Texas A&M Transportation Institute

Understanding Congestion Context and a Tool to Help Choose the Right Mitigation Strategies

Final Report

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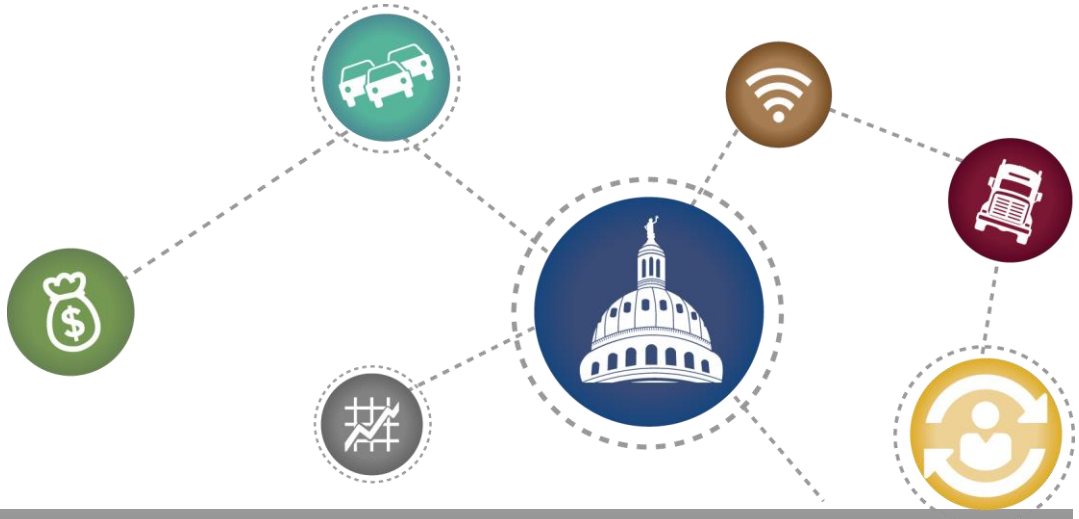

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Understanding Congestion Context and a Tool to Help Choose the Right Mitigation Strategies

Texas A&M Transportation Institute

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Executive Summary

Congestion Mitigation Strategies

Cities of every size (and even some rural areas) face growing traffic delays, increasing travel time variability, and overall longer trip times, which makes traveling more frustrating and difficult for everyone. Many congestion solutions focus on a single location, a single type of problem, or a single idea that then generates few or similar solutions. The discussion often shifts to one strategy to fix traffic congestion and mobility. While this in general may help, taken out of context, this one strategy may not solve the systemic and underlying issue (and may even worsen the problem).

For example, some cities have used highway-widening strategies exclusively that, in certain circumstances, no longer resolve congestion by themselves. This solution shortfall may be due to incorrect analysis techniques that only focus on the peak hour of the improved roadway; the larger effects are usually on parallel roads and times outside of the peak morning and evening traffic hours and are often unanticipated.

While researchers have identified over 100 individual strategies to address congestion and mobility, the context in which these work best is often lost. Through misunderstanding of the strategy itself, the benefits it provides, or where it should and should not be used, many strategies simply cease to be discussed. Practitioners are left with limited options.

Many of these strategies, when paired with their complements and used in the proper context, can provide synergistic benefits that save time for travelers and money for taxpayers. Many of the added benefits may also increase economic productivity, improve quality of life, or encourage healthy living.

Methodology and Tool

What is needed to better address congestion then is recognition of the complexities of a region's transportation goals, the importance of the context in which the problem is being addressed, the many potential solutions under the given context, and the fact that many of these strategies work better when combined with others.

Researchers at the Texas A&M Transportation Institute have developed a methodology and tool to identify congestion and mobility strategies that work well together in their appropriate context. This tool will aid policy makers in shaping the broader transportation discussion, assist practitioners and planners in addressing congestion in their regions, and support the general public in their understanding of the context and potential solutions for travel issues. This tool can be found at tti.tamu.edu/policy/what-strategies-are-best-for-you.

