Pima Association of Governments (PAG) is a nonprofit metropolitan planning organization (MPO) for the Pima County region. PAG’s planning area covers Pima County, a total area of 9,189 square miles, which is larger than some states. PAG is governed by a nine-member Regional Council with an elected official serving from each member jurisdiction, including the Cities of South Tucson and Tucson, Pima County, the Towns of Marana, Oro Valley and Sahuarita, the Pascua Yaqui Tribe, the Tohono O’odham Nation and the Arizona State Transportation Board. PAG’s mission is to help promote good decision making for the region by providing accurate data and encouraging consensus among its members and the public.

PAG’s programs focus on cross-jurisdictional planning issues, such as air quality, water quality, population growth and transportation. One of PAG’s primary responsibilities as the MPO is to coordinate the development of the long-range regional transportation plan. This long-range plan represents the work of the regional community; input was provided by all the jurisdictions, many interest group representatives and the public at large. The 2040 RTP presents the collective vision for the transportation network for the next 30 years.

PAG provides staff support for the Regional Transportation Authority (RTA), a government entity that manages the $2.1 billion, 20-year RTA plan, which was approved by Pima County voters on May 16, 2006. The RTA is governed by a nine-member board, which includes the same representatives who serve on the PAG Regional Council.

This report has been prepared in cooperation with, and financed in part, by the U.S. Department of Transportation - Federal Highway Administration, the Federal Transit Administration, and the Arizona Department of Transportation. The contents of this report do not necessarily reflect the official views of the Arizona Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation. Disclaimer: This is not a legal document. Although much care was taken to ensure the accuracy of information presented in this document, PAG does not guarantee the accuracy of this information.
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* for transportation matters only  ** ex-officio members
Our regional transportation system needs to connect our communities, strengthen our economy and create mobility that is accessible, safe and convenient for our residents. It must serve a diverse population, support a variety of modes, reach extensive urban and rural areas and cope with the demands of major population growth and changing demographics. At the same time, we want to ensure that our transportation facilities complement our communities by preserving the scenic, cultural, historic and environmental resources we treasure.

The 2040 RTP acknowledges that while roadways are and will remain the backbone of our transportation infrastructure, we can’t expect to build our way out of congestion. The planning process included extensive public outreach as the basis for the selection of projects to meet the region’s needs. Clearly, our citizens want safe and sustainable transportation options. They want us to preserve the investments we’ve already made and also take advantage of new, emerging technologies. They want the state, the county, our cities, towns, tribes and transit agencies to work collaboratively and make sound, balanced decisions.

In 2006, the voters of Pima County took a bold step toward meeting our regional transportation needs with the adoption of a 20-year Regional Transportation Authority Plan (RTA) and a half-cent sales tax to fund that plan. To date, the RTA has programmed 394 projects at an estimated cost of $519.8 million. Completed projects range from intersection improvements to bicycle/pedestrian projects to bus pullouts to additional transit services.

Today, four years later, the 2040 Regional Transportation Plan (RTP) has identified nearly a thousand projects, programs and strategies that are needed to meet our region’s complex travel demands. These needs would cost over $32 billion through the year 2040. Unfortunately, even assuming extension of the RTA half-cent sales tax, our transportation revenues through 2040 are projected to be $18.3 billion; this means we are $14 billion short and can only fund less than 60 percent of our region’s transportation needs.

Federal regulations require the RTP to be updated at least every four years. Needs can change quickly and we can expect to adjust our priorities and investment decisions over time. We must remain adaptive and flexible in order to face emerging challenges like climate change and the transition to new energy sources. We will need to develop new sustainable transportation funding sources. We will need to regularly monitor and assess how well we are doing in meeting our goals so that we can make needed adjustments quickly and efficiently. PAG and the RTA remain committed and prepared to partner with our citizens and governments to develop sound regional solutions to our transportation challenges.

Gary G. Hayes
Executive Director, Pima Association of Governments
How is the RTP used?
The Regional Transportation Plan, or RTP, can be used by community members in a variety of ways.

- **Transportation Professionals:** A project using federal, state or regional funds must be consistent with the RTP. Transportation professionals use the RTP to ensure that projects funded through the regional Transportation Improvement Program, or TIP, are eligible for funding.

- **Real Estate Professionals/Home Buyers:** Maps in the RTP show corridors that are planned for improvement in the coming years. Property buyers may check the RTP to see what is planned for the future and assess whether their property is likely to be better suited for a corner drug store or a home. The RTP does not, however, guarantee that any specific project will be implemented. Rather, the RTP is a snapshot in time, indicating that, based on what we know today, the projects shown are needs that the region will most likely pursue in the next 30 years. Because the world is a constantly changing place, our growth and economy will change and, in turn, our plans will need to change. That is why the RTP is updated at a minimum of every four years.

- **Public:** Transportation is integral to our region’s quality of life. Everything from the environment to the economy is impacted by the transportation choices we, as a community, make. The transportation planning process provides an excellent opportunity for public input into how the community could develop in the future.

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Together, we need to plan for our future.

- By 2040, our region’s population is expected to reach approximately 1.8 million, an increase of nearly 80 percent.

- Our region is also aging. By 2040, 22.5 percent of our population will exceed 65 years of age. Older adults have higher rates of disabilities than the rest of the population and need more transportation alternatives.

- PAG is a leader in planning for current and future transportation systems using a cooperative, regional approach. As we develop regional solutions to transportation challenges, we will create efficiencies and a more seamless transportation network.

- The 2040 RTP calls for new public transportation services such as high-speed rail in the emerging Sun Corridor between Tucson and Phoenix to increase mobility for people of all ages.

- To address the needs of less mobile and older residents, the 2040 RTP identifies more accessible and convenient transportation options for all residents including the elderly and individuals with disabilities, such as expanded special needs transit provided by SunVan and Pima County Special Needs Transportation and expanded ADA facilities.
We need to make it easier to get around.
We need to make it easier to get around.

- Everyone wants a faster trip, more transportation options and less traffic, whether they’re going to work, school, shop or play.

- Safety and mobility go hand in hand to protect the lives and well-being of our drivers, transit users, cyclists and pedestrians.

- If we don’t expand alternatives to driving alone while we build new roads and improve existing ones, average traffic speeds during peak hours could slow to 23 miles per hour by the year 2040.

- The 2040 RTP will invest approximately $18.3 billion over the next 30 years to strengthen our transportation network, including 1,144 miles of new road lanes to ease traffic.

- The 2040 RTP calls for expanded public transportation services by targeting over $5 billion to new and expanded bus, modern streetcar and other transit services.

- The 2040 RTP also adds new public transportation facilities where riders can easily transfer from one mode of transportation to another, such as from a bike to the future modern streetcar and from car to bus.
We need clean air to breathe and a healthy Sonoran Desert.
11

Safety, environmental stewardship and sustainability were the most frequently cited concerns about regional growth during the public input process for the 2040 RTP vision and goals.

Motor vehicle exhaust and electrical utility, industrial fuel-burning and manufacturing operations could threaten our air quality, visibility and climate, particularly as the region grows.

The 2040 RTP’s proactive approach to addressing these concerns includes over 90 implementation strategies to bring the plan’s vision and goals into reality. The strategies support projects and activities that promote sustainable growth, such as commercial and residential growth around existing public transportation routes and stations.

The 2040 RTP considered the environmental impact of new roadway and public transportation projects in comparison to the Sonoran Desert Conservation Plan that directs development toward areas with the least critical natural, historical and cultural resource value.

The 2040 RTP also addresses climate change by considering the impact transportation has on greenhouse gas (GHG) emissions. The plan includes a GHG inventory as well as programs to encourage alternative transportation modes such as car pools, buses and bicycles and adds projects such as passenger rail between Tucson and Phoenix to help reduce GHG emissions.

Regional Challenges

breathe and a healthy Sonoran Desert.
We want transportation to sustain our economy.
As many as 60 trains per day travel Union Pacific’s Sunset Route through Tucson. Our region plays a critical and growing role in freight movement across the southern part of the U.S. and between the U.S. and Mexico.

Interstate 10 moves 19,000 or more trucks per day through the downtown area. Truck traffic is on the rise along major corridors, particularly I-10 and I-19.

The 2040 RTP supports operational and infrastructure improvements to increase the efficiency of transporting people and goods, both within and to destinations outside of the region.

The 2040 RTP identifies infrastructure improvements, such as road improvements and expanded utility lines, near existing or potential businesses to increase their business capacity as well as public access to facilities.

A goal of the 2040 RTP is to realize a healthy, growing economy well-served by the entire transportation network of roads, transit, air, rail, bike lanes and sidewalks.
We need strategies to pay for our mobility.
need strategies to pay for our mobility.

- Transportation improvements are expensive; revenue sources like the state/federal gas tax can’t keep pace and are eroded further as gas mileage continues to improve on newer vehicles.

- We anticipate approximately $18.3 billion could be available to improve our transportation network over the next 30 years but this falls far short of our projected needs of over $32 billion.

- To help address our funding gap, participants in the 2040 RTP public input process strongly supported extension of the RTA ½-cent sales tax, currently set to expire in 2026.

- Even with the RTA, we must explore creative ways to pay for new transportation projects that will reduce traffic delays and keep people moving.

- The 2040 RTP identifies possible new sources of funding for transportation such as public and private partnerships, congestion pricing, fees on vehicle miles traveled, etc., that can be used to develop a diversified funding stream to better meet transportation needs in the future.

- The 2040 RTP supports expanding the use of state-of-the-art, cost-effective transportation technologies and services for a cost-efficient transportation system.
We’ve taken bold steps to improve our transportation future.
In May 2006, voters in Pima County adopted a 20 year Regional Transportation Authority plan (RTA) and a half-cent sales tax to fund that plan. To date, the RTA has programmed 394 projects at an estimated cost of $519.8 million. Completed projects range from intersection improvements to bicycle/pedestrian projects to bus pullouts to additional transit services.

All of the projects that are a part of the RTA plan must be included in the 2040 RTP, which looks even further into the future, addresses a diverse set of needs and identifies potential funding from a variety of sources.

The RTP is updated at least every four years to meet federal funding requirements and to address changing community needs.

Planning is a long-term process and projects may appear in several long-range plans before they come to fruition. Predicting 30 years into the future can be a daunting task. The future will present new technology, new legislation and unforeseen challenges, all of which can influence the way we live and move about the region.

Understanding the past will help us track progress made, recognize new challenges, and identify areas needing further attention in the future.
We’ve planned

Accomplishments since 2000
Projects that are either completed or under construction and were included in the 2001-2025 RTP include the following:

**Roadway**
- I-10 widening to eight lanes from I-19 to Prince Road
- Completed construction of the I-10 and I-19 traffic interchange
- New traffic interchange at I-10 and Linda Vista
- I-10, from Cortaro to Tangerine, widening mainline to six lanes

**Transit**
- Increased Sun Tran fleet from 200 to 241 buses
- Constructed new Sun Tran storage and bus maintenance facility
- Constructed Udall Transit Center

**Bicycle and Pedestrian**
- Increased bikeway route miles from 488 to 817
- Constructed pedestrian bridge on SR 86 at Sells Wash
- Scott Avenue improvements as part of Downtown Pedestrian Plan
- HAWK/PELICAN pedestrian activated signals installed at various locations
Planning for major improvements takes time
Major regional improvements over the past several years include I-10 widening, advancement of the modern streetcar and a variety of other road, transit and bicycle and pedestrian improvements. Projects that have been completed in the past 20 years show that a balanced approach to planning can make a difference in traffic and congestion volume.

Region’s largest transportation project
The largest transportation project ever constructed in the PAG region was the $240 million widening of I-10, from I-19 to Prince Road, expanding from three to four lanes in each direction. The project first was included in the region’s long-range plan from 1990, over 20 years ago. That plan accurately predicted the population growth and transportation needs of today. The I-10 corridor study was one tool used to determine the capacity needs.

A new vision for transit
The long-range plan from 1994 included the development of a light-rail or similar high-capacity transit system. This plan will become a reality in 2013 when the City of Tucson completes the region’s first modern streetcar line using a combination of funding that includes RTA funds, a federal Transportation Investment Generating Economic Recovery (TIGER) grant, and other federal funds.

Creating a vision for alternate modes of transportation years ago allowed us to take the necessary steps to make it more than just a plan.

Integrating facilities for cyclists and pedestrians
Bicycle and pedestrian improvements were considered a vital component of our transportation network in the 1994 long-range plan. The goal was to increase bicycle lanes from 272 miles to more than 600 miles by 2002. We have since surpassed that number, reaching more than 817 miles in 2010 with even more miles planned.
An 80 percent population increase by 2040 will strain our resources.

**Our population in 2040**

Tucson has long been a popular destination for students, families and retirees. Between 1975 and 2000, Pima County’s population grew by approximately 90 percent. Today, there are just over 1 million people in Pima County, and that number is expected to increase by about 80 percent to just under 1.8 million by 2040. The region will see significant growth in the following employment sectors: professional and business services, health care, transportation and warehousing, trade and hospitality.

By the year 2040, the City of Tucson is expected to reach over 900,000, a growth rate of 69 percent. The Town of Sahuarita is projected to grow the most, at 310 percent, reaching over 96,000 people by 2040, and the Town of Marana will follow with a 246 percent growth rate and a population of 117,900 by the year 2040.

Significant growth will occur in the elderly population as life expectancy continues to rise due to improved health care, better quality of life and the migration of retirees. By 2040, 22.5 percent of the population will be 65 years old or older, as compared to 14.9 percent today. Increasing age frequently results in higher levels of varied disabilities, which have multiple affects on a community, let alone the individual and his or her immediate family. We will need to plan for a higher demand for public transportation services, including special needs and wheelchair accessible rides.

Anticipated growth patterns are based on land-use plans adopted by the PAG member jurisdictions, recent growth rates and the build-out capacity for areas already under development or identified for future growth.

**Areas anticipated to experience significant growth in our region are:**

- Town of Marana, both east and west of I-10
- Near Catalina, west of State Route 77
- The Ryan Airfield vicinity along Ajo Way/ SR-86
- Town of Sahuarita
- The Houghton Road corridor south of 22nd
- The southeastern urbanized area, including areas within the City of Tucson and unincorporated Pima County, south to the Santa Rita Mountains, and industrial/ retail areas along I-10 south/east of downtown
Older Adult Population Growth

The effects of increased numbers of older drivers (age 65 and over) on the region’s transportation network will be felt by all roadway users, whether they’re driving, walking or using public transportation. Transportation is crucial to keeping older adults independent, healthy and connected to friends, family and health providers. However, older residents’ transportation needs differ based on their health, income, marital status, age, race and whether they live in an urban area or in low density suburbs outside the urban area.

Roadway Design for Older Drivers

The AARP Public Policy Institute’s 2009 “Planning Complete Streets for an Aging America” encourages the following:

**Slow Down:** Reduce vehicle travel speeds in areas where drivers and pedestrians interact and where older drivers and pedestrians need more time to make decisions. Re-engineer roadways for slower speeds through changes to curb radii, perceived or real lane widths, or replacement of typical intersections with roundabouts.

**Make It Easy:** Make the physical layout of the transportation network easy to navigate for older drivers and pedestrians. Some of the complexity of intersections can be removed by providing travelers a connected network of streets with lower-speed routes and intersections that are easier to maneuver.

**Enjoy the View:** Make it easy for drivers and pedestrians to notice, read, understand, and respond to visual cues and information. Reduce visual clutter of signs, improve access management, and use landscaping, signs and lighting to make the roadway more intuitive.

