.2 database showed trucking to be responsible for 75 percent of the movements attributed to the Philadelphia Consolidated Statistical Area. The entire program not including the Pennsylvania and New Jersey Turnpike projects sums to approximately \$5.3 billion.

The implementation period for each project is identified as short term (0-5 years), medium term (5-15 years), or long term (15+ years). The term of the project is shown as an abbreviation following the project.

Widening

The majority of highway widening projects that are on capital programs are on the Pennsylvania and New Jersey Turnpikes. These projects will be funded through bonds against toll revenue.

- Widen the PA Turnpike Northeast Extension (I-476) from Mid-County to Quakertown. This roadway is currently 2 lanes in each direction. The widening project will make the roadway 3 lanes in each direction. Overhead bridges along the roadway will need to be redesigned to accommodate widening. This project will be completely paid for by the Turnpike Commission using toll revenue.
 - a. Phase I: widen from Mid-County to Lansdale. Estimated to cost \$295 million in 2009 dollars. (ST)
 - b. Phase II: widen from Lansdale to Quakertown. Estimated to cost \$665 million in 2009 dollars. (MT)

- Widen Scudder Falls Bridge (I-95). This project will widen the Scudder Falls Bridge to 3 lanes in each direction and make interchange improvements at the Route 29 Interchange in New Jersey and the Taylorsville Road Interchange in Pennsylvania. Estimated cost of this project is \$309 million in 2009 dollars. This bridge is maintained by the Delaware River Joint Toll Bridge Commission. (ST)
- Widen the PA Turnpike (I-76) from Valley Forge to Downingtown. The roadway is currently 2 lanes in each direction. Widening would make the roadway 3 lanes in each direction. Bridges that cross over the roadway will need to be redesigned to accommodate widening. This project will be completely paid for by the PA Turnpike Commission using toll revenue.
 - c. Phase I: Electronic interchange at PA 29. Estimated to cost \$65 million in 2009 dollars. (ST)
 - d. Phase II: Widen from Downingtown to Valley Forge. Estimated to cost \$300 million in 2009 dollars. (MT)
- Widen NJ Turnpike from exit 6 through exit 9. This project will take the separated highway that exists north of exit 9 (East Brunswick) and extend it to exit 6 (PA Turnpike). This project will be completely paid for by the New Jersey Turnpike Authority using toll revenue. Estimated cost of this project is \$2.7 billion in 2009 dollars. (ST)
- Widen the NJ Turnpike from the Delaware Memorial Bridge to exit 4. This stretch of road currently has 2 lanes in each direction, but north of exit 4 it is 3 lanes in each direction. This project will add 1 lane in each direction so that the Turnpike is 3 lanes in each direction from the Delaware Memorial Bridge until it becomes a separated highway. This project will be completely paid for by the Turnpike Authority using toll revenue. Estimated cost for this project is \$310 million in 2009 dollars. (LT)

New or Improved Interchanges

A highway system is only as good as its interchanges. The ability to get on and off, as well as transfer from one highway to another is essential for all passenger or freight movements. At the same time, interchanges can be extremely expensive to construct. The three projects listed below will cost over \$2 billion but are vital to adding efficiency to the highway system through the year 2035. Additionally, missing connections can force trucks to use local roads and create adverse reactions from the community. As freight companies are asked to be better neighbors it is important that the infrastructure be created in such a way that allows them to minimize their local impacts.

6. Construct I-95 and I-276 (PA Turnpike) Interchange. This project can be broken down into two phases. Phase I would allow for movements from Northbound I-95 to Eastbound I-276 and Westbound I-276 to Southbound I-95. This would allow for the renumbering of a section of I-276 and allow I-95 to traverse the region more seamlessly. Phase II would construct the other 3 quadrants to complete the interchange, as well as widen the PA Turnpike from US 1 to New Jersey. It is believed that phase I can be a viable project without phase II. Estimated total cost for this project is \$871 million. (ST, MT)
7. Construct a direct connection of I-295 at the I-295/NJ 42/I-76 Interchange. This interchange is the most congested interchange in the DVRPC region. The project will provide a direct connection for I-295 traffic, eliminating the segment of road where Route 295 shares roadway with Route 42. Estimated cost for this project is \$1.14 billion in year-of-expenditure dollars. (MT)
8. Construct I-295/NJ 42 missing moves project. This project will allow for moves at the I-295/42 interchange that are not possible with the current configuration. Estimated cost for this project is \$154 million in year-of-expenditure dollars. All funding for this project is identified in the outer years of the DVRPC TIP. (MT)

New and Improved Connectors

Intermodal Connectors are the “last-mile” that freight moves on the highway system. While they are often referred to as the “last-mile,” our region is more of a destination for goods than it is an origin, so the connectors often are in actuality serving as the “first-mile” that freight moves. They are public roads that connect major intermodal terminals to the NHS network. The basic criterion for an intermodal connector is that the facility (or facilities) it is serving must have an average of 100 trucks entering and exiting the facility per day.