How transportation planners, engineers, and policy makers—even the general public—approach fixing traffic and travel problems matters significantly because the way choices are made now affects what options can be considered in the future. By carefully examining the created

congestion mitigation and mobility packages, policy makers will gain a broader and deeper knowledge of the options available to effectively meet existing and future transportation and cost goals. Researchers anticipate that this tool will encourage healthy education, broaden the discussion, and ultimately take advantage of appropriate strategies when and where they can be successful.

Introduction

Complexity and Unintended Consequences

Cities of every size face growing traffic delays, increasing travel time variability, and overall longer trip times, which make traveling more frustrating and difficult for everyone. Many congestion solutions focus on a single location, a single type of problem, or a single idea that then generates few or similar solutions. When solutions are built to remediate some of these congestion or mobility woes, they often create unintended consequences that may improve one specific aspect but may hurt or hinder travel on a different route, by a different mode, or during another time period. Regardless, transportation problems are here to stay, and they are much more complex than they first appear.

Determining Which Strategy to Use

How transportation planners, engineers, and policy makers—even the general public—approach fixing traffic and travel problems matters significantly because the way choices are made now affects what options can be considered in the future. Different perspectives may generate different questions:

- From a theoretical perspective, should one promote more travel, more efficient travel, more modes of travel, or some combination?
- From a policy perspective, what is the optimum balance among the various freight and passenger modes, and how can new technologies be leveraged to get more return on investment?
- From a practical perspective, what is the right combination of improving existing (predominantly automobile) infrastructure, developing alternative modes, creating more travel and freight delivery options, and developing denser mixed-use buildings?

One strategy to fix traffic congestion and mobility in general may help but, applied in the wrong context, may not solve the systemic and underlying issue (and may even worsen the problem). For example, some cities have used highway-widening strategies exclusively that, in certain circumstances, no longer resolve congestion by themselves. This solution shortfall may be due to analysis techniques that only focus on the peak hour of the improved roadway; the larger effects are usually on parallel roads and times outside of the peak morning and evening traffic hours and are often unanticipated.

Other cities invest in expansive bicycle networks in the name of congestion reduction without consideration of the city's broad mobility needs. While bicycle and pedestrian improvements are part of a complete and long-term solution, focusing too much on one solution while ignoring others or its integration with a transportation system ignores the travel needs of the broader community.

Transportation researchers and practitioners have identified over 100 different strategies to address congestion and mobility, but used inappropriately or out of context, even a proven strategy may not provide noticeable benefits.

Methodology and Tool

What is needed to better address congestion, then, is to recognize the complexities of a region's transportation goals, the importance of the *context* in which the problem is being addressed, that there are many potential solutions under the given context, and that many of these strategies work better when combined with others.

Researchers at the Texas A&M Transportation Institute (TTI) have developed a methodology and tool to identify congestion and mobility strategies that work well together in their appropriate context. This tool will aid policy makers in shaping the broader transportation discussion, assist practitioners and planners in addressing congestion in their regions, and support the general public in their understanding of the context and potential solutions for travel issues.

In This Report

This report discusses:

- The fallacy that a single strategy can fix congestion problems.
- The importance of using the right strategy for the context of the congestion problem.
- The tool developed in this research.
- A framework for custom context scenarios based on different context attributes.
- Examples of the tool in action.
- The limitations of the tool and future development.
- The conclusions drawn during this research.

The Fallacy of a Single Strategy

Testing Strategies

When transportation policy and projects are considered, they are often discussed in terms of single strategies that embody an effort to solve a particular problem. A single strategy becomes popular due to its promise of fixing traffic and is discussed at both the policy level (how can this be facilitated, encouraged, or funded?) and the practitioner level (what can we do now?). This lone strategy becomes a bastion for congestion reduction (whether overtly stated or not). The *tone* of the discussion shifts to imply that it may be a congestion panacea, placing ample pressure on the topic.

Modest Results

Some effort or pilot project happens, and if the results are modest, the hype dies. While some efforts may continue to push the strategy, the conversation changes to, "We have tried that, but it did not work."