Transportation and Older Adults in the 2040 RTP:

The 2040 RTP incorporates projects to improve roadway intersections, street lighting, pedestrian safety, and other safety elements, as well as implementation strategies aimed at improving transportation for older adults. Example implementation strategies include:

- Fill gaps in the region’s sidewalk network to provide safer travel for pedestrians of all ages and wheelchair users.
- Expand transportation services to meet the needs of the region’s growing older adult population, including paratransit services and volunteer driver programs and improve sidewalk infrastructure and intersections to make it easier for older adults to walk to their destinations.
- Reduce vehicle travel speeds in areas where drivers and pedestrians interact and where older drivers and pedestrians need more time to make decisions.
We’re Driving More Miles

As our community has grown, the distances we travel by car have increased. In the 1950s, the average number of vehicle miles traveled per person was approximately 28 miles per day. Today, we travel 60 miles per day and by 2040 we are predicted to travel over 70 miles per day.

The number of miles of roads will grow as our region grows. In 1950, eastern Pima County had 300 miles of roadways; today, there are nearly 8,000 center-lane miles of roadways. However, construction of new roadway capacity cannot keep pace with travel demand.

• From 2000 to 2005, vehicle miles traveled grew 1.5 times faster than population.
• By comparison, from 2000 to 2005, vehicle miles traveled grew 7 times faster than roadway capacity.

As our region continues to grow and we travel longer distances to work, school, shopping and entertainment, the number of “vehicle miles traveled” could continue its dramatic increase.

Impacts of growth on the driver:
• Longer commute times
• Increased peak-hour traffic
• Increased trip distance
• Increased stress
• Increased air pollution
• Increased fuel consumption
• Increased costs
The 2040 RTP was developed over a 24-month period and involved members of the public, businesses, local organizations and jurisdiction staff.

Guiding the development of the RTP was the 2040 RTP Task Force, a 30-member body of diverse government and community members. The Task Force members represented the following jurisdictions, interests and groups:

- Arizona Department of Transportation
- Bicycles and pedestrians
- Business and economic development
- City of South Tucson
- City of Tucson
- Development
- Elderly and disabled
- Environmental interests
- Freight
- Low income and minority groups
- Neighborhoods
- Public Transit and alternative modes
- Pima County
- Pascua Yaqui Tribe
- Pima County
- Tohono O'odham Nation
- Town of Marana
- Town of Oro Valley
- Town of Sahuarita
- Tucson Airport Authority
- Tucson Metropolitan Planning Organization
- U.S. Army Corps of Engineers
- U.S. Forest Service
- University of Arizona
- U.S. Bureau of Indian Affairs
- U.S. Bureau of Reclamation
- Arizona Department of Health Services
- Santa Cruz Valley Regional Planning Council
- Santa Cruz Valley Chamber of Commerce
- Arizona Office of Tourism
- Saint Leo Academy
- Universidad de Sonora
- The 2040 RTP Task Force was charged with providing input on the planning Process overview, strategies and impacts of the plans vision, goals, programs and implementation steps. The 2040 RTP Task Force met throughout the planning process for the 2040 RTP to discuss regional transportation priorities and integrate concepts and themes received from the public input process into the plan's multiple components. Task Force members also played a critical role in identifying and encouraging stakeholders to participate in the ThinkTank sessions (more information on page 26) and were invaluable resources in the overall 2040 RTP planning process.

Other Planning Steps

The transportation planning process also involved activities such as the following:

- Public Open Houses
- Stakeholder Coordination
- Feasibility
- Public Participation
- Draft Plan
- Public Outreach
- Final Plan
- Implementation
- Progress

We involved the public and diverse stakeholders. The Task Force was charged with providing input on the plan's vision, goals, programs and implementation strategies. The 2040 RTP Task Force met throughout the planning process for the 2040 RTP to discuss regional transportation priorities and integrate concepts and themes received from the public input process into the plan's multiple components. Task Force members also played a critical role in identifying and encouraging stakeholders to participate in the ThinkTank sessions (more information on page 26) and were invaluable resources in the overall 2040 RTP planning process.
We involved the public and diverse stakeholders.

• Analysis of existing travel conditions and infrastructure demands
• Forecast of future population and employment, including land use and potential growth corridors
• Analysis of current and projected transportation needs
• Identification and prioritization of potential new projects and strategies to address identified needs
• Identification of project costs as well as current and future operating costs
• Development and selection of modal alternatives
• Analysis of the impact of future improvements to the transportation system, including congestion, air quality, Title VI
• Development of a financial plan to cover plan costs.

Public Involvement in Planning
Public input is an important part of long-range planning. PAG conducted wide-reaching public involvement to obtain public input into the 2040 RTP. PAG held stakeholder meetings and open houses, gave presentations to community groups and distributed 15 fact sheets about different transportation topics, such as “Transportation and the Environment,” “Transportation Safety” and “Bicycle and Pedestrian Planning” to inform the public on the diverse components of transportation planning. PAG also made information available on its 2040 RTP Web site, along with comment forms and a list of ways individuals and groups could get involved in developing the 2040 RTP.
Phase 1 of Public Involvement — 2008-2009

PAG sought public input into the 2040 RTP in a variety of ways: open houses, stakeholder sessions, hard copy and online information and surveys, and through the diverse representation of the 2040 Task Force. Public educational efforts included numerous presentations to local organizations, updates in PAG’s quarterly newsletter and posting detailed project information on PAG’s Web site.

ThinkTank Stakeholder Sessions

Twenty comprehensive, interactive stakeholder sessions were conducted, reaching 250 individuals. The sessions were facilitated with ThinkTank, a group decision-making software that allows participants to provide input and comment on each other’s input using individual laptop computers. PAG designed a ThinkTank workbook to direct the process, and participants were asked to respond to both open-ended questions and more structured rating exercises. These sessions generated a total of 7,195 comments which were summarized and provided to the 2040 RTP Task Force for use in its planning and decision making.

Public Open Houses 2009

In addition to the ThinkTank sessions, PAG held four open houses to solicit additional input into the long-range plan. The geographically dispersed open houses were held in March 2009 at the following locations.

- Joyner Green Valley Public Library, Green Valley
- Randolph Clubhouse at Reid Park, Central Tucson
- Foothills Mall, Northwest Tucson
- Desert Sky Middle School, East Tucson

At the Open Houses, PAG and jurisdictional staff were available to talk with the public, listen and answer any questions that arose. There were many maps and other displays showing various aspects of the plan. The individuals who attended the open houses were encouraged to fill out and submit a RTP Comment Form. Over 100 participants attended the open houses. The comments from the forms were summarized and provided to jurisdictional staff and the 2040 RTP Task Force.

Phase 2 of Public Involvement

Public Open Houses 2010

Toward the end of the planning process, PAG held a second round of open houses to share the 2040 RTP project lists and implementation strategies with the public and receive their feedback. The three open houses were held in March 2010 in the same locations above, except for the East Tucson location which had poor attendance in 2009. The open houses gave the public an additional opportunity to learn how PAG plans for the region’s transportation future and to provide input on the 2040 RTP. Approximately 80 people attended the open houses.

Phase 3 of Public Involvement

For all phases, a press release was sent to the media and to e-mail distribution lists to announce the open houses and the public comment period. During Phase 3, a public notice was published to encourage public comment on the final draft and a public hearing was scheduled for the July 2010 PAG Regional Council meeting.

Summary of Public Input

PAG asked participants in the ThinkTank Sessions and open houses to comment on various aspects of the RTP and provide transportation project ideas. From the extensive and diverse comments received, several key concepts and general themes emerged.

The RTP Task Force used public input to help create the 2040 RTP Vision and Goals, a list of priority projects to be included in the plan, and implementation strategies that provide action items to help bring the concepts in the 2040 RTP to reality.

Policies and Solutions

Upon review of potential solutions offered by various stakeholders to address transportation needs in the future, the solutions were prioritized as follows:

**The Most Favored:**
1. Improve Bike/Pedestrian Infrastructure
2. Create High-Speed Rail
3. Support Transit-Oriented Development
4. Utilize More Technology
5. Link Land Use and Transportation

**The Least Favored:**
1. Focus only on maintenance
2. Use incentives and disincentives (using fees to discourage driving during peak, etc.)
3. Support motorized alternatives (such as mopeds, segways and electric bicycles)
4. Improve electric vehicle infrastructure

Projects and Programs

A critical component of this phase of public involvement was soliciting ideas for transportation projects and programs to be included in the 2040 plan. PAG received over 1,400 comments regarding projects and programs.

The comments were categorized by mode of transportation and examples are provided in the descriptions to the right:
Roadway: Roads were the most prevalent topic among the attendees. The comments generally fell into six categories: Roads/Local Service; Roads/Mobility; Beautification, Landscape and Public Art; Operations and Maintenance; Access and Right-of-Way Acquisition; and Wildlife Corridors.

Local roads had the most number of comments but the most contentious comments were about an I-10 bypass, with many both favoring and opposing it.

“Increase River Road capacity to optimize role as a major cross-town corridor.”

“More/easier access to I-10 from far Northwest communities.”

Transit: Most of the transit comments focused on improving the current system, providing more access to elderly and disabled populations, and implementing high-capacity transit projects including a passenger rail line to Phoenix.

“Expand local bus routes and increase frequency of service.”

“Begin high-speed rail center location, planning and right-of-way acquisition.”

Regional Programs: Attendees also had comments on technology improvements, operations and maintenance, travel demand management and a variety of other programs.

“All rail crossings in Tucson that are on major roadways need to be grade separated.”

“Develop a downtown vehicle share program.”

Bicycle and Pedestrian: Comments suggested filling gaps in the bike lane network, providing separated bikeway facilities and bike boulevards, providing sidewalks, safe crossings, and many programs geared toward safety.

“More Bike Boulevards – allowing bicyclists to safely ride on roads with less motorized traffic.”

“Need to fund sidewalks in neighborhoods to facilitate access to bus routes, especially for the disabled.”
Region’s Diversity Reflected
Prior to development of a recommended plan, the 2040 Task Force created a vision and goals for the 2040 RTP with a renewed focus on sustainability. The Task Force reviewed input from the 20 stakeholder sessions and crafted the following vision and goals that reflect our region’s diversity.

Vision
The 2040 RTP envisions a premier, energy-efficient, and environmentally responsible regional transportation system that is interconnected, multi-modal, technologically advanced and integrated with sustainable land use patterns.

Goals for the System:

Multi-Modal Expansion: A balanced network of expanding alternative mobility choices to meet rail, highway, transit, roadway, bicycle and pedestrian mobility needs.

Integrated Transportation Choices: A user-friendly transportation network that integrates modes within the region, connects to facilities outside the region and optimizes mobility for people and goods.

Sustainable Land Use: Vibrant, sustainable communities that link transportation and land use.

Economic Sustainability: A healthy growing economy well-served by the transportation network.

Safety: Safety and security for all transportation users across the region.

Environmental Stewardship: Environmental stewardship, natural resource protection and energy efficiency in transportation planning, design, construction and management.

Accessibility: Transportation options and access for all users including youth, elderly, low-income, and individuals with disabilities.

System Performance: Unobstructed mobility through efficient system management, preservation and operations.

How We Get There:

Public Input: Continued outreach and involvement of all users in transportation decision-making.

Advanced Technologies: State-of-the-art, cost-effective delivery of transportation services and facilities.

Funding and Implementation: Revenue sources and strategies that ensure ample funding and timely project development.

Accountability: Continued transparency, responsiveness and coordination to meet transportation needs throughout the region.
attainable goals and a compelling vision.
The 2040 RTP Financial Plan shows transportation revenue sources that are reasonably expected to be available in the future, including federal, state, regional and locally generated revenue sources as well as private investments. The table below summarizes projected revenues, by source, of over $18.3 billion.

<table>
<thead>
<tr>
<th>TABLE A – REVENUE PROJECTIONS (IN MILLIONS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCAL SOURCE</td>
</tr>
<tr>
<td>Development taxes and fees</td>
</tr>
<tr>
<td>General Fund Transit Contributions</td>
</tr>
<tr>
<td>Transit Fares</td>
</tr>
<tr>
<td>Private Developer Funds</td>
</tr>
<tr>
<td>Clean Energy Funds</td>
</tr>
<tr>
<td>LOCAL TOTAL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REGIONAL TRANSPORTATION AUTHORITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Excise Tax 2010-2026</td>
</tr>
<tr>
<td>Regional Sales Tax 2027-2040</td>
</tr>
<tr>
<td>RTA TOTAL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STATE</th>
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<tbody>
<tr>
<td>Highway User Revenue Funds (HURF)</td>
</tr>
<tr>
<td>Pima County VLT</td>
</tr>
<tr>
<td>State Discretionary</td>
</tr>
<tr>
<td>LTAF II</td>
</tr>
<tr>
<td>ADEQ</td>
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<tr>
<td>UA</td>
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<tr>
<td>STATE TOTAL</td>
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<table>
<thead>
<tr>
<th>FEDERAL</th>
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</thead>
<tbody>
<tr>
<td>Surface Transportation Program (STP)</td>
</tr>
<tr>
<td>Transportation Enhancement Grants**</td>
</tr>
<tr>
<td>Federal Earmarks**</td>
</tr>
<tr>
<td>Federal Transit Administration Grants</td>
</tr>
<tr>
<td>FEDERAL TOTAL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AVIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tucson Airport Authority</td>
</tr>
<tr>
<td>Marana Regional Airport</td>
</tr>
<tr>
<td>AVIATION TOTAL</td>
</tr>
</tbody>
</table>

| REVENUE TOTAL                              |                                                                                               | $18,370.7        |

Note: Numbers do not add up due to rounding.
* Assumes voter-approval of ½-cent excise tax, effective 2027
** These funds are distributed on a competitive basis. These amounts assume a conservative estimate of future awards based on previous awards.
New funding strategies are vital to our success.

Transportation is fundamental to the health, vitality and sustainability of our community and its economy. Funding transportation is a challenge as needs and demands increase, costs escalate and revenues decline or lose buying power.

Project costs may decrease during economic downturns, but costs tend to escalate over time, due to inflation and demands for the latest technologies, as well as to the impacts of factors such as material shortages for specific construction products, regulatory restrictions and processes, and more extensive public expectations.

A sustainable transportation system requires sustainable funding. Our existing revenue stream is under assault at many levels. Most revenues are from state and federal gas taxes which are not indexed to inflation; thus, increases in gas prices do not increase revenues because the gas tax is paid on a strict per-gallon-sold basis. Increased fuel economy in vehicles and more alternative fuel use also reduce the per capita gas sales received.

New sustainable funding sources are needed. The gas tax may be unsustainable, perhaps as early as 2020. Solutions to maintain the viability of the gas tax include an immediate increase and indexing to inflation. But even if these steps are taken, the gas tax does not account for lower fuel use and increased vehicle efficiency, nor for the costs associated with driving on congested roads during peak periods.

Limited revenues require hard choices.

Transportation Revenue
Approximately $18.3 billion in transportation revenue is reasonably expected to become available in the PAG region over the next 30 years. Anticipated revenues include an extension of the RTA and its half-cent sales tax beyond its current 20-year lifespan. The 2040 RTP identifies anticipated needs of over $32 billion, meaning we are roughly $14 billion short and can reasonably address only 57 percent of our needs.

Local Funding
Local funding for transportation comes from various jurisdictional impact fees, general funds, construction sales taxes, transit fares and other sources. Curtis Lueck & Associates (CLA), the consultant company hired to forecast the local transportation revenue, looked at historical data before assuming a modest 2.3 percent increase in most funding categories.

Regional Funding
In 2006, the Regional Transportation Authority (RTA) plan was approved by voters to fund $2.1 billion in roadway, transit, safety and environmental and economic vitality improvements over a 20-year period. The plan is funded through a half-cent sales tax as well as $400 million in impact fees, federal funds and local transportation allocations.

The PAG region jumped ahead of the curve with the 2006 passage of the RTA and its associated half-cent sales tax. These RTA funds helped the region diversify its income stream, and since the RTA tax is based on actual sales prices, revenues adjust for inflation.

State Funding
State funding for transportation comes primarily from the Highway User Revenue Fund (HURF) which is collected from gasoline taxes, vehicle registration fees, vehicle license taxes and other sources. State HURF funds may only be used for roadway projects, unlike federal and local funds which can often be used on transit projects and other programs.

