

DOWNTOWN TRANSPORTATION PLAN UPDATE

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FINAL REPORT



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City of Phoenix

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1.0 Study Purpose and Area

The City of Phoenix (City) conducted the Downtown Transportation Plan Update (DTPU) to evaluate overall traffic circulation in the Downtown area. The study area, shown below, is bounded by Interstate 10 (I-10) on the north, Tonto Street to the south—one block north of Buckeye Road, 7th Street to the east, and 7th Avenue to the west. The DTPU evaluated overall traffic circulation through the year 2025 and options to alleviate potential challenges from increased development, and Light Rail Transit (LRT) in the Downtown area – over 100 projects have been approved within the study area in the past 5 years! In response to the changing Downtown landscape, Council directed the DTPU evaluate the effect these improvements would have on vehicular circulation Downtown. During the public engagement process it was requested that the DTPU identify areas of opportunities that would allow for future evaluations and public engagement to integrate active transportation modes, including bicycles and pedestrians. Additional information pertaining to Opportunity Corridors can be found in Section 4.0 of this report.

This study:



Identified current and future available capacity in vehicular network

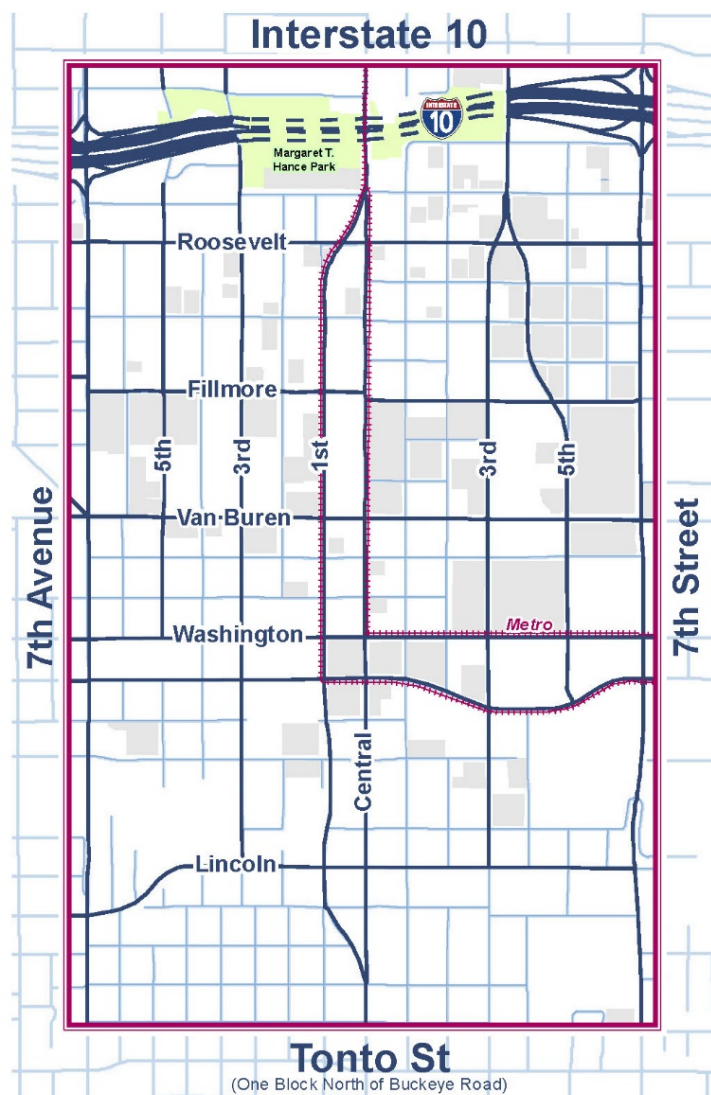


Determined impact of planned development



Investigated Light Rail Transit impacts to network

Study Area Map



2.0 Changing Downtown Landscape

The existing transportation network was evaluated using a simulation model to assess its performance. The 2025 future transportation network was developed by using the existing network and assuming projects that are programmed in the City's Capital Improvement Program by 2025 are constructed. Future demand was estimated based upon planned Downtown development, with additional travel demand assigned to new office spaces, dwelling units, and other planned uses.

2.1. Changing How We Get Around Downtown

There are multiple programmed transportation projects in the Downtown area, including the South Central LRT Extension and the Capital/I-10 West LRT Extension. These LRT extensions, as well as anticipated changes to the roadway network to accommodate them, were included in the future roadway network. Other programmed modifications, for purposes of the simulation model, include:

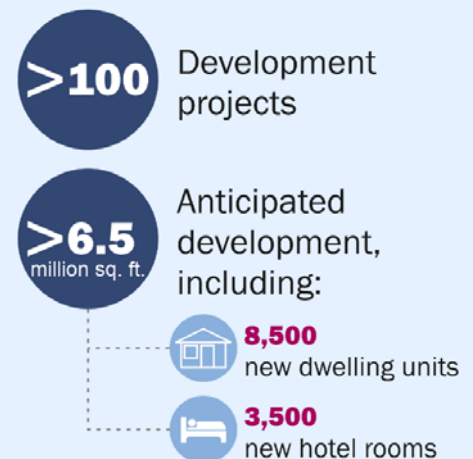
- 3rd Street, Jefferson Street to Lincoln Street: convert from one-way to two-way;
- 3rd Avenue & 5th Avenue: McDowell Road to Washington Street: convert from one-way to two-way streets; and
- Light Rail traffic modifications including Central between Washington and Jefferson.

Changes in the Downtown roadway network are depicted in the map on the following page.

2.2. Planned Revitalization and Growth Downtown

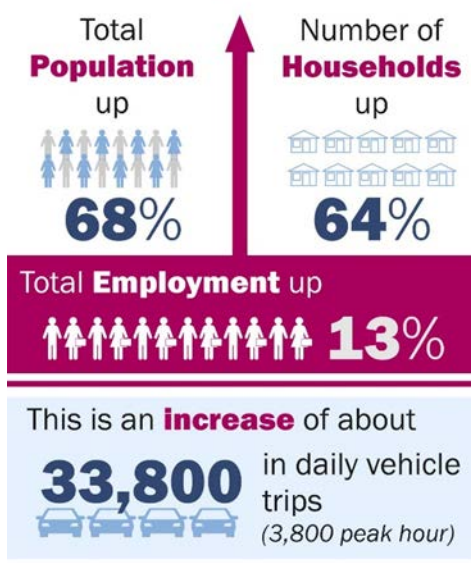
There are 104 development projects proposed, in construction, or recently completed within the study area, as illustrated on page 4. Projects range in size and type throughout the Study area; typical example project types include high density residential apartment and condominiums, mixed use buildings, hotels, educational buildings and more. There are more than 6.5 million square feet of anticipated development within the study area, including approximately 8,500 new dwelling units, and roughly 3,500 new hotel rooms. Development information was obtained from MAG, Phoenix Planning and Development, and Phoenix Economic Development to identify likely development and redevelopment activity in the study area.

