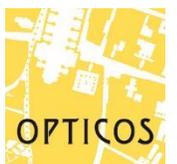




BLACKSTONE SHAW ACTIVITY CENTER STUDY

Summary Report
July 30, 2020 | FINAL



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STUDY PURPOSE

The Blackstone Shaw Activity Center is a key redevelopment area for the City of Fresno. Both Blackstone Avenue and Shaw Avenue are identified in the 2014 General Plan as corridors for bus rapid transit (BRT) lines that will serve infill development. Blackstone Avenue was re-zoned to accommodate more intense development and to transition to a mix of uses, instead of being solely commercial in nature.

These envisioned land use and transportation changes will need to work in concert with changes in the public right-of-way. Greater density of development and increased pedestrian traffic as a result of increased bus service and new housing necessitates infrastructure changes to better serve people walking. Development may also necessitate and be better served by a higher number of street network connections, such as allowing turning movements where they are disallowed today or adding traffic signals that both increase access to parcels and create more crossing opportunities for pedestrians.

This study investigates these types of infrastructure changes in the Blackstone Shaw Activity Center (BSAC). It assessed existing conditions for all modes and identified potential projects that could enhance people's travel experience, especially in light of the desired character of redevelopment. Additionally, the study investigated traffic impacts of a suite of improvements, high-level results of which are presented here. Last, the study developed urban design principles for redevelopment along Blackstone Avenue.

Ultimately, this study provides options for projects that support the envisioned redevelopment. It will be up to project partners such as the City of Fresno and developers to decide whether, when and how these infrastructure improvements may be funded and implemented. Partners will need to discuss the timing of implementation:

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whether improvements in the right-of-way pre-date development as capital projects that could help spur development, by developers at the time of development, or after development incites changes in travel patterns in the area.

USE OF STUDY OUTPUTS

The study provides potential projects and cost estimates that will allow the City to pursue funding in the future for implementation of development-supportive infrastructure, and to work with developers to implement infrastructure projects.

The City of Fresno is not planning to implement infrastructure changes as a result solely of this study; several of the identified infrastructure changes will need further study to assess their impacts; these are identified later in this report. This additional study may be conducted in the future as part of Fresno's commitment to planning, designing, and installing facilities that create a transportation system that balances safety, access and mobility for all users

EXISTING CONDITIONS

The area assessed in this study is centered on the intersection of Blackstone and Shaw Avenues and bounded by Barstow Avenue to the north, Santa Ana Avenue to the south, Maroa Avenue to the west, and Fresno Street to the east. This area includes a segment of Highway 41 which runs parallel to Blackstone and is accessed via entrance and exit ramps on Shaw Avenue.

OPPORTUNITIES

Policy and Community Support

As stated above, a main driver for this study is the desired transformation of this area identified in the 2014 General Plan. Additional plans and policies at the city and corridor level support the types of transportation projects identified in this study. These include:

- » Zoning and Site Development Standards: support the land use goals of the General Plan with public realm design requirements such as 12' sidewalks adjacent to mixed-use or non-residential projects.
- » Restore Fresno identifies Blackstone as one of three citywide Commercial Focus Areas to support revitalization.
- » Southern Blackstone Smart Mobility Strategy: addresses transportation needs with a bold vision for a multimodal Blackstone Avenue from Dakota Avenue to Highway 180.
- » Old Fig Garden Community Transportation Study: recognizes the importance of multimodal connections to and through the neighborhood.
- » Bus Rapid Transit (BRT): provides enhanced transit access along Blackstone Avenue with frequent service, connecting to multiple bus lines on Shaw Avenue.
- » The Better Blackstone Initiative (BBI) continues to build community support for Transit-Oriented Development and multimodal streetscapes along Blackstone - working intensely and inclusively with public agencies, nonprofits, businesses, and community stakeholders.
 - In 2020, the Better Blackstone Design Challenge, part of the BBI, will help stakeholders envision what is possible for this corridor by creating community-supported design plans and real estate analyses that encourage the development of sustainable, pedestrian-friendly and economically viable activity



Project Area Zoning

■ Commercial General	■ Residential Multi-Family, High Density
■ Commercial Regional	■ Residential Multi-Family, Medium High Density
■ Corridor/Center Mixed Use	■ Residential Single-Family, Medium Density
■ Office	■ Residential Single-Family, Medium Low Density
■ Open Space	■ Unincorporated Fresno County
■ Regional Mixed Use	

Figure 1: 2014 General Plan zoning for study area

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centers along Blackstone. The effort is coordinated by Fresno Metro Ministry in partnership with educational institutions, design firms, professional organizations, the City of Fresno, Fresno COG and FAX.

Development

The type of development envisioned in the BSAC is starting to come to fruition. Landowners are working to create visions for mixed-use developments on large parcels that have uses and form geared toward pedestrian activity. Parcels will be traversed by internal connections, whether public or private streets or pathways, that allow for convenient walking trips.

Redevelopment may eventually provide opportunities for increased street network connectivity in the study area. The design principles developed as part of this project for the Better Blackstone Design Challenge encourage planning of through and local connections that provide access to adjacent neighborhoods and increase opportunities for short trips to be made by biking and walking.¹ These types of connections would enable near-corridor neighbors to walk or bike to new businesses on a redeveloped Blackstone Avenue.

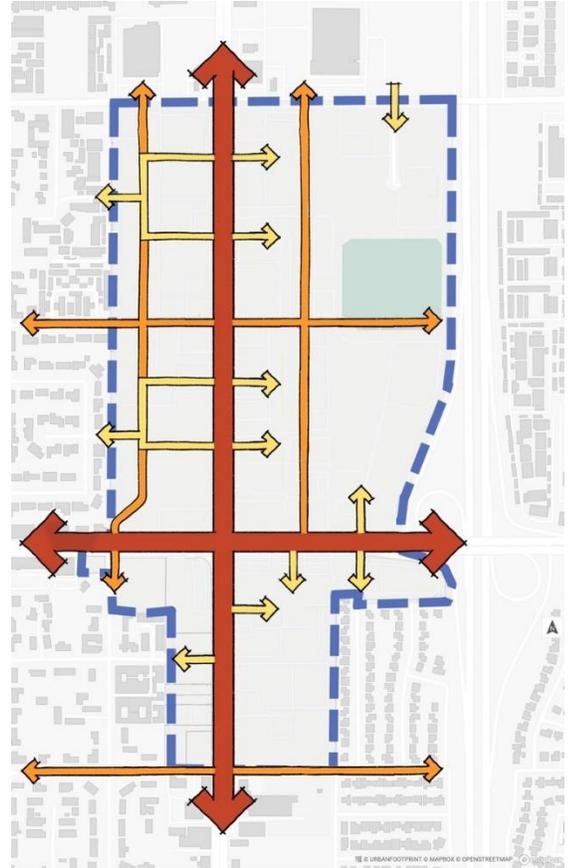


Figure 2: Network connectivity principles for parcel redevelopment from Better Blackstone Design Challenge design principles

¹ The entire set of principles are found in Appendix B to this document.

I. SUPPORTIVE TRANSPORTATION PROJECTS

MULTIMODAL TRANSPORTATION TO SUPPORT DEVELOPMENT

Vibrant, mixed-use development in the Blackstone Shaw Activity Center (BSAC) relies on thoughtful public realm and transportation system design. Businesses and higher-density residential land uses rely on a balanced multimodal approach to thrive. Both Blackstone and Shaw Avenues play important roles in the regional transportation system and will continue to have these demands in the future. However, this automobile transportation function will need to be balanced with space in the public right-of-way that serves the transportation needs of people walking, taking transit, and bicycling to create the thriving redevelopment envisioned.

Transportation projects and conditions assessed in this study focus primarily on Blackstone Avenue which is currently a six-lane, median divided street with no dedicated bike facilities and narrow, curb-tight sidewalks. Illustrations of a typical section of the street are shown in Figures 3 through 5 and show that the majority of space is provided to automobile uses. There are no bicycle facilities along either of these major roads, and people more frequently ride on the narrow sidewalks. The only bicycle facility in the study area is bike lanes on Barstow Avenue. Additionally, parcel access is challenging given the wide spacing of signalized intersections, presence of a median, and the need for left-turning traffic to identify gaps in three lanes of oncoming traffic.

While the FAX Q BRT line runs on Blackstone Avenue with frequent service (10-minute headways during weekday peak hours, 15-minute otherwise), and Shaw Avenue is served by FAX line 9 at 15 minute frequencies, pedestrian access to these transit amenities is lacking as a result of narrow sidewalks whose usable width is often reduced by utility infrastructure. Sidewalks are also frequently interrupted by driveway crossings whose geometry allows for higher speed turning movements into parcels. Opportunities for pedestrians to safely cross the street are also widely spaced, and crossings are long, across six or more lanes of traffic on both Blackstone and Shaw Avenues, with crossing times that only meet minimum requirements.