Federal Funding
Federal funding for transportation comes from a wide variety of federal programs including the Surface Transportation Program (STP).

CHART F – SUMMARY OF ANTICIPATED FUNDING SOURCES
Anticipated revenue: $17.9 billion

Note: Chart does not include funds from Federal Aviation Administration or Federal Rail Administration.
Limited Revenues Require Hard Choices

Transportation stakeholders, jurisdictions and the public identified transportation needs of over 32 billion dollars over the next 30 years. Since the long range plan must be fiscally constrained, not all needs can be included in the plan. Thus, projects designated as “In Plan” are higher priority and expected to be funded by 2040. See Appendix 2 for the In Plan project list. Projects on the “Reserve” list are identified needs, but funding is not expected to be available for those projects. See Appendix 3 for the Reserve project list.

The 2040 RTP recognizes the importance of improving all modes of travel within the region – vehicular, transit, bicycle, pedestrian and aviation. Aviation revenues and needs were indentified separately by airports and airport authorities. Funding was dedicated to the other modes based on regional needs, trends and public input using a modal split similar to the voter-approved breakdown in the RTA plan: 57% for Roadway, 28.5% for Transit, 11.5% for Regional Programs, and 3% for Bicycle and Pedestrian Projects.

### TABLE B — FUNDS AND PROJECTS BY MODE

<table>
<thead>
<tr>
<th>Mode Category</th>
<th>Number of Projects</th>
<th>Total Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadway</td>
<td>227</td>
<td>$10,218,750,000</td>
</tr>
<tr>
<td>Transit</td>
<td>46</td>
<td>$5,100,230,000</td>
</tr>
<tr>
<td>Regional Programs</td>
<td>58</td>
<td>$2,039,809,000</td>
</tr>
<tr>
<td>Bicycle and Pedestrian</td>
<td>217</td>
<td>$536,868,000</td>
</tr>
<tr>
<td>Aviation</td>
<td>76</td>
<td>$416,502,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>624</td>
<td>$18,312,159,000</td>
</tr>
</tbody>
</table>

### TABLE C — FUNDED AND UNFUNDED NEEDS

<table>
<thead>
<tr>
<th>2040 Regional Transportation Plan Components</th>
<th>Funded Needs (Billions-2010 $)</th>
<th>Unfunded Needs (Billions-2010 $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Freeways &amp; Parkways</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Regional Arterials &amp; Collectors</td>
<td>4.3</td>
<td>1.5</td>
</tr>
<tr>
<td>Roadway Management, Operations and Maintenance</td>
<td>2.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Bicycle &amp; Pedestrian Elements</td>
<td>0.5</td>
<td>0.2</td>
</tr>
<tr>
<td>Technology &amp; Safety Projects</td>
<td>0.9</td>
<td>0.2</td>
</tr>
<tr>
<td>Other Regional Programs</td>
<td>1.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Bus Transit &amp; Paratransit Services</td>
<td>1.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Bus Rapid Transit, Streetcar &amp; Passenger Rail</td>
<td>1.9</td>
<td>4.8</td>
</tr>
<tr>
<td>Transit Management, Operations and Maintenance</td>
<td>2.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Aviation</td>
<td>0.4</td>
<td>0.09</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>18.3</strong> (57%)</td>
<td><strong>13.9</strong> (43%)</td>
</tr>
</tbody>
</table>
The cost of transportation is more than the cost to build and maintain roads and public transportation. Major costs are also incurred by individual users of the transportation system, developers, businesses, jurisdictions, the regional economy and the environment.

**Traditional Cost of Transportation**
Many improvements to the transportation network are paid for by the jurisdictions through a variety of federal, state and local funding sources. For many new developments, developers are required to include new transportation infrastructure and/or upgrades to nearby existing infrastructure. In addition, many areas require an impact fee and/or a construction sales tax on new construction to help pay for transportation improvements.

**Additional Costs of Transportation**
Anyone who travels incurs transportation costs, whether it is the cost to drive a vehicle or the cost to ride public transportation. Typically, the farther people travel, the higher their cost, especially for the automobile, which has additional costs for vehicle ownership, maintenance, insurance, fuel and parking. Individuals also face the cost of travel time when longer commutes cut into the time spent on other activities such as work, shopping and entertainment.

Transportation projects may impact the environment through the reduction of open space, disruption of wildlife movement patterns, increased air pollution and potential effects on global climate change. Ultimately, if the transportation network becomes congested or inefficient, the economy suffers as consumers can’t conveniently reach their preferred destinations.

**Housing and Transportation**
The Center for Neighborhood Technology (CNT) has developed a tool known as the Housing + Transportation Affordability Index (H+T Index). This tool measures the affordability of housing choice by factoring in both housing and transportation costs. Traditionally, lenders and consumers assumed that housing costs should be less than 30 percent of income. The H+T Index measures the transportation costs associated with location. In 2008, the H+T Index became available for 52 metropolitan areas in the United States, including the Tucson region, through an interactive online map.

CNT defined an affordable range for H+T as combined costs consuming no more than 45 percent of income. Major portions of the Tucson region within and outside of the central city are indicated at levels of 45 percent or more.

**We need to better understand the true cost of transportation.**
Making Transit a Priority

Transit is a general term that encompasses all major forms of public transportation, such as bus and streetcar. Transit services provide affordable mobility options for residents and visitors, and can positively benefit the environment by reducing traffic congestion and air pollution. The public expressed strong support for transit projects throughout the RTP process. The 2040 RTP recommends building upon recent transit improvements to retain the quality of the current system while expanding services to include high capacity transit options.

Existing Transit

During the development of the Regional Transportation Authority (RTA) plan, transit emerged as a regional priority and 27.5 percent of the plan or $534 million dollars in transit investments were approved by voters over the 20-year life of the $2.1 billion RTA plan. Although only four years into the RTA plan, substantial progress has been made in implementing the transit element and improving the quality of the current transit system. Specific accomplishments include:

- Extended evening and weekend hours on existing Sun Tran routes
- Additional peak hour buses on overcrowded Sun Tran routes
- Construction of a new bus storage and maintenance facility
- Expanded volunteer transit reimbursement program for seniors
- Expanded service area for special needs transit
- Launched new express bus service to Marana, Oro Valley and Rita Ranch
- Initiated Sun Shuttle neighborhood circulator bus service
- Established park and ride facilities in Sahuarita, Oro Valley, Marana, Rita Ranch, and Green Valley
- Additional bus pullouts

Public Transportation Services

The recent improvements to the transit system have made an award-winning system even better. The RTP focuses on retaining the quality of the regional transit network and its many services which are outlined below.

- Sun Tran. The primary fixed-route bus system is operated by Sun Tran, which includes 40 routes covering 570 miles. This includes 13 express routes that enhance commuter options and reduce congestion. All Sun Tran buses use cleaner-burning fuels, are fully accessible to persons with disabilities and contain bike racks. Sun Tran ridership has significantly increased over the past five years and reached an all-time high of 21.6 million passenger trips in fiscal year 2009.
- Sun Van. Sun Van is the City of Tucson’s complementary paratransit service for elderly and disabled persons qualified under the Americans with Disabilities Act (ADA) who are unable to use the Sun Tran fixed-route system. Sun Van provides service to and from points within three-quarters of a mile along each Sun Tran fixed route, excluding express routes, during the days and times that Sun Tran operates. Sun Van services go beyond those required under ADA regulations.
- Sun Shuttle. Sun Shuttle is a new neighborhood transit service (May 2009) in Marana, Oro Valley, Catalina, Sahuarita, Green Valley and rural western Pima County that provides rides within neighborhoods and also connects passengers to other Sun Tran routes, providing transit access to the entire Tucson metropolitan area.

Other Regional Public Transportation Services

- Pima Transit Special Needs is a door-to-door paratransit service provided for persons with disabilities living outside the Tucson city limits, but within the Tucson metro area.
- Oro Valley's Coyote Run provides door-to-door paratransit service for elderly and disabled residents of the Town. Coyote Run provides about 17,000 trips a year to over 1,200 eligible riders.
- University of Arizona's Cat Tran is the fixed-route circulator shuttle system serving the University of Arizona Main Campus and the University Medical Center. The free system transports students, faculty, staff and visitors to the campus core from nearby parking garages, surface lots and off-campus offices along seven fixed routes Monday through Friday.
- Downtown Loop is a weekday circulator service that is free to the public. Twelve conveniently located stations allow for easy access to community services, government offices, court buildings, educational facilities and businesses in the downtown area.
In order to retain the quality of the transit system, adequate funding is required for operations and maintenance. It is also important to regularly evaluate, modify and expand the services offered to ensure they are providing efficient, cost effective solutions that are meeting our changing transportation needs. Examples of RTP projects that will help retain and improve the quality of existing services include:

**Regional Comprehensive Transit Operations Analysis Study:** Conduct a comprehensive operations analysis study (COA) of the entire regional transit system every five years.

**Sun Tran Bus and Support Vehicle Replacements:** Purchase 15 buses every year and replace support vehicles as needed.

**Transit Center Updates:** Rehabilitate and update existing regional transit centers including ITS upgrades, building repairs, bus circulation and access repairs and general cosmetic improvements.

**Paratransit Service Expansion:**
Paratransit provides transportation service to those individuals unable to use the fixed-route service due to a disability. This RTP project calls for an expansion of paratransit services to serve more clients over a greater geographic area.
Intercity Passenger Rail between Tucson and Phoenix

The project most supported during 2040 RTP public outreach was intercity rail between Tucson and Phoenix. The regional component of a Tucson/Phoenix passenger rail line is included in the RTP. The Arizona Department of Transportation (ADOT) is continuing to pursue a Tucson/Phoenix intercity rail line and received funding through the Federal Railroad Administration to conduct an Alternatives Analysis (AA)/Environmental Impact Statement. This study will evaluate the feasibility of the project, determine alternative alignments and compare the alternatives within the context of the federal environmental process.

High Capacity Transit System Plan Projects

In conjunction with the 2040 RTP process, PAG updated the regional High Capacity Transit (HCT) System Plan. The main goals of HCT are to provide faster, more convenient and more reliable service for a greater number of passengers. With rising gas prices and increased awareness about global climate change, HCT is gaining popularity in many cities across America. HCT often stimulates economic activities along its corridors and raises home values. The HCT System Plan is available on the PAG Web site at: www.pagnet.org with detailed information about each of the HCT projects.

The following HCT projects were selected for the 2040 RTP:

**Modern Streetcar**: The majority of funding is already in place for Tucson’s first streetcar. This four-mile line is expected to be completed by 2013 and will connect the Arizona Health Sciences Center, The University of Arizona, Main Gate Square, 4th Avenue Shopping District, Congress Shopping and Entertainment District and the Mercado District on downtown’s west side. The RTP recommends building upon the first streetcar line by having extension lines along: Campbell Avenue (University Medical Center to Tucson Mall), Broadway (Downtown to El Con Mall) and 6th Avenue (Downtown to Laos Transit Center).

**Bus Rapid Transit**: Six BRT corridors were selected for the long range plan: Broadway Boulevard, 6th Avenue/ Nogales, Oracle Road, Grant Road, Campbell Avenue South / Kino Parkway and Vail.

**Sun Tran Express Service Expansion**: The RTP plan calls for additional express routes to further enhance commuter options. Potential new corridors include Ajo Way, Kolb Road and Tangerine Road.
Existing Roadway System

The existing regional roadway system is made up of approximately 8,000 miles of roadway throughout Pima County, including 4,609 miles of freeways, parkways, arterials and collectors. The existing transportation infrastructure requires significant investment to keep it maintained for safe and efficient use. The RTP identifies roadways needing improvements among the different classifications of roads: arterial, collector, parkway and freeway.

Roads remain the largest part of our mobility puzzle and the most visible sign of our plan’s success or failure. While we are seeing greater increases in the funding made available for transit, bike and pedestrian projects, we realize that roadways provide the network by which a vast majority of goods circulate within our community. Transit operates on the same roadway network as cars and can only be as effective as the roadway on which it travels.

2040 RTP Roadway Projects

Roadway network improvements are a high priority in the long-range plan and make up 57 percent of the anticipated 2040 funding. Nearly half of the anticipated roadway funding is designated for projects in the five-year Transportation Improvement Program (TIP) or the Regional Transportation Authority (RTA) plan. The 2040 RTP ensures that adequate additional funds will be made available as needed to complete the TIP and RTA project commitments.

Regional Corridors

Limited funding means that difficult choices were made and that all needed corridor projects cannot be included in the plan. The 2040 RTP does not include any new freeway facilities; it does, however, include improvements to the following eight corridors that will provide high capacity for vehicle travel.

I-10 East Corridor: I-19 to east Pima County line – Widen freeway to 6-10 lanes and reconstruct traffic interchanges. ADOT is initiating a study in 2010 to guide the improvements.

I-10 West Corridor: I-19 to north Pima County line – Widen to 8 lanes (much of the section was finished in 2009) and build new or reconstruct traffic interchanges.

I-19 Corridor: I-10 to southern Pima County line – Widen to 6-8 lanes, construct new traffic interchanges and bridges, and reconstruct existing interchanges.

SR 210 Barraza-Aviation Extension: Palo Verde Road to I-10 – Obtain right-of-way and construct new parkway in Tucson extending the parkway to I-10. ADOT will initiate a study to guide the extension.

SR 77 Oracle Road Corridor Project: Miracle Mile to Pima County line – Widen to 6-8 lanes and improve access management.

SR 86/Ajo Way Corridor Project: Three Points to I-10 – Reconstruct and widen to 4-6 lane desert parkway with paved shoulders, landscaping and irrigation.

Valencia Corridor Project: Ajo Way to Old Spanish Trail – Widen to a 4-8 lane desert parkway, bike lanes and sidewalks. Implement access management improvements and construct grade-separated intersections at various intersections.

Sahuarita Corridor Project: La Canada Drive to SR 83 – Widen to a 4-6 lane divided arterial, bike lanes and sidewalks.

Jurisdictional Roadway Priorities

In addition to the eight regional corridor priority projects, jurisdictions identified specific roadway projects to be constructed with their anticipated local funds. Over 80 additional roadway projects were identified to meet the needs of the local jurisdictions. Examples of these RTP projects include:

Tucson Boulevard: Valencia to Irvington – Widen Tucson Blvd to a six-lane, divided roadway to improve traffic flow to the Tucson International Airport.

Pima Mine Road: I-19 to Nogales Highway – Widen to four lanes.

Naranja Drive: Shannon Road to La Cholla Boulevard – Widen road from two to three lanes and add multi-modal facilities.
Roadway System

Roadways remain our system’s backbone.

For the purpose of the RTP, the classifications of roads are loosely defined as:

Freeways are limited access divided highways that use grade-separated intersections and exit/enter ramps with no driveways to safely carry high volumes of high-speed traffic. The normal posted speed limit is 55-75 mph. I-10 is a local example of an interstate.

Parkways are roads that are connected to arterials (see below) and have divided medians. There may be a few grade separated intersections at major routes to help ease congestion. Access points are kept to a minimum for higher travel speeds. The normal posted speed limit is 45-55 mph. A local example is Kino Parkway.

Arterials are more variable in their characteristics. They can have four to eight lanes, may have divided medians and the posted speed limit tends to be 40-45 mph. Arterials serve the highest traffic volume generators such as shopping malls, hospitals and grocery stores. Broadway Boulevard is an example of an arterial road.

Collectors link traffic collected from local residential roads to nearby arterials. Travel speeds tend to be lower than arterials. Normal speed limits are 25-40 mph. Collectors normally have lower traffic volumes than arterials. A local example is Glenn Street.