Residential and Commercial Growth



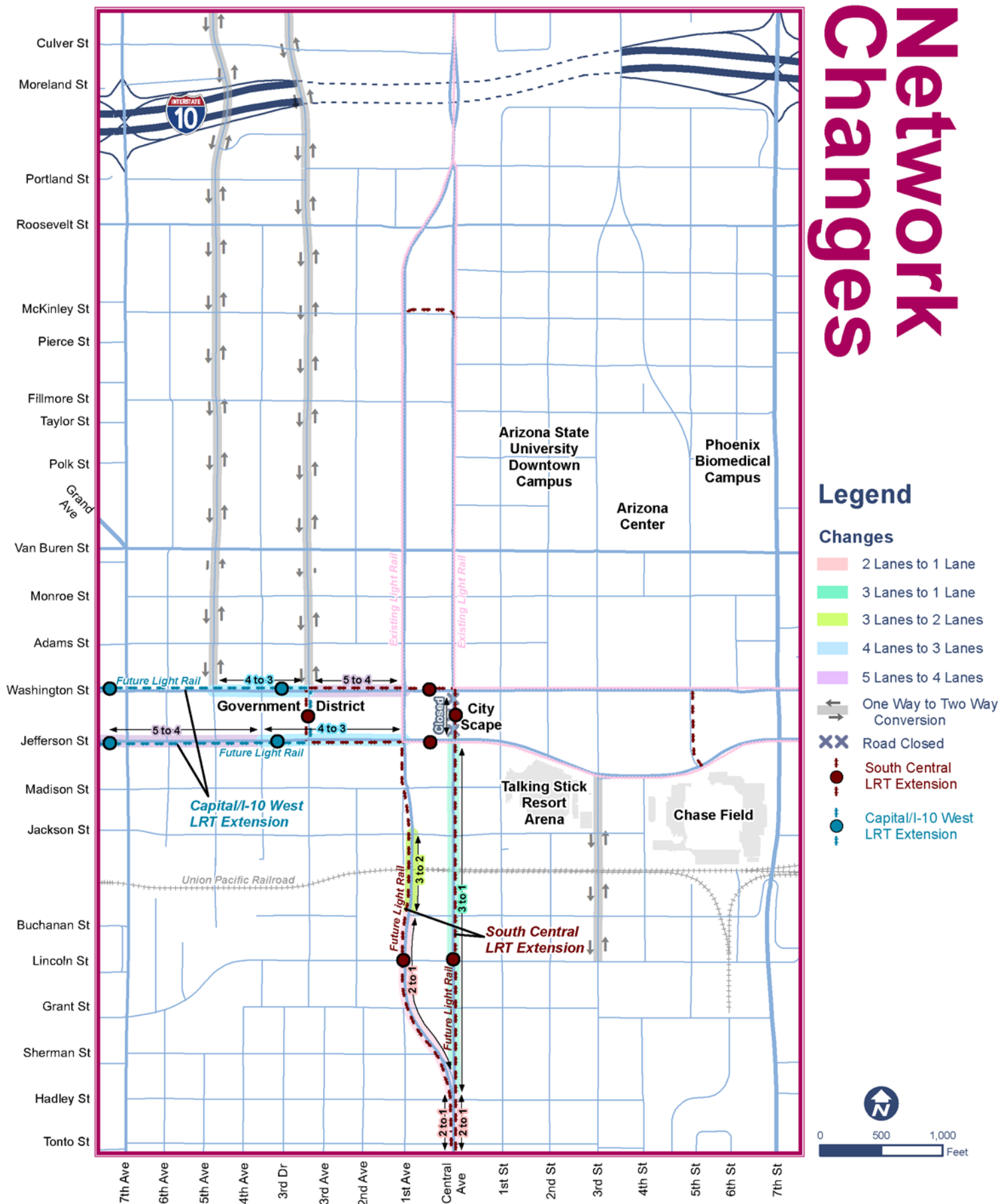
2.3. What do These Changes Mean to the Traveling Public?

Growth Forecasts by 2025:



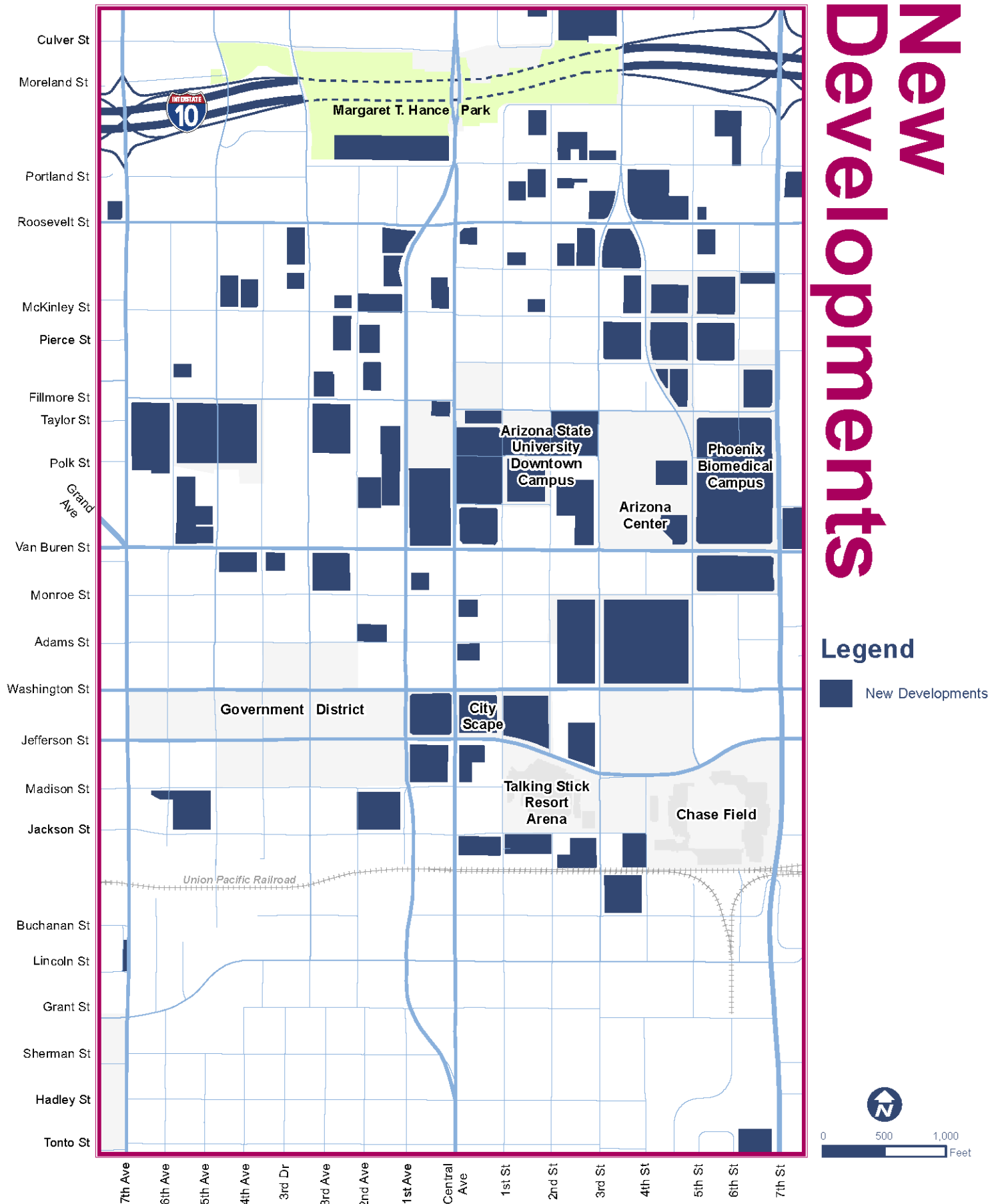
More people are staying Downtown and making trips within the Downtown core, in addition to traditional commuter traffic to and from Downtown. This has resulted in an increased demand for micromobility and active transportation Downtown. The growth within the Study area projected to occur by 2025 is expected to increase the population and number of households by 68% and 64%, respectively. There is an expected employment increase of 13%. This creates a more balanced cross section in the future Downtown, with increased opportunity for residents to live and work Downtown. This will lead to an increase of approximately 33,800 daily vehicular trips within the Study area.

Short work trips in Downtown areas are sometimes completed using other modes of transportation, including walking, biking, and transit or rideshare services. Some of this behavior can be attributed to convenience and/or the costs associated with parking in Downtown areas. These costs could be in the form of actual parking fees or an increase in travel time associated with searching for parking areas.





New Developments



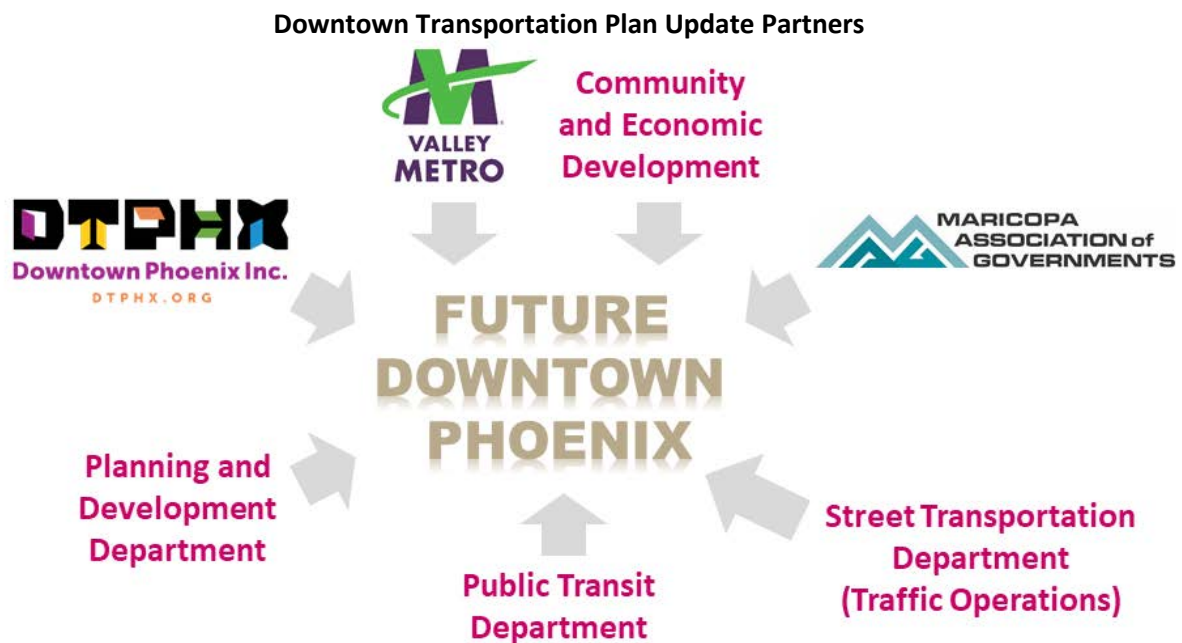
Due to the increasingly vibrant urban living aspect of Downtown and general travel behavior dynamics, multimodal transportation considerations were incorporated into the planning needs of the study area. The following needs were identified based on the analysis:

- Improving timing of existing traffic signals;
- Improving operations at stop-controlled intersections that experience excessive delay;
- Addressing intersection capacity near the planned Central Avenue closure associated with other projects Downtown;
- Identified congestion along 7th Street and 7th Avenue (connections to I-10); and
- Identifying active transportation opportunities.

Analysis results were presented and discussed with stakeholders and the public for input.

3.0 Stakeholder Input

This Study was completed in partnership with the City Street Transportation Department, Valley Metro, Public Transit, MAG and other City departments, and interested groups illustrated below.



The study team conducted a workshop with stakeholders from various City departments on December 17, 2018, for their input and to align the study with broader City efforts. General themes included: 1) An indication of how much development intensification the study area can accommodate before traffic congestion is problematic, and 2) The desire for improved multimodal connectivity. Stakeholders suggested a pedestrian-focused scenario to link LRT and provide connectivity. In addition, existing completed studies, policy documents and construction plans were shared and incorporated into the analysis for consideration:

- Comprehensive Bicycle Master Plan (2014);
- Phoenix Transportation 2050 Plan (T2050) (August 2015);
- South Central LRT Extension
- Capital/I-10 West LRT Extension
- 3rd Avenue and 5th Avenue Project Assessment (November 2016);
- City of Phoenix Complete Streets Policy (June 2017);
- 3rd Street Promenade: Garfield Street to Indian School Road Roadway Modernization (DRAFT April 2018); and
- PlanPHX (April 2018).