The projects listed below include major projects on these NHS connector roads, as well as some other connector projects for potential new connectors, and roadways connecting highways. Some of the projects do not have costs associated with them. This is mostly because these projects have multiple options and the feasibility of each has not been fully studied.

1. Create new Route 309 connector road. This project will construct a new two lane connector road between PA 309 and the PA Turnpike Lansdale Interchange. This project is being completed in two phases.
 - a. Phase I is funded through the DVRPC TIP in 2009-2011. (ST)
 - b. Phase II has yet to be programmed, or have costs determined. (MT)
2. Construct access road and bridge to planned Paulsboro Port Facility. This project will build a dedicated road for truck traffic moving into and out of the proposed new port facility in Paulsboro. This project will keep traffic for the port facility out of the nearby residential community. Estimated cost of the project is \$16 million and will be constructed through a NJDOT grant. (ST)
3. Reconstruct Access road via 26th Street to the Philadelphia Naval Yard. This project will provide another entrance to the Navy Yard besides the heavily used Broad Street entrance. This project is funded from 2009 to 2012 in the DVRPC TIP. (ST)
4. Create a new local connector roadway in Camden and create a Port District Road to connect the terminals along the Delaware River in Camden. This project was identified in the DRPA Master Plan and has an estimated cost of \$115 million. (MT)
5. Improve access to South Philadelphia Freight Complex. Three projects along this road need construction.
 - a. Reconstruct Old Delaware Avenue, which connect the Packer Avenue Marine Terminal and CSX Greenwich Rail Yard to Columbus Boulevard, to accommodate growth in traffic and the heightened need for security. (MT)
 - b. Construct new gate at Packer Avenue Marine Terminal. (MT)
 - c. Create new port access road for the proposed SouthPort facility. Depending on the alignment of the new facility, it may be possible to extend Old Delaware Avenue into the new facility, or to access the new facility through Packer Avenue Marine Terminal, with the two terminals sharing a gate system. (MT)
6. Create alternate access into Penn Terminals. There is only one roadway, Saville Avenue, which connects Penn Terminals to the Interstate System. On Saville Avenue, there is a railroad bridge with 14 feet of clearance. This is enough for a normal trailer, however it prohibits the flow of some of the project, and specialty cargo Penn Terminals is able to carry. Also, since this is the only route into the facility, if any incident were to happen then the facility could not be accessed. The best solution appears to be to build an alternative connection into Penn Terminals for oversized cargo and emergency access. (MT)

7. Construct Gibbstown / DuPont Repauno access road. This project will create a new access road in Gibbstown to the old DuPont Repauno site, which is planned for industrial use, likely a new port facility. Like the Paulsboro access road project, this will keep trucks accessing the facility out of the nearby residential area. The project has an estimated cost of \$25 million. (MT)
8. Reconstruct connector off Route 322 that accesses the CSX Twin Oaks Yard. This interchange is highly used by trucks, especially auto-carriers, but is not configured in a safe way for modern truck use. This project was recommended in the DVRPC NHS Connector study. It may be possible to include this project in the I-95/Route 322 Interchange project. (MT)

Major Reconstruction Projects

The National Highway System (NHS) was first authorized in 1956. It is the largest highway system in the world and the largest public works project in history. The system requires continual maintenance in order to stay running and stay safe. Segments of highway often need to be repaved, resurfaced, or totally reconstructed. The DVRPC LRP allocates roughly 3/4 of its highway funding to roadway and bridge reconstruction, rehabilitation, resurfacing, and restoration. The projects listed in this section represent more than half of the total funding presented in the freight highway program. Before building new capacity to handle additional traffic, it is first imperative that the region's existing infrastructure be safe and functional.

17. Resurfacing, pavement repair, and rehabilitation of Route 295.
 - a. Phase I: Resurfacing Route 295, from Route 130 to Route 29/I-195 Interchange. This project is shown as funded in the DVRPC TIP for 2009. (ST)
 - b. Phase II: Pavement repair and resurfacing Route 295, from Rancocas-Mount Holly Road to Route 130. This project is currently identified in the DVRPC TIP for 2010 and 2011. (ST)
 - c. Phase III: Rehabilitation of Route 295 from Route 45 to Berlin-Haddonfield Road. This project is currently identified in the DVRPC TIP for 2011 and 2012. (ST)
18. Reconstruction of I-95 section A. The I-95 reconstruction project is broken into many sections and phases. The estimated cost of reconstruction is \$14.27 billion in year-of-expenditure dollars; of this total \$3.3 billion is currently identified. This leaves approximately \$10.9 billion unfunded for the reconstruction of I-95 in Philadelphia County. (MT)
19. Reconstruction of I-476 from Chemical Road to I-76. Total reconstruction of both north and southbound lanes. This project will provide no additional capacity; the only widening will be of shoulders to meet FHWA 2008 standards. This project is funded through the DVRPC TIP for 2009 through 2012. (ST)
20. Maintenance to DRPA bridges.
 - a. The Walt Whitman Bridge re-deck main span project is estimated to cost \$115 million and be completed from 2009-2012. DRPA projects are completed with toll revenue. (ST)
 - b. The Commodore Barry Bridge re-deck project is estimated to cost \$200 million and be completed in roughly 2025. DRPA projects are completed with toll revenue. (LT)
21. Rehabilitation of I-76.