TABLE D — BENEFITS OF 2040 RTP REPRESENTATIVE PROJECTS

|-----------------------------------|--------------------------------------|-----------------------------|------------------------------------------|-------------------------------------------------|---------------------------------------------|---------------------------|-----------------------------------------------------------------|---------------|------------------------|
| I-10 Corridor                     | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● 

This matrix describes key benefits of the major corridors as well as other representative roadways. The large traffic volume increases that are projected indicate a need for these corridor improvements.
MAP E – 2040 RTP Roadway Projects

Proposed Improvements

- **New / Rebuilt RR Grade Separations**
- **New / Rebuilt Interchange**

Legend:
- Red: Freeway
- Green: Parkway
- Blue: Arterial
- Purple: Collector

Disclaimer:
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May 17, 2010
Operations and Maintenance

While roadway widening and new construction projects will help address anticipated demands, it is essential to preserve and protect our existing and future transportation infrastructure. An investment in operations and maintenance of the system is an investment in both mobility and safety.

The residents of our community want to see roadways in a state of good repair. That requires regular maintenance – activities such as sealing cracks, repairing pavement, cleaning and repairing drains, fixing signals, and sweeping streets as well as more efforts such as repaving, replacing substandard bridges and reconfiguring intersections. Unfortunately, regular and preventative maintenance is too often ignored or deferred when funding is limited. Studies by the Texas Transportation Institute indicate that it costs less in the long run to have good roads than bad roads. Deferred maintenance drives up long-term cost and accelerates the need for complete roadway rehabilitation, which can be four times as costly. Deferred rehabilitation also compounds the problem, often leading to pavement failure and the need to reconstruct the whole roadbed, at what could be 10 times the cost.

The causes of congestion can often be addressed with operational strategies by directly targeting problem areas such as traffic signal timing work zones, traffic incidents and special events. The 2040 RTP proposes increasing the amount of funding spent annually on roadway operations and maintenance (O&M). Operations include routine traffic signal procedures, incident response, special events management, work zone traffic management, etc.

Maintenance includes the preservation of pavement surfaces, shoulders, roadsides, structures, and traffic-control devices that are necessary for safe and efficient utilization of the roadway system.
Regional Programs
The 2040 RTP has grouped a variety of improvements to the roadway system as well as some ongoing services and activities into the Regional Programs category. This diverse category covers a wide range of community needs and goals:
• Safety-related improvements such as intersection reconfiguration, railroad grade separations and bus pullouts
• Technology improvements to reduce congestion
• Mitigating environmental impacts using wildlife crossings
• Dealing with climate change using alternate fuel programs or by influencing travel behavior through travel demand management.

Safety and ITS
Safety was identified as the highest priority goal throughout the 2040 public participation process. The RTP incorporates transportation safety into each of the projects for all modes. In addition, specific regional programs are dedicated to improving transportation safety and security.

Intelligent Transportation Systems (or ITS) programs use real-time, travel-related information to integrate all components of a traditional transportation system into an interconnected network. ITS programs use advanced technologies in electronics, information processing and communications to gather, process and distribute information necessary to maintain and increase the efficiency and safety of the functioning system. Examples of safety and ITS projects in the RTP include:

**Emergency and Incident Management System:** A program to identify and implement techniques to be used when an incident (such as a traffic accident) or an emergency (such as a flood) impacts the transportation network. The Emergency and Incident Management System techniques include strategies for effective communication, coordination, training and resource utilization.

**Bridge Program:** A program to build new bridges and repair, renovate or reconstruct existing structurally deficient bridges.

**Railroad Grade Separations:** The construction of new railroad grade separations (with new railroad overpasses or underpasses) at several locations throughout the region.

**ITS – Freeway Service Patrol:** Freeway patrols to assist travelers in distress and ease incident management.

**Transportation Security:** Dealing with emergency events such as natural disasters, terrorist attacks or other incidents caused by criminal activity that significantly impact our transportation system and that often require coordinated responses from multiple stakeholders.
Other examples of regional programs that fall outside Safety or ITS include:

**Alternative Energy and Fuel Vehicle Infrastructure**: Clean energy programs including infrastructure improvements to support both biofuels and electric vehicles.

**Regional Aerial Mapping**: Ortho photos and GIS program upgrades for regional mapping needs.

**Wildlife Linkages**: Underpasses, overpasses or fences to assist wildlife in crossing roadways safely.

**Transportation Art by Youth Program**: Employs youth during the summer months to create art pieces to enhance the transportation network.

**Travel Demand Management**: Travel Demand Management (TDM) is designed to change the travel habits of single-occupancy vehicle (SOV) users through various strategies. The TDM program encourages the use of carpools, vanpools and transit for commuting to work and all other trips. TDM also promotes walking or bicycling, shifting travel outside the peak periods and eliminating work trips with telework or compressed work weeks. Examples of TDM projects in the RTP include:

- **Commuter incentives for alternative transportation**: Provide incentives to change the behavior of drive-alone commuters.
- **High Occupancy Vehicle (HOV) Lanes**: Add HOV lanes to I-10 and I-19 in order to encourage carpooling.
- **Van Pool Program**: Maintain existing vanpool service subsidized through PAG.
- **University of Arizona Car Sharing Program**: Expand the UA Car Sharing program that provides students and staff with access to a fleet of cars for short-term use throughout the day. This program reduces the need for car ownership.

Diverse programs can do more with less.
Existing Bicycle and Pedestrian Facilities

The Tucson region is nationally recognized as a great place for bicycling and walking. The League of American Bicyclists has designated the region a gold-rated bicycle friendly community for the extensive bikeway network and model bicycle safety programs. It is the only region in the country with a gold rated designation.

Bicycle and pedestrian safety is a high priority to the region. Tucson also has been nationally recognized for the development of the pedestrian hybrid beacon signal, better known in Tucson as the HAWK light. Tucson has over 100 HAWK signals installed and many more planned. The HAWK lights are synchronized with traffic lights to optimize vehicular mobility.

However, more can be done. The region strives to be ranked a platinum bicycle friendly community, the highest rating given. One of the main areas to improve upon is boosting bicycle ridership rates. Also, efforts to increase ridership must focus on safety improvements.

The PAG 2009 Regional Bike Plan update includes many projects aimed at meeting both of these goals. The bicycle projects selected for the 2040 RTP come primarily from the regional bike plan update.

Many of the programs selected from the regional bike plan for inclusion in the RTP also are beneficial to pedestrians. There are over 100 miles of shared-use paths to be added which allow both bicyclists and pedestrians to travel on a dedicated pathway, separated from vehicles. The region also has interest in expanding the Safe Routes to School program which is designed to help schoolchildren safely walk or bicycle to school.

2040 RTP Bicycle and Pedestrian Projects

There are several categories of bicycle and pedestrian projects in the 2040 RTP to improve the region’s multimodal transportation network for current and future generations. Currently, over 817 miles of bikeway facilities in the region include bike lanes, shared-use paths and residential bike routes. The 2040 RTP would add nearly 700 additional miles of these facilities.

The 2040 RTP includes sidewalk improvements to help fill the gaps in the sidewalk network and make the system easier to navigate for those with a disability to travel.

The 2009 Regional Plan for Bicycling, available through PAG, includes more detailed information about recommended bicycle projects.

ADA Improvements

The 2040 RTP also incorporates several projects that address the needs of persons with disabilities along pedestrian facilities and help the region meet compliance under the Americans with Disabilities Act (ADA).

The City of Tucson and Sun Tran regularly inventory and update ADA accessibility conditions at all bus stops throughout the region. Access to and from the stop, as well as wheelchair boarding pads and shelters are evaluated to identify needed upgrades. Priority projects are identified with
walking programs foster healthier lifestyles.

the assistance of local disabled citizens and neighborhood groups, and then programmed into PAG’s 5-year TIP and 25-year RTP for implementation.

PAG and the City of Tucson continue to update the regional sidewalk inventory database and maps to identify major gaps and needs in the pedestrian system. Improvements are included in the design and construction of major roadway corridor projects, traffic signal projects, or as stand-alone pedestrian improvements to link key destinations and services.

Improvements include new sidewalks, wheelchair ramps, signalized pedestrian crossings, and amenities.

Pima County is updating its ADA Transition Plan, a federally required plan to help bring pedestrian facilities into ADA compliance. These efforts will be used to identify specific locations and recommendations for the pedestrian improvements that are included in the 2040 RTP.

Connectivity (Bicycle Lanes)
The region has over 600 miles of bike lanes. However, the bike lane network has many gaps that endanger cyclists. The Regional Transportation Authority has helped close the gaps by funding 50 miles that have been constructed in the past four years. The RTP plans to close many more gaps in order to have a fully connected bicycle lane system.

The 2040 RTP plans for over 200 miles of additional bicycle lanes totaling $103 million in investments.

Programs
The RTP includes many existing bicycle and pedestrian programs with the goal of expanding current efforts. Examples of programs include:

Bicycle Encouragement and Safety Outreach Programs:
Develop and distribute materials such as PSAs, billboards and stickers to educate cyclists and drivers on bicycle safety. Expand programs and campaigns to encourage walking and bicycling such as Cyclovia, an event that closes streets to car traffic and celebrates non-motorized modes of transportation. Another example is the “one-mile solution,” a campaign to encourage the public to bicycle or walk to destinations within one mile.

Bicycle and Pedestrian Signage and Stenciling:
Placing way-finding, wrong-way signage, and/or stenciling along all shared-use paths, bicycle routes, bicycle lanes and bicycle boulevards.

Adult Bicycle Safety Education:
Continue free adult bicycle safety education courses using League of American Bicyclists certified instructors. Expand the number of classes offered to reach more participants.

Safe Routes to School (SRTS):
Expand the region’s SRTS program that focuses on getting kids to walk or bicycle safely to school.
MAP F – 2040 RTP Bicycle and Pedestrian Projects

Proposed Improvements
- **Urban Loop**
- **Bike Blvd Improvement (Illustrative)**
- **Add Bike Lanes**
- **Shared-Use Path**

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Any regional funding allocations for specific bicycle and pedestrian improvements, including bike boulevards, will be determined during TIP development and subject to Regional Council approval.

June 15, 2010
Importance of Bike/Ped Planning

The relatively flat terrain within the valley, the pleasant climate and beautiful scenery are among the reasons we have made bicycle and pedestrian planning a priority. In addition, cycling and walking exemplify our commitment to preserving our unique natural environment, improving our air quality and maintaining the health of our citizens. Other benefits include:

- Boost our economy; especially from El Tour de Tucson, a large annual bicycling event
- Reduce traffic congestion
- Reduce infrastructure investment costs (adding vehicle lanes, parking spaces, road maintenance, etc.)
- Provide more travel options for the economically disadvantaged
- Less dependence on fossil fuels

Signalized Pedestrian and Bike Crossings: Install more pedestrian and bicycle signals to facilitate safe crossings. Retrofit existing pedestrian lights to accommodate bicyclists in locations with high bicycle volumes.

Sidewalks Continuity and Maintenance: Fill gaps in the regional sidewalk network and maintain system. Retrofit existing sidewalks to be ADA compliant.

Improve Pedestrian Mobility: Enhancements for pedestrians that include truncated domes on sidewalk ramps (to assist the visually-impaired), island refuges, lighting, etc.

Bicycle Boulevard Improvements

Bicycle boulevards are shared roadways that create an attractive, convenient and comfortable cycling environment for cyclists of all ages and skill levels. Bicycle boulevards are low-volume and low-speed streets that are optimized for bicycle travel using treatments such as traffic calming, traffic reduction, unique signage, pavement markings and intersection crossing treatments. These treatments allow through movements for cyclists while discouraging similar through trips by non-local motorized traffic. (Initiative for Bicycle and Pedestrian Innovation 2009). Studies also show bike boulevards are very effective at attracting new riders.

The City of Tucson is planning a bicycle boulevard network in order to increase bicycle use; Tucson’s roadway grid system is ideal for creating a network of residential bicycle boulevards and is a cost-effective means of providing safe bicycle access to popular destinations such as schools, parks and libraries. The City of Tucson has two bicycle boulevards in place, 3rd Street and 4th Avenue between University and Prince.

The 2040 RTP plans for 165 miles of bicycle boulevards totaling $24 million in investments.

Urban Loop

The urban loop is a proposed 55-mile continuous shared-use path that forms a loop around the City of Tucson. Where space permits, the loop will be a divided urban pathway with two separate parallel paths, one paved and the other a softer surface to accommodate different types of users. The Urban Loop consists of the Rillito River Park and the Julian Wash Greenway, and parts of the Santa Cruz River Park, the Pantano River Park, and the Houghton Greenway. Landscaping, unique signage and public art elements will be incorporated into the loop. Today, 63 percent of the urban loop is constructed, though by 2012 it is expected to be 81 percent complete.

The 2040 RTP includes 34 miles of shared-use paths, totaling $32 million to complete the urban loop.

Greenways

In addition to the urban loop, the region has many additional shared-use path networks.

- Oro Valley has 15.25 miles of shared-use paths for use by residents and visitors. The Town’s system includes connections to employment centers, residential areas, businesses, Town facilities and schools. The completed section of the Canada del Oro (CDO) Shared-Use Path (2.7 miles) from La Canada Drive to First Avenue along the CDO Wash, will be supplemented in the next three years with extensions both east and north. The RTP will add approximately three more miles of shared-use paths along the Town of Oro Valley roadway system in the future to allow users to continue to avoid vehicular traffic along major roads.
- Marana currently has a seven and one-half mile pathway along the Santa Cruz with rest areas, artwork, landscaping, etc. The RTP will add seven miles of shared-use paths in the future.
- Tucson Urban Greenways: The RTP includes City of Tucson urban shared-use greenways which provide a safe alternative to riding on busy streets. These greenways include:
  - El Paso and Southwestern Greenway
  - Arroyo Chico Urban Greenway
  - Arcadia Urban Greenway
  - Atterbury Wash Greenway
  - Rose Hill Greenway
  - Alamo Urban Greenway

Importance of Bike/Ped Planning

The relatively flat terrain within the valley, the pleasant climate and beautiful scenery are among the reasons we have made bicycle and pedestrian planning a priority. In addition, cycling and walking exemplify our commitment to preserving our unique natural environment, improving our air quality and maintaining the health of our citizens. Other benefits include:

- Boost our economy; especially from El Tour de Tucson, a large annual bicycling event
- Reduce traffic congestion
- Reduce infrastructure investment costs (adding vehicle lanes, parking spaces, road maintenance, etc.)
- Provide more travel options for the economically disadvantaged
- Less dependence on fossil fuels
Freight Movement Impacts our Daily Lives

Freight is the movement of goods from the manufacturer to the consumer. In the Tucson region, our freight is transported by truck, rail, and air services. Freight movement has a huge impact on our daily lives and on the economic vitality of the region. Not everything that is purchased in the Tucson metropolitan area was made or grown in Tucson, and not everything that is made or grown in the area is sold here. The effectiveness of our transportation system to move both people and goods has a direct impact on the cost of everything you buy.

Freight also impacts our mobility. If, during your daily commute, you get stuck waiting to cross railroad tracks or drive I-10 and/or I-19, you have some idea of how freight movement affects your travel time. Freight planning is required as part of the long-range transportation planning process because it impacts safety, congestion, air quality, and quality of life.

As a region, we are focused on maximizing our region’s geographic advantage at the crossroads of freight corridors which stimulate our local economy through both local and pass through freight movement. The region not only needs to ensure roadway facilities better accommodate truck traffic, but also in a sustainable and environmentally responsible manner.

Existing Freight Facilities

Tucson Region as a Freight Hub

Tucson is located at the intersection of two major commerce corridors resulting in significant volumes of cargo passing through the region on a daily basis. The two major corridors include an east-west route and a north-south route.

East-West: Interstate 10 connects Arizona with California and New Mexico and the rest of the United States. A recent national study of the I-10 freight corridor shows current truck volumes to be around 13,000 trucks per day traveling I-10 through Arizona. The I-10 corridor also includes the Union Pacific Railroad main line that extends from the Port of Los Angeles/Long Beach through Tucson, eastward to New Orleans. Approximately, 50-60 trains travel through Tucson each day.