4.0 Public Stakeholder Input

The City provided information via mailers and the City website to notify the general public of public meetings. The public was presented with the analysis results at three meetings held on May 29, June 7, and June 15, 2019. Over 70 people attended the meetings and provided input by engaging with interactive presentations and activities. Attendees were given the opportunity to comment on the study findings and general concerns regarding transportation issues within the study area. Information was provided online, offering additional opportunities for email or mailed comments. The comments received during the public meetings, and via email and mail submission, were documented and reviewed. They are included as an appendix to this report.



Collage of Public Meeting Images

Public Input



Significant themes from public input included:

- Pedestrian facility improvements: High-Intensity Activated crossWalks (HAWKs), pedestrian-only signal phasing (pedestrian scramble), crosswalks, and sidewalks;
- Bicycle facility improvements, such as protected bicycle lanes;
- Enhanced connectivity to transit;
- Signage, signalization, and pavement marking improvements;
- Left-turn lane improvements or additions;
- Adding or removing parking garages in select locations;
- Adding or reducing street parking in select locations;
- Sunburst Plan revisions;
- Street lighting improvements; and
- Congestion issues.

These stakeholder and public stakeholder meetings informed the development of potential improvement strategies, and invited feedback from the community. Based upon the public comment, a 3rd scenario was added to assist the community in future planning efforts and public engagement discussions for multi-modal corridors and study preparation. Items beyond the scope of this DTPU were forwarded to other City departments.



5.0 Scenarios

Three Scenarios were developed to address the needs identified in the study area. Needs are inclusive of those identified during analysis, as well as needs developed during public outreach. Scenarios include:

- Scenario 1: Identify intersection capacity and circulation improvements to complement programmed and planned improvements anticipated in the transportation and development landscape Downtown by 2025;
- Scenario 2: Identify intersection capacity and circulation improvements to plan for increased potential development (sensitivity analysis); and
- Scenario 3: Identify potential opportunity corridors for enhanced multimodal travel for future study and analysis to modify traffic lane configurations, include more bicycle features, and pedestrian-oriented treatments.

A simulation model was developed using TransCAD, VISUM, VISSIM, and Synchro as part of the DTPU. It allows for a comprehensive multimodal operational analysis under a variety of network and development scenarios, including potential future scenarios. It can examine the effects of development and network modifications across the entire Downtown area. The model can also be used to assess travel times between two locations, known as origin and destination analysis. This allows comparison of changes in travel time between two points based on different scenarios. The model has substantial value in evaluating active transportation modes as well, both by themselves and how they interact with other modes. Some potential model uses include:

1. Determine development impacts on Downtown network operations;
2. Evaluate the impact of lane or road closures on Downtown network operations;
3. Determine potential transit use for new facilities their influence on operations;
4. Determine the affect new/revised signalization would have on the network;
5. Evaluate development influence on the Sunburst Plan; and
6. Evaluate the influence pedestrian scramble/HAWK installation may have on traffic operations.

The results of the scenarios are presented in terms of how intersections perform under the traffic engineering concept of level-of-service, or LOS. LOS is an estimate of the average delay for each car to pass through an intersection because of the traffic control (stop sign or traffic signal), as well as the effect of other waiting vehicles. It is important to note that the model is also considering the total travel time through the Downtown network. This is based on shortest potential distance and time for the trips, as well as the vehicular delay at intersections. The results are reported in terms of LOS due to the ease of comparison and consistent meaning. Generally, LOS A through D are acceptable, while LOS E and F indicate that intersection improvements should be considered.

Each scenario was analyzed using the model to assess network performance. Locations that are expected to experience congestion were identified. Potential solutions that fit within the existing roadway footprint were developed for Scenarios 1 and 2 to mitigate congestion. In Scenario 3, active transportation improvements were evaluated that would maintain acceptable (LOS A through D) intersection performance.

While the scope of this study included three scenarios for analysis, the model is a powerful tool for future evaluations of design options and changes in the development patterns. The simulation model will remain available to the City to review potential projects and the changes they may have on Downtown traffic.



6.0 Scenario 1: Improve Traffic Circulation

Scenario 1 evaluated traffic operations in 2025, with the anticipated developments in place and programmed transportation projects implemented. It identified operational deficiencies during morning and/or evening rush hours. Most of the operational deficiencies can be addressed as described below; however, some locations are not candidates for improvement projects for various reasons, including challenges such as prioritization of streetscape zones and the pedestrian environment, limited right-of-way and existing buildings. In other locations, the road is “built out” to the maximum number of lanes, precluding construction of additional through lanes. These locations include:

- Roosevelt Street and 7th Avenue
- Roosevelt Street and 7th Street
- Fillmore Street and 1st Avenue
- Van Buren Street and 7th Avenue
- Van Buren Street and Central Avenue
- Van Buren Street and 7th Street
- Van Buren Street and 1st Avenue
- Washington Street and 7th Street
- Jefferson Street and 7th Avenue
- Jefferson Street and 7th Street
- Grant Street and 7th Avenue

The following summarizes recommended improvements needed to maintain or improve circulation. Projects will be implemented on an as-needed basis, as part of development mitigation, and as public funding permits. Based upon the potential for changing development patterns and other factors, not all improvements are needed immediately, and some may not be required or implemented by 2025. A map illustrating improvements is provided on page 9.



Improve timing of existing traffic signals with system-wide signal optimization.