- a. I-76 precast bridge parapets from US 1 to South Street, this section includes 19 bridges. This project is funded in the DVRPC TIP. (ST)
- b. I-76 / US 1 bridge at Gustine Lake Interchange. This Interchange is in close alignment to Roosevelt Boulevard, Kelly Drive, and I-76. Five bridges will be replaced. Portions of this project are currently identified through the DVRPC TIP in years 2010 and 2011. (ST)

Freight Rail Program

The freight rail program element is a much more detailed approach than the freight highway program. The MPO process does an excellent job of keeping track of all highway projects, so it was possible to be selective and pick out the highway projects which were especially beneficial to freight. The DVRPC TIP has not historically funded many projects for privately owned railroads. That is starting to change as the 2009 TIP includes \$5 million for a double stack project along the CSX Trenton Subdivision (listed as project #7 below).

The goal of the freight rail program for the freight element in the LRP is to stand as a comprehensive list of all capital projects meant to improve the capacity of the freight rail system. Because of this, projects range greatly in cost from those around \$500,000 to those over \$500 million. The total program is estimated to represent roughly \$1.3 billion in needs.

Many small maintenance projects and new siding projects were not included in this document. It is essential to continue and augment the state funding that helps these small maintenance and new siding projects which allow freight to be shifted to railcars. DVRPC fully supports these projects, but as they have identified state funding and are subject to change based of locations on new businesses, they were not included in the following project list.

Each section below is organized in such a way that the short term projects (0-5 years) are listed first, then medium term projects (5-15 years), and long term projects (15+ years) are listed last. The term of the project is shown as an abbreviation following the project.

New Main Track

Adding a new main track to a rail line is the most straightforward way to creating additional freight rail capacity. Adding new main track to a rail line is extremely expensive. The projects in this section represent the majority of money that makes up the freight rail program. As freight increases these are the projects that will be necessary to maximize rail as a mode of choice for the DVRPC region.

Many main lines are single track with passing sidings, which allow the trains to be rearranged, or for one train to pass another going in opposite directions. This slows the movement of trains which restricts the type of cargo carried by rail. To truly maximize rail capacity, double tracking all main lines is necessary.

1. Create additional capacity on the Norfolk Southern Morrisville line between Abrams and Morrisville Yards. There have been two projects identified for this section of track.
 - a. Additional capacity could be created by the construction of a 2-mile passing siding for an estimated cost of \$6 million. (MT)

- b. Restore a second main track and rehabilitate bridges and culverts to accommodate the second main track for an estimated cost of \$72.2 million. This project was identified in the Mid-Atlantic Rail Operations (MAROps) Study Phase I. (LT)
2. Add second main track on the CSX Trenton line from Ewing to Manville Yard. The large majority of this project takes place outside the DVRPC region. The estimated cost of this project is \$76.5 million. This project was identified in the MAROps Study Phase I. (MT)
3. Add second main track on the CSX Trenton line from Control Point (CP) River to CP Wood. This project would connect a series of sidings creating a second main track. The segments that need additional track are Newtown Junction to CP Nice, Cheltenham Junction to CP Berry, and CP Nesh to CP Wood. This project has an estimated cost of \$102.9 million. This project was identified In the MAROps Study Phase I. (MT)
4. Construct additional main track along the CSX High Line and CSX Trenton Line from CP Belmont to CP Arsenal. Estimated cost of this project is \$202.2 million. This project was identified In the MAROps Study Phase I. (LT)
5. Construct a second main track on the CSX Philadelphia Subdivision from the Delaware State Line to CSX Trenton Line. The estimated cost of this project is \$40 million. This project was identified In the MAROps Phase I study. (LT)
6. Construct dedicated freight track along the Amtrak Northeast Corridor from Wilmington to Philadelphia. Estimated cost of this project is \$582.6 million. This project was identified In the MAROps Study Phase I. (LT)

In the mean time, allowing for 286,000 pound railcars on the Amtrak Northeast Corridor could open up additional rail based business for the region. The Amtrak Northeast Corridor has capacity for 286,000 pound rail cars, but does not allow freight railroads to run this weight due to maintenance concerns. This limits rail service to local customers in the region. A compromise between the concern for additional wear and tear to the Amtrak tracks and the freight needs should be reached.

Additional Vertical Clearance

Intermodal freight transportation using railcars can trace its history back to before World War II. However, the concept of double stacking container trains was not fully implemented until 1984. Now more than one million shipments are transported using double stack intermodal rail service every year in the US and it represents a growing share of the railroad industry. The nature of double stack requires more vertical clearance than more traditional rail cars. The rail industry in general is moving towards larger and heavier railcars because the more goods they can fit into a railcar or on a rail platform the more effective their business can be. Because of these trends in business, it is becoming necessary to create more vertical clearance on many freight rail lines. The projects listed below offer an excellent way for the region to improve its rail capacity and allow additional business to take advantage of rail transportation.