North-South: Many of the trucks and trains carrying goods to or from Mexico (through the Nogales Port) pass through Tucson. This section is part of the Canamex Corridor, a major corridor linking Canada to Mexico through the United States. The traffic to and from Mexico is projected to increase substantially as the rising costs of gasoline may prompt more manufacturing companies to take advantage of Mexico’s proximity to the United States. Interstate 19 carries truck traffic between Nogales and Tucson, with approximately 4,000 trucks per day. Union Pacific operates the Tucson-Nogales branch line that moves rail traffic to and from Mexico and connects with the UP main line, known as the Sunset Route.
Freight in the 2040 RTP

The 2040 RTP incorporates projects to maximize our region’s geographic advantage and to help alleviate some of the congestion caused by the large volumes of freight that passes through the region. Examples of freight elements in the RTP include:

- Regional roadway projects such as 22nd Street, I-10 east widening and SR 210: Barraza-Aviation extension to I-10 that will help accommodate truck traffic on heavily traveled corridors.
- Railroad grade separations are planned for several intersections throughout the region to optimize safety and mobility at these locations.
- Tucson International Airport and Ryan Airfield improvements will help the efficiency of cargo shipped by air.

Implementation strategies aimed at freight operations such as:

- **Incorporate** regional multimodal freight centers (villages) into a comprehensive land use model in cooperation with Tucson Regional Economic Opportunities Inc. (TREO) and other public and private entities to serve as multifaceted logistics centers dedicated to more efficient handling of intermodal freight movements.
- **Collect** and distribute freight data to gain efficiencies in operation.
- **Encourage** development of private sector freight facilities to provide jobs and increase the region’s economic vitality.

Future Freight Planning

Travel modeling predicts severe congestion for the roads between Tucson and Phoenix which could have a huge impact on freight movements. In early 2010, Maricopa, Pima and Pinal counties entered into a joint planning agreement to begin addressing this and other super-regional planning issues. Future planning efforts will need to consider the discussions that evolve and possible solutions could include the following:

- Developing parkways in a “loop” fashion around Tucson, thereby leaving truck traffic on I-10 and allowing an alternative to local traffic to reduce locally generated interstate traffic.
- Expanding rail facilities to take advantage of the efficiencies of rail. Trains can move a ton of freight more than 436 miles on a single gallon of fuel. Properly planned rail facilities not only help provide jobs within the region but have the net effect of taking trucks off the road.
- While the 2040 RTP has several railroad grade separations planned, additional grade-separated railroad crossings would make both the rail and roadway systems safer and more efficient.
MAP I – Transportation and Logistics

Spotlight on Transportation & Logistics
TUCSON MSA
✓ 152 Logistics Service Providers
✓ 3,698 Workforce

- Air Service
- Logistics Support Service
- Rail Service
- Third Party Logistics Service
- Truck Service
- Warehouse Service

Proposed UP Classification Yard Near Picacho
- 43 Rail Miles
Calexico/Mexicali Port of Entry
- 352 Rail Miles
Port of Long Beach, CA
- 526 Rail Miles
Port of Hueneme, CA
- 578 Rail Miles
Punta Colónet, BC, MX
- 689 Rail Miles

Marana Regional Airport

Ryan Airfield

U.S. Customs & Border Protection Tucson

National Law Center for Inter-American Free Trade

Arizona U.S. Export Assistance Center

Union Pacific Railroad

Port of Tucson

Nogales Port of Entry
- 66 Rail Miles
Port of Guaymas, SO
- 331 Rail Miles
Port of Mazatlán, SI
- 756 Rail Miles
SPOTLIGHT ON TRANSPORTATION AND LOGISTICS

The adjoining Transportation and Logistics map shows the network of logistics service providers in the Tucson region mapped by categories of air, truck, rail, warehouse, third-party logistics and logistics support services. Logistics service providers manage the flow of goods from the goods’ point of origin to their final destination, either by providing air, rail or truck services or serving as third-party firms to manage goods movements between those modes of transportation.

PAG and Tucson Regional Economic Opportunities Inc. (TREO) jointly developed the map to illustrate the concentrations of transportation and logistics service providers and their relationship to Foreign Trade, Enterprise, and Empowerment Zones. PAG and TREO can use this map, its accompanying GIS data, and other travel modeling data to analyze freight movements in the region.

The Transportation and Logistics map also shows the region’s geographic location as it relates to existing and proposed shipping ports in the United States and Mexico. Logistics services providers, including those interested in moving standardized shipping containers long distances, can use the map to calculate distances that future intermodal container shipments may need to travel.
Congestion Management Process

PAG’s Congestion Management Process (CMP) is a tool to address congestion by enabling PAG and its partners to define, identify and measure congestion and develop and select appropriate strategies to reduce it. The process assists in identification of system deficiencies, and analysis and selection of alternative strategies to address congestion for inclusion in the long-range transportation plan (RTP) and the short-range transportation program (TIP).

The PAG CMP establishes a performance measurement and monitoring system for regional multi-modal transportation planning, programming and reporting for congestion management. The PAG CMP integrates systematic CMP strategy analysis and consideration into the TIP and RTP project development process.

The PAG CMP has developed regional congestion management and operations objectives that are directly linked back to the vision and goals of the 2040 RTP and linked forward to specific performance measures that are part of the CMP. Ultimately, the objectives-driven, performance-based process for managing congestion of the regional transportation system will lead to more efficient use of transportation dollars and result in a reduction of roadway and transportation network congestion.

The goal of the CMP is effective management of new and existing transportation facilities using both operational and travel demand management strategies. For example, the improvement of a congested corridor might incorporate strategies that augment or reduce the need to widen the roadway by providing more transit and alternate mode options, utilizing new technologies like signal timing or managing access to business and residential areas to make the existing facility work better.

As use of a roadway increases, it can become congested, leading to more frequent stops, slower speeds, longer trip times and longer lines of traffic. Frequently roadways may operate well during most of the day but have heavy or severe congestion levels during specific times of the day.

There are many sources of congestion, including bottlenecks, traffic incidents, work zones, bad weather, poor signal timing and special events. While bottlenecks may require new construction, the remaining 60 percent of congestion can often be addressed by improving management and operations.

Seasonal shifts in traffic volume may occur during the school year and periods marked by winter visitors. Holiday travel demand places a heavy demand on corridors serving regional malls, and popular recreation and entertainment activities contribute to intermittent, but severe, congestion at times.

The PAG Congestion Management Process will enable PAG to address both recurring congestion (usually caused by “bottlenecks” where capacity is constricted) and non-recurring congestion (resulting from incidents, special events, work zones, signal timing, weather etc). Recurring congestion, which takes place at predictable intervals at particular locations, can generally be traced to a specific cause, such as a physical bottleneck. Causes of nonrecurring congestion may be more difficult to isolate, and solutions may require non-traditional strategies.
We need to reduce congestion.

Congestion Management is more than O & M

Operations and Maintenance (O & M) typically refers to a jurisdiction’s efforts to maintain existing facilities and the operational equipment used.

Management and Operations (M & O) refers to an integrated program, often across jurisdictional systems, designed to improve the performance of existing and proposed infrastructure through implementation of a variety of multi-modal and technology-enhanced services and projects that preserve capacity, improve safety and enhance reliability.

**Travel Time Index**

The travel time, whether 10 minutes, 20 minutes or 30 minutes, is multiplied times the travel time value in order to determine the amount of time required for a trip during peak congestion. Using a value of 1.3, a 20-minute trip would take 26 minutes.

**Annual Delay per Traveler**

Sums up the number of extra hours the average driver will spend on the road each year due to congested conditions.

Source data: Texas Transportation Institute
PAG’s CMP performance monitoring process includes annual performance monitoring and a five-year reporting of congestion measures to show year-over-year changes and longer term trends. The PAG CMP performance measures are designed to put the 2040 RTP vision and goals into action.

One of the overriding goals/objectives for the CMP is to increase the use of alternative modes. Performance measures are recommended for transit, paratransit, bike and pedestrian facilities so that the performance of these modes can be related to how well each mode is helping to reduce congestion. In addition, a recommendation is made to consider the development of a mobility index to indicate the overall performance of alternative modes.

The exhibit below shows how recommended roadway performance measures align with the established goals and objectives for the PAG region. See the final CMP document for additional information, including performance measures for transit, bicycle and pedestrian systems.

To ensure the CMP is ongoing and sustainable by PAG and its member jurisdictions, a major emphasis was given to using existing data and resources for data processing. Primary and secondary measures were identified with recommended update frequencies. See chart to the right. The primary measures provide the best general assessments of the characteristics of the roadway system and should be updated and reported more frequently to monitor system performance. The secondary measures provide additional supplementary information that can be used to provide a more detailed performance assessment. The measures fall within three descriptive categories:

- **System Size / Extent** – these measures allow for tracking the supply of transportation system facilities year-to-year and measure system expansion/contraction.
- **Level of Use** – these measures assess the demand on the transportation system elements and allow for tracking the growth in demand over time.
- **System Performance** – these measures generally relate demand to supply and provide an assessment of the transportation system operation under existing demand conditions.

Regular reporting on congestion throughout the region will lead to more informed decision making for transportation investments.

### TABLE F – RTP System Goals and CMP Objectives and Performance Measures

<table>
<thead>
<tr>
<th>2040 RTP SYSTEM GOALS</th>
<th>CMP OBJECTIVES</th>
<th>SYSTEM PERFORMANCE MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expand Regional Multi-Modal Choices</td>
<td>Increase the use of alternate transportation modes (walking, bicycling, transit, carpool, vanpool) to reduce congestion on roadways.</td>
<td>• Auto / Transit travel time ratio.</td>
</tr>
<tr>
<td></td>
<td>• Improve or sustain transit system performance to help reduce congestion.</td>
<td>• Transit level of service.</td>
</tr>
<tr>
<td></td>
<td>• Improve the quality, quantity, accessibility and use of multi-modal traveler information services.</td>
<td>• Alternate mode usage total and per capita.</td>
</tr>
<tr>
<td></td>
<td>• Provide modal options.</td>
<td>• Percent of bicycle facility completeness.</td>
</tr>
<tr>
<td>Integrate Transportation Choices</td>
<td>Maximize the efficiency of the interface between transportation modes.</td>
<td>• Percent of pedestrian facility completeness.</td>
</tr>
<tr>
<td></td>
<td>• Reduce congestion and improve safety at railroad crossings.</td>
<td>• Transit system size/availability.</td>
</tr>
<tr>
<td></td>
<td>• Improve the efficiency of transit boarding.</td>
<td>• Additional traffic delay due to railroad crossings.</td>
</tr>
<tr>
<td></td>
<td>• Improve the efficiency of freight transfer.</td>
<td>• Crashes per year at railroad crossings.</td>
</tr>
<tr>
<td>Promote Sustainable Land Use</td>
<td>Promote programs and land use planning that advance efficient trip-making.</td>
<td>• Commodity flows from, to, within and through the region by mode.</td>
</tr>
<tr>
<td></td>
<td>• Coordinate corridor and land use strategies.</td>
<td>• New mixed use and transit oriented development.</td>
</tr>
<tr>
<td></td>
<td>• Coordinate regional transportation systems and land use planning.</td>
<td>• Access management activities.</td>
</tr>
<tr>
<td>Foster a Vibrant Economic</td>
<td>Make transportation investment decisions that use public resources effectively and efficiently, using performance based planning.</td>
<td>• Most CMP performance measures.</td>
</tr>
<tr>
<td>Enhance Safety</td>
<td>Improve traveler safety through efficient system operations.</td>
<td>• Number of crashes / year by crash type.</td>
</tr>
<tr>
<td></td>
<td>• Reduce crashes consistent with the Arizona Strategic Highway Safety Plan reduction goals.</td>
<td>• Number of fatal crashes / year.</td>
</tr>
<tr>
<td></td>
<td>• Reduce the number of secondary incidents/crashes at incident scenes and work zones.</td>
<td>• Number of injury crashes / year.</td>
</tr>
<tr>
<td></td>
<td>• Reduce the number of crashes involving bicyclists or pedestrians.</td>
<td>• Crash rate.</td>
</tr>
<tr>
<td></td>
<td>• Improve safety at railroad crossings.</td>
<td>• Fatality rate.</td>
</tr>
<tr>
<td>Foster Environmental Stewardship</td>
<td>Make transportation decisions that are compatible with air quality conformity.</td>
<td>• Crashes per year at railroad crossings.</td>
</tr>
<tr>
<td></td>
<td>• Reduce per capita fuel consumption.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Reduce vehicle emissions.</td>
<td></td>
</tr>
<tr>
<td>Increase Accessibility</td>
<td>Address the needs of population groups with special transportation needs.</td>
<td>• Number of employers with a trip reduction program.</td>
</tr>
<tr>
<td></td>
<td>• Reduce congestion for special transportation needs population groups.</td>
<td>• Number of registered carpools, vanpools, and alternative mode commuters.</td>
</tr>
<tr>
<td></td>
<td>• Improve paratransit system performance to help reduce congestion.</td>
<td>• Estimated CO (tailpipe) NOx, and VOC levels with and without TIP projects.</td>
</tr>
<tr>
<td>Optimize Transportation System Performance</td>
<td>Provide reasonable and reliable travel time and level of service on transportation systems.</td>
<td>• CMP initiative level reflected in TIP and RTP.</td>
</tr>
<tr>
<td></td>
<td>• Improve traffic signal timing, coordination and management across all jurisdictional boundaries.</td>
<td>• VMT per capita.</td>
</tr>
<tr>
<td></td>
<td>• Improve work zone management to reduce incident duration and traveler delay.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Improve incident management to reduce incident duration and traveler delay.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Maintain congestion levels for major arterials.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Maintain delay per traveler not to exceed XX percent of the free flow travel time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Recurring delay.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• V/C, LOS or congestion category (map).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lane miles by LOS E or worse.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Delay as a percent of total travel time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Number of intersections at LOS E or worse.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Most congested locations (top 10 – 20).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Locations where signal timing improvements may be beneficial.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Travel time or speed estimates.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Average incident clearance time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Person throughput.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Daily VHT per capita.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Number of traffic signals retimed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Auto / Transit travel time ratio.</td>
<td></td>
</tr>
</tbody>
</table>
The Greater Tucson region is one of the few metropolitan areas of its size in the country with nearly all of its signals controlled from a single center. Over 500 traffic signals throughout the region (including the Cities of Tucson and South Tucson, ADOT, Pima County, and the Towns of Marana, Sahuarita and Oro Valley) are monitored and controlled from the Tucson Transportation Control Center.
Travel Demand Management

One of the most cost-effective ways to reduce congestion and the demand for new and wider roadways is to promote and support travel demand management (TDM).

According to Census 2000 data, 73.8 percent of those traveling to work drove alone. This represented about a 2 percent increase from 1990. The average daily commute time was 23.9 minutes, an increase of almost three minutes from 1990.

TDM in Pima County includes employer-based strategies that promote the use of alternative modes of transportation, such as carpooling, vanpooling, riding transit, bicycling or walking for the work trip. Local ordinances were enacted 20 years ago that require major employers to implement alternative transportation plans at the worksite. As part of their plans, area companies and government agencies offer incentives, subsidies, infrastructure and information to motivate their employees to find an alternative to driving alone for their commute to work.

PAG offers a variety of services to assist area employers in their travel demand efforts, such as vanpool subsidies, a carpool matching system, outreach and marketing to employees, promotions, and various incentives and prizes to promote behavioral changes.

The PAG region also has expanded Travel Demand Management from an employer-based focus to make TDM services and strategies available to all residents of the region.