BLACKSTONE AVENUE EXISTING CONDITIONS

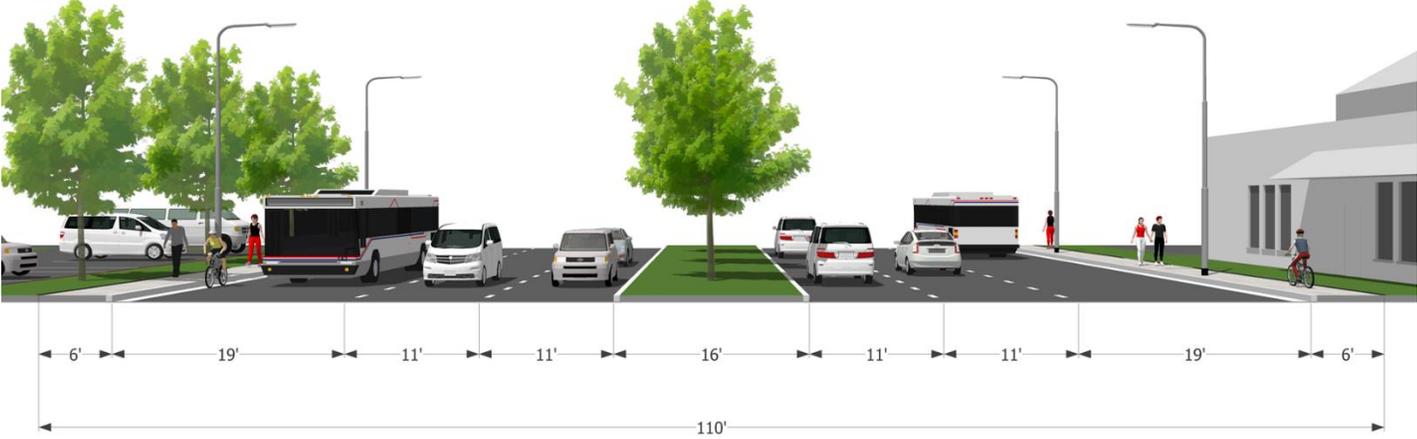


Figure 3: Existing conditions, cross section

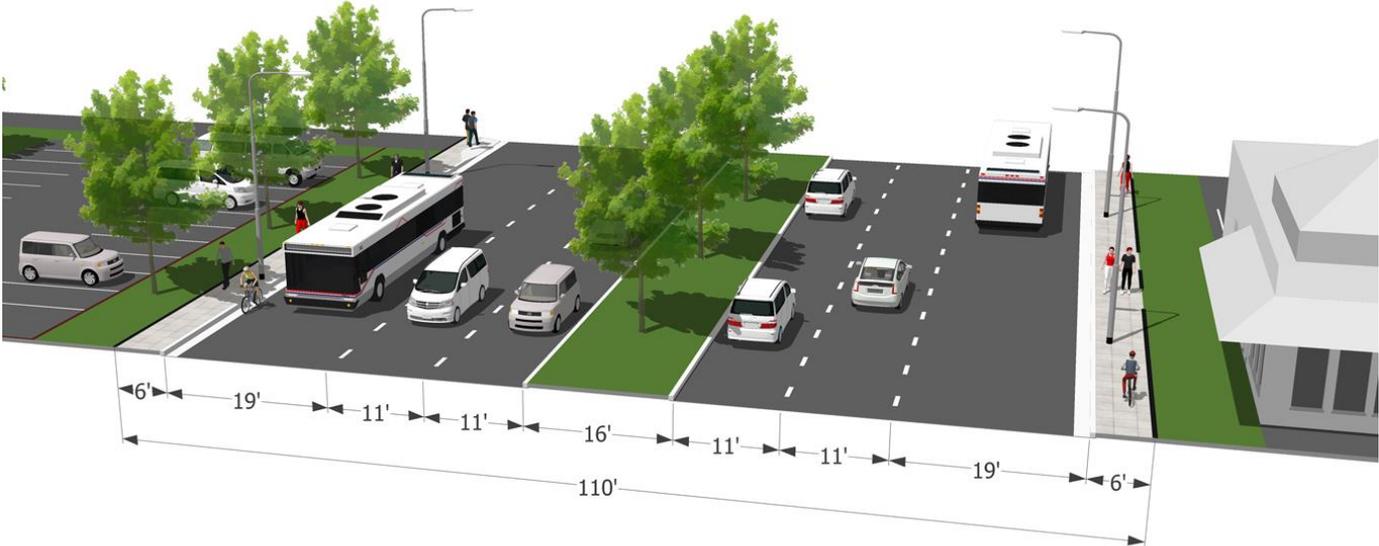


Figure 4: Existing conditions, axonometric perspective

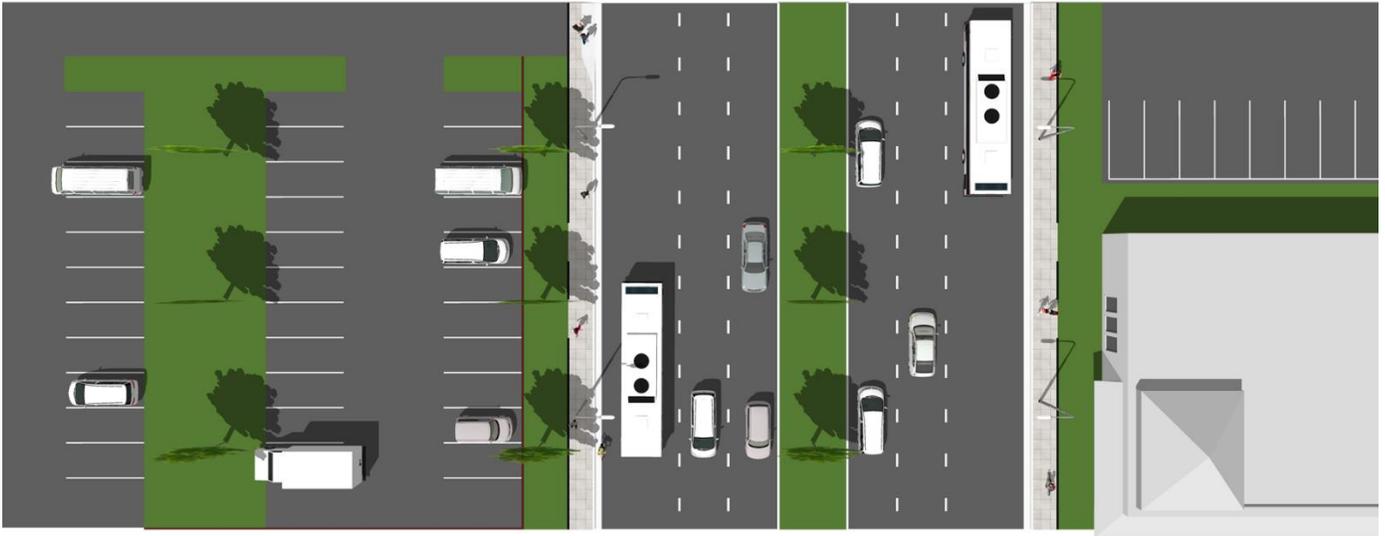


Figure 5: Existing conditions, aerial perspective

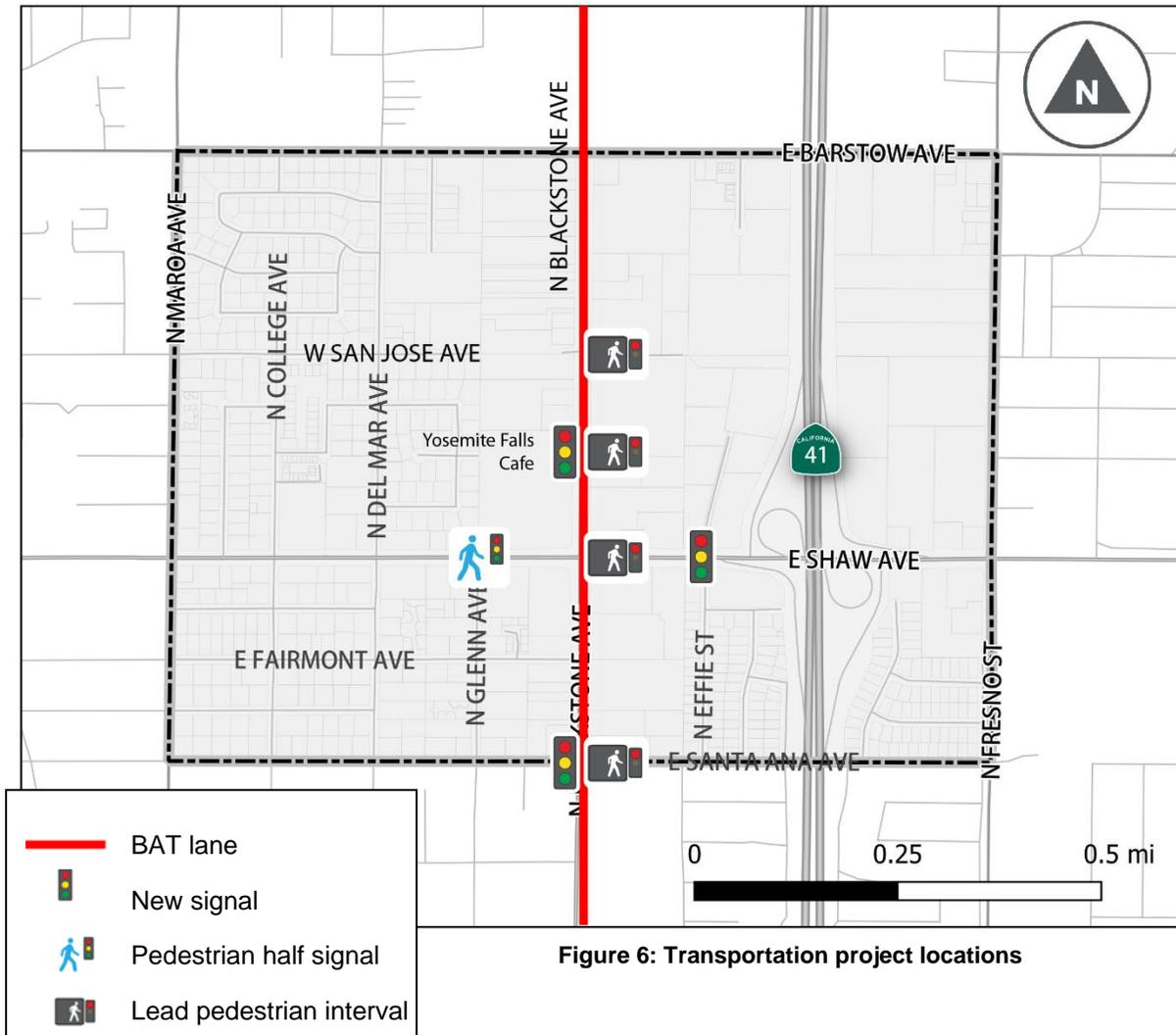
IDENTIFYING TRANSPORTATION PROJECTS

The project team identified transportation projects based upon a review of existing conditions in the study area for travelers of all modes: people walking, taking transit, biking, and driving. Additionally, stakeholders were consulted regarding their interests in transportation projects in this area. From these two sources, projects were identified that could improve the experience of people traveling in the area, no matter the mode, and their ability to access destinations.

Identified projects may be implemented at the time of development through partnership with property owners, or as standalone capital projects once funding sources are identified, or as a combination of both.

Additional detail on the impacts of these projects on area traffic is available in the summary on page 27-29 and in Appendix A: Traffic Analysis.

TRANSPORTATION PROJECT LOCATIONS



ACCESS IMPROVEMENT PROJECTS

Project 1: BAT Lane

Description: Convert the outside motor vehicle lane in each direction on Blackstone Avenue to a business access and transit (BAT) lane.

Benefit: BAT lanes allow right-turning vehicles and transit to share a lane. Creating a dedicated right-turn lane removes turning traffic from the through lanes, decreasing the potential for rear-end crashes and allowing smoother flow for through traffic to progress along the corridor (a full assessment of BAT lane traffic impacts is included in the accompanying Traffic Impact Study and summarized on pages 27-29).

Project 2: Traffic Signals

Description: Add traffic signals at the following intersections:

BLACKSTONE SHAW ACTIVITY CENTER STUDY

- Blackstone Avenue & the Yosemite Falls Driveway, and
- Blackstone Avenue & Santa Ana Avenue.

Benefit: Traffic signals will improve access to parcels by allowing currently disallowed turning movements and allowing safer, controlled turning movements (a full assessment of traffic signal impacts is included in the accompanying Traffic Impact Study and summarized on pages 27-29).