7. Create double-stack vertical clearance along the CSX Trenton Line. This project is funded through both the Pennsylvania State Capital Program and the DVRPC TIP. CSX is also contributing to the funding of this project. Total estimated cost is \$32 million. This project was identified In the MAROps Study Phase I. (ST)
8. Improvements under Broad Street to access port facilities and intermodal yards. Currently only one of the three lines that pass under Broad Street near the Philadelphia Sports Complex is cleared for double-stack. Estimated project cost is \$750,000. (ST)

9. Increase vertical clearance at Willits Road Overpass on the Bustleton Industrial Track. This project will allow for plate F boxcars to get under the overpass to access the Northeast Philadelphia Industrial Park and other businesses located on the line. Plate F boxcars require 17' of clearance. This project is estimated to cost \$1 million. (ST)
10. Increase vertical clearance in Port Richmond. Clear 21 overhead bridges and 2 additional restrictions along the Port Richmond Branch accessing the Tioga Port area. Estimated total cost is \$20 - \$25 million. There is a possible alternative of connecting the northern section of this track to the Delair Branch. (LT)
11. Increase vertical clearance on the Philadelphia subdivision in tunnel under Art Museum. Estimated total cost \$6 million. (LT)
12. Increase vertical clearance at Grays Ferry Avenue. The CSX line leading into the Philadelphia Port Area and Greenwich Yard goes under Grays Ferry Avenue as it enters the East Side / TransFlo Yard (This yard can than connect to CSX Greenwich Yard). Estimated total cost is \$4 million. (LT)
13. Create additional clearance for high stack cars on the CSX Philadelphia subdivision. This project was identified In the MAROps Phase I study. This project will create clearance for high stack cars at 11 locations from Clifton Avenue to Broad Street. The clearance along these 5 miles of track is currently 19 feet 1 inch, but needs to be 20 feet 2 inches to accommodate high stack cars. This project is only practical if the clearance project of the Howard Street Tunnel in Baltimore is completed. This project is estimated to cost \$8.3 million. The Howard Street Tunnel project will be very costly and several alternatives are under review. (LT)

Additional Capacity through Sidings, Yards, and Wyes

Besides vertical clearance and new main track, the other ways to create capacity on freight rail lines is by creating new connections through wyes and sidings, along with increasing capacity in rail yards (creating a new yard, or upgrading an existing yard). These projects are all relatively low in cost compared to the new main track and vertical clearance projects listed above. Also, most of these projects are projected to be completed in either the short or medium-term. It is likely that additional long range projects that would fall in this section will be needed, but have not yet been identified.

14. Rail improvements and expansions at the Keystone Industrial Port Complex (KIPC). This project will be done in phases.
 - a. Phase I is a \$3.2 million project, of which \$750,000 has been secured through PennDOT funding. (ST)
 - b. Phase II identified projects are estimated to cost roughly \$32 million and have been broken down into eight phases. Construction of the additional phases will depend on the businesses that occupy the available space. (MT)
15. Create direct connection from Conrail Engleside connection track to CSX Trenton subdivision at CP Park. This project completes a wye and allows for better movement of westbound trains on the CSX Schuylkill River Line to turn north onto Conrail and vice versa. This project will help connect trains travelling between South Philadelphia and Southern New Jersey. The project is estimated to cost \$4,000,000 and has \$3,500,000 million of dedicated funding from PennDOT. (ST)
16. Restore eastern track connection on the 60th Street Industrial Track. This project will restore the portion of the 60th Street Industrial Track that connects Ft. Mifflin with the SEPTA Airport Line. Currently trains are routed via the western end of Philadelphia International Airport and connect into the SEPTA Airport line. This project could support efforts to transport dredge spoils, and would make a better freight-only connection

into Ft. Mifflin, as well as make the rail line behind the airport expendable if the land is needed for airport expansion. (ST)

17. Add a siding to the Wilmington and Northern Branch in Pocopson, Pennsylvania. This project creates a switching location that will eliminate some train moves across Route 1. This project along the East Penn Railroad is funded for \$550,000. (ST)
18. Expand the Yard Capacity at Bridgeport and Paulsboro. This project will give SMS Rail Lines more yard capacity to store trains for the businesses they serve along these lines. Estimated total cost is \$2.5 million. (ST)
19. Create additional rail yard capacity along the Bordentown Secondary between the Delair Bridge and Woodbury. This area serves as the main rail line for all of Southern New Jersey. The main yard on this line, Pavonia, is antiquated and while able to handle current traffic would not be able to handle additional activity. (MT)

Grade Crossings

Highway – railroad grade crossings represent one of the greatest safety concerns attributed to freight railroads. The majority occur on small short-lines and spurs that do not have large amounts of traffic. It is important that the region maintain an accurate data-base of grade crossings, and that each meets the safety requirements regulated by the Federal Railroad Administration (FRA).