This cycle repeats itself at all levels: policy makers, practitioners, and even the general public. It also occurs with many different strategies—ramp metering, flexible work options, innovative intersections, managed lanes, commuter rail, and bicycle education and enforcement just to name a few—but it is a symptom of the process and not of any particular strategy.

Good Results

The cycle can also work in reverse when a particular strategy works better than planned and gets locked into a one-strategy-fits-all cycle. This mentality can, at times, be more detrimental to ensuring wise transportation decisions than dismissing a strategy.

Comprehensive Results

Some congestion reduction efforts are more comprehensive but are prone to fall into the same cycle, applying the same strategies in different contexts. In this case, decision makers begin to associate certain strategies with inappropriate contexts and lose interest or turn against the entire idea.

Bicycle and pedestrian improvements provide a useful example. While these improvements are appropriate under certain scenarios, one common attitude is to believe that bicycle and pedestrian improvements are meant to be placed on freeways. That is simply not the case, but a failure to emphasize context can raise concerns and cease discussion.

Federal Highway Administration Guidance

The Federal Highway Administration (FHWA) suggests that congestion reduction efforts should adhere to two central principles (*1*):

1. "Strategies should be targeted at specific problems. Knowing the nature and extent of congestion problems in an area or corridor is the first step toward a solution; and

2. Strategies should be used in combination, rather than individually. Because many strategies are complementary, using them together provides synergy."

When congestion mitigation and mobility strategies are targeted at a specific problem within the bounds of an appropriate context and used in combination with complementary strategies, they are more powerful (and sometimes less expensive) than they would be in their own right. There is no single fix for congestion. The goal is to understand what combination of improvements will yield the biggest return on investment.

Linking Strategies in the Tool

The tool developed in this research project helps achieve this goal by linking complementary and dependent strategies with one another. Some congestion mitigation and mobility strategies work well when used with their complements. Others may not work at all unless they are used in tandem with their dependents.

The Case for Context

Definition

Context is crucial for understanding whether or not a particular strategy is both useful and appropriate for addressing a transportation issue. The strategy must be:

- Useful in addressing the transportation goals and problem to be solved.
- Appropriate for the size, scale, and task at hand.

Strategies in Context

Strategies that may work in one location may not achieve the same benefit in a different context. The important element is that all congestion reduction and mobility improvement strategies work best when they are *conceptualized*, *discussed*, and *deployed* in the correct context.

For example, separated bicycle and pedestrian facilities may be considered along freeway rights of way to improve regional network connectivity and recreational use, but should not be considered for congestion reduction on freeways. As a congestion reduction strategy, bicycle and pedestrian facilities work best in urban, mixed land-use areas along or parallel to busy minor arterials and collector streets (*2*). These facilities provide the most congestion and mobility benefit when they allow users to shift short trips to another mode or facilitate a more robust use of transit.

Confining any policy or use discussion within the context of how a particular strategy (or set of strategies) works best and where it works best will produce a productive understanding of how a state or region's transportation and mobility goals can best be achieved.

Context Scenarios

TTI researchers developed *context scenarios* based on user-specified conditions to identify a particular set of strategies (i.e., a mitigation and mobility package). These context scenarios ensure that congestion mitigation and mobility strategies are appropriate for the given context.

The Tool

In an effort to facilitate a broader congestion mitigation and mobility discussion, TTI researchers developed a web-based tool (tti.tamu.edu/policy/what-strategies-are-best-for-you) that lets users take context and transportation goals into account to produce a custom package of congestion mitigation and mobility strategies for the specified area.

Description of Strategies

TTI has developed an extensive library of information, examples, and attributes on over 100 congestion mitigation and mobility strategies (*3*). Each strategy is classified according to the following facets to help educate and inform policy makers, practitioners, and the general public:

- Relative cost.
- Hurdles for implementation.
- Target market (areas where the strategy works best).
- Implementation examples where the strategy has succeeded or failed, with a discussion of why it succeeded or failed.
- Benefits information.
- Other valuable resources.

Each strategy topic has been written and reviewed by one or more subject matter experts in that field, drawing from diverse sources and years of expertise.