TRANSIT IMPROVEMENT PROJECT

Project 1: BAT Lanes

Description: Convert the outside motor vehicle lane in each direction on Blackstone Avenue to a business access and transit (BAT) lane.

Benefit: BAT lanes allow right-turning vehicles and transit to share a lane. Bus rapid transit (BRT) vehicles would have fewer conflicts with other vehicles, which can result in better reliability and adherence to scheduled headways. A BAT lane could serve as a proof of concept for other FAX Q lines in the city. Further study is needed to evaluate the feasibility of potential BAT lanes and their impact on transit operations.

PEDESTRIAN IMPROVEMENT PROJECTS

Project 1: Pedestrian Half-Signal

Description: Install a pedestrian half-signal at the Shaw Avenue & Glenn Avenue intersection. This project complements Access Improvement Project 2 – installing traffic signals at the Blackstone Avenue intersections with the Yosemite Falls Driveway and Santa Ana Avenue.

Benefit: Increased frequency of controlled and designated pedestrian crossing opportunities improves safety and access and helps improve connection between the two sides of the street. Detailed analysis and signal warrants are included in the accompanying Traffic Impact Study.

Project 2: Leading Pedestrian Intervals

Description: Add leading pedestrian intervals (LPIs) to the signalized intersections of Blackstone Avenue and San Jose Avenue and Santa Ana Avenue.

Benefit: LPIs provide crossing pedestrians a “head start” in advance of automobile traffic making them more visible and allowing them enough time to completely cross the intersection. This also may decrease conflicts between pedestrians and right- and left-turning vehicles. An assessment of traffic impacts from LPIs is included in the accompanying Traffic Study. For existing conditions assessment, LPIs were modeled at the Shaw Avenue and San Jose Avenue intersections. LPIs were also modeled in the “plus project scenarios” for new signals at the Yosemite Falls driveway and Santa Ana Avenue.

Project 3: Sidewalk Widening

Description: Widen the sidewalks along Blackstone Avenue to 12' to meet current standards. Wider sidewalks along Shaw Avenue would encounter more constraints in the private realm [topography, existing buildings at parcel line, parking impacts] without redevelopment.

Benefit: Wider sidewalks provide greater pedestrian comfort by further separating people walking from moving traffic and providing more space to navigate around obstructions (utility poles, etc.) that exist today.

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Project 4: Sidewalk Standards

Description: re-assess existing development standards (15-1103) and sidewalk standards (15-1104.F) to obtain 16' nominal sidewalk widths in the RMX zones and 12' in the CMX zones. Consider the use of minimum Build-to Lines in lieu of flexible setbacks.

Benefit: Wider sidewalks present greater opportunity for placemaking and social life to occur in the public realm.

BICYCLE IMPROVEMENT PROJECTS

No specific bicycle infrastructure projects were identified in this study, but high-level guidance regarding appropriate bicycle facilities, facility interaction with transit, and estimates of probable cost are included on pages 21-26. It should be noted that without dedicated bicycle facilities, people will likely continue to ride on the sidewalk due to high traffic volumes and speeds along Blackstone and Shaw Avenues.

II. PEDESTRIAN INFRASTRUCTURE CONCEPTS

CROSSING IMPROVEMENTS

New signals would improve pedestrian access. Implementation of these signals should include the following provisions to ensure their benefit to people walking as well as people driving: 1) providing pedestrians of all abilities adequate time to cross either Blackstone Avenue or Shaw Avenue in one signal phase, 2) installation of leading pedestrian intervals, and 3) shortening the signal phasing in off-peak hours to reduce pedestrian wait time to cross, which leads to less desire on the part of pedestrians to cross against the signal.

SIDEWALK IMPROVEMENTS

The City of Fresno standards call for 12' sidewalks in this area. Wider sidewalks are more supportive of the mixed-use, higher density uses envisioned for this area. Additionally, development standards state that parcel owners are responsible for creating the 12' sidewalk if a sidewalk is substandard at the time of redevelopment.

The following alternatives provide viable options to achieve the City of Fresno standard widths for sidewalks.

SIDEWALK WIDENING ALTERNATIVES

Alternative A: Through Development

Alternative A is dependent upon redevelopment along the corridor. Through development, existing sidewalks are widened by 6' into parcels, as required by zoning and site development standards.² This will result in inconsistent sidewalk width along the corridor with pinch points until the entire corridor redevelops. Figures 7-10 illustrate the inconsistent sidewalk width resulting from development progression along the corridor.

The benefit of this approach is that the costs to widen the sidewalks are borne by the developer as part of their overall parcel redevelopment cost. However, the inconsistencies in the pedestrian realm may not address the pedestrian comfort concerns, nor does it contribute to traffic calming as the travel lane widths remain unchanged.

With the recommended reassessment of the development code (see page 12) to call for 16' sidewalk, widening into the parcel would require a 10' dedication or easement instead of 6'. See Figures 8-10 that illustrate the resulting inconsistent sidewalk width along corridor.



Figure 7: Existing 6' sidewalk (foreground) is still constrained, while redeveloped sidewalk (background) provides more space.

² Site development standards state that if sidewalks are below the 12' width standard at the time of development, it is required that the developer construct the additional sidewalk width to meet the 12' standard. Parcel owners would dedicate land for this purpose.

BLACKSTONE SHAW ACTIVITY CENTER STUDY

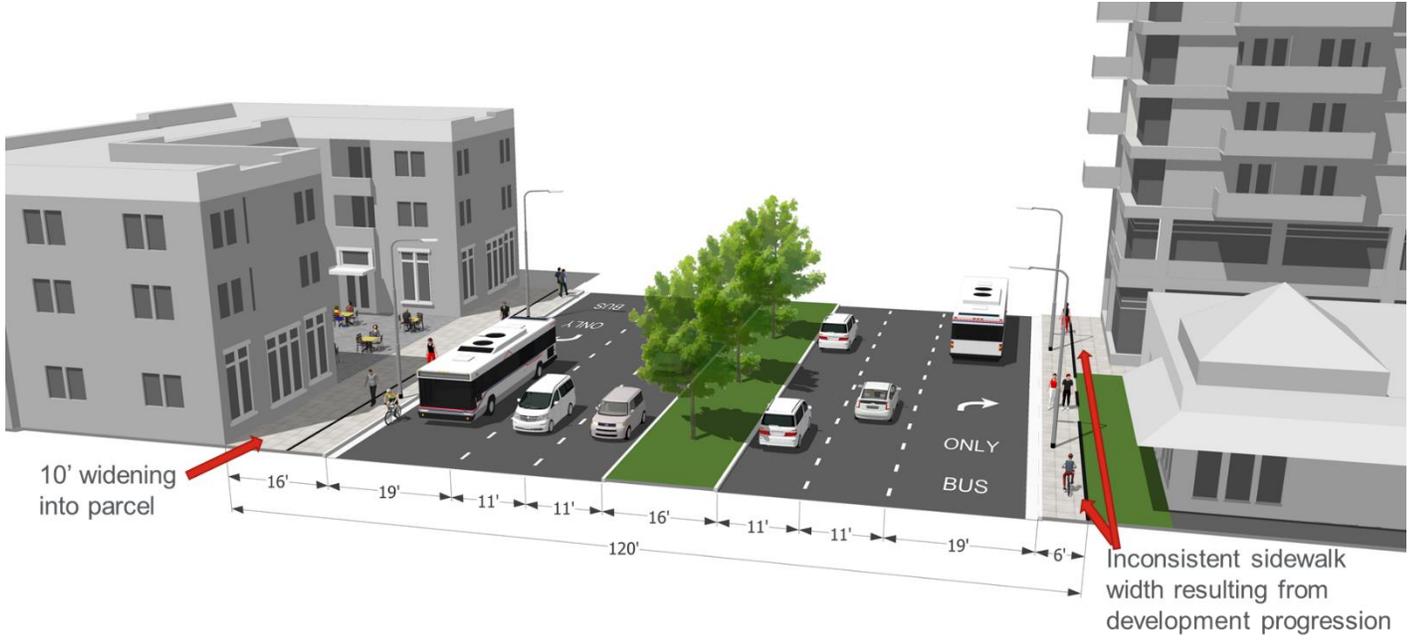


Figure 8: Alternative A axonometric perspective showing inconsistent sidewalk width