Expanded strategies include:
- Web-based services that allow commuters to find carpool partners for any trip (not just to work), learn of transit options for their work commute and get a route map of the safest bike route to the local grocery store.
- Direct-marketing campaigns to area residents that improve awareness about travel options and provide incentives to try other modes of travel.
- Improved mass transit that reaches suburban and rural residents and provides greater accessibility for all users.
- Improved routes for school children that reduce the number of school buses and provide students easier and safer access to schools.
- Parking management and pricing policies that encourage other modes of travel than driving.
can’t just build our way out of congestion.

Benefits of investing in Travel Demand Management

- Reduced traffic congestion
- Reduced infrastructure investment costs (parking spaces, road maintenance, etc)
- Improved air quality
- Improved overall community health
- Improved travel options for the economically disadvantaged
- Less dependence on fossil fuels
- Fewer greenhouse gas emissions
Overview of Tucson International Airport, Ryan Airfield, Marana Regional Airport and Ajo Municipal Airport

Tucson International Airport (TIA) is one of nine primary commercial service (PCS) airports in Arizona and the only PCS airport in the region. Ryan Airfield and Marana Regional Airport are general aviation reliever airports in the region. A brief description of the airports and their services are listed below.

Anticipated Aviation Demand

Aviation demand forecasting is the foundation for determining future airport facility needs. For air carrier airports like TIA, the number of anticipated annual enplanements (passengers boarding an aircraft at an airport), is a useful predictor of facility needs. For general aviation airports like Ryan Airfield, the number of anticipated annual operations is the most useful predictor.

Operations are the total number of takeoffs, landings, or touch-and-go procedures by an aircraft on an airport.

Over the RTP’s 30-year planning horizon, TIA annual enplanements are expected to nearly double, from approximately 1,800,000 in 2010 to 3,600,000 in 2040. Likewise, operations at Ryan Airfield will grow significantly over the next 30 years; the current level of operations (131,000) will expand to approximately 210,000 operations in 2040.

Future Development at Tucson International Airport

The TIA 20-year program includes over 100 major projects, representing an approximate $315 million investment over that time period. The table below provides a representative list of future projects and anticipated costs through the year 2040.

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reconstruct Main Terminal, Multi-phased</td>
<td>$20,000,000</td>
</tr>
<tr>
<td>Expand Concourse to Add Gates</td>
<td>$40,000,000</td>
</tr>
<tr>
<td>Extend Taxiways</td>
<td>$8,562,000</td>
</tr>
<tr>
<td>Install Airport Lighting Control and Monitoring System</td>
<td>$2,500,000</td>
</tr>
<tr>
<td>Pavement Preservation for Public Roads and Parking Lots</td>
<td>$40,000,000</td>
</tr>
<tr>
<td>Pavement Preservation for Runways and Taxiways</td>
<td>$25,000,000</td>
</tr>
<tr>
<td>Expand Security Monitoring Capabilities</td>
<td>$1,850,000</td>
</tr>
<tr>
<td>Airfield Drainage Projects, Multi-phased</td>
<td>$30,000,000</td>
</tr>
<tr>
<td>Expand Air Freight Facility</td>
<td>$2,600,000</td>
</tr>
<tr>
<td>Construct Fuel Storage Facility</td>
<td>$18,000,000</td>
</tr>
</tbody>
</table>

Future Development at Ryan Airfield

The Ryan Airfield 20-year program includes over 50 major projects, representing an approximate $35 million investment over that time period. The table below provides a representative list of future projects and anticipated costs through the year 2040.

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct Apron to Facilitate Aeronautical Development*</td>
<td>$2,060,000</td>
</tr>
<tr>
<td>Construct New Air Traffic Control Tower</td>
<td>$4,500,000</td>
</tr>
<tr>
<td>Expand Apron and Construct Remaining Apron*</td>
<td>$5,325,000</td>
</tr>
<tr>
<td>Airfield Drainage Projects</td>
<td>$8,000,000</td>
</tr>
<tr>
<td>Airport Lighting and Security Equipment</td>
<td>$3,712,000</td>
</tr>
<tr>
<td>Reconstruct Primary Runway</td>
<td>$2,209,000</td>
</tr>
<tr>
<td>Pavement Preservation</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>Land Acquisition for Runway Approach Protection</td>
<td>$2,209,000</td>
</tr>
<tr>
<td>Security Fencing and Perimeter Roadway Construction</td>
<td>$2,688,000</td>
</tr>
</tbody>
</table>

*Apron — The area where aircraft are parked, loaded or unloaded, refueled or boarded.

Marana Regional Airport

The Marana Regional Airport is owned and operated by the Town of Marana. The airport, formerly known as Avra Valley Airport, was purchased by the Town in 1999 from Pima County. The three letter identifier for the airport remains AVQ.

The Marana Regional Airport is classified as a general aviation reliever airport for Tucson International. It is located approximately fifteen nautical miles northwest of Tucson and is five miles west of Interstate 10 on Avra Valley Road. The airport is home to more than 310 based aircraft and had over 110,000 takeoffs and landings in 2007. The airport’s main runway is 6,900 feet and the crosswind runway is 3,900 feet. The table to the right provides a representative list of future projects and anticipated costs through the year 2040.

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct an Air Traffic Control Tower</td>
<td>$9,000,000</td>
</tr>
<tr>
<td>Construct Airport Terminal</td>
<td>$7,000,000</td>
</tr>
<tr>
<td>Land Acquisition for roadway realignment</td>
<td>$4,500,000</td>
</tr>
<tr>
<td>Install Security Fencing</td>
<td>$1,500,000</td>
</tr>
<tr>
<td>Construct New Runway (12R/30L)</td>
<td>$5,000,000</td>
</tr>
</tbody>
</table>
cargo and passenger air service is critical.

**Ajo Municipal Airport**

The Ajo Municipal Airport, also known as the Eric Marcus Municipal Airport, is located approximately five miles north of downtown Ajo on Arizona Highway 85. The airport is on 1,320 acres of Pima County owned property and has a single 3,800-foot long runway and rental hangar spaces. It is maintained by the Pima County Department of Transportation and serves the general aviation needs of far western Pima County. Planned improvements include:

<table>
<thead>
<tr>
<th>Project</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upgrade security fencing</td>
<td>$860,000</td>
</tr>
<tr>
<td>Upgrade airfield signage</td>
<td>$39,000</td>
</tr>
<tr>
<td>Construct taxiway turnaround</td>
<td>$365,000</td>
</tr>
<tr>
<td>Facility &amp; pavement maintenance</td>
<td>$300,000</td>
</tr>
</tbody>
</table>

**Tucson International Airport**

8,244 acres
3 runways
9 airlines provide non-stop service to 16 domestic destinations
Air freight and cargo-handling
Air ambulance
Charter service and pilot instruction
Aircraft rental and aircraft sales

**Ryan Airfield**

1,754 acres
3 runways
Major airframe and engine repair
Charter service and pilot instruction
Aircraft rental RYAN

**Marana Regional Airport**

570 acres
2 runways
Major airframe, engine, avionics repair
Hanger and tiedown facilities
Charter service and pilot instruction
Aircraft rental
Annual operations 120,000

**Ajo Municipal Airport**

1,320 acres
1 runway
Rental hangar spaces

A high-quality aviation system is essential to the economy and quality of life of the Tucson region. The largest aviation operator in the region is the Tucson Airport Authority (TAA) which operates the Tucson International Airport (TIA) and Ryan Airfield.
Implementation Strategies

In developing the long-range transportation plan, the 2040 RTP Task Force identified specific strategies the region can take to better implement the plan, creating an energy-efficient and environmentally responsible transportation system that reduces congestion and travel delays. The Implementation Strategies reviewed here are specific actions PAG, local jurisdictions, and stakeholders can take to bring about the 2040 RTP vision and goals.

The first four goals, titled “The Fundamental Goals,” focus on fundamental tools and techniques that must be in place to achieve and sustain a meaningful transportation vision. The second eight system goals focus more directly on concepts, programs, and projects that could manifest in measurable changes in the physical or social characteristics of our transportation, land use and economic infrastructure.

Illustrative Strategies

The 2040 RTP Implementation Strategies are action steps that can be taken by the eight jurisdictions in the region, PAG or the entire community to bring the concepts in the 2040 RTP to reality. Over 90 implementation strategies were developed and relate to one or more of the 12 goals. Example RTP projects were identified for each goal but are illustrative only and not meant to be all-inclusive. See Appendix 3 for a full listing. Some sample strategies include:

- Improve the connections between transit facilities and major destinations within and beyond the region to allow for easier travel for non-driving populations.
- Develop a regional strategy that links land use and transportation by targeting transportation investment in designated growth areas in each jurisdiction’s adopted land use plans.
- Develop meaningful incentives that encourage businesses to locate near transit hubs.
- Explore new sources of funding such as public and private partnerships, congestion pricing, vehicle miles traveled, etc., in order to develop a diversified funding stream that will adequately meet transportation needs in the future.
- Support the preservation of open spaces including undeveloped land, habitats for plants and animals, places of natural beauty, and critical environmental areas.
- Pave dirt roads with average daily traffic greater than 500 vehicles per day in order to abate dust pollution.
- Include traffic signal timing review and adjustment as part of the construction process of corridor road projects.
- Increase the use of Intelligent Transportation System (ITS) strategies in work zones, such as dynamic message signs and dynamic lane merge systems that provide real-time traveler information and real-time response to lane merging conditions. Use of ITS strategies in work zones are intended to improve safety and operations.
- Provide bike lanes/shoulders on all principal roadways in the region and their corresponding intersections following American Association of State Highway and Transportation Officials (AASHTO) standards.
- Include broad, geographically dispersed populations in developing plans and projects, including significant participation from traditionally underrepresented groups.
- Advocate for the development of educational programs to teach the public about sustainable land use, transit-oriented development, and successful, mixed-use communities.
- Innovate and pilot new technologies that have potential for creating a safer and better performing system. An example of this has already been done in Tucson is the HAWK (High Intensity Activated Cross Walk) pedestrian signals.
- Incorporate regional multimodal freight centers (villages) into a comprehensive land use model in cooperation with Tucson Regional Economic Opportunities Inc. (TREO) and other public and private entities to serve as multifaceted logistics centers dedicated to more efficient handling of intermodal freight movements.
- Support rainwater harvesting efforts along roadways and at commercial sites to reduce stormwater peak flows and reduce stormwater pollution.

2040 RTP: The Fundamental Goals

1. Public Involvement
2. Advanced Technologies
3. Funding and Implementation
4. Accountability

Goals for the System

1. Multi-Modal Expansion
2. Integrated Transportation Choices
3. Sustainable Land Use
4. Economic Sustainability
5. Safety
6. Environmental Sustainability
7. Accessibility
8. System Performance
Safety through Traffic Incident Management

Safety was identified as a top concern by the public during planning for the 2040 RTP and more than 10 implementation strategies are dedicated to the topic, including Traffic Incident Management. Traffic incidents, such as crashes, stalled vehicles, traffic stops, roadway debris, weather events, construction and special events, are estimated to cause nearly 60 percent of the total delay experienced by motorists in the United States. Traffic congestion caused by these incidents affects the safety and mobility of all travelers.

Traffic incident management is an effective transportation improvement program that works to reduce the effects of incident-related congestion. Incident management detects incidents when they occur, reducing the time for responding vehicles to arrive, and decreasing the time required for traffic to return to normal conditions. Many public sector and private sector partners are involved in traffic incident management, but it is not a core function of any agency. The 2040 RTP Implementation Strategies encourage the jurisdictions and private sector partners to establish a formal traffic incident management program in order to better coordinate the operations and responses of the many entities involved, including first responders and police.

Regional Inland Ports and Multi-modal Distribution Centers

Tucson is located at the crossroads of two major commerce corridors, I-10 and I-19, resulting in significant volumes of freight coming into, going out of, and passing through the region on a daily basis. The 2040 RTP includes an implementation strategy to incorporate regional multi-modal freight centers (villages) into a comprehensive land use model in cooperation with Tucson Regional Economic Opportunities Inc. (TREO) and other public and private entities. These freight centers would bring more efficient handling and distribution of intermodal freight to the region.

Regional inland ports can serve as unique multi-modal logistics centers that can promote and facilitate the free and competitive flow of regional and international trade between the U.S. and other markets such as Mexico, Latin America and the Pacific Rim. These multi-modal logistics centers such as the Port of Tucson can provide businesses with convenient, cost-effective access to many corners of our fast-growing global marketplace and bring high-value, career-oriented jobs to southern Arizona.
The “4Es” of safety: Engineering, Education, Enforcement, and Emergency medical services

It is no surprise that safety was identified as the highest priority goal throughout the 2040 public participation process. For many years, the average number of fatalities annually in the United States due to traffic-related crashes has been about 40,000; non-fatal injuries typically exceed 3 million while financial losses due to traffic-related crashes in the United States are estimated at $630 million each day. Whether due to less driving, better vehicles and facilities, or greater public understanding and education, there was an 8.9 percent drop from 2008 to 2009 in the number of fatalities nationwide. This is a trend our region wants to build upon and improve.

Safety is also a core program of federal transportation legislation. The FHWA has identified the need to make our roads safer by addressing the “4Es” of safety: engineering, education, enforcement and emergency medical services. FHWA further stresses the importance of developing data-driven, systematic approaches and technologies to deal with safety issues as well as to consider safety needs early and throughout the project development process.

Incident management becomes critical when crashes occur. Faster response saves lives and reduces the chance that a crash will cause other accidents or problems with the transportation system.

It is estimated that driver inattention, impairment or unsafe behaviors such as speeding, lane changing, etc. factor into 80 percent of all crashes; thus, anticipating human behavior is critical to improving safety, as are more public education and activities aimed at changing unsafe behavior.

PAG is integrating safety into both the long-range and the short-range planning processes. Safety became part of the RTP Vision and Goals Statement and was incorporated into the RTP through specific project, program and implementation strategy recommendations.

First, safety is seen as an essential piece of every project in the RTP. Additionally, there are projects in the RTP that specifically address multiple safety issues including intersection safety, road departure issues, emergency response, bicycle and pedestrian safety, safety education, work zone safety and data management, among others. The RTP Task Force took a multifaceted approach to safety by identifying infrastructure-specific projects, technology-focused projects, emergency-response projects, enforcement-based projects and education-oriented projects. This will allow the region to concentrate on delivering a safer transportation system to the public. Safety is identified as a key factor in the TIP criteria for evaluation of TIP projects selected for funding and implementation.

PAG also focuses on the coordination among agencies and stakeholders that is critical to any successful safety program. This includes participation in state safety planning such as in the development of the state’s Strategic Highway Safety Plan (SHSP) and has continued through its coordination of implementation strategies throughout the region.

Incorporating security into transportation planning is accomplished by providing a forum for discussion of transportation-related security issues and strategies, recognizing the complex nature and diverse causes of transportation-related emergencies, as well as the interdependency of the jurisdictions and organizations involved.

Safety also involves enhancing freight and intermodal (rail, air) transportation planning, efficiency and safety by improving coordination and developing partnerships with regional stakeholders, and working in close cooperation with the regional inland port and transportation initiative of the region’s economic development agency.

Other key components where we address safety include:

- Safety conscious planning
- Intersection improvements
- Pedestrian safety programs such as Safe Routes to School
- Pedestrian equipment upgrades
- Roadway shoulders
- Rumble strips
- Elimination of obstacles
- Geometric design and retrofitting older infrastructure
- Better signalization and lighting
- Nighttime visibility
- Turn bays
- Red light cameras
- Speed management
- Work zone safety
- Bicycle safety
- Highway/rail crossing improvements and grade separations
- Use of emerging technologies, such as pedestrian signal countdowns and in-pavement lighting
- Road safety audits
- Safety belt, helmet and other laws
- Safety data development
- Performance monitoring and reporting
- Coordination and collaboration with agencies and stakeholders on a wide variety of operational activities including transportation security, emergency response and regional evacuation planning

Safe and secure transportation will save lives.
and secure transportation will save lives.
Transportation and the Environment

The Sonoran Desert, rich in biodiversity, has been identified by the Nature Conservancy as one of the top eco-regions worldwide. The unique natural environment in the Tucson region has fostered a longstanding consciousness and strong commitment for environmental protection by planners and the public. In keeping with the RTP’s vision and goals, the projects in the plan incorporated the public interest in preserving our environment and sustaining our quality of life.