Install new traffic signals at the following intersections:

- Fillmore Street and 7th Avenue
- Fillmore Street and 5th Avenue
- Fillmore Street and 3rd Avenue
- Fillmore Street and 2nd Avenue
- Fillmore Street and 1st Street
- Garfield Street and 3rd Street
- Garfield Street and 5th Street
- McKinley Street and 2nd Avenue
- McKinley Street and 3rd Street
- McKinley Street and 4th Street
- McKinley Street and 5th Street
- McKinley Street and 6th Street
- McKinley Street and 7th Street
- Jackson Street and 3rd Avenue
- Jackson Street and 1st Street



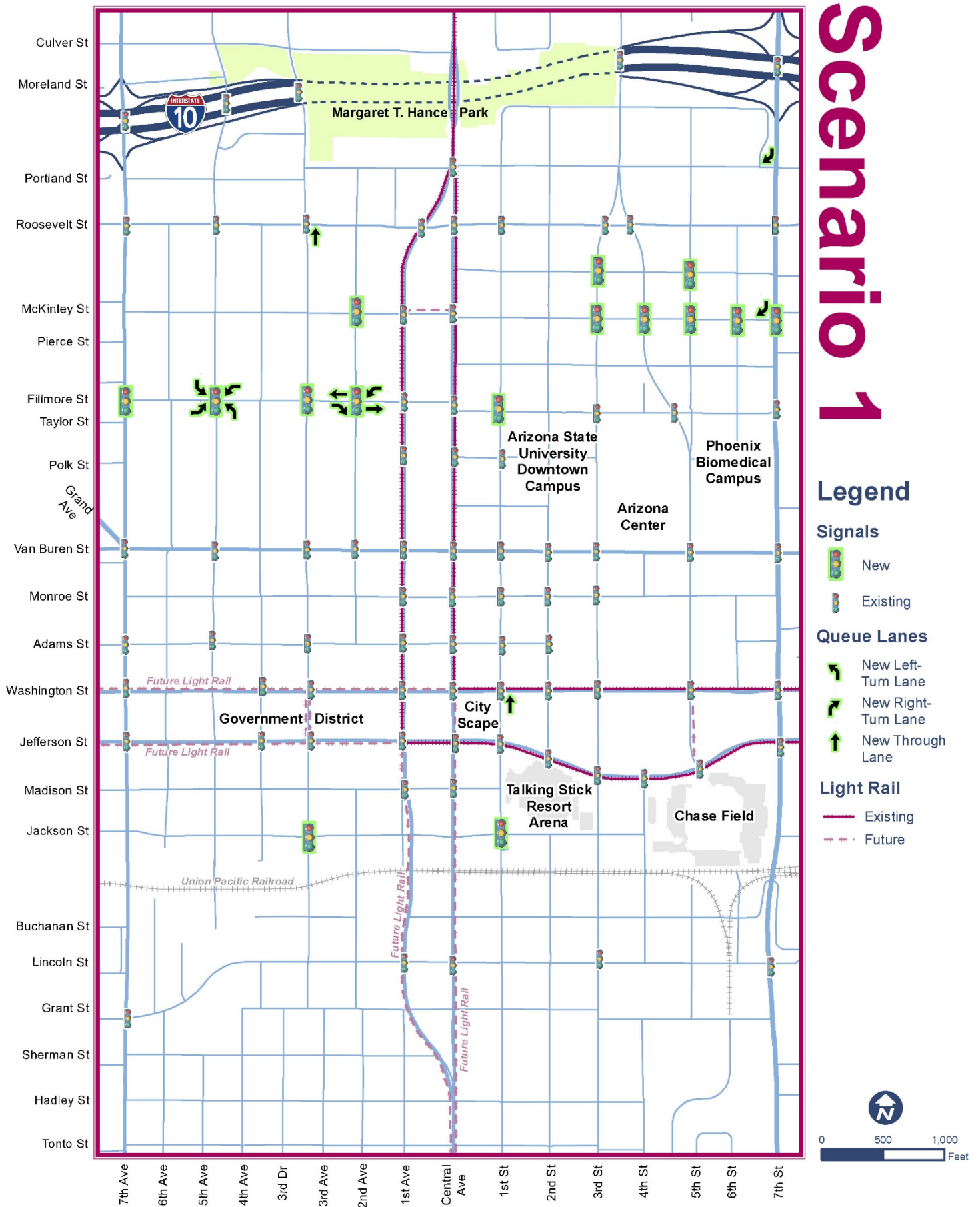
Add turn lanes at the following intersections:

- Portland Street and 7th Street (southbound right-turn)
- Fillmore Street and 5th Avenue (left-turn at all approaches)
- Fillmore Street and 2nd Avenue (eastbound right-turn and westbound left-turn; east and westbound through)
- McKinley Street and 7th Street (southbound right-turn)



Add a through lane at the following intersections:

- Washington Street and 1st Street (northbound through)
- Roosevelt Street and 3rd Avenue (northbound through)



Scenario 1

Legend

Signals

- New
- Existing

Queue Lanes

- New Left-Turn Lane
- New Right-Turn Lane
- New Through Lane

Light Rail

- Existing
- Future



0 500 1,000
 Feet

7.0 Scenario 2: Downtown Phoenix is Open for Business!

There has been significant development Downtown, but with careful assessment of incoming developments and appropriate treatments, the Downtown transportation network can accommodate additional growth. A second scenario was evaluated to test the Downtown network performance for additional, yet unidentified development intensification. The future transportation network with potential developments was used as the base model, as in Scenario 1, except Scenario 2 assumed 3rd Street was two-way from Lincoln Street to Roosevelt Street with turn lanes at major intersections. Potential growth areas were identified based on recent development trends. A large proportion of new developments are being proposed in Areas A and B, illustrated to the right. There is under-developed and vacant land in these areas, which can support new development. These areas have also attracted some of the largest developments, which will create a large increase in trips. To assess the potential for future growth, hypothetical increases of 8,800 trips in Area A and 5,200 trips in Area B were evaluated, based on comparable projects already proposed and the model structure.

Scenario 2 included all operational deficiencies identified Scenario 1, as well as the following:

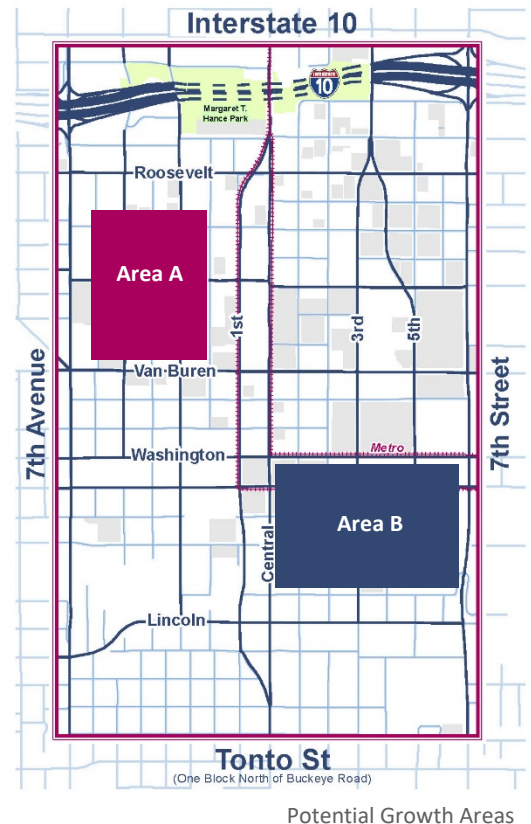
- Lincoln Street and 1st Street
- Pierce Street and 4th Street
- McKinley and 3rd Avenue
- Garfield Street and 4th Street
- Garfield Street and 6th Street
- Roosevelt Street and 5th Street