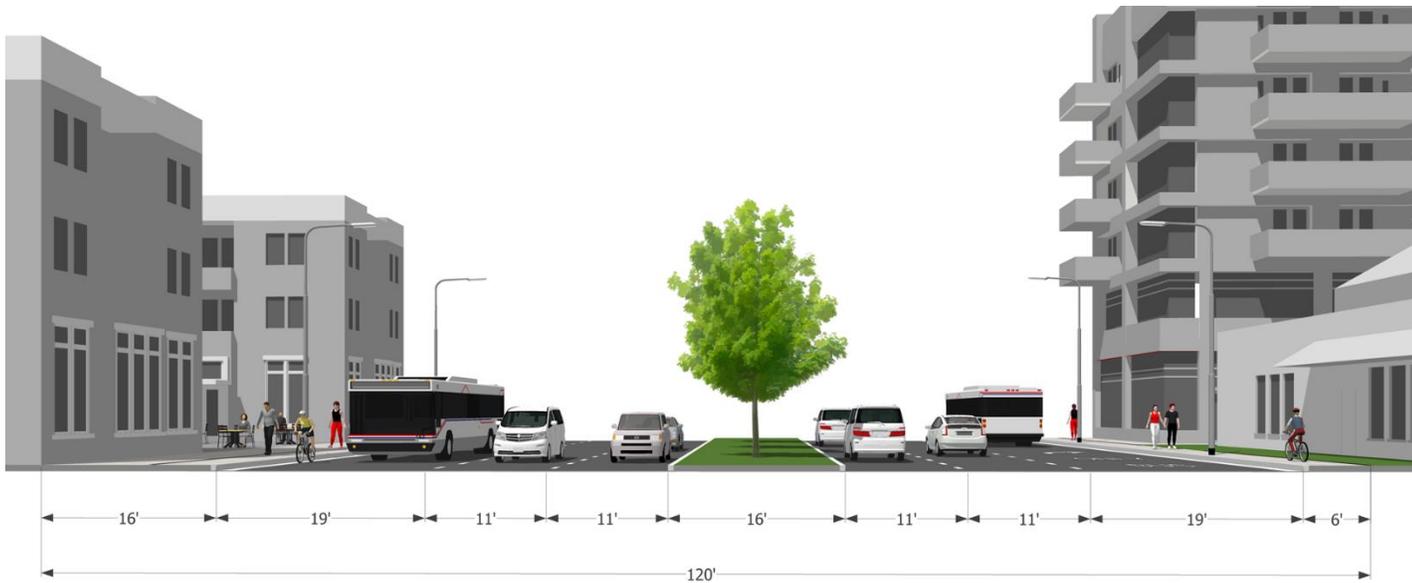


Figure 9: Alternative A cross section

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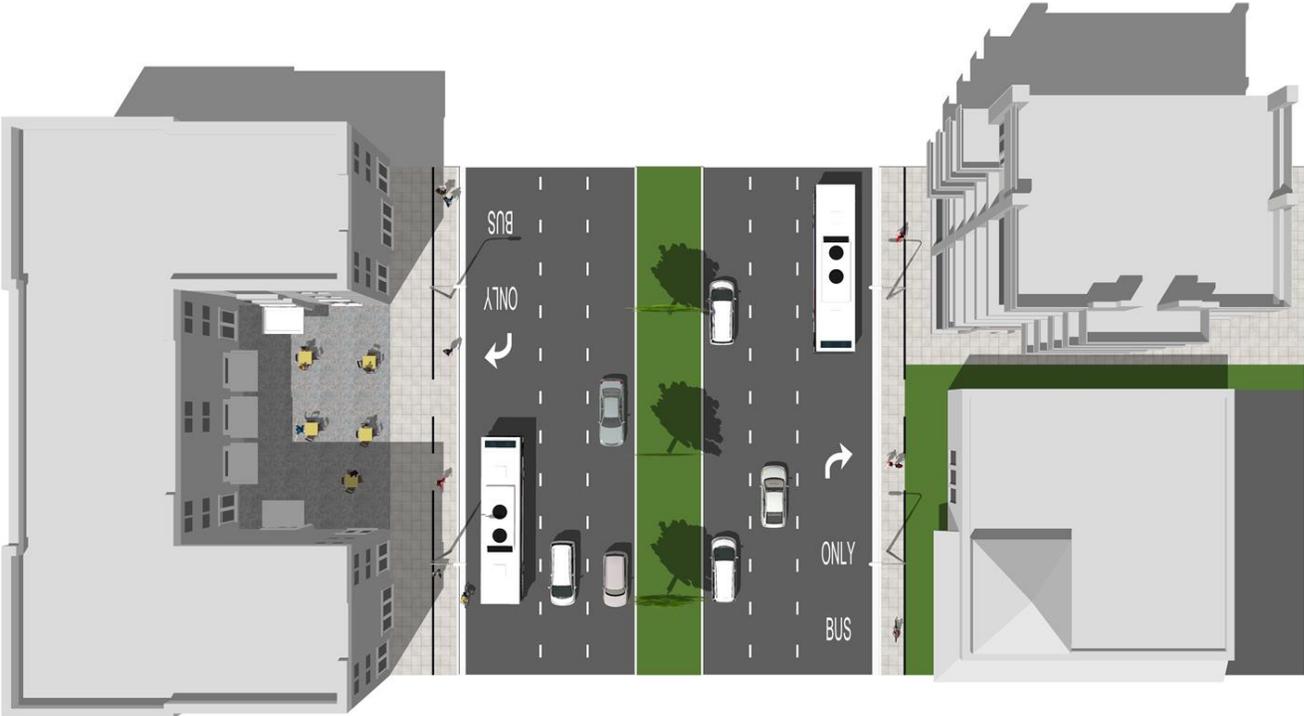


Figure 10: Alternative A aerial showing inconsistent sidewalk width

BLACKSTONE SHAW ACTIVITY CENTER STUDY

Alternative B: Pre-development Capital Project

Alternative B consists of widening the existing sidewalk by 6' into the outside travel lane from Barstow Avenue to Santa Ana Avenue. This will result in a consistent sidewalk width that meets City standards throughout the corridor and will help manage traffic speeds by reducing the width of the outside lane. This change would not impact traffic operations because the outside lane is currently 17-19' wide. Sidewalk has already been extended to this width at the BRT stops in the study area.

This alternative would be a major capital expense to the City (and any project partners) and is not in any current project list or budget. It should be noted that additional maintenance costs would also be incurred with any design that places features such as trees or street furniture in the furnishing zone of the widened sidewalk. Though a greater cost, the investment in trees would add significantly to the comfort and vitality of a re-imagined Blackstone Avenue.

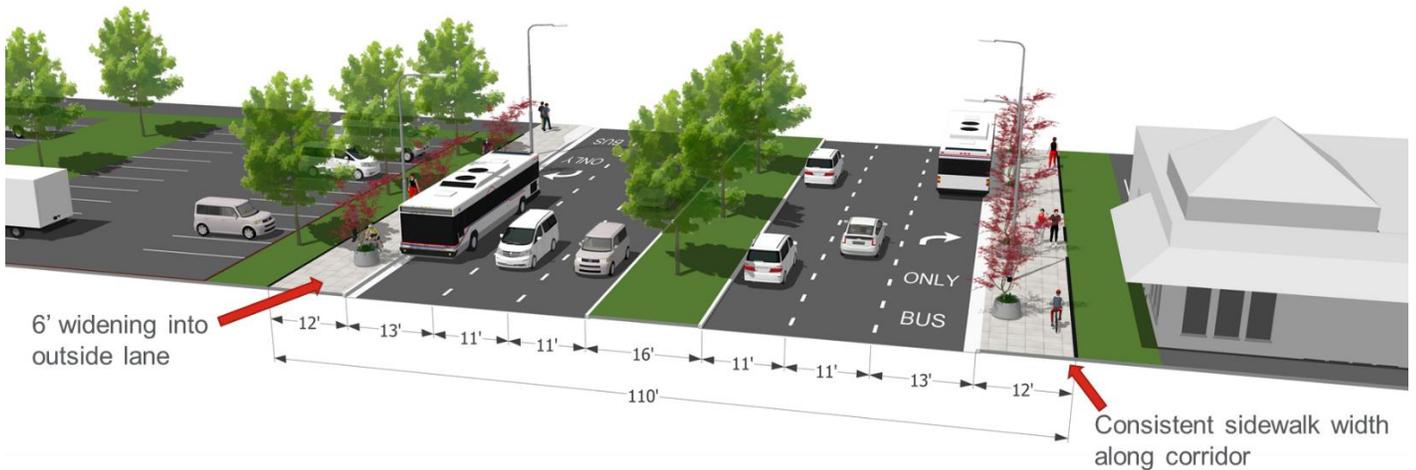


Figure 11: Alternative B axonometric view

BLACKSTONE SHAW ACTIVITY CENTER STUDY

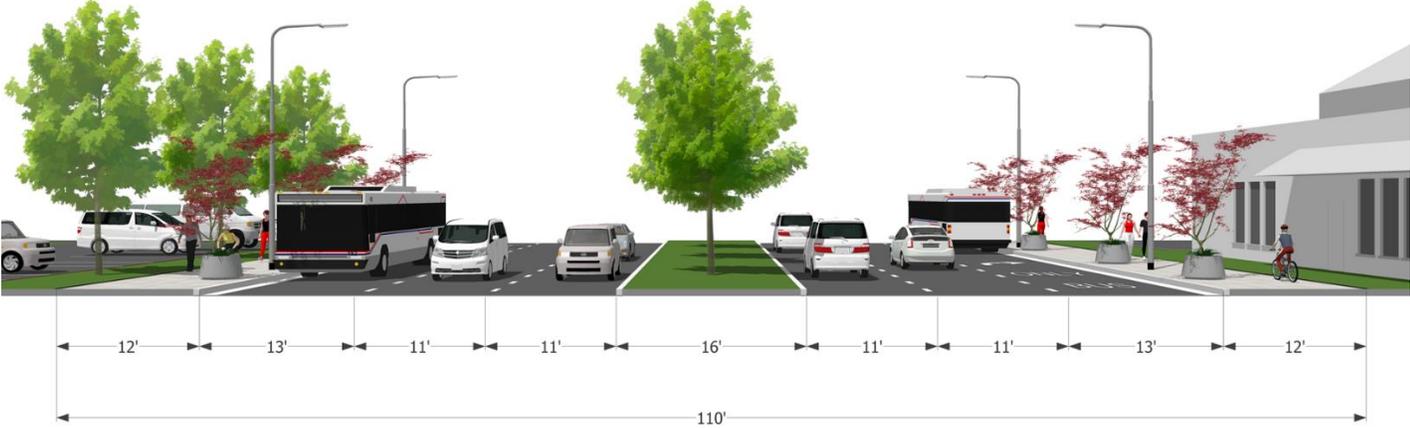


Figure 12: Alternative B cross section

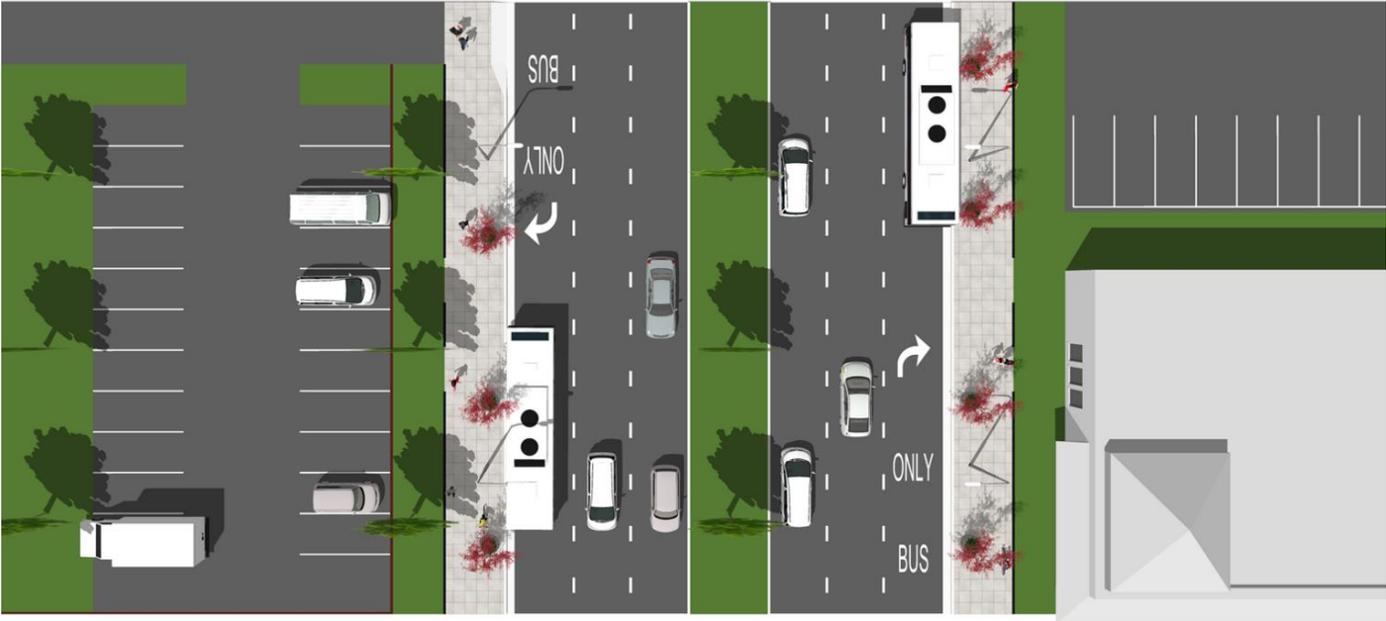


Figure 13: Alternative B aerial view

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Alternative C: Post-development Capital Project

Alternative C consists of widening the sidewalk 6' into the outside lane after redevelopment. This would be in addition to development widening their sidewalks to the current 12' standards and result in an 18' sidewalk that can accommodate more placemaking components such as plantings and street furniture and permitted private uses such as café seating. It should be noted that additional maintenance costs would also be incurred with any design that places features such as trees or street furniture in the furnishing zone of the widened sidewalk. Though a greater cost, the investment in trees would add significantly to the comfort and vitality of a re-imagined Blackstone Avenue.