20. Create a grade separated crossing at Main Street in Darby, PA on the CSX Philadelphia Subdivision. This rail crossing is unique in that it involves a public transit trolley (Route 13) crossing a Class I main line in a commercial area. This project was identified in the DVRPC study of the grade crossings in Delaware County. The estimated cost of this project is \$50 million. (MT)

Reconstruction

There are select reconstruction projects that are of the magnitude that they should be included in this document. There are countless other maintenance projects that can be completed by private funds or using the state funding sources. It is a primary imperative that the region's existing infrastructure be safe and functional.

21. Replace crossover switch at CP Trent. This project will upgrade the crossover at CP Trent directly beyond the West Trenton train station. This project is estimated to cost \$2.5 million. (ST)
22. Bring Stoney Creek Branch up to Class II rail. The Stoney Creek Branch currently has washouts and derailments which frequently put the line out of service. It is estimated that \$10 million would be needed to bring the line up to Class II standards. (MT)
23. Rehabilitate track, signaling, and bridge on the Phoenixville Industrial Track. This project will help to repair track that services the northern end of the Phoenixville Industrial Track, which was originally used by Pennsylvania Railroad to access sand quarries. The line is 10.3 miles long; however, Norfolk Southern only operates over the first 2.3 miles. This project will replace an aging bridge over this 2.3 mile section, as well as make ballast and other track improvements. The rest of line is being looked at for transit operations, or may be abandoned. Estimated cost for this project is \$1 million. (ST)
24. Rehabilitate track along Beesley's Point Secondary. Ideally, this line would be upgraded to continuously welded rail, however due to the cost that is a long-term solution. To install continuously welded rail would require complete new lines at the cost of approximately \$300,000 per mile. However, short-term, Conrail is working to weld sections of the jointed rail which only costs \$80,000 per mile. (ST)

25. Reconstruct two swing bridges along the Penns Grove Secondary in Bridgeport and Paulsboro. Both of these locations have bridges that open for marine traffic. Replacement of the current bridges is estimated to cost about \$20 million each. They will need to be reconstructed in about 5 years. (MT)
26. Restore Blue Comet Line. The Blue Comet Line was a historic commuter rail line that connected north and south New Jersey through the Pine Barrens. Currently freight rail traffic that travels between North Jersey and South Jersey has to take a circuitous route through Pennsylvania and over the Delair Bridge. This project would restore this line for freight and possible commuter service between Winslow Junction and Woodmansie which is currently owned by NJDOT. Estimated cost for this project is \$130 million. (LT)

Ports and Facilities Program

Travel by other major modes, water, and air, is not directly linked to the MPO funding system or funding pots. One way a MPO can help these modes is to work on the highway and rail infrastructure that connects into these facilities. The connector roadways mentioned in the highway section are vital to the facilities mentioned below. Also vital are land use measures. Only one new distribution center/warehouse is mentioned below, but others will be needed. Because they tend to be private endeavors and locations are mostly unknown, they are not mentioned in this capital programming based section. This section contains a list of the facilities in the DVRPC region that have plans for expansion, thus increasing the cargo processing capabilities of the region.

1. Construct new relocated regional produce market in Southwest Philadelphia. The new site is anticipated to hold a state-of-the-art 560,000 square foot warehouse with a storefront area where the public can buy fruits and vegetables. 70 percent of the \$215 million project cost will be paid by the State of Pennsylvania, while \$5 million will be paid by the Federal Government. The rest of the funding will come from private developers. The Philadelphia Regional Port Authority will own the land and lease it to the Produce Market. (ST)
2. Deepen main channel of Delaware River to 45 feet. Ships traveling the Delaware River to the area ports must stay within the Main Channel of the Delaware River. This project would increase the depth of this channel from the Delaware River Bay to the Ben Franklin Bridge. The channel is currently at 40 feet, but that restricts the ports along the river from competing for the larger ships. (MT)
 - a. The funding for maintenance dredging in the Delaware River from the Delaware River Bay to the Port of Bucks is split into two sections: from the Bay to the Ben Franklin Bridge and from the Ben Franklin Bridge to the Port of Bucks. The two sections that need yearly maintenance dredging are near Marcus Hook, Pennsylvania, and New Castle, Delaware.
3. Construct new marine terminal in Paulsboro. The planned port of Paulsboro will be a 3 berth facility with roughly 190 acres of land for cargo handling. The terminal is envisioned as a mixed-use terminal. The construction of this facility is estimated to cost \$150 million. (ST)
4. Construct new Marine Terminal in Gibbstown at the former DuPont Repauno site. The facility in Gibbstown has not yet been designed, but would sit on a parcel with 300-acres of useable land for the terminal. The terminal is envisioned as a mixed-use terminal. The construction of this new facility is estimated to cost \$200 million. (MT)
5. Construct a new marine terminal just north of the Packer Avenue Marine Terminal entitled NorthPort. Northport is a joint venture between the PRPA and Holt Logistics Corp. The site consists of piers 96, 98, 100 and the Publicker Industries site. The parcel size is over 100-acres (including water areas) and the future terminal will be developed as a multi-purpose facility. (MT)
6. Construct new marine terminal at eastern end of Navy Yard entitled SouthPort. The site consists of a developable area in excess of 150-acres (including water areas) and provides for up to 2,280 linear feet of potential berthing along the Delaware River. The site is surrounded by the PIDC Navy Yard to the west;