Relationships between Strategies

Building upon this expansive resource, researchers and subject matter experts created a series of relationships between each strategy, noting which strategies are necessary for a particular one to work or which complement another to maximize benefit. This created a matrix that connects individual strategies, as noted in FHWA's second recommendation of capturing synergy.

Tool Input: Context and Goals

The tool allows users to define the context and select broader transportation goals in order to create the customized mitigation and mobility strategy packages. Users create context scenarios based on:

- Population size.
- Expected growth rate.
- Development character (land use patterns).

Once the context scenario is set, users may then select one of many broad transportation goals that their area is pursuing.

Tool Output: Mitigation and Mobility Package

Based on the relationship matrix, the user receives a customized congestion mitigation and mobility package usually containing a mix of suggested strategies. Using the web interface, users can then explore each strategy and any complementary strategies that work well with those suggested.

The package also includes strategies that regions should be aware of even if they are not implementing these strategies now. For example, a fast-growing small town might want to consider efforts that apply to larger cities as they prepare to accommodate that growth.

Framework for Context Scenarios

Congestion and mobility strategies should be applied with consideration of the local context. While some strategies are broadly applicable in many regions, others are only applicable under certain geographic or economic conditions. Ultimately, a set of strategies must align with the needs and goals of a city and region.

Researchers assembled a framework for custom context scenarios based on different context attributes (e.g., small, medium, and large cities; rural, suburban, and urban contexts; and transportation goals). The tool uses these attributes to describe the context and local needs of cities and rural areas.

Researchers identified three categories of attributes to create the appropriate context scenarios:

- **Area type**—accounts for the physical attributes of the area, including population size, expected growth rate, and development character.
- **Transportation focus**—sets the policy-related attitude toward transportation by listing goals or areas of concern that are a priority for the area. For example, a city that is fully built out and has limited space to increase roadway capacity may focus on providing more travel options, whereas a growing exurban town may want to improve its connectivity to larger economic hubs.
- **Leadership**—identifies a local or regional agency, employers, or individuals in the region that might be poised to lead efforts to achieve transportation goals.

While many other attributes can be used for defining the appropriate context, researchers had to balance a diverse set of contexts with simplicity to increase the tool's usability. After assessing all the options, these categories stood out above the rest to achieve the tool's goal while remaining simple enough to use.

This tool was created for Texas but also has broader national uses.

Area Type

Texas is a diverse state that includes small, rural communities and some of the largest cities in the nation—each with its own unique character. Congestion reduction and mobility strategies that may apply in parts of Houston may not be appropriate for Wichita Falls. While the unique character of each Texas city and region cannot be summed up in a few statistics, researchers used three aspects to classify area types into broad multidimensional categories:

- Population size.
- Expected growth rate.
- Development character.

Population Size—Are You in a Small, Medium, Large, or Very Large City?

The population in a city directly contributes to the level of congestion. Individuals and households travel to reach work, school, shopping, and other community activities. The nature and extent of congestion can vary greatly in cities of different sizes.

Texas cities (and, more broadly, U.S. cities) can be divided into four broad population size groups:

- **Very large**—Very large cities have *more than 500,000 residents* and contain schools, jobs, and activity centers that are used by many more from the surrounding urban area. Each very large city is also the principal city of a metropolitan region—an anchor for surrounding cities, towns, and regions. Very large cities are major economic centers, with one or more airports and more than one significant activity center other than downtown. Texas' very large cities are growing in population although recently not as fast as their surrounding neighbors. Texas' very large cities generally include a densifying urban core surrounded by suburban neighborhoods. These cities are the most likely to offer large-scale transit service.
- **Large**—Large cities have *between 200,000 and 500,000 residents*.
- **Medium**—Medium cities have *between 50,000 and 200,000 residents*.
- **Small**—Small cities have *fewer than 50,000 residents* and may include significant rural areas. According to the Texas Demographic Center, at least 24 percent of Texas' population lives in places with less than 50,000 people (*4*). This means that millions of Texans live in the state's rural communities.

Table 1 gives examples of the four population size groups.