The space at the roadway edge could also, instead, serve as an intermediate- or sidewalk-level separated bike lane. Alternative C would be a major capital expense to the City (and any project partners) and a long-term project that could be a response to increased pedestrian activity as a result of redevelopment. The city could also potentially use banked development fees to fund, or partially fund, this development-supportive project in the right-of-way.

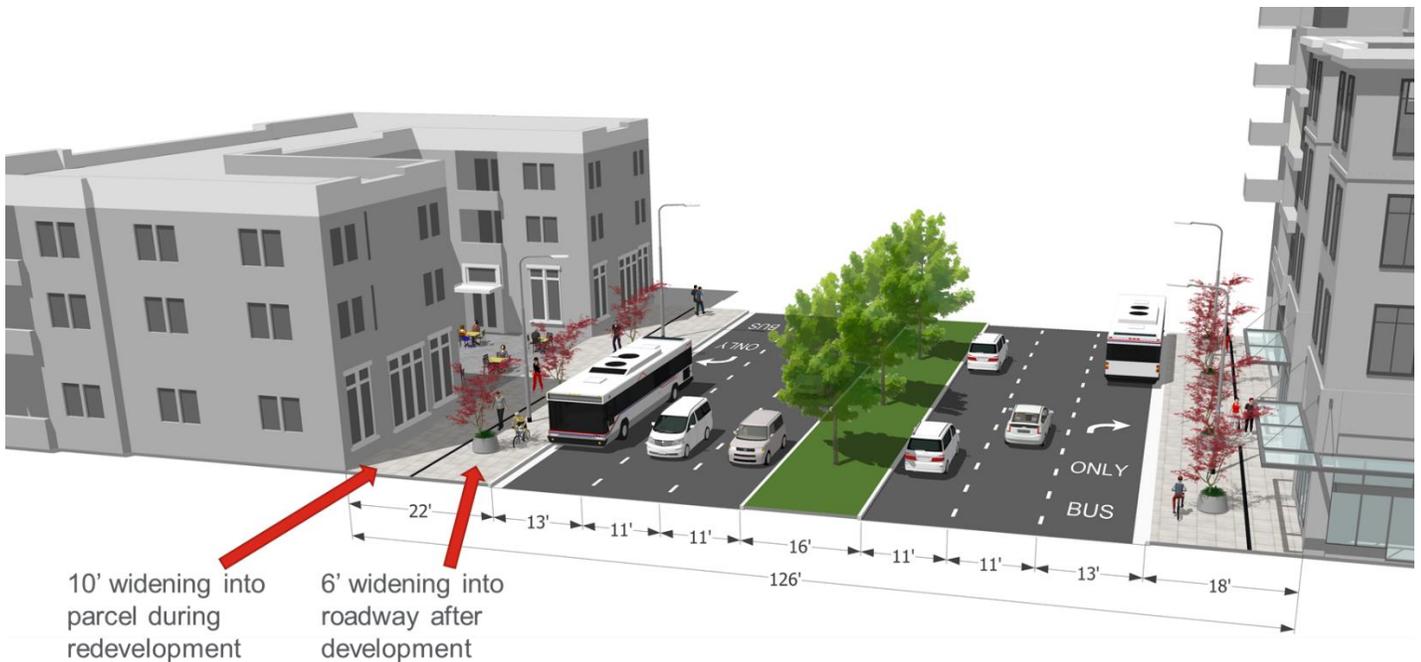


Figure 14: Alternative C axonometric view

BLACKSTONE SHAW ACTIVITY CENTER STUDY

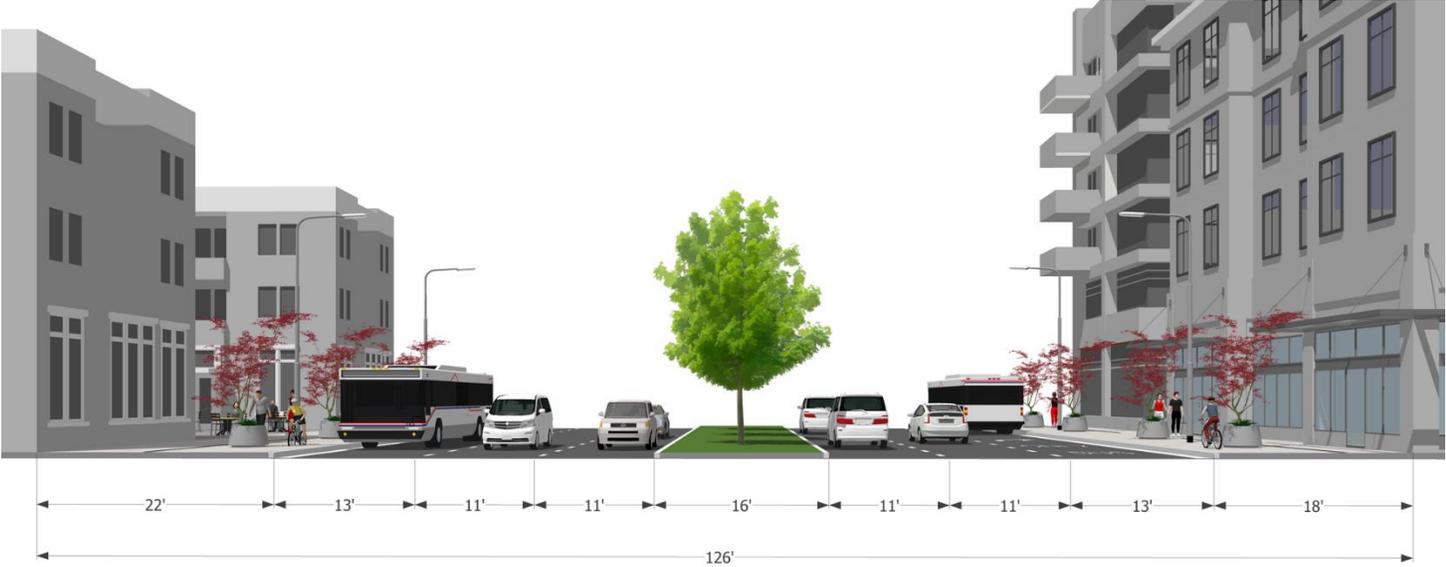


Figure 15: Alternative C cross section

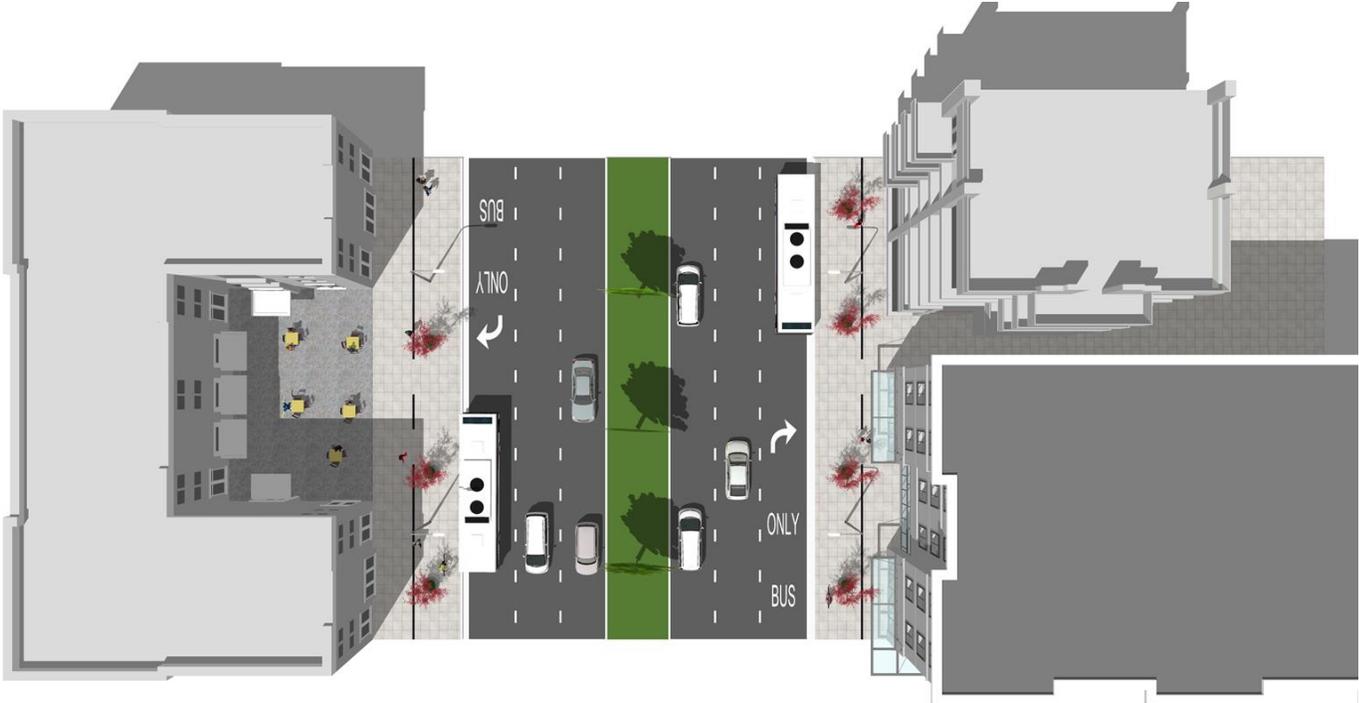


Figure 16: Alternative C aerial view

BLACKSTONE SHAW ACTIVITY CENTER STUDY

PEDESTRIAN IMPROVEMENT COSTS

The following are estimated pedestrian improvement costs.³ These costs can help the City of Fresno and developers understand the level of investment needed to support envisioned redevelopment along the Blackstone corridor.