The importance of environmental protection to the region is reflected in the overarching vision for the RTP:

“The 2040 RTP envisions a premier, energy-efficient, and environmentally responsible regional transportation system that is interconnected, multi-modal, technologically advanced and integrated with sustainable land use patterns.”

The region’s transportation infrastructure affects the region’s environment in many ways, both directly and indirectly. About 60 percent of the air pollution in the Tucson region comes from motor vehicles. Paved roads can increase stormwater runoff and flooding which negatively impacts our water quality, safety and mobility. Wildlife and habitat are impacted through land consumption, habitat fragmentation and road kill.

The 2040 RTP recommends projects and programs that can help alleviate the potential negative effects of transportation on the environment and sustain the flora and fauna of the Sonoran desert region.

Environmental Representation on the RTP Task Force

The 2040 RTP Task Force included a diverse group of members who represented different community interests. Two members of the Task Force are recognized as environmental experts: the Executive Director for the Coalition for Sonoran Desert Protection, a non-profit alliance of nearly 40 conservation and neighborhood groups, and the Environmental Projects Coordinator for the City of Tucson Office of Conservation and Sustainable Development. However, many other task force members provided guidance and support on topics that are closely linked to the environment including representatives from Pima County Development Services; Bicycle Advisory Committee; City of Tucson Planning; City of Tucson Parks and Recreation; Southern Arizona Transit Advocates and University of Arizona Planning, Design and Construction.

These Task Force members provided input on all aspects of the plan as it was being developed, including the implementation strategies that focused on environmental considerations.

Environmental Coordination

In addition to the environmental representatives on the RTP Task Force, many other environmental agencies and community groups provided input on the 2040 RTP. PAG held two environmental stakeholder sessions that provided structured feedback on elements of the plan. Participants in the stakeholder sessions included representatives from the National Forest Service, Defenders of Wildlife, Pima County Department of Environmental Quality, Watershed Management Group, jurisdictions’ planning and sustainability departments, landscape architecture firms, transit advocacy groups and the regional Bicycle Advisory Committee. Upon completion of the draft 2040 RTP, PAG sent copies of the plan and environmental maps to different federal, state and local environmental agencies, including the Bureau of Land Management and the National Forest Service, asking for additional feedback.

Implementation Strategies

Given the strong emphasis on environmental protection in the RTP vision and goals, many of the implementation strategies provide information on mitigation activities that can help alleviate some of the negative consequences of transportation projects. Some sample Implementation Strategies that relate to the environment are:

- Support the preservation of open spaces including undeveloped land, habitats for plants and animals, places of natural beauty and critical environmental areas by carefully selecting infrastructure types and alignments.
- Include removal of buffelgrass, and other invasive species, as part of jurisdictions’ road maintenance efforts.
- Adopt a regional “Complete Streets Policy” so jurisdictions consider all modes of transportation when they design or re-design a street.
- Use recycled materials including rubberized asphalt for constructing roadways.
- Support rainwater harvesting efforts along roadways and at commercial sites to reduce stormwater peak flows and reduce stormwater pollution.
- Monitor greenhouse gas (GHG) emissions and develop strategies to reduce the effect of transportation-related emissions; currently, it is estimated that one-third of all GHG emissions come from transportation sources.
- Adopt environmentally sensitive roadway design guidelines.
- Support local initiatives to create wildlife crossings on major roadways especially along wildlife corridors between mountain ranges.
We want to ensure the integrity of our unique environment.

These images are graphic representations of a bridge that would allow wildlife to cross over a major roadway.
RTP Projects and Programs

Many projects and programs in the RTP, if implemented, will directly and indirectly help preserve the natural environment. A critical starting point was a greater emphasis on transit and bicycle/pedestrian projects that are designed to reduce single-occupancy vehicle use than in any prior regional plan. Additionally, the plan incorporated major regional programs that establish critical wildlife linkages and support air quality planning. There are several alternative energy and fuel vehicle infrastructure programs including adding public electric vehicle charging stations and biofuels infrastructure. Programs are available for education and encouragement of alternative modes of transportation.

Sonoran Desert Conservation Plan and 2040 RTP Projects

Throughout the development of the plan, the Task Force was provided information to help make informed decisions, including presentations on the Sonoran Desert Conservation Plan (SDCP). The SDCP is a comprehensive planning initiative developed by Pima County to maintain or improve the region’s critical ecosystems while accommodating future development and transportation needs. The plan directs growth toward areas with the least natural, historic and cultural resource values. The SDCP is not about whether Pima County continues to grow but rather where the county will grow. Development of the SDCP included participation from broad-based community groups, including federal and state agencies.

As part of the project selection and analysis phase of the RTP process, PAG mapped the list of preferred projects to be included in the 2040 RTP and superimposed the project map over a map of regional biological resources that was based on the SDCP (see map K). Projects that appear within the sensitive areas were flagged to help identify where special attention, further study and/or mitigation may be required. It is expected that improvements and route alignments may be adjusted to ensure sensitivity to the natural environment and to conform to requirements of adopted plans or other regulations. Environmental clearances and mitigation requirements will be assessed on an individual project basis as part of the design and engineering of those individual projects. For example, the Reserve List Lambert Lane roadway project in the Town of Marana falls in an environmentally sensitive area identified as a wildlife linkage by technical experts. It would need an extensive environmental analysis if this project moves forward towards construction. A potential mitigation strategy for this project would be a wildlife crossing. All federally funded projects are expected to conform to National Environmental Policy Act (NEPA) requirements.
MAP K – 2040 RTP Roadway Projects and Priority Biological Resources

This map overlays potential transportation improvements and environmentally sensitive areas identified by the science of the Pima County Sonoran Desert Conservation Plan to help identify where special attention, further study and/or mitigation may be required. It is expected that improvements and route alignments may be adjusted to ensure sensitivity to the natural environment and to conform to requirements of adopted plans or other regulations.

This map is for informational purposes only. The information included on this map has been compiled from a variety of sources and is subject to change without notice. Pima Association of Governments makes no representation or warranties, express or implied, as to accuracy, completeness, timeliness or rights to the use of such information.

Priority Biological Resource categories are aggregated from the Maureen Marie Behan Conservation Lands System, as adopted in the Environmental Element of the Pima County Comprehensive Plan.
Overview of Climate Change in the Region

Climate change resulting from natural fluctuations and human activity can involve temperature and precipitation changes along with increased weather variability. Arizona has experienced climate change through rising temperatures, particularly since the mid-1970s. Since 1976, the average annual temperature in Arizona increased by 2.5 degrees F. (Source: CLIMAS, University of Arizona, 2008). In the desert Southwest, climate change is expected to result in longer, warmer and drier summers in the future.

The major human-generating factors in the United States that contribute to climate change are greenhouse gas (GHG) emissions coming from burning fossil fuels including power plants, industrial facilities and transportation. (Source: 2010 U.S. GHG Inventory Report: 1990-2008, April 2010, US EPA # 430-R-10-006)

PAG and the local jurisdictions are working hard to develop programs and policies that reduce GHG emissions and create a more sustainable community. For transportation projects, jurisdictions are adapting roadway planning and design to incorporate practices earlier in the process to reduce traffic congestion and vehicle idling. Jurisdictions also use recycled materials such as rubberized asphalt when constructing roadways. Sun Tran, the public transportation system, is committed to expanding its fleet of alternative-fuel vehicles which includes biodiesel, compressed natural gas and hybrid electric powered buses.

In order to assess greenhouse gas emissions over time, PAG has conducted a GHG emissions inventory for eastern Pima County. The regional, broad-based inventory serves as baseline information to measure the region's overall progress in achieving long-term GHG emission reductions and enable the development of programs and policies that reduce GHG emissions. Inventories were developed for Pima County, the City of Tucson and the Towns of Oro Valley, Marana and Sahuarita and included key sectors of residential, commercial and industrial energy use, transportation and waste. See pie chart to the left.

Addressing Climate Change in the 2040 RTP

The 2040 RTP includes over 400 specific projects and programs that will help reduce GHG emissions. Some of the recommended transit, bicycle and pedestrian projects, travel demand programs, alternative fuels and other programs include:

• Expand existing and add new express bus routes

• Construct passenger rail between Tucson and Phoenix (Funds for Pima County portion with transit stops)

• Provide educational outreach to promote alternate transportation modes, bicycle safety, and Safe Routes to School to reduce the number of vehicle miles traveled.

• Employ techniques to improve traffic flow and reduce congestion on arterial networks, including enhanced traffic signal system operation and new railroad grade separations.

The 2040 RTP also includes over 90 implementation strategies, several of which address environment and sustainability issues. These include recommendations on providing bike lanes or paved shoulders on all principal roadways, developing incentives to promote non-vehicular trips, monitoring GHG emissions and ensuring consistency between regional transportation plans, local circulation plans, and adopted conservation plans.

Partnerships to Address Environmental Challenges

PAG addresses the issues of climate change and sustainability on many levels, through transportation planning, watershed planning, air quality planning and the Clean Cities program, which promotes the use of clean-fuel vehicles. There is a strong spirit of coordination and collaboration in the Tucson region that supports these environmental programs, which includes participation from local jurisdictions, environmental organizations and businesses.

PAG’s Clean Cities program is currently working with Nissan North America, the U.S. Department of Energy and the Electric Transportation Engineering Corporation (eTec) of Scottsdale, AZ, to build a comprehensive electric vehicle infrastructure where electric vehicle owners can charge their vehicles at stations throughout the region.

With over 300 days of sunshine each year, the Southern Arizona Regional Solar Partnership has set a goal to encourage and assist in bringing 2,000 solar energy systems to the region. The Solar Partnership will expand the use of solar-based systems in businesses, non-profit organizations and schools, further educating the public on solar energy, GHG emissions and climate change.

Climate Change Terms

Climate Change: any change in climate over time, whether due to natural variability or as a result of human activity

Climate Change Mitigation: in transportation terms, mitigation refers to the implementation of any policy or strategy that will reduce greenhouse gas emissions and enhance sinks (i.e. trees or other parts of the physical environment that absorb greenhouse gases)

Climate Change Adaptation: in transportation terms, adaptation refers to changes in the way surface transportation infrastructure is planned, designed, constructed, operated and maintained
In the Tucson region, greenhouse gas (GHG) emissions from on-road transportation are expected to rise as the region continues to grow and the number of vehicle miles traveled by individuals increases.

We must deal with emerging issues.
Air Quality Assessment

The Clean Air Act Amendments of 1990 require that the RTP conform with regional air quality plans and insure that it will not cause or contribute to air quality violations of the National Ambient Air Quality Standards (NAAQS). Under the federal transportation conformity rule (40 Code of Federal Regulations Parts 51 and 93), conformity determinations for transportation plans and programs must include an emissions budget test, use of the latest planning assumptions and models, timely implementation of transportation control measures (TCMs) specified in the applicable air quality implementation plans and consultation. The final determination of conformity for the RTP is the responsibility of the Federal Highway Administration and the Federal Transit Administration.

Prior to 2000, the Tucson region was designated in nonattainment with the carbon monoxide (CO) health standard. This nonattainment status required that federally supported transportation plans, programs and projects not adversely affect air quality. A conformity determination on the short- and long-range plans included modeling results showing that future on-road mobile emissions from motor vehicles did not exceed those of the base year, assumed in our region to be 1990 levels.

Approval of the Carbon Monoxide Limited Maintenance Plan (CO LMP) for the Tucson Air Planning Area (TAPA) in July 2000, and the second 10-year CO LMP in January 2010, removed the conformity determination requirement for an emissions cap. However, modeling of the regional CO emissions is used for comparative purposes and compliance is determined by monitoring of the existing system.

Air Quality Conformity of the 2040 RTP

The Tucson area continues to be in attainment with the health standard for CO under the LMP. The region currently monitors levels that are less than a quarter of the standard. Improved emission standards and newer vehicle fleets have helped to significantly reduce the CO emissions in the region. These low readings serve to reinforce that CO is no longer considered a health issue in the Tucson metropolitan area.

The following mobile source emissions control measures in the CO LMP for the TAPA are currently in effect:

- Federal Motor Vehicle Control Program
- State Vehicle Emissions Inspection Program
- State Oxyfuels Program
- PAG’s Travel Reduction Program including the RideShare Program
- Pima County Department of Environmental Quality’s Voluntary No-Drive Days Program

These programs represent the permanent and enforceable commitments (as required under § 107(d) (3) (E) (iiii) of the CAA) that assist the region in achieving attainment status and/or will help keep the area in attainment.

The regional CO emissions impact from motor vehicles was analyzed for the 2040 RTP projects. Outputs from the travel demand forecasting model, and the air quality model, MOBILE6.2, were utilized by PAG air quality planning staff to estimate the CO emissions from motor vehicles for the start year, as well as the 2040 scenario for the transportation network, using local data. The MOBILE6.2 model takes into account regulatory changes that affect the outputs, including changes to tailpipe emissions standards and fuel sulfur content.

Under the CO LMP, regional emissions analysis for CO is not required in determining conformity of transportation plans and programs in the TAPA, but serves as a guide to the region for future air quality planning. Monitored CO levels continue to remain well below the EPA health standards and, as outlined in the CO LMP, TCMs will continue to be implemented.

The following page shows a summary table of the modeling results (Table H). Tier 2 emissions standards and fleet turnover result in an overall reduction of emissions per vehicle. However, with the significant increase in VMT from 2010 to 2040, CO emissions are projected to increase.

Other Pollutants of Regional Concern

In addition to monitoring CO levels, air quality levels for other pollutants are monitored on a regular basis by PDEQ for adherence to the NAAQS. Those pollutants include the following:

Ozone: The Tucson region is in attainment with the current health standard for ozone. However, the U.S. EPA’s proposed revisions to the ozone NAAQS (published in January 2010) are more stringent than the current standards and will likely place the Tucson region in nonattainment. Ozone is formed by a complex set of chemical reactions between two ozone precursors: volatile organic compounds, also known as hydrocarbons, and oxides or nitrogen in the presence of sunlight. On-road vehicle emissions are sources of both precursors.

Particulate Matter (PM): The Tucson region is currently in attainment for both fine and coarse PM. Tailpipe emissions and dust from paved and unpaved roads are sources of PM. The region engages in outreach, education and increased enforcement activities to ensure compliance with the local regulations.

Other Air Pollutants: The other common pollutants measured in Pima County are nitrogen dioxide and sulfur dioxide and both remain well below their respective health standards.

Summary

Nationally, CO concentrations have consistently declined over the past 20 years, despite increases in VMT in the United States. Similar trends for CO have been seen in the PAG region; however, the pollutant of concern to this region is ozone, with concentrations currently near the health standard and likely to exceed the EPA’s proposed standards.

In order to ensure compliance with the federal health standards, continuing current programs to reduce vehicle miles of travel, and promoting the use of alternate modes of transportation and clean fuels, will be an important regional component for maintaining healthy air.
We must preserve our air quality.

**TABLE H – CO Emissions Modeling Results of the 2040 RTP**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Vehicle Miles Traveled (miles per day)</th>
<th>Average Freeway Speed (miles per hour)</th>
<th>Average Arterial Speed (miles per hour)</th>
<th>Regional CO Emissions (tons per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>28,504,874</td>
<td>54.9</td>
<td>33.5</td>
<td>340</td>
</tr>
<tr>
<td>2040</td>
<td>53,203,239</td>
<td>44.8</td>
<td>31.0</td>
<td>368</td>
</tr>
</tbody>
</table>

* Total travel time savings may not add due to rounding.
Dealing with growth and congestion

As a region, implementation of the Regional Transportation Authority plan in 2006 was a step toward keeping transportation infrastructure and transit services on pace with growth and demand. However, the region expects an approximate 80 percent population increase by 2040. With such a growth level, simply maintaining the existing transportation system will not be enough to meet the region's future transportation needs. By 2040, vehicle trips are expected to increase by over 75 percent. More people will travel in different ways around the region: walking, bicycling, riding the streetcar or bus system, driving alone or in carpools. More trucks will be delivering goods to households or businesses.