Table 1. Examples of Urban Area Population Categories.

Very Large— More than 500,000 Residents	Large— between 200,000 and 500,000 Residents	Medium— between 50,000 and 200,000 Residents	Small— Fewer than 50,000 Residents
Austin	Brownsville	Amarillo	Galveston
Dallas	Corpus Christi	Bryan/College Station	Granbury
El Paso	Denton	Midland	Lockhart
Houston	Killen	Odessa	Nacogdoches
McAllen	Lubbock	Port Arthur	Uvalde
San Antonio		San Marcos	
		Tyler	
		Waco	
		Wichita Falls	

Source: (*5*)

Expected Growth Rate—How Is Your City Changing?

Cities change in response to population growth; they base much of their transportation planning on growth assumptions and scenarios in addition to other factors.

Texas cities have been among the fastest growing in the United States in recent years (*6*). While as a whole the state is outpacing growth in the United States (*7*), the population is changing at different rates in cities across the state. Some Texas cities are experiencing high growth, others are not growing, and some have had decreases in population. All of these trends can influence the type of congestion and mobility strategies that apply to a particular location. While population growth provides only a high-level understanding of the changes and conditions in a particular city, it does provide a useful metric for the direction a city is moving in.

Researchers created four population growth tiers, with anything less than zero defined as negative growth and growth over 2 percent annually being high (Table 2). Growth ranges were based on Census population and FHWA vehicle miles traveled growth rates for U.S. urban areas from 2008 to 2015.

Table 2. Urban Growth Rate Classifications.

Growth Range	Annual Percent Change
High growth	Greater than 2%
Steady growth	1–2%
No or low growth	0–1%
Negative growth	Less than 0%

Texas grew at a rate of 1.5 percent per year between 2010 and 2014, based on population estimates from the Texas State Data Center. Texas cities and towns (as defined by the Texas Demographic Center, excluding those with fewer than 200 residents as outliers) ranged from a low of nearly 3 percent annual decline to over 30 percent annual population growth in a few small towns.

Development Character—What Does Your Development Look Like?

Cities range dramatically from large metropolises to small towns. Between different cities and within single regions, the patterns of development help place each region on a spectrum from urban to rural. These patterns of development can include:

- Housing patterns.
- The street network.
- Density gradients.
- The ratio of natural to built features.

Urban Transect Model

While density (population, residential, job, etc.) alone is often used to characterize development patterns, TTI researchers determined it falls short of explaining what an area or corridor may actually look like (and corridors may dramatically change from one mile to the next). Therefore, researchers chose to use the urban transect model (Figure 1) to better capture the broad diversity of development patterns (*8*).

Source: (*8*)

Figure 1. Urban Transect Model.

Planners sometimes use an urban to rural transect to characterize this range of development patterns. Each zone varies in its natural, built, and social characteristics. Some congestion reduction strategies are more appropriate for higher-order zones than others. For example:

- Transit service tends to have better success in areas with higher population densities because such areas provide a larger pool of households from which transit can attract riders.
- System modification strategies, such as intersection improvements, can have positive impacts on congestion and mobility in many zones and can be implemented in narrow rights of way.

Zones

For this study, researchers used a set of five zones to classify the range of local conditions. The T1 zone generally does not warrant congestion mitigation except in state or national parks or other very specific circumstances. Researchers combined zones T4 and T5 due to their similarity in Texas, though the tool can distinguish between the two if necessary.

- **Rural (T2)**—Rural areas are low density, are likely to have some farm-based employment, and have more natural landscape than built environment. Many rural areas do not have robust transit or travel options and benefit the most from land use strategies, capacity expansion, and some system modification.