	Cost	Length	Assumptions
<i>Alternative A: Through Development</i>	\$71,000/parcel approx. \$2,000,000 for corridor ⁴	Per parcel, 6' into parcel	Average parcel frontage of 250'; clearing and grubbing and removal of hardscape 8' into parcel, construction of sidewalk, 25% for soft costs, and 30% contingency
<i>Alternative B: Pre- development Capital Project</i>	\$3,100,000	Corridor-length; Blackstone from Barstow Ave to Santa Ana Ave	Demolition and reconstruction of curb, demolition of 8' of roadway, updating of drainage system, trees in planters at approximately 30' spacing, 25% for soft costs, and 30% contingency.
<i>Alternative C: Post- development Capital Project</i>	\$3,100,000	Corridor-length; Blackstone from Barstow Ave to Santa Ana Ave	Demolition and reconstruction of curb, demolition of 8' of roadway, updating of drainage system, trees in planters at approximately 30' spacing, 25% for soft costs, and 30% contingency.

³ This opinion of probable construction cost was developed by identifying pay items and establishing quantities based on the current draft concept documents. Additional pay items have been assigned approximate lump sum prices based on a percentage of the anticipated construction cost. Preliminary cost opinions include a contingency to cover items that are undefined or are typically unknown prior to final design.

Unit costs are based on 2020 dollars and were assigned based on historical cost data from sources listed by each item in the Bid Items tab. This cost opinion does not include easement and right-of-way acquisition; permitting, inspection, or construction management; escalation; or the cost for ongoing maintenance. This cost opinion is provided for the Client's information, and is based on the design professional's recent experience, adjusted for factors known at the time of preparation. Toole Design Group, LLC has no control over the cost of labor and material, competitive bidding, or market conditions; and makes no warranties, expressed or implied, concerning the accuracy of the opinion as compared to actual bids or cost to the Client. Detail sheets on opinions of probable cost accompany this document in an Excel spreadsheet.

⁴ Note that if the recommendation to revisit development standards is enacted and building sidewalk 10' into the parcel is required, the per-parcel cost would be approximately \$111,000, and the full corridor cost would be approximately \$3,100,000.

III. BICYCLE INFRASTRUCTURE CONCEPTS

BICYCLE FACILITIES FOR THE STUDY AREA

Neither Blackstone nor Shaw Avenues are planned for bicycle facilities in the City of Fresno Active Transportation Plan. However, without a bike facility in place, people will continue to ride on sidewalks, and given the speed and volume of traffic, most people would not be comfortable riding in a standard Class II bike lane either.

The Southern Blackstone Avenue Smart Mobility Strategy recently completed by the City of Fresno recommends a Class IV separated bike lane or Class I shared use path for the length of that project area. The following section presents information about separated bike lane best practices, several options for implementation on Blackstone Avenue, and opinions of probable cost for these options.



Figure 17: Existing conditions along Blackstone with cyclist riding on sidewalk

AREA BIKE NETWORK

Blackstone Avenue connects to bike lanes on Barstow Avenue and is planned to have separated bike lanes or a shared use path from Dakota Avenue to Highway 180 (approx. 1.3 miles south of the study area). Figure 18 shows that there are planned parallel bikeways on Del Mar and Maroa Avenues that would provide through routes but would not provide access to businesses and new development on Blackstone Avenue.

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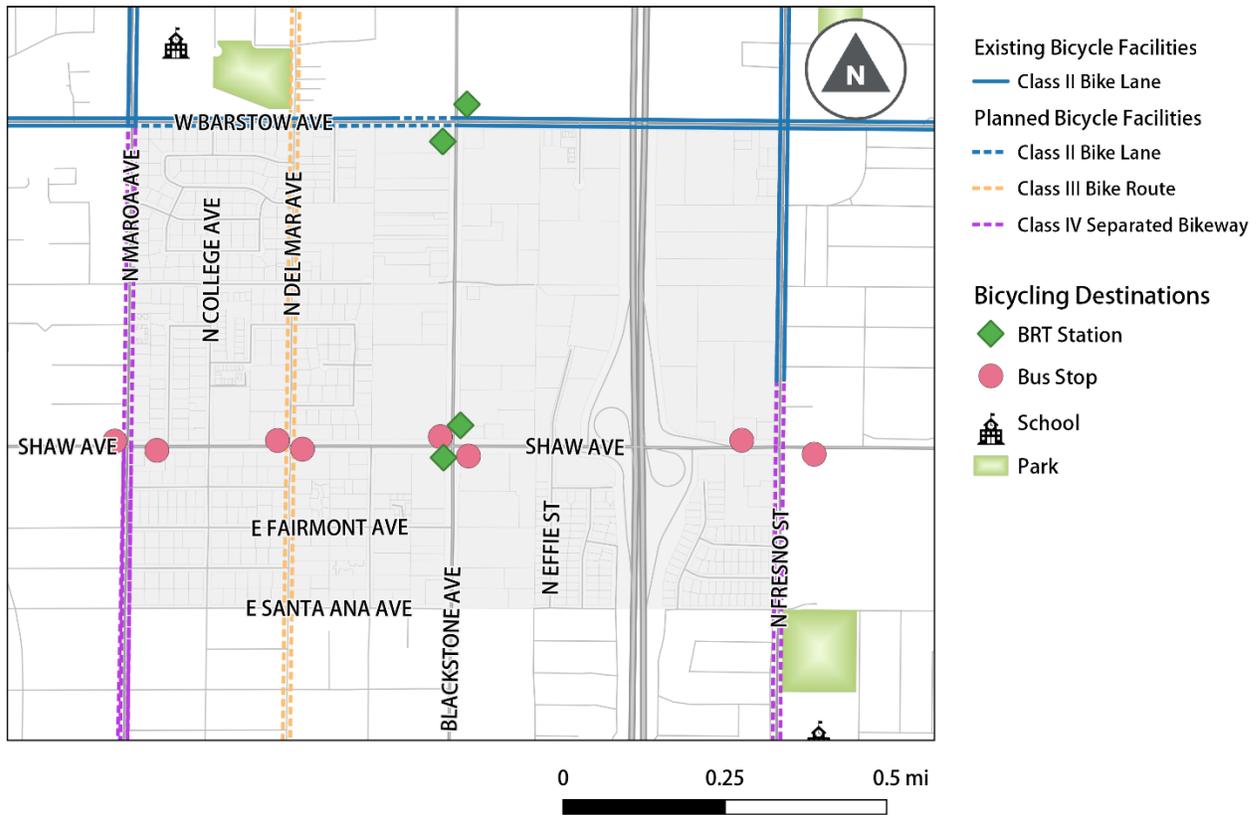


Figure 18: Area Bicycle Network

BICYCLE AND PEDESTRIAN PROJECT INTERACTION

The bicycle facility options presented in the following sections are independent of Alternatives B for pedestrian infrastructure presented in the prior section. Note that sidewalk widening into the roadway as presented in Alternative B precludes the addition of a bicycle facility without further space reallocation. Alternative C in the pedestrian infrastructure section is consistent with Alternative C below and presents the option of a sidewalk- or intermediate-level separated bike lane.

WHAT IS A SEPARATED BIKE LANE?

Separated bike lanes (SBLs) are on-street bicycle facilities that are physically separated from vehicular traffic. They can be one-way or two-way. Physical separation comes in many forms, including plastic bollards and striping, planters, parking lanes, concrete medians, landscaped medians, and vertical separation (i.e., sidewalk- or intermediate-level SBLs).

Numerous configuration options mean that SBLs can be constructed quickly with lower cost materials or on longer construction timelines with higher cost, more permanent materials, depending on available resources.



Figure 19: Example of a separated bike lane.

Intersections

Separated bike lanes should be extended to intersections to maintain bicyclist comfort and protection. At intersections, corner islands provide a protected space for bicyclists to queue and wait for a green signal.

Through intersections, SBLs are oftentimes phase-separated from conflicting turning vehicle movements to separate bicyclists and vehicles temporally. Large intersections with heavy traffic volumes like Blackstone/Shaw necessitate phase-separation.

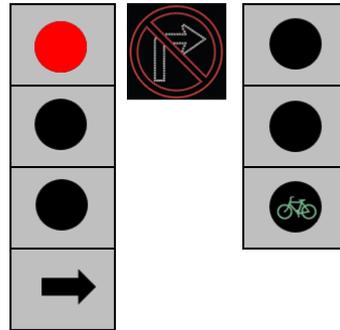


Figure 20: A separated bike lane in an intersection (left), and a graphic of a bicycle signal to protect bicyclists from right-turning traffic (right).

Driveways

Driveways are conflict zones between turning vehicles and through bicyclists; green pavement markings are oftentimes used at driveways to increase driver and bicyclist awareness of potential conflicts.

Separated bike lane protection buffers must temporarily end at driveways to allow vehicle access to properties. SBLs are less comfortable at driveways since they are not protected; therefore, driveway width and density should be limited through access management to preserve the comfort of the SBL. For example, the three driveways accessing the strip mall on the southeast corner of Blackstone/Barstow could be consolidated into a single driveway given that there is also access via Barstow Avenue.



Figure 21: A driveway and a separated bike lane.

Transit Stops

Transit stops are another type of conflict zone between bicyclists and vehicles where buses must access the curb for boarding/alighting. Different transit stop configurations can be used to manage or mitigate transit/bike conflicts including:

- Unprotected mixing zone (one-way SBLs only, see Figure 22)
- SBL protected by transit boarding island (one-way or two-way SBLs, see Figure 23)

BLACKSTONE SHAW ACTIVITY CENTER STUDY

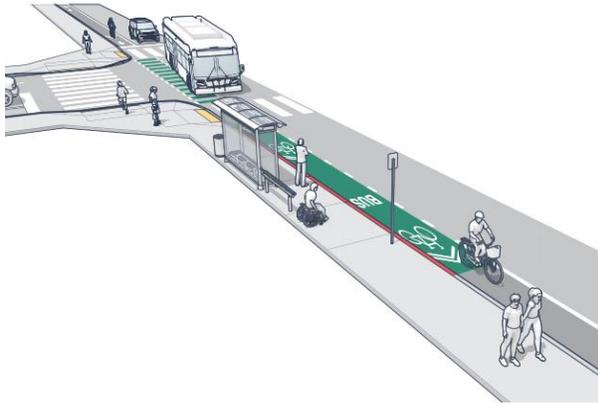


Figure 22: Unprotected mixing zone between separated bike lane and transit stop.