This huge anticipated growth means that projects planned in the 2040 RTP will not eliminate congestion and may not even significantly improve beyond the congestion we already experience today. However, proposed plan improvements are likely to reduce the rate of growth of congestion and improve our travel experience compared to what would occur were there no such transportation system improvements made.

Traffic Modeling

We use modeling projections to assess how our recommended plan is expected to perform. The model addresses how much traffic is generated within each area of town, based on land use, population, employment, major destinations and other transportation data.

Modeling statistics reflect average daily travel regionwide. As a result, congestion in urban activity areas is frequently underestimated, especially during peak travel times. Peak hour travel reflects the majority of travel to and from work trips. Regional peak hour data indicates that a sharp morning peak occurs from 7:30 a.m. until 8:15 a.m. Vehicle traffic begins to increase midday at about 1:30 p.m. and continues to gradually rise through the evening peak period occurring from 4:30 p.m. until 5:45 p.m. The time-period with the highest average traffic volume is typically weekdays between 5:00 p.m. and 5:15 p.m.

Extremely severe congestion represents roadway conditions with travel at, or nearing, a standstill. Frequently roadways may operate well during most of the day, but have heavy, severe, or extremely severe congestion levels during specific times of the day. Every mode of travel has limitations on how many people can use any given sidewalk, bikeway, transit route or roadway before the effectiveness or attractiveness diminishes.

Seasonal shifts in traffic volume may occur during the school year and periods marked by winter visitors arriving in the early winter and leaving in March or April. Holiday travel demand places a heavy demand on corridors serving regional malls, and popular recreation and entertainment activities contribute to intermittent, but severe, congestion at times.

MAP L – Morning Traffic Congestion

![2040 Tucson Metro Traffic Congestion Map](image-url)
We need to plan for increased travel.

**Modeling the No-Build Scenario**

The process that looks at the impacts of growth in the area if no new transportation improvements were made is called the “No-Build” analysis. As might be expected, Vehicle Hours Traveled (VHT) and Vehicle Miles Traveled (VMT) under a “No-Build” scenario both go up dramatically.

The table to the right illustrates the expected change between the year 2010 and the year 2040 for the number of vehicle hours and vehicle miles traveled on an average weekday if no new capacity roadway projects were built. It should be noted the “No-Build” scenario assumes that already committed capacity projects will be built. Committed projects are those included in the region’s current Transportation Improvement Program and in the Regional Transportation Authority plan approved by Pima County voters in 2006.

The maps below show what vehicle congestion levels would look like on the existing street network in 2040 if no other capacity transportation projects were built.

Roadways shown in red are projected to approach full capacity and thus experience the highest levels of congestion and delay. No-Build modeling results indicate that an estimated 16.5 percent of the regional transportation network would experience severe or heavy congestion by the year 2040 unless the region responds to these future projected needs.

###TABLE I – Vehicle Hours and Vehicle Miles Traveled: No Build Analysis

<table>
<thead>
<tr>
<th></th>
<th>YEAR 2010</th>
<th>YEAR 2040 NO BUILD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday Vehicle Hours Traveled (VHT)</td>
<td>661,500</td>
<td>1,452,008</td>
</tr>
<tr>
<td>Weekday Vehicle Miles Traveled (VMT)</td>
<td>25,225,552</td>
<td>44,416,934</td>
</tr>
<tr>
<td>Vehicle Hours (in Minutes) Traveled per Person</td>
<td>36</td>
<td>46</td>
</tr>
<tr>
<td>Vehicle Miles Traveled per Person</td>
<td>22.7</td>
<td>23.4</td>
</tr>
</tbody>
</table>

*Typical Weekday VHT and VMT (excludes travel on local streets)*

*Source: PAG Regional Transportation Model, May 2010*
Title VI Analysis
A Title VI analysis was performed to determine the impact of 2040 plan improvements on protected populations. The Federal Highway Administration and the Federal Transit Administration are committed to ensuring that Title VI of the 1964 Civil Rights Act is carried out for federally funded programs. Within this context, PAG recognizes the importance of transportation to all residents in the region and works toward the fair distribution of benefits and burdens of transportation improvements.

The Title VI analysis assesses the relative distribution of costs and benefits of transportation projects upon various segments of the community. The Title VI analysis is conducted using sophisticated travel modeling software and GIS mapping software to determine the average travel times for all populations. Travel time refers to how long it takes the average person to travel by auto on a home-based vehicle trip (a trip that starts or ends at home).

PAG also performs a Title VI analysis on projects included in the five-year Transportation Improvement Program (TIP) while the jurisdictions conduct project-specific assessments during project development. Each jurisdiction or project sponsor is responsible for Environmental Justice and Title VI compliance as part of the planning and construction of its individual projects including “just” compensation and relocation assistance for properties that qualify due to the impacts of the individual projects.

The analysis shows that, when compared to a baseline travel time of all residents in the urban portion of the county (labeled as “all”), the protected populations are expected to experience comparable travel time benefits.

In the analyses, the average travel time improvement “with the RTP projects” compared to “without” was 1.2 minutes for everyone in the region. All protected classes experienced an improvement “with the RTP projects” compared to “without” in travel time between 0.2 and 1.9 minutes.

Title VI of the 1964 Civil Rights Act (42 U.S.C. 2000d-1 and related regulations) states, “no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.”
Title VI Analysis
Hispanic Population

2040 RTP Proposed Roadway Projects

Title VI Maps
Title VI maps graphically represent the location of the projects in comparison to the location of various concentrations of protected populations. While the mapping of the projects doesn’t take into consideration the travel time impact of the projects, this visualization of the proximity of the projects acts as a good “common sense” double check to make sure there is an appropriate distribution of projects across the region in relation to protected populations. This is an example of a 2040 RTP Title VI map. There are additional maps located in Appendix 4 and available on the PAG Web site.
Building a quality Arizona (bqAZ)

The Arizona Department of Transportation (ADOT) recently completed a long-range collaborative planning effort known as “Building a Quality Arizona” or bqAZ. The bqAZ plan looks forward to 2050 to assess how Arizona as a whole would address its transportation challenges. Each region within the state (see Map O) had its own planning process and bqAZ strove to bring these plans together to make a seamless transportation network for the state. Unlike the PAG 2040 RTP, bqAZ is not fiscally constrained. That means that bqAZ could include any, and as many projects that areas around the state felt were necessary to address mobility challenges statewide.

Because the timeframes of the PAG 2040 effort did not mesh perfectly with the bqAZ timeline, PAG’s input on bqAZ incorporated a variety of information from past PAG studies (such as the adopted 2030 RTP and the PAG “Loop Road” study), input from stakeholders at bqAZ events held in southern Arizona and the PAG 2040 RTP Task Force. For more information on bqAZ and the recommendations made for the Pima County portion of bqAZ, please go to the bqAZ Web site at http://www.bqaz.org/

ADOT is following the bqAZ effort with development of a fiscally constrained plan called “What Moves You, Arizona?” that is now under development.

### Scenario Pima

PAG provided ADOT with a preferred scenario for bqAZ, called Scenario Pima, which includes over 900 miles of roadway improvements and almost 650 miles of transit improvements as shown in the chart above.

Certain issues and challenges were deemed critical for ADOT to address in its long-term planning process for Pima County. Many of these challenges centered on the enormous growth that is projected to occur throughout the Sun Corridor and the process that would be used to address the growth at the regional and state level.

The 2040 RTP bqAZ Working Group understood the need for more routes and connectivity between Pima and Pinal counties and was aware that the roadway and transit improvements it recommended in Scenario Pima will not solve the traffic congestion projected for the megapolitan area emerging between Tucson and Phoenix know as the Sun Corridor. In order to address the many unresolved planning issues between Pima, Pinal and Maricopa counties, the 2040 RTP bqAZ Working Group developed policy recommendations and stressed that interregional planning should be facilitated by ADOT so that the state can move beyond attempts to solve the major transportation challenges at the local level.

Since the policy recommendations were finalized, PAG Regional Council has taken steps to formalize PAG’s coordination and information sharing efforts with the regional planning agencies from central Arizona and Phoenix (Central Arizona Association of Governments and Maricopa Association of Governments) by signing a resolution to support joint planning coordination in the Sun Corridor and hold meetings with representatives from those agencies.
Policy Recommendations

The following Policy Recommendations were developed by the 2040 RTP bqAZ Working Group.

1. **Pima / Pinal County Planning.** ADOT should facilitate coordinated planning efforts, not only between Pima and Pinal counties, but also between Pima, Pinal and Maricopa counties. These planning efforts should include discussions of roadways, transit, freight and passenger rail, land use and the effects of the infrastructure growth on environmentally sensitive lands.

2. **Addressing Projected Congestion along the Sun Corridor.** Traffic projections for the Sun Corridor show significant congestion on roadways within and between Pima, Maricopa and Pinal counties. Further congestion relieving options are needed and it is clear that the major interregional transportation challenges that are evolving within the Sun Corridor cannot be solved at the local level or in a regionally focused and fiscally constrained planning effort such as the 2040 RTP. ADOT should join with PAG and the other MPOs in the Sun Corridor to initiate additional planning that will actively address the projected congestion. Planning efforts should consider a full range of congestion-relieving options, from technology and operational improvements to expansion of alternate modes as well as construction of additional interregional roadway arterials. An added planning focus should address how needed improvements could be developed in an environmentally sensitive manner.

   It should be noted that Pinal County’s bqAZ recommendations include a La Cholla Corridor extending from Tucson to Oracle Junction and a highway to connect with a potential I-10 bypass loop west of downtown Tucson, neither of which is included in Scenario Pima. Environmental and ecological impacts of the roadway projects along the proposed alignments need to be comprehensively analyzed and publicly reviewed prior to projecting the roadway for Pima County.

3. **Alternative Modes of Transportation.** ADOT should include accommodations for bicycles and pedestrians on new roadways and create user-friendly connections between alternative modes and roadways throughout Pima County.

4. **Light Rail Transit and Commuter Rail Transit on Oracle Road.** Light rail transit on Oracle Road between downtown and Tangerine Road is a regional priority to reduce local congestion along one of Tucson’s major north-south corridors. In order to address some of the Pima/Pinal traffic congestion, commuter rail transit is recommended between Tucson and Florence. The commuter rail and light rail could share the same track and allow long-distance commuters to switch from one transit service to the other. Bus rapid transit is assumed to precede light rail transit and commuter rail transit within Pima County until construction of the rail lines are completed.

5. **High Capacity Transit Recommendations.** ADOT should participate in PAG’s adopted HCT recommendations for Pima County.

6. **Rail Planning.** The PAG region needs to be an active player in rail and air planning between Pima, Pinal and Maricopa counties. At least three freight rail lines are needed through the Tucson metropolitan area, with a potential fourth line. There would be the two current interstate freight lines, plus a new passenger rail line and a potential new Tucson-Phoenix freight line. The additional freight line could take some truck traffic off of I-10 and provide for faster freight movement between Tucson and Phoenix as well as within Pima County. ADOT should lead inter-regional discussions on future freight movements and continue conversations about high-speed rail between Tucson and Phoenix.

   The region does not support the development of a freight line through Pima County along SR 85 to Lukeville. Such a rail line would affect environmentally sensitive lands in Organ Pipe National Monument and draw economic activity away from the county’s primary economic generator, the Tucson region.

7. **Wildlife Crossings and Infrastructure.** Maintaining habitat connectivity for wildlife is critical to transportation planning in Pima County. ADOT should include wildlife crossing structures in the bqAZ plan. The wildlife crossings accommodate large and small mammals and facilitate linkages between protected wildlife areas such as the Tortolita and Santa Catalina Mountains. Four wildlife crossing structure locations are shown on the bqAZ Scenario Pima map.
The bqAZ Scenario Pima Transit map shows an interconnected system that provides a wide variety of bus and rail options to travelers in the region.

Wildlife Crossing is located 25 miles to the west.
MAP Q – bqAz Scenario Pima Roadway

The bqAZ Scenario Pima Roadway map shows improvements to major roadways throughout the region and new roadways in high growth areas.

Wildlife Crossing is located 25 miles to the west.
Moving Forward

Mobility matters throughout our lives. Each day, the residents of our community, from school student to retiree, from office worker to soccer mom or dad, from retail salesperson to truck driver and everything in between, all need a transportation system that they can rely on today, tomorrow and in the future.

Transportation also affects the character of our community and the quality of our lives. We want our transportation to be safe and convenient, not dangerous or frustrating. We want accessibility provided to the myriad of activities that make up our lives at any one point in time, activities that are different for every person and changing over time in each person’s life.

Our transportation needs influence how we spend our money. The gasoline tax and RTA sales tax are only a part of what each resident pays to help support development and maintenance of the system. Additionally, transportation efficiency impacts the price of goods and services.

The 2040 RTP was developed to help the community move forward by visualizing and facilitating development of an integrated, multi-modal transportation system that serves all our residents and makes our community a better place to live.

Key components that ensure the 2040 RTP will contribute to our transportation future include:

- Development using a broad public involvement program to determine needs and issues.
- Commitment to delivering projects and honoring past commitments, including additional funding as needed for TIP and RTA projects.
- Increased funding for system maintenance.
- Increased funding for transit and other alternate mode improvements.
- Roadway improvements that focus on key regional mobility corridors and specific jurisdictional needs.
- Increased emphasis on lower cost operational and efficiency improvements to address congestion.
- More transportation options for all segments of the population, including transit dependent and low income groups.
- Enhanced travel demand management activities.
- Environmental mitigation and context sensitive design.
- Performance measurement to assess how well we are doing.
- Focus on safety improvements and programs.
- Growth of alternate fuels and alternate sources of energy, including needed infrastructure.
- Climate change adaptation and mitigation strategies.
- Development of implementation strategies to guide the vision.
- A regional vision in partnership with all jurisdictions in the area.

- Improving daily average travel 38% by reducing the amount of time spent travelling under congested conditions compared to not building planned improvements.

An Efficient Transportation Network for all Users

The 2040 RTP recognizes the importance of improving all modes of travel within the region — vehicular, transit, bicycle, pedestrian and aviation — in order to relieve stress on the region’s roadways, improve air quality and promote healthy living. The 2040 RTP Task Force dedicated a percentage of all available funding to each mode based on regional needs, trends and public input. The modal split for the 2040 RTP is similar to the breakdown in the RTA plan, which was approved by voters in 2006.

In order to ensure the most efficient transportation system possible, PAG will help facilitate project implementation and build upon the region’s Travel Demand Management program. TDM strategies work to reduce the number of single occupancy vehicle users by promoting carpools, vanpools and transit for commuting to work and other trips. PAG uses sophisticated travel modeling software to evaluate the impact of the 2040 RTP projects on congestion and the region’s RTP.

Project List

The 2040 RTP project list is a detailed list of roadway, transit, bicycle and pedestrian projects along with programs and projects to improve mobility and safety, provide transportation for persons with disabilities and other services. See the included Project List, Appendix 2.

2040 RTP Reserve List

The Reserve List of the 2040 RTP identifies additional transportation projects that were deemed necessary for the region but for which no funding is available. PAG and its partner jurisdictions will continue to seek additional funding along with new funding sources so that these projects and programs can become a reality in the future. A complete list of Reserve List projects for the 2040 RTP can be found in Appendix 3.

Additional Information

For more information about the 2040 RTP visit the PAG Web site at www.PAGnet.org or call (520) 792-1093.
plan to work and create a better future.