the Norfolk Southern and CSX Corporation rail intermodal yards to the northwest; the Packer Avenue Marine Terminal to the north; and the Delaware River to the east and south. SouthPort is envisioned by the Philadelphia Regional Port Authority (PRPA) as a container facility. The site is being bid out to a private developer for construction and operation rights. (MT)

7. Add a 3rd berth at the Kinder Morgan Facility within the Keystone Industrial Port Complex. This 3rd berth would be for handling liquid cargo. (MT)
8. Reconstruction / Reclamation of Pier 3 along the Schuylkill River. This site is currently home to the SJ Anderson Construction Inc.; however, it is possible that other industrial use could be made of the pier. Reconstruction of the pier would allow barge traffic to service industry at the location. (MT)
9. Expansion at Penn Terminals. The company that borders Penn Terminals to the North recently went out of business and Penn Terminals is looking into the property as space to expand their on-site warehousing capacity. (MT)
10. Philadelphia International Airport Expansion. A proposed \$5 billion project to reduce delay at the Philadelphia International Airport, one of the most delayed airports in the nation. The proposed project, which includes a new runway, two major runway extensions, expanded terminals and associated airfield and landside improvements, builds on the existing airfield to expand the capacity of the airport. Another alternative contemplates reconfiguring the entire airport, with two new runways, and a consolidated terminal. The 2,200-acre airport site is bounded by I-95, the Delaware River, a residential neighborhood, and a national historic landmark. The project may require the relocation of a UPS sorting facility on the airfield; 100 acres of a U.S. Army Corps of Engineers dredge disposal site, a rail line, and twenty acres of fill in the tidal area of the Delaware River. (MT)

A P P E N D I X F



Acronyms

The following is a list of commonly used acronyms in planning and the *Connections* plan.

AASHTO American Association of State and Highway Transportation Officials
ADA Americans with Disabilities Act
AQP Air Quality Partnership
ARC Access to the Region's Core (trans-Hudson tunnel)
ARRA American Recovery and Reinvestment Act of 2009 (federal funding)
AVL Automatic Vehicle Location Systems
BMS Bridge Management System
BPI Bid Price Index
BRT Bus Rapid Transit
CAD Computer Aided Dispatch (buses)
CCTV Closed Circuit Television Cameras
CHSTP Coordinated Public Transit Human Services Transportation Plan
CJTF Central Jersey Transportation Forum
CMAQ Congestion Mitigation and Air Quality (federal funding)
CMP Congestion Management Process (of DVRPC)
CO₂ Carbon Dioxide (air quality)
CPI Consumer Price Index
DOD Degrees of Disadvantage (Environmental Justice)
DRPA Delaware River Port Authority
DVRPC Delaware Valley Regional Planning Commission
EGGS Efficient Growth for Growing Suburbs (of DVRPC)
EJ Environmental Justice
EPA Environmental Protection Agency (of United States)
ESP Emergency Service Patrols (highways)
EST Environmental Screening Tool (of DVRPC)
FAA Federal Aviation Administration
FHWA Federal Highway Administration
FTA Federal Transit Administration
FY Fiscal Year (July 1 to June 30)
GA General Aviation
GHG Greenhouse Gases
GIS Geographic Information System
GMTF Goods Movement Task Force (of DVRPC)
HSIP Highway Safety Improvement Program (of DVRPC)
IMP Interstate Management Program
IREG Information Resources Exchange Group
IRI International Roughness Index (pavement)
IT Information Technology