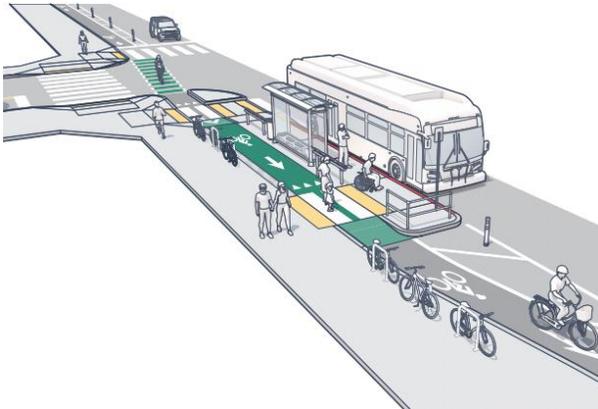


Figure 23: Separated bike lane protected by transit boarding island.

SEPARATED BIKE LANE ALTERNATIVES

The following alternatives provide viable options to implement separated bike lanes on Blackstone Avenue.

Low-Cost

The low-cost SBL alternative includes a striped buffer with plastic flexposts. At bus stops, the SBL transitions to a mixing zone.

The benefits include:

- Quick to implement
- Inexpensive to construct
- Easy to modify
- Proof of concept opportunity

Drawbacks include:

- Separation style of paint and flexposts offers less user comfort than more robust materials
- Less aesthetically attractive buffer materials
- Mixed bus/bike traffic at bus stops exposes bicyclists to additional conflict with vehicles, reducing bicyclist comfort
- Creates more conflicts for bus operators to navigate.

The estimated cost for a flexpost separated bike lane with bus mixing zone is **\$427,000**. This includes installation of striping and flexposts, bus stop conflict markings, and removal and replacement of turn arrows as appropriate.



Figure 24: A separated bike lane with delineator posts (top); a shared bike lane and transit space (bottom).

Mid-Cost

The mid-cost SBL alternative includes a striped buffer with plastic flexposts. At bus stops, the SBL ramps up to sidewalk level and wraps behind the transit shelter to create a shared pedestrian/bicycle zone. This would require widening the sidewalk by 8 feet (minimum) into private property.

The benefits include:

- Separation between bikes and transit vehicles at bus stops

Drawbacks include:

- Separation style of paint and flexposts offers less user comfort than more robust materials
- Less aesthetically attractive buffer materials
- Mixed ped/bike traffic at bus stops
- Sidewalk widening construction and easement/ROW acquisition more expensive than mixing zone

The estimated cost for a flexpost separated bike lane with bikes wrapping behind the bus stop is **\$509,900**. This includes installation of striping and flexposts, removal and replacement of turn arrows as appropriate, 8' concrete sidewalk for bikes behind shelter, asphalt ramps to access sidewalk, and



Figure 25: A separated bike lane transitioning to from on street to shared path/sidewalk behind a transit stop.

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appropriate markings. Cost estimates do not include the acquisition cost of approximately 1,440 s.f. (i.e., 480 s.f. per bus stop) of right-of-way for bikes to wrap behind the bus stop.

High-Cost

The high-cost SBL alternative includes a protective buffer comprised of a concrete median. At bus stops, curb lines are reconstructed to create a 10' wide bus boarding island adjacent to an 11' transit lane. The SBL ramps up to sidewalk level and wraps behind the boarding island. The sidewalk is relocated away from the boarding island to accommodate the SBL. Twelve feet is the preferred minimum width of the sidewalk and one-way SBL, with visual and physical delineation between the two.

Benefits include:

- Concrete median separator, which feels more comfortable to a wider variety of bicyclists
- More aesthetically attractive buffer materials
- Separation of all modes at bus stops

Drawbacks include:

- Slowest to implement
- Most expensive
- Difficult to modify

The estimated cost for a concrete curb separated bike lane with floating bus stop is **\$1,215,000**. This includes pavement removal and installation of 3' concrete curb median (with breaks for drainage flow), 6' wide asphalt trail behind bus shelter, 6' concrete sidewalk behind bike lane, appropriate markings, and tactile strips. The estimate also includes a 60% contingency (significantly higher than normal) to approximate accounting for the cost to relocate all of the BRT station amenities (shelter, pay station, etc.) to the new boarding island location. Cost estimates do not include the acquisition cost of approximately 2,160 square feet (sq.ft.) (i.e., 720 sq.ft. per bus stop) of right-of-way for the bike lane and sidewalk to wrap behind the bus stop.



Figure 26: A concrete curb-separated bike lane (top); bike lane bending out to traverse behind transit boarding island (bottom).

BICYCLE IMPROVEMENT COSTS

The costs included above should be used for planning purposes. All estimates are for one-way SBLs on each side of Blackstone Avenue from Barstow Avenue to Santa Ana Avenue and include green pavement markings at conflict areas, bike lane symbol markings, bike lane signage, and a bike signal at Shaw Avenue. Estimates do not include right-of-way acquisition costs. Detail sheets on opinions of probable cost accompany this document in an Excel spreadsheet.

All estimates use the following percentage cost assumptions:

- Percentage of materials cost: 8% for drainage, 10% for mobilization
- Percentage of materials plus above: 25% soft costs, 30% contingency

IV. TRAFFIC ANALYSIS

TRANSPORTATION IMPROVEMENTS ASSESSED

The traffic analysis included the addition of the following projects as improvements in the study area:

- Converting the outside motor vehicle lane on Blackstone Avenue in each direction to business access and transit (BAT) lanes
- New traffic signals at the following intersections
 - Blackstone Avenue & the Yosemite Falls Driveway
 - Blackstone Avenue & Santa Ana Avenue
 - Shaw Avenue & Effie Street
 - Pedestrian half-signal at Shaw Avenue & Glenn Avenue
- Leading pedestrian intervals for the signalized intersections of Blackstone Avenue between San Jose Avenue and Santa Ana Avenue

PURPOSE

The purpose of this traffic analysis is to assess the impacts of transportation projects that would improve access to parcels with redevelopment plans and to improve multimodal travel in the study area. Projects were identified through conversation with stakeholders and by consultant team's assessment of existing multimodal transportation environment. The traffic analysis specifically assessed impact on queue lengths and intersection operations.

GROWTH ASSUMPTIONS

FUTURE DEVELOPMENT

Based on known in-process redevelopment activity within the study area, an estimate of new development was established, consisting of 383 new residential units, 148,700 square feet of new retail space, and 75,600 square feet of new office space. This new development is expected to generate 8,435 net new daily trips and up to 823 new trips during the highest peak hour. Details on the methods and assumptions used for traffic generation calculations are included in the Appendix A: Traffic Analysis.

GROWTH EVALUATION

Several scenarios were evaluated. These included:

- » Near-term: current volumes plus known in-process development trips identified above
- » Near-term plus project: above, plus transportation projects
- » Cumulative: Fresno COG traffic model year 2042 volumes plus known in-process development trips
- » Cumulative plus project: above, plus transportation projects

The growth assumptions result in a conservative traffic growth scenario by layering the BSAC development changes on top of the 2042 Fresno COG model build-out scenario which already accounts for growth in the area consistent with the City of Fresno General Plan. This may result in expected traffic growth being overestimated by duplicating potential land use changes.

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Additionally, no trips were reduced to account for pass-by trips, internal trip capture related to the mixed-use development, or proximity to the FAX Q bus rapid transit service.



POTENTIAL BENEFITS

PEDESTRIAN

Pedestrian connectivity within the study area will improve with new signalized crossings at the pedestrian half-signal and new traffic signals. Additionally, leading pedestrian intervals would also help reduce potential vehicle-pedestrian conflicts by giving pedestrians a “head-start” crossing at the signals along Blackstone Avenue.

TRANSIT

The BAT lanes on Blackstone Avenue will help improve transit reliability along the corridor by reducing the number of vehicles sharing the lane with the BRT service.

AUTOMOBILE

Several intersections within the study area would have a better level of service (lower congestion) as a result of signal timing changes and the new signals reducing the delay associated with unsignalized minor street turn movements. Some intersections within the BSAC study area would operate below the City of Fresno’s level of service standards for congestion during peak hours.

Access to the parcels within the BSAC study area would be improved with the additional traffic signals and the BAT lane by easing turn movements into and out of the parcels. Vehicle queuing at several intersections within the study area may exceed available storage and could result in queues spilling back through the upstream intersection.

Benefits and Impacts Summary

Traffic operations will reduce delay at some intersections while others will exceed the City of Fresno level of service standards at others. There are potential queuing impacts at Effie Street & Shaw Avenue, as well as Blackstone Avenue and Shaw Avenue. The following table summarizes these potential benefits and impacts.

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Intersection	Existing Conditions	2042 Conditions
Blackstone Ave & Shaw Ave	--	x*
Glenn Ave & Shaw Ave	✓	✓
Effie St & Shaw Ave	✓*	✓*
Blackstone Ave & Yosemite Falls Dwy	--	✓
Maroa Ave & Shaw Ave	--	✓
Fresno St & Shaw Ave	--	✓
Blackstone Ave & Barstow Ave	--	x

Figure 27: Potential benefits and impacts to automobiles

- ✓ Potential Delay Benefit
- x Potential Delay Impact
- * Potential Queueing Impact

FEASIBILITY

ADDITIONAL ANALYSIS

The following outlines the need for additional analysis for aspects of improvement projects.

- » BAT lanes and traffic signals: More detailed analysis may be necessary to determine corridor-wide impacts beyond the BSAC study area. As well, analysis is required to determine the full impact of the BAT lanes on transit operations
- » Traffic signals: Need to meet California MUTCD warrants before moving forward
- » Additional analysis could also help determine the extent of any queuing or congestion along the corridor and help determine any required signal retiming, signal progressions to minimize congestion-related impacts, and where turn pockets may need to be extended to accommodate longer queues

CONTINGENT IMPROVEMENTS

Traffic signals and the pedestrian hybrid beacon improvements may be contingent on new development within the BSAC study area that:

- » Generates additional automobile and pedestrian trips to meet warrants
- » Contributes funding for these high-dollar pieces of infrastructure

Caltrans does not currently support signalization at Shaw Avenue & Effie Street due to the potential for queue spillback and impacts on the State Route 41 on- and off-ramps on Shaw Avenue. Any signalized improvement at this intersection will need to clearly demonstrate that impacts to State Route 41 can be avoided and will be contingent on Caltrans approval.

TIMELINE HORIZON

Leading pedestrian intervals are more easily implemented on a shorter time horizon because they require minor signal timing adjustments or limited signal modifications.

Other projects would likely be implemented on a longer time horizon. New traffic signals, the pedestrian hybrid beacon, and the BAT lane would take further study and more time to meet applicable warrants, engage the community in the proposed changes, and develop improvements' designs.

V. PROJECT FUNDING OPTIONS

The following sections provide an overview of funding sources, and their respective improvements. A summary of these funding sources can be found in Figure 28.

CITY FUNDING AND DEVELOPER FUNDING

City-funded projects may receive funding from a variety of sources, and the City may also partner with other agencies such as Fresno COG to pursue project funding. Projects in this area may also be funded by developers and constructed as part of development either on site or to improve transportation functions nearby, or developers may pay in lieu fees to construct these improvements

ACTIVE TRANSPORTATION GRANT FUNDING SOURCES

The following are sources of funding and their specific funding programs. City dollars can be used to match these regional, state, and federal funding sources.