- **Suburban (T3)**—Suburban areas can exist in cities of many different sizes. While it is difficult to pinpoint exactly what defines a place as a suburb, typically suburban areas have a large proportion of single-family housing, greater separation between different land uses and activity centers, and predominately car-oriented transportation infrastructure. These areas may still require capacity expansion but also benefit from system modification, traffic management, land use strategies, and some transit options.
- **General urban and urban centers (T4+T5)**—Urban neighborhoods and centers have a much higher-density, more mixed-use development pattern and usually greater street network connectivity. This setting provides greater opportunity for transit, bicycle, or pedestrian options.
- **Urban core (T6)**—Urban cores are usually large population or job centers marked by significantly higher residential or employment density. These areas typically are completely built out, limiting major expansion efforts but allowing other mobility options such as transit, pedestrian improvements, travel options, or traffic management.
- **Special districts (SD)**—This zone includes unique areas that require special attention and could include military bases, universities, sports or entertainment complexes, civic space, or airports. While suggestions may be given for these districts, care must be given to how they are assessed.

Transportation Focus

Cities and regions may have identified specific transportation challenges or goals that they want to achieve. Goals should be linked to a community's values and vision for the future. For example:

- In urban areas, transportation and mobility goals may include improving connectivity for economic growth, improving quality of life for an aging population, or controlling congestion and improving mobility.
- In more rural areas, goals may focus on improving connections to markets to stimulate economic growth and catalyze development.
- Other goals likely include improved safety and enhanced connectivity (*9*).

TTI researchers identified the following 10 broad transportation and mobility goals (one has three subparts) that guide the tool to pare down possible strategies to those that are contextually relevant to the area's immediate needs, policies, and goals:

- **Providing more travel options**—seeks to provide travelers, employers, and shippers with varied options, whether by travel demand management or other means.

- **Adding new capacity**—seeks to add base capacity to either a new or existing network. This can include both highway and transit infrastructure.
- **Adding/improving transit**—encompasses all modes and seeks a more robust and multimodal set of alternative options to driving.
- **Doing more with operations/efficient system management**—seeks to improve the system performance of the existing infrastructure by maximizing efficiency.
- **Using active transportation and healthy living**—seeks to encourage walking and cycling, and improves safety by altering space dedicated to traditional modes and accommodating a variety of developmental uses to shorten trips.
- **Embracing technology**—provides ideas for improving the connectedness of travelers and infrastructure through information and includes ideas for preparing for connected or automated vehicles.
- **Improving connectivity**—seeks to increase the movement and flow of commercial goods and services in three areas:
    - Borders and ports—by increasing the efficiency of goods movement through major entry and exit points. This includes quickly moving goods away from busy urban areas to break-bulk facilities.
    - Freight—by facilitating the smooth transition and flow of short- and long-haul freight through traditional interstate or rail routes. This includes a focus on transportation between manufacturing facilities or distribution centers and end users.
    - Business links—by facilitating the efficient movement of services and ideas through traditional commuter routes or between major employment centers.
- **Preparing for an aging population**—seeks to provide transportation solutions sensitive to the needs of a traveling aging population.
- **Improving air quality**—seeks to decrease pollution and increase air quality.
- **Improving safety**—seeks to provide options for increasing safety for all travelers, regardless of mode.

For more information on congestion goals and how to address them, see FHWA's congestion report (*10*).

Leadership

There is also a context for who can implement congestion and mobility improvements. While many commonly view congestion and mobility improvements as a responsibility of the state (or local area), many effective strategies rely upon employers, manufacturers, and commuters to implement on their own. And while state and local agencies can (and should) encourage these practices, the responsibility ultimately lies elsewhere.

For the tool, researchers added a function to help focus strategy packages on two travel types:

- Home-to-work commutes.
- Store/warehouse-to-home/manufacturer trips.

Home-to-Work Commutes

Strategies that focus on moving people (during work commutes) can be implemented by state and local agencies, employers, or the commuters themselves. All of these efforts should be supported by broad policy support at the state and local level.

Agencies can also ask how they can work smarter to move commuters better. This attitude of "How can you help yourself?" or "How can your employer help?" spreads the mobility burden across perspectives and scales, allowing for innovation and imagination to step into the transportation picture.

Store/Warehouse-to-Home/Manufacturer Trips

The same is true for freight. How can the movement of goods be facilitated by all those involved? How can state and local agencies help freight move through the supply chain more efficiently? What can private shipping companies do? And what can manufacturers and stores do for deliveries? Again, the shifting of responsibility across affected users enables more creativity (e.g., using unmanned aerial vehicles for small deliveries).