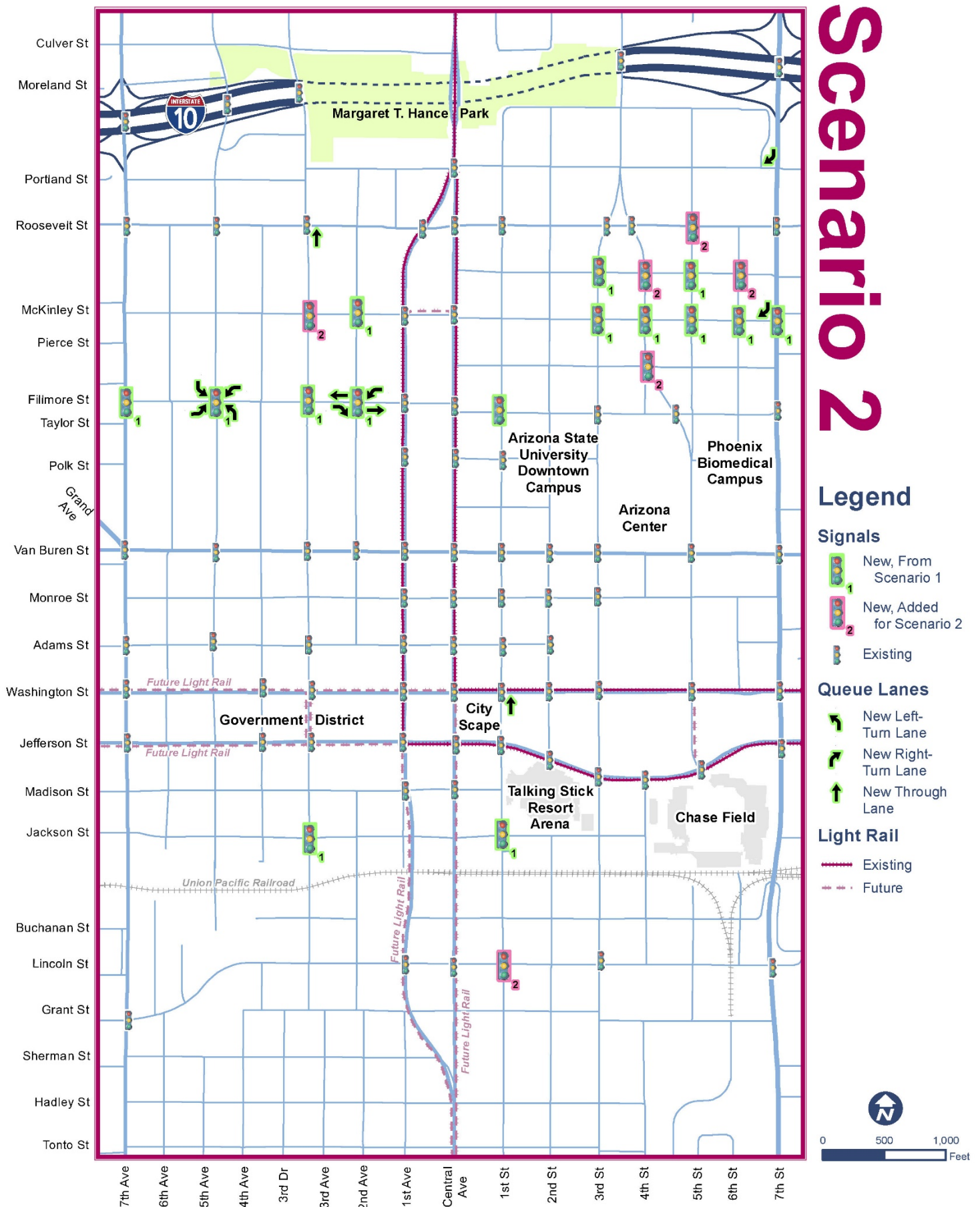
The following map illustrates the necessary improvements, highlighting those that would be needed in addition to Scenario 1, which include the following:



New traffic signals:

- Lincoln Street and 1st Street
- Pierce Street and 4th Street
- McKinley and 3rd Avenue
- Garfield Street and 4th Street
- Garfield Street and 6th Street
- Roosevelt Street and 5th Street







8.0 Scenario 3: Bicycle and Pedestrian Accommodations

Scenario 3 was developed to assess opportunities to provide better bicycle and pedestrian connectivity and circulation per stakeholder and public input. The future transportation network with potential developments was used as the base model, as in Scenario 1, except Scenario 3 assumed 3rd Street would be converted to two-way traffic from Jefferson Street to Roosevelt Street with turn lanes at major intersections. HAWKS and pedestrian-only signal phasing were evaluated based on input received, available pedestrian counts, and traffic operations. Findings are illustrated on page 15.

8.1. Opportunity Corridors

Opportunity corridors were identified by analyzing future peak hour traffic volumes and intersection operations. The existing number of through lanes was reviewed to determine whether it is feasible to modify a through lane and/or on-street parking to another use without adversely affecting traffic operations. Opportunity corridor criteria include:

- Available capacity along the roadway; and
- Intersections along the roadway perform acceptably.

Modifying the roadway within its existing footprint was considered to accommodate bicycle facilities where there are gaps in the existing bicycle network. Potential modifications include removing a turn lane or painted median, reducing street parking, and reducing existing lane widths. The existing streetscape will be maintained, including landscaping and other features. Streetscaping can improve aesthetics, provide a more comfortable environment for walking and biking, and may increase livability and property values.

The following opportunity corridors could be achieved via adjustments to on-street parking:

- Moreland Street: 1st Street to 7th Street
- Portland Street: 1st Street to 7th Street
- 2nd Street: Roosevelt Street to Fillmore Street
- 5th Street: Roosevelt Street to Fillmore Street

The following opportunity corridors could be achieved by narrowing existing lanes:

- 5th Street: Fillmore Street to Jefferson Street
- Jackson Street: 7th Avenue to 4th Street (excluding 1st Avenue to 1st Street) (sharrows are present in some locations)

3rd Street in Scenario 3 mirrored Scenario 2; it was modeled as a two-way road with one lane in each direction and turn lanes at intersections. Based on this configuration, a bicycle lane could be implemented with modifications to on-street parking from Roosevelt Street to Lincoln Street.