Caltrans

- » Active Transportation Program
- » Sustainable Communities Planning Grant

USDOT

- » Congestion Mitigation and Air Quality Improvement Program

Fresno County Transportation Authority

- » Measure C Transit Oriented Development Program
- » Measure C Extension for:
 - Street Maintenance and Rehabilitation
 - Flexible Program
 - ADA Compliance
 - Bicycle Facilities

STATE GAS TAXES FOR TRANSPORTATION PURPOSES

The following are sources of funding from the state gas tax, to be used for transportation purposes.

- » Special gas tax, exclusively for traffic signals and streetlights
- » Proposition 111, Street Maintenance for street TSSL operations and capital grant match
- » BX8 6 Gas Tax, Street Maintenance operations and the Neighborhood Street Program
- » SB 1 Gas Tax, received on a per capita basis, used primarily for Street Maintenance operations and capital projects

Figure 28: Sources of funding

Funding Sources	Administering Agency	Availability of Funding	Notes	Eligible Improvements	Weblink
Federal Funding (Administered Locally)					
<i>Surface Transportation Block Grant</i>	FHWA, FAST Act Program administered through the Fresno Council of Governments	Every two years	Projects must be in the Statewide Transportation Improvement Program (STIP) and be consistent with the Long-Range Statewide Transportation Plan and Metropolitan Transportation Plan. May require 11.47% local match.	Bicycle facilities, including trails	2019 application guidelines are here - https://www.fresnocog.org/wp-content/uploads/2016/06/A.-2019-20-Final-STBG-Guidelines.pdf
<i>Congestion Mitigation and Air Quality Program</i>	FHWA, FAST Act Program administered through the Fresno Council of Governments	Every two years	Projects approved the Fresno COG Policy Board are included in the Federal Transportation Improvement Program (FTIP) prior to federal reimbursement. The 2019-2020 CMAQ Call for Projects covers two years in the FTIP, 2020-2024. May require 11.47% local match.	Pedestrian and bicycle facilities eligible if they demonstrate impact of decreasing emissions	2019 application guidelines are here - https://www.fresnocog.org/project/congestion-mitigation-air-quality-cmaq-program/
State Funding Sources					
<i>California Active Transportation Program</i>	California Transportation Commission	Varies; Cycle 5 call for applications expected in the spring 2020	Consolidated several older grant programs, including State SRTS and Bicycle Transportation. Funds range of capital and non-capital projects. Some preference given to projects in disadvantaged communities. The state program is competitive among jurisdictions statewide; the regional program is competitive among Fresno Council of Governments member agencies.	Bikeways, crossing improvements and most programmatic activities (e.g., encouragement, education, and enforcement), and plans (including active transportation plans and Safe Routes to School plans)	https://dot.ca.gov/pr ograms/localassistance/fed-andstateprograms/activetransportationprogram/cycle5
<i>California Proposition 68 (Parks and Water Bond)</i>	California Department of Parks and Recreation	Amount available is \$395,333M; grant applications should be	Eligible projects are from the Statewide Parks Program (SPP)	A variety of park facilities and types, including linear greenbelt parks, nonmotorized	https://www.parks.ca.gov/pages/1008/files/Final_Prop._68_SPP_A

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Funding Sources	Administering Agency	Availability of Funding	Notes	Eligible Improvements	Weblink
<i>Act of 2018), Statewide Parks Program (SPP)</i>		between \$200K and \$8.5M Round Four may occur in 2020		trails, pedestrian and bicycle bridge	pplication Guide 1.22 .2019.pdf
<i>California Office of Traffic Safety Grants</i>	California Office of Traffic Safety	Annually; applications due January 30.	For traffic-safety education, awareness and enforcement programs aimed at drivers, pedestrians and bicyclists.	Certain activities under the SRTS, safety/education and enforcement programs.	https://www.ots.ca.gov/grants/
<i>Highway Safety Improvement Program</i>	Caltrans	Varies; From one to two years. Cycle 10 expected April or May 2020	For projects and programs that reduce traffic fatalities and serious injuries by correcting or improving a specific problem. Highly competitive at the state level.	For projects and programs that reduce traffic fatalities and serious injuries by correcting or improving a specific problem. Highly competitive at the state level.	https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/highway-safety-improvement-program
<i>Affordable Housing and Sustainable Communities Program</i>	California Strategic Growth Council	Annually; next call for projects slated for November 2019 with applications due February 2020	Projects that facilitate compact development, including bicycle infrastructure and amenities, with neighborhood scale impacts. Available to government agencies and institutions (including local government, transit agencies and school districts), developers and non-profit organizations.	Bikeways and pedestrian improvements, particularly those in the area covered in specific plans. Must be paired with affordable housing development, cannot be submitted as a standalone project.	https://sgc.ca.gov/programs/ahsc/
<i>Sustainable Transportation Planning Grants</i>	Caltrans	Annually; last round due October 2019	Funds for communities to do planning and studies to identify and evaluate projects, including conducting outreach or implementing pilot projects.	Planning, community engagement, studies to improve bicycle and pedestrian connections.	https://dot.ca.gov/programs/transportation-planning/regional-planning/sustainable-transportation-planning-grants

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Funding Sources	Administering Agency	Availability of Funding	Notes	Eligible Improvements	Weblink
<i>Urban Greening Grants</i>	California Natural Resources Agency	Annually; Round 4 call for applications anticipated March 2020	A statewide program that allocates cap-and-trade dollars to projects that reduce greenhouse gas emissions.	Projects that reduce commute vehicle miles traveled by constructing bicycle paths or lanes, or pedestrian facilities that provide safe routes between residences, workplaces, commercial centers, and schools.	https://resources.ca.gov/grants/urban-greening/
<i>State Transportation Improvements Program</i>	California Transportation Commission	Every 2 years	Projects need to be nominated in Regional TIP, but MTC may nominate fund categories.	Any transportation project eligible for State Highway Account or Federal Funds	https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/state-transportation-improvement-program
<i>California Gas Tax</i>	California Transportation Commission	Annually	Ineligible expenses include decorative lighting, transit facilities, park features, and new utilities.	Construction, engineering, and maintenance	https://sco.ca.gov/Files= AUD/gas_tax_guidelines31219.pdf
<i>Transformative Climate Communities Program</i>	California Strategic Growth Council	Annually	Program's first year was 2017. Program focus is on reducing greenhouse gas emissions, improving public health, create economic opportunity, especially in disadvantaged communities. Fresno received a \$66.5 million grant in the program's first round.	Bicycle and pedestrian facilities, affordable and sustainable housing developments, transit stations and facilities, bicycle and car share programs, residential weatherization and solar projects, water-energy efficiency installations, urban greening, low-carbon transit vehicles and clean vehicle rebates, and health and well-being projects.	https://sgc.ca.gov/programs/tcc/resources/application.html

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Funding Sources	Administering Agency	Availability of Funding	Notes	Eligible Improvements	Weblink
Regional and City Funding Sources					
<i>Measure C, Transit Oriented Infrastructure</i>	Fresno Council of Governments	Annually	Program created in the 2006 Measure C Extension Plan. TOD allocation support community-based transit projects aimed at increasing transit use.	Transit facility improvement, bicycle and pedestrian facility improvements, public plaza, streetscape enhancements.	https://www.fresnocog.org/measure-c-transit-oriented-development/
<i>Measure C, Local Transportation Program</i>	Fresno County Transportation Authority	Project funding decisions made by the FCTA Board	The Measure C Extension Plan provides multi-modal funding from a percentage of local sales tax revenue in three programs: public transit, local transportation, and regional transportation.	The Local Transportation Program funds various projects including street maintenance and rehabilitation, ADA Compliance, and pedestrian trails and bicycle facilities.	City 2020 Adopted Budget, page 21 - https://www.fresno.gov/finance/wp-content/uploads/sites/11/2019/10/FY2020AdoptedBudgetUpdated2.pdf
<i>Regional Sustainable Infrastructure Planning Grant</i>	Fresno Council of Governments	Annually; Cycle 3 grant application deadline was August 1, 2019	Program objective is to encourage local and regional multimodal transportation and land-use planning and addresses the needs of disadvantaged communities.	Planning studies, safe routes to school plans, complete streets plans, bicycle and pedestrian plans with safety enhancement focus (including Vision Zero).	https://www.fresnocog.org/project/fresno-cog-administered-grant-programs/
Local Funding Sources					
<i>Pedestrian and Bicycle Facility</i>	City of Fresno	Annual	This program in the Public Works Department implements and maintains walking and bicycling facilities. Funds can be used as match for grants.	On-road bicycle facilities and pedestrian infrastructure.	
<i>General Fund</i>	City of Fresno	Annually	A component of local general funds can be dedicated to transportation improvements through allocations to the City's Public Works, Parks and Recreation, or Police Departments. There are generally few restrictions on these funds.	Operating expenses such as staff time, outreach and education materials, facility maintenance and other small capital expenses	

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Funding Sources	Administering Agency	Availability of Funding	Notes	Eligible Improvements	Weblink
<i>Municipal Bonds</i>	City of Fresno	n/a	Cities have the authority to issue municipal bonds to finance infrastructure projects.	All transportation improvements	
<i>Parking Benefits</i>	City of Fresno	n/a	Parking Benefit Districts can finance infrastructure improvements in popular employment or commercial centers by dedicating parking fee and ticket revenue to bicycle and pedestrian enhancements. Within a parking benefit district, public parking spaces (on- and off-street) are charged hourly rates to aid turnover of spaces for customers.	Bikeways and crossing improvements	
Other Funding Opportunities					
<i>Other Local foundations, health organizations, and businesses</i>			Local Foundations, Health Organizations, and Businesses can be good sources of funds for education and outreach, however, may not be suitable for the larger funding needs for trail network expansion.		

VI. NEXT STEPS

The results of this study will be used by Fresno COG, the City of Fresno, developers, and other stakeholders to move a vision of a vibrant Blackstone Shaw Activity Center forward. Fresno Metro Ministry/Better Blackstone CDC will continue to provide engagement work for this effort as they have throughout the development of this study.

Funded by Caltrans and in partnership with Fresno COG and many others, Metro/BBCDC is now conducting the Better Blackstone Design Challenge, focused on crafting design scenarios for mixed-use TOD development on over 500 mixed-use zoned parcels on Blackstone between Barstow Avenue and Hwy 180

Major community open houses to share ideas and images, and receive property owner, business, and community resident input are planned for August and fall 2020.

APPENDIX A: TRAFFIC ANALYSIS

APPENDIX B: BETTER BLACKSTONE DESIGN CHALLENGE – DESIGN PRINCIPLES