Examples of the Tool in Action

The two scenarios discussed in this section provide examples of customized congestion mitigation and mobility packages. The tool provides a foundation for the discussion of congestion mitigation and mobility strategies that should be included in the discussion of how to address the needs of a particular area. This approach may not be exhaustive but should facilitate a broader discussion *under the appropriate context* for addressing the transportation goals for an area or city. In both examples, Leadership was not used as it is an optional tool selection.

Scenario 1: Big City, Urban Development

Houston is a large metropolis surrounded by suburban communities (Figure 2). Very few opportunities for capacity expansion exist, especially toward the urban core (inside Interstate Loop 610), which over the past decade has been transitioning into a higher-density urban region. While transit and other travel options are becoming more viable, the area's auto-centric character provides a perfect opportunity to do more with operations and system efficiency—to maximize the efficiency of current investments.

Figure 2. Houston Metropolitan Area.

Tool Inputs

This scenario uses the following inputs:

- Population size: very large.
- Expected growth rate: high.
- Development character: T4+T5—general urban and urban centers.
- Transportation focus: doing more with operations/efficient system management.

Customized Congestion Mitigation and Mobility Package

The model narrows the possible strategies and creates a customized package with a mix of strategies from several categories. In this case, 49 strategies are available due to the selected transportation goal. The package includes the following suggestions for corridors in the area:

- Aggressive incident clearance.
- Managed lanes (high-occupancy vehicle or high-occupancy toll lanes).
- Reconfiguration of ramps.
- Truck lane restrictions.
- Signal operations improvements.
- Active traffic management (ramp metering, variable speed limits, and queue warning).
- Reversible lanes.
- Reduction of construction disruptions.

The package also suggests complementary strategies for the area as a whole, including pricing, land use, active transportation, and transit strategies:

- Parking management systems.
- Improved pedestrian connections.
- Transit fare strategies.
- Form-based zoning codes.
- Redevelopment and infill.
- Special event management.
- Active demand management.
- Truck incentives and use restrictions.

All of these strategies are designed to make the *transportation system as a whole* more efficient with what is already in place *within the given context*. While this list is not exhaustive, it does offer a diverse set of solutions for policy makers, practitioners, and the general public to consider and discern what may be best for their area.

Scenario 2: Rural Community with Aging Population

This second scenario examines a small, rural community either on the edge of a larger metropolitan area or as a regional center for nearby farming and ranching (Figure 3 shows Marfa, Texas, one such area). Many of these communities in Texas and the United States have seen younger generations migrate to larger cities and an influx of retirees. Generally, these bastions of small-town America are struggling to breathe new life into their economies. Those near larger metropolitan areas may market themselves as alternative bedroom communities to attract growth, while those more isolated look to manufacturing for new life. Either way, many of these communities are aging and still deal with mobility and congestion issues.