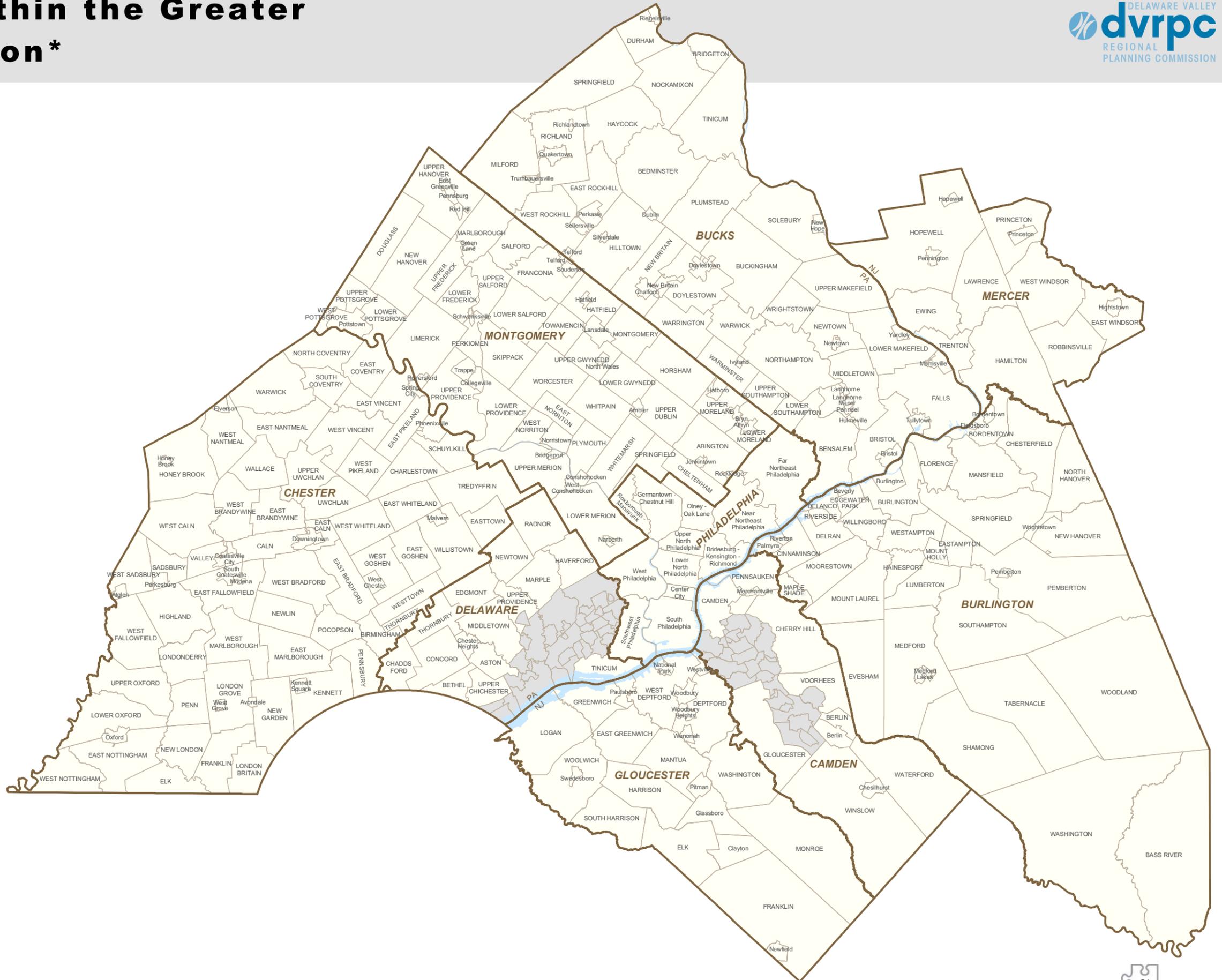
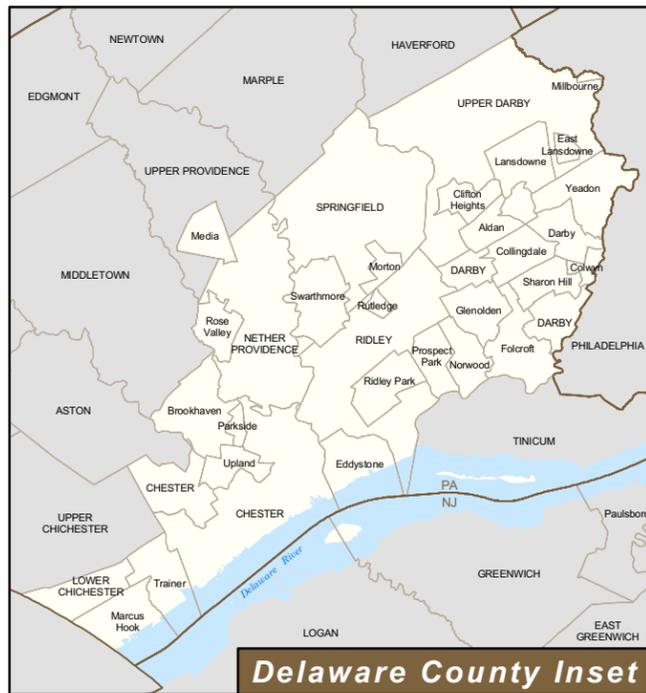
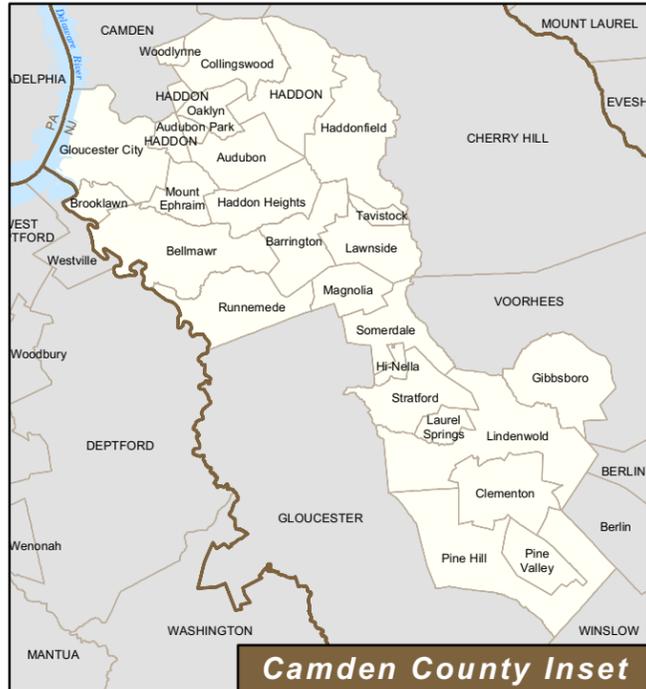
ITS Intelligent Transportation System
JARC Job Access Reverse Commute
LRP Long-Range Plan (of DVRPC)
LUHC Land Use and Housing Committee (of DVRPC)
LUTED Land Use, Transportation, and Economic Development Forum (of DVRPC)
MAP Mobility Alternatives Program
MIT Municipal Implementation Tool (of DVRPC)
MPO Metropolitan Planning Organization
MSA Metropolitan Statistical Area
NAAQS National Ambient Air Quality Standards
NEPA National Environmental Policy Act
NHS National Highway System
NJDEP New Jersey Department of Environmental Protection
NJDOT New Jersey Department of Transportation
NLT Natural Lands Trust
NPS National Park Service
NO_x Oxides of Nitrogen (air quality)
PADEP Pennsylvania Department of Environmental Protection
PADCNR Pennsylvania Department of Conservation and Natural Resources
PATCO Port Authority Transit Corporation (of DRPA)
PEAC Planning at the Edge Advisory Committee (of DVRPC)
PEC Pennsylvania Environmental Council
PennDOT Pennsylvania Department of Transportation
PHL Philadelphia International Airport
PMS Pavement Management System
PPI Producer Price Index
PPP Public-Private Partnerships
PM_{2.5} Fine Particulate Matter (air quality)
PTC Pennsylvania Turnpike Commission
PTTF Public Transit Trust Fund (of Commonwealth of Pennsylvania)
PUT Pottstown Urban Transit
RAC Regional Aviation Committee (of DVRPC)
RASP Regional Aviation Systems Plan
RCC Regional Citizens Committee (of DVRPC)
RIMIS Regional Integrated Multi-modal Information Sharing Project
RPO Rural Planning Organization
RTAC Regional Transit Advisory Committee (of DVRPC)
RWTS Road Weather Information Systems
SAFETEA-LU Safe, Accountable, Flexible Efficient Transportation Equity Act: A Legacy for Users (2005-2009 federal transportation legislation)
SCADA Supervisory Control and Data Acquisition (transit technology)
SDI Surface Distress Index (pavement)
SEPTA Southeastern Pennsylvania Transportation Authority