Taylor Street is closed to vehicular traffic between 1st Avenue and 1st Street and 3rd Street to 5th Street. Bicycle lanes could be added between 1st Street and 3rd Street by removing on-street parking and reconfiguring the through lanes (on-street parking is on the north side of the street between 1st Street and 2nd Street and on the south side between 2nd Street and 3rd Street). A future Taylor Street paseo was identified in Chapter 12 of the Downtown Code will be installed by future private development projects between 6th Avenue and 1st Avenue, which would provide improved multimodal connectivity.

What is an **Opportunity Corridor?**

“An opportunity corridor is a roadway with available capacity (space or accommodates more drivers than necessary) within the existing curb that could be used to accommodate active transportation features, such as bicycle lanes. Identification was framed by public and stakeholder input.”





There are opportunities to link the existing bicycle network along McKinley Street between 1st Avenue and 1st Street; the exact treatment will need to be established during project development.

There is an opportunity to narrow the existing lanes and provide bicycle lanes along Jackson Street between 7th Avenue and 4th Street.

Marked shared lanes are sometimes used when constraints preclude dedicated bicycle lanes. An example is shown to the right of a marked shared lane along Fillmore Street between Central Avenue and 7th Street. There are also pavement markings from 1st Avenue to Central Avenue.



Marked Shared Lane on Fillmore Street

A separate Active Transportation Plan is pending, which can utilize the model results and input collected as part of this Study effort. The Active Transportation Plan will be focused on how the City can better deliver active transportation infrastructure.

8.2. HAWKs

HAWKs are pedestrian-actuated traffic signals intended to provide safe and timely opportunity to cross a street. They serve the dual purpose of protecting pedestrians while maintaining a less inhibited flow of traffic than would be seen at a stop-controlled or signalized intersection. Because they are activated based on pedestrian demand, HAWKs are typically considered to improve pedestrian safety and mobility, not to improve vehicular circulation. They are typically well suited to areas with high pedestrian volumes. HAWK installation was evaluated based upon the Manual for Uniform Traffic Control Devices (MUTCD) criteria, which considers number of pedestrians per hour, traffic volume, posted speed limit, and the length of pedestrian crossing. In order to address traffic operations and pedestrian crossings, in some locations requested by the public, a traffic signal is recommended in lieu of a HAWK. These locations were all established in response to public comments and include:

- Fillmore Street and 5th Avenue;
- Fillmore Street and 3rd Avenue;
- McKinley Street and 4th Street; and
- McKinley Street and 3rd Street.

A HAWK is recommended at the intersection of Taylor Street and 1st Street based upon the MUTCD criteria and public and stakeholder input.

Locations with low pedestrian volumes that do not currently reach the thresholds established by the MUTCD include:

- Moreland Street & 3rd Street; and
- McKinley Street & 7th Street.

A broader study of HAWK needs beyond the DTPU, including a safety evaluation, constructability, and additional pedestrian counts, should be conducted to inform prioritization.



The following locations were requested by stakeholders and/or the public and should be evaluated in the future when bicycle and pedestrian counts are available. Locations requested from both groups are italicized below:

- Willetta Street and 3rd Street;
- Portland Street and 3rd Street;
- Portland Street and 7th Street;
- Roosevelt Street and 2nd Avenue;
- Garfield Street between 3rd Street and 4th Street;
- Garfield Street and 7th Street;
- *McKinley Street & 5th Street;*
- 7th Avenue from McKinley Street to Fillmore Street;
- Fillmore Street from 5th Avenue to 2nd Avenue;
- Polk Street and 7th Avenue;
- *Taylor Street & 3rd Street;*
- 5th Street from Fillmore Street and Van Buren Street;
- *7th Street between Fillmore Street and Van Buren Street;* and
- Monroe Street and 7th Street.

8.3. Pedestrian-Only Traffic Signal Phasing (Pedestrian Scramble)

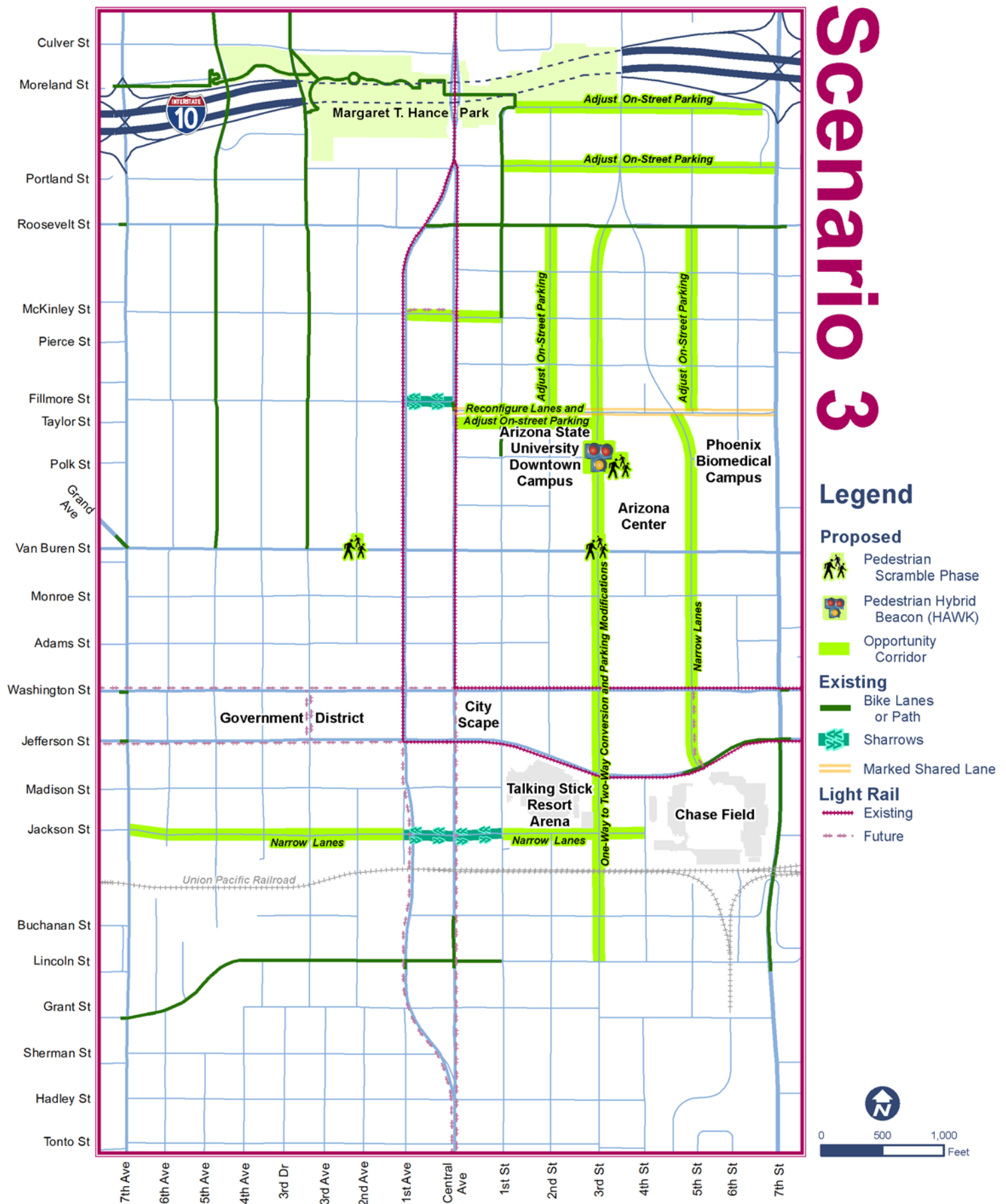
Pedestrian-only traffic signal phasing is also known as a pedestrian scramble. During a pedestrian scramble, pedestrians may cross an intersection in any direction, including diagonally. All vehicles are given a red traffic light and no turning movements are permitted. Introducing a pedestrian scramble at intersections with high numbers of turning vehicles and pedestrian crossings may improve intersection safety and pedestrian operations. Conversely, a pedestrian scramble could increase the wait times for vehicles. Pedestrian-only signal phasing was evaluated based upon pedestrian volumes, traffic forecasts from Scenario 1 for 2025, and locations that would not interfere with light rail operations. Locations were identified for consideration based on stakeholder input. Locations where pedestrian-only phasing is recommended include:

- Van Buren Street and 2nd Avenue
- Van Buren Street and 3rd Street
- Taylor Street and 3rd Street



HAWK at 7th Avenue and Fillmore Street

A full study, including safety analysis, number of pedestrian actuations per hour, and comprehensive operational analysis to ensure traffic progression would be maintained should be performed prior to implementation.





9.0 Sunburst Plan

Event traffic Downtown is managed via the Sunburst Plan, which limits access to the Downtown network when events conclude to expediently direct traffic toward the freeways and major arterials. In recent years, there have been a limited number of residential and/or hotel uses near the stadiums that required continuous access during events. Anticipated development Downtown will influence what closures and restrictions are feasible; additional roads will likely need to have some form of opening to allow residents and hotel guests continuous access. Due to the COVID-19 pandemic, there are currently no large-scale events Downtown. As development occurs and events resume, the simulation model developed as part of the DTPU can be used to evaluate egress strategies and closures that may accommodate new development. The model can be used to determine the delay associated with removing various restrictions and to determine which routes are the most efficient.

The DTPU simulation model was used to gain insights on how the increase in development Downtown could impact the Sunburst Plan. Rather than focusing on individual intersection performance, the model assessed the total time to leave the Downtown area. A large, 25,000 attendee event scenario was modeled. Currently, traffic dispersion using the Sunburst Plan takes approximately 32 minutes. With increased development in the Downtown area, there will be more people using the roads during and after events, unrelated to the event itself. As the expected development and number of travelers on the roads near the stadiums increases, traffic dispersion utilizing the current Sunburst plan would take approximately 37 minutes, for an increase of 5 minutes. Through the insights coming from the model as well as anticipated development access needs, there is future opportunity to proactively determine if adjustments can be made for the benefit of all stakeholders.

10.0 Findings

The DTPU found that internal traffic circulation Downtown works very well. Anecdotally, many large downtowns in the United States have failing traffic operations. Often, there is no opportunity to improve operations due to existing constraints. Based on the DTPU, almost every intersection Downtown can operate acceptably through optimization or a capital project. The transportation network has the resiliency to accommodate additional growth in areas that are likely to redevelop and provide acceptable traffic operations.

At some point, Downtown development could intensify to the point that efficient traffic operations cannot be maintained. New developments may result in a higher demand for different modes of transportation as more people live and work Downtown. The City is evaluating multimodal infrastructure as well, including bicycle, transit, and pedestrian modes. These modes serve to make Downtown more livable, promote health, increase business exposure, and reduce reliance on the vehicular network.

Existing congestion along 7th Street and 7th Avenue, the key Downtown connections to I-10 and I-17, is expected to further degrade. “Common” practices to improve traffic operations cannot eliminate congestion along these routes. Delay on these routes may be partially attributable to the on ramps and downstream interstate congestion. Ramp queuing as exists creates a bottleneck, which contributes to congestion on 7th Street and 7th Avenue. Both 7th Street and 7th Avenue are “built out,” meaning they have as many lanes as the City of Phoenix street classification allows. A larger, holistic solution in coordination with the Arizona Department of Transportation is needed. Additionally, the trip generation impacts associated with future development may be felt more on these routes than on those adjacent to the development itself.



11.0 What is Next?

Recommendations from the DTPU will advance to further project development activities. Nearest-term action items may include the pedestrian-only (scramble) signal phasing trial and HAWK installation at key locations. The DTPU identified infrastructure needs Downtown. The model can be used to determine additional needs, inform prioritization, and funding allocation. The DTPU will assist in identifying future capital projects under separate design and neighborhood input.

Public comments were reviewed for potential near-term solutions. Many items were addressed through the recommendations of this plan. Maintenance items were forwarded to appropriate departments, as were signal timing and other concerns.

The model developed during the DTPU can be used to evaluate comprehensive network improvements needed to support large-scale planned developments Downtown. Traditional traffic studies may not provide a complete assessment of impacts associated with new developments. Often, they focus on the immediately adjacent roadway network and may not address impacts beyond those limits. The model would analyze all impacts Downtown. Development information in the model should be kept up-to-date, and the model should be updated when major network changes occur. There is an opportunity to use the model to evaluate potential changes to the Sunburst Plan as development continues to occur in the surrounding area.

A separate Bicycle Master Plan Update is pending, which can utilize the model results and input collected as part of this Study effort. Opportunity corridors identified in the DTPU will be further analyzed as part of the Bicycle Master Plan Update effort. The model could be used to assess the impacts of additional network modifications to support the Downtown bicycle network.