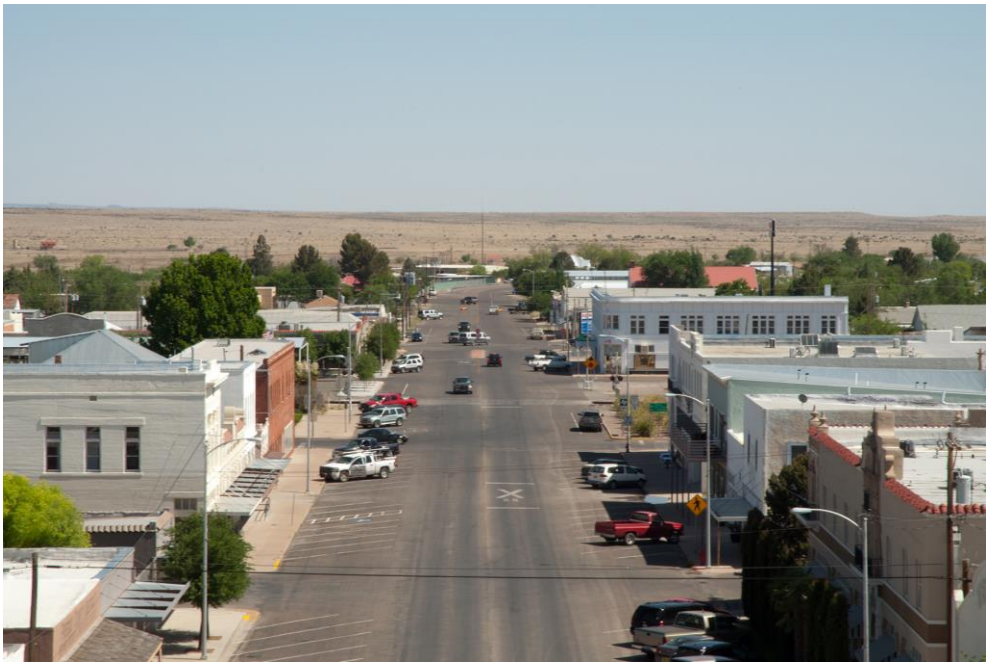

Figure 3. Marfa, Texas, Rural Community.

Tool Inputs

This scenario uses the following inputs:

- Population size: small.
- Expected growth rate: no or low growth.
- Development character: T2—rural.
- Transportation focus: preparing for an aging population.

Customized Congestion Mitigation and Mobility Package

Under this scenario, fewer strategies can be deployed (13 total) but are focused on both preparing a small town for an aging population and also laying appropriate transportation and mobility foundations for future growth. The package includes these suggestions for small rural communities:

- Intersection improvements.
- Demand-response transit.
- Real-time ridesharing.
- Bicycle and pedestrian connections.
- Pay-as-you-drive auto insurance.
- Roundabouts.
- Smart growth design.
- Telecommuting.
- Rural transit.
- Bicycle and pedestrian education and enforcement.
- Compressed work weeks.
- Flexible work hours.
- Complete streets.

All of these strategies are designed to encourage healthy aging and support the transportation needs of a growing population segment while simultaneously preparing for growth and renewal. While this is not an extensive list (an examination of complementary strategies would be beneficial), it does offer a diverse set of solutions *under the correct context* for policy makers, practitioners, and the general public to consider.

Limitations and Future Development

While the tool is designed to encourage discussion and education at the policy, implementation, and public levels, the tool falls short of customizing packages to such a degree as to make specific recommendations. While this would be helpful, the breadth of contexts and unique designs that make our cities and neighborhoods exciting and interesting places to explore also make it difficult to assess detailed solutions without enough contextual information and local input. Researchers acknowledge other factors that were difficult to incorporate into the tool, such as whether a city is part of a broader regional planning authority, whether there are legal limitations to the use of some strategies, and whether the city has other unique geographic and built features that are not easily captured in the transect model.

Researchers have completed the tool to its specified design:

- To aid the broader policy and implementation discussion of the unique contexts by which congestion mitigation and mobility strategies can be deployed.
- To broaden the spectrum of strategies used by identifying complementary techniques that will ensure the biggest return on investment.

Researchers would like to integrate more of these details listed earlier, provide additional transportation goals, and broaden the depth of strategy typology to create more specific packages. A simple first step would be to differentiate between freeway-specific, arterial-specific, and other use strategies.

Conclusion

While researchers have identified over 100 individual strategies to address congestion and mobility, the context in which these work best is often lost. Through misunderstanding of the strategy itself, the benefits it provides, or where it should and should not be used, the discussion about many topics often simply ceases. Practitioners are left with limited options and tied hands to use them.

Many of these strategies, when paired with their complements and used in the proper context, can provide synergistic benefits that save time for travelers and money for taxpayers. Many of the added benefits may also increase economic productivity, improve quality of life, or encourage healthy living.

By carefully examining these congestion mitigation and mobility packages, policy makers will gain a broader and deeper knowledge of the options available to effectively meet existing and future transportation and cost goals. Researchers anticipate that this tool will encourage healthy education, broaden the discussion, and ultimately take advantage of appropriate strategies when and where they can be successful.

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