SOGR “State of Good Repair”
SOV Single Occupant Vehicle
STIP State Transportation Improvement Program
TCDI Transportation and Community Development Initiative (of DVRPC)
TDM Transportation Demand Management
TDR Transfer of Development Rights
TFRC Transportation Funding and Reform Commission (of Commonwealth of Pennsylvania)
TIP Transportation Improvement Program (of DVRPC)
TMA Transportation Management Association
TND Traditional Neighborhood Development
TOC Transit Operations Center
TOD Transit Oriented Development
TOMP Transit Operations Master Plan (of DVRPC)
TOTF Transportation Operations Task Force (of DVRPC)
TTF Transportation Trust Fund (of State of New Jersey)
VMS Variable Message Sign
VMT Vehicle Miles Traveled
VOC Volatile Organic Compounds (air quality)
VPP Value Pricing Pilot Program (tolling)
Y-O-E Year-of-expenditure dollars

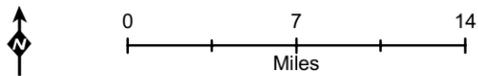
A P P E N D I X G



Municipalities within the Greater Philadelphia Region*



* County Planning Areas are shown within Philadelphia



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Geographic Area Covered: The nine-county Greater Philadelphia area which covers the counties of Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania and Burlington, Camden, Gloucester, and Mercer in New Jersey

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Abstract: The *Connections* plan sets regional policy and agenda. It reviews long-term and recent development trends and considers future land use scenarios along with extensive public input as the basis for creating a regional vision to guide future development in the nine-county DVRPC region. The Plan is organized around four key planning principles: Create Livable Communities; Manage Growth and Protect Resources; Build an Energy-Efficient Economy; and Create a Modern Multi-Modal Transportation System. The Plan includes a 26-year needs assessment for maintaining existing transportation infrastructure with limited new capacity expansion. Reasonably expected available revenue is used to constrain the identified need in the financial plan, including a list of major regional projects. To fully achieve the 'vision' beyond the constrained Plan, the region needs to consider alternatives such as local funding options or public private partnerships.

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